ORGANIZING FOR CHANGE IN A CRIMINAL JUSTICE TECHNOLOGY DEVELOPMENT AGENCY

by

David G. Boyd

MA, University of Illinois at Chicago, 1978
MBA, Golden Gate University, 1974
BA, University of Illinois, Champaign, 1969

Submitted in Partial Fulfillment of the Requirements for the Degree of
Doctor of Philosophy in Applied Management and Decision Sciences

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This research employs an embedded case study to examine the technology development efforts of a federal criminal justice research agency during two different organizational phases–as the National Institute of Law Enforcement and Criminal Justice (NILECJ) from 1969 to 1980, and as the National Institute of Justice (NIJ) from 1992 to the present. For analytical purposes, the two organizational phases are treated as separate organizations in this study. An attempt is made to establish (a) whether there are substantial differences between the two organizations; (b) whether the modified second organization was more effective than the first; and (c) whether the identified differences, if any, are sufficient to explain any variations in organizational effectiveness. The study employs a conceptual scheme proposed by T. E. Deal and J. A. Rosaler in 1975, which identifies six key subsystems in any organization: its goals, formal structure, technology, informal norms and processes, environment, and the interactions of these subsystems. The study found that during the NILECJ period the technology program lacked support both within and outside the organization and that constantly changing leadership, missions, and goals made it difficult to develop or maintain a coherent vision or process. In contrast, broad support from the leadership of NIJ's parent organizations (the Office of Justice Programs and Department of Justice) and Congress compensated for much of the instability inherent in the rapid growth of the technology program during the NIJ period. The author suggests that a key element of NIJ's success was its clarity and consistency of vision, mission, and goals; that social and physical science programs coexist uneasily within a single organization, but developing cooperation between the two is an important goal; and that a nonpartisan political posture is critical for organizations of this type.

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Finally, support of an indispensable kind came from the woman who put up with weekend after weekend while her husband pored over arcane documents or was tied to his computer. No one suffered more than she did during the completion of this paper, and no one provided more valuable support. No word but love itself can describe the only occasionally flagging patience with which Carol accepted the temporary primacy of the word processor in her husband's life.

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CHAPTER 1

Introduction to The Study

Introduction

If the Law Enforcement Assistance Administration experience taught the nation nothing else, it demonstrated that changing–much less improving–the way new technologies (used here to refer to products or the direct application of the physical, biological, and engineering sciences) are introduced into U. S. law enforcement is no trivial task. Despite major studies conducted by the Institute for Defense Analysis (Institute for Defense Analysis, 1967), follow up assessments made by the National Academy of Sciences (White & Krislov, 1977), the investment of tens of millions of dollars, and a major review by the attorney general of the United States (National Institute of Justice, 1986), by 1992 law enforcement was still equipped essentially as it had been in 1967. Patrol officers still arrived on the scene typically carrying only a firearm, baton, handcuffs, and a single channel FM radio. Despite the information technology revolution in most of the rest of society, police officers continued to receive their information primarily by voice from a dispatcher talking into a microphone, while tools used to control uncooperative subjects were basically unchanged.

The state of technology in other elements of the criminal justice system was not much better. Courts and prosecutors were even further behind, probation and parole had changed not at all, corrections agencies were just beginning to introduce new technologies, and all were tied inextricably to the most politically visible of the

elements of the criminal justice system: the beat officer in police and sheriffs' departments (National Committee on Criminal Justice Technology, 1998).

Organization of the Study

This chapter reviews the background of the subject of the dissertation and describes the research problem, purpose and significance of the study, the question to be studied, and other relevant defining materials. Chapters 2 and 3 address two principal issues: (a) what is available in the literature, both to lay a foundation for the study and to determine what is already known; and (b) how, methodologically, the study was conducted. The final two chapters provide the details and analytical findings of the two case studies which are the focus of this research, the researcher's conclusions and, where appropriate, recommendations for further research.

Background

It is useful, briefly, to describe some of the characteristics of law enforcement organizations, the application of science in law enforcement, and how technologies have been developed for law enforcement in order to set the stage for an understanding of both the missions and key elements of the environments of the organizations included in the case study. In the law enforcement instance, this is especially important because many broadly held public impressions of the nature of law enforcement are wrong. Former defense industry officials, hundreds of whom have briefed the author about what they believe they can do for the law enforcement community, are especially likely to

harbor misconceptions about the structure and nature of domestic law enforcement. Yet defense industries and the U.S. Department of Defense have–at least since 1967–been viewed as important players in attempts to modernize law enforcement agencies (Law Enforcement Assistance Administration, 1976; National Committee on Criminal Justice Technology, 1998; National Institute of Justice, 1994c).

Characteristics of Law Enforcement

Unlike in national defense, there is no central authority in the United States that directs all law enforcement, either operationally or in terms of research and development. Each law enforcement agency is essentially independent, makes its own decisions about equipment, and makes its own purchases. There is no structure that extends from either the federal or the state level to the local law enforcement agency. Each reports to the governmental entity that created it, hired its employees, and pays its bills. While federal, state, county, and municipal laws affect the operation of local agencies, these laws are often not very extensive and vary substantially among states and lower levels of government (Fyfe et al., 1997). More importantly, law enforcement in the United States is local and predominantly small.

> There is perhaps no area of American government where the principles of federalism are realized more fully than in the area of criminal justice and law enforcement. Criminal law in the United States is primarily and predominantly state law, and most criminal justice activity takes place at the level of local government. (Zenk, 1979, p. 4)

Fully 95% of law enforcement personnel in the United States are in state or local law enforcement agencies (Federal Bureau of Investigation, 1996). As one witness

observed in testimony before Congress, "Federal agencies are rarely the first on the scene for those problems the average citizen is most concerned about: domestic disturbances, rapes, assaults, murders, barroom brawls, drive-by shootings, burglaries, carjackings, robberies and the like" (Boyd, 1995b). In fact, he pointed out, whereas federal agencies "are involved in a dozen or so hostage barricades or barricade operations each year, the New York City police alone are called on to confront this kind of problem several hundred times each year" (p. 6).

More than 90% of the roughly 17,360 law enforcement agencies in the United States employ 24 or fewer sworn officers. Half employ fewer than 12 (Federal Bureau of Investigation, 1996). The situation is not much different in corrections, where over 90% of prison inmates and all the jail inmates (federal prisoners requiring temporary custody are typically held in local facilities under contract) are held in state and local facilities (Bureau of Justice Statistics, 1995). In fact, the largest federal facilities, which rarely house more than 2,000 prisoners, are dwarfed by the Los Angeles County jail, which frequently houses over 20,000 (Bureau of Justice Statistics, 1995).
Most courts, prosecutors and probation and parole agencies are similarly small, with courts and prosecutors in every State and county, and in many municipalities.

Science and Technology in Law Enforcement

In the late 19th century, when Arthur Conan Doyle began to pen his stories about Sherlock Holmes, the idea of using science and technology to combat crime immediately seized the public imagination. Barely 3 years after Doyle's great detective

used the identifying characteristics of a typewriter to catch a criminal (Doyle, 1936), real detectives also began to use the technique (Nash, 1986). Doyle, considered by then the master of science in the pursuit of crime, was even called upon to assist in the investigation of London's most famous killer, "Jack the Ripper" (Nash, 1986). And even in the United States, science and technologies were beginning to make themselves felt in law enforcement.

By 1903, Chief Francis O'Neil of the Chicago Police Department would observe that "those were desperate times for policemen in a hostile country with unpaved streets and uneven sidewalks, sometimes miles from the police station, with little prospects of assistance in case of need," but all that had begun to change because the "invention of the patrol wagon and signal service [had] effected a revolution in police methods" (O'Neill, 1976, p. 7). Not long after, Chief J. H. Haager, of Louisville, Kentucky, proudly reported "that the police department of Louisville is in such a line of progress that we feel ourselves beyond the utility of the horse, and can now boast of three power-driven vehicles" (p. 172). But this promising start at modernizing technologies in law enforcement was not to last.

Nearly 60 years later, a Presidential Commission would observe that "the scientific and technological revolution that has so radically changed most of American society during the past few decades has had surprisingly little impact upon the criminal justice system." Most public and private officials, observed the Commission, had begun routinely to call on the scientific and technical community for independent advice and objective analyses, yet "the public officials responsible for establishing and

administering the criminal law–the legislators, police, prosecutors, lawyers, judges, and corrections officials–have almost no communication with the scientific and technical community." In fact, even though the police had made early use of science and scientific and technological expertise in establishing crime laboratories and radio networks, "most police departments could have been equipped 30 or 40 years ago as well as they are today" (President's Commission on Law Enforcement and Administration of Justice, 1967, p. 245).

To address this issue, a special task force of the President's Commission recommended the creation of a major science and technology development program within a well-funded research institute (Institute for Defense Analysis, 1967, p. 82). Congress responded in 1968 by including within the Omnibus Crime Control and Safe Streets Act of 1968, which created the Law Enforcement Assistance Administration (LEAA), a provision creating the National Institute of Law Enforcement and Criminal Justice (NILECJ). By 1977, the Institute–although primarily a social science research agency–had invested more than $31 million in the development of science and technology for the law enforcement community, with little to show for it (White & Krislov, 1977, p. 147). In 1981, Congress ceased appropriating funds for LEAA. The NILECJ technology program (Diegelman, 1982, p. 1000), which continued despite the disestablishment of LEAA, shrunk quickly to a shadow of its former self. Not for another dozen years would a second major attempt be made to create a Federal structure to drive physical science research and technology development for law enforcement.

In 1992, the Director of the National Institute of Justice (NIJ) decided to expand NIJ's role in the development of new technologies for law enforcement (Charles B. DeWitt, personal communication, September 21, 1992). Although technology was already a part of the Institute's mission (National Institute of Justice, 1994b), it had not been a major part of its portfolio since the demise of LEAA. The director wanted to change that by building a stronger technology component of the Institute, so he reorganized NIJ to include a Science and Technology Division (designated the Office of Science and Technology in 1994). He consolidated in this office the small number of technology projects then underway (including the development of standards for DNA identification technologies, the testing and certification of police soft body armor and the Less than Lethal Technologies Program), which meant the office had a total budget of roughly three million dollars, most of which was earmarked by Congress for the development of less than lethal technologies.

Congress apparently liked this new program, at least in principle, and over the next four years invested nearly five times as much in the development of technologies to support the unique needs of law enforcement as had been invested in the entire twelve-year life of LEAA.

What is paradoxical about these two attempts to improve law enforcement technologies–first under NILECJ from the creation of LEAA until its abolishment in 1979, and then under NIJ from 1992 to the present–is that while the first attempt is widely thought a failure (Diegelman, 1982; Feeley & Sarat, 1980; U.S. House of Representatives, 1977) the second has, so far, received favorable reviews from Congress

(U.S. House of Representatives, 1994; U.S. House of Representatives, 1995) and from the media (e.g., Boyd, 1994; Dederichs & Wolff, 1997; Morrison, 1994; Rao, 1997)[1], yet it is clear that the first attempt actually did produce a small but significant number of technologies to help combat crime, while the second effort has not yet been examined in any systematic way which would allow comparisons among the various incarnations of the program. The national 911 system and bullet-resistant armor, clear examples of the successful deployment of important technology, were both products of LEAA and its technology programs (National Committee on Criminal Justice Technology, 1998).

Technology Development Mechanisms

While the law enforcement community offers a particular case of science and technology management, technology transfer, and technology development, it is still helpful to search the broader literature for material which might apply usefully to the issue under study. Logically, a researcher might began by examining major bibliographies which cover this area, and conduct other searches–such as computer-assisted searches–to see whether relevant information exists.

There are several published bibliographies which touch on various technology topics. Clarke and Reavley (1993) offer a typical example with a listing of more than 10,000 publications concerning science and technology management. Most of these,

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[1]No attempt has been made to list all the media references, on radio, television, and in printed media. The Office of Science and Technology, however, maintains a clipping file and–where possible–tapes of video or radio stories or interviews about the program. Several hundred have appeared.

however, have to do with industrial efforts to manage particular research and development or technology programs, or major defense or energy related research and development operations. None concern themselves with the unique issues involved in developing technology for the law enforcement community. Instead, these articles and those in Dworaczek (1987), Henwood and Thomas (1984), and Taylor (1985), focus entirely on either conventional federal government purchasing or management systems, or on the technology producers themselves. Yet, in many ways, law enforcement agencies resemble a cross between consumer markets–where thousands of individuals make independent purchasing decisions from competing industries–and government, where acquisition rules often make it difficult to quickly make purchases that reliably meet agency needs.

Other writers, such as those included in Golden (1988), provide rich material on a broad range of science and technology issues facing the United States but omit entirely the law enforcement community, principally because their focus is on scientific advice to the Executive, Legislative, and Judicial branches of Congress. This is unfortunate, because Golden declares that his book "has a purpose . . . [which is] to attract attention to the necessity for quality advice on science and technology issues to the President of the United States, to the Congress, and to the Judiciary" (p. 1). The book, nevertheless, provides a stark demonstration of the degree to which national science policies have largely overlooked the role of science in law enforcement.

A final, narrow category of publications–most of which are of fairly recent origin–are largely publications of proceedings of technical conferences in which

specific law enforcement technologies that are either under development or may be of value to law enforcement have been presented. Virtually all of this sort of material has been published since about 1993. Most of these technology conferences are run by organizations such as the International Society for Optical Engineering (Mataloni & Mintz, 1995) or the National Defense Industrial Association (National Training Systems Association, 1997) which, until the collapse of the Soviet Union, were concerned solely with national defense technologies. None of these address either general management or policy issues, but restrict their treatments specifically to the technologies or the specific science behind the technologies.

A number of publications do concern themselves with technologies specifically aimed at the law enforcement community, but generally treat the technologies with little regard for either the manner in which they are or can be developed, or for issues surrounding their actual deployment and use. Boyd (1995a), Larson (1989), Morrison (1994), and others offer popular, rather than scholarly, treatments of particular technologies likely to be of interest to the general public.

The critical question is whether the lessons of the LEAA experience can be useful in more recent, better-funded efforts to develop technologies to combat crime, or whether the same mistakes that have haunted efforts to modernize police equipment will continue to frustrate government.

Statement of the Problem

Twice in the last half century, Congress and the Department of Justice have undertaken to modernize technologies employed to combat crime. The first attempt began with the creation of the National Institute of Law Enforcement and Criminal Justice (NILECJ) within the Law Enforcement Assistance Administration in the late 1960s and effectively ended by 1980. The second began with the creation, in 1992, of the Office of Science and Technology within the National Institute of Justice (NIJ). Neither effort, despite the investment to date of billions of dollars of federal funds through the various LEAA activities, has ever been examined in detail.

The main problem this research attempts to address, therefore, is how an organization, in this instance a particular federal criminal justice technology development agency, has improved its effectiveness over time. Effectiveness in this context is defined as an improved capacity to make modern law enforcement technologies available for use by law enforcement organs of the nation. Accordingly, this research examines the factors explaining the transition from a less to a more effective organization within the realm of structural and strategic changes the organization under study has undergone during the specified time periods.

Purpose of the Study

Despite the fact that there have been two major attempts to develop a national approach to apply the physical sciences to support the operations of law enforcement agencies or to develop and deploy modern equipment or technology to support these

agencies, there has been no comprehensive study of the historical, organizational, or strategy development of either effort. The purpose of the study, therefore, is to:

1. identify the organizational designs, structures, strategies, cultures and management approaches (hereafter referred to, for convenience, as "organizational strategy models") for modernizing law enforcement technology employed by the technology programs during the two organizations under study, the National Institute of Law Enforcement and Criminal Justice and the National Institute of Justice;

2. identify the major strengths and weaknesses inherent in each organizational strategy model;

3. determine the extent of the effects of other relevant organizational variables on the development and implementation of the organizational strategy models; and–most importantly–

4. make a comparative assessment of the effectiveness of these models in identifying, developing, and deploying new or improved technologies to combat crime. is to attempt to fill this gap by answering the three research questions listed in the next section.

In short, this is a study in applied change within an organization that was itself formed to foster change in one of the key institutions in American society–the criminal justice system.

Research Questions

1. What are the main differences, if any, in the organization during the NILECJ and NIJ eras that helped or hindered organizational efforts to modernize technologies for law enforcement?

2. To what extent has the second organization really proved to be more effective than the first, as is commonly believed?

3. If there are clear differences, how well do they explain the difference in the effectiveness of the organizations during the two periods under study?

Significance of the Study

Over the more than 30 years since the publication of the report of the President's Commission on Law Enforcement and Administration of Justice (1967), the United States has invested billions of dollars in the deployment of improved technologies for law enforcement and several hundred million on research and development as part of a massive experiment in social change. The 1997, 1998, and 1999 appropriations each provided more than $500 million for technology grants to states. Over the past 4 years, the annual appropriations for the NIJ science and technology program have increased from just over $4 million to nearly $80 million. In short, by the end of 1998, the NIJ science and technology program had invested nearly $300 million over 4 years in developing new technologies for law enforcement, nearly 10 times the total amount invested by NILECJ over more than 10 years. Making the most effective use of these investments requires that the NIJ, as the agency charged with leading the institutional

change required to encourage the modernizing of law enforcement technologies, have some idea of what failed as well as what worked in earlier efforts in order to avoid making the same mistakes.

The study, therefore, has a significance which is both theoretical and practical. Its theoretical significance lies in the replication of an adapted conceptual model in an empirical domain different from where it was initially used by its original authors, Deal and Rosaler (1975). This framework identifies five principal organizational subsystems which can be applied with equal effect to nearly any kind of organization: (a) the *goals* of the organization; (b) the *formal structure* of the organization; (c) the *organizational technology*[2] it employs to accomplish its mission; (d) the internal, *informal norms and processes* of the organization; and (5) the external *environment* in which it operates.

While no attempt was made to test this formulation directly, this well-defined classification system was employed as part of a comparative case study of the development of the two organizations which are the object of the analysis in order to allow the formation of insights that might be used to better design the present organization.

Remarkably, despite frequent Congressional statements of both criticism and support and the investment of large amounts of money, there has been–save for a single limited National Research Council examination of the National Institute of Law Enforcement and Criminal Justice (White & Krislov, 1977)–no systematic examination

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[2]Deal and Rosaler call this subsystem *technology*, but to avoid confusion, the term has been modified to *organizational technology* in keeping with the definition provided later.

of the organizations or processes used to develop physical science research or technologies for law enforcement (U. S. House of Representatives, 1977, 1994, 1995). The practical significance of this study, then, arises from its contemporary relevance as a study of a nation's attempts to encourage positive change in the way new technologies are developed for law enforcement and possibly for other, similar organizations.

An additional practical significance of the study lies in Chris Argyris' observation that

> it is becoming increasingly clear that modern organizations may not survive unless they are able to innovate. It is equally clear that the costs of innovation are growing rapidly while the useful life span for any new idea is decreasing. Caught in this squeeze, organizations must not only innovate, they must also transform their ideas into . . . products quickly . . . . (Argyris, 1965, pp. 1-2)

Finally, the significance of this study for organizational change is direct, while the potential for social change is indirect but substantial. The direct significance for the organization arises from the degree to which this study provides insights that can be used to improve that organization, while the indirect significance for society comes from the improvements in effectiveness of policing and the safety of the public which are a consequence of the new technologies the organization produces. For example, police soft body armor is a product of the developmental efforts of the organization under study and has been credited with saving over 2,000 police officer lives since its introduction. DNA technology is another important technological contribution and has been instrumental in convicting the guilty. But more importantly, it has also been responsible for exculpating more than 60 individuals convicted of crimes and for preventing miscarriages of justice in dozens of other cases. The indirect impact on

society will depend on the degree to which the success of such technologies change public perceptions of the effectiveness of police.

This study, therefore, is intended to establish a foundation upon which to assess present and future attempts at developing new and improved technologies for law enforcement.

Conceptual Framework

In the study of any complex human organization, a model can be particularly helpful in understanding the organizational development, institutional evolution and related historical information. Such a model is useful because, as Amitai Etzioni (1964) explains, "a system model constitutes a statement about relationships which, if actually existing, would allow an organization to maintain itself and to operate" (p. 19).

But a model for analysis need not (perhaps should not) represent all the complexities of the subject under study. Instead, the criteria employed to select a model should emphasize two key criteria: relevance and economy of representation. The purpose of the model is not to replicate precisely the system being studied, but only to credibly "resemble the empirical system," which is essential to establishing its relevance. This tradeoff is necessary, because to be economical, a "model must in some respect be simpler than the situation modeled" (Deutsch, 1966, p. 16).

Logically, then, a single organizational development model is most appropriate for the examination of two different periods in the history of the organizations under

study because it allows reasonable comparisons to be made. As Knezevich (1975) explains,

> organizations, like individuals, are dynamic. They are born, experience frustrations, mature, and may even pass from the scene. Concern for an organization's life history, sensitivity to the conflicts within that could influence achievement of goals, and restructuring it if need be to enhance its productivity is what [organizational development] is all about. (p. 198)

While there are a number of organizational development models which might be used to study the NILECJ and NIJ organizations, the one developed by Deal and Rosaler (1975) to analyze the complexities of the educational system in the United States seems to offer a particularly good fit because it meets (a) Deutsch's (1966) requirement that the model be "in some respect simpler than the situation modeled " (p. 16); and (b) Knezevich's (1975) insistence on a concern for the life history of the organization being studied and for sensitivity to conflicting subsystems in its management. It is a rich model because it is essentially a systems model in which each of the principal elements of analysis is itself a subsystem of a larger system. Specifically, Deal and Rosaler (1975) argue that contained within educational systems in the United States are five basic organizational subsystems: (a) goals, (b) formal structure, (c) organizational technology, (d) informal norms and processes, and (e) the environment.

These subsystems constantly interact with each other in very complex ways, such that changes in any subsystem will have effects for every other subsystem. They describe these interactions as a "herniae" or "pebble in the pond" theory of organizational change. This construct is not entirely original with Rosaler and Deal and

appears in a variety of forms in the work of a number of different authors, a fact which suggests the concept is a robust one.

Paul Hersey and Douglas Scott presented a similar structure in 1973, crediting most of the inspiration for the concept to a series of earlier lectures delivered by Boris Yavitz, Dean of the School of Business Administration at Columbia University . They described it as a model of "social systems comprising many interrelated subsystems, only one of which is a human/social subsystem" (Hersey, Blanchard, & Johnson, 1996, p. 13).

Depicted graphically as four mutually intersecting circles with the intersections of the circles overlaid on a box labeled "goals," the basic model includes the administrative/structural, economic/technological, informational/decision-making, and human/social subsystems. While either structure could provide a usable conceptual framework for this study, the Rosaler and Deal model is particularly useful because the educational institutions around which it was developed resemble–to a remarkable degree–law enforcement organizations today: a large number of mostly small, essentially autonomous organizations, directed at the local level, personnel intensive, and politically very visible. This basic approach is grounded in systems theory applied to organizations.

This choice of a perspective through which to describe and analyze the development and operation of an organization is important, Deal and Rosaler (1975, p. 5) tell us, because it establishes the frame of reference which, in turn, determines what

questions are asked, how problems are defined, what strategies for change are proposed, selected, and implemented, and the methods that will be used to evaluate the results.

In the Deal and Rosaler taxonomy this study employed, there are five principal organizational subsystems. In addition, the interaction of these subsystems is also treated as a subsystem. Each of these is described briefly below.

Goals

Every formal organization has goals which may or not be explicit. Goals are statements of mission or purpose, which establish the very reason for the existence of the organization. They are essentially philosophical statements, often couched in altruistic language. Goals frequently are not fully articulated and are seldom expressed in terms amenable to measurement (Deal & Rosaler, 1975, pp. 11-12).

There are, however, certain characteristics possessed by goals that can be measured. It is possible, for example, to establish continua against which measurements can be made of (a) the level of consensus on and support within an organization for its goals, (b) the degree of specificity of an organization's goal(s), and the number of goals an organization is attempting to pursue at any given time (Deal & Rosaler, 1975, pp. 11-13). Etzioni (1964, p. 103) describes organizational goals in a similar way, suggesting that they represent "a state of affairs which the organization is attempting to realize [or] . . . an image of a future state, which may or may not be brought about." Katz and Kahn (1978, pp. 42-43) also recognize the importance of goals as a part of any organizational system, and suggest that these goals directly influence both the success and the basic

structure of the organization, while Hodge and Anthony (1988, p. 77) include the goals and objectives of the organization as major components of organizational feedback systems.

Formal Structure

There exists in every organization a formal structure of authority which regulates its operation. It consists of a chain of command, a set of systematic decision processes, and a set of generally prescribed rewards and sanctions, all of which "organizations frequently try to manipulate . . . to achieve their goals" (Baldridge & Deal, 1975, p. 12).

It is, suggest Deal and Rosaler (1975), the structural components of size, differentiation, interdependence, and coordination that provide the framework for measuring the effectiveness of the formal structure of an organization (pp. 15-22). Size matters because it is a major determinant of complexity. Differentiation, which refers to how responsibilities are divided and/or shared within the organization, can be measured either laterally in terms of the distribution of tasks, or vertically in terms of the distribution of authority (p. 16).

Interdependence relates to the degree to which the role of one organizational participant affects that of another. For example, the roles of several different participants can converge simultaneously to achieve a single goal. In other cases, work may flow in a sequence such that one's role begins where another's leaves off. More often, however, roles among subsystems are reciprocal so that the work of one organizational participant may directly affect or be affected by another (Deal & Rosaler,

1975, p. 17). "Without adequate coordination, each role or unit tends to pursue its own subgoals and the organization becomes fragmented. . . . Coordination is the primary organizational mechanism for channeling diverse and specialized contributions into a unified whole" (p. 18).

Coordination is controlled in turn by authority, which is implemented through administrative sanction and applied primarily through the mechanism of evaluation. Policies, procedures, and rules (usually in the form of standard operating procedures or administrative directives), formal meetings, and/or the creation of special coordinating roles or units within the organization are common mechanisms for accomplishing coordination (Deal & Rosaler, 1975, pp. 20-21). Inherent in the notion of coordination is the primacy of the quality and quantity of information emanating from the top administrators within the organization.

Other authors provide support for the formal organization as a subsystem of its own. Etzioni (1964), for example, suggests that the congruence between the goals of an organization and its formal structure heavily influences the effectiveness of the organization. Katz and Kahn (1978) observe that the formal structure of an organization "is the equivalent of the blueprint for the design of a machine that is to be created for some practical objective" (p. 19), but that the totality of what an organization *is* also involves "unforeseen embellishments [that] dominate the organizational structure" (p. 20).

Organizational Technology

The link between the goals of an organization and the actual production of desired results is what Deal and Rosaler (1975) have termed the "technology" of the organization. Technology thus includes both materials and methods (Deal & Rosaler, 1975, p. 14). The importance of technology in this scheme arises from the fact that the structure of an organizational system "is at least partly shaped by its technology, . . . [so that major] changes [also produce] changes in the structure of the organization, or the program will not function well" (pp. 11-12). For a research and development organization, the central organizational technology is the process–which can also be described as an organizational strategy or model–which the organization employs to identify, select and implement its research projects. Hodge and Anthony (1988) also recognize the importance of an organization's technology, but treat it as one of several components of what they term the macro-environment of the organization (pp. 78-79).

Informal Norms and Processes

Depending on the issue, the informal power structure within a complex human organization can often be a more powerful force in the peaceful resolution of that issue than can the formal structure. These informal norms and processes are what constitute the culture of the organization; as employees are enculturated by these norms, their behavior is more or less controlled.

> As individuals relate to each other in small groups there are accepted codes and prescribed patterns for relationships. From these also, individuals derive rewards, and, on the basis of their participation in informal settings, their

> identities and orientations are formed and reformed. (Deal & Rosaler, 1975, p. 23)

The settings in which these informal norms and processes work are more often outside both the normal workday and the workplace. Elite "in" groups, "kitchen cabinets," and casual poker games, or persons who socialize with top administrators, are all examples of settings, some outside the workplace, in which the informal norms and processes subsystem may be at work (Deal & Rosaler, 1975, p. 23). These informal norms and processes are often at odds with the coordination and control mechanisms of the formal structure and thus can directly affect coordination within an organization (p. 23). It was Elton Mayo's (1933) work on the Hawthorne experiments that provided the first scholarly demonstration of the power of the informal group, which both Katz and Kahn (1978) and Hodge and Anthony (1988) highlight as essential elements in understanding organizations. In some cases, informal groups even possess the power to either block management reforms or to increase or reduce worker productivity (Hodge & Anthony, 1988, pp. 49-50).

Environment

Environmental constraints can be classified as either "relevant" or as "remote," depending on the immediacy with which that constraint impinges upon the organization (Deal & Rosaler, 1975, p. 24). But these classifications are impermanent; the organizational environment tends to change over time as new circumstances arise, so what was yesterday a remote environmental issue may suddenly become relevant today.

And since, in large organizations higher levels of management constitute much of the relevant environment for lower levels, personnel changes may also affect the relevance or remoteness of constraints (p. 24).

The Deal and Rosaler environmental subsystem can be further divided into four distinct elements: diversity, activity, stability, and predictability (Deal & Rosaler, 1975, pp. 24-25). The many special interest groups within an organizational environment may, for example, have more or less diversified expectations of mission-related outcomes for the organization. The activity within an environment can be measured on a scale running from active to passive according to how loudly or persistently demands are made for organizational responses. How stable these demands are is a measure of the stability of the environment. In other words, whether the same demands are made year after year or new demands are constantly replacing previous ones affects the stability of the environment. And over time, of course, that tends to mean the predictability of the environment will vary, so that some administrators may be able to reliably forecast how the organization will have to respond over a number of years, while others in different systems may have difficulty projecting even a few days into the future (p. 24). Deal and Rosaler conclude then that "simple environments are uniform, passive, stable, and predictable," whereas "complex environments are diverse, active, highly variable, and unpredictable" (p. 25). Baldridge and Deal (1975) further argue that "no analysis of [organizational] change can afford to neglect the strong influence of the environment for both promoting, supporting, or hindering change, as the case may be" (p. 11).

Hodge and Anthony (1988) lend great support to the environmental element of the model by emphasizing that the organizational environment is composed of several important subenvironments, each capable of further analysis (pp.78-79).

Subsystem Interrelationships

A key element of the Deal and Rosaler organizational perspective is the high level of interaction which will always be present among the five subsystems: goals, formal structure, organizational technology, informal norms and processes, and environment. They describe this dynamic interplay in terms of the "pebble in the pond" or the "herniae theory of organizational change," because

> the subsystems form an intricate, complex system. When any of the subsystems change–or are changed–this fact has implications for all the rest. . . . Pressures on any one part of the organization ripple across and produce "bulges" in other parts. (Deal & Rosaler, 1975, p. 25)

"The 'herniae' theory applies not only to interrelationships between the five subsystems, but to elements within each subsystem too" (Deal & Rosaler, 1975, p. 30). As a consequence, whenever there are changes in role differentiation and interdependence in the formal structure of an organization, coordination is inevitably also affected. Similarly, a change in environmental diversity may increase activity which will lead to more unpredictability (p. 31).

The "pebble in the pond" in the Deal and Rosaler formulation is intended to emphasize that "changing any aspect of a subsystem affects all the others" (Deal & Rosaler, 1975, p. 31). Support for this notion of subsystem interaction can be found in

Katz and Kahn (1978), who emphasize "the system character of social relationships and the transactions of systems with their environment" (p. 15), as well as in other authors who describe the complex interactions of systems (see Hersey et al., 1996).

While the terms used are sometimes different, a number of students of law enforcement issues have used similar, but less complete, constructs to describe law enforcement and related organizations. Hudzik and Cordner (1983), for example, describe a system as "composed of *elements* or components that are in relatively constant *interaction* with one another, having both impact or effect and mutual dependence on one another" (p. 88, emphasis in original), and include organizational, conceptual, ideological, and environmental issues as important considerations for the system (pp. 87-89). Fyfe, Greene, Walsh, Wilson, and McLaren (1997), describe the key components of a police organizational system in terms very much like those used by Deal and Rosaler. They argue that "these systems focus on various aspects of the organization, each of which provides the administrator with a better grasp of the organization, the behavior of its members, and the effects of its efforts" (p. 166), and that these systems include organizational goals, organizational technology, structure, environment and communications (pp. 168-170).

Assumptions

This study makes only one conscious assumption, that successful adaptation and change to meet changing demands and circumstances is essential to the survival of an organization. "Virtually all organizations will face an increasingly dynamic–less stable,

more heterogeneous–environment in the future," and this will require constant adaptation if the organization is to live successfully "with its environment in a dynamic interaction" (Hodge & Anthony, 1988, p. 645). Since this observation does not appear to have been established empirically (and doing so is beyond the scope of this dissertation), it is treated here as an assumption.

Scope and Delimitations

1. There are other sources of research and technology development that may support law enforcement, but these are all limited, ad hoc, and coincidental results of other activities within organizations with missions other than the support of law enforcement (e.g., the Department of Defense and the Department of Energy). Consequently, this study did not consider them.

2. Technology transfer, although considered a significant element of the strategies employed by both NILECJ and NIJ (Boyd, 1993a; Law Enforcement Assistance Administration, 1976, p. 86), was not treated except as it appears as part of a strategy employed by the agency.

3. The theoretical model employed as a conceptual framework for this study is used solely as a heuristic device to guide the study. It is not the object of the study, so no attempt was made to provide an empirical test of the validity of the Deal and Rosaler (1975) theory of organizational development.

4. The author of this proposal has been–since joining NIJ in September, 1992–the Director of the Office of Science and Technology of the National Institute of

Justice–the organization which is central to the NIJ era–and makes the critical technology funding decisions for that organization. Some of the informants who were interviewed for this study are now in private industry and may have submitted or be preparing to submit proposals for funding to the NIJ Office of Science and Technology. As a consequence, it is possible that their responses may have been somewhat influenced by the author's role in the organization.

5. Finally, the introduction of technologies into law enforcement raises a number of complex issues, including how individual criminal justice agencies are prepared for the deployment of new technologies, the impact on the community of the introduction of new technologies, organizational impacts (e.g., training requirements, policy changes, tactical adjustments, the socio-technical impact of technologies, etc.), and others, all of which are worthy of research. The National Institute of Justice has commissioned a number of studies to address most, if not all, of these issues (see National Institute of Justice, 1995b; National Institute of Justice, 1995c; National Institute of Justice, 1997). This study addresses those issues only when and if they are important elements of the strategies employed by the agencies under study.

Definition of Terms

The terms *technology, organizational technology, technology development, science,* and *model* have broad definitions and wide connotations. For example, technology can refer to the development of processes which might be used to inform decisions in a social context, or to actual pieces of hardware that perform certain tasks.

So, to avoid confusion, the definitions which follow will be used, unless otherwise noted.

The term *technology* can include both hardware and applied knowledge. Both are accurate, both are important, and both are routinely confused because there is no clear dividing line between the two definitions. Heller (1991, p. 2261), for example, defines *technology* as "the application of knowledge and science to the production of goods and services." The term may be used to refer to actual hardware (e.g., radios, laboratory equipment, weapons, etc.), or to methods or procedures to accomplish some specific function or purpose, which may be relevant to the physical sciences or to the management or operation of an organization. However, when applied "as a key organizational variable, [technology] does not refer to sophistication of equipment but to the tasks and techniques by which work is to be accomplished" (Hudzik & Cordner, 1983, p. 110). It is, in other words, "knowledge that can be studied, codified, and taught to others" (Berniker, 1987, p. 10).

An automobile manufacturer uses science, engineering, and technology in the form of machines to produce automobiles. But at the heart of the production of automobiles is a systematic procedure which must be taught to workers on the assembly line. This systematic procedure also constitutes a technology, even though it may exist only on paper or in the mind of managers.

It is important that as distinct a line as possible–albeit arbitrary–be drawn between these two definitions, so two different terms will are used to accomplish this. The term *technology,* therefore, is limited in this study to hardware, equipment, or to the

direct application of the physical, biological, chemical, or engineering sciences in investigations or courtroom proceedings. It does not include technologies grounded in the social or management sciences, such as the management of law enforcement situations, which are the province of a sister organization not included in this study.[3]

Organizational technology, in contrast, refers to the application of systematic knowledge to direct the work of an organization. This distinction is critical, because this is a study of the experience of a single organization–during two different periods in its history–and the development and application of its organizational strategies (*organizational technology*) to address the problem of developing better equipment and better scientific techniques (*technology*) to modernize all elements of the criminal justice system. Similarly, *science* will be used to refer to the physical, as distinct from the social or behavioral sciences. This distinction is made for no other reason than that most of the references upon which this study must rely employ the terms *technology* and *science* in this fashion, as referring to hardware, equipment, and the physical, biological, chemical, and engineering sciences.

Technology development refers to the application of the physical, biological and chemical sciences to the development and production of physical tools, equipment or protocols to permit the accurate and credible application of these disciplines to evidence used in investigations or in judicial proceedings, and to the development of equipment

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[3]At the direction of Jeremy Travis, Institute Director since 1994, a number of cooperative projects have been undertaken in recent years to join the social and physical sciences in cooperative projects, but so far the numbers are too small for analysis. There were no comparable joint efforts in the LEAA period.

for law enforcement or corrections use. It is not used in this paper to refer to management techniques, processes or procedures.

Technology transfer refers to the act of moving a technology developed to meet the needs of one organization to another organization for application for a different purpose, in a different context, or in a different environment (e.g., military technologies adapted for use by law enforcement or rescue units). It can include technology in any of the forms described elsewhere in this section.

A *model* is a pattern of events capable of being learned and repeated. Unlike a theory, it does not attempt to explain why the pattern exists as it does. For example, in trying to explain *why* Henry Ford was moved to develop a production line system for automobiles, you would draw on a theory; but if you wanted to illustrate the actual procedures and sequences the production line followed to produce an automobile, you would employ a model (Hersey et al., 1996, p. 190).

Law enforcement and *criminal justice* are related terms, often used interchangeably. Some suggest that *law enforcement* properly refers only to those organizations or officials authorized to carry arms and vested with the power to arrest. They argue that *criminal justice*, on the other hand, should be taken to refer to all the components of the state involved in the protection of people or property, and includes those officials and agencies involved in the apprehension, prosecution, trial, imprisonment, probation and parole of criminals. In practice, distinctions of this sort are more terms of art than fact, since police officials also incarcerate prisoners (often for sentences of a year or more), and some of the officers of the court are also armed and

have the authority to make arrests. Similarly, many corrections, probation and parole officials also have the authority to carry arms and the power to make arrests. Consequently, the technology programs of both NILECJ and NIJ have characteristically defined law enforcement as including every person or agency from the officer on the beat, through the jails, courts, and prisons, on to probation and parole officers, and including prosecutors and crime laboratories (personal communication, Lester Shubin, former director of the NILECJ technology program, October 9, 1997; David Boyd, current director of the NIJ technology program). This is the definition that will be observed in this study, but the term *criminal justice* will be preserved in references (quoted or described) to the work of other researchers who make a distinction between the two terms.

Four additional terms used in this paper are *organizational structure, organizational strategy, organizational model,* and *organizational effectiveness.*

Organizational structure refers to the arrangement of formal "relationships among the positions, groups of positions (units), and work processes that make up the organization" (Shafritz & Ott, 1996, p. 203). Included in this term are the hierarchical elements of the organization, the distribution of organizational authority and coordination, and the characteristics which provide the horizontal differentiations between organizational units, usually described graphically in organization charts.

The term *organizational strategy,* as used here, is intended to refer narrowly to any approach, process or procedure intended to accomplish the mission or goals of the organization. It is not intended to suggest that structure or strategy operate

independently, but is intended to differentiate between the more mechanical elements of organizational structure and the specific actions taken by management without explicitly changing the structure of the organization.

The term *organizational model* recognizes Alfred Chandler's (1962) observation that structure follows strategy and incorporates both organizational structure and organizational strategy in order to provide a useful shorthand reference to unique combinations of the two, rather than to either a specific structure or a specific strategy alone.

Organizational effectiveness refers to how well the organization accomplishes its goals. As Peter Drucker (1973) has observed, "effectiveness is the foundation of success–efficiency is a minimum condition for survival after success has been achieved. Efficiency is concerned with doing things right. Effectiveness is doing the right things" (p. 45).

The next chapter examines the literature used in developing the study plan, and other material uncovered during the course of the research.

CHAPTER 2

Review of the Literature

Introduction

This chapter is divided into four parts:

1. A brief discussion of the literature essential to understanding the history of the development and evolution of NILECJ and NIJ.

2. A discussion of relevant organizational development literature.

3. A brief treatment of the literature on models.

4. An integrated summary of the literature.

Histories

The National Institute of Law Enforcement and Criminal Justice

It is puzzling that, despite the perception that the Law Enforcement Assistance Administration (LEAA) was a massive failure (Diegelman, 1982), there are few studies of the technology development process actually employed by any component of the LEAA. Diegelman's 1982 exposition on the lessons of LEAA observed that

> the LEAA program ran afoul of unrealistic expectations, wasteful uses of funds, mounting red tape, and uncertain direction. In the face of growing criticism, the program had difficulty demonstrating that it was having any measurable impact on crime or on the administration of justice. (p. 1004)

Nevertheless, this criticism–though at least partly justified–"tended to overshadow the program's accomplishments" (p. 1004). In fact, Diegelman identified six different programs which he maintained offered examples of success, but only one of which–a management information system designed to support prosecutors–could be described as a technology project. This was despite the fact that, at the time the article was published, more than $31 million had been invested by LEAA in the development of technology.

In a glossy bicentennial publication celebrating *Two Hundred Years of American Criminal Justice* (Law Enforcement Assistance Administration, 1976), the agency traces the history of technology in criminal justice, identifying it as "the application of tools and skills," and suggesting that while it is most thought of in terms of something material than can be touched (i.e., a piece of equipment or gadget), the term also "includes another kind of tool, less tangible but just as important in everyday life–the rational method or systematic organizing concept, such as the assembly line" (pp. 78-79). This distinction is important, the publication suggests, because "throughout American history the police, for instance, have adapted comparatively swiftly the newest technological developments in things, but slowly to new concepts or systems" (p. 79).

The publication then touts LEAA's contributions of the previous three years in six idiosyncratic categories: courts, corrections, contemporary technology, electronic data processing, management and equipment. It observes that few changes had taken place in the courts until the just the last few years. "Since then, major change has

occurred in the manner in which the most advanced court systems operate," principally in the form of newly introduced information technologies (Law Enforcement Assistance Administration, 1976, p. 84). At the same time, scientific and technical testimony had begun increasingly to be introduced into many court cases, a development for which the courts were largely unprepared (p. 85).

"In corrections," the report declared, "technological developments in equipment have tended to lag somewhat behind those in law enforcement," but no LEAA contributions are identified in the corrections arena (Law Enforcement Assistance Administration, 1976, p. 85). Under contemporary technology, the report indicates that "a central goal for LEAA since its inception has been the application of technology to State and local criminal justice systems," but questions the extent to which this has occurred (p. 86). There then follows a list of technology initiatives, including a report of a symposium on technology transfer to law enforcement (principally from the military), electronic data processing (which focuses on Project SEARCH and the Prosecutor Management Information System), management (in the form of 911 emergency systems, the application of systems analysis to law enforcement, and the purchase of computers for agencies), and equipment (including lightweight body armor, computerized systems for producing court transcripts, forensic techniques, metal detectors, closed circuit television, and computerized educational programs in prisons). Several of these projects are explained in greater detail under the remaining headings (pp. 86-97).

The technology section of the report concludes, in the voice of O. W. Wilson, with a warning that "all of the scientific and technological data available will not make law-abiding and responsible citizens out of criminals," and that "any applications of technology in criminal justice must accommodate the rights and privileges guaranteed to all persons in the United States by the Constitution" (Law Enforcement Assistance Administration, 1996, p. 97). It is important, however, to note that this is an official report from an agency that had difficulty tracking its projects and was under attack.

Congress never conducted a thorough investigation of LEAA and–as late as 1976–critics could point out that "no reliable inventory now describes with accuracy the nature, far less the degree of success or failure, of the 105,000 grants LEAA has funded to date" (Navasky & Paster, 1976, p. 21). Despite the creation by the agency of a Grants Management Information System (GMIS), information available to agency officials was little improved. GMIS data was of questionable utility because grant descriptions on the GMIS were written by the grantees and not checked for accuracy, the categories into which projects were divided were imprecise and overlapping, and the same grant was frequently (but inconsistently) listed in more than one category. Worse, the system's coding procedures were "informal, subjective, and unreliable." In short,

> GMIS information [was] incompatible and inaccurate . . . [so that] LEAA could account for only 39.9% of its fiscal 1974 . . . block grant funds and for only 75% of its 1973 . . . block grant funds, although 90.2% of the money had been spent. (Navasky & Paster, 1976, pp. 21-22)

They suggest that, while these failures were probably inevitable, for LEAA to be genuinely useful, it had to go beyond meeting the short-term needs of the law

enforcement community and address the long-range concerns of the larger society by including representatives of the public from outside government to participate in LEAA's decision making. "The federal government's war on crime," they observed, "is too important to leave to its generals" (Navasky & Paster, 1976, p. 143).

Feeley and Sarat (1980) place the blame for the failure of LEAA on what they term the "policy dilemma," which is that government tends to respond to public demands by trying to do too much and promising more than it can possibly deliver. The creation of NILECJ within LEAA offers an instructive example of this tendency and of Congressional failures to recognize them. The Institute was charged by the 1968 Crime Act with the responsibility for encouraging research and development and improving and strengthening law enforcement by providing direct funding for research projects and by undertaking its own research.

> In theory, Institute-sponsored research would play an important role in the granting and planning activities carried out with block grant funds. There is no evidence, however, that this has been the case. Instead, the Institute has . . . operated without a clear and comprehensive vision of the role of research in dealing with crime. (Feeley & Sarat, 1980, p. 53)

The only clear successes the Institute had experienced were "in the development of hardware and equipment" (Feeley & Sarat, 1980, p. 3), a refrain that appears repeatedly in the early criticisms of LEAA (see U.S. House of Representatives, 1977).

Later researchers have had more positive things to say about the role of LEAA and the Institute in particular in advancing research in areas other than hardware and equipment. Petersilia (1987), in a study funded by NIJ and designed to demonstrate the influence of the research it funded, includes six chapters on the value of the research

conducted by NIJ, only one of which concerns technology. Describing it as "product-oriented" research, Petersilia observes that the "research [already] is so extensive that it was not possible to address all aspects of it in this report" (p. 77), and limits her treatment to discussions of the technologies themselves, not of the processes employed to develop them. More recently, scholars have observed that

> although technology has improved dramatically in society generally and in its use by some criminal justice agencies, the application is not universal across criminal justice agencies and there has not been much advancement in conceptual innovation. . . . Research [both social and physical] has not become an institutionalized element of policy development in criminal justice either at the national or local levels. (Conley, 1994, p. xiii)

The failure of LEAA was not, therefore, just a failure of administration, but was also a failure of concept and political theory, because it was at both the political and conceptual levels that the value of research had gone unrecognized (Feeley & Sarat, 1980, pp. 133-137).

Several other publications are concerned with specific categories of law enforcement technologies. For example, a 1972 report by the Institute for Defense Analysis examined the needs of the law enforcement community for less than lethal technologies, while a number of articles have been published which are concerned with the use of information technologies in law enforcement. None of these, however, addresses the process by which these technologies might be introduced into law enforcement (Manning, 1992; Waldron et al., 1987).

The National Criminal Justice Information Service touts itself as the most complete collection of criminal justice related publications in the world (see the World

Wide Web, http://www.ncjrs.org), so the fact that an automated search for the terms "LEAA" and "technology" yielded fewer than 50 abstracts suggests the relevant literature is limited. Most are project reports on specific technologies funded under the National Institute of Law Enforcement and Criminal Justice, annual reports of the Institute, annual program plans of the Institute, LEAA annual reports to Congress, and studies of police management information systems, but none address how one might go about modernizing technologies in either individual law enforcement agencies or in law enforcement in general.

The three principal publications during the LEAA era that do address how to go about developing technology are the two original reports produced by the President's Commission on Law Enforcement and Administration of Justice (1967) and its Task Force on Science and Technology (Institute for Defense Analysis, 1967), a report by Zenk (1979) on Project SEARCH, and a case study by Kramer (1977). Zenk's (1979) case study of the struggle for control of criminal information in America offers a powerful set of insights into the turf battles that rage continuously among federal, state and local law enforcement agencies. These turf battles are important to the understanding of any project designed to improve any part of policing, because as Newbold (1997) has demonstrated, cooperation is an uncertain thing even in special local/federal crime task forces created specifically to encourage cooperation among agencies at all levels of government. The same forces affect the development and deployment of technologies.

Project SEARCH still exists as a legacy of the LEAA, but in a greatly reduced form and at much lower levels of Congressional funding (Bureau of Justice Assistance, 1995, October). It was originally intended to be a "System for Electronic Analysis and Retrieval of Criminal Histories," from whence it gets its name, but by 1974 had become a non-profit California corporation intended to provide support for the development of state criminal information systems. The only attempts to examine how NILECJ was organized to support the development of technology for law enforcement, and how well it went about accomplishing that task, is a chapter included in the 1977 National Research Council (NRC) evaluation of the entire Institute (Kramer, 1977).

Frederica Kramer (1977) offers a number of criticisms of the way the Institute was organized to develop technology, including an observation that

> there is no clear evidence that NILECJ at any time in its history chose to integrate so-called technological R&D for crime problem-solving with research activities that are based on the social and behavioral sciences. Therefore, technology R&D is planned and conducted separately from research programming for police, courts, corrections, prevention, etc. (Kramer, 1977, p. 130)

Further, since the program essentially turned the needs analysis, development, and prioritization functions over to contractors (Kramer, 1977, pp. 135-138), the Institute had sacrificed the level of involvement and control in the project that was required to ensure the quality of the work. This meant that the Institute staff was effectively "out of the loop," unable to offer effective guidance to the project performers. This problem was, in turn, aggravated by the isolation of the technology unit from the rest of the work of the Institute. "It is clear that the inability to structure a

technology research and development program as part of a broader strategy to solve problems in criminal justice–whether deliberate or not–created a kind of abandoned child" (p. 146).

The report is limited, however, to coverage of only a very brief period of the time in which the Institute was involved in technology development, from 1973 until sometime before the report was published in 1977. As a consequence, it provides information about the Institute's appreciation and organization of the technology mission, but does so for only a portion of the period of interest, even for the NILECJ case. More importantly, it offers several leads in the form of studies commissioned by the Institute, which diligent research may be able to locate. However, while it describes the model in use at the time of the study–which was one of contracting out most of the major elements of both social science and technology research–it offers few concrete details on the actual process used to select and develop technologies.

It is interesting to note that the report takes the technology program to task for investing major effort in developing soft body armor (better known as bullet resistant vests), because the authors were skeptical that these vests would ever be much more than a passing fad. They suggested that–because vests do not deteriorate rapidly–they would never be likely to be more than a one-time purchase and thus would not be able to support an industry of any size. Ironically, it is this very development which is recognized by the law enforcement community today as the single most important contribution the Institute has made to the individual officer on the street, and which has today produced an international industry dominated by the United States (National

Institute of Justice, 1994a). Nevertheless, this and the Congressional hearings at which these findings were first presented, appears to provide the only documentation which describes, even in part, the technology development process in NILECJ.

The National Institute of Justice

The NIJ era, over a much shorter period, has produced significantly more published information on the organizational vision and strategies than did NILECJ. Some of this material has been included in Institute solicitations for applications for funding for new technology projects (National Institute of Justice, 1996a), and in other, more general Institute publications, such as the annual reports to Congress which have been published by NIJ each year of its existence.

Each of the technology conference reports it has published (National Institute of Justice, 1994b; National Institute of Justice, 1995b; National Institute of Justice, 1996b) has been focused primarily on how to develop technologies for law enforcement and how to move them into a commercial market for deployment to agencies. One of the solicitations for applications for funding (National Institute of Justice, 1996a) includes discussions of what it terms the "Technology Assistance Strategic Process Diagram," the "Foundations of the NIJ R[esearch,] D[evelopment,] T[est,] & E[valuation] Initiatives," and "The Technology Infusion Process," complete with diagrams (pp. 2-3, 8-10). These are, in each case, high-level schematic representations of a process that begins with a needs assessment and then progresses through stages where potential solutions are identified, projects selected, development initiated and reviewed,

prototypes are produced and demonstrated in the field, and finally projects are turned into commercial products. No details are provided for any of the elements of the process. The solicitation does, however, include a section calling for proposals "that explore the dynamics of the technology infusion processes, and the resulting behavioral, operational, and organizational consequences of technologies which have, or could be, introduced into law enforcement, courts or corrections" (p. 8). No similar materials seem ever to have been published by NILECJ.

Perhaps the most complete discussions of the vision for the NIJ program are contained in Congressional hearings (Boyd, 1995b), in which it was described as addressing five major issues:

1. Drawing attention to the advantages technology can offer to law enforcement, "because—while virtually no money has been invested in developing effective technologies for law enforcement, it is also true that law enforcement has not readily embraced technology" (Boyd, 1995b, p. 32).

2. Identifying a principal focus for law enforcement technology efforts in order to coordinate the development of new technologies, eliminate duplication, ensure law enforcement involvement in order to reduce expensive mistakes, make possible the development of a coherent strategy that considers immediate, mid- and long-term technology needs, and identify "what we can and what we cannot do with technology" (Boyd, 1995b, p. 33).

3. Creating a mechanism "to ease the collection of technological information by public safety agencies" (Boyd, 1995b, p. 34).

4. Building on "the health and justice interagency working group [to be formed pursuant to language included in the fiscal year 1994 Defense Budget Authorization (U.S. House of Representatives, 1994, pp. 201-202)] to establish a way to insure public safety needs are always taken into account in the earliest states of every federal research and development effort" (Boyd, 1995b, p. 36).

5. And, finally, "addressing the fragmented buying power of law enforcement" (Boyd, 1995b, p. 37).

Additional materials discuss the development of the NIJ National Law Enforcement and Corrections Technology Center (NLECTC) system, which is comprised of regional technical centers and special technical offices. This system was designed to replace the Technology Assessment Program Information Center (TAPIC) and to become the virtual hub of a national organization of regional centers dedicated to supporting Federal, State, and local law enforcement, corrections, and criminal justice system science and technology requirements.

The NLECTC was designed to function as a hub for hot-line services, standards, evaluations, data base development for the Technology Information Network (TIN), and for support to law enforcement technology assessment councils, panels, and committees. The regional centers were intended to be centers of excellence for respective technologies and to provide regional interfaces for law enforcement agencies and the Technology Information Network (National Institute of Justice, 1994a, p. 53).[4]

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[4]NLETC was the original name of NLECTC. It became NLECTC when "corrections" was added.

On September 29, 1996, Congressman Steve Schiff introduced House Concurrent Resolution 227 (U.S. House of Representatives, 1996), which declared that it was the intent of Congress that the "technology program at the National Institute of Justice . . . should be designated as the national focal point for law enforcement technology programs" in order to: (a) "ensure that Federal agencies are not duplicating one another's work;" (b) "develop a nationwide database to provide information on law enforcement equipment and technologies to State and local law enforcement;" (c) "promote testing and evaluation of law enforcement equipment and technologies and make available a list of product failures and shortcomings;" (d) "promote establishment of standards for law enforcement equipment and technologies;" (e) "maintain the National Law Enforcement and Corrections Technology Center system as the main clearinghouse for the research, development, testing, evaluation, and dissemination of law enforcement technologies and standards;" and (f) "develop a program to improve forensics technology and work with the Nation's crime labs." Congressman Schiff died before any action could be taken on the resolution.

Most of this material is self-generated by NIJ. There are no published external studies of any kind on the NIJ program, and internal studies have been limited in scope.

Organizational Development

Organization development has come a long way since Gulick (1996) defined the principal problem of organization as "the problem of building up between the executive at the center and the subdivisions of work on the periphery of an effective network of

communication and control" (p. 17). With a history that extends back centuries in time (Shafritz & Ott, 1996, p. 11), it has existed in its current general form in the world of business and industry for at least the last 40 years (French, Bell, & Zawacki, 1978; Owens, 1970), and has been applied to an increasing number of organizational structures, including research and development organizations (Argyris, 1965; Bozeman, 1987), educational organizations (Hoy & Miskel, 1978; Knezevich, 1975), and government in general (Osborne & Gaebler, 1993).

Over the years, a number of writers have offered definitions of organization development:

> – Organization development is an effort: (1) *planned*, (2) *organization wide*, and (3) *managed* from the top, to (4) *increase organizational effectiveness* and *health* through (5) *planned interventions* in the organization's "processes," using *behavioral-science* knowledge. (Beckhard, 1978, p. 20; emphasis in original)
>
> – The process of analyzing the organization and developing ways of implementing elements of a new organization design–in structure or process–is called *organization development.* (Hodge & Anthony, 1988, p. 325; emphasis in original)
>
> – Concern for an organization's life history, sensitivity to the conflicts within that could influence achievement of goals, and restructuring it if need be to enhance its productivity is what O[rganization] D[evelopment] is all about. (Knezevich, 1975, p. 198)
>
> – For heuristic purposes, we define O[rganization] D[evelopment] as planned efforts to improve the management of organizations. (Patten & Vaill, 1976, pp. 20-24)
>
> – O[rganization] D[evelopment] can be defined as a planned and sustained effort to apply behavioral science for system improvement, using reflexive, self-analytic methods. (Miles & Schmuck, 1978, p. 23)

In general, most of the definitions of organization development can be distilled into one offered by Hodge and Anthony (1988, p. 63):

> Organization development is the process whereby organizations attempt to improve and renew themselves [and] . . . usually includes critical examinations of organization goals, work systems, strategies, policies, procedures, work group behavior, and structure. It also includes executive, management, professional, supervisory, and technical training and development. . . . The goal of [organization development] is to improve the functioning of the organization and of its managers and employees. It is planned renewal and development of the organization initiated by top decision-authority centers.

But no matter how they are defined, organization development techniques are equally applicable in every organizational type at any stage in its development, whether for the existing units of a well established organization, or for the new units created by a start-up organization (Miles & Schmuck, 1978, p. 24).

However, the application of organization development techniques can be problematic when applied to certain kinds of organizations (Miles & Schmuck, 1978, p. 393). Educational institutions, for example, face special challenges because, unlike industrial organizations, many educational institutions tend to: (a) suffer from goals that are both too diverse and ambiguous; (b) lack well differentiated roles; (c) be especially vulnerable to short-run demands from their sponsors and constituents; (d) under-invest in research and development; and (e) lag well behind significant cultural changes in the community. All of these conditions, although not always described in the same way, are also recognizable in criminal justice agencies (Buerger, 1993; Hudzik & Cordner, 1983, pp. 87-90).

Baldridge and Deal (1975, pp. 1-2), writing about the systematic study of change in educational organizations, suggest that three things are required to understand organizational development: (a) a firm grasp, from a comprehensive organizational perspective, of the crucial organizational subsystems and processes involved in innovation; (b) a firm appreciation of the strategies available to cause and support educational changes (i.e., leadership dynamics, change agents, internal organizational politics and the process by which programs are evaluated); and (c) a foundation of actual experience with the dynamics of educational change, gained by actually administering an institution undergoing change, or vicariously through case studies of actual attempts at change.

It was this notion of a "comprehensive organizational perspective" that led Deal and Rosaler (1975) to apply the model that will be used in this study to describe both the subsystems of an educational institution and the interrelationships between those subsystems. The same model, adapted only slightly to fit law enforcement and criminal justice organizations, will provide the conceptual framework for this study. It is particularly attractive because it offers a model firmly based in systems theory.

Systems Theory

Systems theory assumes that there is a constant interaction between a system and its environment in the form of demands, pressures, supports, and so on, which require the system to respond or to react in some way. These environmental effects are inputs to the system, while the system's responses to the environment are its outputs

(Bertalanffy, 1968). In the early 1960s, as the space program made the term *system* a common element of American speech, the concept began to be applied to the problem of crime, most notably in the report of the President's Crime Commission report, *The Challenge of Crime in a Free Society.* Included in this report was a diagram purporting to describe the movement of cases through the "criminal justice system," and showing what kind of agency was involved at each step in the process. This comprehensive view of the "system" led to the creation of a 1969 Law Enforcement Assistance Administration guideline which required the criminal justice planning agencies submitting funding proposals to LEAA to consider "all facets and elements of law enforcement activity, including police, court and correctional programs, and *systems* as well as general crime prevention and control" (in Hudzik & Cordner, 1983, p. 87).

The criminal justice system exists in an environment which includes such things as current social or economic conditions, public opinion and expectations. How a system responds to these and other environmental inputs affects the environment, and this—in turn—produces still further reactions by elements of the environment. These reactions provide feedback to the system which shapes its adaptation to its environment (Hudzik & Cordner, 1983).

