Acquisition Program Baseline
for
FAA Telecommunications Infrastructure

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JRC ~90 days after contract award to rebaseline and add options for additional services (PBX, LORCL, FAATSAT, etc.) as required.
7/13/99

Acquisition Program Baseline

FAA Telecommunications Infrastructure

Investment Decision for Acquisition

July 13, 1999

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1.0 Overview

The Federal Aviation Administration (FAA) Telecommunications Infrastructure (FTI) Mission Need Statement 322 (MNS 322), approved May 6, 1998, identified the need to replace most existing FAA leased and owned telecommunications assets. The systems included in MNS 322 must be replaced between Fiscal Years 2002 and 2010, as a result of lease expirations or end of service life.

The objective of the FTI Program is to provide the FAA with commercial services capable of meeting the present and future needs of programs requiring interfacility telecommunications. The proposed telecommunications service environment will be designed to use modern, highly reliable, consolidated network infrastructure, effectively incorporating multi-service and multi-media capabilities at the lowest possible cost. New and upgraded services will be added as communications technology and FAA needs evolve.

1.1 Description of Solution

The solution, an Integrated Interfacility Services Network (IISN), addresses all MNS-322 concerns in the context of the NAS telecommunications architecture. The core of the IISN approach is a comprehensive, performance-based, telecommunications service contract that will provide Service Delivery Point (SDP)-to-SDP telecommunications service for voice, data, and video for operational and mission support traffic. This contract, in addition to providing for LINCS replacement, will obviate the need for continued reliance on FAA owned multiplexing and switching networks and will assist the FAA in reducing the resources associated with the management and support of multiple networks.

The distinguishing feature of the IISN is its fidelity to the telecommunications architecture articulated in NAS Architecture Version 4. The IISN consolidates transmission, multiplexing, and switching systems for operational and mission support telecommunications into one integrated network. Figure 1.1 provides a functional block diagram of the IISN.

