



2010 DTIC CONFERENCE
March 22-24, 2010

Celebrating 65 Years of Providing Access to Defense Information

Arnold Engineering Development Center (AEDC): DTIC's Counterpart from World War II and Today's Provider of Test & Evaluation Information

24 March 2010

Ms. Wendy Hill, Moderator



Arnold Engineering Development Center

DoD Field Activity Since 2004 DoD Field Activity Since 2004 DoD Field Activity Since 2004 DoD Field Activity Since 2004 DoD Field Activity Since 2004

Ms. Theresa J. “Jeannie” Bowden

Facility Security Officer

AEDC

Arnold AFB, TN

Celebrating 65 Years

Arnold Engineering Development Center

Defense Technical Information Center



Dr. Theodore von Karman

1945-2010



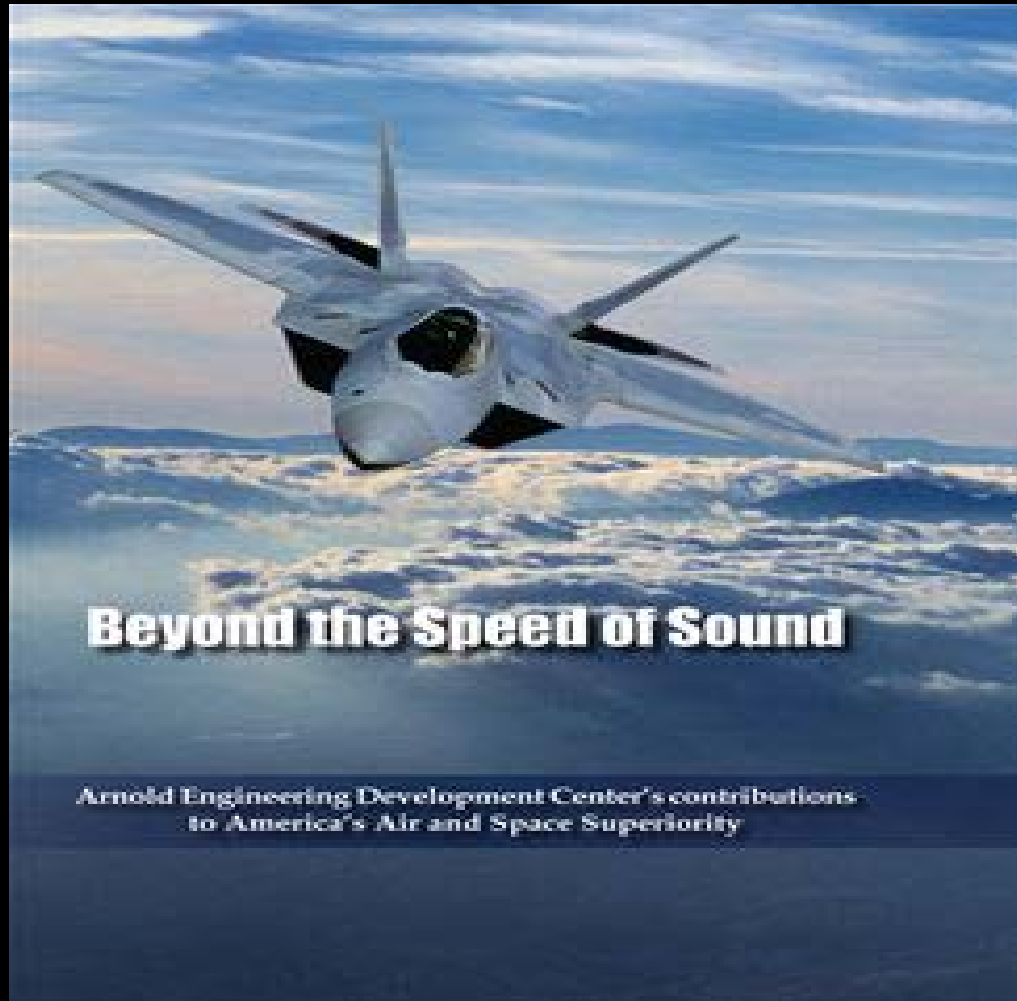
Gen. H. H. (Hap) Arnold

“Never again will the United States ride the coattails of other countries in the progress and development of the aeronautical art”



Arnold Engineering Development Center (AEDC) WWII Counterpart to DTIC for Test & Evaluation Information

*Jeannie Bowden, Security Officer
Aerospace Testing Alliance (ATA) 2003 - Present*



*Arnold Engineering Development Center (AEDC)
Arnold Air Force Base, TN*



World War II American-Built Allied Air Power 1939-1945



Great Britain:

First nation in history to retain its freedom and independence through the use of **air power**, forever ending the aura of Nazi invulnerability and military superiority

The first RAF airplane to engage in aerial combat with the *Luftwaffe* was an **American-built** Lockheed Hudson maritime patrol airplane

France:

A French-piloted **American-built** Curtiss Hawk 75 scored France's first aerial victory

Finland:

Within a year of the aerial victory of France, **American-built** fighters sold to the Finnish government, would clash over Finland with Russian opponents

World War II 1939-1945



WW I 1914-1918



Global conflict – most widespread war in history

>100 million military personnel mobilized

Erased distinction between civilian and military resources – countries placed their entire economic, industrial and scientific capabilities at the service of the war effort

>70 million people, mostly civilians, were killed – deadliest conflict in human history

When Japan continued to reject terms for unconditional surrender of all Japanese forces in July 1945, the United States dropped atomic bombs on the Japanese cities of Hiroshima and Nagasaki. Japan surrendered on 15 Aug 1945; signed surrender documents aboard deck of American battleship USS Missouri on 2 Sep 1945, ending WW II



World War II Allied Nations 1939-1945

Allies of World War II: the countries that opposed the Axis powers and became involved in WW II either because they had already been invaded, or were directly threatened with invasion by the Axis, or because they were concerned that the Axis powers would come to control the world:



Wartime poster for the United Nations, created in 1942 showing the 26 members of the alliance.

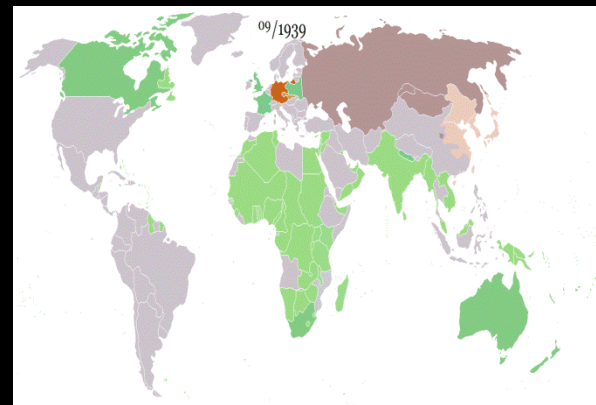
- * **United States of America**
- * **United Kingdom**
- * **Union of Soviet Socialist Republics**
- France (before defeat in 1940 and after Operation Overlord in 1944)
- China
- Australia
- Belgium
- Netherlands
- Norway
- Poland
- Yugoslavia
- Brazil
- Canada
- Czechoslovakia
- Greece
- India
- Mexico
- New Zealand
- Philippine Commonwealth
- Union of South Africa
- Ethiopia