Most organization theorists have observed that any system—especially a social system—which fails to consider or adjust to changes in the environment which affect its supports and demands may fail to accomplish its purpose or goals, or even risk extinction. Nevertheless, one of the key distinctions made by systems theorists about

how to study systems has to do with whether a system is to be analyzed with or without regard to the environment.

When an analyst examines a system without considering any environmental factors, he is employing a classical closed-system approach; when the analyst includes environmental factors in his studies, he employs what is called an open-system approach. While the closed systems approach can often be used effectively in examining concrete systems (e.g., a voltage regulator for an electronic device), it can virtually never be used successfully in the analysis of a social system, because environmental influences frequently produce morphogenesis in order to permit the social system to respond more effectively to these influences. For example, community policing represents a significant change from only a few decades ago in the concept of policing (Mastrofski & Greene, 1993). Most scholars believe this change to have been produced, in part, by public dissatisfaction with crime and the way police were attacking the problem, which provided environmental pressures on police to find both more efficient and effective ways of dealing with crime, as well as better means of interacting with the community (Bracey, 1992). In fact, changes in the way society defines crime may itself be part of a morphogenic process.

Walker (1980, p. 57) offered an implicit example of this morphogenesis when he described changes in policing from 1815 to 1900:

> The development of a criminal justice system in the United States was a response to the extraordinary disorder wrought by social change. . . . Americans launched what historian Robert Wiebe called a "search for order." The search led to the creation of a network of specialized bureaucratic agencies, each

> designed to deal with a particular social problem. The criminal justice system was only one part of this new network.

This blurring of the lines between environmental and internal pressures and reactions is the source of a particularly sticky problem, since those elements of the world which fall outside the boundaries of the system are what comprise the environment of the system. As Emery (1969, pp. 4-5) has observed, "[i]nteractions will . . . exist between a system and its environment, but the exogenous variables through which the interactions are manifested are treated as noncontrollable. Only the endogenous variables used to describe a system are considered to be subject to a significant degree of control." This observation is important, because how what is essentially an arbitrary boundary between a system and its environment is selected may cause the researcher to miss opportunities to influence or change significant interactions which influence the system.

The boundary between a social system and its environment, however, is rarely clear, because it is often impossible to distinguish elements of the system from elements of the environment. For example, should welfare agencies providing probation-related services be considered part of the criminal justice system? A truly open-system approach may easily lead to the conclusion that everything has to be considered, which is probably impossible. And more to the point, simple systems or biological systems do not provide accurate analogies for complex social systems (Hudzik & Cordner, 1983, p. 89).

Perhaps the greatest weakness of the systems concept, however, is that since it evolves out of the mechanistic notions of cause and effect of the physical sciences, it does not easily recognize or take into account independent behavior characteristic of human and social systems. Human and social systems do not simply react to environmental influences; instead, they pursue independent goals in ways that cannot be easily explained by simple cause-and-effect mechanisms.

It may be that the most serious challenge to the application of systems concepts to social entities comes from writers who share the view expressed by Hoos (1972), who argues that the systems approach, originally drawn from the natural sciences and engineering, is applied to the social sciences in order to attempt to simplify very complex and value-laden processes. Unfortunately, this approach hides important questions that may not be amenable to systems analysis by suggesting that systems thinking necessarily produces objective answers.

Critics of systems analysis argue that it cannot deal "systematically" with all relevant policy variables in the study of social systems. For example, a former head of NASA has observed that it was far easier to manage the engineering and human systems it took to land a man on the moon than it is to find a way to apply any kind of systematic management to the court subsystem alone. The goals of the space program were very specific and operated almost entirely within a structured, controlled environment, whereas the environment within which the goals of the criminal justice system are determined is highly unstructured and intensely political, a circumstance "anathema for

a systems approach with its objective of stating clear, unconflicting, and uncluttered goals" (Hudzik & Cordner, 1983, p. 89).

The systems approach can also lead to a gross oversimplification of organizational relationships. Because the human mind has difficulty identifying or expressing adequately all the relationships among elements in a system, most models or organizations tend to oversimplify reality, a problem that tends to be particularly pronounced in open systems models.

Thompson (1967) points out that in closed systems, it is possible to develop a complete knowledge of cause-and-effect relationships, because results for every possible combination of variables can be known from experience or can be calculated. With open systems, however, actions often have multiple causes and effects that operate differently at different times. Effects within the system are affected by actions outside it, so tracing specific effects to specific causes can be difficult or impossible. Consequently, argue Hodge and Anthony (1988, pp. 62-64), models developed from a systems philosophy should be considered tools for understanding a complex reality, - rather than as total representations of reality.

Nevertheless, the systems approach brings a broader, more complete perspective to the analysis and study of organizations by providing a framework which demands a wider perspective. This not only forces the theorist to consider the effect that environmental dynamics are likely to have on the organization, but also permits the examination of both how the component parts of the organization function together as a unit, and how organizations link to each other (Hodge & Anthony, 1988, p. 62).

But the systems approach is not a panacea. It serves best as a tool or as a framework for examining organizations, or societies, or parts of each. And as a tool or framework, it can be a uniquely powerful resource for decision-makers or researchers. It provides, in effect, a perspective with which to examine an organization, while the principle value of the systems framework offered by Deal and Rosaler is that it provides a comprehensive model and a rich foundation upon which to shape this study.

Models

Modeling is a well-established process in the physical and engineering sciences where it is typically thought of in mathematical terms. This is because

> a mathematical model describes a problem much more concisely . . . [which] tends to make the overall structure of the problem more comprehensive, and it helps to reveal important cause-and-effect relationships. In this way it indicates more clearly what additional data are relevant to the analysis . . . [and] facilitates dealing with the problem in its entirety and considering all its interrelationships simultaneously. (Hillier & Lieberman, 1974, p. 740)

More importantly, mathematical modeling is amenable to high speed computer analysis which permits researchers to rapidly examine large numbers of relationships of great complexity. This approach, therefore, is widely used wherever a process can be described as a set of mathematical relationships.

In more sophisticated forms, models are described with greater accuracy as simulations of actual phenomena, much like those seen in many of today's computer games, or which are widely employed in engineering to test designs before they are constructed or put in production (Johnston, 1984, pp. 1-2). But the reality is that all

"models are abstractions of reality in which only those *components* relevant to the problem being analyzed are included. Thus, a major portion of model construction involves identification of relevant components and description of the *relationships* between these components" (Lee, Moore, & Taylor, 1981, p. 6, emphasis in original). Consequently, a model can take a wide variety of alternative forms. It can appear as a flow chart, a graph, a network, or as a set of mathematical equations.

What all the authors who write about models recognize, however, is that to validate a model, all the assumptions employed in its construction must be clearly identified and validated. Typically, this validation is performed by checking to see if the model correctly reflects the operation of the system it represents (Hersey et al., 1996; Hillier & Lieberman, 1974; Johnston, 1984; Lee, Moore, & Taylor, 1981).

The variety of models available to the researcher is limited only by imagination. This is particularly true of models intended principally for use as heuristic devices to provide an abstract picture of a process, organizational structure, or other social interaction as a framework for either instruction or analysis. The important issue is that while some writers view model development as being akin to theory development (Hillier & Lieberman, 1974), it is now more common for authors to note the differences between a model and theory. As Hersey et al. (1996, p. 190) explained, "the theory attempts to explain why things happen as they do." They are not intended to recreate actual events. A model, in contrast, attempts to describe a pattern of actual events in order to allow the pattern to be learned and possibly duplicated. Situational leadership, for example, is a model rather than a theory. "Its concepts, procedures, actions, and

outcomes are based on tested methodologies that are practical and easy to apply" (p. 190).

Summary

What the literature suggests is that the modernization of law enforcement technologies in the United States has been a recurring theme in national efforts to fight crime. This interest in modernizing a diverse community made up of a large number of small agencies performing a critical public function has led to the creation of an organization charged with this task. Its initial efforts under the direction of LEAA, however, are widely viewed as failures, while its most recent effort in NIJ appears to be viewed largely as a success. Yet, despite the investment of hundreds of millions of tax dollars, only one of these attempts has ever been evaluated (by the National Research Council in 1977), and that evaluation was incomplete. The second attempt, under NIJ, has never undergone a systematic evaluation.

There is, however, a vibrant literature which offers a framework with which to study these organizations. It is made up of the work of organization development theorists, and one of its manifestations is a conceptual scheme developed by Deal and Rosaler (1975) and built upon foundations established by earlier theorists. Although often modified (e.g., as by Hersey et al., 1996), the basic outline described by Deal and Rosaler remains popular among organization development scholars. Its five basic elements–goals, formal structure, organizational technology, informal norms and

processes, and the environment–provide a far richer way of conceptualizing an organization than can mere descriptions of its formal structure.

Finally, understanding something as complex as a human organization requires a method of analysis which is simpler than reality, but faithful to major issues of interest to the analyst. Well-designed models offer that capability, serving as predictive constructs, descriptions of active processes, or as heuristic devices. Together, these elements describe a problem worthy of research and offer useful tools to support that research.

CHAPTER 3

Methodology, Design And Procedure

Introduction

Few research projects allow the researcher the luxury of a textbook research design. This project was no different, so some modification of the basic methodology selected for this research–a case study approach–was required.

Yin (1994) tells us that single cases are common case study designs, and are of two types: holistic designs and embedded units of analysis. These designs are "eminently justifiable . . . where the case represents a critical test of existing theory, where the case is a rare or unique event, or where the case serves a revelatory purpose" (p. 44). In these instances, the case under study may itself be the sole unit of analysis or it may contain within it subunits of analysis.

Multiple-case designs, on the other hand, tend to be preferred because the larger number of cases tends to offer the potential for the researcher to develop more powerful insights into the operation of the cases. In its basic form, the multiple-case design involves selecting or developing a theory, and then selecting and conducting some number of individual case studies with which to examine or test the theory. Once the individual case studies are completed, a case report is written for each one, after which the researcher draws cross-case conclusions, which are conclusions about the category of cases under study, rather than about individual cases. The researcher then makes whatever modifications to the theory the findings may dictate, identifies the policy

implications of the study and finally prepares a cross-case study report. In a perfect world, each case would provide a replication of every other case (Yin, 1994, pp. 45-48).

This study, however, was not well suited to either a single case or replicable multiple-case design because the object of study is unique. However, since there is a clear and dramatic change in the organization between the NILECJ era and the NIJ era, it was possible to demarcate the two eras within the case study and compare the organization structure, environment, and effectiveness in each case by employing what Yin (1994) calls an embedded single-case study, in which subunits of a single case are treated as individual cases for the purpose of analysis (Yin, 1994, p. 44).

Description of the Research Design

Unit of Analysis

The basic units of analyses for this study come from a single organization during different time periods and under different leadership. The first unit is defined as the National Institute of Law Enforcement and Criminal Justice (NILECJ) during the period from its creation within the Law Enforcement Administration in 1968 until about 1980, not long after it was renamed the National Institute of Justice by the Justice System Improvement Act of 1978. This unit will be referred to as "NILECJ" for convenience. These rough dates were selected as logical breakpoints because there was a significant change–or at least outward appearance of change–as a consequence of legislative action which substantially altered NILECJ's role in technology development efforts for

criminal justice by substantially reducing its budget for that purpose, and by changing its name.

The second unit of analysis covers the time from the creation in late 1992 of what is now the Office of Science and Technology under the National Institute of Justice (NIJ), to the present, and will be referred to for convenience as "NIJ." The interim period between the end of the first period and the beginning of the second was also briefly reviewed in order to set the foundation for the second unit of analysis. It was not, however, a primary focus of this study. It is called "Interim" for convenience. Within both of the two primary units of analysis were three categories of individuals of interest: (a) those who were associated with the organization, either as employees or as significant participants in programs sponsored by NILECJ; (b) those who were associated with the organization, either as employees or as significant participants in programs sponsored by NIJ; and (c) a very small number of individuals who were involved in both the NILECJ and the NIJ periods. These individuals constitute the interview population for this study, and each served as a data source to augment other data sources, such as files, documents, and records.

Subunits of Analysis

Subunits often become appropriate as a study proceeds, but Robert Yin (1994) cautions that researchers must guard against allowing subunits of analysis to receive too much attention at the expense of the larger, holistic concerns of the case. If they do, there is considerable risk that the focus of the study may shift in ways which

substantially change the nature of the original study, an event which may be justified by the development of the case, but which should not be allowed to catch the researcher by surprise (Yin, 1994, p. 44).

The design used for the study, therefore, is the embedded single-case design where, as Yin (1994, p. 39) tells us, "the same case study may involve more than one unit of analysis." This study is, therefore, an essentially archival and ethnographic study, involving close scrutiny of relevant historical documents, interviews with a number of key players, and the personal knowledge and experience of the investigator himself during the two demarcated periods of the organization under study.

Procedures

Sources of Data

The history of both the NILECJ and the NIJ eras can be located in four primary sources: (a) the existing official documents, housed primarily in NIJ's offices in Washington, or at the National Criminal Justice Reference Service (NCJRS) maintained under contract for NIJ by the Aspen Systems Corporation in Rockville, Maryland; (b) a limited number of studies conducted by scholars and published in books or research journals; (c) hearings before Congress, published in the Congressional Record; and (d) the direct experiences and personal recollections of individuals who were the prime movers in the creation of the organizations, were or are the senior officials in LEAA or the directors of NILECJ and NIJ, or who were or are the program managers of the

relevant science and technology programs and were interviewed for this research. The interview population is summarized by category in Table 1.

Table 1

Interview Population

	LEAA	Interim	NIJ
LEAA or Institute Director	1	1	1
Office/Division Director	3	3	2
Program Manager	3	5	5
Others	1	1	2

Some of the subjects are listed in more than one cell. For example, Lester Shubin was a program manager from 1969 to 1989, and so is listed in both the LEAA and Interim periods, while Tom Brady is listed in all three of the cells labeled "Others." The total number of individual subjects interviewed was 14, including one self interview. The total number of individuals who provided information, even if not in formal interviews, are listed at Appendix C and totaled 26.

Few other individuals were involved in related activities and therefore had useful information relevant to the study, but could not be interviewed formally. A list of all the individuals who provided any information, either through interviews or otherwise, is included at Appendix C.

Additional supporting information was provided by a survey of the staff of the Office of Science and Technology, some of whom were also interviewed. The survey,

reproduced in Appendix B and described more fully later in this section, consisted of a descriptive component intended to collect information on the duties, educational levels, and experience of OST staff, and an attitudinal component designed to provide information on the perceptions of OST employees. A total of 16 subjects were surveyed, 5 of whom were also included in the interviews.

Data collection

Yin (1994) identifies six possible sources of evidence for a case study: (a) documentation, (b) archival records, (c) interviews, (d) direct observations, (e) participant observation, and (f) physical artifacts. Three of Yin's sources, augmented by a survey, were used: documentation, archival records, and interviews.

Documentation is particularly useful because it is stable, can be reviewed repeatedly, tends to be exact about names, references, and details of an event, and provides broad coverage in terms of time, events, and settings. Its disadvantages include the difficulty of retrieving the documents (which can often be considerable), the risk of bias in the selection of documents if the collection is incomplete, the presence of reporting bias (which may be unknown) on the part of the individual who prepared the document, and potential limits to access (Yin, 1994). In this instance, some of the documents referenced in the records of the Institute are not available because the only copies have been lost. Some of these were located in private collections, but there are substantial holes. There was, for example, a task force (discussed later in this paper) formed by LEAA to examine its research efforts. If the task force produced a report,

and several of those interviewed report that it did, no trace of that report could be located, either in LEAA, NIJ, Justice Department or other archives, yet references to it are found in other documents. The report of the 3rd National Symposium on Law Enforcement and Technology (Cohn, 1970), for instance, is available from NCJRS, but the reports of the first and second symposia are not, although they are listed in the NCJRS database. Other reports similarly appear in the listings at NCJRS but are no longer present in the actual collection.

Archival records also share many of the same strengths and weaknesses as documentation, as well as offer the advantage of greater precision and raw quantitative data, but may raise significant privacy issues, or–in the case of technology proposals–proprietary concerns.

Interviews are useful because they can be focused directly on the case study topic, provide information on individual insights, and can provide "perceived causal inferences" (p. 80), but in an historical study–as that of NILECJ necessarily is–access to individuals with useful information is limited because there may be no record of where that person is now and some may, as is the case in this study with Joseph Kochansky and Ralph Siu, have died before they could be interviewed. One consequence is a potential selection bias which arises from the fact that some subjects may be interviewed simply because they remain in the area, have remained in contact with others associated with the object of study, or have a particular interest in the subject and so–hearing of the study–seek out the researcher. This sort of bias can only be managed by a diligent effort to seek out and interview as many subjects as possible. That has been done here, so

that–while most of the interviews are in person–a few were conducted telephonically because the subject was not available in any other way.

Although the author is a participant in one of the organizations included in the study, the National Institute of Justice, participant observation was not used. Since he has not engaged in observing the case in a systematic way, he was treated as an ordinary interview subject, except that his own interview was completed on paper without the presence of an interviewer (i.e., a self interview). This approach is useful because it can provide insights into interpersonal behavior and motivations behind decisions, and in this instance–since it is the researcher who made many of the decisions–is essential. It may, however, be as likely as the participant-observation method to suffer from biases which arise from the observer's manipulation of events, whether conscious or not. Nevertheless, despite these potential problems, the observations of the author can often be essential to a full understanding of the case, for the very reasons suggested by Ketl (1990). He observed that the public-management school relies heavily on case studies and tends to be dominated by the personal reflections of the senior administrative officials and by case studies of individual public managers. He argues, in fact, that "there is no intellectual alternative to regarding the experience of each public executive as a unique case," because the situation of every manager is so unique that broad generalizations are impossible. Therefore,

> the public management school's approach to the problems of administering public programs is to present broad propositions about the need to adapt "and about the problem that can hinder adaptation;" *to add rich case studies about public managers who have been perceived as successful and unsuccessful*; and

> to ground it all in Neustadt's dictum that executive power is the power to persuade. (Ketl, 1990, p. 413; emphasis added)

Direct observation was not used, primarily because the time and resources it required were not available, while an analysis of physical artifacts was not employed because physical artifacts have only limited relevance to this study. The study does, however, include an analysis of the recorded, documentary histories of the science and technology programs of both NILECJ and NIJ in terms of the framework described by Deal and Rosaler (1975).

Historical records examined as part of this research include official agency correspondence, reports, internal memoranda, formal publications, organizational schematics, employee handbooks, and any other material resources which promised to help build an understanding of the research problem. In selected cases, the content of some of the agency reports was also analyzed. Validation of the accuracy of the sources was accomplished by comparing various sources with each other and reporting discrepancies which could not be resolved adequately.

Open-ended interviews emphasized, but were not limited to, top-level managers because, as Argyris (1965) tells us, "the lower one goes down in the hierarchy in organizations, the greater the probability that behavior is controlled by systems of technology, organizational structure, and managerial controls." Deal and Rosaler (1975, p. 9) also note that "administrators play a key role and are the 'legitimate' manipulators of a system . . . [so an] administrator's decisions can affect organizational change or even survival."

A survey was employed to augment the information gleaned from interviews, permit limited comparisons with a survey of NILECJ conducted by the National Research Council, and to provide added validation of the findings from the interviews.

All of the records not readily available to the public are readily available to the researcher as a consequence of his position in the organization, and he has the authority to permit access to them.

Instrumentation

The great challenge in any case study is in properly recording and categorizing the data from what can frequently be an overwhelming number of sources. To help simplify this project, data sheets were employed to note essential information gleaned from each document.

Similarly, a protocol in the form of a set of core questions (Appendix A) designed to elicit information on key historical events and processes within the two cases was used to steer the conduct of each interview. Each interview subject was provided a copy of these core questions several days in advance of the interview. The interview then, with permission, was recorded and the recordings used to produce written summaries of each interview.

Validation of the interview protocol was accomplished through interviews, first with the senior forensic science program manager of the Office of Science and Technology of NIJ, who has been a program manager for more than 25 years in both NILECJ and NIJ, and second, with a former Director of NIJ who served in that capacity

for eight years between the periods represented by the two cases. This validation, which differs from that normally sought in a quantitative study or in a qualitative study using quantitative methods, is intended primarily to assess the degree to which the interview schedule provokes answers which address the issues relevant to the study. Both the validity and the reliability of the information obtained from a respondent or informant, as Yin (1994) makes clear, depends more on post-interview checking against multiple sources of information than on prior testing of the instrument.

> Overall, interviews are an essential source of case study evidence because most case studies are about human affairs. These human affairs should be reported and interpreted through the eyes of specific interviewees, and well-informed respondents can provide important insights into a situation. They also can provide shortcuts to the prior history of the situation, helping you to identify other relevant sources of evidence. (Yin, 1994, p. 85)

They are, however, subject to all the problems common to what are essentially verbal reports, including problems of bias, erratic memories, and the confusion that arises from poor or inaccurate articulation. Accordingly, any reasonable approach includes attempts to corroborate interview data with information from other sources.

A questionnaire was also employed (Appendix B) to provide additional information to help in the final triangulation of data, and was tested on the same subjects as in the case of the interview protocol. The instrument consisted of two parts: (a) a general personnel background information questionnaire and (b) a limited attitudinal survey designed to elicit responses which can be quantified and analyzed. The first part of the questionnaire was adapted from the personnel questionnaire used by the National Research Council in its 1977 evaluation of NILECJ (White & Krislov,

1977, pp. 233-235). Adaptations were limited to changes required to allow the questionnaire to be used to survey NIJ personnel. Since this instrument uses the same questions in the first part as did the original survey instrument, it allows newly collected data from NIJ personnel to be directly compared with the results of the White and Krislov study. The attitudinal portion of the survey, however, is new and was not part of the National Research Council survey. This portion was added in order to provide further validation of the findings from the interviews, especially with respect to the environment within which the organization functions.

This questionnaire was originally to have been administered to each of the subjects interviewed during the research. However, the number of individuals interviewed for the first case (NILECJ) was necessarily small, and the subjects represented a very different sort of cross section than did the NIJ case. In the NILECJ instance, none of the program managers were engineers, only one was a physical scientist, and no separate technology office existed for most of the period under study. As a consequence, those questionnaires collected from the NILECJ era (there were only four) were discarded and only the NIJ questionnaires were used in the analysis.

Since the entire eligible population for the survey was very small and some of the population was no longer available, only a nonprobabilistic, availability sample was possible (Schutt, 1994, pp. 158-165). Such surveys and sampling approaches, though limited, are useful "when random sampling is not possible, or with a research question that does not concern a large population," both of which apply in this case (Schutt, 1994, p. 161). The major value of this second part of the study lies in its use as one of

several sources of validating information for the larger case study, particularly in providing an additional check for any bias which may have been introduced into the study because of the author's role in the organization.

The author of this dissertation conducted all of the interviews personally. In addition, where appropriate, follow up interviews were conducted and these were also recorded and summarized. The survey instruments were delivered to respondents by way of the internal office mail system and then were collected anonymously in a drop box. The two sections of the instrument were separated to remove any possibility that the first section could be used to identify respondents to the second section. The total population consisted of only 19 employees, since 6 of the 25 authorized positions in the organization were vacant at the time. Sixteen questionnaires were returned, for a response rate of 84.2%.

Yin (1994, pp. 34-35) contends that establishing the construct validity of each case study requires using multiple sources of evidence, establishing a chain of evidence, and having key informants review the draft of the case study report, all of which were employed in this study. He suggests, however, that establishing the internal validity of a case study is appropriate only for explanatory or causal studies, but not for descriptive or exploratory studies such as the one that was undertaken here. They are not relevant to the latter case studies because they may suggest, but cannot clearly establish, causal relationships (p. 35). Similarly, although this study examined the organization at different periods in its history, later periods of analysis clearly cannot be considered replications of the first, so external validity (i.e., establishing the domain within which a

study's findings can be generalized) may be suggested but cannot be established, with any degree of certainty (pp. 35-36). Finally, Yin argues that establishing the reliability of the study hinges on the quality of the protocol developed to direct the case study and on the quality of the case study database developed during the data collection phase (pp. 36-38). The case study database will be discussed in the next section.

Database

Yin (1994) has pointed out that one of the major weaknesses in case studies is that it is often difficult for later researchers to make use of the data collected by the author of a case study of interest, because "with case studies, the distinction between a separate database in the case study report has *not yet* become an institutionalized practice." In many cases, the only case study data available to later researchers is the case study itself, and there is no recourse for a researcher that wants to inspect the basic data which led to the case study conclusions.

> The main point here is that every case study project should strive to develop a formal, presentable database, so that, in principle, other investigators can review the evidence directly and not be limited to the written reports. In this manner, a case study database markedly increases the *reliability* of the entire case study. (Yin, 1994, p. 95, emphasis added)

Accordingly, any data collected for this case study which is not available in regular collections open to researchers, will be assembled in an orderly fashion accessible to other researchers, and will also be made available to the data resource collection at NIJ, catalogs of which are published periodically for use by the research community (National Institute of Justice, 1995a).

The historical events which lead to the inception, creation, and evolution of the organization represented by the different periods included in this study were examined within the framework of the Deal and Rosaler (1975) organizational perspective. The histories of the development of science and technology within NILECJ and NIJ, as developed from the documentary, archival, testimonial, and observational evidence were analyzed and are reported within this framework.

The study attempted to identify: (a) the formal goals of the organization, any changes over time, and any informal goals within the organization which may be identified during the course of the study; (b) the formal structure of the organizations and any changes over time that might be relevant to the study; (c) the organizational technology and any changes in it over time; (d) any informal norms and processes within the organization which may be important in understanding the organization at various points in its history; and, finally (e) the larger environments within which the organization functioned. To accomplish this, the study includes several qualitative and quantitative analyses of such matters as the

- Stability of the formal structure of the organization (e.g., where the technology program is placed in formal organization charts, how often and how much it changes).
- Stability of the legislative mandates, goals and objectives of the organization over time.
- Distribution of funding among technology development programs and other programs and how they changed over time.

- Stability of specific technology development programs over time.
- Stability of the selection process used to choose projects for development as well as its congruence with the goals and objectives of the organization.
- Degree of openness of the organization to internal and external assessment or review, as revealed by the existence of assessments or the judgements of interview subjects.
- Stability of staffing levels.
- personnel qualification (education, experience) and levels of civil service grades among technology development staff.
- Publications and other materials disseminated to the field, and the degree to which these are congruent with the goals and objectives of the organization.
- Stability of the management structure at all levels.
- others, as appropriate.

Where feasible and appropriate, each data analysis is displayed in suitable tabular, graphic or statistical forms.

Each organizational subsystem was examined with particular attention to the subsystem interactions and how the "herniae" or "pebble in the pond" theories of organizational change developed by Deal and Rosaler (1975, pp. 25-27) apply. The implication of this concept is that a change cannot be made in one organizational

subsystem, whether the changes are intentional or not, without having some effect on it least one other subsystem.

Finally, an attempt was made to assess the relative effectiveness of the different organizational approaches to the modernization of law enforcement technologies, in terms of the perceptions of the subjects interviewed and based on what the documentary record suggests. In addition, an effort was made to determine whether the organization measured its own success at the different points in its history of interest to this study, and–if possible–to compare these metrics with each other in order to determine whether a usable assessment of the relative success of the organization at different points could be made. Unfortunately, no such metrics were employed in any studies extant, but comparisons have been made of more qualitative suggestions or recommendations made by several studies of the organization at various points in its history.

In making relevant comparisons, four steps were involved:

1. Careful interviews, supplemented by a survey, of individuals involved in each of the different periods (NILECJ, Interim, and NIJ), in order to determine how successful they believed the organization to be in the various periods in its history;

2. An examination of documentary evidence, in order to determine as precisely as possible how effective the organization appeared to be to those who wrote or assembled the documents, and any formal effectiveness measures which may have been employed.

3. Comparison of these metrics to identify commonalities and differences among the different periods of interest; and

4. Assessments of each period, as far as possible, using as many as possible of the measurement systems which may have been employed at various points in the history of the organization.

In the final analysis, however, the most important requirement is that the researcher

> have a general analytic strategy . . . [because] the ultimate goal is to treat the evidence fairly, to produce compelling analytic conclusions, and to rule out alternative interpretations. The role of the general strategy is to help an investigator to choose among different techniques and to complete the analytic phase of the research successfully. (Yin, 1994, p. 103)

This approach was necessary because the researcher could not be certain what kinds of data might develop in the course of the study, so a variety of techniques were used, including fitting some qualitative or quantitative data into matrices arranged by categories, assembling the data into arrays, using various statistical comparisons (usually in graphic form), organizing databased on a temporal scheme, developing flow charts, and a number of others as various authors have suggested (Miles & Huberman, 1984).

It is not always clear which parts of a methodology may properly be thought of as part of the data collection and validation procedure, or as part of the analysis and reporting process. There is, however, one crucial step in a case study which is appropriately included as part of the reporting and analysis of the data. Yin (1994) suggests that in a multiple case study, each individual case ought to be put in written form and then be reviewed by one or more of the informants in the study. In this case, reports were developed for each of the periods of interest in the history of the

organization, and these were reviewed by study participants. Once these reviews were completed, a comparative assessment was made across the reports–in much the same fashion as in a cross-case analysis in a multiple-case study. It is from this analysis that the essential findings of the study were developed.

CHAPTER 4

Results

Introduction

This chapter is divided into four major parts: NILECJ, Interim, NIJ, and Cross-Case Comparison. The NILECJ and NIJ parts are each further divided into two sections. In both cases, the first section lays out the major points in the institutional history of the organization under study in order to provide a context for the second section, in which the institution is analyzed in terms of the organizational perspective described by Deal and Rosaler (1975). This second section is further divided into six subsections, each corresponding to one of the subsystems described by Deal and Rosaler, the first five of which are: goals, formal structure, technology, informal norms and processes, and the environment. The sixth subsection, "subsystem interactions," examines the effects of change in the institution in accordance with Deal and Rosaler's "pebble in the pond," or "herniae" theory. Selected changes are traced from their origin to their impact on other subsystems, and on how these changes affected the entire organization.

The National Institute of Law Enforcement and Criminal Justice Context

Crime is not an uncommon element of American political campaigns. While more usually a local political issue, it has emerged as a major issue on at least three occasions in American electoral politics–in the 1920s, in the 1960s, and more recently

in the early 1990s. In the 1960s, crime became a major issue in national elections, first pressed hard by Barry Goldwater and George Wallace in 1964, both of whom built their campaigns around a "law and order" theme. They used this issue to charge Lyndon Johnson and others with a permissiveness and leniency which encouraged crime and successfully made it a major element of the 1964 campaign. Reacting to this political pressure, Johnson–as the incumbent–began taking steps to defuse the issue (Diegelman, 1982; Feeley & Sarat, 1980; Navasky & Paster, 1976).

The response included two elements: a very small grant program aimed at providing direct assistance to state and local law enforcement, and a very public executive order by the President creating a bipartisan commission to study and develop recommendations for the nation on how to tackle the problem (Navasky & Paster, 1976). The Law Enforcement Assistance Act of 1965 permitted the attorney general to make grants to both public and private organizations to support the development and implementation of programs that would improve local capabilities to address crime (Ruth, 1968), and led to the creation of the Office of Law Enforcement Assistance (OLEA). Unfortunately, this agency "did not develop a clear set of priorities or plans to guide its funding activities, nor did it have a clear congressional mandate to guide its funding decisions" (Feeley & Sarat, 1980, p. 36).

Charged by President Johnson in his executive order to both bring crime under control and then to "root out the cause," the Crime Commission began its work in mid-1965. Organized into task forces, it produced nine separate reports on various aspects of crime and on the administration of criminal justice in the United States, concluding that

while "the criminal justice system has a great potential for dealing with individual instances of crime . . . it was not designed to eliminate the conditions in which crime breeds." According to the report, the criminal justice system needed help and any efforts to address poverty, inadequate housing and unemployment would also support the war on crime (President's Commission on Law Enforcement and Administration of Justice, 1967, p. 6). The Commission suggested, therefore, that no effort against crime would be complete until the very conditions that produced crime were corrected. "To speak of controlling crime only in terms of the work of the police, the courts and the correctional apparatus, is to refuse to face the fact that widespread crime implies a widespread failure by society as a whole" (p. 15).

The Commission also found a wide range of shortcomings in all the elements of law enforcement, including inadequate or nonexistent planning, a lack of training for criminal justice officials, and law enforcement delivery systems that lacked the capacity to meet local needs. Fixing these, the Commission suggested, would require major investments by the federal government in order to help state and local governments build the capabilities needed for system wide improvements. It would also require federal support for a number of innovative demonstration projects which would test a limited range of modern technologies in law enforcement, primarily in wireless communications and information systems. The Commission made clear that it believed an active partnership among the federal, state, and local levels of government would be required (President's Commission on Law Enforcement and Administration of Justice, 1967).

Since the Commission relied for its technology work on a Science and Technology Task Force managed by the Institute for Defense Analysis, it is not surprising that the Commission would adopt the systems analytic processes developed by Robert McNamara's Defense Department, especially since the Science and Technology Task Force was led by Dr. Alfred Blumstein, who was employed at the time in the Office of the Secretary of Defense (Conley, 1994).

Under Blumstein's leadership, the task force took a very expansive view of what technology could offer, observing that "the natural sciences and technology have long helped the police to solve specific crime" (Institute for Defense Analysis, 1967, p. 1).

"The use of systems analysis," observes the report, "was a major theme of the work of the Task Force" (Institute for Defense Analysis, 1967, p. 3). Further, because the range of research and development possibilities was so extensive, the task force felt it essential to begin its analysis with the problem rather than with the technology, so that efforts could be concentrated in areas likely to yield the most useful results. But doing this meant limiting the task force's work to parts of the criminal justice system which were "amenable to systems analysis, and then to present conclusions in appropriately qualified terms" (p. 3). Accordingly, the task force sought

- To identify problems, immediate and long-term, which might benefit from the application of science and technology and to suggest what research and development efforts were needed.
- To identify and describe the problems of crime control in a way which would make quantitative analysis possible and useful.

- To identify what data on crime control and the criminal justice system did not exist or was lacking, unreliable, or otherwise unusable, and to suggest ways to collect the data or correct the deficiencies.
- To conduct an analysis of the problems associated with the assessment of crime and the functions and performance of police, courts, and corrections in order to support the work of the Commission and its other task forces.
- To suggest strategies for developing, field testing, and rendering useful new devices, technologies, and techniques (Institute for Defense Analysis, 1967, pp. 3-4).

From this analysis, the task force developed 12 recommendations, only three of which necessarily involved the direct consideration of the application of the physical, biological or engineering sciences. Eight involved data collection, adjustments in either process or procedures, the introduction of programed learning to contribute to changing the behavior of youthful offenders, or the more extensive application of systems analysis to the criminal justice system. The last recommendation proposed a national research and development program which would focus on far more than the physical, biological or engineering sciences.

This outcome was probably inevitable because James Vorenberg, the Executive Director of the President's Commission was concerned lest the Task Force become so enthralled with technological solutions that it might "come up with something that might be viewed by some as a technological quick fix, and thereby detract attention

from some of the other more fundamental approaches being pursued by the operational task forces" (Blumstein, 1994, p. 146). This concern that technology as a quick fix might overtake the more important social concerns of the Commission lay at the center of much of the debate that followed publication of the report and creation of LEAA.

Blumstein would later write that the most "fundamental perspective that the Task Force emphasized . . . was the theme of looking at the criminal justice system as a 'system,' that is, as a collection of interacting organizations pursuing some common objectives." This meant that the Science and Technology Task Force, unlike the others under the Commission, tried consciously to consider every aspect of the criminal justice system in its analyses and to "emphasize the connections and interdependencies among the police, courts, and corrections parts of the system" (Blumstein, 1994, p. 149).

This emphasis on a systems approach caused the task force to limit its consideration of what might be considered major areas of technology interest to criminal justice. Forensics, for example, was explored by the task force but "never attained significant saliency," because of the "more pervasive systems perspective sought by the Commission," which felt that the Task Force could make no more than a marginal contribution to forensics in any case. Even if the Task Force was successful in identifying some important new development, the Commission did not believe it would have a major impact on the crime issues with which the Commission was concerned (Blumstein, 1994, p. 148).

Maintaining this attitude in the task force "took some strong determination in light of the intense commitment to their area displayed by forensic scientists." Oddly, it

was this very determination that seemed to ensure the forensic sciences would be firmly relegated to a secondary concern, because the Task Force was convinced that improvements in the forensic sciences "were going to come from basic improvements in laboratory instrumentation and measurement–all of which were under way continuously in the broader instrumentation and measurement industry–and not from the short-term efforts of our Task Force" (Blumstein, 1994, p. 148).

Perhaps the most important finding of the task force was that an extensive research and development program was needed, but this research program was to be not so much a program aimed at developing or applying technology, as it was to identify the contributions that could be made "from the processes of science and from the methods of systems analysis for analyzing and improving the operation and the performance of the criminal justice system' (Blumstein, 1994, p. 156).

The Johnson Administration used the Commission report to create a major federal program of support for law enforcement and criminal justice, an effort which led to the passage in 1968 of the Omnibus Crime Control and Safe Streets Act (Pub. L. 90-351). This bill established the Law Enforcement Assistance Administration and gave it a tripartite leadership structure in which all three of the senior leaders–one of whom was by law from the political party out of power–had to agree on every funding decision. This system had been developed by Congress largely to ensure that the attorney general, then Ramsey Clark, would have as little funding discretion as possible, and to prevent the development of a single "crime czar" within the federal government (Cronin, 1981,

p. 57). The arrangement stayed in place until passage of the Crime Control Act of 1973 (Pub. L. 93-83).

NILECJ came into being in October 1968 when an attempt was made to plan for a research structure which would comply with the requirements of Section 402(a) of the 1968 Act:

> There is established within the Department of Justice a National Institute of Law Enforcement and Criminal Justice (hereafter referred to in this part as "Institute"). The Institute shall be under the general authority of the Administration [of LEAA]. It shall be the purpose of the Institute to encourage research and development to improve and strengthen law enforcement.

To accomplish these ends, the Institute was authorized to use a broad variety of funding instruments and to engage in partnerships with

> public agencies, institutions of higher education, or private organizations to conduct research, demonstrations, or special projects pertaining to the purposes described in this title including the development of new or improved approaches, techniques, systems, *equipment, and devices* to improve and strengthen law enforcement. (emphasis added)

Elsewhere the Act directed the Institute to "carry out programs of behavioral research designed to provide more accurate information on the causes of crime and effectiveness of various means of preventing crime, and to evaluate the success of correctional procedures," as well as to undertake extensive support for programs designed to train law enforcement personnel. It was on the phrase "equipment, and devices" upon which all subsequent technology and physical science research and development efforts were justified.

Ralph Siu, then at the Department of Defense, was nominated to be the first director but was never confirmed and left when the Administration changed after the

1968 election (White & Krislov, 1977, p. 17). Henry Ruth thus became the first confirmed director, serving only one year before being succeeded by his deputy, Irving Slott. Slott then served as the acting director until early 1971.

Ruth established five centers in the Institute to conduct its work: the Center for Criminal Justice Operations and Management, which focused on the employment of operations research techniques to improve the management of law enforcement agencies; the Center for Crime Prevention and Rehabilitation to manage research into the underlying causes of crime and on new approaches to prevention and rehabilitation; the Center for Law and Justice, which concerned itself with the fairness and appropriateness of criminal laws; the Center for Demonstration and Professional Services which had as its principal mission the translation of research into action by providing technical assistance programs and disseminating research findings; and, finally, the Center for Special Projects which administered a modest fellowship program to support researchers, ideally working at the Institute itself during the fellowship (Law Enforcement Assistance Administration, 1969, p. vi; Law Enforcement Assistance Administration, 1970b, p. 48). No specific provision was made for an organization for technology.

Ruth was convinced during this period that Congress was hostile to research and thus was forced to spend an inordinate part of his time justifying the Institute's research efforts to Congress as well as to his own hierarchy. Charles Rogovin, the first LEAA Administrator, told evaluators from the National Research Council that he had promised Ruth "that he could design his own research program and enjoy real freedom and

flexibility in implementing it." As it turned out, however, Ruth's initiatives were constantly frustrated by the lack of agreement among the members of the troika (Velde, Coster, and Rogovin) who administered LEAA. "Despite a wealth of experience in assessing the quality of research institutions and individuals during his service as Deputy Director of the Crime Commission and in academic life, he was second-guessed on every judgment," a situation which characterized the role of every Institute director in the LEAA period. Theirs was, in every case, more a political than a research role (White & Krislov, 1977, p. 18).

In 1971, President Nixon appointed Jerris Leonard as the new LEAA Administrator, and Leonard appointed Martin Danziger to head NILECJ. With Congress still demanding quick demonstrations of the LEAA's effectiveness in reducing crime, Danziger reorganized the Institute into four divisions: Research Operations, Research Administration, Statistics, and Technology Transfer, and made clear in the Institute's 1973 program plan that this was done to allow the Institute to provide nearly immediate, operational support to the field (National Institute of Law Enforcement and Criminal Justice, 1973). The reorganization included no new division devoted to technology development. The Technology Transfer Division was essentially a dissemination operation, responsible for publications, conferences, and other outreach efforts.

This basic organization was soon modified, however, when the Statistics Division was moved out of NILECJ to become part of the National Criminal Justice Information and Statistics Service (now the Bureau of Justice Statistics) in December,

1972 (Law Enforcement Assistance Administration, 1973, p. 98), and again in 1974 when the Juvenile Delinquency Division was taken from the Office of Research Programs to become what is now the Office of Juvenile Justice and Delinquency Prevention. Danziger also decided to change substantially how programs would be funded, concentrating Institute dollars on a small number of very large grants and contracts in order to achieve the greatest possible payoff in the shortest amount of time. For example, the 1973 Annual Program Plan argued in one case that the program would invest a substantial portion of LEAA's discretionary and research funds to selected Impact Cities in order to "halt the increase in the target crimes and to achieve a 5% reduction in two years and a 20% decrease in five years" (National Institute of Law Enforcement and Criminal Justice, 1973, p. (b), a goal so explicit and so unachievable that it subsequently became a major source of criticism of the Institute's work (Feeley & Sarat, 1980)

The Institute's technology programs were similarly refocused from a number of individual projects, which were often in different divisions, into three very large programs within what was called the Equipment Systems Improvement Program (ESIP) within an Advanced Technology Division (ATD). This represented the only time before 1992 when the organization had a division or larger structure specifically devoted to research in the physical and engineering sciences. This program, which will be discussed in greater length later in the paper, continued in this form until at least 1977.

> In sum, the Danziger period produced an intensification of the Institute commitment to directly reducing crime. Goals, objectives, and planning were all

> tied to a belief that crime was a problem that could be solved: a war on crime on the model of the war on poverty. (White & Krislov, 1977, p. 21)

By the time Donald Santorelli took over LEAA in 1973, a series of reports from the General Accounting Office had criticized LEAA for not evaluating its programs to determine which worked and which did not. In response, Congress amended the Crime Act by requiring NILECJ to provide this function for LEAA, and so Santarelli directed Gerald Caplan, whom he had recently appointed to head the Institute, to create an evaluation capability. This meant that "the institute was being asked to carry a tremendous share of the burden of making LEAA effective" (Cronin, 1981, p. 157), but with this heavy burden came dramatically increased resources as the Institute budget increased from roughly $7 million in 1974 to over $25 million in the following year, a funding level near or above which the Institute remained until early in the NIJ Period (see Figure 1).

A consensus had apparently developed in both the Institute and in LEAA that specific crime reduction goals were not only unachievable, but politically dangerous, because Caplan was convinced that it was not possible to demonstrate credibly that there was any meaningful connection between changes in crime rates and specific programs, especially since crime rates had not only not gone down, but had actually increased in most places. Caplan thus reorganized the Institute to meet this challenge by creating an Evaluation Division and moved toward what National Research Council researchers called "a new period of deflating expectations" (White & Krislov, 1977, p. 22).

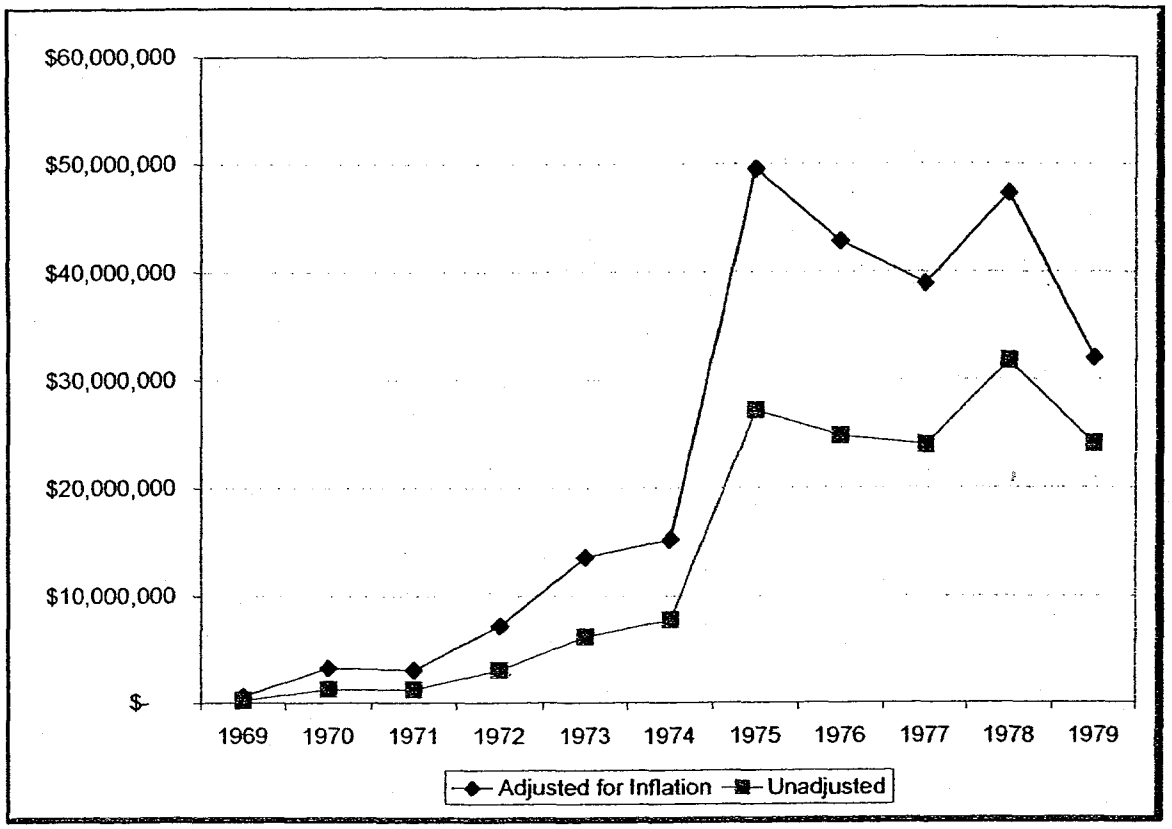

Figure 1. NILECJ funding levels, as claimed in NILECJ annual reports.

When Caplan left the Institute in 1977, it was facing a series of Congressional hearings. These hearings were conducted jointly by Subcommittees of Judiciary and the Science and Technology committees of the House of Representatives and led, in part, to the recreation of the National Institute of Law Enforcement and Criminal Justice as the National Institute of Justice after the death of LEAA in 1979 (Based in part on text material found in Feeley & Sarat, pp. 133-148).

Analysis of the National Institute of Law Enforcement and Criminal Justice

As the Institute's annual reports make clear, after Caplan's departure, NILECJ was led by acting directors, first by Blair Ewing and then by Harry Bratt, which meant

that–by the time NILECJ became the National Institute of Justice in 1979–the organization had been led by seven different directors and acting directors. Caplan had served the longest of any director, less than 4 years, and the average tenure was barely 18 months, with only three serving more than 2 years. One consequence was a constantly changing set of goals within the Institute.

Goals

Deal and Rosaler (1975, p. 11) maintain that "goals give organizations a general overall direction, . . . serve as symbolic rallying points for participants, [and] . . . are used to obtain social support and resources." Variances in goals, they observe, may occur in three major ways: (a) in the degree of consensus among significant participants on the goals of the organization; (b) in the specificity of goals, with some well articulated in terms amenable to measurement while others may be either too lofty or too diffuse; and, finally, (c) in the number of goals within the organization, possibly as a consequence of the relative complexity of the organization (pp. 12-13). Goals, in turn, are only part of the larger equation–vision, mission, goals, and objectives–that ultimately both defines what an organization is, and determines how successful it ultimately becomes.

While terms may occasionally differ, the notion that these elements (often emphasized in a different order) are crucial to organizational success is well recognized in the management literature, much of which suggests that goals are derived in the final sense from the vision and mission of the organization, and that goals then determine the

means and objectives of the organization. "To choose a direction, a leader must first have developed a mental image of a possible and desirable future state of an organization." This image, which may also be described as a vision, "may be as vague as a dream or as precise as a goal or mission statement," as long as it describes a view that offers a realistic, credible, attractive future for the organization (Bennis, 1985, p. 89).

> To get action and commitment you need to create a strong emotional vision or desire to be part of the organization. Tom Peters describes this emotion as passion, one of the three essentials for organizational success: vision, passion and action. (Hersey, Blanchard, & Johnson, 1996, p. 548)

The requirement for a limited number of well articulated goals is no different in government organizations than it is in private, commercial organizations. The very struggle to define the essential purpose of an organization can provide a powerful source of motivation to its members. "When it is done right, a mission statement can drive an entire organization from top to bottom. It can help people at all levels decide what they should do and what they should stop doing" (Osborne & Gaebler, 1993, p. 131). Unfortunately, however, while "public organizations work best when they have *one* clear mission . . . governments tend to load several different–and often conflicting–missions on each agency as the years go by" (p. 131).

Formal goals, however, do not often appear in clear terms in the various documents published by NILECJ. As a consequence, other indicators have to be relied upon to determine what the goals of the Institute were, even in the original task force report. The Institute did produce a number of indicators of what constitute its real

goals, but only occasionally articulated explicitly its goals, mission statements, or objectives. Many of the Institute's goals, however, can be determined only indirectly by examining what programs it chose to undertake, what functions it described as important, and what tasks it set for itself.

Formal goal development. From the beginning, even in the report of the Task Force on Science and Technology, the goals for science and technology programs aimed at addressing crime were unclear and subject to substantial room for both interpretation and disagreement. The task force recognized that "the natural sciences and technology have long helped the police to solve specific crimes," but argued that neither engineers nor scientists had had much meaningful impact on the operations of the criminal justice system or its major components, the police, courts, and corrections. Although more than 200,000 scientists and engineers had been employed in finding solutions to military problems and hundreds of thousands more had contributed to private sector innovation in many other areas of the daily life of Americans, only a tiny fraction of these had been applied to finding ways to control crime. "Yet, the two communities have much to offer each other: science and technology is a valuable source of knowledge and techniques for combating crime; the criminal justice system represents a vast area of challenging problems" (Institute for Defense Analysis, 1967, p. 1).

Unfortunately, declared the report, "in the traditional view, science and technology primarily means new equipment bought." While technology was capable of providing devices not then available that would be useful in improving the operations of

criminal justice agencies, technologies had been only very slowly incorporated into the operations of criminal justice agencies. This was partly because funding to buy the equipment had always been limited, the fragmentation of the market had offered industry little incentive to invest in basic development for an "uncertain and fragmented market," and criminal justice agencies rarely had technically trained staffs. "Much closer communication," they concluded, was "needed between criminal justice officials and engineers to identify the problems for the engineers and to enumerate the possibilities for the officials' consideration" (Institute for Defense Analysis, 1967, p. 1).

In order to achieve this end, the report identified several critical elements of information that would be required by scientists and engineers in developing effective research and development programs. Among these were information on the extent and nature of crime and its causes, information on current crimes to be used by police in the immediate apprehension of offenders, information on past crimes in order to help solve them, information on individual offenders in order to help prescribe treatment for them, information on criminal justice operations that would permit officials to better allocate their money and manpower, and finally, information on the "effects on crime of actions taken by the criminal justice system, to help promote the evolution of a more humane and effective system" (p. 2).

The task force, therefore, decided to rely on systems analysis as a "major theme of the work of the task force." The task force decided that because the range of research and development possibilities was so great, it would be essential to begin with the problem rather than with any specific technology, observing that "systems analysis is a

valuable method for matching the technology to the need" (p. 3). Although it would be necessary to "narrow the focus to those parts and aspects of the criminal justice system that are amenable to systems analysis, and then to present conclusions in appropriately qualified terms," the Task Force was convinced that systems analysis offered the greatest promise for solving these problems (Institute for Defense Analysis, 1967, p. 3).

They described this process as a series of steps, and diagramed an example of their work in using systems analysis to discover how the police patrol force might better deter crime by shortening the time it takes to respond to a call for help. In this example (see Figure 2) the objectives are shown on the risers and the means for achieving them on the treads. The support (in their example, assumptions) for each step is shown below the step. "By a sequence of analytical and empirical investigations, necessarily interlaced with assumptions and judgment, it was possible to proceed from a basic objective of the criminal justice system–reducing crime–to specific recommendations concerning new technology and operating procedures" (Institute for Defense Analysis, 1967, p. 3). This process, they believed, should be central to the nation's technology development efforts.

What is perhaps most striking about the five objectives identified by the task force, however, is that only two treat technology directly, while three focus primarily on what might be termed social science questions. This distinction is important, because the task force intended that technology be defined in the broadest possible manner and wanted to make certain that the focus was not solely on equipment. Nevertheless, as the task force's simplified illustration of a systems approach relating technology to crime

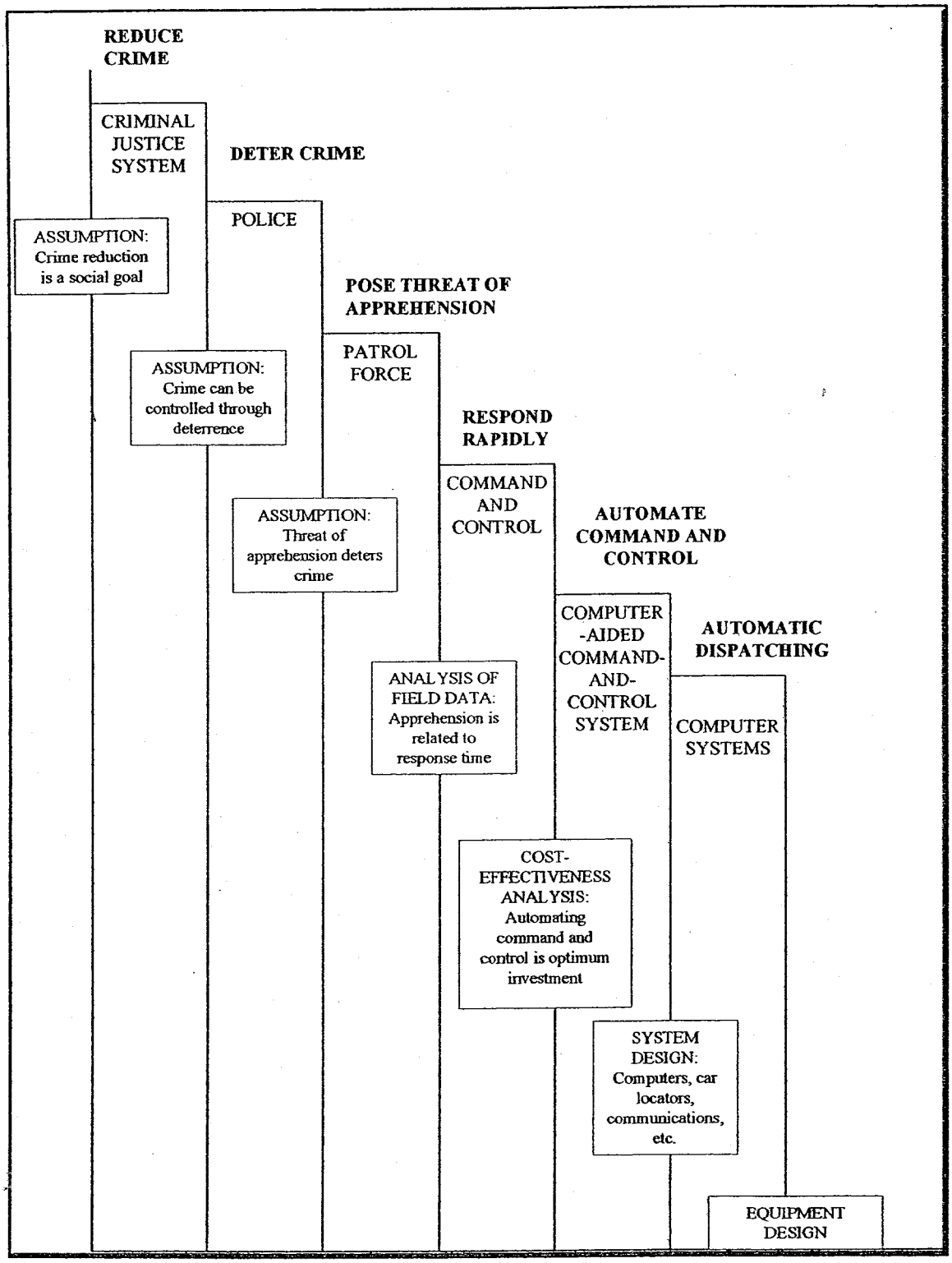

Figure 2. A simplified illustration of a systems approach, relating technology to crime control (Institute for Defense Analysis, 1967, p. 4, a government-funded, public domain publication).

control demonstrates, most of its focus was on equipment, especially on information technologies and communications equipment. Its illustration ends, quite explicitly, in "equipment designed." It should come as no surprise then, that of the 12 recommendations put forth by the task force, only five related explicitly to technology as defined here: efforts to reduce congestion on police radio frequencies; a program for the development of a semiautomatic fingerprint recognition system; studies examining technological innovations for police operations in such areas as alarm systems and nonlethal weapons; development of an outline–short of a detailed design–of a national information system for criminal justice agencies; and a proposal for a national research and development program (pp. 5-6). This last, however, included a great deal more than equipment or the physical sciences, wrapping it all into a confusing morass of research priorities in operations research, the social sciences, and technology, but with no clear indication of the most appropriate priorities. But as ambiguous as was this identification of goals for the development of technology, Congress introduced even more ambiguity when it attempted to translate the task force report into legislation.

In its earliest incarnations, LEAA was essentially a grant program, more specifically a block grant program, intended by the Republican administration to move substantial funds to the states. Research–either social or physical science–was only incidentally part of the mission established for it. Republicans, and some conservative Democrats, concentrated on passing an amendment to the act that would ensure that the states, rather than either the attorney general or the cities, would control LEAA funds.

Although the language included an institute for research and development, it was barely funded (Cronin, 1981, p. 54).

More importantly, Congress was determined that Attorney General Ramsey Clark, distrusted by both Republicans and conservative Democrats, not be permitted to have any meaningful authority over the anticrime program (Cronin, 1981, p. 57). In fact, the congressional language made clear that the program was intended to provide national assistance to state and local governments in "strengthening and improving law enforcement at every level." It declared that the purpose of this legislation was to: encourage state and local governments to develop and adopt comprehensive plans based upon evaluations of state and local problems of law enforcement; provide grants to state and local governments in order to improve and strengthen law enforcement; and encourage research and development in order to improve law enforcement, develop new methods for preventing and reducing crime and detect and apprehend criminals (U.S. Department of Justice, 1969, p. 2).

Included within the 1968 Omnibus Crime Control and Safe Streets Act (Pub. L. 90-351) were five specific tasks assigned to NILECJ:

1. Make grants to public and private organizations for research demonstrations and special projects.
2. Undertake research to strengthen law enforcement.
3. Carry out research on crime causes and crime prevention.
4. Make recommendations to federal, state, and local governments.
5. Provide training.

6. Disseminate information and establish a research center.

None of these tasks specifically mentioned technology of any kind, even though conservatives in Congress–in both parties–and large majorities in both the House and Senate Judiciary Committees supported the idea of providing funds to local governments for police support and equipment purchases, rather than for training, research, and experimentation. "Give them the men and the tools to do the job was a prevailing attitude" (in Cronin, 1981, p 12).

Nevertheless, Congressional guidance was unclear and typified by "creeping categorization," which called sometimes for police equipment and riot control, at others for support for high-impact cities programs, or for corrections, or for juvenile justice, or for courts and community programs, all of which only clouded matters further (Cronin, 1981, p. 138). The Safe Streets Act thus became more a "rhetorical vision which substituted expenditure for goals. The result is an administrative structure without the ability or authority to translate vision and money into a coherent program" (Feeley & Sarat, 1980, p. 135).