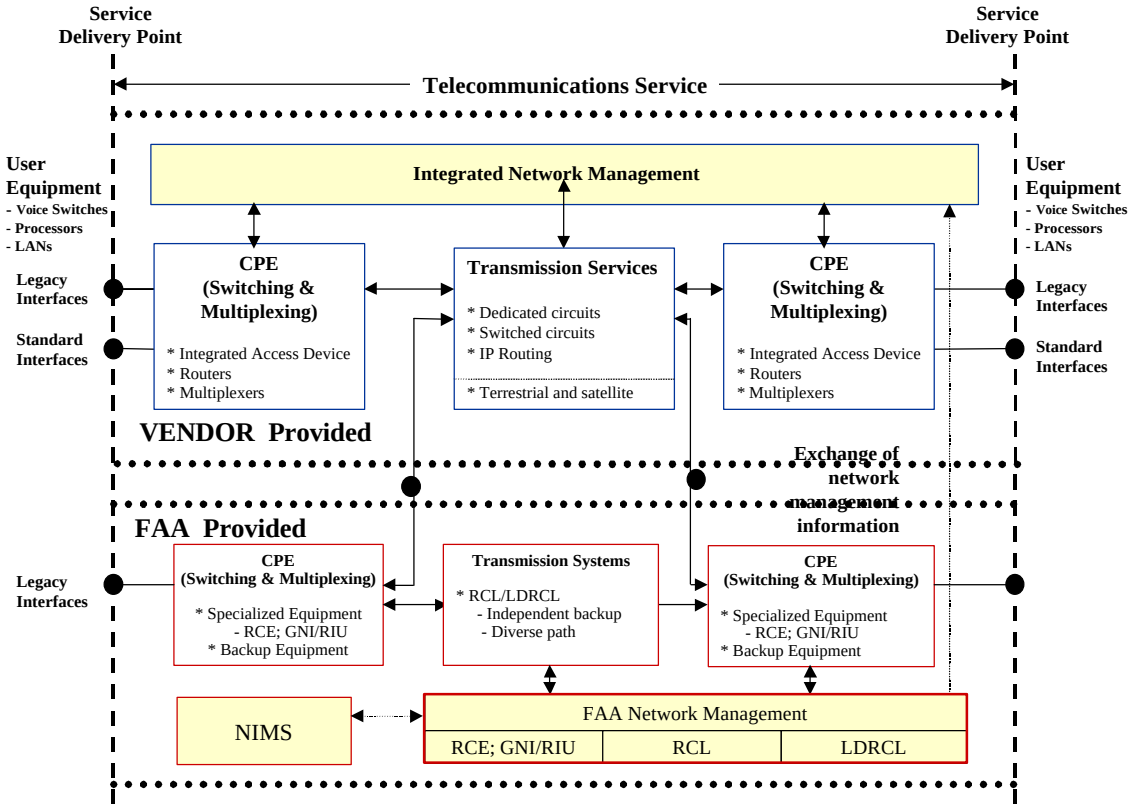

Figure 1.1 IISN Architecture

IISN Features

The IISN alternative is characterized by the following features:

Interfaces at Service Delivery Points

The IISN will provide legacy interfaces and a full range of industry standard interfaces.

Customer Premise Equipment (CPE) for Switching and Multiplexing

FAA-provided:

- All FAA-owned CPE listed in MNS-322 will be phased out. Present plans call for the FAA to deploy new CPE related to the Next Generation Air-to-Ground Communication System (NEXCOM), namely the Ground Network Interface (GNI) and the Radio Interface Unit (RIU).

Vendor-provided:

- In support of required services, the vendor is expected to provide a suite of equipment that consists of an Integrated Access Device (IAD), routers, multiplexers, and other required elements of the facility infrastructure.

Transmission

FAA provided:

- Radio communications Link (RCL) provides Air Route Traffic Control Center (ARTCC)-to-ARTCC backup connectivity.
- RCL and Low-density Radio Communications Link (LDRCL) provide alternate connectivity to remote sites.

Vendor-provided:

- Vendor-provided services include a range of transmission services (e.g., dedicated connectivity, switched connectivity, and IP routing) and a range of multiplexing and switching services (e.g., subrate multiplexing and X.25 packet switching). These services will be used to meet user requirements in the most cost-effective way. Users that require dedicated connectivity will receive it. Over time, these users will be able to migrate to typically less expensive bandwidth-on-demand services if and when their interfaces or operational requirements change.
- FAA Telecommunications Satellite (FAATSAT) service provides primary and secondary connectivity to some sites, at least until 2006.

Integration of Operational and Mission Support Traffic

Operational and Mission Support networks will be integrated to the extent consistent with security requirements.

International Civil Aviation Organization (ICAO) Message Switching

- NADIN MSN provides ICAO-compliant message switching service. It will be accessible through the FTI X.25 service.

Network Management

- The FTI service provider will be responsible for managing and controlling the IISN. The vendor will provide a single point of responsibility to the FAA. The vendor will provide standards-based, real-time and non-real-time management information on the IISN to the NAS Infrastructure Management System (NIMS) and other FAA-designated systems.
- Legacy FAA transmission assets, such as the RCL and the LDRCL, while not part of FTI initially may be leveraged to satisfy requirements on a case-by-case basis.
- Remote maintenance monitoring (RMM) capabilities will be used to integrate the management data from the IISN; legacy telecommunications systems, to the extent practicable, and end-user systems to provide end-to-end service management.

The IISN business practices are characterized by the following responsibilities:
FAA responsibility:

- Real-time and non-real-time oversight of vendor-provided SDP-to-SDP service. This includes review of performance metrics related to service quality, technical performance, network

- and LDRCL.

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- contractual requirements are met.