**After 1941 "The Big Three" held leadership of the allied powers*





World War II Axis Powers 1939-1945



Axis powers/nations/countries of World War II - the countries that were opposed to the Allies in WW II :

* **Germany**

* **Italy**

* **Japan**

Romania

Hungary

Bulgaria

**Three major Axis powers were part of a military alliance on the signing of the Tripartite Pact in September 1940; they ruled empires that dominated large parts of Europe, Africa, East and Southeast Asia and the Pacific Ocean*

**World War II ended with their total defeat and dissolution*



World War II 1939-1945

War started when Nazi Germany invaded Poland

Two days later, Britain and France declared war on Germany

Sixteen days later, Soviet Union invaded Poland

Soviet Union invaded Finland upon rejecting Soviet territorial demands

Germany invaded Denmark and Norway

Germany invaded France, Belgium, Netherlands and Luxembourg

Italy invaded/declared war on France and United Kingdom

France was neutralized so Germany began an air superiority campaign over Britain,
which failed

Italy began a siege of British-held lands





World War II 1939-1945



Ethiopia and Italy were already at war

China and Japan were already at war

United States, British Commonwealth and the Netherlands declared war on Japan as a result of Japanese attacks on Pearl Harbor and British Colonies

Hungary, Slovakia and Romania invaded USSR

Italy invaded Greece

Germans invaded Greece

Empire of Japan attacked British, Americans, Southeast Asia and the Central Pacific; therefore, United States, United Kingdom, Australia, other Western Allies, and China formally declared war on Japan; therefore, Germany declared war on the United States

The war ended in a victory for the Allies

Soviet Union and United States emerged as world's two superpowers, setting the stage for the Cold War, which lasted for the next 46 years

United Nations was formed in the hopes of preventing another world conflict





WW II and Gen Hap Arnold 1941-1945



1941 – when Gen Arnold witnessed British/Frank Whittle’s turbojet in test flights, he immediately ordered the concept brought to the U.S. for further development

1943 – U.S. troops sent captured German and Japanese aircraft to Wright Field for assessment

1944 – Gen Arnold directed that items of captured enemy equipment be collected methodically so technical experts could study the equipment

1944 – Gen Arnold requested Dr von Karman investigate possibilities and desires for postwar and future war’s development for the Army Air Forces

1945 – Wright Field established a formal committee to prepare plans for an Air Engineering Development Center

Celebrating 65 Years

Arnold Engineering Development Center



Defense Technical Information Center



Letter from Gen Hap Arnold dated 7 Nov 1944

Letter from Dr. von Karman dated 15 Dec 1945

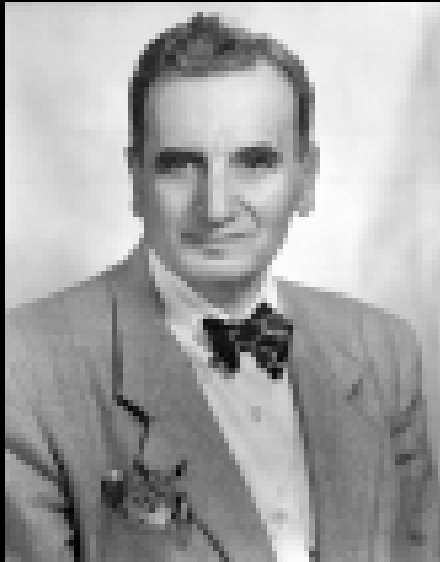
Subject: Army Air Forces Long Range Development Program

Gen Arnold: I believe the security of the United States of America will continue to rest in part in developments instituted by our educational and professional scientists. May I ask that your final report include recommendations dealing with cooperation between science, industry, and the Air Forces. While our scientists do not necessarily have the questionable advantage of basic military training, conversely our AAF officers cannot by necessity be professional scientists.

Dr. von Karman: You directed me to prepare a report as a guide for recommended future Army Air Forces research and development progress. **Development centers should be established** for new types of equipment and for making novel methods suggested by scientific discoveries practical. Such development centers for definite tasks are more efficient than separate laboratories for certain branches of science. The first requirement for successful scientific collaboration is an efficient method of making the material contained in the archives of the Air Forces and other military bodies accessible to those scientific workers who are cleared for classified information and whose cooperation is desired. The lack of such an organized library service has in the past been one of the great impediments to scientific work. The Air Documents Division, established recently at Wright Field, may be the nucleus for the development of an efficient library and information service.

Celebrating 65 Years

Arnold Engineering Development Center



Dr. Theodore von Karman



...charted a long-range aerospace research and development program for the nation, and led to the creation of what would become Arnold Engineering Development Center. Gen Hap Arnold asked Dr. von Karman to study Germany's rapid development of advanced jet aircraft and other systems which almost allowed their then-Nazi-dominated nation to win World War II



Gen. H. H. (Hap) Arnold

15 Dec 1945

“Toward New Horizons”

Written at Request of Gen. Henry H. “Hap” Arnold
by Theodore von Karman & AAF Scientific Advisory Group

“In 1944, the AAF farmed out its research and testing to other agencies, which Gen Arnold found untenable because he wanted the AAF to maintain control over the aircraft development process”



WW II and AEDC 1945-1946



1945 – Western Allies and Soviet Union competed for German equipment and for German engineers who had built and run German research and test facilities

Mar 1946 – BrigGen Hodes, Asst Chief of Staff, authorized AAF to proceed with further planning and to coordinate with other government agencies regarding new aeronautical facilities in the U.S.

Jun 1946 – AAF contracted with civilian engineering firm, **Sverdrup and Parcel, Inc., St. Louis, MO**, to conduct a survey, study utility and cost requirements, and recommend a location for Air Engineering Development Center (AEDC) and National Advisory Committee for Aeronautics (NACA) facilities – report issued **Nov 1946**

*One of the government's early decisions concerning the center was to employ a primarily contractor work force. The Arnold Research Organization known as ARO was formed by **Sverdrup and Parcel** to become that contractor work force. Part of the rationale was to maintain a stable work force that came to accumulate a volume of experience with the test facilities that were to be built. That idea would make the center a model for outsourcing for the Department of Defense by the 1990s.*



Jack Sverdrup (right)



AEDC and Contractor Workforce 1940s - Present



By **1940s** Sverdrup & Parcel was one of the best bridge firms in the country

Worked with the Corps of Engineers in the Pacific theater during World War II

Company president, Jack Sverdrup, had accepted a commission in the Corps of Engineers and ended the war as major general in command of all engineering forces in the southwest Pacific and adviser to General Douglas MacArthur

Sverdrup had refused President Harry Truman's request to become Secretary of Defense

Scope of work was so great, the company had to reorganize, and it was incorporated for the first time in 1946

As the **1950s** began, Congress decided to privatize AEDC; Sverdrup and Parcel established a separate subsidiary organization called ARO (Arnold Research Organization) to operate AEDC

Sverdrup & Parcel was succeeded by Sverdrup Civil, which in **1999** was part of the merger between Sverdrup and **Jacobs Engineering**