Since the primary responsibility for law enforcement has traditionally rested with state and local governments, suggestions of any federal role had to avoid even the slightest appearance that the federal government was going to usurp local authority for crime control. The result was a purpose defined as "fostering system change and improvement through national leadership and assistance," upon which LEAA built four basic purposes. It would: encourage the states to engage in comprehensive planning for a broad range of improvements in criminal justice agencies and programs; offer both

technical and financial assistance to the states to support plans to improve and strengthen law enforcement and criminal justice; undertake relevant research and development projects to improve the effectiveness of operations of criminal justice agencies and programs; and develop and transfer to the states improved ways to reduce crime, detect, apprehend, and rehabilitate criminals (Diegelman, 1982, p. 997). Unfortunately, "with each new LEAA Administrator came new direction and new program priorities" (p. 999).

The 1969 LEAA annual report noted that the agency's work had begun in that first year, and that grants were also awarded through the National Institute of Law Enforcement and Criminal Justice, "the research arm of LEAA," for a variety of programs which included studies of the development of new police equipment (Law Enforcement Assistance Administration, 1969, p. 3). There were, however, no explicit indications of goals for NILECJ, although the LEAA annual reports for 1969 and 1970 list eight aims for NILECJ that generally resemble what might otherwise pass for formal goals. This tendency to not explicitly list institutional goals held throughout the existence of the Institute. Only in 1972, under Director Martin Danziger did the Institute list explicit goals, although some sections in annual reports indicate–among the more usual generic topical headings–a few specific goals.

Whether characterized as goals, topics, missions, or a research agenda, the formal presentation of these changed frequently, in both number and character. Although explicitly defined goals appear only infrequently in the existing published materials by or about the Institute, headings and descriptions in the texts of the LEAA

and NILECJ annual reports offer useful clues. These headings or descriptions often served for the Institute as analogues for the Institute's real or public goals.

For 1969 and 1970, the Institute listed in the descriptions of the research foci of its five research centers, eight categories which could qualify as goals, although they were not so described in the annual report. Only one of these referred to the development of technology, but that one reference was unusually explicit, indicating that the Institute was "to sponsor development of new kinds of devices, equipment, and facilities for the increased effectiveness of the law enforcement mission" (Law Enforcement Assistance Administration, 1969, p. 23; Law Enforcement Assistance Administration, 1970a, p. 48).

By 1971, the number of headings had been increased by one and had been combined into such categories as "crime prevention," "police operations," "prosecution of courts," and so on. Development of equipment and technologies was now changed to "development and testing of new systems and equipment to improve police apprehension and clearance rates," and shared equal billing under "police operations" with preventing crime through improving community support for the criminal justice system, and with the development of new management techniques and technologies (Law Enforcement Assistance Administration, 1971, p. 71).

The next year, for the first time, the LEAA annual report explicitly identified four goals for the Institute, none of which made reference to technology or equipment development:

1. To improve understanding of the extent and consequences of crime, how the criminal justice system operates, and to assess the effectiveness of various crime prevention and control strategies.

2. To design, develop, and disseminate improved criminal justice procedures, policies and systems based on well executed research.

3. To assist in the design, implementation and evaluation of national demonstration programs.

4. To help speed the adoption and utilization of new approaches to crime control by the criminal justice community (Law Enforcement Assistance Administration, 1972, p. 17).

This expression of goals, however, was transient and was replaced the following year by a very lengthy list of nine categories–much like those used in 1971–within which were a number of "research and development activities." The annual report described these programs as being "organized around a model which ties all Institute efforts to the ultimate goals of reducing crime and delinquency and improving the quality of justice," and then, confusingly, indicated that the basic goals of the model were

- To alleviate social, economic, and behavioral conditions which cause crime.
- To intervene in incipient and ongoing criminal careers to reduce recidivism.

- To reduce opportunities for crime by identifying and developing preventive measures which will eliminate targets of opportunity and reduce the vulnerability of potential victims.
- To increase the risk of crime by improving detection, identification and apprehension capabilities of law enforcement agencies, and by improving the adjudicative process (Law Enforcement Assistance Administration, 1973, p. 98).

While none of the goals explicitly addressed technology development, one of the research problem categories was listed as the "equipment systems improvement program," but was, according to the report, limited to the development of "standards and guidelines and assist[ing] in identifying problems where new or improved equipment can provide a solution" (Law Enforcement Assistance Administration, 1973, p. 98).

Barely a year later, in the first annual report published separately by the Institute, Director Gerald Caplan had removed all reference to the four goals and had collapsed the eight research categories into six. As in 1971, the equipment improvement task had been lumped into another category. This time it was "Police" (National Institute of Law Enforcement and Criminal Justice, 1974, pp. 21-27).

But even stability at the head of the agency did little to reduce turbulence in the expressed goals and missions of the Institute. Over the next 2 years, Director Caplan changed both the form of the annual report and the research emphasis each year. In his introduction to the 1975 report, Caplan observed that the Institute was created "amid

great expectation about what could be done quickly to solve the problem of crime," in response to President Lyndon Johnson's vision of an "effort that would 'not only reduce but banish crime' in the United States." But, he observed, "time has tempered that vision" (National Institute of Law Enforcement and Criminal Justice, 1975, p. 1). Reflecting this newly tempered view of crime, the 1975 report listed three "issues"–efficiency, fairness, and reducing the cost of crime–and three programs: research, evaluation, and technology transfer (National Institute of Law Enforcement and Criminal Justice, 1975).

In 1976 the report again changed the way it presented the mission, agenda and functions of the Institute, perhaps because Caplan had now been the director long enough to more fully influence the report. It had ten section headings, including "The Citizen and the Criminal Justice System," "Designing for Safer Environments," and "Crime and Punishment" (National Institute of Law Enforcement and Justice, 1976), but none specifically referencing technology.

Caplan left the Institute during 1977, leaving Blair Ewing as the acting director to finish the year out and publish the annual report. This time the number of substantive headings in the report was reduced to seven, and several of the earlier categories returned, including "Police," "Adjudication," and "Corrections," but still none of the headings explicitly addressed technology. The following year continued the now annual process of redefining the Institute and, even though Blair Ewing was still the acting director, the number of areas of research interest to the Institute increased to ten. Even the category names were changed so that none of the headings were similar to those of

the previous year (National Institute of Law Enforcement and Criminal Justice, 1978, p. viii).

A final change came in 1979, when LEAA was abolished and NILECJ became the National Institute of Justice. This time the report, now prepared by new acting director Harry Bratt, simply listed the missions directed by the law, none of which made express reference to technology development.

This ambivalence about technology meant that throughout its history, NILECJ contained within the organization a number of contradictory perspectives, with the importance of the technology programs rising and falling as those perspectives changed. Lou Mayo (interview, December 12, 1998), who describes himself as one of the Institute's founders, maintains that it is pointless to "look for any sense of coherence or rationality as you look at the Institute programs over [the] years, because there isn't any." He maintains that this is because there was a "continual turnover of Institute directors with interim directors, acting Director's and everything else . . . so there was no continuity of management." More importantly, all his attempts

> to focus the Institute on clarifying its goals, its objectives, with measurable indicators, both to guide our program development and to assess its progress [were] kicked out. They did not want to hear it. Nobody wanted to hear it. Oh, as Institute directors came and went and presidential appointees came and went, and so forth, whatever the policy was, it changed from a high emphasis on technology to technology being a dirty word. (Lou Mayo, interview, December 12, 1998)

This was largely confirmed in 1977 by a National Research Council examination of the technology program, which found that "the isolation and frustration that characterize the [Advanced Technology Division] staff suggest an ambivalence toward

hardware research on the part of the Institute." In fact, the director at the time of the study "had stated a flat disinterest in hardware and equipment," even though his immediate superior–the Director of LEAA–"had repeatedly shown active interest in specific projects" (White & Krislov, 1977, p. 146).

Lester Shubin (interview, December 12, 1998), a chemist by training and manager of the Equipment Systems Improvement Program (ESIP), believes that "technology projects were included in official reports only because it was politically necessary to protect the social science programs." This attitude was probably aggravated by the attitudes of particular Institute directors, such as those of Gerald Caplan, about whom Dr. Richard Rau (interview, December 18, 1998), the principal program manager for forensic science programs, tells a story he believes typifies Caplan's view of technology.

For years, Institute publications were displayed on tables in front of a set of elevators outside the entrance to the Institute. Caplan happened to walk through one day and saw several stacks of technical standards for police equipment, which have always been among the most popular Institute publications among police. As Rau tells it, Caplan suddenly scooped up all the standards, dumped them in the trash and mumbled "who needs standards." Later, at a meeting with a senior official from the Department of Housing and Urban Development, Caplan asked a senior HUD official if they used standards and why they needed them. Since HUD uses a great many standards when it builds homes, the official responded in amazement, indicating that of course standards were important to HUD's work. "That," says "Rau, typifies the lack of

interest in technology most of our directors had, although Caplan was the most anti-technology of them all."

Even Richard Velde, a founding administrator of LEAA and largely considered within the Institute as "pro-technology," was convinced that the Institute was not really interested in technology, and so chose to use his authority to work around the Institute. He did this by initiating major projects such as the development of the 911 emergency telephone system and PROMIS (a computerized prosecutorial case management system), managing them from his office until they were well established and then assigning them to the Institute for management by the Advanced Technology Division (Richard Velde, interview, December 3, 1998). The degree to which this lack of interest in technology was a consequence of a single person's lack of interest in technology cannot be known for certain, but Caplan was known even outside the Institute as resolutely anti-technology (Tom Brady, interview, February 2, 1998). But it may also be that, because he served far longer than any other director, his attitudes have tended to produce especially exaggerated responses in some Institute personnel, especially within technology programs.

An examination of funding and reporting patterns strengthens observations heard in interviews that support for technology programs was generally limited. Since all the funding within the Institute was discretionary under the Crime Act, the director could allocate the funds as he saw fit. Except for the early, formative years of the Institute, technology was not well funded, and the differences in emphasis between technology and other, primarily social science research became even more stark after Caplan

became the director in 1973, as Figure 3 demonstrates. But a more telling indication of what may have been the Institute's real goals lies in what it considered important enough to report in its Congressionally mandated annual reports.

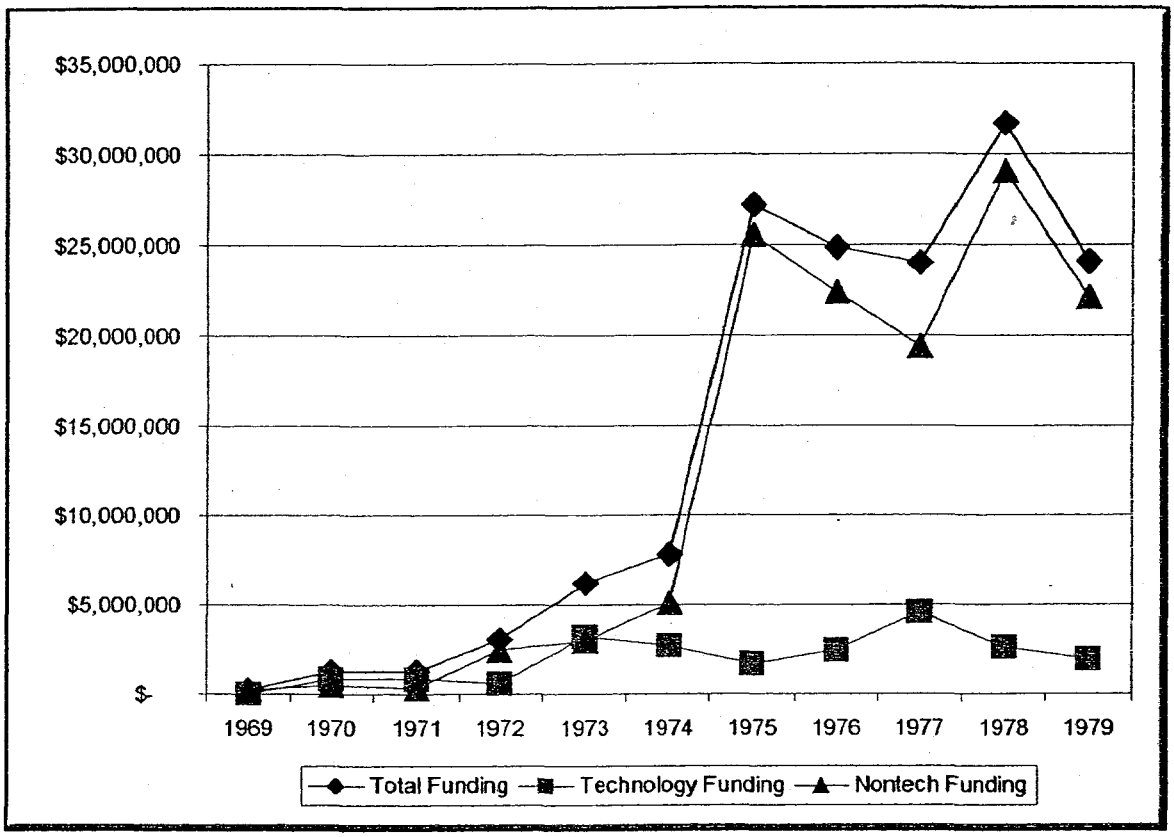

Figure 3. Distribution of funding, as claimed in NILECJ annual reports.

What the organization identifies as both its most important programs and greatest successes in reports to its key constituencies, tells us much about what the organization values and what it believes its most important constituents value. Such an analysis, by itself, cannot conclusively reflect the real goals of the organization, because published reports may reflect what current administrators and managers believe is necessary to satisfy outside constituencies or to head off criticism, rather than to reflect what is

actually happening in the organization. Nevertheless, such an analysis, added to other kinds of information, can help draw a better picture, through a process of triangulation, of how the goals were generally viewed within the organization (Yin, 1994, pp. 91-93).

From the very first report, the proportion of section headings and subheadings in NILECJ annual reports showed continuing declines in the share devoted to technology, from a high approaching 35% to a low of less than 5% by 1979 (see Figure 4). In 1976, in fact, not a single heading was devoted to technology. This analysis of section headings, however, may hide a brief period of greater interest in technology within the institute, since an analysis of the proportion of column inches of text (exclusive of project listings) devoted to technology shows an increase from just over 5% in the first annual report to a high of more than 25% in 1971, before a constant decline began that

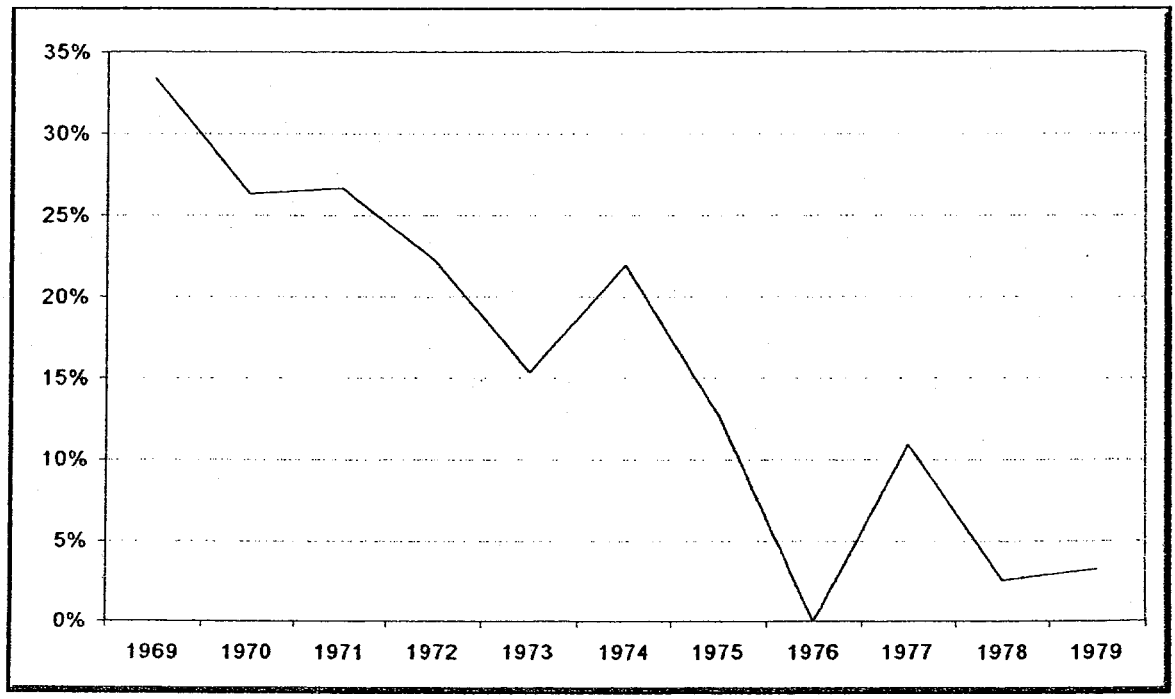

Figure 4. Percentage of headings in NILECJ annual reports reflecting technology.

brought the figure to less than 5% in 1979 (see Figure 5). Nevertheless, both analyses suggest a generally declining interest in technology programs.

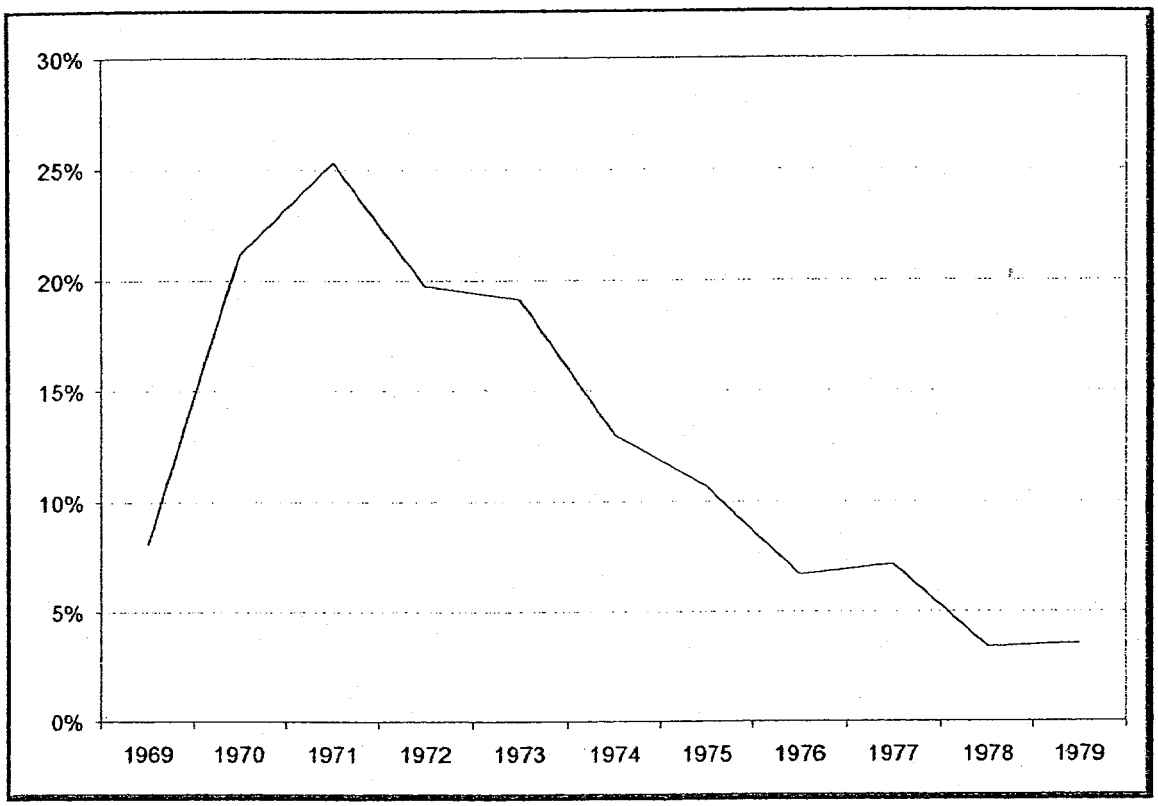

Figure 5. Percentage of column inches devoted to technology in NILECJ annual reports.

Summary of goals analysis. At the beginning of this section Deal and Rosaler are cited as identifying three sources of variances in goals: degree of consensus, specificity of goals, and the number of goals. If stability is added to these three, the nature of the goals of the organization can be fairly well summarized.

Stability, which was not included in the Deal and Rosaler list of sources of variance in goals, may have been the single most important issue in the organization. As

the archival record makes clear, NILECJ's goals and missions were always in a state of flux and the uncertainty this produced within the organization was particularly acute in its technology programs. It is also clear from interviews with Institute personnel, funding patterns and the contents of the Institute's annual reports, that most of the Institute's directors were only marginally interested in and in some cases actively hostile to technology development projects, despite the fact that its establishing legislation made technology an explicit part of the Institute's mission. The instability thus produced in missions and even in program categories inevitably made it difficult for program staff to plan, and–as many of the members of the NILECJ staff indicated–had adverse consequences on morale within the organization. NILECJ's goal subsystem appears, therefore, to be a fairly complicated one, a circumstance which the Deal and Rosaler typology (Deal & Rosaler, 1975, p. 13) suggests is likely to produce far less consensus than a simple, stable regime of goals. What happened in NILECJ, then, parallels Batten's observation that

> organizational policies, procedures, processes, and programs must be indivisibly rooted in the organization's philosophy, which is the basic repository of corporate vision and values, and which, in turn, pervades every part and person in the organization. It is important to note that in the absence of a coherent and cogent philosophy, mediocrity and a sense of drift abound. (Batten, 1994, p. 61)

In NILECJ's case, the organization's philosophy changed so often it could not offer the coherent and cogent philosophy Batten considers so essential to the maintenance of quality in an organization. Coupled with these changes in philosophy were equally frequent changes in the formal structure of the organization.

Formal Structure

The most important aspect of formal structure is that it "helps determine how effectively an organization will accomplish desired goals." Accordingly, all the dimensions of formal structure, including size, differentiation, interdependence, and coordination, directly influence the effectiveness of the organization (Deal & Rosaler, 1975, p. 15). The more stable this formal organizational structure, the more likely the organization will succeed in the accomplishment of its most fundamental missions, provided it has a clearly defined set of goals. Unfortunately, while more stable than its goals, the formal structure of the Institute changed frequently, evolving through three identifiable periods in the history of the organization, which the author has termed the academic, the transitional, and the mature.

The academic structure (1968-1970). When the Institute was first formed, Ralph Siu and Henry Ruth attempted to create a research Institute that resembled an academic institution. Accordingly, most of its resources were placed into five centers, much as a college might be divided into departments. Each of these centers was defined by a problem identified by or alluded to by the 1968 Crime Act:

– The Center for Crime Prevention and Rehabilitation, responsible for conducting and sponsoring research and development to determine the underlying causes of criminal behavior and develop programs for crime prevention, correction, and rehabilitation.

– The Center for Criminal Justice Operations and Management, concerned with identifying ways to improve the efficiency, structure, and tactics of various law

enforcement organizations, and with "the development of new kinds of devices, equipment, and facilities" to enhance the effectiveness of the "law enforcement mission."

– The Center for Law and Justice, which managed programs to study "the appropriateness, fairness, and effectiveness of our criminal laws and the procedures through which the laws are enforced.

– The Center for Special Projects, which principally handled the Institute's fellowship programs.

– The Center for Demonstration and Professional Services, charged with the dissemination of the results of Institute-sponsored research and the development of what is now the National Criminal Justice Reference Service (Law Enforcement Assistance Administration, 1969, p. 23).

It soon became clear, however, that much of

> . . . Congress doesn't cotton to the research and studies approach. The thing, for example, in the area of "research" that would impress many of the senators most is a new type of bullet that would have better and more effective results, i.e., killing someone faster and more totally, that is what you have to deal with when you talk about research with Congress. They want to satisfy the hardware people and the police first, those are the people they listen to. . . . (Cronin, 1981, p. 54)

The consequence of this disconnect between the "academic" design of the Institute and the police constituencies that influenced Congress was the creation of a task force, charged with examining the organization of NILECJ. Finding that the Institute's research program was "demonstrably non-productive" and its "grants process . . . not now well handled," the task force recommended that the Institute "take a more

aggressive grantsmanship stance." More importantly, "the Task Force also called for a major in-house research effort to be coupled with the outside research program" (Law Enforcement Assistance Administration, 1971, p. 69). Irving Slott, the acting director who took over from Henry Ruth, therefore began to transition the Institute into an organization explicitly based on the task force's recommendations and capable of responding more quickly to external political demands (Navasky & Paster, 1976).

The transitional structure (1971-1973). Slott's structure retained Ruth's center concept but reduced the number to three and folded them into the new Research Operations Division, which became the center of the Institute's major work. The Institute's intramural and extra-mural research responsibilities were divided between the Research Operations Division and the Research Administration Divisions, while LEAA's Statistics Division was moved from the LEAA front office into the Institute. The Center for Demonstration and Professional Services was renamed the Technology Transfer Division and given additional responsibility for the Pilot Cities operation. The LEAA library and Reference Service (which is now the National Criminal Justice Reference Service) was pulled under the Office of Operations Support. Technology development went into the Center for Crime Prevention, Detection and Apprehension within the Research Operations Division, rather than into the more aptly named Technology Transfer Division (Law Enforcement Assistance Administration, 1971, pp. 69-70).

Martin Danziger retained this basic organization but made the Institute a more explicitly operational organization by separating the evaluation function into the new

Planning and Evaluation Division in 1972 to meet Congressional criticism that no one knew whether the federally funded crime programs were reducing crime or not. At the same time, the Statistics Division, which had only just become part of the Institute, was transferred to the National Criminal Justice Information and Statistics Service. Technology development programs remained in the Research Operations Division (Law Enforcement Assistance Administration, 1972, pp. 17-18; Law Enforcement Assistance Administration, 1973, p. 98). One final major reorganization later, the Institute assumed the general structural form it would maintain until it was reorganized into the National Institute of Justice in 1979.

The mature organization (1974-1979). As Gerald Caplan took the reins of the Institute, it was experiencing a dramatic increase in funding, from about $7 million in 1973 to over $27 million by 1975. He took the basic structure developed by Slott and Danziger and expanded it as the Institute grew. He collapsed the four divisions Danziger had left after the departure of the Statistics Division into three offices devoted to research, evaluation, and dissemination.

The Office of Research Programs contained six divisions devoted to research into community crime prevention, juvenile delinquency, police, courts and corrections, education and manpower, and advanced technology. Technology development programs were contained primarily in the Advanced Technology Division, but a number of others were placed in the Police Division (e.g., forensic sciences, 911 emergency

communications systems, and the improved police car) and in the Community Crime Prevention Division (e.g., architectural security technologies).

The Office of Evaluation was effectively mandated by the Crime Control Act of 1973, which instructed the Institute to "evaluate various programs and projects . . . to determine their impact upon the quality of law enforcement and criminal justice and the extent to which they have met or failed to meet the purposes and policies of this title." Contained within this office was three divisions. One was charged with evaluating LEAA programs, a second with managing evaluation resources (primarily contractors), and a third with developing new evaluation research methodology tools.

The third office was called the Office of Technology Transfer and retained the major functions of the old Technology Transfer Division. This three-office structure remained generally intact until 1977.

Blair Ewing arrived in the Institute just as a critical National Research Council study of the Institute was completed, and just as Congress convened a series of critical hearings on LEAA. These hearings eventually resulted in the demise of LEAA and the reconstitution of NILECJ as the National Institute of Justice. At the same time, two other studies on the Institute's technology programs had also been commissioned and recently completed, both of which the National Research Council used in a case study of the Institute's Advanced Technology Division, which was responsible for the most expensive of the technology projects in the Institute.

The first study was an attempt by NILECJ to head off what the Institute's leadership thought might be a less friendly evaluation the management of LEAA was

threatening to fund (interviews, Paul Estaver, December 15, 1998; Lou Mayo, December 12, 1998). This study, an evaluation of the Equipment Systems Improvement Program (ESIP), found that the Institute's technology efforts were not well connected to the needs of the law enforcement community and declared that further investment in existing ESIP programs was not likely to result "in significant national benefits either in the long or short run" because the program lacked policy direction," and was not based on any "systematic appraisal of the real world situation and of the key issues confronting the main elements of the producer to user R&D system for law enforcement equipment" (Radnor, 1975, p. I-1).

The study suggested that a central policy issue NILECJ needed to consider was whether it "should be working towards the establishment of a national law enforcement technology laboratory along lines similar to that found in Britain and Japan, coupled with a decentralized assistance program for users and producers" (Radnor, 1975, p. I-6). The study also suggested the creation of regional technology centers, which "could act to aggregate user demand for specialized and costly equipment which might not be attainable by an individual user" (Radnor, 1975, p. III-10).

As it turned out, the effort to head off the LEAA study was unsuccessful when Administrator Richard Velde directed that the Arthur D. Little Corporation be funded to study ways to improve LEAA's utilization of research and development in science and technology (Tate, Kriegsman, Michaelis, Miles, & Prescott, 1976). This study inevitably focused on the only technology development program in LEAA, that of the National Institute of Law Enforcement and Criminal Justice. The study offered three possible

approaches: (a) an LEAA/NILECJ-managed R&D Program, performed by multiple contractors and grantees; (b) a prime-contractor-managed R&D program; or, (c) a multi-disciplinary R&D laboratory, similar to the one suggested by Radnor's (1975) study (p. v).

The study recommended rejection of the second alternative because it might mean the Institute would lose its ability to direct the program and rejection of the third as far too expensive to be justified. Adopting the first recommended alternative would "entail a considerable expansion of internal effort and a modified approach for NILECJ in the area of technological research and development." This could best be accomplished, the study's authors suggested, by creating a new office within NILECJ, which would both incorporate and replace the existing Advanced Technology Division and be on an equal level with the principal offices of the Institute (Tate et al., 1976, p. 75). Ironically, such an office would not be created anywhere within the Justice Department until 1992.

At the same time the Arthur D. Little study was underway, LEAA also asked that the National Research Council conduct a comprehensive examination of all of NILECJ's research programs. Observing that "the technology program in NILECJ began and has remained structurally separate from the other research programs" (White & Krislov, 1977, p. 130), NRC researchers suggested that it might be neither useful nor feasible to make technology research and development a separate and discrete activity within the Institute (p. 131), because–without mechanisms to assess the social implications and benefits of every project–"no level of spending on technology can be justified" (p. 147).

This report played a major part in the subsequent Congressional hearings, and was included as an appendix in the report of the hearings (U.S. House of Representatives, 1977, pp. 307-358). While these hearings resulted in the Justice System Improvement Act of 1979, which killed LEAA and made NIJ (NILECJ's successor) an independent agency within the Justice Department, they led to no specific legislative directions to reform the technology program in NILECJ. Indeed, they exemplified the standing disagreements between liberals and conservatives in Congress and in the Administration. As Congressman John Conyers described it,

> . . . this is a precise instance of being caught between a rock and a hard place, and it is going to turn on what kind of attitude is in the Department of Justice. I mean, . . . if we don't have the kind of attitude that is going to sanction legislation [to follow the NRC recommendation to make the Institute an independent agency outside the Justice Department] at least he has been candid enough to tell us up front they want high success, immediate-application-type activities, which means we are back into applied science systems, gadgetry, and the whole thing that reverses what we are supposed to be learning after 8 years of fumbling around with LEAA. (U.S. House of Representatives, 1977, p. 216)

Faced with these divergent recommendations and a very visible set of ongoing political battles, Blair Ewing--who was only the acting director--took a cautious approach to reorganizing the Institute. He split the Office of Evaluation into two new offices, the Office of Research and Evaluation Methods and the Office of Program Evaluation. He renamed the Office of Technology Transfer the Office of Development, Testing and Dissemination and moved into it the personnel from the former Advanced Technology Division, which he abolished. Finally, he created an Associate Director for Science and Technology within the Office of Research Programs to oversee all the projects throughout the Institute. He did not, however, consolidate the technology development

programs under the new associate director, but left them scattered throughout the Institute. Most, in fact, went with the former ATD staff to an entirely different office under a different and more senior office director.

Where technology lay in the Institute remained confusing even to program managers, some of whom evidence frustration even now. Asked where technology programs were managed within the Institute, Lou Mayo (interview, December 12, 1998) could only answer only that it had once been in his division, but "then the management changed and technology became a dirty word, all that was wiped out, all the tire tracks" (Lou Mayo, interview, December 12, 1998).

Summary of Structural Analysis. As Deal and Rosaler (1975) make clear, the formal structure of an organization is not the same thing as the inanimate wiring diagrams published by organizations. Instead, "structure is the formal network of organizational (a) roles, (b) relationships, and (c) processes" (p. 51), and can be understood in four dimensions: (a) the *size* of the organization; (b) how responsibilities are allocated among the various specialized units or roles of the organization, termed *differentiation*; (c) the pattern of relationships among the various roles units of the organization which defined its *interdependence*; and (d) *coordination*, which is defined by the mechanisms existing within the organization to integrate the diverse efforts of the various roles and units in order to ensure that the various elements of the organization work together (pp. 15-16). Deal and Rosaler suggest that these dimensions are closely related to organizational size, and that the degree of differentiation of responsibilities,

interdependence among the elements of the organization, and the mechanisms required to maintain coordination increase in complexity as the organization grows.

To some degree, this was true with NILECJ, but the amount of fluidity of roles and relationships throughout the Institute's history is striking and may have contributed more to the complexity of these dimensions than did the size of the organization. NILECJ remained, throughout its history, a relatively small organization that should, in keeping with the Deal and Rosaler perspective, have meant that differentiation, interdependence, and coordination remained uncomplicated. Yet, as the Institute's history demonstrates, this clearly was not the case.

Although NILECJ was the putative research agency for LEAA, it was often bypassed by the LEAA Administrator in his efforts to achieve particular goals, especially in technology development. Even within the Institute, competition for missions often resulted in a blurring of the formal lines of responsibility in the organization and exacerbated institutional tensions. "Interest in technological research by nontechnological staff," for example, "seems to have often been affected by feelings of threat or competition" (White & Krislov, 1977, p. 142).

Although the formal wiring diagrams describing the organizational structure of the Institute stabilized by the end of the fourth or fifth year of NILECJ's history, specific projects and project managers were frequently and often arbitrarily moved about within the organization. A 1976 study of the Institute found that "the category [Advanced Technology Development] varies in definition such that activities described in a particular year may be included under another program in the next (and vice versa)"

(Tate et al., 1976, p. 106). In one instance, all the operations research positions–which described most of the technology personnel in the Institute–were reclassified as social science positions, even though the presence of operations researchers in a research agency had been a major recommendation of the 1967 President's Commission on Crime (interviews, Richard Rau, December 10, 1998; Richard Laymon, December 10, 1998).

Deal and Rosaler (1975) suggest that the degree of interdependence among elements of an organization will be reflected by the level of coordination among those elements (pp. 15-22). Clearly, the independence of the technology program from the other activities of the Institute typify Deal and Rosaler's observation that the reverse relationship is also reflected in complex formal structures where a lack of coordination leads to a reduced level of interdependence among elements of the organization (p. 26). Not surprisingly, changes in the formal structure of the organization generally entailed changes to the organizational technology employed by the Institute to accomplish its missions.

Organizational Technology

The technology employed by an organization to accomplish its mission depends in large measure on the nature of that mission. For example, Deal and Rosaler (1975, p. 14) point out that "in schools the principal technology is the instructional program." For the NILECJ technology program, it was the combination of structure, processes and procedure employed to decide which projects to fund in the development and

modernization of law enforcement technologies within state and local law enforcement organizations.

Initially, NILECJ employed a competitive grant process for all its programs, and for the first two years universities, research organizations, and public agencies were the principal beneficiaries. In 1969, of seven grants awarded by the Institute, four went to colleges or universities, two to research centers and one to a police department. The following year, five went to universities, four to police departments, two to research organizations funded exclusively by the government (RAND and the Institute for Defense Analysis), and one went to a special interest group, the International Association of Chiefs of Police (IACP). By the next year, an increasing share of the awards began to go to government owned or operated activities and to government agencies. Technology programs, in particular, began to be placed in federal, often military, laboratories (National Institute of Law Enforcement and Criminal Justice, 1973). Most of these early grants for technology were directed at studies and evaluations of the application of technologies, although as the years passed, the share devoted to technology development increased.

This reliance on discrete grants placed a huge burden on a very tiny staff. The original NILECJ staff numbered only four, including the director, and by the end of 1970 was managing 19 separate grants or interagency agreements (contracts between federal agencies), nine of which were technology projects. By the end of 1971, the project total had doubled to 38 and technology projects were spread among several different parts of the Institute's small staff.

Danziger then directed what was "probably the first attempt at a systematic process for analyzing technology needs and then prescribing a development and standards operation based on that analysis," a process which would be conducted mostly under contract by activities outside the Institute (White & Krislov, 1977, p. 131). Called the Equipment Systems Improvement Program (ESIP), this work was to be accomplished under "umbrella" contacts in which the contractor, generally supervised by the Institute, would be required to define the program and subcontract out under its supervision what it could not accomplish by itself.

The precedent for this approach had been established earlier, with the creation in 1970 of the Law Enforcement Standards Laboratory (LESL), which was set up to develop standards for law enforcement equipment. Since the Institute had no laboratories of its own, it provided $44,000 to establish a small interagency agreement with the National Bureau of Standards to set up the laboratory to serve as NILECJ's standard-setting arm. By 1971, demands on LESL had grown so much that the agreement was increased to more than $480,000, provided in three separate funding agreements. In 1972, four more funding increments were provided, totaling more than $1.3 million, so that by the time ESIP was started, the Institute already had in place a significant standards-setting capability.

ESIP initially began in 1972 as a three component program, each with its own umbrella contract. Its objective was to "contribute to the solution of law enforcement and criminal justice problems by developing, demonstrating and evaluating new or improved

procedures and equipment systems," and consisted of an analysis group, a development laboratory, and a guidelines and standards group (Holden, 1972, no page number).

The first award was for $1 million to the Mitre Corporation to set up the Analysis Group to "identify and formulate criminal justice system problems and assess the value of existing and proposed systems for the resolution of these problems" (Holden, 1972, no page number). Oddly, though, this award preceded by only one month the second award for $1,850,000 to the Aerospace Corporation, to set up the Development Laboratory to develop "solutions to criminal justice systems problems admitting to hardware solutions, . . . generate design concepts, . . . fabricate prototypes and test gear for evaluative purposes, . . . prepare field evaluation test plans and [support] operational tests and evaluations in the field (Henshall, 1972, no page number). LESL made up the Guidelines and Standards Group.

Starting both the analysis and development activities at the same time meant that, because the budget did not increase as anticipated, much of the planning work of the Analysis Group had to be scrapped after 14 months and a $2.6 million investment because it was too ambitious. It also meant that the Development Group had to plan its own research and development program without information from the Analysis Group on real needs in the field. Because Development Group projects were very large and expensive, and took a long time to be completed, they tended to be continued

> despite any recommendations from the Analysis Group, and, in many cases, despite desires on the part of the Institute to make major changes in the development program. In short, commitments to early decisions and early dollars were locked in. (Kramer, 1977, p. 132)

These grants were soon followed by an award to the California Crime Technological Research Foundation for $37,970 to the California Crime Technological Research Foundation to "provide an independent source of review for the National Institute's Equipment Systems Improvement Programs's [*sic*] . . . Analysis component" (Wormeli, 1972, no page number). This was a task Mitre was to perform, yet this grant was awarded barely 6 months after Mitre began its work. The reasons for this award, funded well before the Analysis Group could possibly produce any usable products, are lost in the mists of time.

By the time the National Research Council report on NILECJ had been published in 1977, nearly $22 million of the Institute's $31 million investment in technology research and development had been spent by ESIP (Kramer, 1977, p. 131), without–in the opinion of many observers–having delivered anything of value. Some believed this failure occurred because "NILECJ does not have a clear sense of mission independent of the pressures it experiences from both LEAA and a larger political arena" (Kramer, 1977, p. 134), while others suggested that the problem arose from an insufficiently broad vision on the part of "its own personnel or from the outside help it solicits" (Radnor, 1975, no page number), from inadequate monitoring (Tate et al., 1976, pp. 108-110), and from an inability to accurately predict what would be the effects of various funding strategies on the time required to complete various projects. This left the Institute unable to determine "whether individual projects could be completed faster if higher funding were authorized" (Lowe, 1976).

Lester Shubin, program manager for ESIP, blames Aerospace for the key failures, because "they spent their time working on pet projects and wouldn't pay attention to what law enforcement really needed." In his view, they were deciding mostly on their own what to develop, burned up huge amounts of money because of a very high overhead, tended to submit huge and mostly unusable progress reports, and took far too long to deliver products to the field. One of Shubin's favorite examples is a police transceiver that could be carried in one hand. Despite huge investments, "commercial outfits like Motorola beat them to it so it was obsolete even before they completed it." According to Shubin, only LESL had managed to stay focused on what was really needed by law enforcement, and although their work was limited to the development of equipment standards, this work "turned out to be more important than what Aerospace was doing." For these reasons, Shubin killed the ESIP contract with Aerospace as soon as he could after arriving at NILECJ, maintaining that "they weren't doing anything but eating up money" (Lester Shubin, interview, December 12, 1998).

The NRC report bolsters Shubin's observation that LESL, in contrast with some of the other elements of ESIP, was effective and pointed out that LESL–although conceptually a part of ESIP–actually predated ESIP by several years. It had been created in response to a Crime Commission recommendation for a standards laboratory for law enforcement and had, since 1971, been operated with NILECJ funding by the National Bureau of Standards (NBS) as a technical management unit within the National Bureau of Standards that funneled law enforcement work to operating laboratories within the NBS. It had, according to the NRC report, undertaken over 160 separate projects on a

wide range of law enforcement-related technologies, including communications equipment, security systems, protective equipment, investigative aids and other systems such as lights, sirens, prison locks, buildings, vehicles, and others. During the first 10 months of fiscal 1976 alone, LESL completed 34 standards, 6 guidelines, 50 reports, and 7 materials, and had been allocated only about $8 million total from its creation through fiscal 1975 (Kramer, 1977, p. 133). More importantly, of all the elements of ESIP, LESL was the only one that had a clearly established an effective mechanism for obtaining user input.

Lester Shubin had established the Technology Assessment Program Advisory Council (TAPAC), a panel of law enforcement officials (many of them chiefs of police and sheriffs) from throughout the United States, to develop priorities for LESL's development of standards and guidelines. Although the group had no published instructions to guide development of its priority lists, it met annually and Shubin was able to develop significant loyalty among its members, several of whom serve on NIJ's successor council, the Law Enforcement and Corrections Technology Advisory Council (LECTAC) to this day. He describes LESL as his "ace in the hole," because it allowed him "a way to put extra money in an account in LESL so that when [he] needed something done quickly, LESL could do it." Since LESL wasn't using NBS money, NBS managers were rarely concerned about how the money was used (provided it was used legally), which meant that the program ran with almost no interference. Most of TAPAC's work was accomplished by LESL, which probably explains part of law enforcement's satisfaction with the laboratory, and for the body armor program which

Shubin indicates was developed principally through a partnership with the Army laboratory at Aberdeen Proving Grounds and with LESL (Lester Shubin, interview, December 12, 1998)

LESL, alone among the components of ESIP, survived beyond 1977 and is still funded by the National Institute of Justice as the Office of Law Enforcement Standards. Technology development programs in NILECJ were never again consolidated under large contracts or agreements. Instead, NILECJ returned to the use of a competitive grants process.

While more than the organization's technology is involved in determining whether an organization is successful or not, the processes it employs are significant components in its efforts to accomplish its mission, especially in technology development organizations (Rogers, 1983, pp. 348-355). It is appropriate, therefore, to include a brief examination of what NILECJ's technology programs may actually have accomplished.

Technology accomplishments. Remarkably, despite the essentially negative findings of most of the studies of NILECJ's technology program, the Institute still managed to develop a number of significant technologies for the law enforcement community, many not recognized until years later. When the National Institute of Justice published *25 Years of Criminal Justice Research*, among the technology accomplishments it claimed credit for was an odd mix ranging from fairly mundane

studies to highly complex scientific techniques or advanced technologies. Included from the NILECJ era were (National Institute of Justice, 1994, p. 45-49):

- A determination that installing longer screws in the striker plates of doors made doors "almost impregnable to those who wanted to kick them down."
- Evaluative studies of night vision devices which "led directly to the wide-spread use of night vision gear by law enforcement agencies today."
- Assessments of helicopters in police operations.
- "Establishment of scientifically based, voluntary commercial manufacturing standards so that police agencies could select high-quality, low-cost equipment."
- Standards for radios, walk-through and hand-held metal weapon detectors (NILECJ Standard 0601 for airport metal detectors is still in use), portable x-ray devices for bomb disarmament, handcuffs, etc.
- Key research and development in the forensic sciences on techniques to identify trace evidence, blood and semen analysis, drug detection dogs and others.

The most often claimed success, however, was the body armor program that developed bullet resistant body armor for police and which provides what is probably the best example of the more informal and personal mechanisms used to develop technologies in NILECJ. Widely identified by former NILECJ personnel as Lester Shubin's singular contribution, he described it as a work of love involving a number of

players from several different organizations (interviews, Paul Cascarano and James Stewart, October 15, 1992; Lou Mayo and Lester Shubin, December 12, 1998).

Shubin claims his interest was generated by an advertisement he saw in an airline magazine which suggested that Kevlar® was stronger than steel. He immediately contacted DuPont, the manufacturer of the material, and asked if he might be allowed to shoot several samples. Satisfied by these informal tests that the material had great promise, Shubin managed to initiate a project in 1972 with the U.S. Army's Land Warfare Laboratory to develop a lightweight, comfortable, and effectively protective garment. Once a prototype vest had been developed and tested extensively, Shubin arranged to have 4,200 garments produced, and purchased another 800 from commercial sources. These garments were then provided to police officers in 15 urban departments, each serving a population greater than 250,000, and data on wearability and performance were collected. Shubin then worked with the International Association of Chiefs of Police and the DuPont Corporation to create the Kevlar® Survivors' Club which widely disseminated information on every incident in which body armor played a role in saving an officer's life, and charged LESL with developing performance standards for the product. Finally, he created a mechanism, the Technology Assessment Program Information Center, to manage the testing of bullet resistant vests against the standard, and to help publicize information on which vests passed (National Institute of Justice, 1992; Lester Shubin, interview, December 12, 1998; National Institute of Justice, 1994).

The body armor program was so successful that both NILECJ and NIJ have touted it in every annual report since it was first demonstrated. According to NIJ, within the

first six years of its introduction, body armor was credited with saving more than 400 police officers' lives, a number that had grown to more than 1,500 by 1993. The significance of this accomplishment, NIJ has repeatedly reported, goes beyond even its human dimension and is responsible for an estimated savings in survivors' benefits and replacement costs of more than $1 million per officer for a total of $1.5 billion by 1993. It has even created a new industry (National Institute of Justice, 1994, p. 47).

Summary of organizational technology analysis. The technologies employed by NILECJ as the "vehicle for reaching goals," began and ended with the same basic approach (i.e., a competitive grant program), but never provided for a complete concept to deployment process. In some cases, projects were undertaken without ever involving the end user of the proposed technology, while in others, "what was not adequately planned for was dissemination" (Kramer, 1977, p. 133). Only one major effort, development of soft body armor, seems to have touched most of the essential elements, a situation which seems to have been largely both serendipitous and personality driven. Unfortunately, neither Shubin nor anyone else in the Institute ever published any explicit descriptions or analyses of what the elements of this process were, probably because they were largely unaware that they had identified a possibly unique and effective approach that could be applied to other technology development efforts.

Although the approach does not seem to have been applied to any other development process in NILECJ, it has been studied at length and reconstructed and adapted for use as the foundation of the process now used by the Office of Science and

Technology, established in 1992 as the technology component of the National Institute of Justice (National Institute of Justice, 1996).

Informal Norms and Processes

Deal and Rosaler (1975, p. 22) define informal norms and processes as "the unspecified features of organizational life [arising] from the personal needs, beliefs, and orientations of individuals and the social needs of small groups." As a consequence, "the informal part of an organization is often irrational and unpredictable, [yet] has patterned and regularized features" (p. 22). Other scholars have noted similar characteristics in informal organizations. Katz and Kahn (1978, p. 80), for example, note that the formal structure of an organization is "set up to insure predictability, efficiency and coordination of the efforts of a great many individuals." This runs counter to the notion of individual differences and "the needs of people for self-determination, spontaneity, accomplishment, and the expression of individual skills and talents" (p. 80).

Lou Mayo (interview, December 12, 1998), Director of the Policing Division, put it even more starkly. "I wouldn't say there was disagreement [over the mission or goals]. It was just that there was no systematic coordination. One division would be doing something. Another division would be doing something else."

Within any organization, informal norms and processes will inevitably develop, through which the actual work of the organization is accomplished. These "informal norms and processes arise from the personal needs, beliefs, and orientations of individuals and the social needs of small groups" (Deal & Rosaler, 1975, p. 22). This

informal subsystem reveals itself in three ways: through "(a) communication patterns (who talks to whom?); (b) affective ties (who likes whom?); and (c) informal influence (who has the most clout . . . with peers [or] with superiors?)" (p. 22). Individual preferences, personal feelings of satisfaction, rewards, identity, and self-concept weave together to produce intricate work behavior patterns in organizations, which may either produce or limit conflict. As Katz and Kahn (1978) have pointed out, "every group thus develops its own pattern of communication, interaction, and informal norms to meet the social and emotional needs of its member" and often these structures operate in "contradiction to the prescribed institutional paths for reaching those goals" (Katz & Kahn, 1978, pp. 80-81).

This pattern was evident in NILECJ, where instability in organizational goals and the perception on the part of the technology program managers that the Institute's constantly changing leadership was often hostile to the very existence of the programs they managed, led to the development of a number of informal, undocumented processes. Much of this arose from the fact that, while there may not have been significant disagreement on the Institute's mission, there also was–as Lou Mayo observed–no systematic coordination.

There existed no formal coordination mechanism within the Institute to resolve such disagreements, and attempts to develop one were generally met with hostility or indifference. "Interest in technological research by nontechnological staff," for example, "seems to have often been affected by feelings of threat or competition" by the technology development staff (Kramer, 1977, p. 142). Lou Mayo, who had supervisory

oversight of most of the technology programs in NILECJ claims that all of his efforts "to get a coherent Institute plan, a philosophy, a values specific goals, objectives, and measures . . . was always stopped" (Lou Mayo, interview, December 12, 1998).

Influence over program choices varied from director to director, although Paul Cascarano, the director of the dissemination activity, often emerged in interviews as a particularly influential figure in the Institute, possibly because he was–for most of the organization's history–the only civil service supergrade (what would today be a member of the Senior Executive Service). No single person, however, always had primary influence. As Dr. Rau observed, each director had certain people he listened to more than to others. For much of the Institute's history, Paul Cascarano–as the only member of the Senior Executive Service in the agency–exerted the most influence. At other times, the "head of what was called the research office, research programs had more clout with the director, but that was a function primarily of what director was in office, who they listened to." All this could and often did change even within one director's term because "he could get teed off at somebody [and] start listening to somebody else" (Richard Rau, interview, December 10, 1998).

While Richard Velde was present in LEAA, initially as the Associate Administrator and later as the Administrator, technology programs received considerable support, at least from LEAA if not from NILECJ's own leadership. But once Velde left LEAA and ESIP was eliminated, the principal technology manager–Lester Shubin–was virtually isolated within the Institute, a fact which still offends Lou Mayo.

> Once the ESIP program went down, there was no support for it. The point man for technology was left twisting in the wind, was Lester Shubin and he wasn't supported by anybody and he was crapped on by many. Finally, towards the end of his career, [the Institute] gave him a $500 bond for recognition for his work. And I'd say, come on, he saved thousands of police officers lives. He's the only person in the Institute that could say that. (Lou Mayo, interview, December 12, 1998)

Not surprisingly, Shubin developed his own informal organization and technology development process, although he still does not articulate it in so explicit a fashion, nor does he seem fully aware of the reasons the project succeeded. Shubin believed that "the social scientists [in the Institute] kept trying to take all the technology money for their social science projects," so he developed, not entirely consciously, a technology approach which consisted of four major components: a small competitive grant program, the Law Enforcement Standards Laboratory, the Technology Assessment Program Information Center which supported an advisory council of law enforcement officials known as the Technology Assessment Program Advisory Council (TAPAC), and an informal process that had its most successful application in the body armor program (Lester Shubin, interview, December 12, 1998).

Neither Shubin nor anyone else in the Institute ever developed a description or diagram of the development process employed so successfully to produce body armor, but the key elements of that largely ad hoc process are discernible in the history of the body armor program. The author of this study has broken this process into eight discrete steps.

1. Identify potential technologies from any source and take steps to introduce them as potentially useful technologies to the law enforcement community.

2. Determine the feasibility of the technology through limited, informal testing.

3. Confirm the need for the technology by consulting with prospective users, relying especially on a standing panel of law enforcement personnel to provide a credible sounding board.

4. Develop prototypes of the technology, leveraging major government research and development activities where possible (e.g., Aberdeen Proving Ground, where much of the research and development was accomplished) and subject them to extensive technical (laboratory) testing.

5. Produce or purchase enough working samples of the technology to conduct credible operational tests by actual users.

6. Develop performance standards for the commercial products which result from this development effort.

7. If appropriate, test the commercially manufactured versions of the product against the standards in a voluntary program, and publish the results to users.

8. Finally, develop an effective public information campaign to inform prospective users of the successful application and value of the product.

These basic steps, developed by the author of this paper and confirmed in 1994 by Shubin as generally descriptive of what he believed he had tried to do, were adapted by Dan Hunt of the extended staff of the Office of Science and Technology (which includes personnel employed under contract as "Scientific and Technical Assistants," as well as federal staff) and published by the National Institute of Justice in a technology

solicitation published in 1996. A summary diagram of that process is illustrated in Figure 6.

This diagram lays out the foundations of the NIJ research and development process and expands the 8 steps to 10, depicting them as a pyramid beginning with the identification of needs and ending with the documentation of the entire development process (National Institute of Justice, p. 2).

Summary of informal norms and processes. According to Deal and Rosaler (1975), organizationally dysfunctional conflicts often arise from informal intergroup disagreements or apparent dichotomies between an organization's formal and informal subsystems (p. 22). Paradoxically, these "informal patterns may [also] be highly effective in [either] solving problems or in reducing conflict" (p. 23). It seems clear that both cases applied to NILECJ's technology program.

The perception on the part of NILECJ's technology staff of significant hostility on the part of the larger social science element of the Institute led to a nearly total isolation of its principal technologist. This, in turn, caused him to follow–whether consciously or by happenstance–his own informal technology development process which resulted in what is generally acknowledged as the Institute's most successful (and possibly most important) technology effort, and which became an important part of the Institute's efforts to defend itself in an often hostile environment.

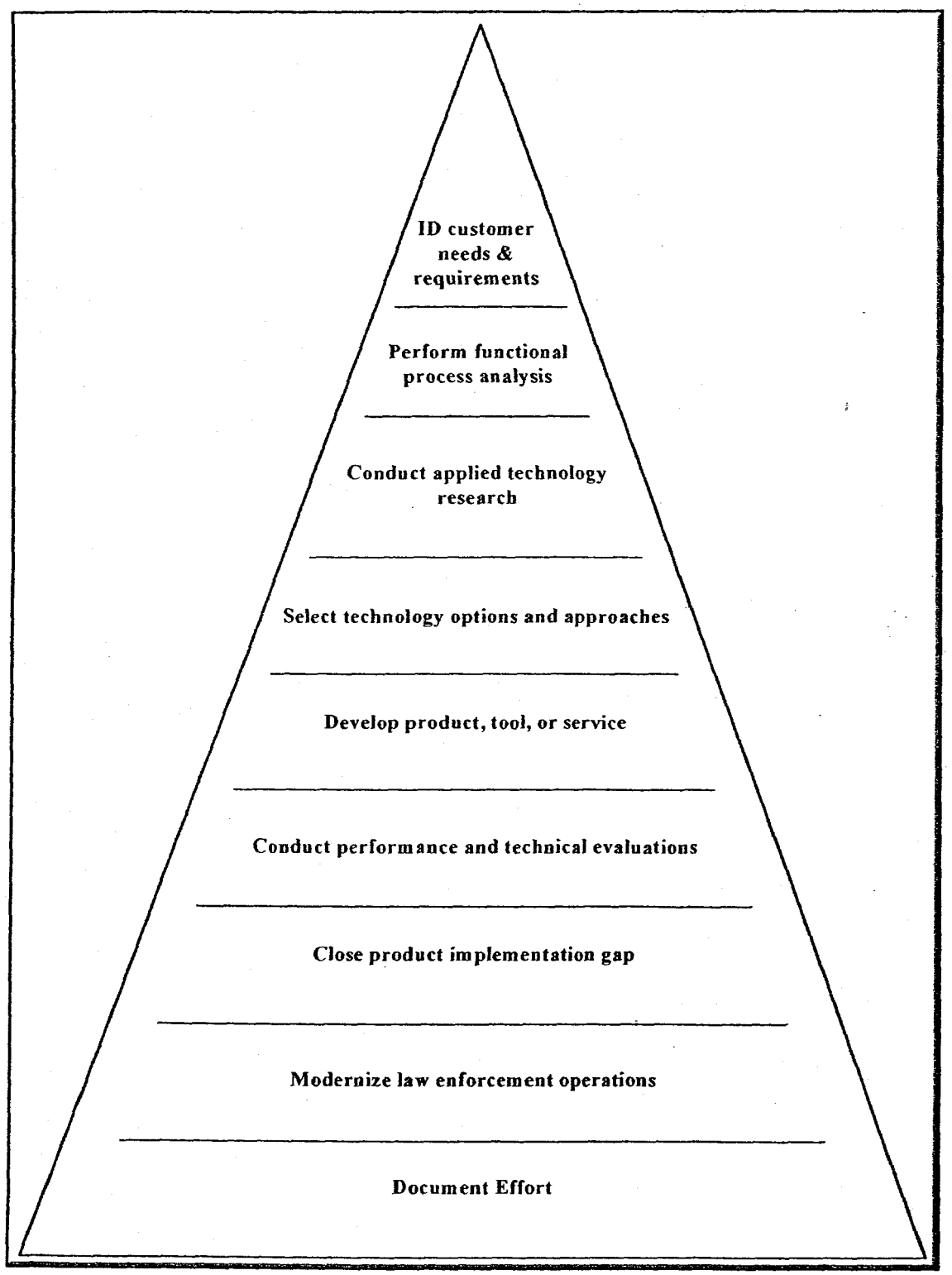

Figure 6. Foundations of NIJ RDT&E Initiatives (National Institute of Justice, 1996).

Environment

Deal and Rosaler (1975) observe that organizations may be open or closed to their environments. Educational organizations, they suggest, are particularly open to their environments, constantly "interacting with and influenced by environmental pressures and forces," primarily because most educational organizations are public organizations (p. 23), as was NILECJ. Other organizations, such as many of those described by Katz and Kahn (1978), may be viewed as closed off from their environments (see chapter 2).

In many respects, NILECJ resembled educational organizations, the environment of which Deal and Rosaler describe as consisting of "everything 'out there': parents, teacher organizations, individuals, opinion leaders, social issues, community groups, economic conditions, the state legislature, and other schools or districts" (Deal & Rosaler, 1975, p. 24). For NILECJ, one need only add such groups as the International Association of Chiefs of Police, Congress, the White House, universities, the nation's research and development laboratories, and industry. For open organizations such as NILECJ, Deal and Rosaler (1975) argue that the key components of the organizationally relevant environment are diversity, activity, stability, and predictability (p. 24).

Diversity. Diversity has to do with both the number and the relative uniformity of expectations imposed on the organization by the special interest groups which operate within a pluralistic environment (Deal & Rosaler, 1975, p. 24-25). From the very beginning, the research component of LEAA was caught in a very noisy and very partisan

ideological struggle, both inside and outside the organization, which pitted research in the soft sciences against technology development and physical science research. As Richard Velde (interview, December 3, 1998) observed, the debate was "liberal/conservative partisan, but was not democrat/republican partisan." Even when Velde, a Nixon appointee, was the LEAA administrator, since "liberal LEAA wasn't doing what the conservative senators wanted," every year when "they went up on the hill, they'd get battered about all this liberal stuff the Democratic chairman didn't want." Typical of the criticism was Velde's "paint problem."