1.2 IISN Transition Strategy

The following major activities will provide the transtion from the present telecommunications architecture to the IISN:

Transition from LINCS to a LINCS replacement network (2000 to 2005). This includes

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- 2005). Those circuits for which both endpoints are located in facilities that will be visited by LINCS transition teams will be cut over to the LINCS replacement network.

Transition from Bandwidth Manager provided multiplexing service to FTI service (2002 to

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The transtion strategy and program milestones recognize that certain critical milestones must be met. These include LINCS and ADTN-2000 transition. Risk will be mitigated by focusing on

that optimizes the transition schedule and reduces over-all cost (See Figure 1.2).

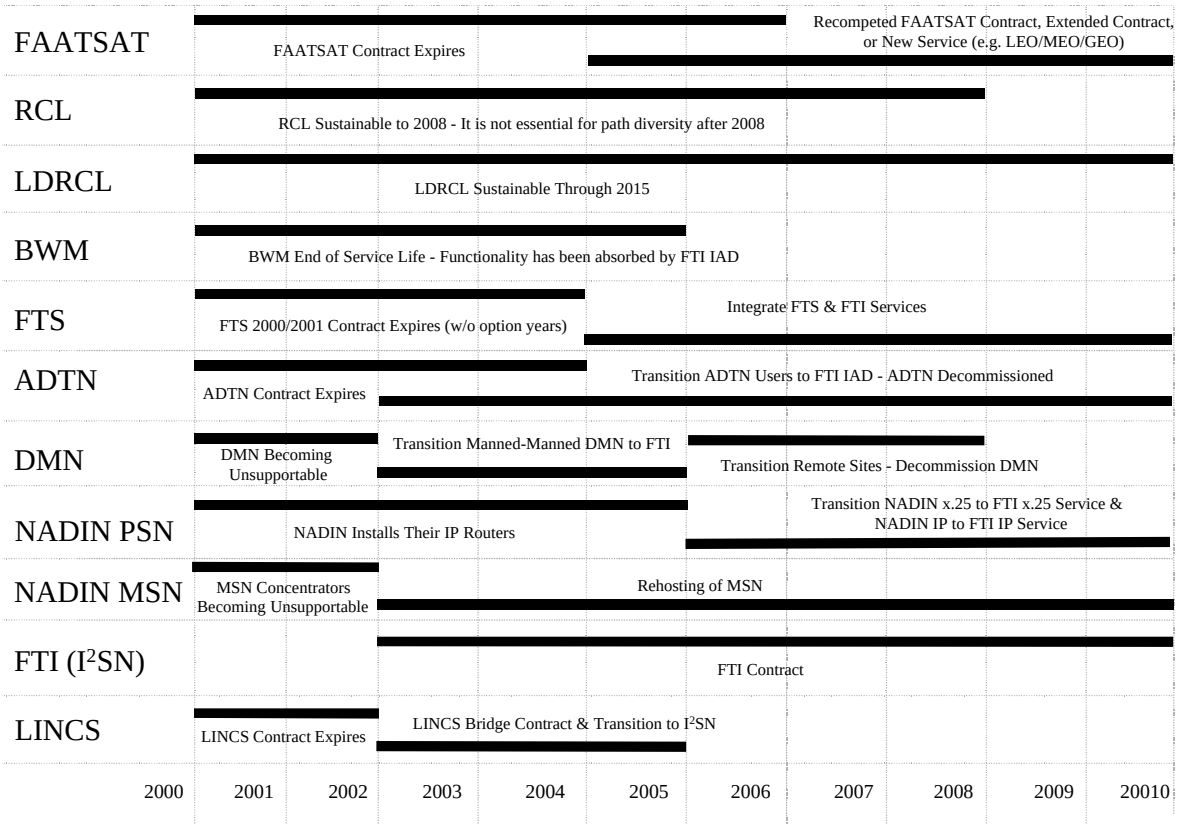

Figure 1.2 IISN Timeline

1.3 Relationship of FTI to NAS Architecture 4.0

The services that FTI provides will support the implementation of the programs and capabilities defined in the NAS Architecture 4.0 and the Telecommunications Strategic Plan.