WW II and AEDC 1947-1951



1947 development of proposed national program of Transonic and Supersonic Wind Tunnels at Air Engineering Development Center

1949 passage of Public Law 81-415 – authorized construction of testing facilities suitable for research, development and evaluation in the field of transonic and supersonic aeronautics

Title I, Unitary Wind Tunnel Act of 1949

Title II, Air Engineering Development Center Act of 1949

1950 – development of needs for: **AEDC** (a) propulsion wind tunnels, (b) High Altitude Engine Test Facility (formerly BMW), (c) Gas Dynamics Facility (later renamed Von Karman Facility), and **NACA** transonic and supersonic wind tunnels

June 1951 - technical and political battles among nations and U.S. government agencies regarding the character and site of AEDC were significant enough to bring the President of the United States for AEDC's dedication



AEDC Today 2010



Arnold Engineering Development Center is the world's largest and most complex collection of flight simulation test facilities

The **4,000 acres** that comprise the industrial area of AEDC are part of the 40,000 acres of Arnold Air Force Base

Dedicated June 25, 1951, by President Harry Truman, AEDC has tested virtually every high performance aerospace system the Dept of Defense has used since

AEDC supports the development of aerospace systems through its major testing facilities broken into three business areas:

Aerodynamics (Flight Systems)
Aeropropulsion (Turbines)
Space & Missiles

Arnold Engineering Development Center



AEDC 1948

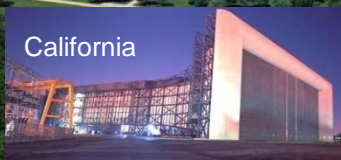


AEDC 2010

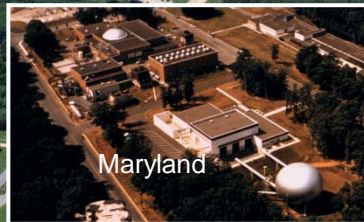


Tennessee

California



Maryland



President Harry S. Truman
AEDC Dedication Speech
Warehouse Loading Dock
25 June 1951



Before the War.....
(WW II)

Prior to AEDC – Camp Peay



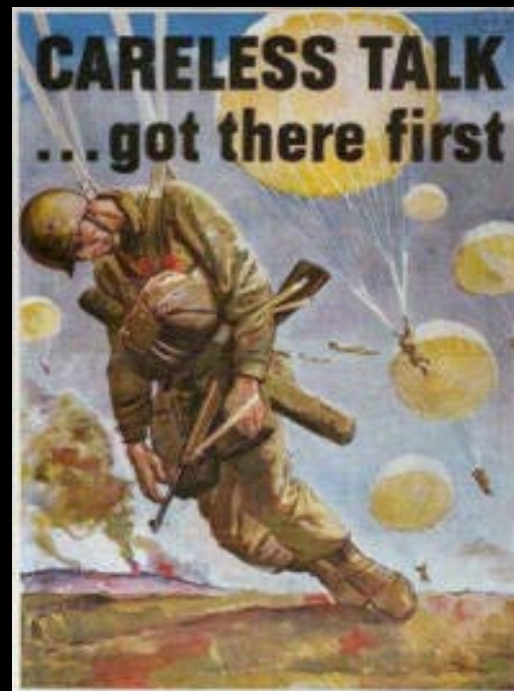
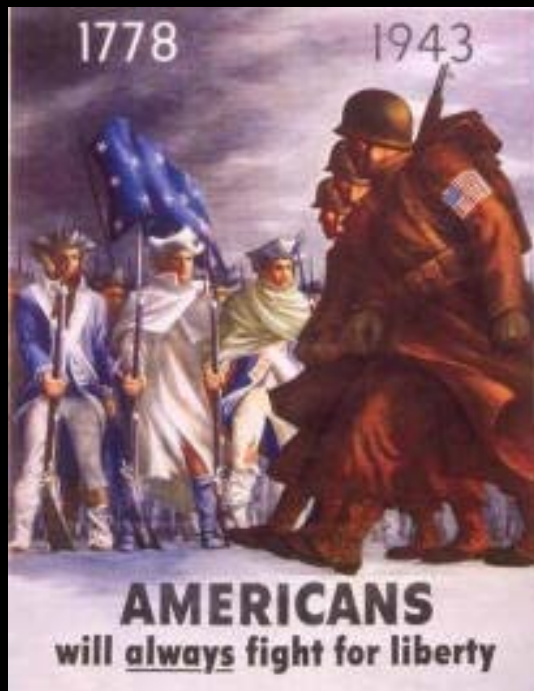
Built as an Army National Guard Camp in **1926**
Named after Tennessee Governor, Austin Peay
Camp Peay covered **1,040 acres**



Photo of Camp Forrest
(Camp Peay photo not available)

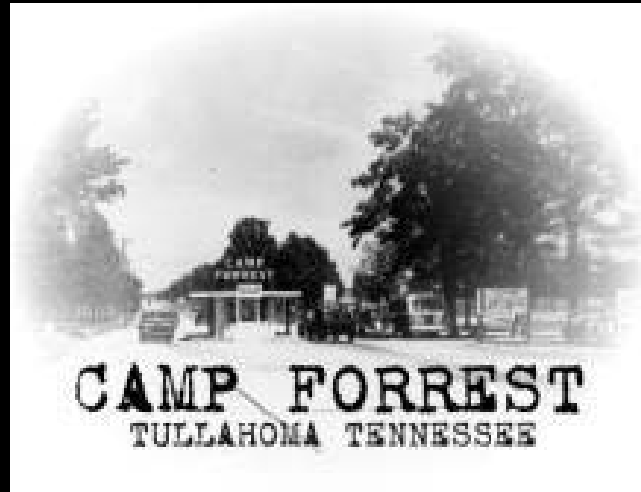
Tennessee is home to more
than 10,700 soldiers of the
Tennessee Army National Guard

America at War in 1940s

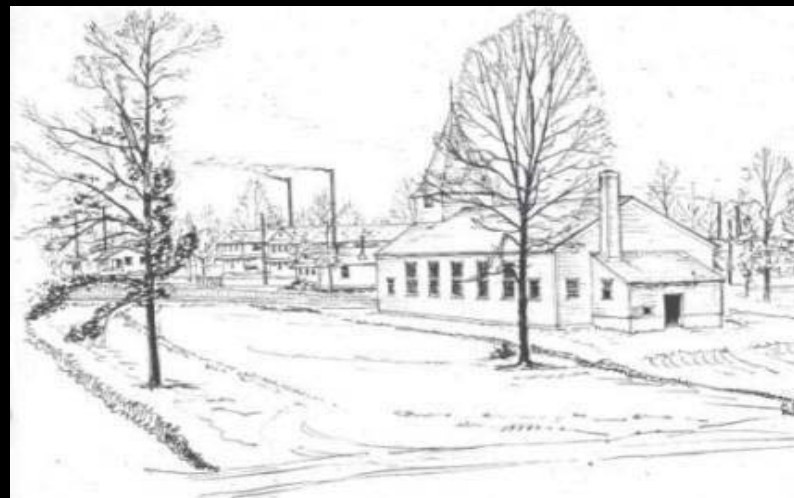
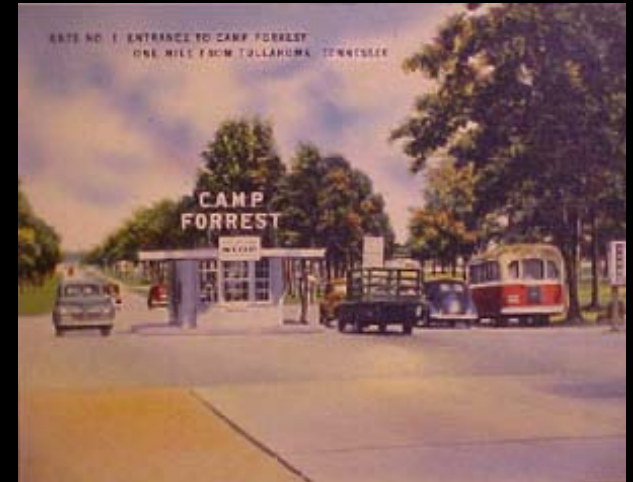