Among the grants awarded in the first year by the Office of Law Enforcement Assistance (OLEA), the forerunner of LEAA was one for $12,000 to the District of Columbia Police Department to repaint several patrol cars to make them more visible. Another was to IACP to fund a conference of big city chiefs, which IACP convened at a high-toned resort in Warrenton, Virginia. When OLEA's first funding request was submitted by the Administration, these two grants caught the attention of the appropriations chairman, who immediately began to criticize the "inordinately expensive and unnecessary paint jobs," and the "resort boondoggle for chiefs," an issue he raised with LEAA "every fiscal year until he retired." As Velde is fond of pointing out, one can look at the appropriations testimony he gave on the fiscal 1977 LEAA budget (some 10 years after those grants were awarded), "and here's Rooney asking questions about painting patrol cars and the rural retreats." For all three fiscal years that OLEA submitted budget requests, the hearings were "dominated by these two grants," which

were used as justifications each year to reduce the $21 million Administration request to $3 million (Richard Velde, interview, December 3, 1998).

This ideological conflict drove both personnel and program decisions about research, and thus about NILECJ and its predecessors, because administrators were faced with the annual challenge of proposing and defending a budget authorization and then getting the authorization turned into an appropriation. This was no simple task in such an ideologically charged environment.

LEAA was authorized three presidentially appointed positions. Nixon nominated Charlie Rogovin to be the first administrator of LEAA, and Velde was appointed to be the associate, but the third presidential position was not filled. Since the law required that both parties be represented, Velde–a former Congressional staffer–filled the Republican slot, while Rogovan–who had been an assistant attorney general in Massachusetts and had made his reputation on an organized crime task force–occupied the Democrat seat. Velde provides a colorful but telling story about those early days.

He and Rogovin arrived at their desks the first time to find confidential FBI reports on nearly 15% of the key personnel in the research program of the agency they now headed. The reports indicated that these were people who would be comfortable in "the anti-war riots and all that." This was particularly upsetting to Velde who was concerned that this hotbed of liberalism would interfere with efforts " to build credibility for the research program with the Congress so we could get the funding" (Richard Velde, interview, December 3, 1998).

But at the same time Velde was making the case for the development and deployment of technology to criminal justice agencies, others were attacking LEAA for an over-reliance on technology. Typical was Joseph Golden's 1970 article in *The Nation* magazine which articulated clearly the antipolice, antitechnology perspective, declaring that "its original good intentions notwithstanding, the federal government has taken the first dangerous steps toward transforming the United States into a society whose police agencies have a repressive capacity unparalleled in history," and bemoaned the fact that LEAA had, from this perspective, "become a pork barrel whose chief beneficiaries are the uniformed police" (Goulden, 1970, p. 520).

This perception of LEAA programs as tending to focus on technologies rather than on social solutions, on police rather than on communities, and of the organization itself as a badly run pork barrel program became a familiar refrain even in the mainstream press. Headlines announcing that "LEAA is called ineffective; abolition of agency urged" ("LEAA is called ineffective," 1976), or that "NAS and justice panels pan federal crime research effort" ("NAS and Justice Panels," 1977, p. 236) appeared frequently. *Time Magazine* said the "handling of the program has been extraordinarily inept. The history of the LEAA has been one of waste and mismanagement" (in Cronin, 1981, p. 90), and even a doctoral student saw fit to observe in a 1981 dissertation that she found "the program's mobilized bias . . . to favor police; means to acquiring increased information; new sophisticated technology; and professional management of criminal justice agencies" (Pearson, 1981, p. xiv). This early criticism of technology programs in

LEAA and in the Institute thus represented one of two polar views on the proper role of federal support to criminal justice.

"Congress," wrote Cronin (1981, p. 12), "wanted the war on crime to begin slowly in order to make sure that only a limited number of 'liberal social engineers' were funded." Conservative members of Congress from both parties, who represented powerful majorities on the appropriations committees in both the House and Senate, "favored federal assistance for police support and purchase of equipment, as opposed to training, research, and experimentation" (p. 12). At the same time, other powerful members of Congress were critical of the emphasis on technology. Typical of these was Congressman James Scheuer of New York, who declared that he and others were concerned that political influence from the highest levels of the Justice Department were forcing the Institute Directors, who did not have independent signature authority for their grants to

> look to upper echelons that are not really familiar with the research process and in many cases have not been sympathetic to the research process, and particularly the theoretical role of applied research, and because of the politicization of the process the basic credibility of the Institute has suffered greatly and they have found it difficult, if not impossible, to recruit first-class scientific personnel. (U.S. House of Representatives, 1977, p. 290)

This controversy produced a volatile environment which constantly redefined the demands made on the Institute. As different elements in the debate became more or less influential, the environment became increasingly less stable.

Stability. The stability of an organization has to do with the consistency over time of the demands made on it by both internal and external forces. This, in turn, is related to the degree of vacillation in both what objectives the organization should pursue and the priorities the organization places on those demands. Both were problematic for NILECJ.

Over the course of its roughly 12 years of existence, the Institute was headed by seven different directors, was reorganized to varying degrees at least seven times, and changed its missions and priorities nearly annually. As demands on LEAA changed, the demands on NILECJ similarly changed, and over time became more confused in the face of what Cronin describes as "Creeping categorization," in which Congress would call one year for major investments for police equipment for riot control, for funding for corrections programs or the construction of new prisons the next year, then for juvenile justice programs or something else in following years. Further complicating the agency's ability to plan its programs was a remarkable degree of Congressional micro-management, in which legislative language emphasizing different areas of the criminal justice system "were plastered all over the legislation until the statutes looked like a child who has pasted himself over with a box of band-aids." All these had to be considered in identifying program priorities (Cronin, 1981, p. 138). The environment faced by the agency was thus an extremely active one.

Activity. Environmental activity has to do with how persistent and loud are the demands made by the special interest groups that act on the organization. For NILECJ

the demands were not just loud and persistent, but in a constant state of change as well, depending on which ideological or political perspective was ascendant at the time. "Democrats began to sound like Republicans, supporting a lock-'em-up approach to crime and special revenue sharing for LEAA," while supporters of LEAA, as had its original congressional sponsors, were constantly maneuvering to force the agency to favor their own constituencies (Cronin, 1981, p. 130). As rapidly as one hot new crime issue would fade, others would blossom, so that a focus on riot control and police equipment would give way the next year to an emphasis on community issues. "And just a few months after LEAA's budget was killed, a new task force on violent crime was being set up by [President] Reagan's attorney general" (p. 130).

Predictability. The last element of the environment–predictability–refers to how accurately the organizational system managers and administrators can forecast the demands of the special interest groups and plan for those demands (Deal & Rosaler, 1975, p. 24). Neither NILECJ nor LEAA was able to forecast or plan for demands for all the groups making demands on the organization, largely because every change in leadership brought not only changes in goals and objectives, but significant changes in the influence of special interest groups. No administration maintained a constant set of demands on the organization.

Summary of environmental analysis. NILECJ was thus, like LEAA, as much a victim of its contradictory and ever-changing environment as it was of any of its own

failures. As the demands became more intense and harder to sort out, the organization responded by making frenetic changes in its goals, programs, and objectives in an effort to satisfy the most influential of its critics. The consequence was that the organization began to focus on immediate problems and near-term goals of interest to particular members of the organization rather than on the longer term goals of the organization. This tendency, suggests Selznick (1969, p. 198), is common in organizations under stress, as were both LEAA and NILECJ during most of their existence.

Subsystem Interactions

Deal and Rosaler (1975) maintain that all five of the organizational subsystems–goals, formal structure, organizational technology, informal norms and processes, and environment–are highly interrelated. "When any of the subsystems change–or are changed–this fact has implications for all the rest. The dynamic interplay is best captured as a 'pebble in the pond' or 'herniae' theory of organizational change" (p. 25). In other words, when a change is introduced into any one subsystem, it produces a ripple effect which transmits pressure to the other subsystems. This pressure sometimes causes what are described as "bulges" in other parts of the organization. Too often, managers of organizations fail to appreciate the complexity of this process and so fail to take this "ripple" effect into account when introducing changes into the organizations and so are unprepared for, or fail to understand, just how dysfunctional these organizational "herniae" can be (p. 27). For NILECJ, these herniae were nearly a

permanent part of the organization's existence, since change was almost continuous and the turmoil generated by the changes directly affected every other subsystem.

NILECJ personnel uniformly observed in interviews that the cycle of change was constant, so that none of the elements of the organization ever seemed to be at rest. As each new director arrived, the goals would be adjusted and the formal organizational structure would be changed to bring it into line with the new goals, or the agency would be reorganized and the goals brought into line with the new organization. Frequently, changes in goals or structure would occur so rapidly that one subsystem or another was as much as a generation behind.

Even when new directors were not themselves making changes, Congress was legislating changes for them. Some of these changes were marginal and implemented in annual appropriations bills. Others were more substantial, as for example when Congress amended or passed entirely new crime acts. What seemed most to typify NILECJ was instability in every system as change after change was introduced into the organization or into LEAA, its parent. This instability was so pronounced that it is not always clear to what degree a change in one subsystem drove herniae in other systems, because it was not always even clear which subsystem changed first. There is little doubt, however, that the various subsystems had major influences on each other.

When LEAA was unable to account for all its grants because its Grant Management Information System (GMIS) was incomplete, that damaged the credibility of the organization and became a useful tool for Congressional and media critics. When NIJ's technology program invested in ESIP but produced little of value, that further

weakened the credibility of both NIJ and LEAA programs. As these weaknesses were explored in the press and in Congressional hearings, they inevitably damaged the confidence of both the law enforcement community and the Department of Justice itself in technology programs in LEAA.

Unfortunately, the Deal and Rosaler perspective clearly did not anticipate an organization in which change was so constant or so pervasive, so its usefulness as an analytical tool was limited. Educational establishments, on which the Deal and Rosaler perspective is based, simply are not subject to changes which are quite so extensive or frequent, in part because the cultural history of education imposes its own resistance to change and because schools have a broadly acknowledged basic mission. Neither LEAA nor NILECJ had any history, or even any similar organizations to help provide stabilizing models.

NILECJ Summary

The major observations from the application of the Deal and Rosaler perspective to NILECJ's technology program have been summarized in Table 2. Each of the subsystems has been listed in this table, and below each goal subsystem are listed any dimensions relevant to that subsystem along with a simple scale used to assess each dimension. For example, the goals subsystem may be assessed on each of three dimensions: (a) the degree of consensus among participants, which may range from none to complete; (b) the specificity of goals, which may range from vague to concrete; and (c) the number of goals, which may run from none to many. Each dimension is allowed

only three possible ratings and each rating is also assigned a numeric equivalent for convenience in displaying the results. Thus, goals may be assessed as extremely unstable (for a score of 1), moderately stable (2), or totally stable (3), while specificity of goals can be scored as extremely vague (1), mixed (2), or extremely specific (3).

The last column in the table indicates the primary kinds of evidence used by the author to arrive at the assessment. Collecting them in this fashion helps to highlight how complex and changeable were the subsystems within which NILECJ operated, and makes it possible to compare NILECJ with NIJ, both descriptively and graphically, as will be done later in this chapter. This is particularly useful because none of the external assessments of either NILECJ or NIJ employed any metrics which would allow comparisons between the NILECJ and NIJ periods.

While subjectivity cannot be entirely eliminated from an assessment of this sort, every effort has been made by the author–where feasible and appropriate–to base each of his scores on some objectively verifiable measure, such as the number of different goal sets published by the Institute, or the number of different organizational structures. In other cases, the author has based his scores on a combination of archival material such as Congressional hearings, studies, or correspondence, and on information gleaned from interviews of NILECJ personnel. In each case, the table also provides a quick summary of the reasons for the score and an indication of the sources of the evidence used to adduce the score. Using this approach simplifies comparisons of subsystem assessments and makes it possible to display them in an easily understood graphic form.

Table 2.

Assessment Summary for NILECJ

Subsystem	Scale	Score	Basis for Score
Goals	Extremely unstable (1) moderately stable (2) extremely stable (3)	1	Per annual reports and interviews, goals changed every year from 1970-79.
Degree of consensus among participants	Limited or none (1), moderate (2), total (3)	1	Interviews, transcripts of speeches, independent studies and Congressional hearings show wide disagreement over goals.
Specificity of goals	Extremely vague (1), mixed (i.e., some specific, some vague) (2), extremely specific (3)	1	Annual report listings of goals as well as interviews confirm goals were almost universally general; 1972 is the only year an annual report had an explicit listing of goals.
Number of goals	4 or less (1), 5-8 (2), 9 or more (3)	3	NILECJ averaged 9 "goals" in each annual report, with a range from 4 in 1971 to 14 in 1972. In 6 of 11 years 9 or more goals were listed.
Formal Structure	Unstable (1), moderately stable (2), stable (3)	1	Annual reports show 7 different organization structures from 1969-1979 with only one surviving more than 2 years.
Size	Small (1), medium (2), large (3)	1	Personnel listings and organizations chart show that the Institute never grew larger than 50 individuals during the period.
Differentiation	None (1), some (2), much (3)	1	Program documents and interviews suggest that staff were considered interchangeable and specialization was either rare or nonexistent.

(table continues)

Subsystem	Scale	Score	Basis for Score
Interdependence	Very little to none (1), some (2), much (3)	2	Interviews indicate very little work required crossing of internal organization lines and management did not actively encourage any.
Coordination	Limited (1), moderate (2), much (3)	1	Since, as interviews indicate, there was little interdependence and little need to share information, coordination was rare.
Organizational Technology	Ad hoc (1), occasional (2), frequent (3)	1	Process or procedure documents were rare, while interviews indicate that what existed was very ad hoc.
Informal Norms and Processes	Unstable (1), moderately stable (2), stable (3)	1	As formal organizational structures changed, interviews suggest that informal relationships were also affected.
Communications Patterns	Limited (2), moderate (2), pervasive (3)	1	Interviews indicate communications in all directions (up, down, and lateral) were limited and often hostile or suspicious.
Affective Ties	Limited to small cells (1), fairly common across organizational boundaries (2), common throughout the organization (3)	1	Interviews, testimony and external studies (e.g., White and Krislov, 1977) indicate that internal hostilities and competition for status and resources tended to limit friendships to within small subgroups within the organization.
Informal Influence	Unstable (1), moderately stable (2), stable (3)	2	Interviews confirm that informal influence within the organization changed often, particularly when directors changed, as they did 6 times from 1969-79.

(table continues)

Subsystem	Scale	Score	Basis for Score
Environment			
Diversity	Limited (1), moderate (2), extensive (3)	3	Public media, Congressional testimony and internal correspondence show a huge number of different parties trying to exert influence on the Institute.
Activity	Limited (1), moderate (2), persistent (3)	3	Both archival data (Congressional hearings, Congressionally directed studies, media reports, etc.) and interviews indicate activity within NILECJ's environment was persistent and often hostile.
Stability	None (1), moderate (2), total (3)	1	Legislation and external studies reflect an ever changing set of demands on the organization, with some groups demanding a focus on police, while others insisted that research be focused on criminal behavior.
Predictability	Unpredictable (1), somewhat predictable (2), predictable (3)	1	Legislation governing the Institute changed 5 times from 1969 to 1979, not including changes in appropriations bills. Interviews indicate changes directed by Institute management and by the Justice Department were even more frequent.

(table continues)

Subsystem	Scale	Score	Basis for Score
Subsystem Interactions	Limited (1), common (2), extensive (3)	3	Annual reports indicate frequent changes in goals in response to environmental pressures which justified changes in organization. Interviews indicate these changes affected the entire organization and all its subsystems.
	Infrequent (1), common (2), constant (3)	3	Interviews provide evidence that constant changes in goals and organizations required constant changes in every other subsystem, including informal norms and processes

While no similar assessments have been made for the Interim Period, a review of that period is important to some of the major issues which opened the NIJ Period.

The Interim Period

The passage of the justice systems improvement act of 1979 (P.L. 96-157) effectively meant the end of the Law Enforcement Assistance Administration. The act reauthorized and restructured the Justice Department's program to improve the administration of state and local criminal justice. Reflecting some, but not all of the recommendations contained in the assessments conducted over the previous years, the act placed the Institute inside a newly created division within the Department of Justice, the Office of Justice Assistance, Research and Statistics (OJARS), which was headed by an assistant attorney general. The act retained the principle that the Institute's parent

agency had only a coordinating role and no formal authority over the operations or funding decisions of the Institute.

The Institute Director was to be nominated by the President and confirmed by the Senate, and would have "sole and final" authority over Institute funding decisions and policies. This was intended to ensure the independence and integrity of research conducted by the Institute by elevating him from a "mere" attorney general appointee to a position requiring Senate confirmation. The act also created an advisory board appointed by the President and charged with making recommendations to the Institute on its research agenda, policies, and priorities. This structure, however, was neither as successful as its proponents had anticipated nor as bad as its opponents had feared (Tonry, 1997, p. 102).

LEAA remained in operation but without any appropriations under the direction of OJARS from 1980 until its termination in 1982, when all its continuing programs were transferred to OJARS. In 1984, with the passage of the Justice Assistance Act, the final vestiges of LEAA died and the Office of Justice Programs was created to provide federal leadership, coordination, and assistance to the effort to improve the efficiency and effectiveness of the nation's criminal justice systems.

The first period of genuine stability in the Institute's history was ushered in by the Reagan Administration with the appointment of James K. Stewart to direct NIJ. Serving from 1982 to 1990, Stewart became the longest serving Director in the history of the Institute, a distinction he still holds and is likely to hold for the foreseeable future. While his tenure was not characterized by significant increases in the share of funding

which went into technology programs (see Figure 7), his influence in enhancing the visibility of the Institute's technology programs was considerable, as an analysis of both

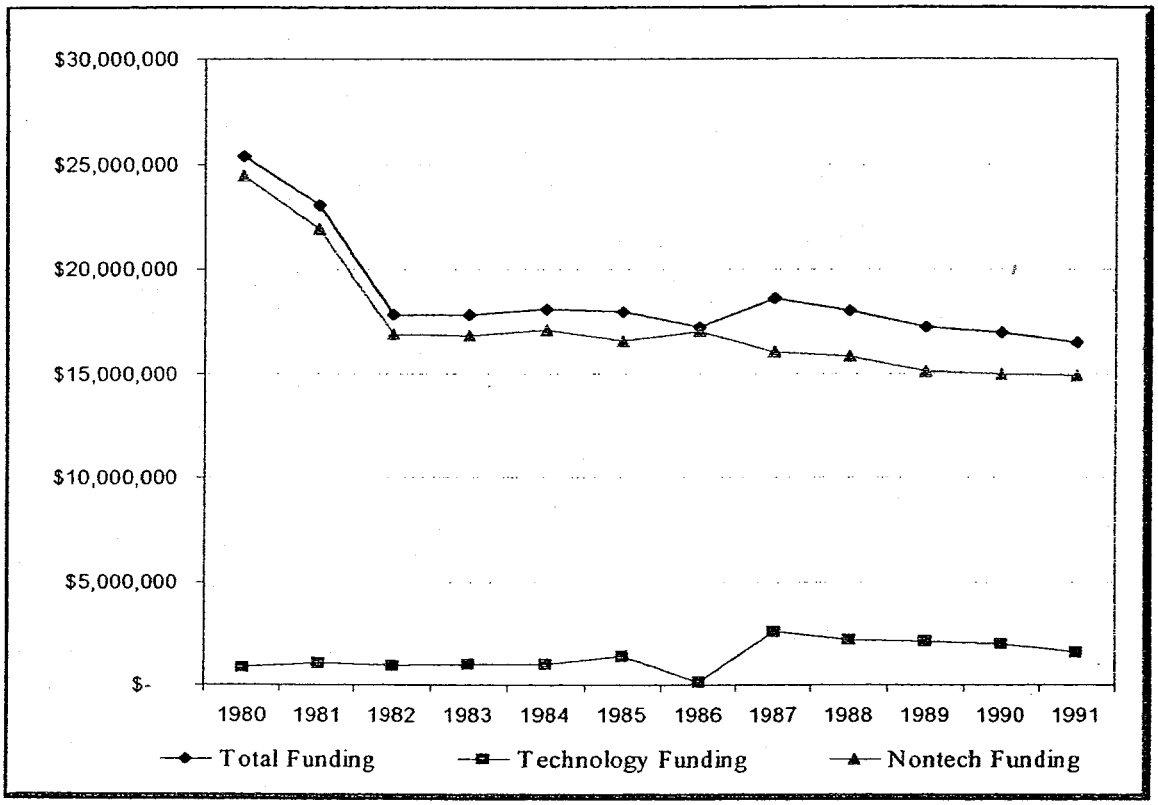

Figure 7. Distribution of funding in NIJ, adjusted for inflation (1980=$1.00).

the major section headings and share of text in annual reports demonstrates (see Figure 8). Stewart did this consciously, because he believed technology was both important and underutilized by law enforcement, especially police agencies. The emphasis on technology in NIJ reports during his tenure was, says Stewart, because he was trying to make the case for technology. He defends his limited investment in technology as the best that could be done given his lack of a budget or adequate staff to manage major technology development programs. Shifting funds to technology was also difficult

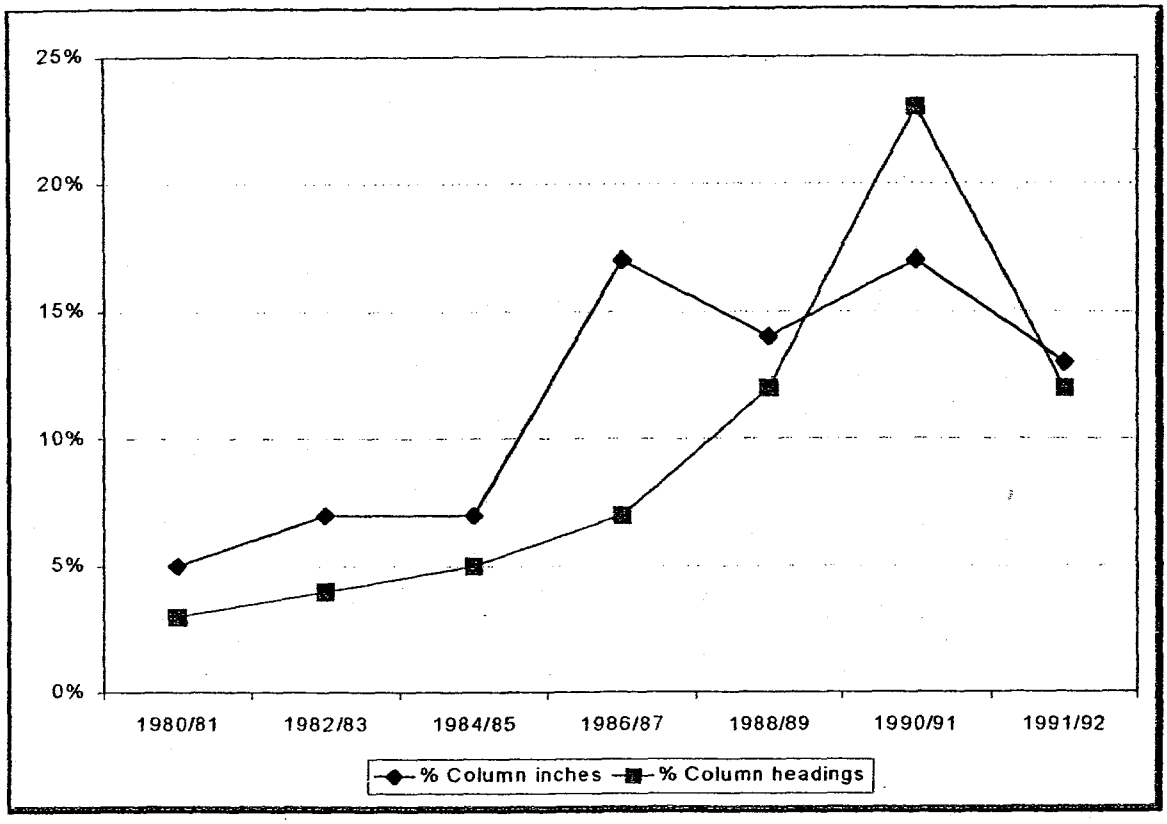

Figure 8. Percentage of headings and text devoted to technology in NIJ annual reports.

because he faced considerable opposition, especially from the social science community, whenever he tried to put more money into technology. Since the NIJ budget during most of his tenure was essentially flat, except for some transfer funds from other agencies, any funding he moved to technology came at the expense of social science projects. He was successful, he says, in "initiating several important projects, including the development of DNA identification technologies" (James K. Stewart, interview, January 8, 1999).

There were only two different organizational structures during the entire 12 years of the Interim Period. The structure established in 1977, which created four offices–Research Programs, Research and Evaluation Methods; Program Evaluation;

and Development, Testing, and Dissemination–remained unchanged until 1986, a span of ten years.

In 1986, Stewart collapsed the four offices into three and renamed them to help communicate what Stewart intended to be seen as a clearer focus on practical research. The new Office of Crime Prevention and Criminal Justice Research contained what had originally been part of the Offices of Research Programs and Program Evaluation. The Center for Crime Control absorbed most of the technology and systems analysis programs and projects, while the third office–now called the Office of Communications and Research Utilization–was an essentially unmodified version of what had earlier been called the Office of Development, Testing, and Dissemination. Interestingly, except for occasional renaming, this office has experienced relatively little organizational change from its creation in 1971 as the Technology Transfer Program to the present in its incarnation as the Office of Development and Communication, perhaps because it had only one director, Paul Cascarano, for most of its existence.

Goals were also somewhat more stable during the Interim Period than they had been during the NILECJ era. In the NILECJ era, the annual reports contain ten different lists of which might be characterized as goals. Only one list–the very first–went unchanged for more than a single year, and then it lasted only one additional year, from 1969 through 1970.

During the Interim Period, which encompassed roughly two years more than the entire NILECJ era, there were only five lists that might be called goals. One of these lasted from 1986 to 1989 and was basically a list of the Institute's legislatively

mandated purposes. A similar list, with nearly the same tasks (but ordered differently), was also used from 1980 to 1981. In contrast to NILECJ, where a listing of goals only once lasted more than one year, no list of goals lasted less than two years during the Interim Period.

Although the Institute was enjoying an extended period of relative stability through most of the Interim Period, the technology programs remained modest from 1980 through 1991, totaling just over nine million dollars for the entire period. Nearly two-thirds (61.8%) of that was invested in the development of technology standards and the operation of the body armor testing program. It was this program–bullet resistant armor–which came to define the Institute's technology program and around which evolved the most damaging controversy in the Institute's history, commonly called within the Institute, the "great body armor controversy." This controversy, ironically, introduced a different sort of instability into the Institute and set the stage for the development of a far larger technology program after 1992.

The Great Body Armor Controversy

In 1972, the DuPont Corporation began marketing a new fiber they called "aramid." This fiber demonstrated a number of exceptional properties and was then being used as a substitute for steel belts in tires. The NIJ technology program manager, Lester Shubin, was intrigued by this fiber and wondered whether it would work in light weight bullet-resistant armor that might be useful for police use.

Shubin obtained approval for the funding of several developmental efforts, and by 1974 was ready to transfer the new product to private industry. A few isolated manufacturers had already begun to use the new fiber in body armor, so Shubin undertook a field test in 15 cities throughout the United States which successfully established that the new armor was suitable for routine, full-time wear. In a fairly short time, most of the armor manufacturers were making exclusive use of aramid in the construction of vests. But even before that, police officials had become concerned about the lack of any mechanism to ensure the quality of armor being purchased by officers.

In response to those concerns, the first NIJ standard for body armor was published in March 1972 (National Institute of Justice, 1972). This standard established the principal of matching the performance of body armor to the level of the threat likely to be encountered by the officer wearing the armor. This standard was also limited solely to measuring whether vests were penetrated or not, and provided no mechanism for determining whether the vest was also capable of protecting wearers from blunt trauma injuries. (These are injuries produced behind the vest by the impact of the bullet even when the vest is not penetrated.) The second generation of the NIJ standard (NILECJ-STD-0101.01), promulgated in December 1978, corrected this omission (National Institute of Justice, 1978), and was the first full-fledged U.S. standard ever published for police body armor. It was developed with the active participation of the body armor industry through the Personal Protective Armor Association (PPAA).

Almost immediately after the release of 0101.00, NIJ established the Technology Assessment Program Advisory Council (TAPAC) to provide advice to the Institute on the direction of its Technology Assessment Program (TAP). Its first recommendation was that NIJ establish a testing program to evaluate the performance of law enforcement equipment, and that it began with body armor. The resulting test program was administered under an NIJ grant by the IACP (Office of Technology Assessment, 1992, p. 7).

In 1975, at Lester Shubin's urging, NIJ had established TAPAC to assist in defining user needs and to improve the technology assessment program (TAP) by identifying priorities for law enforcement. In late 1976, at the urging of TAPAC, NIJ had established the equipment testing program, which concentrated first on body armor. This program undertook the testing of existing commercially available armor and the results of this testing were published in December, 1978 by the International Association of Chiefs of Police (IACP). The findings from this testing were very disturbing to police officials, since fully half of all the tested armor had failed to meet the standard (National Institute of Justice, 1992).

Industry reaction was predictably negative and very defensive, but manufacturers quickly responded by modifying the model designs which had failed and resubmitted them for testing at their own expense. By 1985, 87 different models of armor had successfully passed NIJ compliance testing against the ".01" standard (National Institute of Justice, 1992).

Early in 1980, DuPont introduced a new, thicker aramid yarn that began to appear in the fabric of new models of armor. Testing, however, indicated that material made with this new fiber tended to be significantly more susceptible to penetration when bullets struck the vest at an angle than was the case with the older fabrics, unless special care was taken in the construction of armor. Accordingly, NIJ revised its standard to incorporate angled shots and introduced standard 0101.02 in March, 1985 (National Institute of Justice, 1985).

At about the same time, irregularities in the handling of grant funds by IACP (the grantee charged with managing the NIJ testing program), resulted in a criminal investigation which ended in a settlement with the federal government which nearly bankrupted the association and ended its participation in the program (Cascarano, personal communication, November 12, 1992; Office of Technology Assessment, 1992). The testing program was then transferred to a new grantee, Aspen Systems Corporation, and the Technology Assessment Program Information Center (TAPIC) was relocated. Unfortunately, record keeping before the transfer had been spotty, and test specimens could not be reconciled, nor could test results be validated. In a fateful decision, NIJ chose to modify the 0101.02 standard slightly and re-issue it as 0101.03 (National Institute of Justice, 1987; Office of Technology Assessment, 1992b).

Industry, through the Personal Protective Armor Association (PPAA) had participated in the drafting of the ".01" standard, but had not commented on ".02." With the publication of the ".03" standard, however, industry response was both prompt and extremely negative. Among the issues raised by industry were objections to

research reports published by the Institute, and changes in test procedures made in response to those reports.

NIJ research had demonstrated that aramid fibers, when wet, were as much as 30% more likely to fail than when dry, while other research had shown that properly maintained armor remained serviceable more than 10 years after manufacture (Office of Technology Assessment, 1992, p. 7). Both of these were rejected by PPAA in favor of a five-year replacement policy which DuPont had recommended in a report claiming that armor degraded after five years of use (National Institute of Justice, 1992).

Shortly after the new standard was introduced, two new manufacturers introduced entirely new ballistic fibers. Allied Signal introduced Spectra® and a Dutch firm, Akzo, announced its intention to began marketing Twaron®, its equivalent of the DuPont aramid product (Dan Frank, personal communication, November 12, 1994; Lester Shubin, personal communication, January 7, 1995).

Because the introduction of the ".03" standard had been initiated by NIJ in response to the failures in its own testing program, NIJ retested all the armor previously tested under the ".02" standard at the Institute's own expense. Almost immediately, it became apparent that a significant percentage of the previously tested armor was not going to comply with the new standard. The industry immediately objected and began to raise a number of issues intended to discredit the test results of the NIJ certified laboratory. Of 84 models of body armor tested, only 34 were found to be in compliance with the standard.

> This surprised NIJ as well as those in industry who had been consulted about the revision. A DuPont spokesman later claimed, "Both sides [NIJ and the Personal Protective Armor Association (PPAA), an industry group] agreed '03' was to be no more stringent than '02.'" (Office of Technology Assessment, 1992a, pp. 5-6, insertions in the original)

The DuPont Corporation, in particular, was extremely critical of the test results and encouraged PPAA to demand through the attorney general that NIJ rescind its ".03" standard and declare the results of its testing invalid. Stewart, who was then the Institute Director, convened TAPAC to review the criticisms made by industry and to determine whether the standard was, in fact, flawed. TAPAC was unanimous in its endorsement of the standard without change and advised Stewart that it fully supported any NIJ decision to deny the PPAA appeal (National Institute of Justice, 1992; Office of Technology Assessment, 1992; James K. Stewart, interview, June 1, 1998).

Since NIJ standards are all voluntary and do not carry the force of law or regulation, PPAA decided to issue its own standard. In June, 1989, it published what it called the ".05" standard. In August, the ".05" standard was briefed to TAPAC and tests were conducted by H.P. White Laboratories against the ".03" standard. These tests demonstrated that the PPAA standard was less stringent than NIJ's standard (Office of Technology Assessment, 1992a, p. 6).

DuPont remained critical of the NIJ standard and, at the same time, published notice that it intended to restrict the sale of its aramid fiber if a body armor manufacturer intended to use the fiber in armor sold in compliance with the NIJ standard but not built in keeping with DuPont specifications, which would have the effect of requiring the use of Kevlar™, a DuPont aramid product. Over the next few

months, the Police Executive Research Forum (PERF), the Fraternal Order of Police (FOP), and IACP all endorsed the NIJ standard (National Institute of Justice, 1992).

Over the next year, NIJ held several technical meetings with DuPont to resolve differences of opinion. During the course of these meetings, both DuPont and National Institute of Standards and Technology (NIST) statisticians agreed that the conclusions in the DuPont analysis could not be supported based solely on the data they had presented for public review. DuPont then unilaterally broke off the technical meetings.

In May, 1990, two identical bills were introduced in Congress: H.R. 4830 and S. 2639. Both bills would have "made it a criminal offense to manufacture, distribute, or sell armor not complying with NIJ Standard 0101.03 or any superseding standard issued by NIJ." H.R. 322, introduced in the following Congress, contained the same language (Office of Technology Assessment, 1992a, p. 6). Each bill also included a requirement that a review by the General Accounting Office be conducted, but such a review was never undertaken by GAO.

As the controversy became increasingly bitter, people began to take sides. Allied Signal, Akzo, police groups, and several manufacturers lined up with NIJ; PPAA, several other manufacturers, and DuPont lined up on the other. During the summer of 1990, various congressional delegations continued to consider legislation that would mandate compliance with the NIJ standard, an action strongly opposed by the Republican Administration because it did not want to commit to the costs and burdens associated with undertaking such a regulatory program (James K. Stewart, interview, June 1, 1998).

By late summer of 1990, NIJ was becoming increasingly aware of incidents in which manufacturers were selling production units of models of armor on the NIJ published Consumer Product List (CPL) which either had failed NIJ testing but was still being sold as in compliance with the NIJ standard, or which had been modified in some way after the original vest design had been tested and listed by NIJ as compliant armor. (NIJ did not then permit, and still does not permit, any design or construction modifications to be made to armor listed as compliant without requiring that the armor be retested to insure the modifications have not affected the ballistic integrity of the vest). A number of these incidents were referred to the Federal Trade Commission for action while others were resolved in cooperation with the manufacturer. Most of the apparent changes in construction of the armor appear to have resulted from a failure to exercise quality control.

When Charles B. DeWitt became the new Institute Director, he suggested to Senator Joseph Biden, who then chaired the Institute's Senate oversight committee, that the Office of Technology Assessment (OTA) be directed to conduct a major study of the NIJ standard and testing program. OTA began this work soon after and published its final report in September, 1992. Unfortunately, before OTA could conclude its study, several models of body armor were retested by a police department and a number, manufactured by different companies, failed. These failures triggered an NIJ policy (still in place) which requires that any retest failure be investigated in order to determine if the failure is a consequence of a violation of the integrity of the NIJ testing program.

When some of the companies failed to comply with NIJ's requests for information, the Institute decided to publish an announcement over the National Law Enforcement Telecommunications System (NLETS) of the details of the armor failures. At least one of the companies, American Body Armor (ABA), immediately hired an attorney to make its case to the Institute. DeWitt and the Institute staff, for reasons which are unclear, reacted by shutting off communications with the affected companies. After several months, during which the Institute would not provide information on the status of the failed armor, ABA filed suit in federal court, alleging that the Institute was treating it unfairly and favoring certain other manufacturers. More importantly, the ABA suit alleged that since NIJ had not allowed the company to respond to the retest failures, it had failed to follow minimal due process (Wendy Howe, interview, March 3, 1999).

The result was a long and nasty public controversy in which critical articles appeared in law enforcement related publications such as *Law and Order*, but during which the Institute was either unable or unwilling to respond. As passions became increasingly inflamed, supporters of the PPAA camp began circulating flyers accusing the Institute of indirect responsibility for the murders of police officers because the NIJ standard was so unreasonably stringent that it made compliant armor so uncomfortable that some officers would not wear it. Consequently, every officer who was killed by a bullet while not wearing a vest was the Institute's fault. Body armor manufacturers in the NIJ camp responded by circulating campaign-style buttons imprinted with "No way

PPAA; NIJ is here to stay." Several of these flyers and buttons are currently in a collection assembled by the author of this study.

By the time the OTA report was complete, the morale of the technology staff of the Institute had been deeply injured and some had resigned. The lawsuit resulted in a pro forma settlement in which the Institute promised to treat every manufacturer the same, something it insisted it had always done. ABA, drained by its battle with the Department of Justice, filed for bankruptcy (Olga Trujillo, personal communication, late 1992).

For reasons which would require inquiries beyond the scope of this paper, the atmosphere within the Institute, and between the Institute and the Technology Assessment Program staff, had become so strained that DeWitt had taken to funding TAPIC and the Office of Law Enforcement Standards (OLES), which was the National Institute of Standards and Technology (NIST) operation funded by NIJ to develop standards in monthly increments. This, of course, made it impossible for either activity to do any planning and ensured that staff morale in both programs was poor because they were always on the verge of closing. So hostile was DeWitt to the OLES operation that the day he left office–on the last day of the Bush administration–he left lying on his desk a complaint addressed to the NIST Inspector General, which he knew his deputy, Mike Russell, would be obligated to act on as soon as he assumed his duties later that day as acting Director of the Institute (Mike Russell, personal communication, January 20, 1993).

By early 1992, DeWitt had become so estranged from Paul Cascarano (the Senior Executive Service director of the Office of Crime Research Utilization), under whom fell the Technology Assessment Program, that he created a new technology division and had it report directly to him. He consolidated all the technology programs of the Institute in this one division, and began a search for a director.

One of the major criticisms leveled at the Institute had been that it had no one with testing and evaluation credentials and, therefore, lacked the competence to run a testing program. Accordingly, DeWitt sought someone with a credible background in testing and evaluation. To find the credentials he was seeking, however, required several attempts over nearly an entire year as DeWitt would interview candidates and–on at least two occasions–scrap the list and start the process all over again (Carol Petrie, personal communication, March 12, 1994).

Although the Institute ultimately weathered the storm created by the body armor controversy, the Institute's reputation, both within and without the Department of Justice, was greatly weakened. Some suggested that the same weaknesses in the Institute's leadership which had led to the body armor controversy also damaged other Institute missions. The Institute "at points during this period . . . still struggled with the problems created by its political organization within the Department and with unprofessional Institute Directors" (Dalton, 1999, p. 21). The low point, according to Michael Tonry, was probably reached in 1991 when the Institute funded a project entitled "Occult Crime: A National Assessment" (Tonry, 1997a).

Nevertheless, by 1997

> the Institute had achieved visibility and credibility in its scholarly and professional constituencies that would not have been imaginable twenty or even ten years ago. [However], this continuing paradox shows that the good reputation built by some Directors and some Administrations can easily be diminished by others and that the success of the Institute is heavily dependent on the whims of the Administration in power. (Dalton, 1999, p. 21)

It was this environment which set the stage for the third and final period of this study.

The National Institute of Justice Context

Ironically, the controversy surrounding the body armor program produced the first definitive step toward making research and development in the physical sciences an equal partner within the Institute with the social sciences. Faced with an urgent need to restore the credibility of the body armor program, DeWitt created the Technology Division, consolidated within it all the Institute's technology programs, and began a search for its first director.

The Great Body Armor Controversy, Continued

One of the key criticisms of the program had been that the Institute had no one with credible credentials that would qualify them to manage the testing and evaluation of technologies, so such credentials became a major consideration in the search for the new director. After several aborted attempts, the Institute received an application that seemed to meet all the essential requirements. The applicant was a senior Army officer

about to retire, and his title–Deputy Director, Science and Engineering for the U.S. Army Operational Test and Evaluation Command–seemed to DeWitt to be exactly what the Institute needed to put to rest once and for all the criticisms that NIJ was unqualified to run a testing program. Someone who performed exactly that task for the United States Army would, DeWitt believed, answer even the most skeptical critics (Charles B. DeWitt, personal communication, September 21, 1992).

This newly formed Technology Division (immediately renamed the Science and Technology Division by the new director) had been created by renaming the Center for Crime Control Research and pulling into it the body armor and testing programs from the Office of Communication and Research Utilization. This meant that when the new director arrived, the office consisted of two program managers and one administrative support person. In addition, DeWitt had arranged to have the Idaho National Engineering Laboratory provide a visiting scientist for a year. Interestingly, this meant that the average grade of personnel in the Technology Division was very high. The new director was a GS-15, both program managers were GS-14s and even the administrative assistant–who was actually a social science technician–was a GS-8.

Although the new director was completely unaware of the body armor controversy when he arrived, DeWitt advised him that his first task would be to resolve the controversy, a task made more urgent less than a month later when the long awaited Office of Technology Assessment (OTA) report arrived at the Institute. The publication of this report immediately encouraged critics to demand that NIJ comply with all of its

"recommendations." Perhaps the most vocal of these critics was Martin Fackler, who had been for some time a paid consultant to several of the most strident of NIJ's critics.

Fackler claimed in the headline of an article in *Law and Order* that the "OTA Report Strongly Condemns [the] NIJ Soft Body Armor Test." "Despite valid evidence to the contrary," he wrote, "the NIJ has persisted in proclaiming their standard valid and refusing to consider revisions suggested by producers." The result was that the continuing controversy over how body armor was tested had confused the law enforcement community and shaken their confidence in body armor. The OTA report, he claimed, had established his position beyond reasonable argument.

> After studying the controversy for a year and a half, the Office of Technological (sic) Assessment (OTA) which evaluates and clarifies scientific issues for the U.S. Congress recently published their report. The report states, unequivocally, "It is clear that the standard should be revised . . . ." (Fackler, 1992, p. 106)

This article posed an immediate problem for NIJ because *Law and Order* is one of the most widely circulated magazines in the law enforcement community (subscriptions are free to law enforcement personnel), and because Fackler had made convincing use of very carefully edited excerpts from the OTA report, many of which hid more than they revealed. More importantly, law enforcement officials who were unlikely to read the actual OTA report, including a few low-level but influential employees in the Firearms Training Unit of the Federal Bureau of Investigation (FBI), were beginning to believe what appeared to be direct and accurate quotations from the report.

What the ellipses in Fackler's quotation from the OTA report hides, however, is critical to its meaning. The actual wording, "it is clear that the standard should be revised–*eventually*" (Office of Technology Assessment, 1992, p. 30, emphasis in original), reflected the Institute's own position that once appropriate research was completed, the standard should be revisited.

Arguing that "certain NIJ researchers strayed beyond their areas of competence," Fackler claimed that the OTA report contained a number of important recommendations for improving the NIJ standard. In fact, the OTA report actually had not offered any recommendations. Instead it included a lengthy list of "options" for consideration by the Justice Department, some of which were mutually exclusive. For example, the first option offered by the report was to simply postpone any changes in the standard and in the testing process, because no armor certified to comply with the NIJ standard was known to have ever failed in any actual assault to stop a bullet it was rated to resist, or to prevent a lethal blunt trauma injury. "Yet the criterion for protection from blunt trauma is not so strict that many models fail it. . . . The vast majority of the failures were caused by penetration. . ." (Office of Technology Assessment, 1992, p. 85).

The article prompted a letter from the Dallas, Texas Police Department (William Rathbun, personal communication, November 16, 1992), requesting a response to the article by NIJ and asking whether "the author of the [*Law and Order*] article [was] an unbiased participant representing the medical community or [whether he was] appointed to the [OTA] advisory panel by the vest manufacturers."

In his reply, the STD director pointed out that the OTA Advisory Panel had been made up of a wide range of people with a variety of views because OTA wanted to include as many different perspectives as possible. Contrary to Fackler's assertions, however, the OTA Report reflected only the views of the OTA project team and not those of any individual member of the Advisory Panel. The panel, in fact, had also included–in support of the NIJ standard–the doctor who had led the U.S. Army medical assessment team which set the back face signature (BFS) limit at 44 mm (personal communication, January 4, 1993).

So many requests for responses were received by STD that the director decided to put together a point-by-point rebuttal in which each of the carefully edited statements used by Fackler was expanded into its original form. The result was a 10 page paper entitled "What the OTA Report *Really* Said," which systematically compared the claims in the *Law and Order* [L&O] article to the actual text of the OTA Report by quoting the excerpts in the L&O article directly, and then by "plac[ing] them back into the context of the report to show what [had] been omitted or overlooked" (Boyd, 1993b, p. 1).

The paper went on to suggest that "the best way to check what the OTA Report *really* says is to read it yourself . . . because the report offers a broad range of often mutually exclusive options" (Boyd, 1993b, p. 1, emphasis in original). Over the next few weeks the issue faded to the point that neither NIJ nor any law enforcement publications were showing further interest (Wendy Howe, interview, January 14, 1999). Whether this was a consequence of the NIJ paper or simply of the exhaustion of the participants in the controversy will probably never be clear.

Shortly after the 1992 election, DeWitt asked for a briefing on the new director's proposal to resolve the body armor standards program controversy, and then arranged a meeting in November at DuPont headquarters in Delaware, where the new program was first described publicly. The plan provided for the creation of the National Armor Advisory Board (NAAB), which met for the first time in early March, 1993, to review and comment on a proposed body armor program policy structure and process (Technology Assessment Program, 1993).

NAAB was composed of representatives from the leading law enforcement associations, including the International Association of Chiefs of Police, the National Sheriffs' Association, the Fraternal Order of Police, the National Association of Police Organizations, and the International Brotherhood of Police Officers.

Concerned that police would be uncomfortable with the direct involvement of industry in the standards process, the STD director designed the board in a way intended to assure law enforcement that they were clearly in charge. NAAB was established as a subgroup reporting directly to the Technical Committee of the Technology Assessment Program Advisory Council (TAPAC)–which was made up almost entirely of law enforcement officials–rather than directly to NIJ. In addition, the board was structured so that the chair would always be a law enforcement official and so that membership on the board would always favor law enforcement (see Figure 9).

At its first meeting, the STD director told members that NIJ Standard 0101.03 would be the baseline for modifications and that the board would actively participate in the standards review process. He also discussed modifications to the existing body

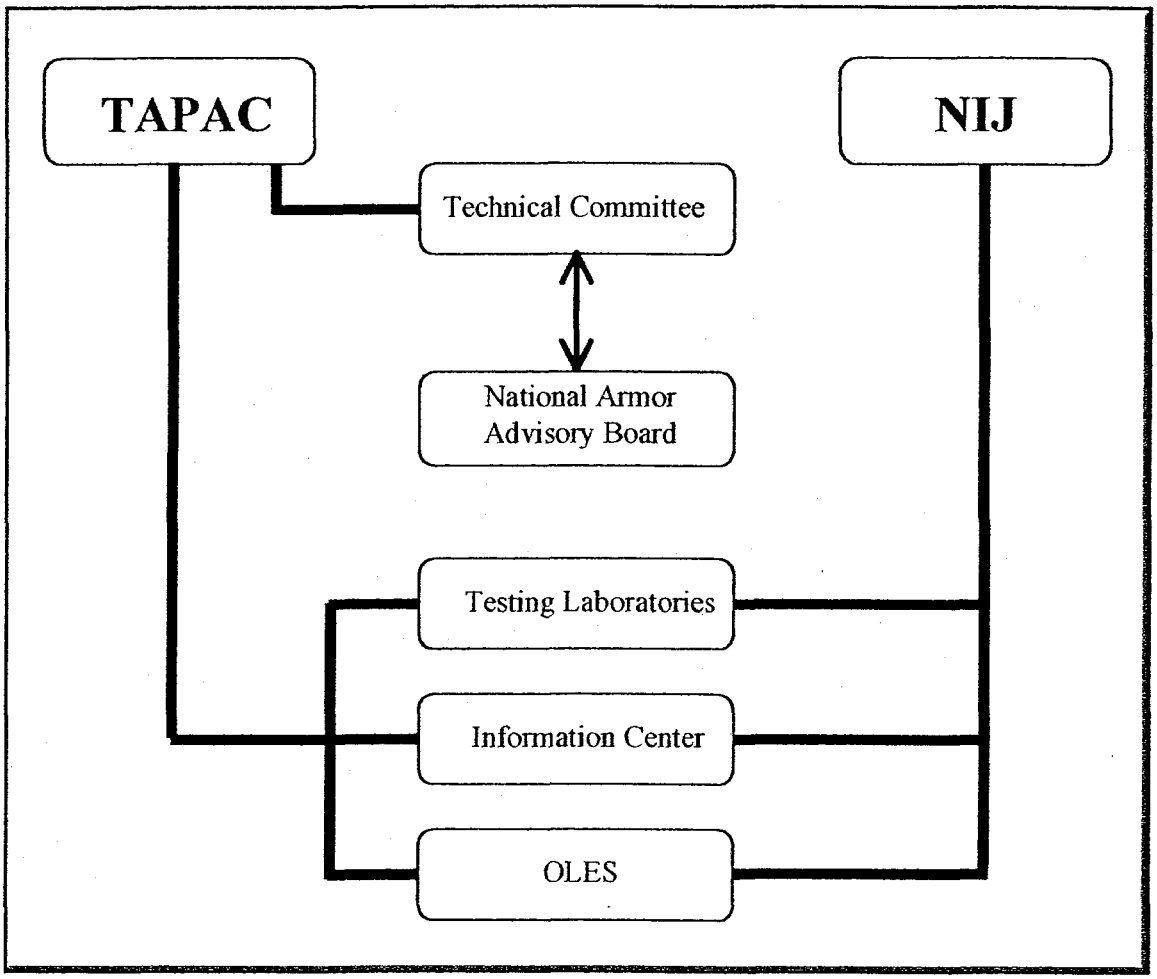

Figure 9. Body armor policy structure (Technology Assessment Program, 1993, p. 4).

armor program, including several that had been suggested by the report of the Office of Technology Assessment. He "asked for and received the boards endorsement of the proposed process and modifications to the program, . . . [and] also asked the board to consider expanding its membership to include other industry representatives, to define areas for future research, and to identify issues for future meetings" (Technology Assessment Program, 1993, p. 4).

A few months after the meeting, NIJ published a report entitled "NIJ's New Body Armor Initiative," which outlined the new standards development process and, for the

first time, described the principles and priorities which would now drive the NIJ physical science research and technology development activity. It also included two new items–a diagram of the new standards review process (see Figure 10) and a

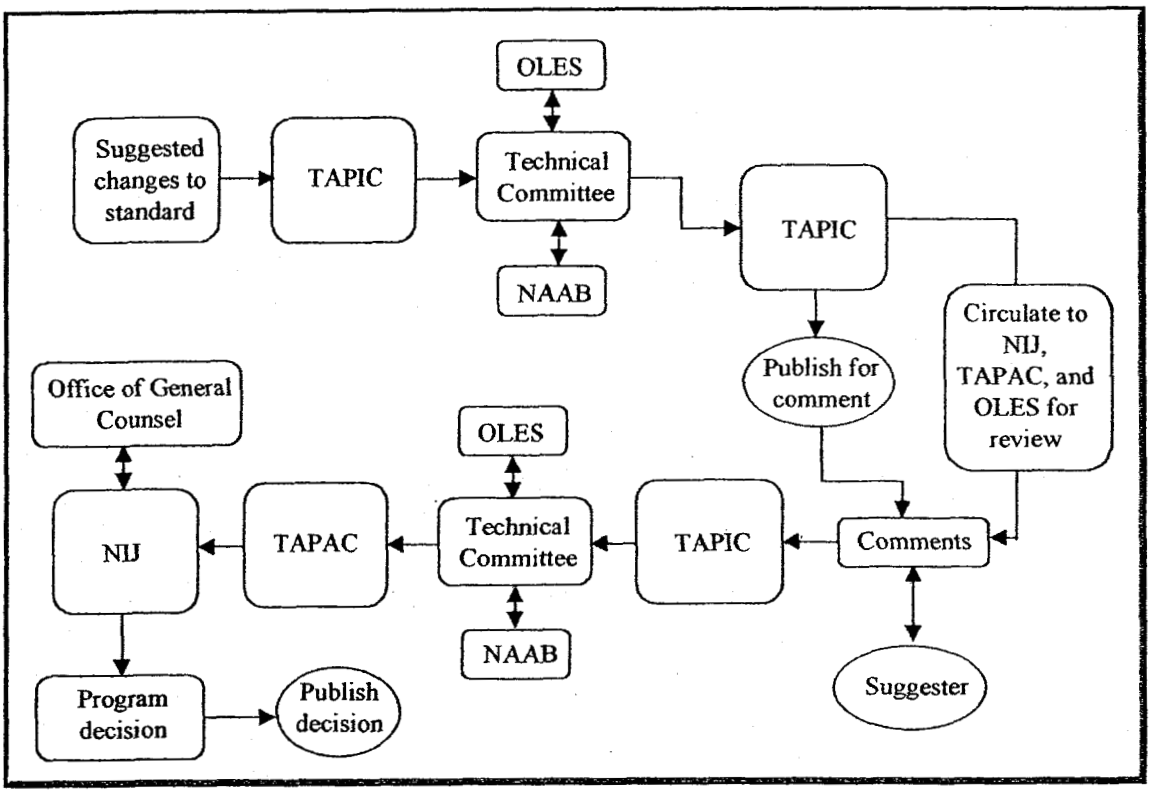

Figure 10. Standards review process (Technology Assessment Program, 1993, p. 5).

technical change to the retest procedures to be employed by the Institute when body armor failures were reported from the field. The report declared that "NIJ's research has always emphasized the practical needs of the local law enforcement user," and had produced "broad, policy relevant studies or specific technical research into applied technologies." For most state and local law enforcement agencies, it suggested, NIJ was the only research and development resource, and so its mission was "to identify law enforcement needs, find expedient and cost-effective solutions, and bring them to the

attention of the law enforcement community." (Technology Assessment Program, 1993, p. 1).

The Institute further described the goals of its technology program as being driven by six criteria, mandating that its projects would: (a) address a real need; (b) produce practical and workable technologies; (c) be cost-effective; (d) not require extensive training; (e) not require dedicated manpower; (f) and pose no unmanageable liability issues. "NIJ is guided by certain principles in all of its research priorities. . . . Nowhere are these principles more important than in the body armor program." These principles, it said, were designed to ensure the safety of law enforcement personnel, the effectiveness of law enforcement equipment and–in an obvious bow to the recently settled lawsuit–"fairness to users and manufacturers" (Technology Assessment Program, 1993, p. 1).

The announcement also made clear that NIJ now considered its first priority, in deciding where to concentrate "efforts and limited funding," to be the identification and deployment of off-the-shelf technologies from the military or industry where development costs could be avoided. Its second priority would be the identification of new but largely unknown technologies the Institute could introduce by demonstrating their utility to law enforcement and their marketability to industry. Finally, the Institute would "develop new technologies only if they have widespread and important applications for the public safety community," and would do so by establishing a new cooperative effort between the NIJ Technology Assessment Program (TAP) and the body armor industry. It would do this through TAP "by refining the process for

developing policy and reviewing standards" (Technology Assessment Program, 1993, pp. 1-2).

The report then described the key organizational components of the TAP policy development process at NIJ, listing the Technology Assessment Program Information Center (TAPIC), the Office of Law Enforcement Standards, TAPAC and its technical committees, and the testing laboratories. For the first time, industry's role would now be "formalized through the introduction of advisory boards" (Technology Assessment Program, 1993, p. 2).

Finally, in response to demands from some body armor manufacturers that the Institute settle any questions regarding the performance of body armor in the field quietly and out of public view, the report responded firmly that the then current procedure for handling noncompliance or failure of TAP-approved armor would also continue. Whenever noncompliant armor was detected or TAP-approved armor experienced a failure in testing, TAPIC would provide timely notification to the manufacturer of the problem armor, and provide a period of time for the manufacturer to respond with a written explanation of the situation and how the manufacturer intended to resolve the problem. "In every case, NIJ [would] first pursue the options that will be most satisfactory to all of the involved parties," by attempting a cooperative resolution or referring the problem to TAPAC for a recommendation. But, if cooperative attempts at resolution were unsuccessful, four possible actions could be taken by NIJ, depending on the urgency of the situation:

1. Delete the model or company from the Consumer Product List (CPL).

2. Refer the case the Federal Trade Commission.

3. Issue a warning through the National Law Enforcement Telecommunications System (NLETS).

4. Issue a follow-up to law enforcement agencies, as needed (Technology Assessment Program, 1993, p. 5).

But NIJ also wanted to make clear that its concern for fairness to manufacturers was subordinate to a more important concern, declaring that "the manufacturer will be notified of the intended action. If hazard to life is immediate, however, NIJ reserves the right to issue warnings without response periods for the manufacturers" (Technology Assessment Program, 1993, pp. 5-6). This process, essentially unchanged, remains in place to this day.

By the end of 1993, the body armor issue had ceased to be more than a routine program to NIJ, until during a visit to the Southwest Border, concerns were raised with Attorney General Janet Reno about the "wearability" of soft body armor procured from UNICOR (Federal Prison Industries) for the U.S. Border Patrol. Border Patrol personnel had complained that their body armor was effectively unwearable because of its bulk and stiffness, and that this compromised their safety. They also expressed misgivings about the fact that their vests were being made by prisoners (personal communication, Director, Investigative Agency Policies (DIAP) to the Attorney General, March 25, 1998).

To prepare a response to the attorney general, the director of the Office of Investigative Agency Policies (OIAP), a coordinating organization made up of the major federal law enforcement agencies, formed the Federal Body Armor Advisory Panel (FBAAP), chaired by the FBI. Without consulting NIJ, the FBAAP chair initially resurrected many of Fackler's old arguments, suggesting that the NIJ test was unduly stringent and that this stringency resulted in vests that were unnecessarily uncomfortable. This position was softened considerably once the attorney general directed that NIJ also play a role in developing a solution. Nevertheless, at the insistence of the FBI chair of the FBAAP, traces of the criticisms were retained in the recommendations provided to the attorney general.

The FBAAP report observes that the UNICOR body armor worn by Immigration and Naturalization Service (INS) Border Patrol agents is similar to vests approved by NIJ at the defined protection level (both in terms of bulk and performance), but also cites a 1989 NIJ publication which said that "Type II body armor, heavier and bulkier than either types of I or IIA . . . may be considered unsuitable for full-time use in hot, humid climates." The memo then goes on to acknowledge NIJ's observation that body armor had changed significantly since 1989, so that some level IIIA body armor is actually lighter than and more flexible than level II body armor, but dismisses it by declaring that "while we do not dispute this, we maintain that in both categories the SBA remains unacceptably uncomfortable, particularly for sustained use in hot, humid climates" (personal communication, Director, OIAP, to the Attorney General, March 25, 1998).

The memo did not, however, include NIJ's observation in its earlier response to the draft of this memo, that NIJ was in the process of revising all of its body armor literature and no longer believed the statement in the 1989 publication "properly reflects the current state of body armor technology." The NIJ response indicated that the new language–which had already appeared in the most recent version of the NIJ publication–stated that "for protection against higher velocity . . . ammunition, officers traditionally select Type II armor" (facsimile from Jeremy Travis, Director of NIJ, to Bob Hayes, Office of Investigative Agency Policies, November 10, 1997).

The OIAP memorandum further observed that, although NIJ testing and certification protocols are voluntary, they "are *de facto* industry standards used by both manufacturers and purchasers of SBA." Therefore, the ultimate responsibility for fixing the problem rested with NIJ. The recommendations which emerged from FBAAP thus were phrased in a way that tended to strengthen the FBI's positions and directed NIJ to report back within 6 months on three key issues.

1. NIJ was directed to revisit the back face signature (BFS) requirement for certification of SBA (a factor which contributes to the stiffness of SBA), and determine "whether it can be modified in lieu of the previously published findings of NIJ sponsored 'blunt trauma' research conducted in 1976." The recommendation did not mention that NIJ had already observed that European standards were even more stringent than were NIJ's current requirements.