Specifically, the NAS Architecture and the Telecommunications Strategic Plan call for the consolidation of current networks into a common network infrastructure that integrates mission support and operational communications systems for the interfacility transmission of voice, data, and video signals. FTI will support this integration within the limits imposed by security considerations. The NAS Architecture calls for migration to an all-digital telecommunications infrastructure to take advantage of new technology and the growing number of digital service providers. Numerous telecommunications-related interdependencies are defined in the NAS Architecture. These interdependencies define schedules and capabilities that must be supported as new programs that will rely on advanced transmission and switching capabilities and higher throughput capacities become operational. The FTI schedule and planned capabilities support these programmatic interdependencies.

2.0 Cost Baseline

The Life Cycle Cost (LCC) Summary shown in Figure 2.1 provides the cost baseline for both the Facilities and Equipment (F&E) and Operations and Maintenance (O&M) accounts, as defined in the FTI Investment Analysis Report. Funding for FY-00 and FY-01 is provided in the current FAA Budget. The SEOAT has reviewed the funding shown for FY-02 through FY-10 and determined that it is affordable. The affordability assessment was based on year-by-year F&E costs (see Table 2.1).

Notes Associated with Cost Table:
1: Assumes final contract award in December 2000.
2: Affordability assessment is based on year-by-year F&E costs.
3: Subtotals and Grand Total may not sum, due to statistical variance and other factors in the Economic Analysis process.

Figure 2.1 FTI Funding Profile

(all costs in $ millions)			Year-by-Year Cost Breakdown *(in Then-Year Dollars)*										
Cost Element / Approp. Fund			**FY00**	**FY01**	**FY02**	**FY03**	**FY04**	**FY05**	**FY06**	**FY07**	**FY08**	**FY09**	**FY10**
Program Management & Engineering													
	F&E Costs		$1.0		$0.0		$0.0		$0.0		$0.0		$0.0
		$352.0		$36.1		$37.4		$32.6		$27.4		$27.7	
	Subtotal		$0.0		$0.0		$0.0		$0.0		$0.0		$0.0
	F&E Costs		$6.3		$23.9		$30.6		$1.3		$1.3		$1.4
		$0.0		$0.0		$0.0		$0.0		$0.0		$0.0	
	Subtotal	$132.0	$6.3	$26.2	$23.9	$28.6	$30.6	$9.4	$1.3	$1.3	$1.3	$1.3	$1.4
Implementation & Transition													
	F&E Costs		$1.0	$1.2		$6.7	$7.5		$0.1	$0.1		$0.1	$0.1
		$4.1	$0.6		$0.2	$0.0		$0.0	$0.0		$0.0	$0.0	
	Subtotal	$25.6		$1.8	$3.6		$7.5	$3.9		$0.1	$0.1		$0.1
In-Service Operations & Maintenance													
		$0.0	$0.0		$0.0	$0.0		$0.0	$0.0		$0.0	$0.0	
	O&M Costs	$1,355.0		$138.8	$154.4		$124.2	$113.1		$102.0	$107.2		$118.0
	Subtotal		$138.4	$138.8		$143.3	$124.2		$104.0	$102.0		$111.8	$118.0
	F&E Costs	$8.5		$0.0	$1.2		$1.8	$1.8		$0.4	$0.3		$0.0
	O&M Costs		$0.0	$0.0		$1.2	$1.1		$1.2	$1.2		$0.0	$0.0
		$14.4	$0.0		$1.2	$3.1		$3.0	$2.0		$0.3	$0.0	
Combined Totals													
	F&E Costs		$6.1	$29.2		$51.5	$52.2		$1.1	$0.7		$0.2	$0.2
		$1,725.7	$176.2		$193.4	$183.7		$148.3	$134.8		$136.5	$140.8	
	Grand Total	$1,947.6		$206.4	$232.1		$214.2	$173.4		$133.0	$137.1		$147.9

3.0 Schedule Baseline

The FTI schedule baseline shown in Figure 3.1 includes the essential acquisition and implementation events that will be monitored by the JRC.