Prior to AEDC – Camp Forrest – Federal Training Camp 10 Jan 1941 (80,000 acres)

One of Army's largest training
Bases during World War II
Tullahoma TN 1941-1946



Named after Civil War Confederate
General Nathan Bedford Forrest



Camp Forrest sketch
by interpreter born in
Germany

Prior to AEDC - Camp Forrest 1941



Training camp for infantry, artillery, engineer and signal organizations

William Northern Field (now Tullahoma Regional Airport) was an air training base; crew training with four-engine B-24 bombers

Incoming troops had service clubs, a hospital, religious services, theaters, showers, recreation facilities for swimming, archery, tennis, a sports arena, a nine-hole golf course, etc.

1946 - war over - Camp Forrest and Northern Field declared surplus property; buildings sold at auction, torn down and carted away; roads, brick chimneys and concrete foundations remain

Site selected for Air Force Air Engineering Development Center; dedicated in 1951 by President Harry Truman

Prior to AEDC – Camp Forrest – POW Camp

1942

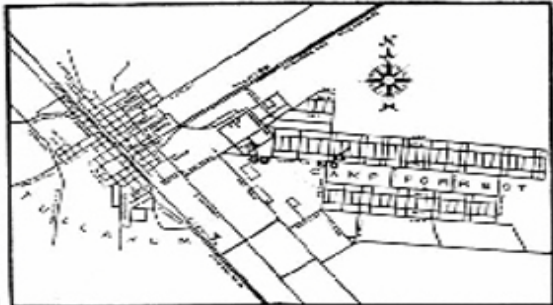
800 alien civilians interned at Camp Forrest
(capacity of 300)

First civilian internment camp in the nation

Holding Japanese immigrants plus German and Italian nationals

At one time, up to 190 Japanese immigrants interned, but were returned to Japan or transferred to Camp Livingston Louisiana to make room for POWs captured on the battlefield

1943 By end of war, over 24,000 members of Wehrmacht (unified German forces) were under guard at Camp Forrest



1. Public Telephone Center
2. Post Office
3. Sports Area
4. Service Bldg.
5. Camp Office
6. Mess Hall

SKELETON MAP OF TULLAHOMA AND CAMP FORREST



Prior to AEDC – Camp Forrest – POW Camp

1942

Prisoners were processed as laborers at Camp Forrest, hospitals and local community farms

1943

U.S. government implemented an Intellectual Diversion Program which would enlighten Germany on American way of life and increase their appreciation for the USA. This program used educational and recreational media to change views of POW's. The program was successful with many prisoners.



AEDC...the beginning



1950s - development of three major test facilities that remain active today:

Engine Test Facility (**ETF**)

Von Karman [Gas Dynamics] Facility (**VKF**)

Propulsion Wind Tunnel Test Facility (**PWT**)

First jet engine test **equipment** installed at the center was acquired from the Bavarian Motor Works (BMW) Munich, Germany (**still in use today!**)

To move the equipment took:

58 railroad cars

2 barges

450 tons by truck

After refurbishment, this equipment became the cornerstone for the Engine Test Facility, which was completed in **1953**. By May **1954**, the facility was put to work, testing the General Electric J49 engine for the **B-47 bomber**.



Cooperation Between Science, Industry and the Air Forces



In **1965**, the University of Tennessee and AEDC worked together in founding the University of Tennessee Space Institute. The institute became a place for AEDC engineers and scientists to further their education, and for students and professors to work on research projects to help AEDC.



Arnold Engineering Development Center Tennessee, California and Maryland



AEDC Mission: develop aerospace systems by testing hardware in facilities that simulate flight conditions

AEDC has contributed to the development of nearly every national aerospace program since the 1950s

58+ aerodynamic and propulsion wind tunnels, rocket and turbine engine test cells, space environmental chambers, arc heaters, ballistic ranges and other specialized test units for DoD, NASA and commercial aerospace systems use

27 test units have unmatched capabilities in the United States

14 test units are unmatched anywhere in the world

Facilities can simulate flight conditions from sea level to altitudes above 300 miles and from subsonic velocities to those well over Mach 20

Also conducts a Research and Technology Program to develop advanced test techniques and instrumentation, and to support the design of new test facilities, including work conducted cooperatively with UTSI