2. The Institute was directed to reexamine its rules regarding the testing of ballistic "inserts" to determine whether strengthening selected key areas (e.g., over the

heart or spleen) might provide adequate protection from penetration and blunt trauma injury to vital areas. The OIAP memorandum suggested that "this could lead to a breakthrough in the development of SBA which is lighter, more wearable, and less costly than heavier, bulkier vests offering comparable protection." .Omitted from the paper was any mention of NIJ's concerns that this approach might lead to armor incapable of stopping a penetration anywhere on the vest but in the small areas covered by the ballistic "inserts."

3. Finally, the Institute was to consider adopting a more detailed and more frequently disseminated "Consumer Reports" model for reporting test results which would include "complete descriptive information about the item and testing conducted." Again, the recommendation did not include the NIJ objection that this data was misleading outside of the testing process itself, had frequently been misrepresented in the past by vendors, and was available to federal agencies on request to NIJ.

The NIJ response, delivered January 5, 1999, in a memorandum to the attorney general, observed that armor design and construction had changed dramatically since the late 1970s with the introduction of new fibers and new technologies. Armor that had once both stiff and cumbersome even at lower threat levels was now far more pliable and more comfortable to wear. "In fact," it declared, "the average weight of a ballistic vest had declined as much as 40-percent over this period." With the introduction of these lighter and more flexible vests, however, it was–in the Institute's judgment–"even more important not to relax the proven NIJ back face signature requirement," because the Institute's research into the revision of the standards had

shown that the majority of vests that fail to meet the requirements of the standard do so as a result of penetration, and not for back face signature failures. (Ironically, the Institute was already well into the process of revising the standard). This was not true, however, for the level IIIA armor (which stops high-velocity 44 magnum and submachine gun 9mm ammunition) that the FBI indicated it thought most appropriate for federal agencies. NIJ testing laboratory records for this armor, said the memorandum, showed that 50% of failures at level IIIA are because of penetration and 50% because of extensive back face signature.

NIJ recommended, therefore, that the back face signature requirement be unchanged, there be no change to allow special testing of ballistic inserts, and that the body armor lists be updated more frequently but not include information that manufacturers feel is proprietary. The result was a requirement in the new OIAP *Guidelines on Procurement and Replacement of Body Armor* that "body armor purchased for standard, general use by [Department of Justice] law enforcement agencies must be certified by the National Institute of Justice." Three months earlier, the OIAP chairman had announced that he was "appointing Donna Kay Barnes of the Immigration and Naturalization Service to serve as Chair of the Federal Body Armor Advisory Panel" (OIAP Resolution 23, October 28, 1998).

Despite the considerable negative publicity generated by the body armor controversy, it provided two major positive effects for the new Science and Technology Division. First, because it became associated with the end and successful resolution of the body armor problem, its credibility and that of the new director were greatly

enhanced. More importantly, by weathering the body armor controversy–especially when the standard was challenged by the FBI in 1997–it was established as the appropriate home for standards development and equipment evaluation for law enforcement. Its second dividend was that it forced the Institute to develop a public and credible process for managing the development and implementation of standards, a process which became the model for the way the Office of Science and Technology does business.

The Justice/Defense Partnership

In early 1992, the Director of the science and technology division (STD) had obtained approval to fund "the Less-than-lethal Technology and Policy Assessment Panel comprised of senior policy experts with law enforcement, defense, government and industry experience." At its March 1993 meeting, "the panel recommended that U.S. Attorney General Janet Reno formally request assistance from the Department of Defense (DoD) and the Intelligence Community Management Staff (CMS) to initiate a dual-use technology effort to support law enforcement" (National Institute of Justice, 1994, p. 51). That letter, signed by the attorney general in April 1993, resulted in a series of meetings between the Advanced Research Projects Agency (ARPA) and NIJ.

In late summer of 1993, Congresswoman Patricia Schroeder contacted Mike Russell, who was then the acting director of NIJ, and asked if the Institute would be able to assist her in devising a program to develop technologies which could be used to prevent a handgun from firing for anyone except its authorized user. Russell instructed

the Director of the Science and Technology Division to develop a plan to be presented to Schroeder's staff the next day.

At this meeting, the Congresswoman–who was then chairing the Research and Technology Subcommittee of the House Armed Services Committee–asked if there was anything she could do to assist NIJ's nascent technology program. The Institute's only request was that she consider placing language in the defense appropriations bill requiring the creation of a joint working group consisting of the Advanced Research Projects Agency (ARPA) and NIJ, which would allow the Institute to peer into ARPA's research portfolio and identify those projects or programs which might be a value to the law enforcement community. The resulting language, included in the House Defense Authorization for FY 1994, directed the Secretary of Defense,

> acting through the Director of ARPA, to convene a working group of Federal research agencies within the health and justice fields to explore the potential use of ARPA resources and dual-use technologies to address health and justice issues. (U.S. House of Representatives, 1994, pp. 201-202)

This working group was to include, as a minimum, the National Institute of Justice of the Department of Justice, the Centers for Disease Control, National Institutes of Health, the National Academy of Science, the National Governors Association, the Federal Bureau of Investigation and outside recognized oversight groups. Its purpose was to

> develop an inventory of ARPA resources, an analysis of issues that have criminal justice and health implications and recommendations for ARPA funding and legislative remedies to address those issues." (U.S. House of Representatives, 1993, p. 157)

In late August, 1993, the Director of NIJ's Science and Technology Division was invited by James K. Stewart, who had been the director of NIJ during most of the 1980s, to deliver a paper at an International Society for Optical Engineering (SPIE) Symposium on "Coupling Technology to National Needs." This paper described, for the first time, a strategic vision for technology development by NIJ for criminal justice in the United States (Boyd, 1993a). What distinguishes this paper is that there are no earlier examples in NIJ's history of an articulated vision for a strategic process for technology development. More importantly, it is this vision which has informed NIJ's technology efforts since it was delivered in 1993 in Albuquerque. Echoes of this paper are discernible in most subsequent NIJ publications which discuss the technology programs.

The paper argued that "in contrast with defense, there is no federal level agency driving the development, manufacture or acquisition of specialized law enforcement equipment" (Boyd, 1994, p. 3), and pointed out that only within the past year had NIJ begun to identify existing technologies (particularly those from the defense and intelligence communities), and to encourage "promising new concepts and [facilitate] the transfer of already developed technologies to law enforcement use" (p. 4).

But despite this new emphasis, little funding was available for this or any other initiative, which meant that law enforcement projects were necessarily very small. Thus, at the national laboratories where much of the work is being done, law enforcement projects tended to be "part time work, sandwiched in among the major, multi-million dollar projects." The result was that it was "difficult to attract high-

powered talent and . . . even harder to develop the critical mass required to make significant breakthroughs (Boyd, 1994, p. 2).

Recognizing that "there obviously is no one-on-one relationship between investments in technology and reductions in crime or improvements in police productivity," he argued, nevertheless, that law enforcement was probably one area where large gains could be realized from technology. This was so because so little had been invested in bringing technology to law enforcement that there were likely to be many opportunities to improve police operations through technology (Boyd, 1994, p. 3).

What he suggested was a five part strategy, the first part of which was to "draw attention to the advantages technology can offer to law enforcement." This was necessary, he suggested, because even more important than the meager investments in technologies for the law enforcement community was the fact that "law enforcement has not readily embraced technology," and had instead invested in increased numbers of police officers, rather than in tools to make the department more efficient or more effective (Boyd, 1994, p. 5).

Laying a foundation for NIJ's technology development role, he suggested that the second part of the strategy should focus on the identification of "a principal focus for law enforcement technology efforts," since none then existed. This focus would be responsible for developing new technologies, eliminating duplication and ensuring law enforcement involvement

> so we avoid the costly mistakes made too often in defense research and development and charge it with the development of a coherent strategy that considers immediate, mid- and long-term technology needs and identifies what we can and cannot do with technology." (Boyd, 1994, p. 5)

Accomplishing this would require the creation of "a mechanism to ease the collection of technological information by public safety agencies" (p. 5), which might logically be accomplished through a "*Technology Resource Center* which can consolidate information and provide it to law enforcement" (p. 5, emphasis in original). This could be done, the paper suggested, by building on the health and justice interagency working group, which had been directed in the recent FY 1994 Defense authorization bill. Although this working group was eventually formed by NIJ and the Advanced Research Projects Agency (ARPA), it never included any of the health or other groups identified in the Congressional authorization language.

Finally, the strategy called for attention to "the fragmented buying power of law enforcement," because this fragmentation made it difficult to interest companies large enough to bring the advantages of economy of scale to law enforcement markets. "The result is that local agencies are often the victims of less than competent and sometimes even unscrupulous producers and vendors." An even more visible indicator, he suggested, was the fact that while we have specially designed postal and UPS trucks, there is no manufacturer in the United States that builds a car especially designed for police. This was the case largely because police departments lack the concentrated buying power required to interest manufacturers in producing specially designed cars for police.

> In fact, police buying power is so limited that the police were unsuccessful even in persuading manufacturers to produce cars without the passenger side airbag, which is forcing agencies to completely reengineer the placement of police equipment in the car. (Boyd, 1994, p. 6)

Congresswoman Schroeder also began exploring with the Director for Defense Research and Engineering (DDR&E) options for supporting law enforcement. Although the Defense Department resisted initiating any formal cooperative agreement, the combination of Schroeder's pressure and the attorney general's letter resulted in tentative negotiations on a possible memorandum of understanding (MOU).

In an effort to accelerate the negotiations, Schroeder scheduled a hearing on "defense technologies and law enforcement" on March 22, 1994. In the questions provided to members of the panels who were to testify before that hearing, Schroeder made a point of asking about the status of the ARPA/NIJ MOU,[5] which had been in negotiations since the previous April. She believed it likely that including these questions would produce pressures on defense to both more quickly (Patricia Schroeder, personal communication, Jan. 14, 1994).

In his testimony, the OST Director took the opportunity to highlight the current status of the MOU, declaring that, in his judgment, the most important development to that point was committee language in the 1994 Defense Department budget authorization that directed the Secretary of Defense to form, through DARPA, an interagency health and justice working group. This group was to include the National Institute of Justice and be charged with the development of an inventory of DARPA resources potentially applicable to the non-Defense working group partners, and with

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[5]ARPA and DARPA are the same agency. As political winds change, the "D"–which stands for "Defense"–comes and goes.

the execution of an analysis of issues with criminal justice and health implications that would lead to "recommending remedies."

Noting that this legislation also directed the Secretary of Defense to report within six months to the House and Senate Armed Services Committees on the findings of the working group created under the legislation, he suggested that "this provided, for the first time, a formal law enforcement voice in the federal research and development apparatus."

He then went on to point out that the attorney seneral had written the secretary of Defense in November, 1993, "to ask that the next iteration of the Technology Reinvestment Program (TRP) include at least one panel sensitive to law enforcement needs" (U.S. House of Representatives, 1994, p. 166).

These hearings attracted the attention of a number of members of the Washington media. One of these was David Morrison who produced extended articles in both the *National Journal* and in *Government Executive*, describing the problems involved in getting technology to law enforcement, most of it based on the testimony at Schroeder's hearings and on interviews with NIJ's technology program director. As did most of the early coverage of this issue, Morrison's articles focused on the potential for defense technologies to help modernize law enforcement and identified the

> nexus for this Cold-War-to-home-front technology transfer initiative [as] the National Institute of Justice (NIJ), a Justice Department unit founded in 1968 to sponsor research on crime and crime-control. (Morrison, 1994, pp. 42-43)

This office, however, had few resources available to it and consisted of a staff of five with an annual budget of $5 million, in contrast to the "$75 billion-plus the nation

spends annually on the operation of law enforcement and criminal justice agencies." Of $67 billion spent on all federal R&D, he reported, only "a tiny 0.0007% aids law enforcement" (Morrison, 1994, p. 42-43).

Media reports of this hearing attracted the attention of Vice President Gore and prompted his staff to contact the Institute to ask whether it might be possible to create a major technology event around the proposed memorandum of understanding. NIJ responded by suggesting that a technology fair be set up to display technologies that the new partnership would be capable of delivering to law enforcement, and suggested this would provide a setting for the formal signing of the MOU by the attorney general and the Secretary of Defense, in a public ceremony hosted by the Vice President himself.

The Vice President's office liked the idea but found that negotiations on the agreement were still stalled. His office quickly began to apply pressure through the Office of the Secretary of Defense. The agreement was finally concluded the day before the formal signing on April 20, 1994, at a ceremony held in the auditorium of the Drug Enforcement Administration (Joint Program Steering Group, 1997; National Institute of Justice, 1994a, pp. 52-53).

The final MOU established a new joint office which it called the "Joint Program Steering Group" (JPSG), and provided that it be staffed jointly by personnel from both the Justice Department and the Department of Defense. The respective executive agencies were NIJ for Justice and ARPA for Defense (Department of Defense/Department of Justice Memorandum of Understanding, April 20, 1994). The MOU provided that the JPSG would "designate areas of common technological need

and provide management of projects," in three categories: (a) existing Equipment, in which DoD would, at its own discretion, "select equipment in its inventory to be made available to DOJ for evaluation for law enforcement applications," while DOJ would fund its own evaluations of these technologies; (b) current programs, which would include the sharing of ongoing technology programs at either DoD or DOJ as appropriate, with the receiving agency retaining responsibility for funding any optimization or modification necessary to make the products suitable to perform their missions; and (c) new technology projects which could be initiated under the MOU, pursuant to mutual agreement of the parties. The MOU further provided that this last category of projects

> shall receive funding, pursuant to such mutual agreement and in accordance with all applicable laws and regulations, from both DoD and DOJ throughout the development cycle. Each Department is expected to fund that part of the project necessary to integrate the technology into its own operational missions. (Department of Defense/Department of Justice Memorandum of Understanding, April 20, 1994)

Since the agreement provided that each agency would fund its own projects, no funding was provided for as part the agreement. From NIJ's perspective, this was sufficient, because the agreement did lead to an extensive series of briefings by NIJ to ARPA on the needs of the law enforcement community, and by ARPA to NIJ on technologies with possible application in law enforcement. Congresswoman Schroeder, however, had more expansive ideas and succeeded in including a major funding authorization in the FY 1995 budget, which had the effect of formally institutionalizing the JPSG. The result was an appropriation in which the initiative received a total of

$37.5 million, taken entirely form DoD funds (Congressional Reference Service, 1994, p. CRS-9, 10).

This authorization dramatically enhanced the credibility of the technology program and its director within NIJ and within the Justice Department itself. The NIJ Annual Report for 1995 trumpeted this appropriation as a major step in strengthening NIJ's technology development programs for law enforcement (National Institute of Justice, 1996b, p. 13), and every subsequent annual report has made reference to the MOU, which also provided a credible justification for the creation of what became the National Law Enforcement and Corrections Technology Center (NLECTC) system.

Later that year, NIJ directed the Technology Assessment Program Information Center (TAPIC) to relocate its activities to a more suitable facility and to change its name to the National Law Enforcement Technology Center. Simultaneously, NIJ funded at a very low level–$250,000–a technology partnership with the U.S. Navy in Charleston, South Carolina, and directed that it be called the Southeast Regional Law Enforcement Technology Center.

A second Congressional hearing was held in El Segundo, California, on June 1, 1994, at Congresswoman Jane Harmon's request. This hearing followed the same pattern as the first, with the opening panel consisting of Anita Jones, the Director of Defense Research and Engineering (DDR&E), and David Boyd, NIJ's Director of Science and Technology. The second panel, however, had a decidedly local flavor, and was made up of state and local law enforcement agency heads. Also included in the second panel were representatives from the Aerospace Corporation, a federally funded

research and development center (FFRDC) for the Air Force and an important activity in the district, which led Harmon to propose that a local office be established with federal funding to coordinate space technology application activities with local law enforcement agencies. This office would have three major responsibilities: (a) development of a communications architecture to facilitate operational contact between all local police jurisdictions in Southern California; (b) providing technical forensic laboratory support to law enforcement agencies in Southern California; and (c) the application of advanced technology to improve what command, control, communications, and intelligence operations of law enforcement agencies in Southern California (U.S. House of Representatives, 1994, p. 317).

Determined to find funding to support the NIJ technology program, Schroeder asked NIJ's STD to suggest language to insert into the Violent Crime Control and Law Enforcement Act of 1994 (P.L. 103-322). The language she subsequently inserted in the bill declared that one of the purposes of the act was to "encourage the development of new technologies to assist State, Indian tribal government, and local law enforcement agencies in re-orienting the emphasis of their activities from reacting to crime to preventing crime," and included a provision in the section on public safety and community policing which authorized the attorney general to make grants to develop the technologies that would be required by state and local law enforcement agencies to accomplish this purpose. Finally, she succeeded in having $37.5 million inserted in the 1995 Defense Appropriations Bill to support the Defense/Justice MOU for the development and transition of technologies applicable to law enforcement and military

operations other than war, stipulating that such support "may include support for the national law enforcement technology centers of the National Institute of Justice" (P.L. 103-322).

Later that year, a third technology center was established in a partnership with the Aerospace Corporation and called the Western Region Law Enforcement Technology Center. Like the center in South Carolina, this center was funded at a very low level in order to, as the STD Director often described it, "plant the flag and make it real so there will be a foundation upon which to build when appropriations eventually grow to meet the need."

Almost immediately, Dr. Anita Jones contacted Assistant Attorney General Laurie Robinson to demand that the three program managers mentioned in the MOU be sent to ARPA to work out of *its* offices while managing this appropriation. Since NIJ's Science and Technology Division had only three program managers, including the Director of the division (something which was well known to ARPA), acceding to this demand would have had the effect of transferring NIJ's entire technology staff to ARPA. Robinson, of course, objected to this request, declaring that it was her interpretation of the agreement that program managers from each agency would work out of their own agencies, but would do so cooperatively when projects involved both parties (Laurie Robinson, personal communication, November 4, 1995). Jones, in turn, made clear that if Justice could not hold up its end of the bargain by "properly staffing the joint office, the agreement would be inoperative" (Anita Jones, personal communication, November 6, 1995).

NIJ was finally able to resolve the impasse by taking three unusual actions. The Director of STD, over a period of about three months, identified and put in place several mechanisms that could be used to provide the required program managers without destroying STD. With strong support from its security technologists, he succeeded in convincing the Federal Bureau of Prisons (BOP) that this partnership would also be of considerable benefit to them, and that they should detail to NIJ a senior program manager. The FBI was persuaded to do the same, and the Navy, since the first regional center had been established in Charleston at one of their facilities, was encouraged to provide another senior program manager. The NIJ contingent to the JPSG thus consisted of Dr. Pete Nacci, a GS-15 psychologist from BOP, Dr. John Hoyt, a GS-14 computer scientist from the FBI, and Irv Smietan, a retired member of the Senior Executive Service brought on by the Navy under an Interagency Personnel Assignment (IPA) agreement (Joint Program Steering Group, 1997).

When the 1995 Justice appropriations bill was published, it included–for the first time–a $3.5 million Congressional earmark to create a "technology information network" and a $1.5 million earmark to establish a commercialization activity collocated with the National Technology Transfer Center in Wheeling, West Virginia. Inserted by Senator Fritz Hollings of South Carolina and Congressman Alan Mollohan of West Virginia, chairs respectively of the Senate and House Appropriations Subcommittees on Commerce, State, Justice, these earmarks effectively institutionalized the center system. NIJ highlighted this increased funding in its 1995 annual report to Congress by touting that soft body armor, which had become standard

issue equipment in most law enforcement agencies, had originated from an early NIJ initiative, and announced that in "continuing this commitment to harness scientific advances for the benefit of criminal justice operations," the Institute had "significantly expanded its science and technology efforts during fiscal year 1995, allocating a total of $13 million for these activities" (National Institute of Justice, 1995, p. 13). What the report did not point out is that the entire funding expansion was a consequence of Congressional and White House mandates and had not been a consequence of any decision by the Institute director or of any NIJ budget submission.

Included in the $13 million was $4 million transferred to NIJ by the Community Oriented Policing Services (COPS) Office in response to a White House inquiry about the feasibility of producing a device capable of determining whether a person is carrying a concealed weapon. This inquiry quickly found its way to STD, which had a number of concealed weapons detection technology proposals in-house but lacked funding to initiate any of them. When this point was made in a briefing to Associate Attorney General John Schmidt, under whom both the COPS Office and OJP fell, he arranged for the COPS Office to provide $4 million to initiate the development of several concealed weapons detection technologies, including one portable enough to be hand-held by officers in the field.

With $13 million now devoted to technology, STD was, for the first time, a significant part of the NIJ research portfolio. Its budget had grown from less than 19% of the Institute's budget to nearly half (42%), yet the staff still constituted less than 10% of Institute personnel.

It was the 1996 appropriation–which was characterized by a series of continuing resolutions and government shutdowns that also closed NIJ and sent all of the STD personnel home–that produced the most dramatic single year increase in technology funding for the Institute. In a period of intense partisanship, Congresswoman Schroeder had succeeded in building bipartisan support for an amendment to House Rule 728 (hereafter referenced as H.R. 728), which provided that

> the Attorney General shall reserve 1 percent in FY 1996 through FY 1998 authorized to be appropriated . . . for use by the National Institute of Justice in assisting local units to identify, select, develop, modernize and purchase new technologies for use by law enforcement. (H.R. 728)

Schroeder told her Judiciary Committee colleagues that "with this amendment we are going to be able to avoid many of the pitfalls that we saw with LEAA," and declared NIJ "a group that has really gotten a terrific track record in doing R&D and transferring military technology to law enforcement and trying to get a much better deal for the taxpayer every way around." Republican Congressman Bill McCollum, then chairing the debate, responded that he thought Schroeder had "worked up a fine amendment," and explained that "what it would do is . . . [set] aside 1% per year for the National Institute of Justice for these purposes. That would amount to roughly $20 million a year for the life of the bill" (U.S. House of Representatives, 1995a, p. H 1647). Supported by both parties, the amendment was passed by voice vote. House Rule 728, however, was never passed by the Senate, which meant that, under ordinary circumstances, the amendment would have no force. The FY 1996 appropriation this bill attempted to authorize, however, was passed under circumstances that were well out of the ordinary.

When H.R. 728 failed in the face of Clinton Administration opposition to the block grant provisions of the bill, the resulting impasse forced the passage of a series of continuing resolutions and caused two separate government shutdowns. NIJ found itself operating under 13 different continuing resolutions in a single year, until an appropriation was finally agreed to in April, 1996–more than halfway through the fiscal year. But in the scramble to paste together an acceptable compromise bill, several shortcuts were taken in writing the bill that was eventually passed. One of the shortcuts was a number of references to provisions in H.R. 728, which initially produced some confusion within the Justice Department, especially among affected agencies in the Office of Justice Programs.

Determined to salvage as much as possible out of the wreckage of the FY 1996 appropriation, the STD director and the OJP General Counsel constructed an argument that the repeated references in the appropriation bill to H.R. 728 logically meant that Congress intended to incorporate those elements of H.R. 728 which were not expressly modified in the appropriation. Therefore, any amendment attached to that bill and not expressly rejected by language in the appropriations bill should also apply to any appropriation which made reference to H.R.728. Although initially skeptical, the Justice Department finally acceded to the argument, reasoning that the relevant provisions provided the Department with more discretion and that "more discretion is always better than less" (Paul Kendall, OJP General Counsel, and Kent Marcus, Assistant Attorney General for Legislative Affairs, personal communications, May 15, 1996). This reasoning meant, paradoxically, that a bill that had not been passed by both

houses of Congress or signed by the President had still became part of the law of the land.

This internal debate, however, also had the effect of delaying by an additional two months when NIJ could begin to draw on the appropriation. As a consequence, FY 1996 funds were not available to NIJ until June, three quarters of the way through the year, so the 1996 solicitation was not released until August. FY 1996 thus became what STD staff called "the year that never was," and the next year became a banner year for law enforcement technology as funds from both years were awarded during FY 1997.[6] In every subsequent year, appropriation bills have made explicit references to H.R. 728. The FY 1999 Appropriation, for example, includes among its dozens of references to this never passed bill a provision "that $20,000,000 shall be available to carry out section 102(2) of H.R. 728."

The same appropriation also increased funding for the NIJ technology centers from $3.5 million to $5 million and the commercialization activity in West Virginia from $1.5 million to $2.8 million. No similar increases were made for the social science activities of NIJ until fiscal year 1998, when the appropriation added a small amount to study health issues for prisoners about to be released from confinement. By 1999, the total NIJ budget–adjusted for inflation–was its highest ever, exceeding the 1975 peak by more than a third.

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[6]Unlike most federal organizations, agencies in the Office of Justice Programs have always had what are known as "no year" funds which remain available to the agency until spent, even if it takes more than one year to spend them.

Even more striking was the change in the share of the Institute's budget devoted to technology. In 1992, technology had represented barely 10% of the total budget, but by 1996 the technology program had grown to more than 52% of the Institute budget (Figure 11), the first time since 1973 that more money had gone to technology than had gone to social science programs. As of 1999, the technology share of the budget stood at just over 64%, while the President's budget for FY 2000 proposes to increase the

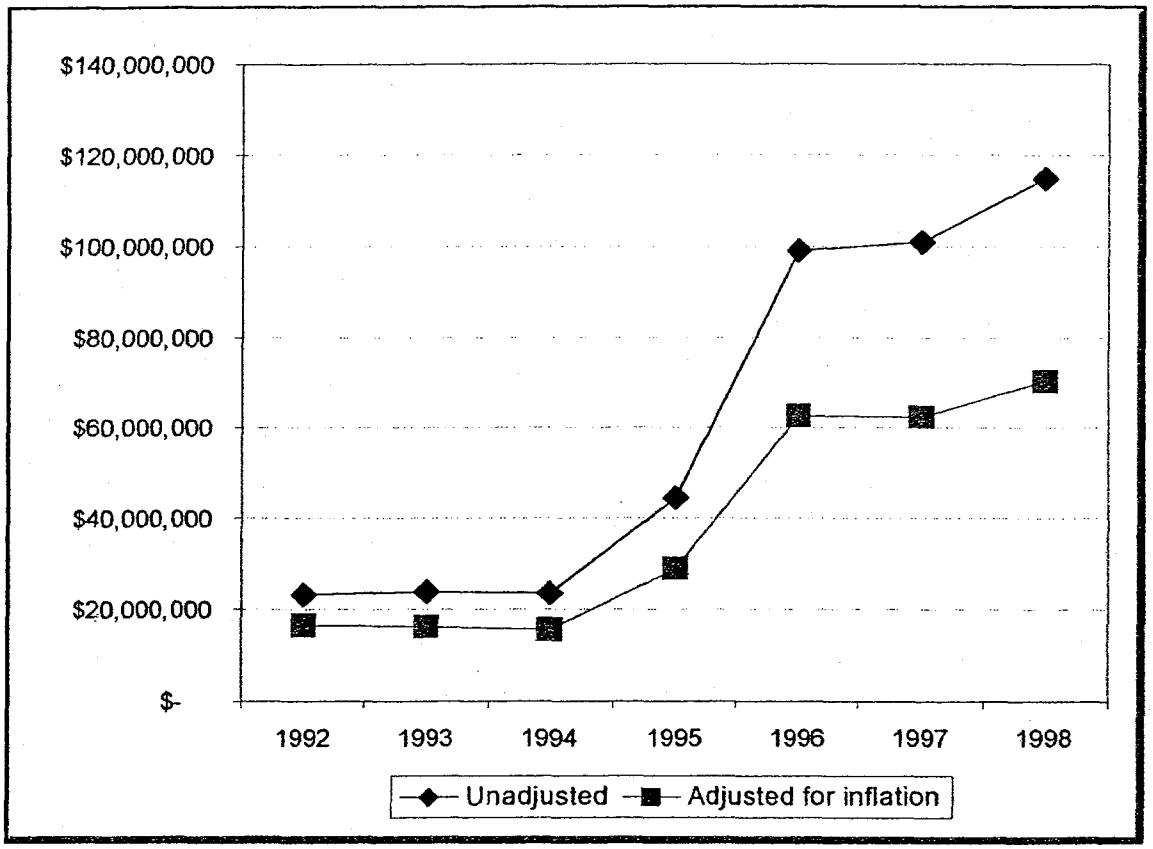

Figure 11. NIJ funding levels.

technology program by another 40% or more. (These figures are based on the amounts shown in appropriations bills or reported in internal budget summaries as transferred from other agencies.)

Analysis of the National Institute of Justice

By the beginning of 1999, the Institute was in the midst of the greatest expansion of its financial resources it had ever experienced, and with this expansion came both a high level of instability and rapidly expanding goals.

Goals

A goal can be defined as "an unrealized state or condition that the members of an organization do not possess, but which they deem desirable" (Hodge & Anthony, 1988, p. 756), but may also be described as "a statement of attainment/achievement that one proposes to accomplish or attain with an implication of sustained effort and energy directed to it over a longer range" (Hunt, 1993, p. 337). In either case, they are distinguished from the mission which provides the purpose for the organization or the reason for its existence, and from objectives which provide a "statement of the desired result to be achieved within a specified time," and which always includes "by definition, . . . an associated schedule" (pp. 338-339). Rarely, however, are any of these three terms so clearly applied in practice in organizations. Instead, they are frequently used interchangeably and inconsistently, as they have been in both NILECJ and NIJ.

Institute goals. Charles B. DeWitt, the Institute director from early 1991 to the beginning of 1993, hired Professor Al Reiss to help develop a long-term research plan and define the Institute's first clear set of goals. This allowed DeWitt to declare in the Institute's 1992 annual report to Congress that "the force driving these changes [in

organizational structure and agenda] at NIJ has been its strategic long-term plan," which was intended to guide the Institute's research over the next five years. The plan was structured around six broad goals: reducing crimes and their consequences; reducing drug-related crimes; reducing the consequences of crime for individuals, households, organizations, and communities; improving the effectiveness of law enforcement, criminal justice, correctional, and service systems' responses to offenses and victims; developing household, school, workplace, and community crime prevention programs; and developing and evaluating information for criminal justice responses to changing and emerging crime patterns and utilization of new technologies (National Institute of Justice, 1992, p. iv).

DeWitt, who had just created a new technology division in the Institute, intended that technology would be a major part of the Institute's work and pointed out that "NIJ continues to pioneer science and technology that will ensure access by criminal justice professionals to the methods and equipment they need to perform their jobs more efficiently" (National Institute of Justice, 1992, p. 78).

These goals stayed in place with little change through two acting directors and for the first year after Jeremy Travis was confirmed by the Senate as the Institute director. But in 1995, Travis made several small changes in these goals, none of which required dramatic changes in the Institute's plans or processes. He rephrased all of them, added alcohol to the second goal, dropped the prevention and "emerging crime patterns" goals, added a goal aimed at "improving law enforcement and the criminal

justice system," and made the development of new technology the explicit focus of the last goal.

Later that same year, Travis convened a series of meetings to rework the goals to emphasize more clearly the research interests of the Institute, and to emphasize an interest in new ideas and research approaches. He was looking, he told NIJ staff, for an expression of the Institute's goals that retained the issues identified in the goals of the previous years, but which would more precisely focus on the interrelationship of those issues and crime. Out of these meetings came what Travis described as a set of goals which defined a strategy: rethinking justice; understanding the link between crime and other social concerns; breaking the cycle by testing new interventions that hold promise for significantly reducing crime; creating tools and crime control strategies useful to practitioners and policy-makers; and looking beyond traditional boundaries to develop a fuller understanding of crime and justice issues (National Institute of Justice, 1996, pp. 6-9).

Despite attempts by the director of the science and technology program, no goal explicitly identified technology development or the application of the physical sciences as an Institute interest. Instead, Travis maintained that these issues fit appropriately within the "creating the tools" goal, which did include the parenthetical phrase, "e.g., technologies" (Jeremy Travis, personal communication, November, 1995).

Early the next year, the Institute's research prospectus observed that "over the past few years, NIJ's science and technology program has grown exponentially," and described the "creating the tools" goal as almost exclusively technology based (National

Institute of Justice, 1997b, pp. 20-21). At the same time the goals were shortened slightly and the fourth goal was changed to read "creating the tools and technologies that meet the needs of practitioners" (National Institute of Justice, 1997a, p. 7; National Institute of Justice, 1998, p. 7). (As this study was being completed there were no plans in the Institute to make any changes to these goals for FY 2000.)

The clearest indication of the importance placed on a goal or category of goals by an organization, however, often is how it allocates its resources, particularly its funding. That measure alone demonstrates an increasing role for technology goals in the Institute's calculus, as Figure 12 demonstrates. The real story, however, may be

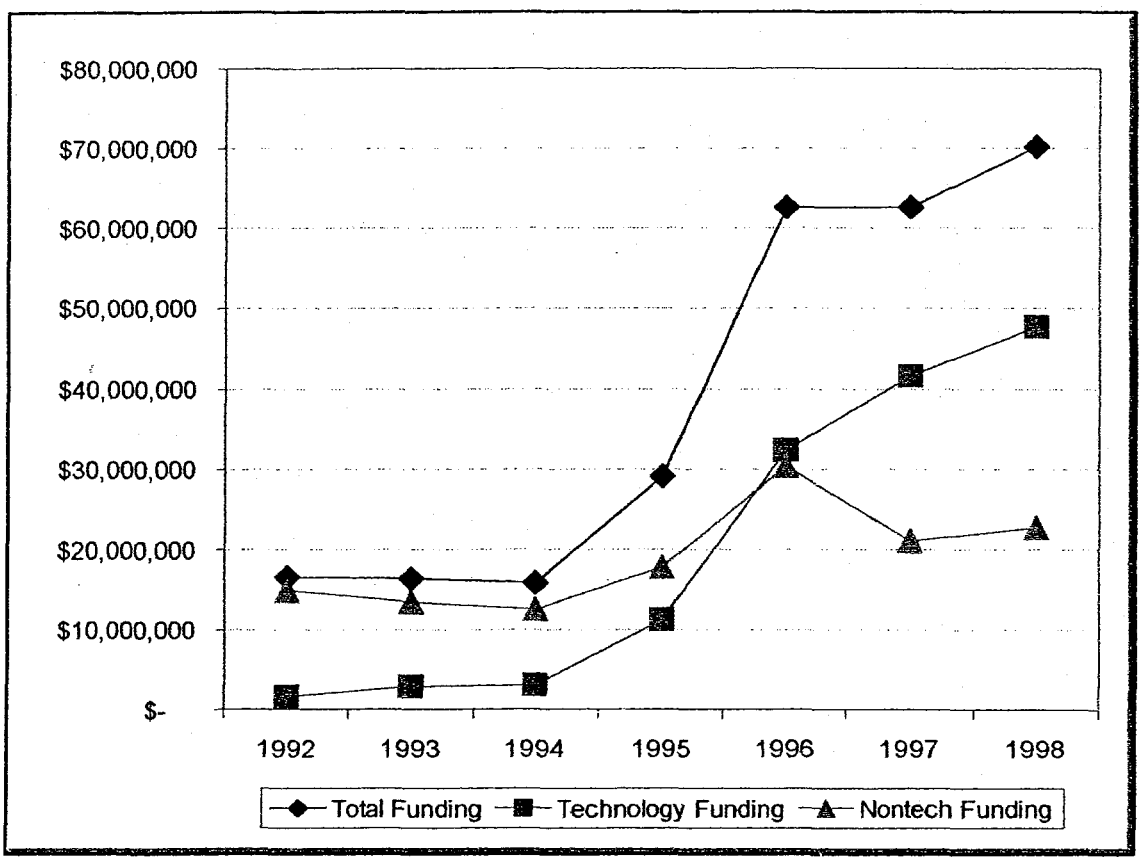

Figure 12. Distribution of funding within NIJ.

more complicated since much of the technology funding was directed by Congress, leaving the Institute little choice in how it was committed.

As Travis was developing the Institute's more general goal, at a lower and more specific level, another set of goals–focused specifically on technology–was simultaneously being developed by the Office of Science and Technology.

Goal development within the Office of Science and Technology. Managers within the Office of Science and Technology (OST) place the origin of the technology goals in a paper delivered by the office director at a conference in Albuquerque in 1993 (Kevin Jackson, interview, March 1, 1999; James K. Stewart, interview, January 8, 1999; Robert Tolle, interview, February 11, 1999). (For convenience, the acronym OST will refer for the rest of this paper to both the Science and Technology Division and the Office of Science and Technology, as appropriate.) In this paper, the director defined the general goal and mission of his office as "the development of new technologies that will provide law enforcement officers with tools that will allow them to meet the complex challenges of daily policing in a safe and effective manner" (Boyd, 1994, p. 6).

When he was called to testify before the House Armed Services Committee in 1994, the OST Director prepared testimony based largely on the Albuquerque paper. Budget analysts in the Department of Justice, however, were concerned that this testimony might suggest an expansion of NIJ's mission that the Department was not prepared to fund. As a consequence, any direct identification of goals was eliminated from the testimony, but what became the foundation of OST's formal goals were several

carefully worded statements scattered throughout the oral testimony (U.S. House of Representatives, 1994, pp. 148-220). He suggested that the Institute's appropriate focus was on local law enforcement, pointing out that NIJ's major concern was the problems of smaller agencies, which accounted for 90% of all law enforcement agencies in the United States. This focus on state and local law enforcement was crucial, he argued, to any effort to reduce crime since "state and local police, who represent more than 95% of our Nation's police personnel and handle well over 95% of the crime in this country, are still equipped much as was Wyatt Earp in the late 19th century" (U.S. House of Representatives, 1994, pp. 148-149).

Using technology to address these shortfalls was critical "since it is unlikely we can afford to double our expenditures [for] law enforcement," which makes "improving the productivity and effectiveness of policing . . . essential" (U.S. House of Representatives, 1994, p. 149). More importantly, the payoffs for technology are potentially very large because,

> . . . if we could improve the efficiency of the entire law enforcement and criminal justice system by just 1% through the application of technology . . . [the savings would] be equal to adding roughly 15,000 police officers. Unfortunately, our efforts to leverage technology to obtain those productivity improvement have hardly been reassuring. (U.S. House of Representatives, 1994, p. 149)

He drew on the Justice/Defense MOU to suggest that there were less expensive ways to support this technology modernization and observed that the MOU signed by the attorney general and the Secretary of Defense in 1994 had already identified technologies with potential for declassification and transfer to or dual use by law enforcement (U.S. House of Representatives, 1994, pp. 151-152).

Finally, he began to lay the foundation of the same case he had made in Albuquerque in 1993 for making NIJ the center of research and technology development for state and local law enforcement, and for the creation of what became the technology center system, by arguing that what was needed was: (a) an effort to draw attention to the advantages technology can offer to law enforcement; (b) identification of a principle focus for law enforcement technology efforts that could coordinate the development of new technologies, eliminate duplication, ensure the involvement of law enforcement in the identification of needs and development of useful technologies; (c) a mechanism to ease access to technology information by public safety agencies, possibly through a gateway or clearing house available to law enforcement; (d) efforts to ensure that, where appropriate, public safety needs are taken into account in the earliest stages of every federal law enforcement research and development effort, not just those specifically intended for law enforcement, and, finally; (e) a mechanism to address the fragmented buying power of law enforcement (U.S. House of Representatives, 1994, pp. 152-153). These same points were made–with increasing candor–in four subsequent sessions before Congress, in 1994 and 1995 (U.S. House of Representatives, 1994; U.S. House of Representatives, 1995a; U.S. House of Representatives, 1995b).

As OST expanded and brought in new staff, it became increasingly difficult to maintain a common understanding within OST of its mission and goals. At first, the "Albuquerque" paper and briefings by the director and deputy director were used to help new staff understand the role and missions of the office. For the first couple of years, this was more than adequate. From 1992 to 1993, the staff included only four

individuals and there were no personnel changes. In 1994, Dr. Richard Laymon–one of the original program managers–retired and was replaced by Robert Tolle, a retired Naval officer who had been the Director of the Naval Investigative Service. An additional position was also allocated to OST and was filled by Dr. Raymond Downs, a senior scientist hired away from a Department of Energy national laboratory.

In 1995, one more position was added, bringing the office strength up to six. In 1996, OST staff was nearly doubled when four new positions were added. The staff more than doubled again in 1997 when Congress, in the Justice Appropriation, directed the addition of 14 positions to OST, but the NIJ director took two of these positions for other purposes. OST strength thus climbed to 22 by the beginning of 1998. By the beginning of 1999, five more positions–some short-term hires–had been added so that total strength, as of 1999, is 27. But even these figures do not adequately describe the real growth of the office or the considerable turbulence caused by these rapid additions.

That same year, the FBI, Federal Bureau of Prisons (BOP), and U.S. Navy each detailed a senior program manager to the organization, and two visiting scientists and a research fellow were added. Early in 1996, a special contract was let which brought in a number of non-federal employees under the Scientific and Engineering Technical Assistance (SETA) Act, which permits scientific and engineering personnel to be hired to assist technical program managers. The result was that by 1998, OST had grown from 4 to more than 50.

To handle this expansion, an employee handbook was developed in late 1995, which formally described the goals, missions and procedures of the office. Although a

copy of the handbook was provided to the Director of NIJ, neither he nor any of his staff ever offered comments or input into any part of the development of the OST goals and missions (Robert Tolle, interview, February 11, 1999).

Introducing the handbook at a staff retreat, the OST Director described his vision as making the office the first place called for technology information in law enforcement or corrections, serving as a source of advocacy for technology for law enforcement at every level, and identifying and introducing useful technologies quickly (Boyd, 1997, p. 4). These tasks were to be accomplished "through the technology centers, by leveraging [and] by acting as technology brokers" (p. 4).

The handbook treats goals and missions interchangeably, and identifies five key OST missions:

- Identifying technology requirements for new technology tools, especially at the state and local law enforcement and corrections community level.
- Finding, researching, and developing new technologies and new applications of existing technologies to improve policing and corrections in the United States.
- Introducing promising new technologies to law enforcement and corrections.
- Providing technical and information assistance, via publications, conferences, and the internet, to the law enforcement and corrections community at all levels.

- Ensuring that equipment on which police rely to protect the public and themselves is adequate to the task (Office of Science and Technology, 1999, p. 2-1).

Although the Institute director did not contribute directly to the development of the missions and goals articulated by OST staff, it is clear he was aware of and generally supported all of them, often calling on the OST Director to explain them to the attorney general or other senior officials in the Justice Department or in Congress. At the same time, his annual reports to Congress reflected far more extensive coverage of technology issues. The share of annual report section and subsection headings devoted to technology (Figure 13) showed marked increases, from roughly 6% in 1993, to nearly

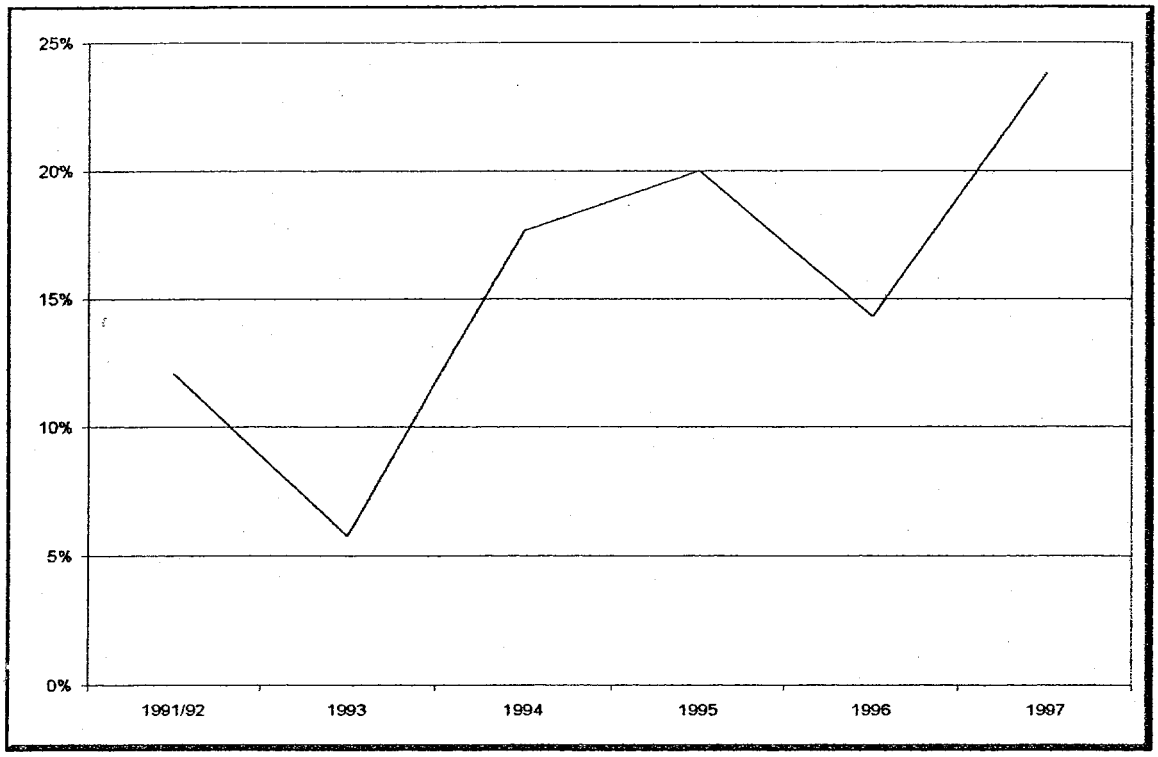

Figure 13. Percentage of headings reflecting technology in NIJ annual reports.

25% by 1997. The share of text devoted to technology (Figure 14) showed somewhat less growth, but was nevertheless significant, especially compared to the levels of interest shown in technology throughout most of the Institute's history.

Figure 14. Percentage of column inches devoted to technology in NIJ annual reports.

The survey of OST staff reported in Appendix G reflect this improvement, as well as some of the continuing Institute ambivalence toward technology. OST staff clearly saw support for OST programs as positive within OST, Congress, the public and the Justice Department, but were less sanguine about the Institute director and the rest

of the Institute. They were ambivalent about the director, with roughly equal numbers responding to a statement that he supported the technology programs with mild agreement, no opinion, or mild disagreement, while there was strong agreement that the rest of the Institute did not support the technology program and that allocation of personnel and other resources disfavored OST. Most interesting, however, are responses which indicated that the staff was satisfied that the technology goals were fully supportive of Institute goals.

Summary of goals analysis. NIJ goals throughout this period were characterized by two different levels of stability. The goals identified in its publications remained fairly stable. The small number of changes made during this period were principally editorial rather than substantive. Similarly, within the offices which made up the Institute, the high level articulation of goals was fairly constant. But this was, as will be discussed in greater depth later, a rapidly expanding organization, so the implementation of the goals introduced a different sort of instability into the organization. Achieving goals generally requires that, at some point, they be further broken into achievable objectives, and it is this process that was most dynamic as the Institute grappled with the demands of its growth.

The technology program, nevertheless, benefitted by having–for the first time in the Institute's history–its own carefully articulated, comprehensive listing of goals and a clearly defined, if ambitious, mission. But most important, and perhaps most striking given the history of the Institute, is the fact that there were no important conflicts

between the goals of the technology program and those of the larger Institute during this period.

The instability these changes introduced into the organization might, however, be reasonably described as positive, because it was primarily a manifestation of a positive development: the rapid growth of the Institute, seen generally by Institute employees as a recognition of the value and success of the organization's work. Although this growth neither generated nor required significant changes in the Institute's goals, its effect on the formal structure of the organization was substantial.

Formal Structure

The formal structures of organizations can be changed for any number of reasons. Sometimes these changes are produced consciously by the leadership of the organization, but at other times result from responses to pressures from within or without the organization. Both kinds of changes have occurred in NIJ, both in the Institute generally and in OST specifically.

The Institute. The NIJ period opened with a significant reorganization forced by Charles DeWitt, the Institute director. He had become disenchanted with the management of the body armor program and blamed most of its failings and bad press on inept management by the technology program staff. Those involved in the body armor and technology program, in turn, blamed most of the failures and bad press on poor decisions made over their objections by DeWitt (interviews, Paul Cascarano,

October 15, 1992; Charles DeWitt, September 22, 1992; Lester Shubin, December 12, 1998; Olga Trujillo, December 12, 1998).

For external consumption, however, the reorganization was described in more benign terms. In his message in the 1992 annual report, DeWitt suggested that the "new" NIJ was more than an intensification of previous efforts, and that redirecting the NIJ agenda had made it necessary to reorganize NIJ's structure and approach. To do this, he said, the Institute took "three important steps forward." It was completely reorganized, two new divisions–Evaluation and Science and Technology–were created, and a new management team was put into place. The NIJ annual research and evaluation plan was then constructed around a "disciplined, structured framework," which DeWitt suggested would permit the identification and funding in a more systematic way the Institute's research, development, and evaluation projects. And, finally, NIJ had developed a number of new national initiatives that he insisted more closely met the needs of criminal justice agencies and the communities they serve (National Institute of Justice, 1992, p. iii).

The new technology division, like the evaluation division, was very small, yet both were led by very senior civil servants at the GS-15 grade level. The Office of Crime Prevention and Criminal Justice Research was much larger and had far more funding than either of these two offices, but was also headed by a GS-15. The only other office, the Office of Communication and Research Utilization, within which most of the technology programs had been housed, was managed by the Institute's only member of the Senior Executive Service (SES), Paul Cascarano. Cascarano had been in

this position (as an SES), through a number of reorganizations, since at least the mid-1970s (interviews, Paul Cascarano, October 15, 1992; Paul Estaver, December 15, 1998; Carol Petrie, January 4, 1999).

DeWitt explains this reorganization as an attempt to bring a sense of coherence to the Institute's technology programs (Charles DeWitt, interview, September 22, 1992), while others maintain the step was taken to remove Cascarano (who DeWitt believed was most responsible for the controversy) from direct control of the body armor program (interviews, Carol Petrie, January 4, 1999; Paul Cascarano, October 15, 1992). Whatever the purpose, it established for the first time since the Advanced Technology Division was dismantled in 1976 after only a 3-year existence, a division explicitly concerned with technology. But unlike the Advanced Technology Division which reported to the Office of Research Programs, this division reported directly to the Institute director. This greater independence and access to the director meant that, for the first time, the Institute's director received technology recommendations and proposals unfiltered by a social science research or demonstration program staff.

With DeWitt's departure less than 4 months after creation of this new division and the arrival of its first director, the Institute then entered a nearly two year period during which it was led by acting directors: first by Mike Russell, a political appointee and Deputy Director under DeWitt, and then by Carol Petrie, a GS-15 career employee of the Institute who, although of lesser rank, was appointed over Cascarano. The Institute's formal structure remained unchanged throughout this period.

In August 1994, the new Institute Director arrived and soon after his confirmation by the Senate in October, took steps to reorganize the social science elements of the Institute. Although he had most recently been the Deputy Commissioner for Legal Affairs for the New York City Police Department, and had for several years before that been a special advisor to Mayor Ed Koch, he had also spent some time at the Vera Institute, a widely respected social science research organization in New York. It was not surprising, then, that his first actions were directed at the social science research elements of the organization. He merged the research and evaluation organizations and renamed them the Office of Research and Evaluation and Criminal Justice Research (ORE), and elevated the Science and Technology Division to the status of an office. He left unchanged the Office of Communication and Research Utilization until Cascarano's departure a year later.

Travis planned to make the three offices what he termed "the three legs of the NIJ research stool," which consisted of social science research, research in technology and the physical sciences, and the dissemination of the results of the research conducted by the two research offices. He also announced his intention to make all three directors members of the Senior Executive Service (Jeremy Travis, personal communication, April 24, 1995).

This was a particularly ambitious goal for several reasons. The Administration had announced that one of the primary aims of the National Performance Review (NPR) was to reduce the number of senior civil servants in the government. NIJ had never had more than two officials at the SES level and had had only one for the past decade or

more. No other bureau in the Office of Justice Programs had more than one, and NIJ was one of the smallest bureaus, then numbering fewer than 60 employees.

Despite all this, he succeeded in 1996 in obtaining approval to make the director of ORE an SES. When Cascarano retired early the next year, he was able to retain that SES position and hire a replacement. When the final SES was authorized and the Science and Technology Director was promoted to that grade in 1998, Travis finally had the three SES positions he had announced two years earlier. At the same time, NIJ's total personnel strength had also increased substantially and by 1999 numbered 136, with another 47 planned in the Administration's FY 2000 budget submission.

While NIJ was undergoing this transformation, the subordinate organizations within NIJ were also making major adjustments, with OST undergoing the most extensive and complex restructuring. Part of this restructuring was a consequence of funding growth so dramatic that, beginning in 1996, the Institute's technology budget exceeded, for the first time, the budgets for all other work combined. But an even larger cause of the structural turbulence was OST's effort to develop an infrastructure which could support the missions and goals of the office.

The Office of Science and Technology. As the OST organization evolved, it became a complex, hybridized organization consisting of NIJ federal employees, detailed personnel from other federal agencies, an entire organization in another federal agency, and employees working under a variety of contract and other funding arrangements. Believing that it would be difficult to obtain approval for the number of

federal employees required to address the technology mission, the OST Director set out to consolidate existing resource arrangements and to find alternatives to federal employees in constructing an effective staff.

When the OST Director arrived in 1992, the division already had two potentially useful special arrangements. NIJ had, since 1972, maintained an agreement with the National Institute of Standards and Technology (NIST), in which it funded the operation of the Office of Law Enforcement Standards (OLES) and assigned its tasks and missions. Although DeWitt had already taken steps to kill this arrangement by funding it in 30 to 60 day increments (which had made it impossible for the organization to do effective planning), it was still in place when the new OST Director arrived.

Convinced that a credible standards organization would be crucial to settling the body armor problem, and that NIST would provide that credibility, he set out to obtain approval for longer term funding. Despite strenuous arguments by the OST Director, however, DeWitt refused to authorize more than 30 days at a time, so the OST Director chose to wait him out.

When the Administration changed and DeWitt left office four months later, Russell authorized a six month extension and the relationship was soon regularized as an annual effort. To manage this office, The OST Director created the Standards and Testing Program, placed OLES under it, and managed it personally until 1997, when a program manager was authorized for the standards and testing program.

The second element of this early organization was the Technology Assessment Program Information Center (TAPIC), which operated the program which tested body

armor against the NIJ standard created by OLES, and which ran a small technology information program. This center had, like OLES, fallen victim to DeWitt's frustration over the fallout from the body armor controversy and was also being funded in very short increments. As with OLES, the OST Director was unable to provide longer term funding until DeWitt's departure.

Together, OLES and TAPIC provided a very effective extended staff for OST. TAPIC convened and managed the meetings of the Technology Assessment Program Advisory Council (TAPAC), a group of about 80 state and local police chiefs and sheriffs and a small number of federal law enforcement officials. This body, created by Lester Shubin, had developed the needs lists for the Institute's testing program, which included the body armor program, annual testing of new model police car packages, and various other police equipment. DeWitt intended that it too should be disbanded.

Shortly after the 1992 elections, DeWitt summoned the OST Director to his office and told him it was time to disband TAPAC because it was an unnecessary expense and a political liability (Charles DeWitt, personal communication, November 16, 1992). Convinced this group was also critical if NIJ was to maintain the credibility of the program with law enforcement, and aware that the recent election meant that DeWitt would be leaving office in the next two months, the OST Director suggested that it might be wiser politically simply to do nothing and simply allow TAPAC to die through non-use.

DeWitt agreed, so no letters were issued notifying TAPAC members of the dissolution of TAPAC. This allowed the OST Director and Harlin McEwen, TAPAC

chairman and the police chief for Ithaca, New York, police chief, to hold the group together until after DeWitt's departure. Immediately after his departure, planning for the first LECTAC meeting in nearly two years (DeWitt had not allowed any meetings) was initiated by the OST Director and Chief McEwen. The first meeting was thus convened in March 1993.

Later that summer, the OST Director ordered TAPIC to relocate so that all its activities would be in one place, and to rename itself the National Law Enforcement Technology Center. Both tasks were accomplished before the end of the fiscal year. Located in Rockville, Maryland, the center was later renamed the National Law Enforcement and Corrections Technology Center–Rockville, and remains the best funded of all the centers.

In late 1993, the OST Director was approached by Robert Greenberg with a proposal that NIJ establish a partnership with a Navy organization in Charleston, South Carolina, to provide technology support to the criminal justice community. Designated the Southeast Regional Law Enforcement Technology Center, the center quickly attracted the attention of both of the two U.S. senators, some of which was initially negative.

South Carolina's law enforcement community was suspicious of any federal offers of assistance and was concerned that this new center not pull resources away from their needs. A series of meetings with South Carolina law enforcement officials and a major technology demonstration at the Navy base succeeded in winning them over and

this, in turn, also won over the two senators, both of whom participated in the formal opening ceremonies.

The center was not, however, very well funded. For its first year of operation, OST could provide only $250,000, an amount which met only a fraction of the needs identified by South Carolina law enforcement. No resources existed to support activities elsewhere in a region which encompassed more than a dozen states, but because the Navy had recently closed the Charleston Navy Yard, the center was important to South Carolina's congressional delegation as evidence that it was succeeding in bringing other activities to the area. Both of South Carolina's senators, Strom Thurmond and Fritz Hollings, spoke at the official opening of the Charleston center.

With the press generated by this first center opening, a number of other Congressional delegations also became interested. The New York delegation invited the OST Director to come to a meeting in the U.S. Capitol where he was greeted by Congressman Sherwood Boehlert from Utica, New York, representatives from the staffs of Senators Daniel Moynihan and Al D'Amato and Congressman Charles Schumer, and Governor Mario Cuomo. As with South Carolina, a base closing–this time of the Air Force Base in Rome, New York–drove much of the initial interest.

At the same time, Congresswoman Jane Harmon pressed for and was granted field hearings in her California district. So, by 1994, four regional law enforcement technology centers had been established in South Carolina, Colorado, New York, and

California. A Justice Department press officer's *faux pas*, however, would soon force the renaming of the centers.

According to the story the OST director tells, at the opening of the new center in Rome, Congressmen Boehlert and Schumer referred to it as a *national* law enforcement technology center. But when a reporter called a Justice Department public affairs office for more information, he was told "it is not a *national* center. It is a *regional* center. If it had been a national center, it would have been a much bigger thing." The subsequent headlines suggested that the two Congressmen had misled local constituents by describing it as a national center. This embarrassed the members and caused them to call the OST Director for help. The only realistic way out, as the director saw it, was to rename all the regional centers, so effective that day the Northeast Regional Law Enforcement Technology Center became the National Law Enforcement Technology Center–Northeast, and all the others were similarly renamed.

Except that the word corrections was added early the next year, this naming convention is still used, and each center is described as having both a national technology monitoring mission and a regional technology assistance mission. The monitoring mission requires each center to assume primary responsibility for monitoring and collecting information on a particular technology focus area (Robert Tolle, interview, February 11, 1999).

In 1994, Congressman Schumer, Chairman of the Subcommittee on Crime and Criminal Justice of the House Judiciary Committee, called a hearing on law enforcement technology and asked that OST set up a major technology fair and

demonstration in the Rayburn House Office Building (U.S. House or Representatives, 1994). This fair attracted national media attention and was carried on all the major networks and aired live on CNN. This live CNN feed was seen by Congressman Alan Mollohan, then chairman of the Commerce, State, Justice Subcommittee of the House Appropriations Committee. He immediately sent staff to invite the OST Director to his office to explain what the Schumer hearings and the technology fair were about. After hearing the explanation, Mollohan observed that technology transfer–one of the functions mentioned as an NIJ goal–"is done in West Virginia," and asked the director to meet with a group he would convene in the following week to identify how the National Technology Transfer Center (NTTC) in Wheeling, West Virginia and NIJ could collaborate (Alan Mollohan, personal communication, July 21, 1994).

The meeting consisted of representatives from the NTTC (which is housed at Wheeling Jesuit College in Wheeling, West Virginia), West Virginia University, a West Virginia redevelopment activity, and several other organizations in West Virginia. With no agenda and no clear explanation from anyone about the purpose of the meeting, it was unfocussed and produced no proposed actions or decisions, and closing without even a plan for action. But when the next appropriation was passed, it included $5 million for two new projects in NIJ.

Of this money, $3.5 million had been inserted by Senator Hollings to support a Technology Information Network for law enforcement, the nodes for which were the National Law Enforcement and Corrections Technology Centers. This funding was not entirely unexpected by the NIJ staff, because both Hollings and Senator Thurmond had

been so actively involved in the Southeast center opening ceremonies a few months earlier. But the appropriation also included $1.5 million and a directive to NIJ to use this money to create a law enforcement technology commercialization partnership with NTTC. Shortly after the appropriation was passed, Mollohan's office called the OST Director to make clear that this money was to go to the NTTC at Wheeling Jesuit College (Sally Gaines, personal communication, October 14, 1995).