Figure 3.1 Schedule Baseline (Program Milestones)

Event	Event Completion Date	Criteria for Completion
Integrated Program Plan Approved	August 19, 1999	Signed by Integrated Management Team Co-leads
Phase 1 SIR Release	October 30, 1999	Contracting Officer release of the SIR
Phase 2 SIR Release	March 15, 2000	Contracting Officer release of the SIR
Contract Award	December 1, 2000	Contracting Officer Signature
Post Award Program Rebaseline (See Notes)	Award plus 90 days	JRC approval of revised baseline
Security Risk Management Plan Approved	December 1, 2001	FAA acceptance of plan.
In-Service Decision	July 3, 2002	Approval of In-service Review
Services Start Date	July 8, 2002	First circuit cutover accepted by the FAA
LINCS Replacement Complete	September 2, 2005	Cutover of the last LINCS circuit.
ADTN Replacement Completed	December 31, 2005	Cutover of the last ADTN Circuit
NADIN X.25 Network Transitioned to FTI	December 31 2008	Transition of the final NADIN PSN customer to FTI

Note: 1 The cost estimates developed by the Investment Analysis Team do not assume a LINCS incumbent advantage. In addition, bidders have flexibility in proposing a transition schedule as long as high-level program milestones are met. F&E funding levels and profiles will be impacted by the award and the winner's proposed approach. Therefore, the schedule recognizes the need to rebaseline cost and schedule elements after the award.

Note 2: During the period of performance of the contract, in accordance with AMS, the program office will track and report Execution Level Metrics addressing each element of the program baseline as defined in this document.

4.0 Benefits Baseline

The benefits associated with FTI are primarily in the areas of cost avoidance. FTI, through the employment of improved technology and more efficient business practices, will reduce the unit cost of telecommunications service substantially. The total then year value for life cycle cost savings, as identified in the economic analysis, is $609,000,000.

Table 4.1 FTI Benefits Baseline

	LCC Total Benefits	FY00	FY01	FY02	FY03	FY04	FY05	FY06	FY07	FY08	FY09	FY10
Benefits Stream (Budget $M) High-Conf.	**$609**	**-$3**	**-$24**	**-$35**	**-$15**	**$20**	**$62**	**$112**	**$113**	**$119**	**$127**	**$134**

In addition to the substantial cost benefits that will accrue over the life of the program, FTI will prove beneficial in the following areas that are vital to the operation and health of the NAS and

4.1 Improved Operations Management

The IISN will enhance FAA operations and NAS service management with the following features:

- positive control and management of SDP-to-SDP telecommunications service
- Integrated management of switching, multiplexing, routing, and transport services and of operational and mission support networks
- Integrated management and delivery of voice, data, and video services. It will generate a comprehensive picture of the overall telecommunications systems and services status as a natural by-product of its unified, comprehensive, and standards-based network management and control system. Consequently, it can provide real-time health and status information on all NAS systems, and their associated telecommunications links. Further, command and control capabilities inherent in the network management and control system will give the FAA the means to reroute information and maintain continuous service, even if major telecommunications links are interrupted.

4.2 Improved Network Performance

Under the IISN, integrating and consolidating operational and mission support networks and providing an integrated telecommunications management capability will improve interoperability, reliability, survivability, service levels, and security, while reducing the unit cost of the telecommunications services that the FAA receives. Most user telecommunications service requirements will be met by sharing bandwidth within the network, rather than provisioning dedicated point-to-point circuits for individual applications. Eliminating full-period dedicated bandwidth and replacing it with a bandwidth allocation system for on-demand service will provide major cost savings and allow enhanced control of network service. Additionally, the ability under FTI for automated service provisioning, with creation or deletion of services under software

control, will speed service provisioning performance while allowing reduced numbers of service support personnel.