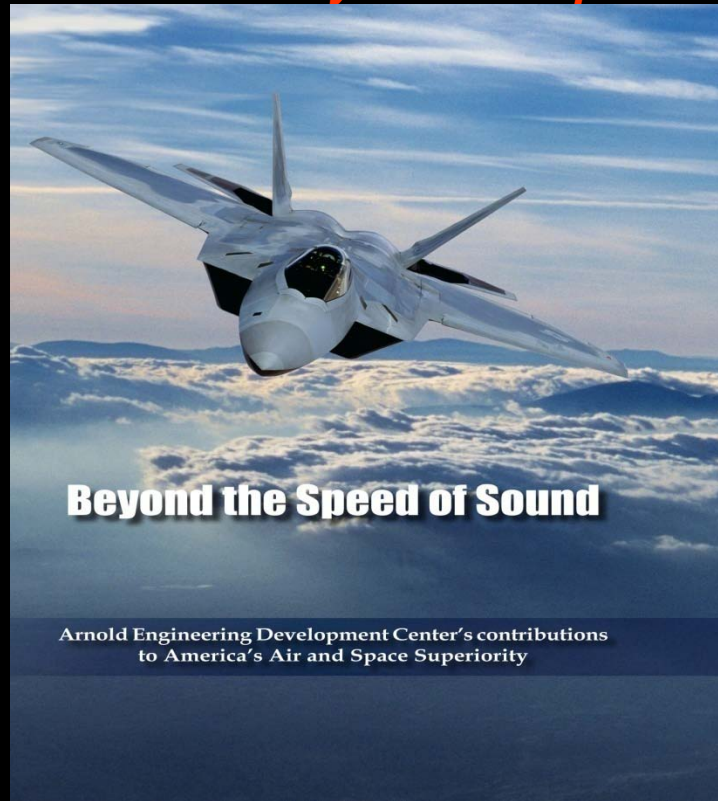


On the **65th** Birthday of the Late Gen “Hap” Arnold
25 June 1951

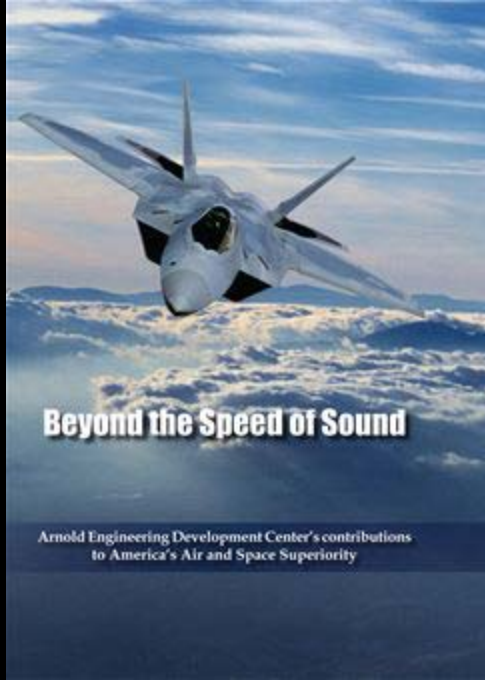


President Harry Truman dedicated AEDC
*“the scientists who work here will explore what lies on
the other side of the speed of sound”*

2010 AEDC Book “Beyond the Speed of Sound”



The general public may request a book by sending an e-mail with your name and address to andrea.stephens@arnold.af.mil, or call (931) 454-5655 and request a copy.



Beyond the Speed of Sound

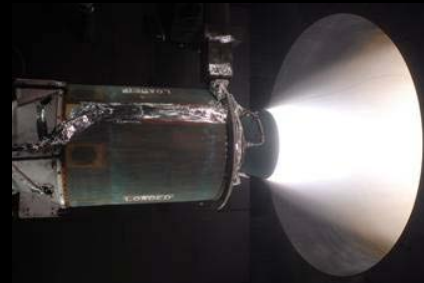
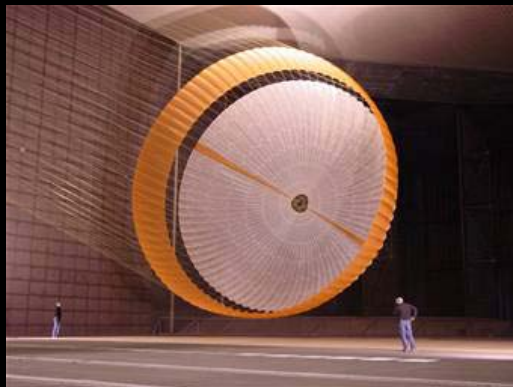
Arnold Engineering Development Center's contributions to America's Air and Space Superiority



Arnold Engineering Development Center

Arnold AFB Tennessee

1951-Present



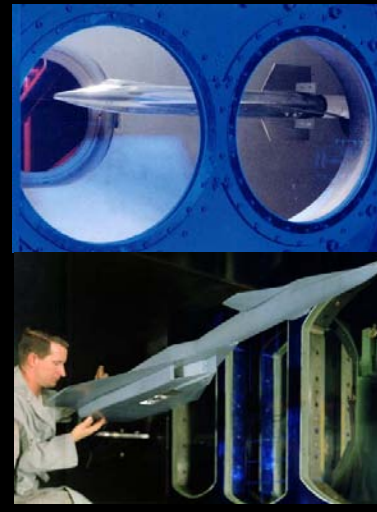
UNIQUE AEDC CAPABILITIES



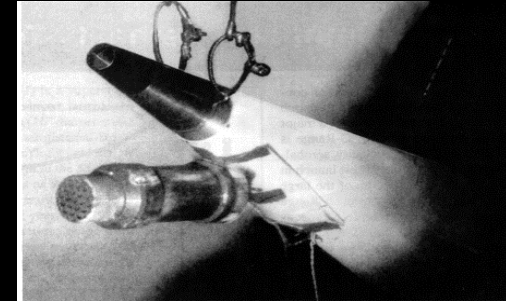
**16T/S Propulsion Wind
Tunnels**



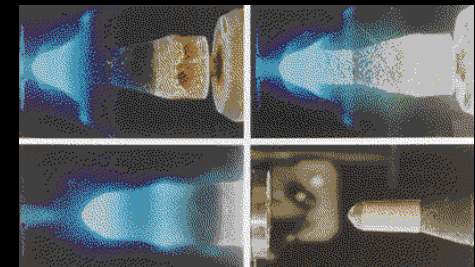
CA NFAC Full-Scale



VKF Wind Tunnels



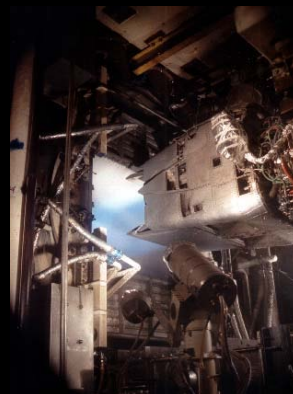
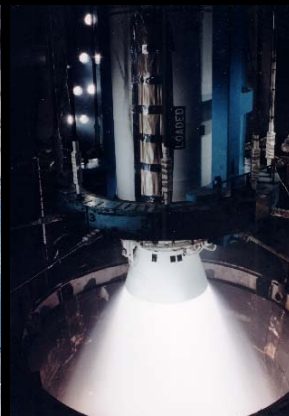
Ballistics G-Range



H1/H2/H3 Arc Heaters



J-4 & J-6 Rocket Test Cells



**C-1/C-2
Propulsion Cells**



SL-2/SL-3 Sea-Level Cells



**MD
Hypersonic
Tunnel 9**



Celebrating 65 Years

Arnold Engineering Development Center



Defense Technical Information Center



Letter from Gen Hap Arnold dated 7 Nov 1944

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Defense Technical Information Center



...central source within **DoD** for acquiring, storing, retrieving and disseminating scientific and technical information to support DoD research, development, engineering and studies programs

...also provides information tools and systems to support **Pentagon** executives and managers

...hosts, develops and maintains more than 100 of **DoD's** major Web sites



Defense Technical Information Center

DTIC Information Analysis Centers (IACs) are organizations chartered by the DoD and operated by DTIC with the mission of helping researchers, engineers, scientists, and program managers, putting the full spectrum of defense science and technology at their disposal, providing free answers to simple questions and projects, while also allowing DTIC services to be utilized for extended projects and Technical Area Tasks

Currently, there are 19 IACs - 10 are DoD sponsored; 9 are military sponsored

DoD Sponsored IACs:

Advanced Materials, Manufacturing, and Testing
Chemical, Biological, Radiological, and Nuclear Defense
Chemical Propulsion
Data and Analysis Center for Software
Information Assurance Technology
Modeling and Simulation
Reliability
Military Sensing
Survivability/Vulnerability
Weapons Systems Technology

Military-Sponsored IACs:

Airfields, Pavements, and Mobility
Coastal Engineering Defense
Cold Regions Science and Technology
Concrete Technology
Defense Threat Reduction
Environmental
Hydraulic Engineering
Shock and Vibration
Soil Mechanics

Defense Technical Information Center



Reasons for having DoD Scientific and Technical Information Program (STIP) same today as stated in Secretary of Defense Memo/Directive dated 14 May 1951:

"The end product of all Department of Defense sponsored research and development - the recorded conclusions - costing vast sums of money and irreplaceable scientific effort, must be assembled, organized, preserved, and made available for future reference by those concerned with exploring and guarding the scientific frontiers of the Nation."