Meanwhile, the U.S. Attorney for Southern California, Alan Bersin, had invited the OST Director to consider supporting the creation of a Border Research and Technology Center (BRTC) in San Diego, and had convened a series of meetings to plan for the creation of this center. Funded at only $250,000–as was every other center except the one in Rockville–the establishment of the BRTC occurred under the most complicated circumstances of any center. Bersin–who was later appointed the "border czar"[7] by the attorney general–wanted the center to have a governing board comprised of the Office of National Drug Control Policy (ONDCP), the U.S. Customs Service, local law enforcement agencies and others, all of which took the better part of a year to accomplish.

Dr. Ruth Davis, in an independent assessment of the center system commissioned by the NIJ director points out that the NLECTC system had been established and made operational in what, by government standards, is a very short period of time–barely five years. Accomplishing this required "a truly entrepreneurial

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[7]Responsible for coordinating law enforcement activities along the Southwest Border, this official is known in the press and even within the Justice Department by this unofficial designation.

spirit and management style in a normally slow-paced bureaucratic environment." She reported that the individual centers and the system itself, due primarily to highly motivated staff and competent management in the centers themselves, and to constant direction and encouragement from OST, had progressed to a point where–with the addition of manpower, resources, and more strategic and management direction from OST–individual centers could easily be substantially expanded (The Pymatuning Group, 1998, no page number).

Davis was concerned, however, that resources available to the system might not be adequate to the challenge. She pointed out that the NLECTC system had only "some 51 full time staff with approximately 35 part time staff and consultants and an allocation of just 31 million dollars over five years" yet was being asked to provide comprehensive technology support to "18,811 state and local law enforcement agencies [with] an estimated 659,226 sworn officers . . . [and] 3,812 jails and adult prisons" (The Pymatuning Group, 1998, no page number).

The Joint Program Steering Group, discussed earlier, provided the next element of the hybrid OST organization. Since no personnel allocations were available to staff the JPSG when it was formed, the OST Director negotiated personnel loans from three different organizations: the Federal Bureau of Prisons, the Federal Bureau of Investigation, and the U.S. Navy. With new positions made available to OST in FY 1999, an NIJ employee will, for the first time, be joining the detailees at JPSG later in the year.

It was not until 1997 that sufficient positions were allocated to OST to begin constructing an organization with "normal" divisions. Although no allocations were offered by NIJ or any other part of the Justice Department, Congress directed, in the FY 1997 budget, that $1.429 million was to be provided for additional personnel in OST, primarily to support its efforts to manage the transfer of technologies from the Defense Department to state and local law enforcement agencies. This amount was sufficient to provide 14 new personnel, but Travis, as the Institute director, chose to assign two of the positions to the Office of Development and Dissemination, where they were filled with technical editors. Nevertheless, the remaining positions were sufficient to justify the creation of two new divisions within OST, each headed by a GS-15: the Research and Technology Development Division, which would be responsible for technology development programs, and the Technology Assistance Division, which would be responsible for managing all the technology centers except the National Forensic Center in Orlando, Florida. This center, the eighth in the system, was created after a signed request from the entire Florida Congressional delegation arrived at the Justice Department.

A Program Support Branch was also created in 1998 to provide administrative, planning, and budget support to the two divisions. With the addition of five new positions, allocated by the Office of Justice Programs to NIJ for OST, the office is in the process of creating the Investigative and Forensic Sciences Division to manage a rapidly growing forensic portfolio, which now includes the DNA Laboratory Improvement Program, the DNA Research and Development Program, and several others. The

Administration budget proposal for FY 2000 greatly expands the forensic programs and includes $75 million to expand the laboratory improvement program to encompass all the forensic disciplines, research and development and related programs.

Although staff growth has been rapid, the budget has grown much more rapidly than the staff, so that–as of FY 1999–OST is responsible for more than 64% of the entire Institute budget, but has less than 20% of the entire Institute staff to manage it (see Figure 16, on page 246), a fact that has not been lost on OST staff. Although the staff indicated in the survey at Appendix G that they were satisfied their educational levels were adequate, they indicate clear convictions that the distribution of staff in the Institute favors activities other than technology. Both the OST director and OST division directors expressed similar concerns in interviews.

Summary of structural analysis. The four dimensions Deal and Rosaler (1975) suggest are appropriate to understanding the roles, relationships, and processes that make up the formal structure of an organization–size, differentiation, interdependence, and coordination–offer a number of useful insights into both NIJ and its subordinate organization, the Office of Science and Technology. As the organization becomes larger, the extent of differentiation of responsibilities, interdependence among the various units of the organization, and the systems required to keep the organization coordinated increase in complexity. This has clearly been the case for both NIJ as a whole (it has roughly tripled in size since 1994) and for OST in particular, which–starting very small–has grown nearly seven-fold.

Although some of the competition for "technological research by nontechnological staff" that White and Krislov (1977) found in NILECJ has also been present in NIJ, it has been both limited and infrequent. Instead, the major sources of complexity have arisen primarily as a consequence of OST's success in winning support for its programs. Its rapid growth has meant that staff are being gradually reassigned to narrower areas of responsibilities as the number of projects in each program grows. Although this increasing differentiation and constant change has sometimes been destabilizing, the fact that it is primarily a consequence of growth rather than external hostility or downsizing tends to cause staff to see the changes more as victories for the organization than as threats to their own security or interests.

Another major source of the increasing complexity has been the growing range of relationships that were consequences of the development of both a hybrid organization and a wide-ranging set of external partnerships with federal agencies such as DARPA, ONDCP, and the Department of Transportation, and with similar foreign organizations such as the Police Scientific Development Branch (PSDB) of the Home Office of the United Kingdom, the Canadian Police Research Centre (CPRC), the Moscow Metropolitan Police, and the Israeli National Police.

This rapid growth and increasing organizational complexity has also produced a high level of interdependence among the new elements of the OST organization, particularly since the technology needs identified in one part of the organization (the Technology Assistance Division and the center system) have to be satisfied by another part (the Research and Technology Development Division and the many research

partnerships). Interdependence among the social science and technology offices within the Institute remain limited, even though at least one formal solicitation from the Institute made explicit reference to an interest in such projects (National Institute of Justice, 1996c).

The most far-ranging indication of interdependence, however, can be seen in the annual budget submissions made for fiscal 2000 and 2001 by the Office of Justice Programs, the Justice Department division within which NIJ resides. At the direction of the assistant attorney general, all the budget submissions by subordinate agencies have been constructed around a comprehensive set of themes into which every budget submission must fit (OJP Budget Memorandum, March 21, 1998). Despite this, however, collaboration has so far been limited.

In only a very small number of projects has there much interaction between offices below the level of the directors. Relations with the dissemination office, however, are far more extensive than ever before, because OST now publishes a great deal more than it has in the past and must therefore draw more frequently on the resources of the dissemination office for publication and conference support. OST still, however, continues to manage a parallel publications and conferencing capability of its own within the center system, a fact which may become a source of friction within the Institute if resources are suddenly reduced.

Organizational Technology

As with NILECJ's technology program, it is the combination of structure, processes and procedure employed to decide which projects to fund that constitutes the technology of the organization. For NIJ, since it had always been primarily an organization which provided grants to fund research, the basic technology had included an annual solicitation for proposals, a peer review process to rank proposals and, finally, the publication–in some form–of the results of that research. Two things, however, have driven a rapid series of changes in the way the Institute does business: (a) its rapid growth, which has made the more informal processes it had used for more than two decades inadequate to its present situation; and (b) the development of a major technology program which requires modifications to meet its needs.

Shortly after the new OST Director arrived at NIJ, he asked for a complete breakdown of the budget for his division. He soon found that the Institute not only was unable to break down any of its division or office budgets, but was even unclear about how its money had been spent. No accounting system capable of tracking individual projects or of identifying either individual division or office expenditures existed within the Institute. He set out, therefore, to create an entire accounting and tracking system and arranged with the National Institute of Standards and Technology to detail a database specialist to OST to assist in the effort.

The OST Director's immediate problem, however, was to stake out a clearly defined budget for his division. After analyzing expenditures on technology over the preceding 3 years, he decided the traditional budget had been $4.242 million per year.

Since the Institute had no way of determining whether this was the right figure or not, while the OST Director seemed to be able to defend his figures, NIJ's planning officer simply accepted the claim (Carol Petrie, personal communication, December, 1992). The OST budget had thus been established essentially by fiat by its own director, and this figure became and remains the base-line figure in the Institute for the OST.

By 1995, the NIJ director had ordered the adoption of the OST tracking and accounting system throughout the Institute, an action which had the combined effect of institutionalizing the OST director's "fiat budget" as the OST baseline, and of bringing the Institute into line with the accounting practices of its smallest office. For the first time, NIJ's budgeting process was suitable for technology programs as well as for others. This system, although now greatly expanded, is still in use throughout the Institute.

Simultaneously, the OST Director introduced a comprehensive process for the review of proposals for changes in existing standards. This process has since become the model for most of OST's dealings with other organizations, and its development was a significant part of efforts to resolve the Institute's body armor problem.

Since body armor represented only one of some 90 or more standards promulgated by the Institute, the OST Director decided at the outset that the process would also be adapted for use in the development of standards throughout the Institute's standards and testing program. This process draws from the rule making procedures of other federal agencies, particularly those of the Federal Communications Commission (FCC). The process allows suggested changes to be sent to the National Law

Enforcement and Corrections Technology Center-National (NLECTC-N) in Rockville, Maryland, which then conducts "an immediate review to ensure that the suggestion is intelligible, relevant to the equipment in question, and has not been considered previously" (Technology Assessment Program, 1993, p. 4). If it passes this review, then the proposal is provided to both the LECTAC Technical Committee and NAAB. OLES then conducts a simultaneous technical review and analysis of the proposal and reports to NAAB and the Technical Committee. If the proposal passes these reviews, copies are published to the field for comment.

This process also requires that comments are to be copied directly to the person or organization who proposed the change, as well as to NLECTC-N for distribution to NIJ, OLES, the Weapons and Protective Systems Technical Committee, and NAAB for review. A final recommendation is then made by the technical committee to NLECTC-N, which passes its recommendations on to NIJ for review by both NIJ staff and the Office of General Counsel of the Office of Justice Programs to ensure that "it fully complies with the law and relevant policy" (Technology Assessment Program, 1993, p. 5).

Reviewers, when considering proposals, are allowed to make one of five recommendations: (a) accept the suggestion as offered; (b) accept the suggestion with modifications; (c) refer the suggestion for further research; or (d) reject the suggestion because it was improperly submitted, previously rejected, irrelevant, or not feasible.

Expanding this model to encompass the entire OST program required the development of an expression of the mission and its relationship to a general

methodology the organization would use in accomplishing that mission. The handbook provided to OST employees describes this methodology as consisting of seven elements: (a) the identification of requirements for new technologies for the criminal justice community; (b) research and development, both to create new technologies, and to identify new applications for existing technologies to meet identified needs; (c) the introduction of promising new technologies into criminal justice agencies; (d) operation of a major program to provide technical and information assistance to criminal justice organizations; (e) working closely with other federal agencies to identify research and development programs "that allow investments already made to be leveraged to support law enforcement and criminal justice agencies at every level;" (f) active encouragement of, and participation in, the sharing of technology information among all levels of law enforcement in order to eliminate overlap and duplication in research and development in OST's areas of interest; and, finally, (g) performing as a "consumer reports" activity to test and evaluate technologies and equipment to ensure that the equipment "on which law enforcement, corrections, and criminal justice personnel rely to protect the public and themselves is adequate to the task" (Office of Science and Technology, 1999, p. 2-2). Interviews confirm that OST staff believe this process works well in ensuring that projects selected are generally responsive to the needs expressed by users in the law enforcement and corrections communities. The survey of OST staff at Appendix G similarly demonstrates that the staff generally agreed with the survey statement that "the technology needs of the law enforcement and criminal justice community determine the selection of technology projects and programs for funding."

This use of panels, councils and committees to broaden participation in OST's development process was established as a fundamental part of the way the office does business, so that there are now approximately a dozen such groups which are routinely drawn on by OST. Most of these are described in Appendix F. Six of the groups are at the center of all of OST's operations: the Law Enforcement and Corrections Technology Advisory Council (LECTAC); the National Armor Advisory Board (NAAB); the Law Enforcement Technology, Technology Transfer, and Policy Assessment Panel (usually referred to as the "Burkhalter" panel); the Liability Task Group (LTG); the Community Acceptance Panel (CAP); and the Technology Policy Council (TPC). Together, these groups help to provide important guidance to OST on which technology projects to pursue, and all but the CAP meet at least quarterly.

LECTAC serves as the principal link to the law enforcement community, while the TPC permits the sharing of technology information among federal law enforcement agencies. The Burkhalter Panel, chaired by retired Vice Admiral Al Burkhalter, former director of the Intelligence Community Management Staff is made up entirely of nationally known figures (e.g., William Webster, former director of the FBI and CIA; William Bratton, former New York City Commissioner of Police; Don Kerr, director of the FBI Laboratory; former Congresswoman Patricia Schroeder; and others), and provides policy analysis and access to the senior levels of the U.S. technology infrastructure. CAP, created at the suggestion of Dr. Raymond Downs, Deputy Director of OST's Research and Technology Development Division, is made up of those community action groups thought to be most likely to be skeptical of OST's programs,

and includes such organizations as Handgun Control International, the League of Women Voters, the National Rifle Association, the American Civil Liberties Union, and the National Association for the Advancement of Colored People.

LTG was created to provide a way for OST to examine and predict the tort implications for a local law enforcement agency that might result from the introduction of new technologies, to identify those projects which were likely to pose excessive liability risks to local agencies, and to identify ways to minimize exposure for projects which were undertaken by OST. The group, chaired by a former White House counsel, includes lawyers who defend law enforcement agencies, a former municipal judge and law school professors. Meetings are also attended by representatives from the litigation divisions of the Justice Department, and from the FBI, who cannot be members but are permitted to observe.

The second major element of OST's organizational technology requires, as the OST Director has suggested in testimony before Congress, that it leverage the work of other agencies. This focus has produced, over the six years covered by this study, research and development partnerships with more than 30 external agencies, including several of the Department of Energy national laboratories, a number of federal and military laboratories (e.g., the Armed Forces Institute of Pathology, Army Research Laboratory, and FAA Technical Center), the Office of National Drug Control Policy, NASA and others. Several other projects were initiated to take advantage of extensive work already done by the Canadian Police Research Centre (on handgun identification and a paint database for forensic use), and the Police Scientific Development Branch in

the British Home Office. The net result is that over a third of the technologies developed and deployed by NIJ in the past six years have originated from one or more of these partnerships.

The technology center system, described in the section on the formal structure of the organization, has as its

> sole mission . . . to be the country's most comprehensive source of law enforcement and corrections product and technology information, . . . to perform outreach to State and local law enforcement and corrections agencies and . . . [to] serve as law enforcement's link to the science and technology community. (Office of Science and Technology, 1999, p. 3-3)

Each center, therefore, has its own law enforcement and corrections advisory council which is linked with LECTAC. This permits local and regional issues to be raised, expands the reach of LECTAC itself, and builds interest and support in the center system. But this reach is limited because, although local and regional law enforcement and corrections (LEC) agencies and practitioners familiar with the system are universally enthusiastic, too many remain unaware of the centers and the assistance they can provide. Unfortunately, resolving this requires more resources than have been available to date (The Pymatuning Group, 1998, no page number).

Finally, for the first time in its history, NIJ has a formal process for the development of technology, which includes both a graphic roadmap (Appendix H) and an extensive review and evaluation process, although its development is too recent for a reliable assessment. As this study was being prepared, a major external assessment had been initiated by the OST Director of the entire research and technology development

program, while a major external assessment of the technology center system–briefly described earlier–had just been completed at the direction of the Institute director.

Technological accomplishments. The temptation to ascribe the successes of the OST program to a superior organizational technology is strong, but a more plausible explanation is that OST was able to invest nearly six times as much in research and development (more than $250 million), over barely six years, than the Institute had invested in the preceding 22 years of its history combined.

By 1999, the NIJ technology portfolio had grown so large that the OST Director could testify to the House Armed Services Committee that NIJ "is an active partner in the national effort to deal with the threat of WMD (weapons of mass destruction) in the hands of terrorists, and could list six major technologies that had been developed and demonstrated as either deployable devices or prototypes within only one OST program: counterterrorism.

The 1997 NIJ annual report (the most recent report published by the Institute as this study was being prepared) devoted 12 pages to OST's programs. Among the accomplishments it describes as successes are: concealed weapons identification technologies, two of which have been successfully employed in operational environments, while four others are being tested as laboratory prototypes; a recently commercialized fingerprinting device which employs cyanoacrylates (super glue), is greatly superior to existing methods, and is already being sold to law enforcement; the Border Tactical Communications Center (BORTAC), a system in operation in San

Diego County which provides full interoperability among all the public safety agencies–federal, state, and local–in the County; a prototype DNA identification laboratory only a little larger than a credit card which is expected to cost less than $6 and permit investigators to identify the sources of biological evidence at the crime scene; the first national guidelines ever produced for homicide investigations, which has become the single most requested publication in the Institute's history; and a multi-jurisdictional, multi-county secure (encrypted) information system in operation in Florida, based on transferred defense technologies.

By 1997, the web site for the center system (JUSTNET),[8] was reporting more than 40,000 "hits," and the centers were responding to hundreds of requests for scientific assistance and special forensic assistance. NLECTC-West had successfully provided the first leads ever in a seven-year old serial rape case in Delaware, provided crucial metallurgical evidence (which cannot be analyzed in any regular crime laboratory) in the conviction of a murderer in Oregon, and provided video and audio enhancement support to hundreds of investigations and prosecutions. NLECTC-Rocky Mountain provided forensic support in a murder case involving a .50 caliber weapon, a caliber impossible to handle in a regular crime laboratory. NLECTC-Southeast was asked by police agencies in Bloomington/Normal, Illinois, to serve as honest brokers when a jointly funded communications system collapsed and the agencies began to blame each other for the failure. The best example of the capabilities of the center system, however, may be a project undertaken in Utica, New York.

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[8]The JUSTNET URL is *www.nlectc.org*.

When the local Air Force base closed near the beginning of the decade, it contributed to a major economic decline in the area and to a large exodus of business and population. Utica's population had fallen from a high of more than 100,000 to less than 68,000. In the face of this rapid decline, some property owners abandoned their property, while others set fire to theirs for the insurance. At the same time, drug dealers moved into the area to set up lucrative drug trades, and this resulted in more arsons when drug dealers burnt out the competition (National Law Enforcement and Corrections Technology Center-Northeast, 1997, p. 1).

When the local congressman asked NIJ for assistance, the OST Director formed a team consisting of the Northeast and Southeast centers of the NLECTC system and sent them to Utica to help form an "arson strike force" of local, state, and federal law enforcement agencies. When the project began, the arson clearance rate in Utica was less than 2%, against a national rate of about 15%.

The assistance provided by the NLECTC team included advice on how to create an inexpensive computer network to allow investigative information to be widely shared by the agencies involved in the arson strike force, engineering assistance in setting it up, and $28,000 worth of equipment. Within nine months, the arson rate in Utica had been cut in half, more than 100 arrests had been made, the local prosecutor had a 100% conviction rate, the arson clearance rate was above 56% (National Law Enforcement and Corrections Technology Center-Northeast, 1997), and the Oneida County Council had passed a resolution declaring an "NIJ/NLECTC Appreciation Day."

Summary of organizational technology analysis. In the creation of OST, the director and senior members of a growing staff tried consciously to avoid what they believed were the mistakes made by NILECJ (many of which they felt continued through the Interim Period). Drawing heavily on the process the OST Director believed had been inadvertently employed by NILECJ in the development of body armor, the result was a suite of organizational technologies that went well beyond the competitive grant program and which attempted to establish a complete concept to deployment process. To a far greater degree than had been the case in NILECJ, formal mechanisms were created to ensure that end users of proposed technologies were involved in each project from beginning to end.

The processes adopted by OST were, however, not without cost. They greatly increased the complexity of the process, which inevitably placed a greater burden on a staff which was already handling several times the management load of any other part of the Institute. One probable consequence of this increased complexity is the development of a range of informal norms and processes, not all of which may be directly observable.

Informal Norms and Processes

It is the informal norms and processes within an organization which defines the informal organization. This informal organization, in turn, is the *de facto* organization and is made up of the "relationships among organizational members that are not necessarily sanctioned by the *de jure* organization" (Hodge & Anthony, 1988, p. 758).

As an organization becomes more complex–as OST clearly has–so do the three ways in which the informal organization makes itself felt: its communications patterns, the arrangement of alliances and friendships, and the locus of greatest influence in the organization. It is this last issue which tends to be most pronounced at the beginning and ending of the term of the political leadership of a public organization such as NIJ.

"Presidential candidates in the United States have increasingly come to office distrusting the career bureaucracy," because they believe it to occupied with holdovers from previous administrations who might engage in foot dragging or outright sabotage of the priorities of the new administration. Since it is also often good politics to run against the bureaucracy, the rhetoric employed by the candidate during the campaign almost inevitably affects the political appointees recruited to staff the new administration, particularly when they have no significant prior experience in the federal government (Pfiffner, 1987, p. 57).

This tension between the career senior executives and the political appointees has been a common problem in the Institute, which has never had a confirmed presidential appointee with significant prior experience in the federal government. Usually, the distrust disappears over time as the political officials develop trust in the career executives who report to them, in a predictable cycle "characterized by initial suspicion and hostility which is followed by two or three years of learning to work together" (Pfiffner, 1987, p. 60). It never really disappeared under the first director in the NIJ period, Charles DeWitt, and was exacerbated by the controversy over body armor.

Whether it was this phenomenon or something else, Travis also had a difficult relationship his first year with Cascarano, the only senior executive in the Institute when Travis took office (Carol Petrie, interview, January 4, 1999). With Cascarano's departure the next year, however, Travis could observe that all the senior leaders in the Institute had been selected by him.

Despite repeated efforts by the Institute director to develop substantial interdisciplinary work among the three offices, however, interdisciplinary projects were infrequent and difficult to get started. When OST assembled its first major solicitation for proposals to be funded with the $20 million provided by Congresswoman Schroeder's amendment to H.R. 728, included was a category which attempted to generate interest in the sociological implications of new technologies. The solicitation noted that "while considerable literature about technology development and transfer exists, there is a need for more knowledge and greater understanding about the infusion and impacts of specific new technologies within the criminal justice system." Accordingly, it sought proposals "that explore the dynamics of technology infusion processes, and the resulting behavioral, operational, and organizational consequences of technologies which have, or could be, introduced into law enforcement, courts, and or corrections" (National Institute of Justice, 1996b, p. 8). No proposals, however, were submitted under this category.

To force the initiation of at least one interdisciplinary project, the OST Director took an evaluation of a gunshot location technology, brought together representatives of both OST and his own office, and created a project which would evaluate not just

whether the technology worked, but also what impact it had on the police department and community in which it was tested. The serendipitous combination of a chemist with an interest in the social sciences, and a social scientist with an interest in police technologies, turned the project into a successful joint effort. Participants in other projects indicate that no other project has ever successfully been managed as a joint effort. In every other case, the project has eventually ended up being managed exclusively by one office without any involvement by the other.

At the same time joint projects have been very difficult to initiate, the perception present in NILECJ that the social science office was hostile to law enforcement was also present in NIJ. A survey of the OST staff, despite the limited sample size, indicates that while the OST staff believed its leadership, Congress, and the attorney general supported the technology program, it also believed the rest of the Institute did not (see Figure 15). The staff also expressed a conviction that the distribution of personnel within the Institute put the technology programs at a real disadvantage, a conviction supported by an analysis of the actual distribution of budget and staff (Figure 16).

What is more difficult to explain is why the OST staff also reports that it believes the distribution of funding does not favor the technology program. Since nearly two thirds of the Institute's budget goes to OST, this perception is difficult to reconcile with the facts, unless it reflects confusion about different kinds of funding. While project funding overwhelmingly favors OST, it was apparent in interviews that many members of the OST staff felt that travel and administrative funds–which are drawn from a different budget–were inadequate and failed to permit the amount of travel they

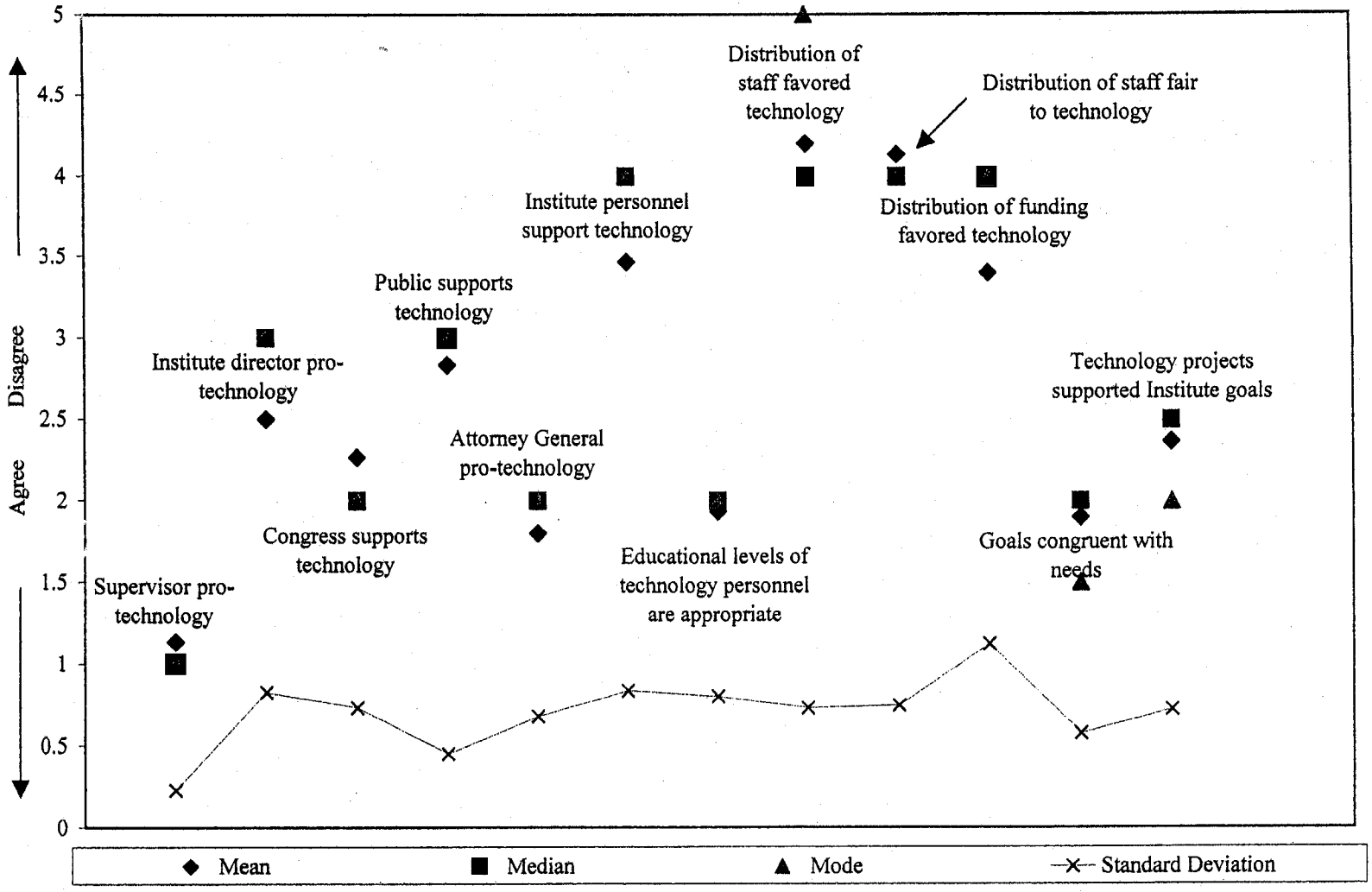

Figure 15. Results of Part II of the survey of OST staff.

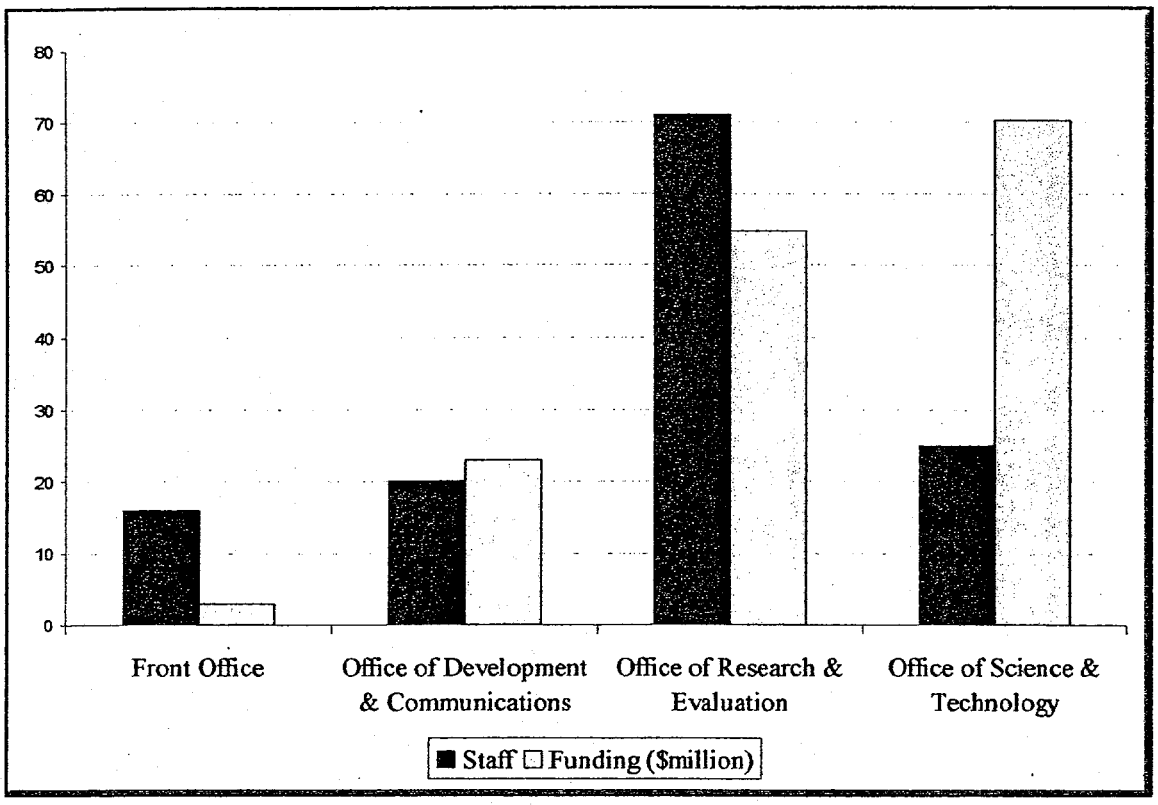

Figure 16. Staff vs Funding (in $millions), Fiscal Year 1999 budget, from NIJ internal budget allocation documents.

believed they needed to do the job or to purchase the equipment (e.g., computers telephones, etc.) they required. At least two of the interviewees, however, suggested that proof the Institute favored other offices over OST lay in the fact that project funds appropriated for technology were occasionally transferred by the Institute director to the other two offices, but no such transfers to OST ever happened. They offered as examples the fact that funding for the Crime Mapping Research Center in the Office of Research and Evaluation (ORE) was transferred from OST, and the fact that the small number of joint OST/ORE projects were always funded entirely by OST.

It is interesting to note that some of these same differences appear in some foreign research activities. Sparrow, Moore, and Kennedy (1990) report that both the

Police Scientific Development Branch (PSDB) of the British Home Office and its counterpart in Australia "has always regarded the police as its primary client and has consequently stayed close to police forces," while the Research and Planning Unit–also in the Home Office–"stands generally apart from the police, has a wider mandate and a more public audience, and tackles broader issues." In both the British and Australian examples, the result is that the agency focused on technology enjoys close and cordial relations with the police, while the social science activity–despite addressing a broader range of issues and concerned with a wider range of constituencies–pays for this with a "lack of access to police forces" (pp. 206-207).

Brian Coleman, the director of PSDB suggests that this is more a disagreement over what is "critical" and what is "relevant," than an accurate appraisal of the situation. He argues that PSDB's greater public acceptance arises because of its perceived greater relevance, especially overseas and in the media (Brian Coleman, personal communication, November 10, 1997), a position echoed by some NIJ social scientists who often suggest that it is "a lot easier to sell the technology toys than . . . [to sell] the harder to explain social science projects" (Carol Petrie, interview, January 4, 1999).

Summary of Informal Norms and Processes. Although, as Deal and Rosaler (1975) suggest, organizationally dysfunctional conflicts often arise from informal intergroup disagreements or from dichotomies between an organization's formal and informal subsystems, no such problems appear yet to have developed in NIJ. This lack of dysfunctional conflict may well be a positive byproduct of the rapid growth of the

Institute. As more resources and more personnel have been added to the Institute in each of the past 5 years, conflicts which might have arisen in a period when elements of the Institute compete for resources to avoid retrenchment or elimination may have been rendered temporarily irrelevant. In this environment, the OST staff perception that the Institute director is generally indifferent to the technology program can be glossed over without much danger to the organization. These differences in viewpoints could, however, become a major source of dysfunctional conflict when the Institute's growth stabilizes or, worse, is reversed.

Environment

NIJ and its predecessors have always been open to their environments, responding to an expansive and very public constituency, a circumstance which makes for a very high level of environmental diversity.

Diversity. The number and diversity of interest groups that relate to NIJ's technology programs are as broad and complex as any experienced by NILECJ, but the noisy and often partisan ideological struggles which took place inside and outside NILECJ, have been almost entirely absent from the NIJ experience. This may be due, in part, to a very different strategy adopted by the organization. Where NILECJ tended to *react* to its environment, NIJ adopted a proactive strategy in which it actively sought participation by a wide variety of the groups which made up the most active parts of its environment. These groups were invited, with what interview responses suggest has

been a high level of success, to become partners in NIJ's technology programs by participating in the different panels and councils described in Appendix F.

At the beginning of the NIJ period, before these panels and councils were formed and while the body armor controversy still raged, the technology program continued to come under hostile fire from both inside and outside the Institute, with the worst fire coming from outside. The October 1992, issue of *Law and Order*, for example, carried a two-page advertising spread which accused the NIJ technology program of being indirectly responsible for the murders of 300 police officers. The ad claimed that every police officer killed while not wearing a bullet-resistant vest died because the NIJ standard made soft body armor too uncomfortable to wear. Ergo, every officer who was killed without it was actually killed by NIJ. The advertisement was even converted into a handout and distributed by the Second Chance Body Armor Company, NIJ's harshest industry critic. But by the end of 1993, most press coverage was positive.

Police Chief, published by the International Association of Chiefs of Police, noted that the passage of time had eased much of the controversy surrounding body armor, and credited NIJ with doing the most to clear the air by bringing in a new manager who had neither a prior history nor a personal stake in any particular position.

> What had an even greater effect was the creation of the National Armor Advisory Board (NAAB), a group of government, industry and law enforcement representatives. NAAB was the brainchild of NIJ's director of the Science and Technology Division. . . . Upon joining the NIJ staff in 1992, [the OST director] . . . did not enter the fray with a polarized attitude about the NIJ's position. Instead, he used his considerable diplomatic skills and a willingness to listen to the other side. (Pilant, 1993, p. 35)

The mainstream press was especially interested in the technology programs and reported them in a largely favorable light throughout the period of this study. *Reader's Digest* quoted the OST Director as reporting "promising work on a 'safe gun' (Nelson, 1994, p. 51), while the *New York Times* reported that "Justice Department officials are encouraged by the speed with which the new [concealed weapons detection] technology is moving from the planning stage into use" (Butterfield, 1997). Reporting on the 1994 Congressional hearings at which the OST Director testified, *USA Today* headlined that "Technology Could Tip Scales in Crime War" (Komarow, 1994). "Tomorrow's police officers could have variety of high-tech and nonlethal crime-fighting gizmos," declared the *Orange County Register* (Collins, 1996). All the major networks carried favorable stories, and even *Law and Order*, which had published the Fackler article criticizing NIJ and the ad accusing it of murdering 300 cops, dedicated eight highly complimentary pages to the NIJ program (Clede, 1996; Sharp, 1996). Even *Family Circle* reported positively on NIJ's progress in its Less-than-Lethal Program ("Millenium Mania," 1998)

Not every report was favorable, however. *The Nation*, which had severely criticized NILECJ 20 years earlier for its lack of success, now criticized NIJ for being too successful, accusing it of "channeling used military helicopters to police forces," and declaring that "the social causes of crime, such as poor education and a lack of jobs, do not concern the NIJ or most police forces." The magazine even claimed that the OST director is often quoted as saying, "This [police use of military high-tech] is the real peace dividend" (Parenti, 1997, p. 24). The OST Director, however, indicates he is unaware of ever having made this or any similar statement and that OST has no role at

all in the transfer of military surplus helicopters to any agency, although it does help state and local agencies identify sources of other kinds of surplus military equipment.

Overall, however, public support for the program was overwhelmingly positive, and this tended to have a stabilizing effect on both political and executive support for the program.

Stability. The Justice Department itself took some time to warm to the technology program and what it could offer to law enforcement. When the OST Director submitted his Congressional testimony to the Justice Management Division (JMD) for clearance the first time, it came back with a handwritten note from the budget accusing NIJ of "building quite a compelling case for additional funding," and declared that, "we've been through all this before in LEAA and don't really care to embarrass ourselves again" (David Harry, personal communication, March 15, 1994). Before the next year, however, the same analyst had requested and received a briefing from the OST Director on the program, and after a careful explanation of how it differed from LEAA's efforts, had declared his support.

Within the Institute, the technology program was, at first, only tolerated. The Institute's technology programs did not appear to many members of the Institute staff to have been especially successful. The body armor program had, in fact, generated the greatest negative controversy in the Institute's history. The result was that the Institute had little interest in doing more with technology. Many of the old hands were convinced that the favorable treatment the program was receiving in the media and on

the Hill was probably only a temporary phenomenon. The press and Congress would soon, they believed, lose interest and turn back to more important issues (interviews, Paul Estaver, December 15, 1998; Carol Petrie, January 4, 1999; Richard Rau, December 18, 1998; Richard Laymon, December 10, 1998).

But as the favorable press and Congressional treatment continued, the Institute and its director began to take greater notice of the program. Once the Vice President had participated in the signing of the Justice/Defense Memorandum of Understanding in early 1994, the program began to be taken more seriously by the Justice Department and by the Institute. When OST was given a presidentially directed project to develop technologies to detect concealed weapons, the Institute director highlighted the story of how it came about in his introduction to the 1996 annual report.

Dr. James Q. Wilson had made note of the need for such technology in 1994 in a New York Times article entitled "What to Do About Crime?" After reading the article, President Clinton directed the Department of Justice to explore the technology. NIJ responded by initiating several development projects, some funded through the Community Oriented Policing Services (COPS) Office, and others under the Justice/Defense technology partnership that had been established by the 1994 Memorandum of Understanding, which provided for the sharing and development of dual-use technologies applicable to military and law enforcement operations (National Institute of Justice, 1997a, p. 4).

By 1998, the Institute director would declare, in his introductory message to the NIJ annual report to Congress, that NIJ had "long shared the Nation's enthusiasm for

technology, and the technology NIJ supported yesterday is commonplace today. . . . The Crime Act has made it possible for NIJ to expand its technology-related research and development program." He reported that "Congress and the President [had] earmarked 1 percent of the policing funds of the Crime Act–$20 million a year–to support the development of new technologies for law enforcement and criminal justice," and that Congress had also funded the creation, within NIJ, of system of regional law enforcement and corrections technology centers distributed across the country (National Institute of Justice, 1998, p. 52). This statement was not entirely correct, however, since Congress had earmarked these funds on its own initiative in a bill opposed by the Administration. It is true, however, that the Administration tacitly approved of this particular funding proposal.

Levels of activity in NIJ's environment were consistently high, though largely positive.

Activity. Whereas the technology program in NILECJ experienced a frequently hostile and continually changing environment, the activity experienced by NIJ's Office of Science and Technology largely centered around supportive actions by Congress and the White House. Congress expanded the technology program every year from 1995 through the present, while Congressional inquiries and statements of support were nearly constant, although occasionally problematic.

Congressman Charles Schumer, while Chairman of the Commerce, Justice, State Subcommittee of the House Appropriations Committee, seriously embarrassed the OST

director by writing the attorney general on April 10, 1994, demanding that she transfer $10 million of the Crime Act funding to "the Office of Science and Technology of the National Institute of Justice" (Charles Schumer, personal communication, April 10, 1994). In 1997, the Anti-Terrorism and Effective Death Penalty Act provided $10 million for the development of counterterrorism technologies for state and local law enforcement *directly* to the Office of Science and Technology, thus discomfiting the Institute director by appearing to bypass him. This funding, which was to have been provided for 1997 and 1998 only, was provided again in 1999 and is expected to become a permanent part of the NIJ base budget in fiscal 2000. The Administration also took successful steps to expand the program in the FY 1998 and 1999 budget, and have proposed a very large expansion in FY 2000. Despite this and other attention from Congress, the technology budget–which continued to increase each year–remained unpredictable, with a variety of new initiatives and directives appearing in each annual appropriation.

Predictability. Until 1996, every increase in the NIJ budget and technology program had occurred in an appropriations bill, rather than in an authorizing bill that would make the program permanent. Schroeder's 1996 amendment to H.R. 728, which provided 1% of the Crime Act to NIJ for technology, was the first authorizing language to make specific reference to the NIJ technology program, but it was attached to a bill which operated under very unusual circumstances, and the funding it provided ($20 million) was for only three years: 1996, 1997, and 1998. Congress did appropriate it

again in 1999, however, and it will be included in OJP's budget submission for 2001. There are other references in authorizing legislation affecting the NIJ technology budget, but in each case the legislation is for a fixed period, as was the Anti-Terrorism and Effective Death Penalty Act, although even this provision has been appropriated beyond what was to have been its expiration date.

Further complicating predictability are two other factors. Congress has frequently earmarked the technology budget to require certain grants to be awarded for specified purposes, often in specified places and in particular institutions. Earmarks in 1997 accounted for nearly two thirds of the budget and seriously hampered the Institute's ability to commit to new projects, while overlapping earmarks had the same effect on the 1999 technology budget. But the most important source of unpredictability may be a proposed reorganization of the Office of Justice Programs.

The FY 1999 appropriation required OJP to submit to Congress a plan to reorganize OJP in a way which would eliminate duplication and overlap and increase accountability. The plan was developed by the assistant attorney general and her staff with little consultation with any of the directors of OJP's constituent bureaus. They were permitted to see the plan only after it was nearly complete. Employees in OJP and its bureaus were permitted to see the plan only after it had been completed and forwarded to Congress (Office of Justice Programs, 1999).

This plan proposes a restructuring of the agency along functional lines and the elimination of all the current presidentially appointed directorships, including NIJ's. Many of the other details of the reorganization, however, are vague. It is not clear, for

example, whether the technology program remains in NIJ or not, although without the assistant attorney general's consistently strong support of the program, it is unlikely it could have succeeded. The political realities of a reorganization of such a magnitude may not have permitted any other approach to the development or content of the proposal. Nevertheless, until Congress acts, this will remain the greatest source of unpredictability in NIJ's environment.

Finally, the President's budget for FY 2000 proposes $127 million in program increases for the NIJ technology program. If it passes, it will constitute a near doubling of OST's budget.

Summary of environmental analysis. So far, NIJ has benefitted from an environment that has generally been favorable to technology development, from the end of the Cold War which allowed significant funding to be applied to the problems of crime, and from strong bipartisan support for its technology programs. This has resulted in a generally stable and favorable environment, despite an often unpredictable budget. This stability, however, may become more problematic if and when Congress takes up the proposed OJP reorganization.

Subsystem Interactions

NIJ personnel uniformly observed, as did NILECJ personnel, that the cycle of change in the Institute was constant. The organization seemed to be in a constant state

of expansion and reorganization, although the direction of change seemed to most of the OST staff to be in a positive direction.

The frequency of changes introduced by Congress and the uncertainties of the budget process have meant that NIJ has been affected nearly as much by change as was NILECJ. The effect of these changes, however, has been very different for NIJ because most have been a consequence of growth. Nevertheless, these changes have been so constant and so large (OST staff and budget each have doubled three different times over the past six years) that it is not always clear to what degree a change in one subsystem drives Deal and Rosaler's "herniae" in other subsystems. It is, however, somewhat easier to determine which subsystem changed first in the current situation than it was in NILECJ.

The OST director has suggested that, although complex, the effect of the subsystem interactions in this case is discernible. Early testimony by the OST director and early budget submissions were met with skepticism by the Justice Management Division (JMD), which includes the budget office for the Department of Justice, even as OST was winning support from Congress. As the office was able to demonstrate that it could reliably manage technology projects and track technology funds (after the development of the budget system now used throughout the Institute), and as its projects began to pick up political support, OST's programs became increasingly credible to JMD, as well as to the leadership of the Institute, and even to the Justice Department itself. As OST projects became more successful and began to receive extensive coverage from the media, this coverage further strengthened the credibility of the

program within the Justice Department, Congress, other parts of the media, and the public. This resulted in projects being assigned by the Justice Department to OST (e.g., the DNA Laboratory Improvement Program under the Crime Act), and more funding being provided in Congressional appropriations–sometimes specifically to OST–which, in turn, increased OST's credibility further.

NIJ Summary

The major observations from the application of the Deal and Rosaler concept to NIJ have been summarized in Table 3, in the same manner as with Table 2, in order to make comparisons possible in the next section. As with the NILECJ section, the author has assigned scores based on an assessment of all the data, including that collected from archival, interview and survey sources.

Table 3.

Assessment Summary for NIJ

Subsystem	Scale	Score	Basis of Score
Goals	Extremely unstable (1) moderately stable (2) extremely stable (3)	2	Per annual reports and interview, there were effectively only two sets of goals, one for 1991-1995, and a similar but simplified set for 1996 to the present.
Degree of consensus among participants	Limited or none (1), moderate (2), total (3)	3	Interviews and transcripts of speeches, independent studies and Congressional hearings demonstrate broad agreement on goals.
Specificity of goals	Extremely vague (1), mixed (i.e., some specific, some vague) (2), extremely specific (3)	2	Annual report listings of goals and interviews confirm Institute goals were almost universally general, but OST goals were more tightly focused.
Number of goals	4 or less (1), 5-8 (2), 9 or more (3)	2	NIJ effectively listed only two different sets of goals in annual reports during this period, with six goals for 1991 to 1995 and five for 1996 to the present.
Formal Structure	Unstable (1), moderately stable (2), stable (3)	2	Annual reports show only three different organization structures, but differences among them are very minor. Most change is a consequence of growth and expansion rather than reorganization.
Size	Small (1), medium (2), large (3)	2	NIJ staff grew to more than 139, with 27 in OST.
Differentiation	None (1), some (2), much (3)	3	Program documents and interviews suggest a clear differentiation between offices and specialization, particularly between the social science and technology programs.

(table continues)

Subsystem	Scale	Score	Basis of Score
Interdependence	Very little to none (1), some (2), much (3)	2	Interviews indicate very little work required crossing of internal organization lines, but program solicitations indicate management encouragement for partnerships across offices.
Coordination	Limited (1), moderate (2), much (3)	2	Interviews indicate increasing levels of coordination within the Institute, while the budget submissions for fiscal 2000 and 2001 demonstrate clear coordination at the level of the Office of Justice Programs.
Organizational Technology	Ad hoc (1), occasional (2), frequent (3)	2	Process and procedure documents in the form of employee handbooks, graphic representations, and budget systems have been developed and propagated across the Institute.
Informal Norms and Processes	Unstable (1), moderately stable (2), stable (3)	2	Interviews indicate these are strong within the office, and generally compatible with larger OST goals and systems, but still limited across Institute offices.
Communications Patterns	Limited (2), moderate (2), pervasive (3)	2	Interviews and survey responses suggest that communications laterally are generally extensive, but communications up and down are more limited. They are not hostile to technology (although they are often indifferent).
Affective Ties	Limited to small cells (1), fairly common across organizational boundaries (2), common throughout the organization (3)	2	Interviews and survey responses indicate that these ties are generally good within OST, but either nonexistent or suspicious–with a few exceptions–across office lines.

(table continues)

Subsystem	Scale	Score	Basis of Score
Informal Influence	Unstable (1), moderately stable (2), stable (3)	3	Interviews confirm that informal influence, particularly within OST, was generally stable, probably because OST has had only one director, and a little less stable within the Institute because of substantial personnel turbulence. All but three members of the Institute director's office staff of 17 has turned over during the current director's tenure.
Environment			
Diversity	Limited (1), moderate (2), extensive (3)	3	Public media, Congressional testimony and internal correspondence show a huge number of different parties exerting influence on the Institute.
Activity	Limited (1), moderate (2), persistent (3)	3	Both archival data (Congressional hearings, Congressionally directed studies, media reports, etc.) and interviews indicate that activity among those that constituted NIJ's environment was persistent but generally supportive.
Stability	None (1), moderate (2), total (3)	2	Legislation and external studies reflect a stable but expanding set of demands on the organization, especially for technology. In 1992, there were no specific mentions of technology in any appropriation or authorization. By 1999, there were 4 separate authorizations and 10 separate appropriations lines or earmarks.
Predictability	Unpredictable (1), somewhat predictable (2), predictable (3)	2	Support for core missions–general research and development, DNA laboratories, the NLECTC system, and counter-terrorism–was very predictable, while others changed frequently.

(table continues)

Subsystem	Scale	Score	Basis of Score
Subsystem Interactions	Limited (1), common (2), extensive (3)	3	Annual reports and interviews indicate a constantly expanding set of missions and goals in response to environmental changes, which caused expansions in the formal organization, responses by the informal organization, and a developing organizational technology.
	Infrequent (1), common (2), constant (3)	3	Interviews provide evidence that constant expansion of goals and missions required extensive adaptations in every other subsystem.

Cross-Case Comparison

For most of the Institute's history, technology has been only a minor part of its research portfolio. By 1975, less than 6 years after its founding, the technology program represented less than 5% of the budget, and stayed at about that level until 1993. In only one year–1973–did the budget for technology exceed that for the rest of the Institute. But beginning in 1994, the growth of both the non-technology and technology elements of the Institute's budget has been dramatic. Technology, however, has greatly outstripped other spending in the Institute, so that technology now represents nearly 65% of the total budget, a remarkable reversal of fortunes.

Even more telling is that a significant share (over half) of the funding devoted to social science research in the Office of Research and Evaluation (ORE) is due–according to internal NIJ budget reports–to reimbursable agreements, which are

agreements in which NIJ does the research but another agency provides the funding. This funding can be precarious because these agreements may be discontinued at any time and for any reason by the funding agency. The technology funding, however, is primarily funding which is either appropriated to NIJ directly by Congress, or provided directly to NIJ at the direction of the attorney general. Not more than 12% of the NIJ technology budget has ever been due to reimbursable agreements. Figure 17 tells the funding story, while the rest of the archival record, interviews, and the personnel survey flesh out the rest.

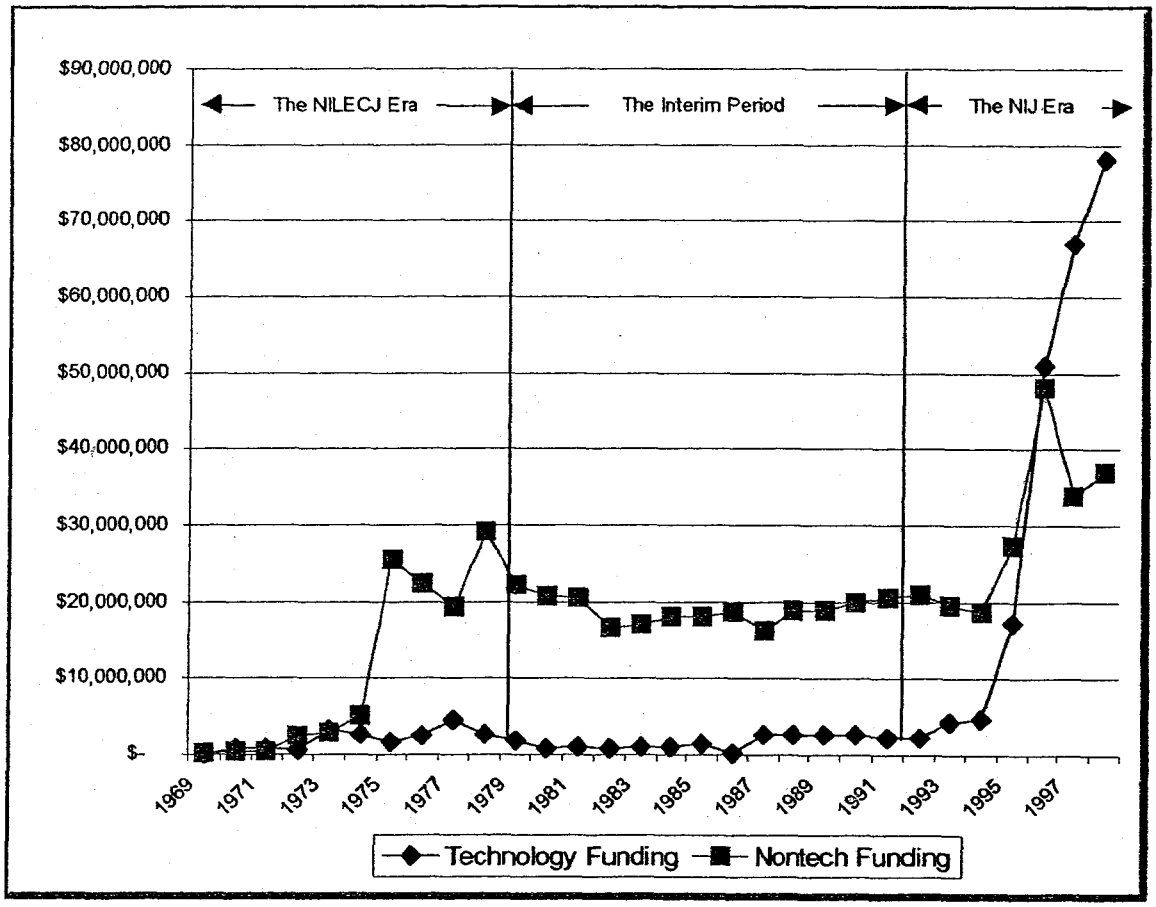

Figure 17. Funding distribution over the history of the Institute (not adjusted for inflation).

Summary of Interviews

For both the NILECJ and NIJ periods, interviews support the views that emerge from the archival record. For the NILECJ period, the interviews reveal an Institute that was generally hostile or indifferent to its technology programs and which offered only infrequent, limited support for the Institute's physical science and technology development initiatives. Those who worked inside NILECJ technology programs all expressed convictions in interviews that technology programs were only marginally supported by the Institute (Paul Estaver, December 15, 1998; Richard Laymon, December 10, 1998; Lou Mayo, December 12, 1998; Richard Rau, December 18, 1998; and Lester Shubin, December 12, 1998). Even those outside the program (e.g., Tom Brady and Richard Velde, interviews February 2, 1999 and December 3, 1998, respectively) observed that support for technology programs within the Institute was only grudgingly given.

In contrast, those interviewed about the NIJ period saw the Institute as generally supporting its technology programs, with only occasional objections from individuals within the Institute. Carol Petrie (interview, January 4, 1999), for example, supported the Institute's technology programs but lamented the fact that it was easier to persuade Congress to support technological than behavioral research. More revealing, however, are the observations of the interview subjects who spanned both periods: Tom Brady, a journalist looking in from the outside; Paul Estaver, a division director for much of the period; and Richard Laymon and Richard Rau, program managers in both periods. All four commented on the dramatic change in the fortunes of the technology program and

on what was clearly greater support for those programs than had ever existed in NILECJ or even during the Interim Period, both from the leadership of the Institute and from officials within the Justice Department.

Summary of Survey Results

Another set of differences is highlighted by the survey of OST staff, responses to which are detailed in Appendix G.[9] The first part of this survey had to do with the grade levels, academic qualifications and distribution of work effort in current and previous jobs. Unlike the second part of this survey, which considered staff reactions to a set of statements about the Institute and technology programs, the first part of this survey requested similar information as did a survey administered by the National Research Council (NRC) in 1976. It is thus possible to make comparisons between responses by NILECJ staff and the responses provided by the OST staff in the NIJ era.

Most of the differences are minor and may be a consequence mainly of the differences in the size of the two survey universes. The NRC survey was of a universe of 56, with 45 responses, for an 80% response rate. The universe for the OST survey, however, was only 19, because 6 of its positions were vacant at the time the survey was administered. The response rate, however, was comparable at 84%. Since there was no technology office for most of the NILECJ era, comparisons were made between all of NILECJ with OST alone (rather than with NIJ as a whole). While not an ideal

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[9]Since these survey results are only a minor part of the research, the tabular results have been placed in an appendix rather than in the text.

comparison, this does reflect the fact that technology staff in NILECJ was not differentiated from other staff, as is the case in NIJ.

The academic credentials of the two staffs are roughly similar, except that the proportion of behavioral science to hard science degrees is reversed. Whereas 22.2% of NIJLEC had hard science degrees and 75.5% had degrees in the behavioral sciences, for OST the proportions were 62.5% and 25% respectively. OST does have a slightly greater number of advanced degrees than baccalaureates than did NILECJ, but the differences are not significant. Interestingly, both seemed to have a similar proportion of staff with professional degrees (lawyers, in both cases).

More of NILECJ than OST staff had published, but the NILECJ staff was also generally older with a larger share having worked at the Institute for over 4 years (more than 31% for NILECJ and less than 19% for OST). Even the distribution of time spent on various tasks is roughly similar for the current position, but is markedly different for the previous job held. Far more of the NILECJ staff had been heavily involved in administrative and direct criminal justice work than was true of OST. This is, however, to be expected, since much of the OST staff is younger than was the NILECJ staff and come from physical science rather than criminal justice organizations.

The 20 questions in the second part of the survey (also summarized in Appendix G) examined staff perceptions of a limited set of issues: (a) who supported or opposed the technology program; (b) adequacy of the educational levels of technology staff to meet the needs of the program; (c) fairness of the treatment of technology programs by

Institute leadership; and (d) whether technology program goals matched needs in the field or supported Institute goals.

The survey indicated that technology staff believed the technology program was strongly supported within the program itself, externally by the attorney general and–to a slightly lesser degree–by Congress. They viewed support by both the public at large, and by the NIJ director himself, as marginally supportive or indifferent, but felt that the Institute outside the technology office tended to be hostile to the program. Despite the lack of clear support from the Institute for these programs, however, this suggests a striking improvement over the overwhelmingly hostile environment NILECJ interview respondents described both inside and outside the Institute.

Technology staff, nevertheless, expressed serious concerns about the fairness of distribution of resources within the Institute. By a substantial margin, the staff indicated a conviction that personnel allocations tended to favor nontechnology activities within the Institute, impressions bolstered by an examination of the distribution within the Institute of funding and staff (see Figure 16). It is likely these perceptions contribute substantially to staff convictions that the NIJ director's support for technology programs is limited.

Staff seemed generally satisfied that the educational levels of technology personnel were adequate, and that the goals of the technology program both supported larger Institute goals and addressed legitimate technology needs in the field. This perception, too, suggests a marked difference between the two periods. Whereas few NILECJ personnel had backgrounds in the physical or engineering sciences–which may

well have contributed to a lack of confidence in the program both within the Institute and within its external environment–NIJ clearly has a far more appropriately credentialed staff managing its technology programs.