4.3 NAS Modernization Facilitation

The IISN will support NAS modernization objectives by integrating operational, mission support systems and multiple transmissions systems and by consolidating multiplexing and data switching functions in an integrated telecommunications service infrastructure.

4.4 Enhanced Information Assurance

The IISN provides the integrated analytical perspective necessary to detect and defend against sophisticated attacks through the integration and consolidation of telecommunications services and resources. It has the potential to provide true end-to-end protection in a distributed, interconnected information system environment.

5.0 Performance Baseline

The FTI Final Requirements Document (FRD) is provided in Appendix A. The FRD defines the full scope of performance, functional, and support requirements necessary to ensure operational effectiveness over the life of the FTI Program. A subset of defined requirements within the FRD has been designated as "Key Parameters." The following Key Parameters, extracted from the FRD, are designated for program office reporting and control by the Joint Resource Council.

Where multiple performance values are specified in the FRD, FTI shall provide services meeting each specified value. The required performance for a specific connectivity will be specified during the engineering and service provisioning process in accordance with validated user requirements.

Transmission Services
FTI shall provide an integrated voice, data and video network.

Note: This may include terrestrial, microwave and satellite links.

Bandwidth Management n Services
FTI shall provide capabilities that support bandwidth management.

Multiplexing
FTI shall provide a means of consolidating low speed transmission rates into high-speed transmission rates.

Aeronautical Telecommunications Network Access
FTI shall be accessible from the Aeronautical Telecommunications Network (ATN) network and interoperable with existing services and systems that have implemented in accordance with ICAO 9705-AN/956, *Manual of Technical Provisions for the Aeronautical Telecommunication Network.*

Note: Special security features will be provided for this interface as described in section 7.6.9 of this document.

Performance Goals
FTI shall be consistent with the performance goals stated in NAS-SR-1000; *FAA NAS System Requirements Document* and FAA Order *6000.36 Communications Diversity,* for NAS services and Table 3.1.

Table 3.1 – NAS SERVICES PERFORMANCE GOALS

NAS SERVICES PERFORMANCE GOALS			
NAS Service Category	**Minimum Availability**	**Maximum Restoration Times**	**Minimum Time Between Outages**
Critical	.99999	6 seconds	One week
Essential	.999	10 minutes	One week
Routine	.99	1.68 hours	One week

Note: The FTI goals will be applicable between SDPs.

Performance Parameters

The FTI shall provide end-to-end service performance as described in Table 3.2, FTI Performance Parameters.

Note: The following table identifies the maximum value ranges for the known service parameters. The service value used will depend on the end user requirement. Call set-up and tear down do not apply to permanent (non-switched) services.

Table 3.2 – FTI Performance Parameters

PARAMETER	SERVICES		
	Voice	**Data**	**Video**
Call set-up[1]	150ms – 15 seconds	2 - 30 seconds	2 - 30 seconds
Call tear-down[2]	150ms – 15 seconds	2 - 30 seconds	2 - 30 seconds
Latency[3]	50 - 750 ms	50 - 750 ms	50 - 750 ms

1. Call set-up time is defined as the overall length of time required to establish a switched call between end users.
2. Tear down time is defined as the overall length of time required to tear down or clear a switched call between end users.
3. Latency is defined as the sum of queuing, servicing and propagation time from SDP to SDP.

Logical Separation of Telecommunications

FTI shall provide logical separation between administrative and operational telecommunications.

Administrative traffic will be merged with operational traffic when cost effective and only when all traffic can be protected and logically separated.

Information Security

FTI shall mitigate the Information Security Risk of any compromised, corruption or interruption of service caused by intentional and unintentional threats.

Appendix A
FTI Final Requirements Document