Defense Technical Information Center



DTIC's Strategic Goals are aligned with those of the DDR&E and AT&L as well as the *DoD Quadrennial Defense Review* and the *President's Management Agenda*, thereby ensuring support for the long term strategies of the Department of Defense and the Nation



June 1952

Air Force major departure from German model re overemphasis of security resulting in unreasonable obstacles to the free flow and exchange of ideas



Need-to-Share



Need-to-Know

Until 2008, scientific research sponsored by the U.S. government came in two principal shapes and sizes:

sufficiently safe to make publicly available, and
sufficiently dangerous to keep secret

2008 DTIC Access Controlled Research Service

DTIC Online Access Controlled
Information for the Defense Community

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Welcome to DTIC

Announcements

Mark your calendars for the DTIC 2009 Conference to be held on 6-8 April at the Hilton Alexandria Old Town, Alexandria, Virginia. More information regarding this conference can be found on the Conference Web site located at <http://www.dtic.mil/dtic/annualconf/2009Home.html>.

More Announcements ...

Quick Links

Public Guides

Information Guide

Where Did It Go?

DoDTechipedia

DoDTechipedia is DoD's first enterprise-wide, social-networking tool focused on the technology community. Using a DoDTechipedia's goal is to foster education and collaboration among DoD researchers, program managers, professionals and warfighters that create greater capability and more rapidly deploy solutions being deployed to the

DoD R&E Success Story

A160 Hummingbird UAV

The A160 program will exploit a hingeless, rigid-rotor concept operating at the optimum rotational speed to produce a vertical take-off and landing (VTOL) unmanned air vehicle (UAV) with low risk loading and low rotor tip... [Full Story](#)

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Customize Your Home Page

Start here to customize your interface. Choose one of these content categories:

- Acquisition
- General Interest
- Resource Management
- Science and Technology

For more information about customizing your home page, see [DTIC Online Help](#).

R&E Database Search

The [Research and Engineering \(R&E\) Search](#) allows you to interrogate the data that the Services and Agencies submit to the DTIC. In addition to the parameters you choose on the query screen, the search is limited to the distribution codes associated with your user account. The data displayed in the search results is as it was provided to DTIC, with the exception of the financial values, which have been redacted to all but the

restricted to DTIC Registered users.



22 different agencies and carried out in 31 different organizations is a case in point.

Consequently, it does not seem unreasonable that many agencies with major research programs have, and will continue to develop information systems specifically designed and oriented to their own internal control purposes. Attempts to standardize these different systems or to enforce compatibility among such systems must recognize the *basic fact* that management practices and procedures are *necessarily* different. To standardize the

information systems that serve research management, suggests that management practices be standardized to make most effective use of the information furnished. Standardization of research management begins to sound like the standardization of research itself—a wholly untenable suggestion that in itself advises a careful analysis and review of the purposes, the objectives, and the uses of information systems before assuming that they be the same merely because they deal with the same basic stock of scientific and technical data.

Defense Documentation Center (DDC) for Scientific and Technical Information

By JAMES O. VANN

United States Air Force, Defense Documentation Center, Cameron Station, Alexandria, Virginia
Received April 11, 1963

DEFENSE DOCUMENTATION CENTER MISSION

ASTIA—the Armed Services Technical Information Agency—has been renamed the Defense Documentation Center for Scientific and Technical Information—DDC. The change signifies greatly increased responsibilities given DDC in Department of Defense (DoD) Instruction 5100.38 dated March 19, 1963, and now being implemented by the Army, Navy, Air Force, and other DoD components. Most important, the change provides an opportunity for a systems approach in the handling of scientific and technical documents in the DoD.

For the nation's 400,000 defense related engineers and scientists, there are five objectives in the new Instruction that are particularly important to them:

1. **Acquisition of all DoD Scientific and Technical Documents by DDC.**—The only limitations involve categories where there is comparatively little scientific and technical information. Under former directives the best ASTIA could claim was to be the principal documentation center of the Department of Defense. It will now be THE Defense Documentation Center with all the meaning the definite article conveys.

2. **Prompt and Well Indexed Announcements of Newly Acquired DoD STI Documents.**—ASTIA has long recognized the need for well indexed announcements but lacked the resources to provide them. Now such indexes are specific requirements. Manpower and an advanced electronic data processing system are being provided which will support these efforts. This will speed decision-making in the selection of documents by engineers and scientists.

3. **Timely Dissemination of Scientific and Technical Documents to the DoD Community.**—The new instruction includes a number of objectives, functions, and authorities which will not only speed the DDC secondary distri-

bution but will ultimately improve primary distribution.

4. **Maintain a Clearing-house, in the Form of an Index of Current Research, Development, Test, and Evaluation (RDT & E) Programs.**—Under the supervision of the Director of Defense Research and Engineering the Agency has already made a start on this service, but the new Instruction emphasizes the task.

5. **Establish a Centralized Directory and Provide Referral Service on Available DoD-Sponsored STI Activities.**—Under the new Instruction, DDC coordinates with DoD Specialized Technical Information Centers as a part of the integrated DoD system.

These are only five of the twenty objectives and functions assigned to the DDC by this new Instruction. They are implemented by a six-page enclosure which details acquisition and security procedures, authorized dissemination of classified and unclassified information, participation of DoD activities, and disposition of classified information disseminated by DDC. Most of these other objectives and functions continue responsibilities which ASTIA was carrying out, such as its Custom Abstract Searches and special dissemination services of its holdings and acquisitions.

Army, Navy, Air Force, and other DoD components have been directed to provide implementing instructions by Dr. Harold Brown, Director of Defense Research and Engineering (DDR & E) of the Department of Defense. The DDC Instruction is based upon a previous DoD Instruction No. 5129.43 issued January 22, 1963, and entitled "Assignment of Functions for the Defense Scientific and Technical Information Program." This first Instruction defined the types of STI functions in the program and established the position of Director of Technical Information on the DDR & E staff. Mr. Walter M. Carlson, a chemical engineer formerly with DuPont, has been appointed to this position. The new DDC



Armed Services Technical Information Center renamed Defense Documentation Center (DDC) for Scientific and Technical Information 11 April 1963

The change provided an opportunity for a systems approach in the handling of scientific and technical documents in the Department of Defense

In 1963, there were 400,000 defense related scientists and engineers

DDC mission statement identified **five objectives** of particular importance to them