The Archival Record

Two other measures, shown in Figure 18, further demonstrate the changing fortunes of the technology program in the Institute. Both the share of section headings and the share of text devoted to technology have increased markedly, if unevenly, over

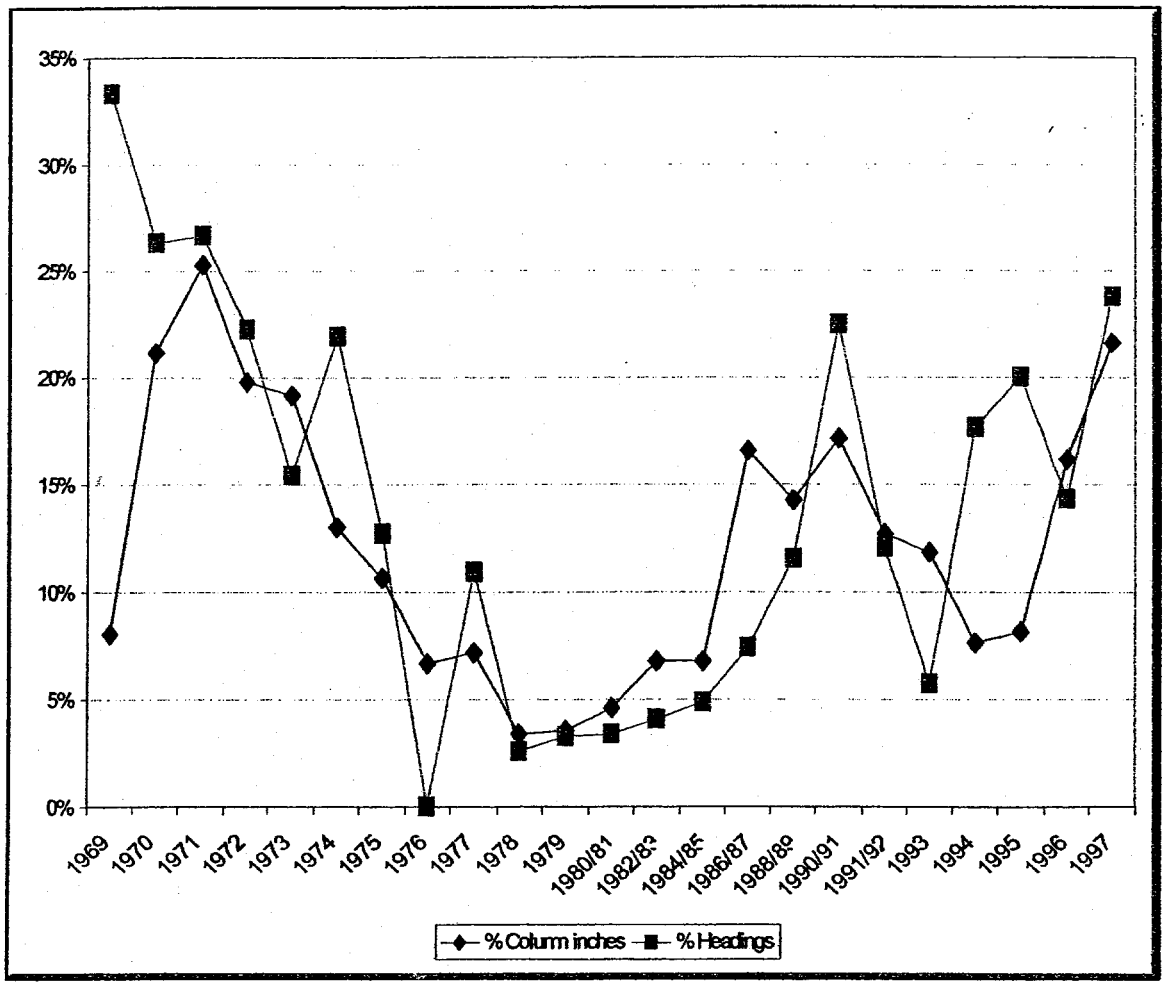

Figure 18. Portion of NIJ annual report headings and text devoted to technology.

the past six years or so. Neither of these measures, however, fully reflects the magnitude of the change within the Institute. The funding analysis depicted in Figure 16 offers a better synecdochic representation for changes both within the technology program and within the entire Institute.

The two sections of this study that dealt with NILECJ and NIJ both included tabular summations of the author's assessment of the six subsystems of each organization. The charts thus constructed further divide each subsystem into one or more subjectively measurable dimensions. With the addition of stability as the first measure for the goals, formal structure, and informal norms and processes subsystems, the total number of dimensions considered come to 20. These are displayed in two tables, one each for NILECJ (Table 2) and NIJ (Table 3).

When these two assessments are combined and a graphical representation of the assessment is constructed (Figure 19), a number of differences can be clearly seen. In fact, on only four of the 20 measures do the two organizations appear to be similar, with the two organizations exhibiting major differences in several dimensions for every subsystem except subsystem interactions.

Annual reports by both organizations show that NIJ goals were generally stable, while NILECJ goals were not. More importantly, there was little consensus within NILECJ on what the goals should be, while interviews suggest there was general agreement in NIJ, particularly within the technology program. Many of these differences clearly arise from the greater political and institutional visibility of the NIJ

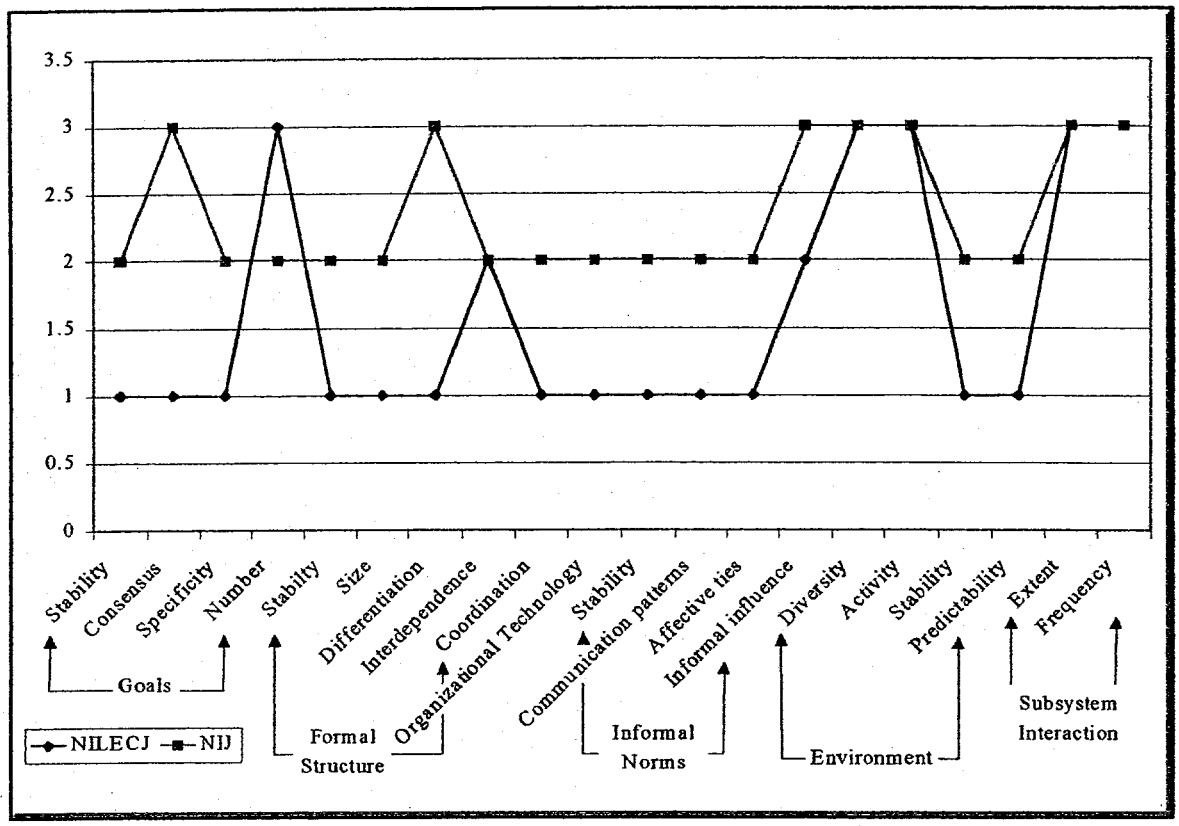

Figure 19. Subsystem assessments.

technology program over that of NILECJ, but some of the differences are consequences of a greater attention to formal goal development in NIJ and OST. This is in contrast to the NILECJ program, where the simple demands of program survival tended to push formal goal development into the background.

Since there was no real technology organization and few technologically qualified program managers for most of the NILECJ period, the formal structure inevitably remained largely undifferentiated. Lack of interest in technology was reflected in a lack of interdependence among the technology and non-technology components of both NILECJ and NIJ, but while former NILECJ employees described an attitude of great hostility towards technology by several Institute directors and most of

the non-technology research staff, NIJ staff–in both interviews and the survey–describe one of weak support, or, at worst, mild indifference. Both organizations, however, were equally unstable, although in very different ways. NILECJ instability might be described as a consequence of the constant rearrangement of chairs on the deck, while instability in NIJ arose primarily from the constant addition of new chairs to those already on the deck.

One of the most obvious differences between the two organizations was the presence or absence of clearly articulated methods and procedures. In the NILECJ technology program, and in NILECJ generally, these were largely limited and ad hoc, but were extensive and well documented during the NIJ era. NILECJ had no written vision or goals, and no written or graphical descriptions of the technology process, while NIJ has these both in its employee handbook and in widely distributed publications, including solicitations for project proposals.

It is likely that the informal norms and processes in the two organizations differ for two principal reasons. First, the growth of the NIJ staff and budget allowed NIJ to develop a richer, more multi-tiered organizational culture than was possible in NILECJ. Although there were differences among the different offices in NILECJ, most of their functions were reasonably well related to each other. The Institute was mainly a social science organization, and all of its offices and divisions–save a very small technology program–were constructed around that primary mission. This emphasis on social science research, according to interviews, tended to work against the development of a larger or more coherent technology program, which was treated as–at best–a minor

irritation to the more important programs of the Institute. During the NIJ period, however, both social science and the technology programs were supported by offices grown large enough that interactions that did not occur within NILECJ now do sometimes take place, if not across the Institute as a whole, then within the individual offices. Moreover, as both interviews and the record of Congressional and legislative action indicate, the technology programs–represented by OST–carry as much, if not more, influence within the Institute as do the social science programs.

The environmental assessment, however, is not well served by the graphic display in Figure 19, because it does not show clearly the qualitative differences in at least two of the environmental dimensions. Although environmental diversity and activity appear to be equal, they are qualitatively very different. For both NILECJ and NIJ, the diversity of groups trying to influence the organization and the level of activity they maintained were very high, but the nature of the diversity and activity is very different. In NILECJ's case, the diversity of the environment was something that "happened" to the Institute, while in NIJ a conscious effort has been made to use a variety of panels and councils to shape the diversity and to bring as much of it as possible into partnership with the Institute. The consequence is that, while most of the environmental activity experienced by NILECJ was negative and often hostile to its very existence, activity in the NIJ period has been both positive and supportive.

Stability and predictability of the environment, however, improved somewhat for NIJ, probably in part because its rapid growth made it more visible and more interesting to influential actors within the environment.

For all these measures, however, it is important to keep in mind three important qualifiers. First, NILECJ not only had a history that spanned nearly twice the number of years as the NIJ period, but can be said to have gone through an entire cycle of organizational birth, growth (development), maturation, and death. The NIJ era, which really reflects almost entirely the OST history, has so far experienced only birth and growth. It has not yet stabilized in any semblance of maturity, so fair comparisons are difficult.

Second, this study has identified major differences in the subsystems examined, but it cannot adduce cause and effect. Case studies are not generally well suited to such determinations, nor can what constitutes a very tiny and possibly exceptional sample prove anything definitively. Although NIJ staff consistently expressed a conviction that they had "broken the code" and had better methods of identifying priorities, more comprehensive and qualitatively superior technology development processes, as well as better financial and project accounting systems and procedures, the apparently greater success of OST in the NIJ era may be more a product of the confluence of a number of serendipitous events: passage of the massive 1994 Crime Act; an attorney general interested in technology because of the tragedy at Waco in 1993; military base closings, which made NIJ technology centers desirable for a number of Congressional delegations; the dramatic decline in the federal budget deficit; or any number of other causes. Nevertheless, the differences between the two organizations in most of the subsystems studied are substantial enough to be worthy of further study.

CHAPTER 5

Summary, Findings, and Recommendations

Introduction

The purpose of this case study has been to examine the technology development efforts of a federal criminal justice research agency during two different periods in its existence, in order to: (a) identify any differences in the organization in the two periods; (b) determine during which of the two periods the organization was most effective; and (c) determine whether any of the differences between the two are sufficient to explain variations in effectiveness. This chapter contains a brief summary of the study, the findings and implications of the study for the present organization, and recommendations for future study.

Summary of the Study

This embedded case study employed a conceptual framework developed by Deal and Rosaler (1975) to examine and compare the technology development programs of the National Institute of Law Enforcement and Criminal Justice, from its establishment in 1969 until the demise of the Law Enforcement Assistance Administration in 1979, and those of the National Institute of Justice, from the creation of the Science and Technology Division in 1992 to early 1999. The study, accordingly, required for each organization an examination of the five subsystems central to the Deal and Rosaler framework: goals, formal structure, informal norms and processes, and organizational

technology. The interaction of these subsystems was itself treated as a subsystem, based on the notion that changes in any one subsystem produce ripples which stress and sometimes cause changes in other subsystems.

The study was based on a series of interviews of former employees and officials of NILECJ and its parent organization, the Law Enforcement Assistance Administration; interviews and a survey of selected employees of the National Institute of Justice, the Office of Science and Technology, and other interested parties; reviews and analysis of the content of agency records and reports, Congressional hearings and externally directed studies; as well as other relevant sources.

Although this research made no attempt to directly test the elements of the Deal and Rosaler theory of organizational development, it has nevertheless provided the conceptual framework for the study, and a useful way of teasing out some of the implications of the findings.

Goals.

Deal and Rosaler (1975, p. 13) suggest that, in their simple state, goals tend to be explicit and fairly singular, a condition which tends to engender a relatively high degree of goal consensus within the organization as well as within its environment. In their complex state, however, goals tend to be diffuse and multiple, which often produces low levels of consensus among the members of the organization.

Following this typology, it is clear that the goal subsystem of the NIJ period was far less complex than that of NILECJ. NILECJ's goals changed frequently, almost

haphazardly, while NIJ's were essentially constant throughout the period under study. NILECJ's goal subsystem thus fell near the complex end of the simplicity-complexity continuum where consensus is likely to be weak, while NIJ fell at the simple end where consensus tends to be strong.

Formal Structure

In its simplistic state, the formal structure subsystem is characterized by limited role definition and little interdependence, but a heavy reliance on authority as a single coordinating mechanism. A complex formal structure, however, is characterized by an opposite set of circumstances: high levels of role differentiation, significant interdependence, and reliance on several coordinating mechanisms, including authority, policies, formal meetings, and coordinating units and roles (Deal & Rosaler, 1975, pp. 15-22).

In two areas–differentiation and coordinating mechanisms–NIJ rests on the more complex end of the continuum, while NILECJ–which had no clearly identified technology organization, and only very small technology programs–rests at the other. As a consequence, NILECJ had little need for coordinating mechanisms (i.e., it was at the simpler end of the continuum), while NIJ's larger structure and wider range of technology projects, coupled with an expanding structure that has become more complex over time, needs and has, therefore, developed these mechanisms.

Organizational Technology

Deal and Rosaler (1975, p. 14) identify the link between the goals of an organization and the actual production of desired results as its "technology," and note that if the structure of the organization is not shaped by or suited to its technology, then the "program will not function well" (pp. 11-12). As this research has shown, even though NILECJ had some striking technology successes (such as body armor), it never developed a complete concept to deployment process and never adapted the organization so that it could effectively accommodate such a process. NIJ, however, developed a fairly comprehensive approach based in part, ironically, on a process originally developed by one of NILECJ's program managers and thus was able to build an organization capable of supporting that process.

Informal Norms and Processes.

A simple state exists in the informal norms and processes subsystem when it is both relatively uniform and congruent with the organization's formal structure. A complex state exists when the number of "influence centers" relative to the size of the organization is high and the informal norms and processes subsystem (or some subsets of the subsystem) are frequently in opposition to the formal structure subsystem (Deal & Rosaler, 1975, p. 23). Measured against these indices, NILECJ falls at the complex end of the scale, while NIJ tends to lie at the simple end.

As the research has demonstrated, there were a number of "influence centers" within NILECJ, which not only frequently worked at cross purposes with the formal

organization, but quite often with each other. Nowhere was this more pronounced than in the technology programs, as most of those interviewed during this research have suggested. Nevertheless, in keeping with Deal and Rosaler's (1975) observation, these informal elements of the organization can also be very effective in helping to solve specific problems (p. 23), as the body armor example demonstrates. Lester Shubin, essentially operating without direct supervision by the Institute, created what was effectively his own technology organization through his combination of formal agreements and informal understandings with the National Bureau of Standards. This informal organization-within-an-organization developed both a successful technology and a successful technology development process, and provided Shubin with a flexibility difficult to achieve within the formal structure of NILECJ alone.

NIJ, in contrast, exhibited a great deal of consensus and congruence, probably as a consequence of its more stable vision and goals, and the general acknowledgment by the Justice Department and the Institute of its success as a technology development organization. It is not clear, however, that the relative lack of conflict with other elements of NIJ will be sustainable if budget shortfalls ever force NIJ's three offices to compete for the same resources.

Environment

Simple environmental subsystems tend to be uniform, passive, stable, and predictable, while complex environments are generally diverse, active, variable, and unpredictable (Deal & Rosaler, 1975, p. 24). The differences between NILECJ and NIJ

are even more dramatic than these indices would suggest. Both organizations operated within environments which were both diverse and active, but NIJ's environment was more stable and predictable than that of NILECJ. The greatest differences in these dimensions, however, were qualitative. The diversity and activity of NILECJ's environment was high and generally negative, while for NIJ it was high but generally positive. The principle reason for the differences seems to lie in the fact that NILECJ played a largely passive role in its environment, acting as though it had little power to influence its environment. NIJ, on the other hand, actively worked to modify its equally active and diverse environment by creating and working with its own constituent panels and councils. The result was that it was able, to a considerable degree, to shape the attitudes of many of those who affected its environment.

Subsystem Interactions.

The "pebble in the pond" or "herniae" theory of organizational change described by Deal and Rosaler (1975, p. 27) seems to have applied to both NILECJ and NIJ, as changes in various subsystems created changes in other subsystems in very complex ways. The weakness of this subsystem analogy for the analysis of organizations, however, has also been highlighted by this research.

The amount and frequency of change in both organizations never really resembled a situation as uncomplicated as Deal and Rosaler's "pebble in the pond" construct where ripples extend outward from the center, eventually coming into contact with and creating ripples in other subsystems. A more accurate analogy might be a rain

of pebbles creating many, many ripples which cross and interfere with each other in an inextricably complex array of confusing interactions. It is likely, therefore, that this particular subsystem will be more useful as a heuristic, rather than as an analytical device.

This analysis makes it possible to answer the first two of the three research questions which informed this study with some confidence. The answers to the third question, however, are far more elusive.

Findings

Research Question 1

The first research question asked what the main differences were in the two organizations, and whether these differences helped or hindered organizational efforts to modernize technologies for law enforcement. To this question the answer is reasonably clear: there *are* substantial differences throughout both of the organizations which both hindered and helped efforts to accomplish the missions of the organizations.

As interviews and the archival record demonstrate, every subsystem in NILECJ changed, and changed frequently. NILECJ was reorganized at least seven times, and several of these reorganizations were major. Goals changed so frequently and so extensively that it is not clear that individuals within the organization were always certain what they were. In fact, interviews indicate that most are still unable to identify what the real organizational goals were. These changes, some of which were hostile to the Institute's technology programs, produced further changes in the remaining

subsystems. Finally, the number of staff and the share of the budget devoted to technology was very small throughout nearly the entire period.

NIJ, in contrast, maintained a stable set of goals throughout the period under study, was reorganized only as a consequence of growth, and enjoyed a far larger share of qualified staff and funding within the Institute. More importantly, as interviews and the survey show, NIJ technology personnel saw the goals of the technology program as supportive of the larger goals of the Institute.

Research Question 2

The second research question asks to what extent the second organization, the National Institute of Justice during the period 1992 to early 1999, actually proved to be more effective than the first, as is commonly believed.

By most reasonable measures, and in keeping with the most common definitions of "effectiveness," the technology program in the NIJ era was far more successful and effective than NILECJ in its era. The archival record makes clear that NIJ was successful in building a far better funded program and a larger and more appropriately qualified staff. It also supported a much broader range of research and produced more deployed technologies and more successful prototypes. Finally, and more importantly as both the archival record and interviews attest, it achieved greater and more positive visibility within the criminal justice community, with Congress and in the media, than NILECJ was ever able to achieve.

Research Question 3

The last research question asked, if clear differences existed, the degree to which they were sufficient to explain the differences in the effectiveness of the organizations during the period under study. In this case, the answer is only suggestive.

While the insights it produces should be of value to other managers, a research universe that consists of only two periods in a single organization's history is unlikely to provide definitive answers. As a consequence, this study is unable to establish definitively whether NILECJ might have been as successful as NIJ, had it had available to it the same level of resources and a similarly favorable leadership environment. Nevertheless, the importance of the greater availability of resources and more favorable leadership climate to NIJ's success suggests that NILECJ might at least have been significantly more successful than it was, had it enjoyed similar advantages.

Implications and Recommendations for the Organization

Implications

This research was intended to address only three questions, but the information developed in the course of the research also offers at least tentative ideas about which observations were most important to the success of the NIJ era. Some of these ideas are only indirectly the products of this research, but they have all been *informed* by the research. The observations which follow represent what the author believes are the most important of these observations.

1. *A clearly defined vision, supported by carefully defined missions and goals, is critical in successfully keeping an organization properly focused.* While this observation is hardly new (as earlier discussions have demonstrated), it is clear that a well-defined vision, articulated early and then adhered to throughout the development of the Office of Science and Technology, was particularly important to the success of the program (Boyd, 1993a). Having a clearly articulated vision made it far easier for the OST leadership to evaluate opportunities against a common vision which, in turn, made it possible for OST to move quickly to seize opportunities that were consonant with the vision, but avoid those that were not. The result was that OST was able to remain focused on a logically related core set of functions that were largely unserved by any potential competing agency or activity, while avoiding being drawn into areas of only marginal value to the community served by the office, or which might directly threaten the turf of more influential agencies before OST was well enough established to defend itself.

The implication of this observation is that the Office of Science and Technology should develop and maintain a fairly simple and direct set of goals, making changes to the goal structure and the mission statement only after careful deliberation.

2. *Physical science programs in a social science agency are likely to be treated as "redheaded stepchildren," unless the physical science management is at the same level as the social science management.* For the first 25 years of NILECJ/NIJ, the two did not coexist well. For most of its early history, as this research demonstrates, the Institute's leadership was directly hostile to the technology programs and more than one effort was made to eliminate both the programs and the personnel who managed them.

Even during periods when the technology programs were treated more positively, support and interest on the part of the Institute's directors tended to be indifferent. In the three cases where the Institute director actively sought to strengthen the technology programs, in two of these cases–under James Stewart and Charles DeWitt–internal resistance made it extremely difficult. During the period of greatest success–from about 1993 to the present–the Institute director, Jeremy Travis, was clearly supportive, but his support was mostly passive. Throughout the period, he clearly demonstrated a preference for deploying his resources primarily to programs other than technology, producing a fairly dramatic imbalance in the resources (especially personnel) applied to technology.

Part of this resistance is probably inevitable. Most of the Institute's directors have been attorneys, although one–James Stewart–came from a policing career. While there are attorneys with solid physical science backgrounds, that has not been true of any of the Institute's directors. Those who have had research backgrounds have had them only in the social sciences. For many of these directors, the physical sciences were genuinely foreign and incomprehensible, and may have appeared beyond the politically appointed director's personal capacity to control in order to avoid some undefined potential political embarrassment. Pfifner (1987) has observed that political appointees often distrust career executives, a tendency likely to be exacerbated when the executive's work is in what may appear, to the appointee, to be an arcane field.

A number of researchers have suggested that the best way to address these problems is to place the technology programs on the same level as the social science programs. Several of these have been discussed in this research, including Kramer

(1977), Henshall (1972), Holden (1972), and Radnor (1975). Several of those interviewed shared similar convictions, including Robert Tolle, Lester Shubin, Lou Mayo, and Richard Velde. As recently as July 1999, Congressman Sherwood Boehlert had drafted a bill which would officially remove OST from NIJ and place it on the same level as NIJ. Although the bill has not yet been introduced, he indicated in a meeting with the Assistant Attorney General, Office of Justice Programs, and the OST director, that it was to be introduced during the first session of the 106th Congress (personal communication, July 16, 1999). The author of this research has suggested that a successful approach might be one in which NIJ was made the National Institutes (plural) of Justice, within which could be institutes for each of the principal research disciplines.

These observations suggest that NIJ should continue to support and maintain the Office of Science and Technology on the same level as that of any other program office in the Institute, and take steps to institutionalize that role, much as an earlier study of NILECJ suggested (Radnor, 1975). At the same time, the Institute should revisit its distribution of resources (particularly personnel) so they do not become a significant source of disenchantment on the part of OST employees or critics of NIJ.

3. *Special effort is required for social science and physical science organizations to coexist and cooperate successfully.* It takes a conscious effort to bring physical science and social science disciplines together in any organization, as the NIJ experience demonstrates. The director of OST created an "intersections" initiative first announced in an Institute solicitation for proposals (National Institute of Justice, 1996c). The purpose of this initiative was to address those areas where the technology and the

community "intersected," through research into the social or behavioral issues posed by the introduction of new technologies into law enforcement. The initiative, however, has been embraced by only one or two of the social scientists in the Institute.

It is clear, however, that social scientists–at least those in the criminal justice arena–rarely have physical science backgrounds and are sometimes reluctant to become deeply involved in technology issues. It is important, nevertheless, that social scientists be encouraged to participate, because the introduction of new technologies often has serious social implications which they can help address. If a strong cadre of technologically conversant social scientists can be developed, it may be possible to avoid some of the serious problems attendant to the introduction of other technologies in other areas. Building such a cadre, however, will require a concentrated effort and may have to be led initially by technologists who are also conversant with the social sciences.

4. *The lack of a credible bipartisan posture can damage any government technology program.* LEAA's greatest weakness was its failure to build bipartisan political support for its work, a failing that caused both the social and physical science efforts to come under intense criticism in Congress. In contrast, OST's great strength was in finding nonpartisan ways to explain its work, which became an important factor in the development of its strong bipartisan support. While OST's first political champion was Patricia Schroeder, a Democrat from Colorado, the apolitical nature of the OST mission quickly attracted the support of Steve Schiff, a Republican from New Mexico. By 1994, OST was being supported by a number of representatives from both parties and in both houses of Congress.

Maintaining this posture often required creative approaches in explaining the purpose of technology projects. The Smart Gun Program, for example, might have become a political football, because it could easily have been characterized as part of a gun control strategy. That might have antagonized Republicans and cost OST crucial support after the 1994 elections when Republicans captured the House of Representatives. To prevent this, OST adopted a very narrow description of the purpose of the project: to protect a police officer from being shot with the officer's own weapon. When pressed by reporters, OST always carefully couched the project in these narrow law enforcement terms, avoiding discussions of any other potential use of the technology, and remaining true to its law enforcement mission.

Both NIJ and OST should carefully examine every project in an effort to understand the relevant political issues attendant to that project in order to develop a nonpartisan (but not necessarily noncontroversial) rationale for each project.

5. *A successful technology development organization needs to periodically review, refine, and fully document its organizational technology.*

Hodge and Anthony (1988), among others, have argued that understanding the dynamics of an organization in order to make needed changes first requires an understanding of the structure or process of the existing organization (p. 325). It is, of course, much easier to develop this understanding when the relevant structure and processes are already documented, because the documentation can provide a baseline from which to launch a more detailed inquiry. NILECJ offers an example of the consequences of the absence of such information.

The lack of documentation of any coherent technology development process in NILECJ had two consequences. It inevitably made it very difficult for the Institute to defend the rationale behind its program decisions, and it made it difficult to assess its practices against those of similar organizations. Since the act of documenting the technology development process also permits serious reconsideration of elements of the process, it offers an opportunity to conduct periodic internal and external reviews of both the process and its relevance to the achievement of the organization's goals.

6. *The Office of Science and Technology's practice of proactively involving its constituents in its planning and self-assessment activities helps to ensure it stays well connected to the needs of those constituents and in a position to influence attitudes toward its programs.*

OST has developed much of its most important external support by taking advantage of its network of advisory councils and panels, including the Law Enforcement and Corrections Technology Advisory Council (LECTAC), the National Armor Advisory Board (NAAB), various working groups in the forensic community and a number of others. As the research suggests, such organizations as the NAAB have been useful in resolving some long term controversies and reducing frictions between the Institute and the major players in its environment. The importance of this approach, in which constituents are made part of, or are at least actively involved in the organization's most important activities, has been highlighted by the NILECJ and NIJ experiences and by authors as diverse as Gulick (1996), Osborne and Gaebler (1993), and Batten (1994).

From these observations, a number of useful recommendations can be drawn.

Recommendations

1. Over time, the environment in which OST operates and the nature of its missions are likely to evolve. OST should, therefore, establish a regular (perhaps annual) process to review its vision, mission and goals and make adjustments as required in order to ensure they stay relevant and can continue to keep the organization properly focused.

2. The research offices of NIJ need to have an equal voice to ensure that both of the Institute's major disciplines can continue to make contributions to the work of the Institute as a whole. To do this, the Department of Justice should steps to establish independent institutes within NIJ, one focused on the social sciences and the other on the physical sciences.

3. Because every new technology carries with it a number of potentially important social implications, OST should continue to encourage and support efforts to bring social scientists into partnerships which permit the systematic examination of the social issues attendant to the introduction of the technologies it develops.

4. OST should make every effort to build nonpartisan descriptions of its work and to invite into its deliberations, wherever possible, diverse elements of the community in order to ensure its projects are worthy and socially acceptable.

5. OST should continue and expand its efforts to review, refine and fully document how it does business and why it employs the processes it does. In order to avoid possible insularity, it is especially important that the organization invite–even if it has to fund them itself–outside critical reviews of its work.

In addition, further research should be undertaken to address a number of related questions.

Recommendations for Future Research

Recommendation 1

No attempt was made in this study to examine other federal technology development programs that might have missions similar to that of NIJ. The Office of National Drug Control Policy (ONDCP), for example, also contains the Counternarcotics Technology Assessment Center (CTAC), which funds research and development into technologies useful in the war against drugs. It would be useful to determine whether there are comparable organizations, and whether there are discoverable principles which may determine the overall effectiveness of other organizations.

Recommendation 2

One tension which appears in both the NILECJ and NIJ eras is between the social science and technology programs. This tension was great enough that technology staff in both organizations–and even behavioral staff in the NILECJ era–questioned whether the two can really coexist successfully over the long term within the same organization. It would, therefore, be useful to examine whether there are other research and development organizations which house both physical and social science activities and whether they have experienced similar tensions or found effective ways to resolve them.

Recommendation 3

The ad hoc technology development process employed by NILECJ project managers in developing bullet resistant body armor provided the basis for the general technology development process employed by NIJ. It would be useful to examine and compare this process with the processes employed in other successful efforts to develop technologies for public agencies.

Recommendation 4

A number of studies have addressed the effective development of technologies for general consumer markets and for narrow government purposes, such as the military or space programs. No similar studies seem to have been conducted on how to best approach the development of technologies for the hybrid market represented by public safety agencies, which–much like public schools–appear to producers as both government activities and "consumer-like" markets. Such a study would be particularly useful to agencies supporting law enforcement, but should also have value for the entire public safety community.

Conclusion

The NIJ program appears to have successfully adapted what worked for NILECJ and discarded most of what did not. Although still buffeted by constant changes and an extremely dynamic environment, it enjoys a degree of acceptance never accorded to NILECJ, in part because of OST's greater success in making the public, the Justice

Department, and Congress aware of what it was producing. The value of the technologies it produced–technologies that will allow police to subdue uncooperative subjects without injury to the subject, police, or any innocent bystander; the development of technologies that will help solve crimes and others, such as DNA, that can both convict offenders *and* prevent the wrongful conviction of the innocent–made clear the intrinsic value of the organization's mission.

The study of such organizations is important, therefore, because how well it performs this mission is the most important test of its effectiveness, and the basis of any contribution it might make. Since societies operate through a variety of institutions and organizations, how well these institutions are able to change to meet changing needs will ultimately determine the quality of life in the society in which we live.

The efforts of the technology development programs in NILECJ and NIJ, therefore, represent only a small part of larger efforts to effect positive change by helping to make law enforcement both more effective and more humane. It has been the goal of this study to contribute, in some small way, to positive change in one of the many small building blocks–the institutions and organizations–that make up the larger society, and thus to contribute to positive change in an important part of our social system.

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APPENDIX A

Interview Guide

Interview Subject: Date/Time

Interviewer:

Has the interviewee granted permission to record the interview?

How was this interview conducted (in person, by telephone, Internet, other)?

I. Background of the subject (obtain a resume if possible):

– Education level (BA, MA, Ph.D.)

– Discipline

– Experience in research and development (specify how much is in NILECJ/NIJ or another organization).

– Experience in law enforcement or criminal justice (specify how much in is NILECJ/NIJ or another organization).

II. Role of the interview subject:

– Dates and nature of employment/involvement with NIJ/NILECJ.

– Assignments, projects, job(s) or job titles while employed/involved with NIJ/NILECJ.

– Relationship to the physical science and technology development programs at NIJ/NILECJ.

– Why did you leave the program (or stay with the program)?

III. Organizational Goals:

– What was/is the mission of your unit in NILECJ/NIJ?

– Was this mission formal or informal?

– How was the mission articulated? By whom and in what form (published, word of mouth)?

– Who established and/or defined the mission?

– Was there general agreement on the mission? What were the sources/causes of any differences? What was the effect of differences in understanding of the mission?

– What do you consider the Institute's greatest technology successes? Failures? Why?

– Was/is there any evidence that the law enforcement or criminal justice has ever made use of any of these technologies? Is it documented?

– Exactly what parts of the law enforcement and criminal justice community did the program address?

– How did the Institute or program define "products"?

– How did the program define "success"?

IV. Formal Structure:

– How was/is the technology program organized to tackle science and technology development projects?

– Are the published organizational charts accurate? What corrections would you make? Why?

– How much discretionary authority did:

– the agency director have?

– the program director have?

– the program managers have?

– What authority did you have?

– Was there a difference between your formal and actual authority?

– How did the Institute allocate its budget?

– How was the science and technology program allocated its share of the budget?

– Who was involved in making budget allocation decisions?

– Did this change over time? If so, how and why?

– Were any external advisory boards, committees, or councils employed?

– In what way? Was their advice heeded? How often did they meet? What was the membership? How were they selected? What was their charter?

V. Technology:

– What was the Institute's process for selecting funding projects?

– Are you aware of any documentation of this process?

– Could you describe what you think was/is the model for the Institute's approach to modernizing law enforcement and criminal justice technology?

– What was/is the degree of involvement of the public or of users in the Institute's work?

– Did the program change over time? How? Why?

– What reports/records were you required to make or keep?

– How were projects evaluated? By whom?

– Was there any integration of the behavioral science components of the Institute and your work? If so, please describe them. If not, why not?

VI. Informal Norms and Processes:

– Were there differences in practices between the formal process and the one actually observed?

– If there were, what were they and why were they different?

– Who had the greatest influence on the choices of projects undertaken by the Institute?

– Among the formal employees of the Institute.

– Among those outside the Institute.

– Among all those employed by or associated with the program?

– Why were each of these influential?

VII. Environment:

– What was/is your impression of the level of support for science and technology (if there were changes over time, please describe them):

– In the agency itself?

– Within LEAA/OJP?

– Within the Department of Justice?

– In Congress?

– Among the user communities (the police, corrections, courts, etc.)?

– Can you point to any visible indicators of support in any of these areas?

– Can you identify any specific effects on the organization or programs of such issues as:

– legislation, pending or passed (identify)?

– public knowledge or perception of crime rates?

– other issues which had an impact on the organization or program?

VIII. General:

– What were the Institute's greatest strengths in this endeavor?

– What were its greatest weaknesses?

– What were the principal reasons for the Institute's successes?

– What were the greatest barriers to success?

(Note to interviewer: Allow the subject to define this question and address the following only once all other areas are exhausted).

– Was personnel a problem (skills, numbers, experience, education, other)?

– Was budget a problem? In what way?

– Who, both within and outside of the Institute, were the strongest supporters of the program?

(Note to interviewer: This question and those that follow are intended to elicit leads to others who may offer valuable information. Get as much information as possible, so those to whom they refer can be contacted).

– Who were its greatest critics?

– What significant changes can you identify? What do you believe caused them? Why?

– Who else might be able to shed light on this subject?

APPENDIX B

Personnel Questionnaire

PART I

1. GS Grade Level when you first joined NIJ or NILECJ: _____ Highest level reached: ____

2. Education

B.S. or A.B.(circle one) Year _____ Institution _____

MA (or other Master's level degree) _____ Year ___ Institution _____

Ph.D. (or other doctorate) _____ Year _____ Institution_____

Undergraduate Major:_____

Graduate Major: (by degree, if more than one)_____

_____

3. Special Qualifications and Skills

Publications: (Number and type only)

Areas of Research:

Other:

4. Employment History

A. Position within LEAA or NIJ:

(1) Title:

(2) Dates of employment:

(3) Job description (e.g., project manager, program manager, budget analyst, etc.)

(4) % of your work spent on:

Program planning	_____%
Administration of grants & contracts	_____%
Technical/advisory review of reports, proposals, etc.	_____%
Analysis of secondary data for program planning	_____%
Program administration	_____%
Research (specify)	_____%
	_____%
	_____%
	_____%
Other (specify)	_____%
	_____%
	_____%
	100%

B. For each of the three positions you held prior to joining NIJ or NILECJ:

Position1

(1) Title

(2) Dates of employment

(3) Job Description (or attach resume)

(4) Kind of business or organization:

Government (Federal, state or local)

Educational institution

Private business (describe)

Research organization (describe)

Self-employed (describe)

(5) % of your work spent on:

Program planning	_____%
Administration of grants & contracts	_____%
Administration of research.	_____%

Analysis of secondary data	_____%
Original research	_____%
Program or project administration	_____%
Direct criminal justice related work	_____%
Other (specify)	_____%
	_____%
	_____%
	100%

Position 2

(1) Title
(2) Dates of employment
(3) Job Description

(4) Kind of business or organization: Government (Federal, state or local)

Educational institution

Private business (describe)

Research organization (describe)

Self-employed

(5) % of your work spent on:	Program planning	_____%
	Administration of grants & contracts	_____%
	Administration of research.	_____%
	Analysis of secondary data	_____%
	Original research	_____%
	Program or project administration	_____%
	Direct criminal justice related work	_____
		____%

Other (specify)	_____%
	_____%
	_____%
	100%

Position 3

(1) Title
(2) Dates of employment
(3) Job Description

(4) Kind of business or organization: Government (Federal, state or local)

Educational institution

Private business (describe)

Research organization (describe)

Self-employed

(5) % of your work spent on:

Program planning	_____%
Administration of grants & contracts	_____%
Administration of research.	_____%
Analysis of secondary data	_____%
Original research	_____%
Program or project administration	_____%
Direct criminal justice related work	_____%
Other (specify)	_____%
	_____%
	_____%
	100%

6. Total number of years professional work experience:

7. Total number of years work experience in criminal justice field:

8. Do you believe you could (or could have when you started) expand or enhance the skills needed to perform your present job by any sort of training or professional experience? Yes No (Circle one)
If yes, what sort of training or experience?

9. Why did you come to the Institute? Were you recruited?

10. Are you doing/did you do the kind of work at the Institute that you believe you were hired to perform? Yes _____ No _____
If not, how is it different?

PART II

Please indicate the degree with which you agree or disagree with the following statements by circling your choice:

11. My immediate superior supported the technology program of the Institute.

1	2	3	4	5
Strongly Agree	Agree	No opinion	Disagree	Strongly Disagree

12. The Institute Director supported the technology program of the Institute.

1	2	3	4	5
Strongly Agree	Agree	No opinion	Disagree	Strongly Disagree

13. The educational levels of the technology staff were appropriate to the needs of the program.

1	2	3	4	5
Strongly Agree	Agree	No opinion	Disagree	Strongly Disagree

14. Distribution of staff in the Institute favored the technology programs.

1	2	3	4	5
Strongly Agree	Agree	No opinion	Disagree	Strongly Disagree

15. Institute goals and objectives had no bearing on program or project selection in the technology program.

1	2	3	4	5
Strongly Agree	Agree	No opinion	Disagree	Strongly Disagree

16. The general public supported the technology program.

1	2	3	4	5
Strongly Agree	Agree	No opinion	Disagree	Strongly Disagree

17. The Attorney General supported the technology program of the Institute.

1	2	3	4	5
Strongly Agree	Agree	No opinion	Disagree	Strongly Disagree

18. The Institute's technology program was widely supported by the rest of the Institute.

1	2	3	4	5
Strongly Agree	Agree	No opinion	Disagree	Strongly Disagree

19. The technology needs of the law enforcement and criminal justice community determined the selection of technology projects and programs for funding.

1	2	3	4	5
Strongly Agree	Agree	No opinion	Disagree	Strongly Disagree

20. Program/project selection in the technology program supported Institute goals.

1	2	3	4	5
Strongly Agree	Agree	No opinion	Disagree	Strongly Disagree

21. The Institute Director was actively hostile to the technology program.

1	2	3	4	5
Strongly Agree	Agree	No opinion	Disagree	Strongly Disagree

22. The distribution of staff in the Institute favored the social science programs.

1	2	3	4	5
Strongly Agree	Agree	No opinion	Disagree	Strongly Disagree

23. My immediate superior was actively hostile to the technology program.

1	2	3	4	5
Strongly Agree	Agree	No opinion	Disagree	Strongly Disagree

24. Congress was very critical of the technology program.

1	2	3	4	5
Strongly Agree	Agree	No opinion	Disagree	Strongly Disagree

25. The distribution of funding within the Institute favored the technology program.

1	2	3	4	5
Strongly Agree	Agree	No opinion	Disagree	Strongly Disagree

26. The Department of Justice largely ignored the technology program.

1	2	3	4	5
Strongly Agree	Agree	No opinion	Disagree	Strongly Disagree

27. The distribution of staff in the Institute was fair to the technology program.

1	2	3	4	5
Strongly Agree	Agree	No opinion	Disagree	Strongly Disagree

28. External support (outside the Institute) for the technology program was/is strong.

1	2	3	4	5
Strongly Agree	Agree	No opinion	Disagree	Strongly Disagree

29. Congress strongly supported the technology program.

1	2	3	4	5
Strongly Agree	Agree	No opinion	Disagree	Strongly Disagree

30. The technology program was not related to the needs of the field.

1	2	3	4	5
Strongly Agree	Agree	No opinion	Disagree	Strongly Disagree

APPENDIX C

PERSONS WHO PROVIDED RELEVANT INFORMATION FOR THE STUDY

Office of Law Enforcement Assistance/Law Enforcement Assistance Administration

Dr. Al Blumstein, member Science and Technology Task Force, President's Commission on Crime and Criminal Justice, 1967 (frequently involved with NILECJ and NIJ from beginning to the present)

Colonel Carl Baker, Chairman, Law Enforcement and Corrections Technology Advisory Council (LECTAC), 1997-present.

Thomas Brady, advisor to several directors at all levels of the organization since 1969

Marc Caplan, Director, National Law Enforcement and Corrections Technology Center-Washington, 1992-1999*

Paul Cascarano, Office of Crime Research Utilization Director, about 1972-1996

Tom Coty, Program Manager, 1997-present

Trent DePersia, Director, Research and Technology Development Division, 1997-present*

Charles B. DeWitt, Director, NIJ, 1990-1992

Dr. Ray Downs, Deputy Director, Research and Technology Development Division, 1995-present*

Paul Estaver, Office of Crime Research Utilization Director, 1969-1996*

Cherise Fanno, Budget Officer, 1997-present

Dr. Lisa Forman, DNA/Forensic Program Manager, 1998-present

Mary Graham, Director, Communications Division, Office of Development and Communications, 1972-present*

Robert Greenberg, GH International, Corp., occasional consultant to the Office of Science and Technology, 1993-present

Michael Grossman, Director, Technology Assistance Division, 1998-present

Dr. Sally Hillsman, Director, Office of Research and Evaluation, NIJ, 1995-present

Wendy Howe, Testing and Standards Program Manager, 1997-present*

Kevin Jackson, Program Manager, Office of Science and Technology, 1994-1999

Dr. Anita Jones, Director Defense Research and Engineering, 1993-1998

Dr. Richard Laymon, Program Manager, 1977-1995

Lou Mayo, Director of the Policing Division, NILECJ and NIJ, 1969 to 1987

Harlin McEwen, Chairman, LECTAC, 1987-1997

Pat Murphy, Director, OLEA, 1967-1969

Sandy Newett, Program Manager, 1998-present

Carol Petrie, Acting Director, NIJ, 1975-1994*

Dr. Richard Rau, Forensic Science Program Manager, 1970-Present

Dr. Sharla Rausch, Director, Technology Support Branch, 1998-present

Patricia Schroeder, former member of Congress, 1972-1998

John Schwarz, Director, Office of Development and Communications, 1996-1997*

Lester Shubin, Technology Program Manager, 1969 to 1989

James K. Stewart, Director, 1982-1990

Robert Tolle, Deputy Director, Office of Science and Technology, 1994-1998

Jeremy Travis, Director, 1994-present

Olga Trujillo, General Counsel, Office of Justice Programs, 1993-1996

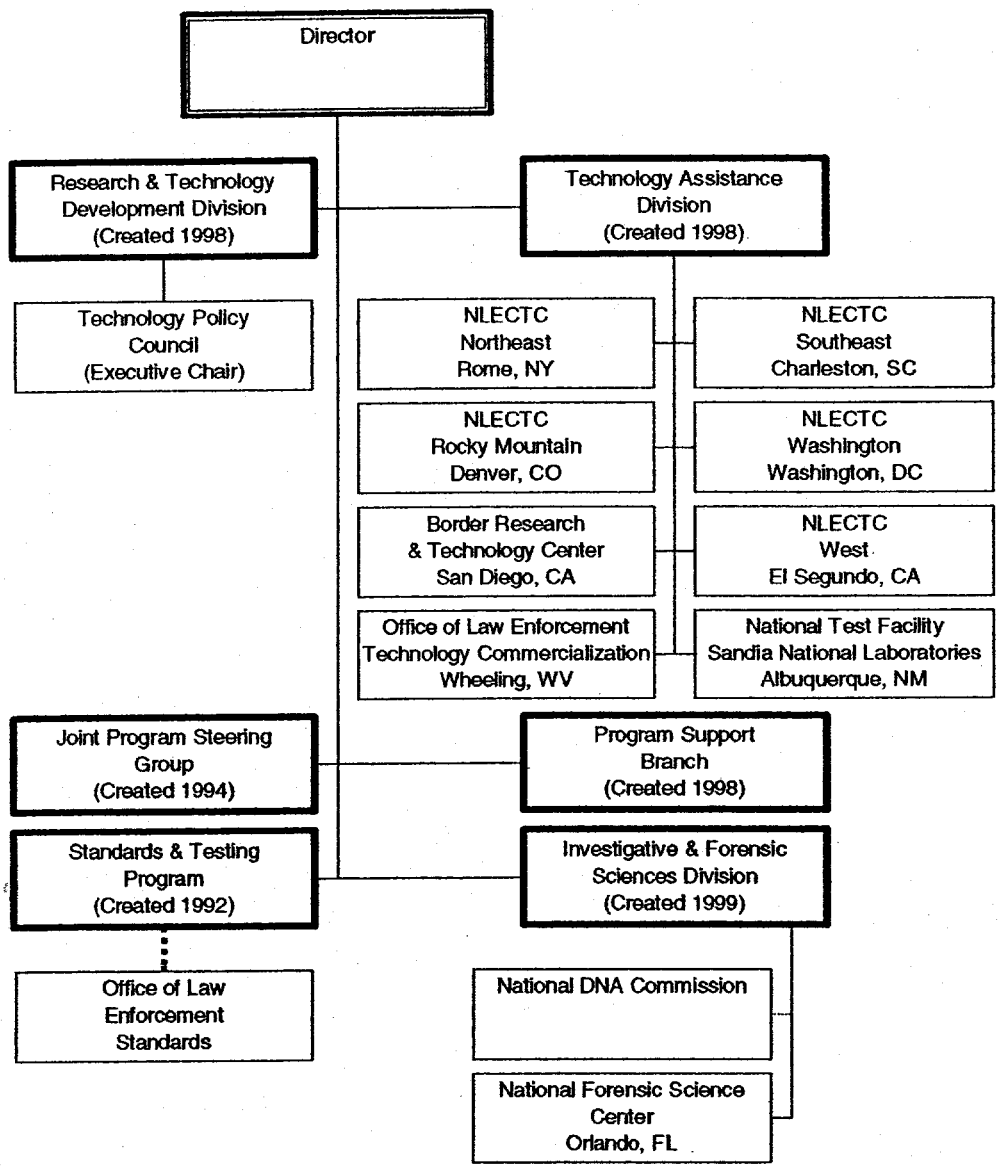
Richard "Pete" Velde, Administrator, LEAA 1969-1971

Dr. Edwin Zedlewski, Assistant Director, NIJ, 1998-present*

*Held other positions in NILECJ or NIJ during the period indicated before achieving the title shown.

APPENDIX D

Organization of the Office of Science and Technology



This diagram was developed by the author based on his personal knowledge of the organization. Dotted lines represent elements of the organization that receive funding from NIJ but are not formally part of the organization.

APPENDIX E

Selections from the OST Employee Handbook

- Mission statements for the Office of Justice Programs and National Institute of Justice
- Goals and missions of the Office of Science and Technology

Our Mission

The Mission of the Office of Justice Programs (OJP)

The mission of the Office of Justice Programs and its bureaus is to make our nation's criminal and juvenile justice systems more efficient and effective and to address problems relating to crime, delinquency, drugs, and violence. Dedicated to comprehensive approaches, OJP provides Federal leadership in the development of policy and allocation of resources. OJP supports the bureaus as the identify emerging criminal justice issues, develop new ideas and test promising approaches, evaluate program results, collect statistics, conduct analyses, and disseminate these findings and other information to state and local units of government, criminal justice practitioners, the media, and the public, as well as to other countries. OJP helps prevent and control crime and delinquency by assisting and coordinating state and local governments, law enforcement, prosecution courts, indigent defense, and corrections, as well as selected social service providers.

The Mission of the National Institute of Justice (NIJ)

The National Institute of Justice (NIJ) is the research and development agency of the U. S. Department of Justice. It was established by Congress to prevent and reduce crime and to improve the criminal justice system by sponsoring research projects and development programs, developing new technologies to fight crime, evaluating the effectiveness of criminal justice programs, and identifying and recommending programs that have been successful or are promising. NIJ publishes materials that allow criminal justice research professionals, policy makers, and researchers to stay abreast of the latest Institute research and the results of program evaluations.

Office of Science and Technology

GOALS AND MISSION

The National Institute of Justice (NIJ) was established within the Department of Justice (DOJ) in 1968. The Office of Science and Technology (OS&T) was formed in 1992.

The goal of OS&T is primarily focused on law enforcement and corrections technology in support of state and local communities, as well as DOJ's programs, such as the Technology Policy Council efforts.

The mission of NIJ/OS&T is to:

- Identify technology requirements for new technology tools, especially at the state and local law enforcement and corrections community level;
- Find, research, and develop new technologies (e.g., concealed weapons detection, explosive detection, DNA, car stopping, and smart gun technology) and new applications of existing technologies (e.g., computer information technology, and communications technology) to improve policing and corrections in the United States;
- Introduce promising new technologies to law enforcement and corrections;
- Provide technical and information assistance via publications, conferences, and JUSTNET information technology, to the law enforcement and corrections community at all levels; and
- Ensure equipment on which police rely (e.g., body armor, vehicles, less-than-lethal weapons) to protect the public and themselves is adequate to the task.

APPENDIX F

Advisory Committees

Panel	Membership	Purpose
Policy Assessment Panel (POLICY PANEL)	25 senior executives, distinguished policy-makers and advisors, meeting quarterly	To review and assess promising technologies, associated approaches and problems, and assist in development and introduction of technologies
Liability Task Group (LTG)	15 to 20 Legal and law enforcement professionals, meeting quarterly	To serve as a forum for the discussion of liability issues which may arise from the introduction of new technologies and to develop strategies to minimize liability exposure for agencies adopting new technologies
Strategic Planning and Governance Group (SPGG)	Senior executives, former elected officials, technology and system designers, meeting as needed	Assist in guiding the strategic planning of science and technology assistance of the NLECTC and related issues
Community Acceptance Panel	25 professionals from community groups, meeting periodically	Address whether a new technology or product will be acceptable to the community
Justice/Industry Committee on Law Enforcement Technologies (JICLET)	25 industry representatives, meeting periodically	Address the implementation and commercialization of technologies, including needs assessment, market development, product standards and testing, legislative and judicial awareness and role of government laboratories

Panel	Membership	Purpose
Law Enforcement and Corrections Technology Advisory Council Executive Committee (LECTAC)	150 members, including participation from UK, Canada, and Israel, meeting twice annually, with executive committee (made up of committee and subcommittee chairs), meeting twice more	To provide the professional and operational review and guidance for development of technologies and products for law enforcement and corrections communities
National Armor Advisory Board (NAAB)	16 to 20 members representing fiber manufacturers, weavers, armor manufacturers, law enforcement and corrections agencies	Review and comment on proposed changes to the NIJ voluntary body armor compliance testing program, including changes or modifications to testing procedures or the body armor standard
Technology Policy Council (Chaired by the Deputy Attorney General, with Office of Science and Technology serving as the executive chair and secretariat)	Senior technology officials in all law enforcement agencies in the Justice and Treasury Departments, as well as representatives from the Departments of Defense, Transportation, and Energy, the Office of National Drug Control Policy, the White House Office of Science and Technology Policy, and the Office of Management and Budget	Serve as a forum for assessing and sharing information, facilitating useful partnerships for resource savings, avoiding wasteful duplication or overlap, identifying technology needs and requirements, and making recommendations to the Attorney General and Secretary of the Treasury on priorities for technology development.

APPENDIX G

Personnel Questionnaire Results

Employee Histories

(Note: Not all percentages total to 100. Differences reflect nonresponsive surveys. NILECJ data is taken from White & Krislov, 1977)

Universe (NILECJ/NIJ):56/19 Responses:45/16 Response Rate: 80%/84.2%

1. GS Grade level:

Highest GS Grade Level	NIJ Nr	NIJ (%)	NILECJ (%)
9-11	5	31.25	22.2
12-13	7	43.75	33.3
14-15	3	18.75	35.6
SES	1	6.25	6.7

2. Education level (highest degree):

Degree	Nr	NIJ%	NILECJ %
Baccalaureate	1	6.25	20
Master's	6	37.5	33.3
Doctorate	5	31.2	26.7
Professional	1	6.25	6.7
Doctoral work	3	18.75	13.3

3. Undergraduate major:

Mathematics/Operations Research	6
Physics/Chemistry	2
Biological sciences	3
Social Sciences (including psychology)	4
Accounting	1

In NILECJ, 22.2% had hard science vs. $75.5% with soft degrees. For OST the figures were 65.5% hard and 25% soft.

4. Graduate major:

Mathematics/Operations Research	4
Physics/Chemistry	2
Biological sciences	4
Social Sciences (including psychology)	4
Finance/Law	2

In NILECJ, 11.1% had hard science vs. 64.4% with soft degrees. For OST the figures were 62.5% hard and 25% soft.

5. Number of Publications.

Number of publications	Percentage publishing this number (OST)	Percentage publishing this number (NILECJ)
None	62.5	37.8
1-3	37.8	6.25
4-10	12.5	15.5
11+	18.75	8.9

6. Number of Years at NIJ:

Number of years	OST staff %	NILECJ staff %
0 < 1	12.5	26.7
1 < 2	43.75	15.6
2 < 3	12.5	15.6
3 < 4	12.5	11.1
4+	18.75	31.1

7. Position in the Institute (OST only):

Administrative:2 Program Management:10 Division/Office Director:4

8. Percentage of time spent by personnel in current job on:

Function (Responses are NIJ/NILECJ in %)	0	<25	<50	<75	>75
Program Planning	18.75/ 15.6	37.5/6 0	25/ 4.4	2.2/ 6.25	0/ 0
Administration of grants & contracts	6.25/ 8.9	12.5/ 15.6	32.5/ 17.8	0/ 28.9	0/ 11.1
Technical/advisory review of reports, proposals, etc.	31.25/ 8.9	25/ 53.3	12.5/ 11.1	0/ 0	0/ 0

(table continues)

Function (Responses are NIJ/NILECJ in %)	0	<25	<50	<75	>75
Analysis of secondary data for program planning	25/ 44.4	25/ 33.3	6.25/ 2.2	0/ 0	6.25/ 0
Program Administration	18.75/ 26.7	18.75/ 40	25/ 13.3	0/ 2.2	6.25/ 0
Research	50/ 68.9	6.25/ 13.3	6.25/ 0	6.25/ 0	0/ 0

8. Percentage of time spent by personnel in the previous job on:

Function (NIJ/NILECJ) %	0	<25	<50	<75	>75
Program Planning	31.25/ 26.7	12.5/ 31.1	12.5/ 15.6	0/ 2.2	12.5/ 0
Administration of grants & contracts	37.5/ 62.2	12.5/ 6.7	6.25/ 4.4	0/ 2.2	6.25/ 0
Administration of research	62.5/ 48.9	6.25/ 20	0/ 6.7	6.25/ 0	0/ 0
Analysis of secondary data	43.75/ 40	12.5/ 24.4	6.25/ 8.9	0/ 2.2	0/ 0
Original research	43.75/ 37.8	0/ 8.9	6.25/ 11.1	0/ 8.9	0/ 8.9
Program or project administration	37.5/ 44.4	12.5/ 24.4	6.25/ 4.4	0/ 2.2	0/ 0
Direct criminal justice related work	37.5/ 57.8	0/ 2.2	0/ 2.2	6.25/ 2.2	12.5/ 11.1
Other	0/ 51.1	6.25/ 0	0/ 2.2	6.25/ 2.2	6.25/ 17.8

Among the previous jobs reported were: forensic analyst, program/project manager (3), office/division director in a DNA testing company (1), deputy district attorney (1), systems analyst (2), social worker (1), student (4), and legislative aide (1), career military (3). Only three of the respondents had held more than one previous job.

8. Areas of research:

Eleven respondents indicated they had conducted research in some field. Of these, ten reported research in the hard sciences, specifically in: infrared sensors, image processing, radar sensors, chemical sensors, X-ray systems, population genetics, forensic DNA analysis, genetic identity testing, and genetic manipulation, computer simulation and modeling. One listed research in military subjects: air warfare, strike warfare, and humanitarian operations.

APPENDIX H

Personnel Questionnaire Results

Personnel Perceptions

A score of 1.0 represents total agreement with the statement, with agreement weakening as the score rises. A score of 5.0 indicates respondent strongly disagreed.

Statement	Mean	Median	Mode	Standard Deviation
11. My immediate superior supported the technology program of the Institute.	1.2	1	1	0.414
12. The Institute Director supported the technology program of the Institute.	2.733	3	3	1.010
13. The educational levels of the technology staff were appropriate to the needs of the program.	1.933	2	2	0.799
14. Distribution of staff in the Institute favored the technology programs.	3.933	4	4	1.033
15. Institute goals and objectives had no bearing on program or project selection in the technology program.	3.467	3	3	0.915
16. The general public supported the technology program.	1.8	2	2	0.561
17. The Attorney General supported the technology program of the Institute.	1.8	2	2	0.676
18. The Institute's technology program was widely supported by the rest of the Institute.	3.467	4	4	0.834
19. The technology needs of the law enforcement and criminal justice community determined the selection of technology projects and programs for funding.	2.2	2	2	0.676

(table continues)

Statement	Mean	Median	Mode	Standard Deviation
20. Program/project selection in the technology program supported Institute goals.	2.2	2	2	0.775
21. The Institute Director was actively hostile to the technology program.	3.733	4	3	0.799
22. The distribution of staff in the Institute favored the social science programs.	1.533	1	1	0.634
23. My immediate superior was actively hostile to the technology program.	4.933	5	5	0.258
24. Congress was very critical of the technology program.	3.867	4	4	0.915
25. The distribution of funding within the Institute favored the technology program.	3.4	4	4	1.121
26. The Department of Justice largely ignored the technology program.	3.6	4	4	0.910
27. The distribution of staff in the Institute was fair to the technology program.	4.133	4	4	0.743
28. External support (outside the Institute) for the technology program is strong.	2.133	2	2	0.743
29. Congress strongly supported the technology program.	2.4	2	2	0.828
30. The technology program was not related to the needs of the field.	4.4	4	5	0.632

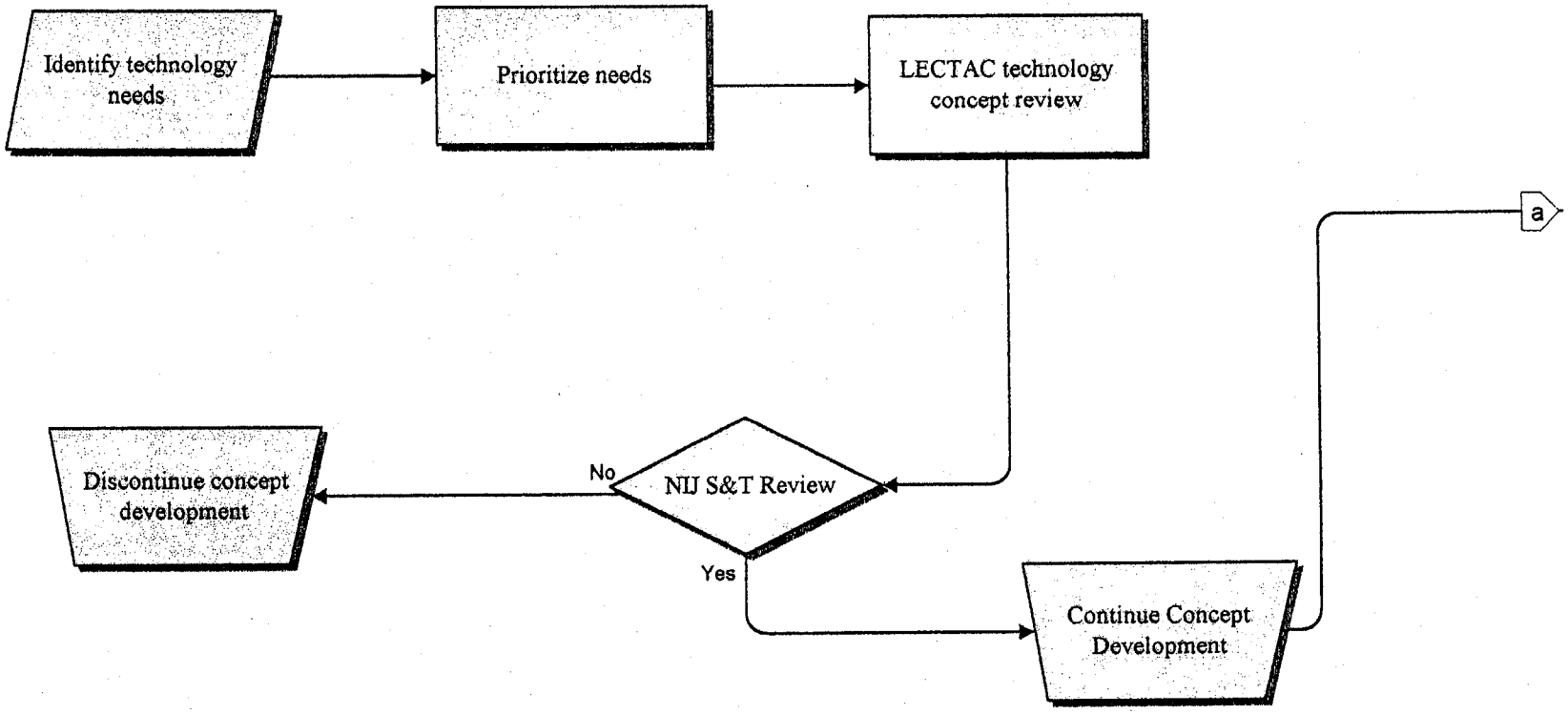
Adjusted Survey Results

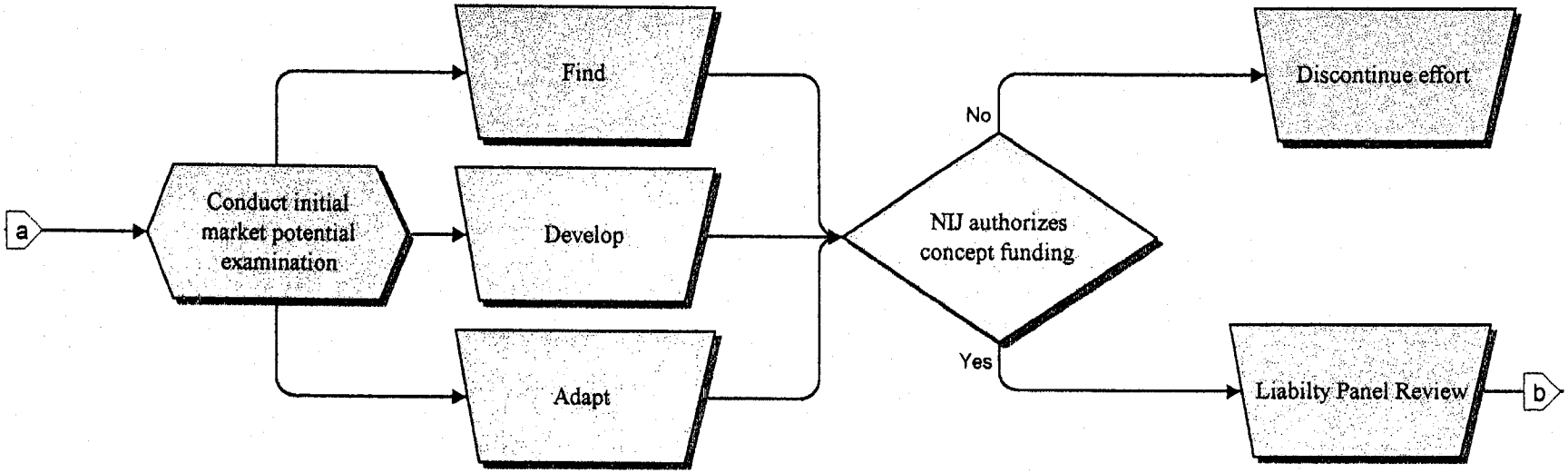
This table represents the results of combining related questions. For example, statement 11 is worded positively, "my immediate superior supported the technology program of the Institute," while statement 23 offers the opposite statement, "my immediate superior was actively hostile to the technology program." By converting responses to this second phrase, they can then be combined to produce a new set of statistics based on double the original number of responses. This is done by subtracting every negative response from the value 6. In this way, a "5," suggesting strong disagreement becomes a 1 (e.g., 6-5=1) and can be compared to the positive version of the question.

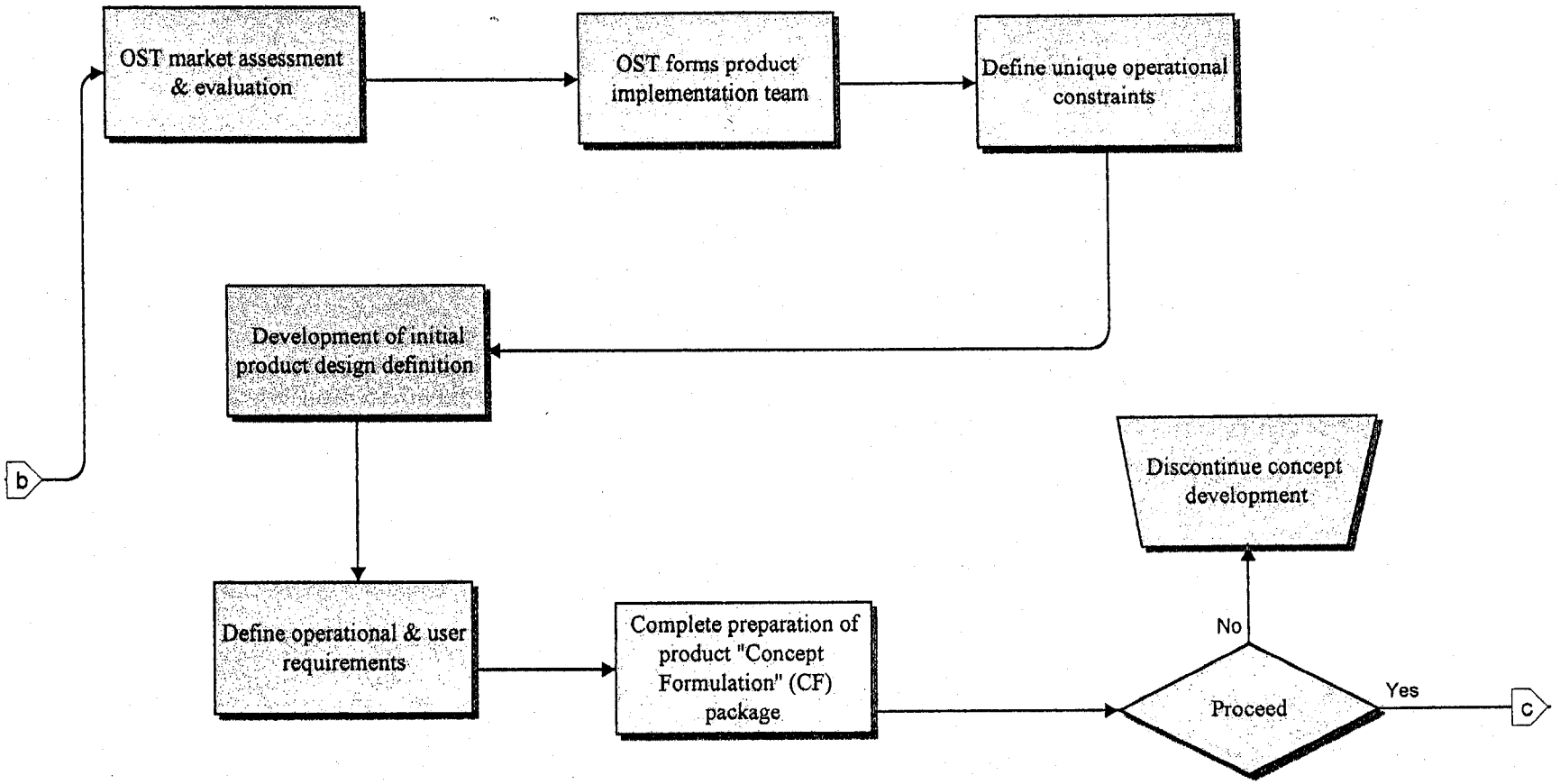
Combined Question	Mean	Median	Mode	Standard Deviation
11&23. Supervisor supports technology.	1.133	1	1	0.229
12&21. Institute director supports technology.	2.5	3	3	0.824
24&29. Congress supports technology.	2.267	2	2	0.729
16&28. Public supports technology.	2.833	3	3	0.450
17. Attorney General supports technology.	1.8	2	2	0.676
18. Institute personnel support technology.	3.467	4	4	0.834
13. Education levels of technology personnel are appropriate.	1.933	2	2	0.799
14&22. Distribution of staff favored technology.	4.2	4	5	0.727
27. Distribution of staff favored technology.	4.133	4	4	0.743
25. Distribution of funding favored technology.	3.4	4	4	1.121
19&30. Goals were congruent with needs in the field.	1.9	2	1.5	0.573
15&20. Technology projects supported Institute goals.	2.367	2.5	2	0.719

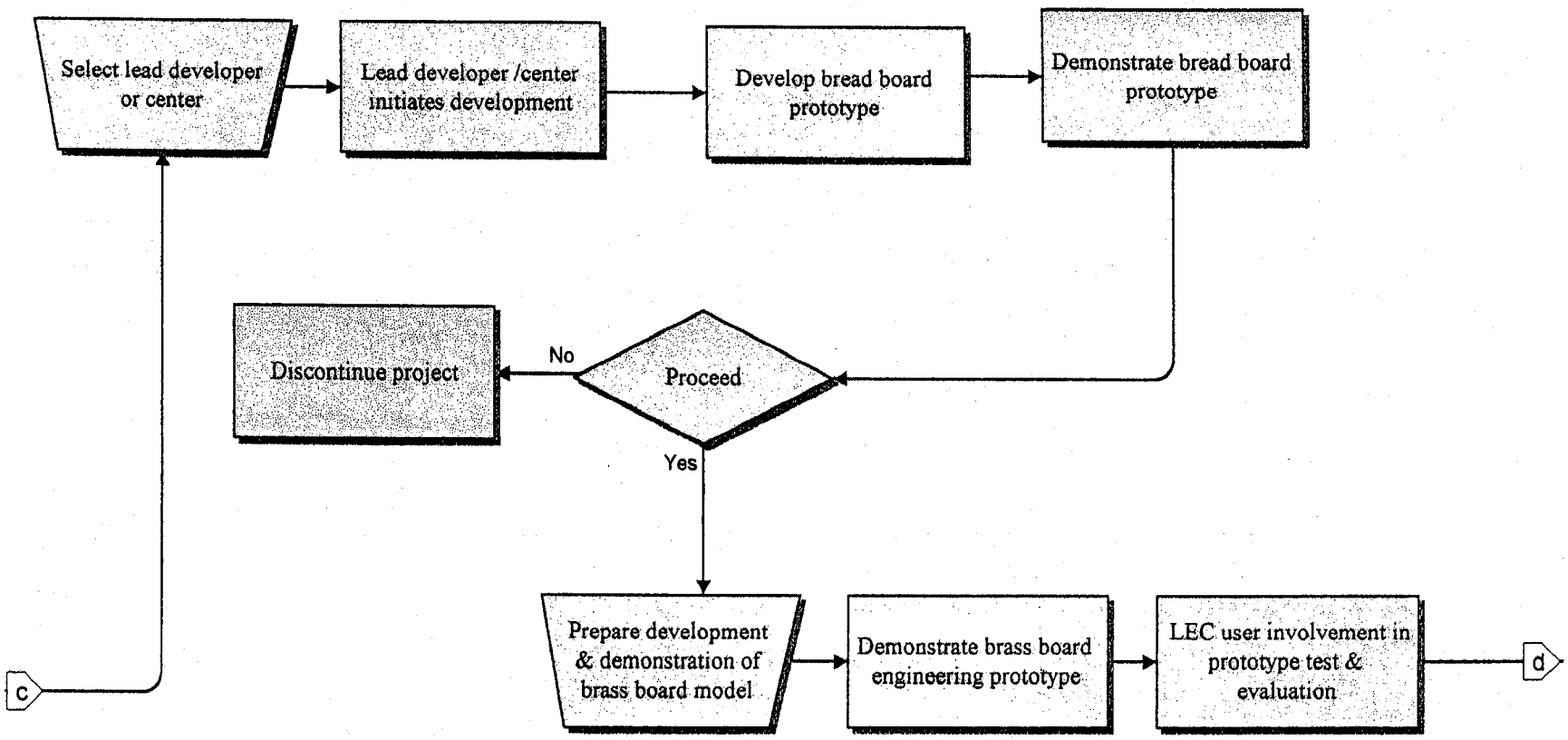
APPENDIX H

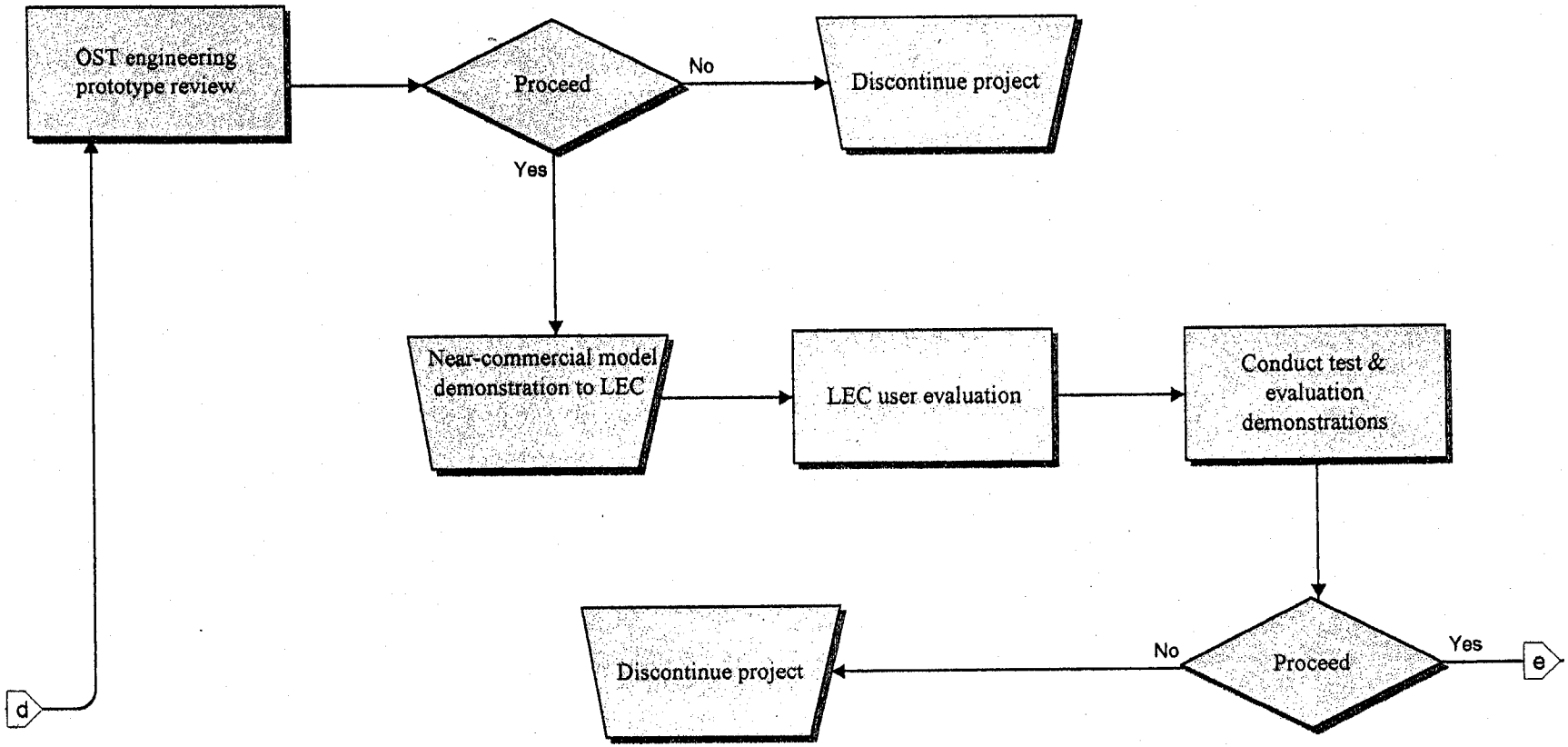
The OST Technology Development Process

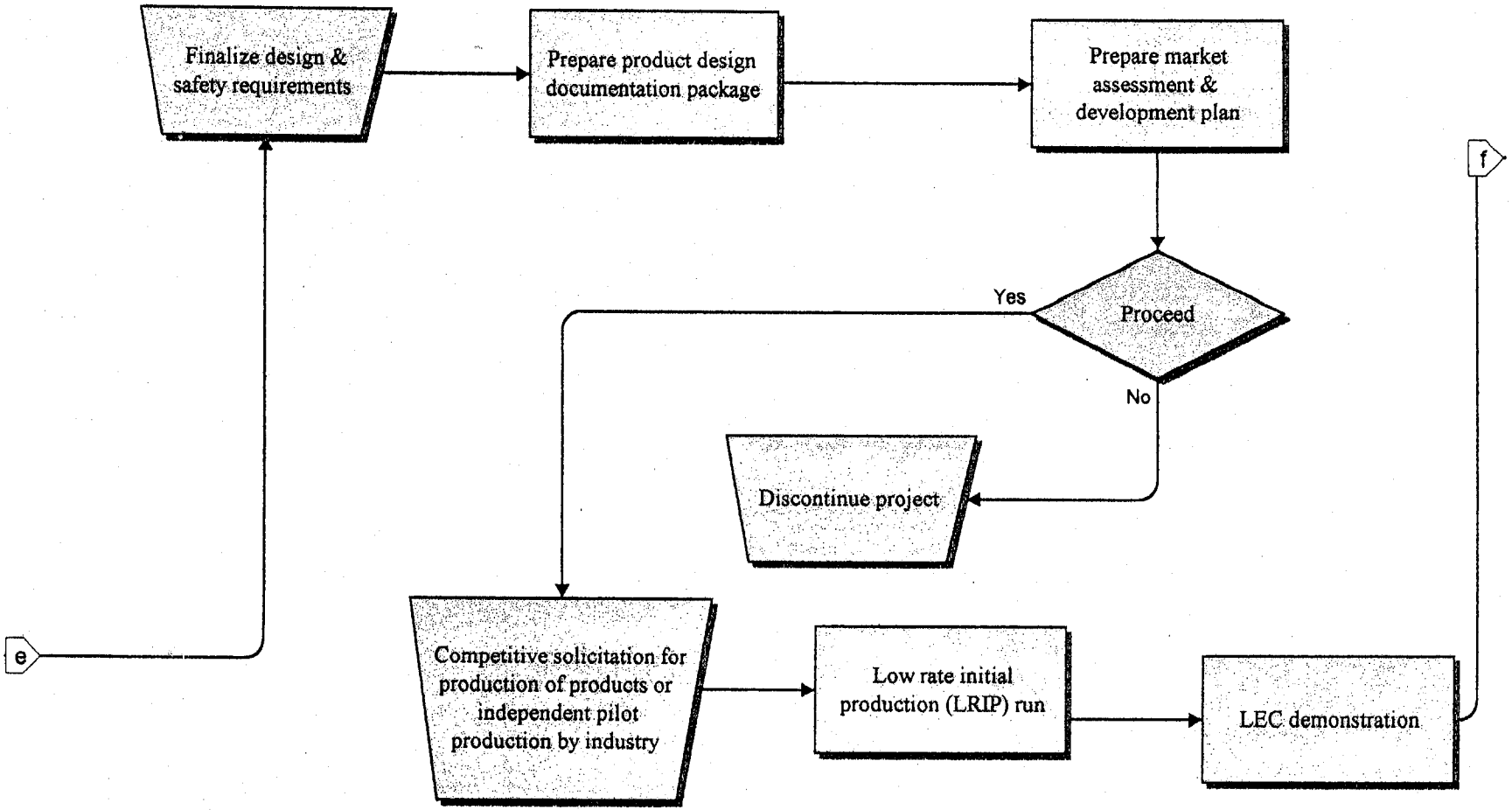


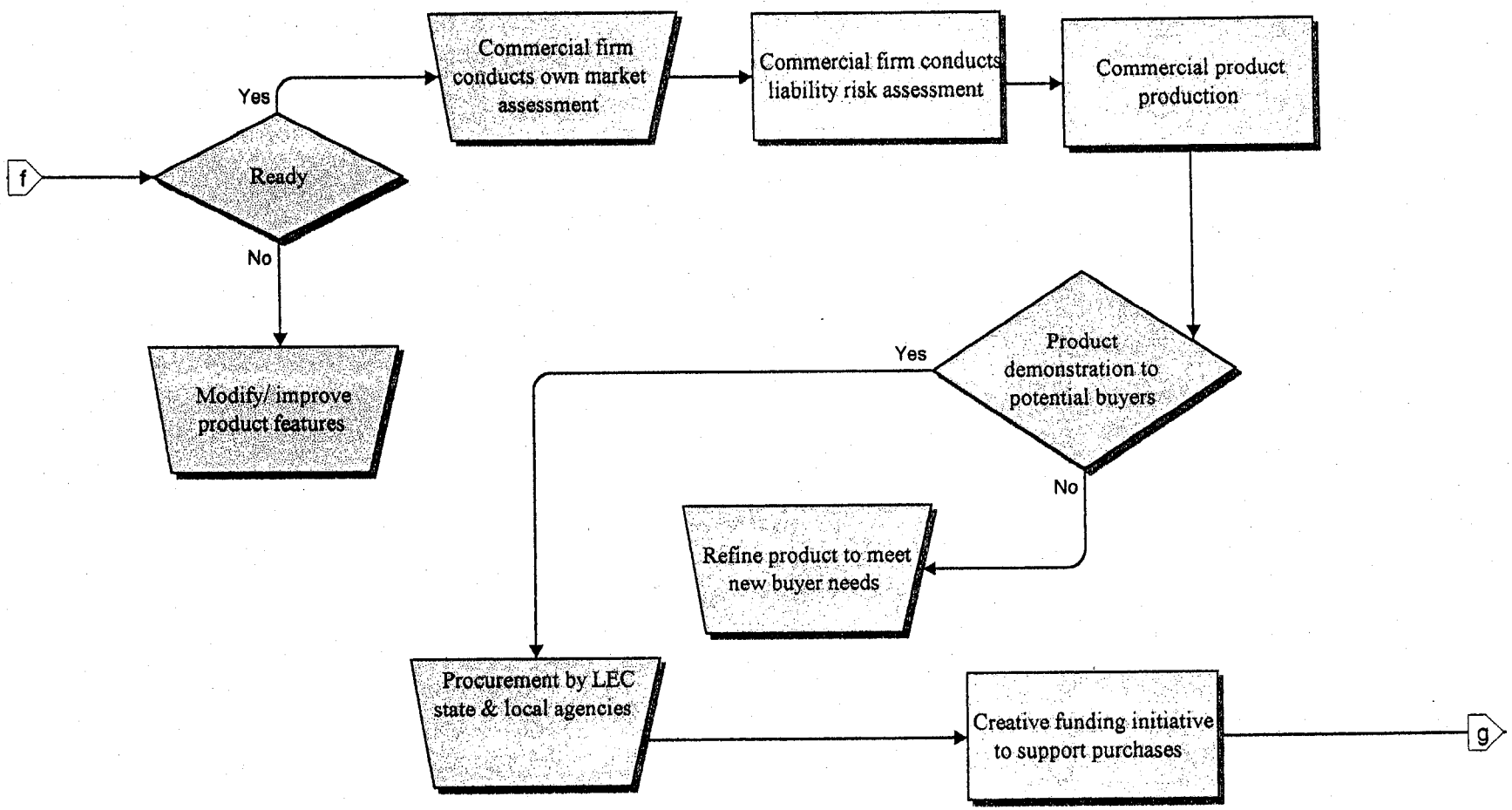


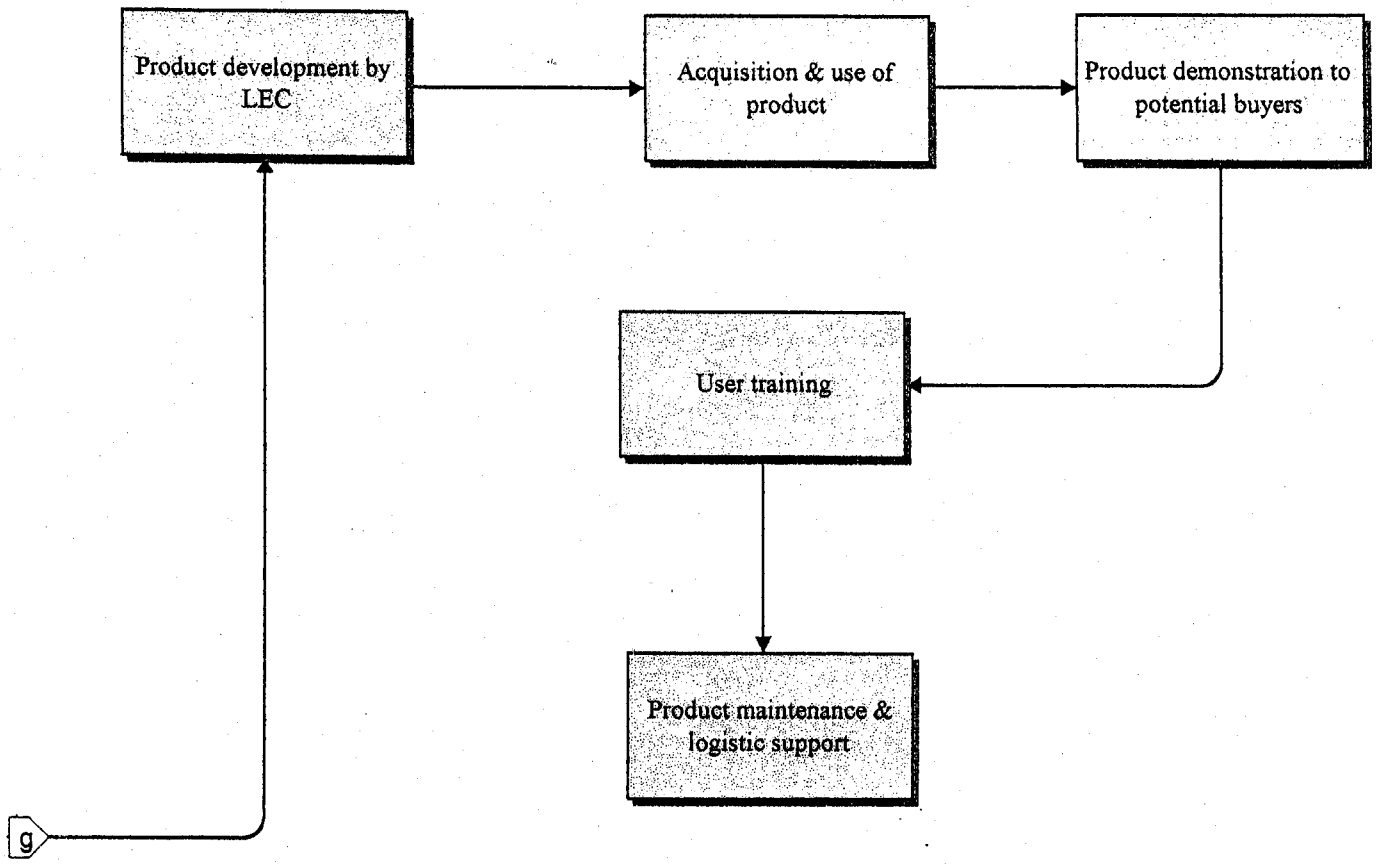












APPENDIX J

Interview Summaries

These interview summaries are paraphrased in the third person, except where indicated by quotation marks. Most of these interviews lasted a full hour. None took less than half an hour and some lasted much longer.

Tom Brady, February 2, 1998.

Tom Brady, a journalist, did a number of research and writing jobs for both the Institute and LEAA and its successor agency for many years. He had worked directly with nearly all of the early figures in LEAA. In 1997, he was commissioned by Vice Admiral Burkhalter to produce a history of technology in law enforcement for the National Committee on Criminal Justice Technology, focused primarily on NIJ's role in developing and encouraging its use. The product of this work was *The Evolution and Development of Police Technology*, published by the Committee in 1998.

Technology programs through LEAA's history had been erratic and ad hoc. There had never been any systematic approach to the development of technology and had always been a tension within LEAA and NIJ between those who wanted to see more technology and those who wanted those resources to be invested in social science research. Most of the technology work was not in development, but in the purchase of equipment under LEAA and OJP managed block grant programs. This resulted, in the LEAA days, in a great deal of waste and even some corruption which damaged the credibility of the entire federal approach to the support of state and local law enforcement.

It is clear that the most important technology developments of the past several years has been in computer information systems, soft body armor, and DNA and these, and new efforts started under OST have produced some of the most positive public and Congressional responses in years for an OJP program.

Despite bad press, LEAA produced much of real value to law enforcement. It educated a whole generation of cops through the Law Enforcement Education Program (LEEP), which allowed education grants to be made directly to police rather than through agencies. It allowed the purchase of a lot of new equipment and even though a fair amount of that was wasted on poor choices, it did result in the early development of computerized criminal information systems, the development of the 911 emergency telephone system, and other important projects.

Much of the early weakness of LEAA can be attributed to political distrust on the part of both parties. This resulted in an agency run by a triumvirate, which made it hard to get anything done because it was hard to get all three members of the "troika" to agree on anything. All three had to sign off on any spending decision, so the wrangling was constant and sometimes pretty bitter.

Paul Estaver, December 15, 1998.

Estaver had served in NIJ since shortly after its creation as NILECJ and until his retirement in 1997. A successfully published novelist, he had been responsible for much of his career for the Institute's publications, and had worked for Cascarano for nearly his entire tenure with the Institute. After the body armor problems began, DeWitt took direct control of the program out of Shubin's hands and gave it to Cascarano, who made it a subset of Estaver's operation. But as the controversy became more bitter, DeWitt began to blame Cascarano and that led to the creation of a new division which pulled all the technology projects out of Cascarano's office and placed them under the new director of the Science and Technology Division. Estaver, however, continued to run the program for nearly a year because DeWitt kept rejecting candidates for this new position.

Estaver could remember no formal goal system within the Institute until DeWitt hired Al Reiss to create one. He was not convinced this new goal structure made much difference, but he also did not think it hurt much.

Estaver found technology interesting, but believed more resources should have been made available to the social science work of the Institute, but he also believed that work needed to be focused more on practical applications. The dissemination of information about successful crime control programs was the mission of the Office of Crime Research and Utilization (OCRU), which was the office led by Cascarano. He believed that greater investment in evaluations of programs to find the successful ones would be more useful than a lot of the research undertaken by the Institute.

Shubin, he believed, was the hero of the body armor program. He had single handedly developed the product, got police to buy and use it, and was rightly credited with all the lives it had saved, but when DeWitt started taking heat over the program, he took it out on Shubin and basically drove him into retirement.

Wendy Howe, March 3, 1999.

Wendy Howe had been a police officer in Largo, Florida for several years before moving with her husband to Maryland. For several years, she worked in public relations and other capacities for the International Association of Chiefs of Police (IACP) until she

was hired by Aspen Systems Corporation in the mid-1980s to manage the body testing program for the Technology Assessment Program Information Center (TAPIC). She remained in this capacity until she was hired in 1996 to be the Standards and Testing Program Manager and Assistant to the Director of Science and Technology.

For most of the time she worked on body armor issues, the program was well supported by the Institute. Even after the controversies first developed, "Chips" Stewart continued to defend the program and work closely with Lester Shubin and TAPIC. At first, relations with DeWitt were also good. When the retest failures which precipitated the lawsuit were first reported, DeWitt said he was determined to make sure the industry complied with the standard and did what was right by the law enforcement community. Within 24 hours, however, DeWitt had gone from being supportive to blaming the whole problem on everybody associated with the program, including TAPIC. In fact, he was so critical of TAPIC that he began funding the program in monthly increments so that for nearly a year the program was in "shut-down mode." He was funding the Office of Law Enforcement Standards (OLES), with which TAPIC worked closely, in the monthly increments so they were also crippled. He also ordered both TAPIC and OLES not to respond to industry questions without prior approval from NIJ, approval which–until the new technology director arrived–generally took months. Things stayed this way until the new technology director arrived.

He immediately got a 3-month funding extension approved for TAPIC and six months for OLES. Once DeWitt left a few months later, things began to be funded annually. The new director worked with TAPIC to create a new National Armor Advisory Board (NAAB), which did a great deal to ease tensions between the industry and NIJ. Over the next year, the controversy mostly faded away until there was a massive body armor failure in retests by Massachusetts. This was the last real challenge to the NIJ program until the FBI, who had always supported the program in the past, made a power grab and tried to convince the Attorney General that the NIJ standard was too stringent. This failed and the Attorney General, for the first time, issued an order requiring every law enforcement agency in the department to buy only armor which complied with the NIJ standard.

Richard Laymon, December 10, 1998.

Dr. Laymon was a GS-15 manager in one of LEAA's regional centers until President Carter eliminated them all. He then took a downgrade to GS-14 and accepted a position as an Operations Researcher/System Analyst (OR/SA) in NILECJ and remained in that position until his retirement in 1995. His duties included both social science and technology projects, although he preferred technology projects. He describes most of the time he spent in the Institute in NILECJ as one where getting support for technology projects was, especially after the arrival of Gerald Caplan, very difficult. Caplan was so opposed to supporting projects outside the social sciences that he even tried to eliminate

all the OR/SA positions. These had been created at the recommendation of the 1967 President's Crime Commission to work as part of teams which were to consist of one social science researcher, a practitioner, and an OR/SA, but Caplan thought it a waste to have OR/SAs in the Institute. Most of the OR/SA then converted to a job series for social science analysts.

Until the creation of OST, the Institute was generally uninterested in technology and most thought public and Congressional interest was only passing. Pressure from Congress over paint jobs for police cars and the "shooting shoe," and the failure of the demonstration of a helmet radio before Congress had discredited technology to most of the Institute. Attacks on the body armor program had also hurt the reputation of technology badly and caused some of the social scientists to argue that technology was too dangerous and the Institute should limit itself to only a few projects in order to help support budget requests.

In the mid-1980s, he was instrumental in bringing DNA identification technologies from Britain to the United States and initiated the first research projects into improving the technology. He and "Chips" Stewart, NIJ director, tried to interest John Hicks, the FBI Laboratory director, in DNA technology, but were told that the FBI had far too great an investment in serology to switch to DNA methods. By the time the success of the Virginia Crime Lab systems made it obvious that the switch had to be made, the FBI–to put its own stamp on it and claim credit for it–set up their own system of DNA markers so everyone would have to follow their lead.

When he and Dr. Rau helped set up a project to support the American Society of Crime Laboratory Directors (ASCLD) in creating a laboratory accreditation program, Stewart and Laymon approached the federal crime laboratories to encourage them to be among the first accredited. The Drug Enforcement Administration (DEA) and, later, the Secret Service all undertook accreditation. The FBI, however, would not submit to accreditation.

Lou Mayo, December 12, 1998.

Mayo describes himself as one of the founders of the Institute and points out that he was one of the first two who "turned on the lights" at the research activity in the earliest days of OLEA, and served most of his time as the Policing Division director. He indicates he made strenuous efforts to "focus the Institute on clarifying its goals, its objectives, with measurable indicators, both to guide our program objectives and to assess its progress," but every attempt was rejected. There was virtually no interest in the Institute in practical research aimed at improving things at the practical level. The social science elements of the Institute, who he describes as "academically oriented" were interested in theory, not in the practical application of what they did. At the same

time, they saw every attempt to move money into technology or into training (which Mayo ran) as a threat to their softer, academic "touchy feelie" interests.

Because so many of the leaders were political appointees, changes in leadership were frequent and every time there was a change in the Institute's director, or in senior leadership in LEAA, all the old plans and priorities would be thrown out and a whole new set put in place. Technology, although strongly supported by Richard Velde (LEAA Administrator) was popular for a time and hated at others. Gerald Caplan, in particular, rejected attempts to do anything with technology and even opposed investing money in any form of training. Despite that, the success of body armor was so great it could not be ignored, so even directors opposed to technology gave it lip service by bragging about body armor. There were no clear goals and what did exist changed regularly. There was little interest in planning or establishing clear goals.

He is particularly offended at what he sees as shabby treatment of Lester Shubin, who he credits with single-handedly developing soft body armor despite opposition from within the Institute and from outside groups such as the National Research Council.

Carol Petrie, January 4, 1999.

Carol Petrie had joined the Institute about 15 years ago, working originally in Paul Cascarano's shop. She had remained in various positions in that office until John Picket, NIJ's planning and budgeting officer died. Not long afterward, DeWitt promoted her to GS-15 and put her in the new planning role. When the Bush Administration left office, Mike Russell (DeWitt's deputy) became the acting director and stayed in that role for about a year. She became the acting director after Russell and stayed in that position about a year until Jeremy Travis arrived.

At about the time she moved into the planning position, her formerly good relations with Cascarano began to cool as she had to make decisions he was not always happy with and as relations between DeWitt and Cascarano began to sour over the body armor controversies. As the body armor controversy became increasingly bitter, DeWitt shut off communications not only with the affected industry, but also with Cascarano, Estaver, Shubin and the people running the body armor program. DeWitt increasingly blamed Cascarano and his people for the problems in the program, while Cascarano and his people blamed DeWitt for shutting off communications with the industry. At first DeWitt was supportive, but as even the Justice Department began to complain about the program, he turned against Cascarano's office. Finally, he took the program away from Cascarano entirely, created the Science and Technology Division, and hired a new director. Petrie supported this decision because she believed part of the problem was a lack of technology management expertise in the Institute. She was primarily responsible for writing the position descriptions and managing the hiring process, which–because DeWitt kept rejecting candidates–took over a year.

By the time Mike Russell left the Institute, Cascarano's relations had also soured significantly with people more senior in the Justice Department, so she was appointed acting director over him. This also was a source of friction, because as a GS-15 Petrie was significantly outranked by Cascarano, who was a member of the Senior Executive Service (SES).

She was impressed with the growth of the technology program, but also frustrated that it was easier to get support from Congress for technology programs than for social science work because it was easier to sell the toys than social research. You could see and touch technology, but not social science research. She was also concerned that the greater visibility of the technology program, specifically of OST, might result in the kinds of negative attention the Institute had gotten in LEAA over paint jobs for patrol cars, a "shooting shoe" (which never actually existed but was used to attack the Institute), a "too expensive star wars police car," and other projects. She believed it was generally better that the Institute be a quiet, unnoticed agency with a moderate but fairly secure budget. Such programs, she thought, tended to attract the interest of Congress and the press, but only for awhile, after which they often became a significant liability.

Not long after Travis became the new director, she retired and took a position with the National Research Council (NRC).

Alan Preszler, December 2, 1998.

Dr. Alan Preszler was a visiting scientist, recruited to spend two years at the National Institute of Justice. He was on loan from the Idaho National Electronics Engineering Laboratories (INEEL), and managed the Institute's Less Than Lethal Weapons Program.

In 1989, partly in response to the recommendations of the 1986 Attorney General's Conference on Less Than Lethal Weapons, Congress had appropriated a few hundred thousand dollars to develop a less than lethal technology to control uncooperative subjects. This funding increased to $1.942 million the next year, and remained at that level for several years. These were "no year" funds which were good until expended (i.e., they were not lost to the agency if they were not spent at the end of any particular fiscal year), and by the time the OST director arrived, had been accumulating for four years. DeWitt had not trusted his existing technology staff to properly manage this program, so he had arranged with INEEL to provide Preszler for two years to develop the program.

When he arrived, Preszler found a staff mired in the body armor controversies and largely uninterested in anything else. He also found no procedures in place for the development or management of technologies and so began the work of creating a program at a time when funding for projects was so limited it was difficult to interest

scientists, even in the national laboratories, in preparing proposals. Complicating things further was the fact that DeWitt was very cautious about funding anything in technology. The result was that, by the time the new technology director arrived, no projects had been approved. An outline of the program had, however, been published by the Institute, but no projects had been funded.

DeWitt and OCRU had become so suspicious of each other, that it was very difficult to get action on anything that was very new. This was not helped when DeWitt created the separate Science and Technology Division because then everything became temporary. Although Paul Estaver of OCRU became the acting "director" of the new division, he also continued full time in his role as director of the publications unit. Not until the new director arrived did the division actually become independent of OCRU.

Once the new director arrived, he began working with Preszler to assemble projects and get them funded. When DeWitt left office about four months later, projects were rapidly initiated and all of the accumulated funding had been committed by the end of 1993.

Richard Rau, December 18, 1998.

Dr. Rau, a mathematician, has been a program manager since the LEAA days and has handled a broad variety of projects, ranging from social science to technology. His principal interest is the forensic sciences, including DNA. Employed originally as an operations researcher/systems analyst (OR/SA), Dr. Rau tells of two incidents under Gerald Caplan which illustrate his lack of interest and even hostility toward technology. In the first, Caplan threw away a stack of Institute standards publications because he did not believe standards were useful and did not care to see the Institute invest in their development. In the other, he eliminated nearly all the OR/SA positions in the Institute. Since the original idea in the Institute had been that there would be a researcher, a practitioner, and an OR/SA on every team in the Institute, that meant that most of the OR/SAs had to reclassify as social science analysts to keep their jobs. He confirms Mayo's observations that the social science elements of the Institute felt whenever a director would invest funds invested technology projects, they felt it threatened their program.

During most of the time from the earliest days of LEAA until Charles DeWitt and Paul Cascarano had a falling out, Paul Cascarano was the most influential of the career people in the Institute. He had been in the Institute for a very long time, was the Institute's only member of the Senior Executive Service (SES) for most of his tenure, and was both the most senior and the most experienced career employee in the Institute. He jealously guarded the resources and prerogatives of his office, which was responsible for managing the peer review process for the Institute, publications, conferences, focus groups, and special research applications.

Body armor was always touted in Institute publications and appropriations hearings, although in the first few years most people in the Institute believed its success and popularity were only temporary and would fade. When that did not happen, the issue was institutionalized and included in every annual report and in testimony whenever a director had to testify.

The technology programs were always small and could never get much in the way of funding out of the director. Social science programs always won, until the current OST director arrived. Before he came, no technology program manager had ever been allowed to testify before Congress and the budget was always tiny and uncertain. The current director not only has been allowed to testify, but has been requested by name and has testified more often even than the Institute director. Since his arrival, the OST budget has grown dramatically and Rau's forensic programs have become both large and important.

Lester Shubin, December 12, 1998.

Shubin, a chemist, joined the NILECJ not long after its creation, specifically to manage the Institute's technology program, which at the time was invested entirely in the Equipment Systems Improvement Program (ESIP). He quickly decided most of ESIP was a waste of money because the Aerospace Corporation spent most of its time working on pet projects rather than on what law enforcement really needed. Because the Mitre component had not delivered anything useful and had been shut down, Aerospace was left to decide on its own what they would do for law enforcement. As a Defense company, they wound up picking out big projects with big price tags. The handheld radio project was one example that consumed huge amounts of money but produced nothing. Industry produced one before Aerospace could finish their prototype, which was inferior to the new commercial product. So one of his first actions was to shut down the Aerospace program.

The Law Enforcement Standards Laboratory (LESL) in the National Bureau of Standards (NBS), however, was producing good standards and that's what police said they needed. Shubin strengthened this work by creating the Technology Assessment Program Advisory Council (TAPAC), a group of law enforcement professionals, to set priorities for LESL.

For most of his time in the Institute, his program was the "black sheep" of the Institute, and got neither support nor respect. However, after he led the development of soft body armor and it started saving lives and getting positive press, the program became too important to not support. But support generally was limited and grudging. He believes this is because the social scientists wanted the technology money to support their projects and did not like investing money in things which were practical and supported police.

Once the body armor program started taking hits from DuPont and its allies, "Chips" Stewart offered strong support to Shubin and the program. After he left, however, the Institute's leadership turned against the whole program and made him the principal scapegoat, along with a few others. He had offered what he believed was good advice on how to handle the body armor criticisms, but the Institute director would not accept it and shut him out of everything once the criticisms started to fly. He believes Charles B. DeWitt–while the director of the Institute–created most of the problem by shutting off communications with the industry. Nevertheless, he considers body armor his most important contribution and the most successful project he managed.

He had never written down a formal technology development plan or process, but thought the OST director's description of how the body armor program had worked was probably a fair representation.

James K. "Chips" Stewart, January 8, 1999.

Note: references also appear to interviews with Stewart conducted on October 15, 1992 and June 1, 1998. The first refers to one of several interviews the author conducted with selected individuals to better understand his new job. The second refers to an interview conducted to help the author design an improved technology development process for NIJ. Although the author maintains notes of these interview, this summary refers only to the 1999 interview to support the research of which this appendix is part.

Stewart is the longest serving of all the Institute directors, having served for roughly eight years. A Reagan appointee, he had good relations with Attorney General Ed Meese and strongly supported technology programs in the Institute. He was particularly proud of his role in defending the body armor program and in encouraging the development of the DNA and laboratory accreditation programs.

When the Institute first helped bring the first DNA technology to U.S. law enforcement, he encouraged the FBI laboratory to build a DNA capability, but was rebuffed. When the laboratory accreditation program began in earnest, he was successful in encouraging DEA to have its laboratories accredited, but failed with the FBI. John Hicks, the FBI Laboratory director confided to Stewart that he was concerned about how it would look if the laboratory failed. Stewart argued that if the FBI could not pass, nobody could and since several had, surely the FBI would also. He never succeeded, however, in getting the FBI to accredit its laboratory.

Stewart credits Lester Shubin with being the force behind the successful development of body armor, but believes he did not get fair credit for his achievement. Stewart finally was able to get Shubin promoted to GS-15, but he never managed a staff of any kind, except as part of the contracts he managed for LESL and the Technology

Assessment Program Information Center (TAPIC), where the body armor testing program was managed.

Getting the Institute's program managers interested in practical, police-related research was always difficult. Most were interested primarily in behavioral research and had little interest in projects with near term application to police. He did not spend as much on technology as he would have liked because he did not have the budget or the staff to manage major technology programs, and he faced considerable opposition–particularly from the social science community–whenever he tried to put more money into technology. Because he, a former Oakland, California, Chief of Detectives, stressed practical projects, he was sometimes criticized for overemphasizing policing research.

Attorney General Ed Meese was very supportive of the Institute and its work, but the Institute's placement within the Office of Justice Programs often made it difficult to do the things the Institute needed to do. While the Attorney General agreed with the need to preserve the independence and integrity of Institute research, this was not always the case with others within the Department of Justice.

When the body armor controversies became public, many in the Justice Department wanted to get out of the business altogether, but some in Congress wanted to make the Institute a regulatory agency. Stewart opposed both positions. He was concerned that the police would be at risk without someone in an objective role checking the quality of body armor, but was also concerned that if the Institute were to become a regulatory agency the financial demands of the regulatory function would eat up all the research resources.

Robert Tolle, February 11, 1999.

Captain Robert Tolle had been the Director of the Naval Investigative Service until his retirement from the Navy, and had then worked for several years as the executive director of a foundation which funded scientific expeditions. In early 1993, he was hired as a consultant to Aspen Systems Corporation to support the development of a plan to create what became the National Law Enforcement and Corrections Technology Center (NLECTC). After Richard Laymon retired, Tolle was hired to be the new deputy director of OST and served in that capacity until his health forced him to retire again in 1998.

One of the first tasks given him by the OST director was the creation of a budgeting and accounting system because the Institute had no way of tracking its own spending, much less of tracking what OST was doing. The system, which started as a simple spreadsheet, was very robust by the time the Institute director discovered it. At

Jeremy Travis' direction, then, OST supported the extension of the system throughout the Institute.

Since he was primarily responsible for management of the administrative requirements of OST, management of the hiring process, and so on, he also was involved in developing the OST employee's handbook which provided an opportunity to put in writing the OST director's vision, mission and goals for the office. This work was made more critical when OST staff doubled in 1996 and then doubled again in 1997. Although the handbook was provided early to the Institute director, he never offered comments or criticism of anything in it, including the vision, mission and goals.

As the centers were created, one of the challenges was how to integrate the functions of the technology center system with the functions of the research and development programs of the office. The way that was finally done was by assigning each center responsibility for monitoring one or more particular technology focus areas. The centers were then made responsible for monitoring and collecting information on that technology area.

Tolle's greatest frustration in the Institute was what he perceived to be the lack of interest in the technology program, even though all of the Institute's real growth in its base budget from 1992 to 1997 or later was in the technology program. Resources–especially personnel–were lavished on the Office of Research and Evaluation (ORE), even though the technology program was far larger, so that while ORE had about 50 people and less than $20 million of the budget, OST had only 22 people and more than $80 million.

Olga Trujillo, December 12, 1998.

Trujillo was the Justice Department attorney responsible for handling the lawsuit which developed out of the body armor controversy, and then OJP General Counsel from 1993 to 1995. The lawsuit arose because NIJ had discovered a number of retest failures of tests produced by four different body armor manufacturers. NIJ responded by demanding that the industry take actions to remedy the problem and replace the failed armor models that were then in the field. When the industry either refused, failed to respond or was–in NIJ's judgment–too slow in responding, DeWitt directed that a notice be transmitted to all law enforcement agencies over the National Law Enforcement Telecommunications System (NLETS). This notice created a major controversy, but it did get the attention of the industry.

When industry began trying to determine what it had to do, DeWitt shut down communications between the body armor program manager in NIJ and the industry. After about six months, the affected companies gave up trying to find out what they had to do to resolve the problem and one of them–American Body Armor–filed suit in federal

court. After more than a year of very bitter litigation, a settlement was reached in which the plaintiff agreed to do a better job of meeting the NIJ standard and NIJ agreed to treat every member of the industry the same.

By the time the settlement was reached, American Body Armor had filed bankruptcy and NIJ's reputation had been injured. Congress, responding to law enforcement organizations concerned that industry was selling shoddy equipment and by industry concerned that NIJ had overreached its authority, considered several bills to regulate the industry. The Department of Justice moved to quash most of these bills because of concerns that the financial demands of a regulatory program would destroy the Institute's ability to continue its research programs.

Richard Velde, December 3, 1998.

Velde had been a Republican member of the professional staff of the House Judiciary Committee and had played a major role in writing the original Crime Control and Safe Streets Act. When the Law Enforcement Assistance Administration (LEAA) was formed, he was nominated by President Nixon to be a conservative Republican member of the "troika" which, under the law, would run the agency. Since the agency was to be led by members of both parties, Charlie Rogovin was selected as a liberal democrat and for some time only these two slots were filled.

Virtually the day he and Rogovin arrived, they encountered confidential FBI reports on their desks which suggested that 6 or 7 of the 40 people in NILECJ were extremely liberal and "would have been comfortable in . . . the anti-war riots and all that," and supported softer, rehabilitation-based approaches to crime reduction. Velde and Rogovin were concerned that, because both parties in Congress distrusted these approaches to crime control that this might make it very difficult to build credibility for the research program and obtain funding for it.

These reports also caused the LEAA administration itself to doubt the research programs in LEAA, particularly when NILECJ resisted research into what both the LEAA administrators and Congress considered more practical matters. NILECJ, for example, resisted work on technology which was a great interest of his. He strongly believed that technology was terribly important, but was generally unable to get NILECJ to undertake the work so he went around them and funded such work directly.

Conservatives in Congress tended to be very skeptical of everything LEAA did, ever since the days of LEAA's forerunner, the Office of Law Enforcement Assistance (OLEA). One of the first things funded by OLEA were a conference at a resort in Virginia and a project to paint patrol cars in the District of Columbia to make them more visible. Both of these projects were used for years to criticize LEAA and to restrict its

budget. The consequence was the early budget was stuck at $3 million until the block grant programs were created.

LEAA technology research and development programs were generally tiny throughout its history and were not expanded even after NILECJ became NIJ. In fact, NIJ's budget was stuck at about $22 million from the end of LEAA until shortly after OST was formed.

Additional Interviews

Other interviews have also been referenced in the paper, but those conducted before October, 1998, were not conducted using the interview outline at Appendix A. For example, the author interviewed Charles DeWitt on September 22, 1992, in preparation for assuming his new duties as the Director of Science and Technology. Paul Cascarano was interviewed on October 15, 1992 while the author was a newly hired manager in the agency and was trying to understand how technology programs had operated in the past. James Stewart was also interviewed on June 1, 1998 to assist the author in developing a more comprehensive forensic science program.

DAVID G. BOYD

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EMPLOYMENT

DEPUTY DIRECTOR — *1992-PRESENT*
National Institute of Justice — *Washington, DC*
AND DIRECTOR
Office of Science and Technology
U.S. Department of Justice

Appointed in September 1992 as Director of Science and Technology for the National Institute of Justice, and in 1997, also appointed Deputy Director of the Institute itself. Oversee the operations of the single largest law enforcement and corrections technology development activity in the United States. The Office of Science and Technology manages research and development programs in every facet of technology affecting law enforcement and corrections, including the forensic sciences, less than lethal technologies, information and communications technologies, concealed weapons and contraband detection, simulation, and others. The office directs the DNA and forensic laboratory improvement programs, which are designed to strengthen DNA identification and general forensic analysis capabilities in state and local crime laboratories. The office also manages the only voluntary standards development and testing organization for law enforcement and corrections in the United States, and is charged by Congress with the development of proficiency tests for DNA laboratories. Invited by Congress to testify several times on the mission of the office, the office subsequently grew from a 1992 budget of less than $3 million and staff of four to an organization encompassing more than a dozen technology centers and satellites in eleven states, including the regional centers of the National Law Enforcement and Corrections Technology Center system, the Border Research and Technology Center, the Office of Law Enforcement Technology Commercialization, and two counterterrorism institutes. As of fiscal year 2000, the office has a budget of more than $124 million and a federal and contract staff of more than 150. Also serve, at the direction of the Attorney General, on the White House National Science and Technology Council, on the National Security Council Interagency Working Group on Weapons of Mass Destruction, and as the Executive Chair of the Justice Department's Technology Policy Council.

DEPUTY DIRECTOR, SCIENCE AND ENGINEERING — *1991-1992*
U.S. Army Operational Test and Evaluation Command — *Alexandria, VA*

Responsible for providing technical assistance to the Director and functioning as his alter ego. Directly responsible for assisting in the formulation of Directorate priorities, workload and budget planning, direction of the development and employment of new disciplines and methodologies, and coordination of all civilian recruitment activities. Served as the senior operations research/systems analysis and modeling/simulation advisor to the director, coordinated the reorganization and relocation of the Directorate, approved test methodologies, and managed all personnel training. Managed the Directorates' quality control efforts by reviewing and drafting major technical and methodological documents produced by divisions within the Directorate and those submitted to the Directorate for review by outside agencies. Designed and directed the implementation of a local area network based personnel accounting system subsequently adopted for use by the entire Command, worldwide. As part of an effort to reduce test and evaluation costs, directed the application to operational testing of SIMNET, a high-tech, networked, real-time ground and air equipment simulator.

CHIEF, CONFLICT RESOLUTION CELL, POLITICO-MILITARY ASSESSMENT DIVISION AND OPERATIONS RESEARCH DELEGATE TO THE U.S./SOVIET STAFF TALKS — *1988-1991*
J-8, Office of the Chairman of the Joint Chiefs of Staff — *The Pentagon*

Responsible for conceiving, designing and supervising the development and application of automated quantitative models in support of interagency politico-military games and seminars conducted under the sponsorship of the Chairman, Joint Chiefs of Staff. The most notable of these was a series of high-level politico-military assessment and seminar games in which teams of military officials, former U.S. ambassadors, intelligence analysts, and academicians helped develop execution strategies and policy recommendations for the Gulf War. Cited by the Chairman of the Joint Chiefs of Staff, for providing "superlative guidance . . . essential to the successful execution of a series of politico-military assessments which led to the adoption of execution strategies and policy recommendations by the Central Command and the Department of Defense." Directed the design, development, foreign military sales and transfer to a computer combat and logistics simulation adopted for use throughout major headquarters and analytical centers of the US military, the North Atlantic Treaty Organization (NATO), Canadian, British, French, and Australian military establishments. Managed the development of the Department of Defense's first comprehensive, computer-based nation building simulation systems, successfully

demonstrated as a counter-drug analysis aid for Central and South America. Led the team which developed an innovative methodology for the integration of operations research technologies to authoritatively rank and identify key regional threats to U.S. interests.

PROGRAM ANALYST, AUTOMATION ARCHITECTURE
CENTRAL ARMY GROUP HQ LIAISON TO ALLIED FORCES
CENTRAL EUROPE HEADQUARTERS — *1985-1988*
Headquarters, U.S. Army Europe — *Heidelberg, Germany*

Responsible for developing the program plans for the automation architecture for U.S. Army Europe (USAREUR), which resulted in the development of a comprehensive USAREUR automation master plan.

CHIEF, TECHNICAL SUPPORT OFFICE — *1982-1984*
Headquarters, U.S. Army Recruiting Command — *Ft. Sheridan, IL*

Responsible for the management of all directorate automation systems used to support analysis and planning. Cited by the Secretary of the Army for developing innovative analytical approaches to data management that saved the government significant costs.

COMMANDER, STAFF OFFICER — *1969-1982*
U.S. Army

Served in command and staff positions from platoon to brigade, in peace and in war.

EDUCATION

PH.D. — *1999*
WALDEN UNIVERSITY — *MINNEAPOLIS, MN*

MA — *1978*
UNIVERSITY OF ILLINOIS AT CHICAGO CIRCLE — *CHICAGO, IL*

MBA — *1974*
GOLDEN GATE UNIVERSITY — *SAN FRANCISCO, CA*

BA — *1969*
UNIVERSITY OF ILLINOIS — *CHAMPAIGN, IL*

SELECTED APPOINTMENTS AND HONORS

CHAIR, GORDON RESEARCH CONFERENCE, ILLICIT SUBSTANCE DETECTION *1998*

WHITE HOUSE NATIONAL SCIENCE AND TECHNOLOGY COUNCIL *1997-PRESENT*

NATIONAL SECURITY COUNCIL WORKING GROUP ON WEAPONS OF MASS DESTRUCTION PREPAREDNESS *1998-PRESENT*

ATTORNEY GENERAL'S STRATEGIC COMMITTEE ON THE FUTURE OF LAW ENFORCEMENT *1999-PRESENT*

EXECUTIVE CHAIR, TECHNOLOGY POLICY COUNCIL, U.S. DEPARTMENT OF JUSTICE *1996-PRESENT*

ASSISTANT ATTORNEY GENERAL'S AWARD FOR OUTSTANDING PERFORMANCE *1994*

EDITOR, *EUROPEAN RESOURCE MANAGEMENT JOURNAL* *1987-1988*

CHAIRMAN, TECHNOLOGY COMMITTEE, AMERICAN CORRECTIONS ASSOCIATION *1998-PRESENT*

EDITOR, *TACT*, ACGL, DIE VEREINIGTEN GROSSLOGEN VON DEUTSCHLAND *1986-1987*

MILITARY AWARDS INCLUDE THE BRONZE STAR, PURPLE HEART, DEFENSE MERITORIOUS SERVICE MEDAL, JOINT STAFF BADGE

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