DDC Mission Objectives

11 April 1963



- 1) *Acquire all DoD Scientific and Technical documents*
- 2) *Prompt, well-indexed announcements of newly acquired DoD STI documents*
- 3) *Timely dissemination of Scientific and Technical documents to the DoD community*
- 4) *Maintain a clearinghouse in the form of an index of current Research, Development, Test, and Evaluation (RDT&E) programs*
- 5) *Establish a centralized directory and provide referral service on available DoD-sponsored STI activities*

Defense Technical Information Center



R. Paul Ryan, DTIC Administrator

...since our inception at the end of World War II, we have fulfilled our mission by providing authenticated content and state-of-the-art information tools

...21st Century wars may no longer be fought solely against nation states but also against small groups of extremists, who may use modern technology and unconventional weapons including biological agents, improvised bombs, and small nuclear devices to attack the U.S. and our allies

...as the focus of the nation's defense priorities shifts to counter these threats, DoD scientists, engineers, program managers and others simply will not have time to sift through mountains of data to uncover the essential pieces of information that will meet critical requirements

...it is imperative to our nation's technological superiority that DTIC takes an innovative, leading role in providing essential information rapidly, accurately and reliably to support newly-emerging DoD priorities

...our information expertise will ensure we do our part to provide authorized access to information worldwide

...emerging technologies and a flexible, well-trained workforce will develop the innovative processes and tools needed to ensure America's information superiority



DTIC and AEDC

Serving the Warfighter



WW II 1939-1945

| DTIC | Decade | AEDC |
|------|--------------|--|
| | 1930s | <p>1936 Germany began development of long-range guided missile A4 (V2)</p> <p>1937 Germany added Aerodynamics Institute for aerodynamic development of V-2</p> <p>1938 Germany operated first of two 40 by 40 cm wind tunnels at Mach 2.5</p> <p>1938 Army Air Forces General Hap Arnold sought to develop advanced facilities at Wright Field</p> <p>1939-1944 Gen Carroll, Wright Field, tried to reconcile their limited potential for expansion of facilities to test high-speed aircraft</p> |



DTIC and AEDC

Serving the Warfighter



| DTIC | Decade | AEDC |
|--|---------------------|--|
| <p>1940 Overall, by August 15, 1940, Great Britain had already placed orders for 20,000 American airplanes and 42,000 engines</p> <p>1944 Air Documents Research Center established in London, England with a mission to collect German Air Documents</p> <p><i>...classified German documents into three types:</i></p> <ol style="list-style-type: none"><i>1) assist in the war on the Pacific front</i><i>2) immediate intelligence interests to the US or British forces</i><i>3) of interest for future research</i> <p><i>Goals: production of (a) card index of German documents to be distributed to US and British forces, (b) compile a glossary of German-English terms related to science and engineering</i></p> | <p>1940s</p> | <p>1941 Gen Arnold witnessed successful turbojet test flights by Germany/England, and ordered the concept to be brought to the U.S. immediately for further development</p> <p>1941 German wind tunnel achieved Mach 3.3</p> <p>1942 US General Electric turbojet engine flew at Muroc Army Air Field (later renamed Edwards AFB)</p> <p>1943 U.S. troops sent German and Japanese aircraft to Wright Field for assessment</p> <p>1944 Gen Arnold directed that items of captured enemy equipment be collected methodically so technical experts could study the equipment</p> <p>1944 40-by-80 foot wind tunnel was built at Moffett Field CA</p> |



DTIC and AEDC Serving the Warfighter



| DTIC | Decade | AEDC |
|--|---------------------|--|
| <p>1945 US Army Air Corps, US Navy, British Air Ministry establish Air Documents Research Center (ADRC) in London, which becomes the Air Force Air Documents Division (ADD) of the Intelligence (T-2) Department of the Headquarters, Air Technical Services, Army Air Force, Wright Field, Dayton OH</p> <p>ADD mission was to catalog 1,500 tons of documents retrieved from Germany</p> | <p>1940s</p> | <p>March 1945 Against Hitler's orders, German scientists stashed secret hypersonics materials (one week before American troops reached their location)</p> <p>1945 Joint Chiefs of Staff adopted Project Overcast (new Air Force Research and Development Center)</p> <p>1945 Early German research conducted to develop supersonic missiles for use against the Allies in World War II; after the war, critical facilities and scientists were brought to America to continue the ground-breaking research</p> <p>July 1945 Custody of German wind tunnel awarded to the Navy to be installed at the Naval Ordnance Laboratory, White Oak MD</p> <p>Dec 1945 Gen. Arnold advised that the 40 x 40 cm supersonic German wind tunnel had been turned over to the Navy and other test equipment had been turned over to the Army Air Forces</p> |



DTIC and AEDC Serving the Warfighter



| DTIC | Decade | AEDC |
|--|--------------|---|
| | 1940s | <p>May 1946 France makes repeated requests to U.S. War Department for return of all German wind tunnel parts</p> <p>June 1946 Air Material Command awarded contract for national facilities studies for AEDC and NSRC to Sverdrup and Parcel, St Louis MO</p> <p>1946-1948 Key German scientists assisted in the installation and modernization of two supersonic tunnels</p> |
| <p>1948 ADD becomes Central Air Documents Office (CADO) designed to collect, process and distribute scientific and technical reports, serving all military organizations and contractors</p> | | <p>Feb 1947 Joint Chiefs of Staff allocated the complete Bavarian Motor Works (BMW) plant along with parts for its expansion to the U.S. Army Air Forces for AEDC</p> <p>May 1947 Army Air Force selected tunnels to be included at AEDC and approved Camp Forrest as the alternate site</p> <p>April 1949 President Harry Truman signed Public Law 81-415, an act with two titles: Title I, The Unitary Wind Tunnel Plan Act of 1949; Title II, The Air Engineering Development Center Act of 1949; Congress designated \$157,500,000 for construction of initial facilities</p> <p>Nov 1949 Announcement of selection of Camp Forrest site for AEDC</p> |

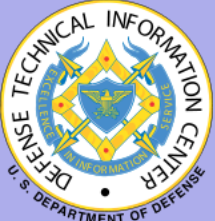


DTIC and AEDC

Serving the Warfighter



| DTIC | Decade | AEDC |
|--|---------------------|--|
| <p>1951 CADO becomes Armed Services Technical Information Agency (ASTIA)</p> | <p>1950s</p> | <p>May 1950 German equipment to be used for the ETF at AEDC was prepared for shipment from CA, AL, TN; next facility was GDF/VKF, then PWT Tests Supported: BOMARC; B-47 StratoJet; Atlas ICBM; T-38 Talon; Sergeant Missile; Snark; Nike; Project Mercury; Project Gemini; Discoverer; Vanguard; F-105; Thunderchief; B-58 Hustler; Polaris SLBM; X-15; Titan; Minuteman; F-5 Freedom Fighter; XB-70; Valkyrie; GAM-78 Quail</p> |
| <p>1958 ASTIA moves from WPAFB OH to Arlington Hall Station VA</p> | | <p>25 June 1951 President Harry Truman dedicated AEDC (65th birthday of the late Gen Arnold), stating, <i>“the scientists who work here will explore what lies on the other side of the speed of sound”</i> June 1952 Air Force awarded contract to Univ of TN to attract and grow capable technical and scientific personnel (UTSI); Major departure from German model re overemphasis of security resulting in unreasonable obstacles to the free flow and exchange of ideas</p> |
| <p>1962 DoD STINFO Program established</p> | <p>1960s</p> | <p>Tests Supported: Apollo; Dyna-Soar; C-5 Galaxy; Little John; E-3A Sentry Patriot; Thor-Delta; F-111 Aardvark; Voyager; Scout; Saturn V; Short-Range Attack Missile; Viking</p> |
| <p>1963 ASTIA renamed Defense Documentation Center (DDC) and becomes <u>field activity</u> of Defense Supply Agency (DSA)</p> | | |



DTIC and AEDC Serving the Warfighter

| DTIC | Decade | AEDC |
|--|---------------------|---|
| <p>1972 Defense Research, Development, Test and Evaluation Online System (DROLS) becomes operational</p> | <p>1970s</p> | <p>Tests Supported: Space Shuttle; Trident SLBM; Sidewinder; A-9A; Firebee; Poseidon SLBM; YF-17; Air-Launched Microfighter; X-24B; Pershing; Maverick; F/A-18 Hornet; Walleye; Tomahawk; B-1 Lancer; F-15 Eagle; F-16 Falcon; F-4 Phantom; A-10 Thunderbolt II; A-7 Corsair; X-24C; Air-Launched Cruise Missile; F-117 Nighthawk; GPS; C-141 Starlifter; AMRAAM</p> |
| <p>1979 DDC changes name to Defense Technical Information Center (DTIC)</p> | | <p>1976 Tunnel 9 became operational, providing aerodynamic simulation in critical altitude regimes associated with strategic offensive missile systems, advanced defensive interceptor systems, and hypersonic vehicle technologies</p> |
| <p>1980 DoD Information Analysis Center (IAC) Program added to DTIC's mission</p> | <p>1980s</p> | <p>Tests Supported: Peacekeeper; AV-8B Harrier; V-22 Osprey; F-14 Tomcat; C-17 Globemaster III; X-29</p> |
| <p>1983 DTIC assumes responsibility for Manpower and Training Research Information System (MATRIS)</p> | | <p>1987 Wind tunnels at NASA AMES Moffett Field CA became NFAC after the 80-by-120 foot test section was added and the fan drive system was replaced</p> |



DTIC and AEDC

Serving the Warfighter

| DTIC | Decade | AEDC |
|---|---------------------|--|
| <p>1991 DTIC transferred from Defense Logistics Agency (DLA) to Office of the Under Secretary of Defense (Acquisitions) to expand its mission to fulfill the needs of the broader acquisition community</p> | <p>1990s</p> | <p>Tests Supported: X-30; Space Station Freedom; P&W 4084 (Boeing 777); Boeing 767; Navy Standard Missile; Trent 800 (Boeing 777); B-52 Stratofortress; KC-135 Stratotanker; F-22A Raptor; YF-23; International Space Station; Cassini-Hugens; Dornier Alpha Jet; F/A-18 Superhornet; B-2 Spirit; EELV; Boeing 777; Global Hawk; A300-B2 Airbus; YF-36; F-35 Lightning II; Pathfinder; P&W 4090 (Boeing 777); Chandra; P&W 4098; X-33</p> |
| <p>1994 DTIC begins offering products and services via the Internet</p> | | <p>1995 Base Realignment and Closure resulted in Navy hypersonic tunnel at White Oak MD becoming part of AEDC</p> |
| <p>1995 DTIC moves to its current location in the Andrew T. McNamara Headquarters Complex, Fort Belvoir, VA</p> | | |
| <p>1997 Defense Reform Initiative transfers oversight of DTIC to the Director, Defense Information Systems Agency (DISA)</p> | | |
| <p>1998 DTIC transferred from the Office of the Under Secretary of Defense to DISA</p> | | |



DTIC and AEDC Serving the Warfighter

| DTIC | Decade | AEDC |
|---|---------------------|---|
| <p>2003 DTIC initiates Private STINET (Scientific and Technical Information Network) - a database that contains citations and often full text for various defense-related research reports</p> <ul style="list-style-type: none"> -Public STINET for general public -Private STINET for unclassified materials with limited distribution -Classified STINET for Secret, Confidential, Uncl | <p>2000s</p> | <p>Tests Supported: X-43 Hyper-X; X-37; Boeing 747; GOES-M; EA-18 Growler; Trent 900 (Airbus A380); GP7200 (Airbus A380); P-8A MMA; RQ-4 Global Hawk; Trent 1000 (Boeing 787); Crew Exploration Vehicle (CEV); Mars Science Laboratory</p> |
| <p>2004 DTIC established as DoD Field Activity realigned under Under Secretary of Defense for Acquisition, Technology and Logistics (USD (AT&L)), reporting to the Director, Defense Research & Engineering (DDR&E)</p> | | <p>2003 NASA closed NFAC due to budget pressures</p> |
| <p>2008 DTIC Online is launched to offer DTIC customers one comprehensive Web site to search and access DoD Scientific and Technical Information</p> | | <p>2006 USAF signed lease with NASA to reopen NFAC</p> |
| <p>2010 DTIC celebrates 65 years of meeting STINFO needs of DoD community in support of the Warfighter</p> | | <p>2008 USAF NFAC full operational capability</p> |

Celebrating 65 Years

Arnold Engineering Development Center



Defense Technical Information Center



Air Force Systems Command (AFSC) History Office

1992 Reprint of *Science, the Key to Air Supremacy*

(originally published in 1945 as part of the multi-volume *Toward New Horizons*)

Excerpts from Reprint *Foreword* by

Dr. Richard P. Hallion, AF Historian

“Since the days of ancient warfare, commanders have relied on science and technology for success in war.

Chemists and metallurgists contributed greatly to WW I

WW II is sometimes referred to as the physicists’ war

In the midst of WW II, Gen Arnold grasped the absolutely essential relationship between post-war science and national security

Although the Cold War has ended, now as then, the capacity exists for a sudden and devastating attack on the American continent.....**a large commitment must be made to research**, which renders the skies safe from aggressors and enables the national command structure to project air power at great distances

Now as then, the capacity exists for sudden and devastating attack on the American continent.

Now as then, the boldness and imagination of the nation’s scientists and engineers must be harnessed to defend American security.”



**Their job is to protect
our freedom**

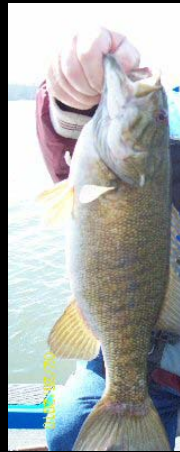


**Our job is to
protect U.S.
technology**



A heritage for environmental stewardship and uniqueness was born in 1976 when the Department of Interior registered AEDC as a unique natural area. The honor recognized AEDC's superior management of fish and wildlife resources, conservation practices and environmental achievement.















Questions?



Partnering for
America Since
World War II



Points of Contact

DoD Field Activity Since 2004 DoD Field Activity Since 2004 DoD Field Activity Since 2004 DoD Field Activity Since 2004 DoD Field Activity Since 2004 DoD Field Activity Since 2004

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