AL/EQ-HBK-61-2

ARMSTRONG LABORATORY

PROJECT MANAGERS'S HANDBOOK

ENVIRONICS DIRECTORATE
139 Barnes Drive, Suite 2
Tyndall AFB FL 32403-5323

SEPTEMBER 1996

Approved for public release; distribution unlimited

AIR FORCE MATERIEL COMMAND
TYNDALL AIR FORCE BASE, FLORIDA 32403-5323

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The objective of this handbook is to assist directorate project managers with the preparation of AL/EQ technical publications to provide uniform and helpful criteria for preparing and processing technical documents for publication. This handbook emphasizes the team approach to entering timely, high quality research results into the Air Force and DoD Scientific and Technical Information (STINFO) program. The overall emphasis is on a final product that will be well-organized, aesthetically presented and readable for both technical and layperson audiences.

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FOREWORD

This handbook has been put together to help you, the Laboratory Project Manager, do your job. You will manage significant amounts of research and development funds. Moreover, the results of the research will enable the Air Force to achieve its environmental objectives. An understanding of the environmental research and development process, from planning through technology transfer, will ensure successful accomplishment of your duties as a Project Manager.

The Armstrong Laboratory, Environics Directorate, executes its mission by conducting environmental research and development and by providing guidance and assistance to the Air Staff, Major Commands and bases in environmental quality areas that affect Air Force weapon systems and industrial complexes. These areas include site remediation, environmental compliance and pollution prevention. To accomplish our mission, research and development must be planned based on customer needs, contracted effectively, and then executed in a timely manner. Technologies must then be transitioned for implementation.

Guidance and assistance can be obtained from your Division Chief, the Technology Development Branch (AL/EQPP), the Program Control Branch (AL/EQPM), the Technical Information Center (AL/EQP-TIC), contract acquisition support personnel, and contracting office personnel.

I encourage you to make use of this handbook.

RICHARD E. SMITHERMAN, Colonel, USAF, BSC
Director, Environics Directorate

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ACRONYMS

ACO	Administrating Contracting Officer
AFCEE	Air Force Center for Environmental Excellence
AFMC	Air Force Materiel Command
AFOSR	Air Force Office of Scientific Research
AIP	Acquistion Investment Plan
AL	Armstrong Laboratory
ALC	Air Logistics Center
APDP	Acquisition Professional Development Program
ASP	Acquisition Strategy Panel
ATD	Advanced Technology Demonstration
BA	Budget Authorization
BAA	Broad Agency Announcement
BPAC	Budget Program Activity Code
CATEX	Categorical Exclusion
CBD	Commerce business Daily
CDR	Critical Design Review
CDRL	Contract Data Requirements List
CFSR	Contract Funds Status Report
CO	Contracting Officer (see also ACO and PCO)
COR	Contracting Officer's Representative
CPAF	Cost Plus Award Fee
CPFF	Cost Plus Fixed Fee
CPIF	Cost Plus Incentive Fee
CRDA	Cooperative Research and Development Agreement
DARPA	Defense Advanced Research Projects Agency
DCMAO	Defense Contract Management Area Office
DCMC	Defense Contract Management Command
DDL	Deliverable Document Log
DDR&E	Director Defense Research and Engineering
DFAS	Defense Finance Accounting Service
DID	Data Item Description
EIAP	Environmental Impact Assessment Process
ESOH	Environment, Safety and Occupational Health
FAR	Federal Acquisition Regulation
FFP	Firm Fixed Price
FMR	Financial Management Review
FTA	Focused Technology Area
FYDP	Future Years Defense Program
HSC	Human Systems Center
JOCAS	Job Order Cost Accounting System
JON	Job Order Number
LN	Logistics Need
MAD	Master Approval Document

MAP	Mission Area Plan
MFP	Major Force Program
MNS	Mission Needs Statement
OPR	Office of Primary Responsibility
ORD	Operational Requirements Document
PB	President's Budget
PCO	Procuring Contracting Officer
PDR	Preliminary Design Review
PE	Program Element
POM	Program Objective Memorandum
PPBS	Planning, Programming, and Budgeting System
PRDA	Programm Research and Development Announcement
R&D	Research and Development
SAB	Scientific Advisory Board
SBIR	Small Business Innovation Research
SECDEF	Secretary of Defense
SERDP	Strategic Environmental Research and Development Program
SOW	Statement of Work
SPO	Systems Program Office
STINFO	Scientific and Technical Information
STTR	Small Business Technology Transfer
TAM	Technology Area Manager
TAP	Technology Area Plan
TAR	Technology Area Review
T for C	Termination for Convenience
T for D	Termination for Default
TIP	Technology Investment Plan
TMP	Technology Master Process
TMR	Technology Management Review
TPIPT	Technical Planning Integrated Product Team
TRP	Technology Reinvestment Project
TTP	Technology Transition Plan
WBS	Work Breakdown Structure
WUIS	Work Unit Information System

SECTION I
INTRODUCTION

A. MISSION OF THE ENVIRONICS DIRECTORATE

The Armstrong Laboratory Environics Directorate (AL/EQ) conducts research and development and provides guidance and assistance to the Air Staff, Major Commands, and bases in environmental quality areas which affect Air Force weapons systems and industrial complexes concerning site remediation, environmental compliance, and treatment and/or elimination of pollution sources.

B. HISTORY OF ENVIRONICS DIRECTORATE

The Environics Directorate, in part, traces its origin to 1968, with the chartering of the Air Force Civil Engineering Center (AFCEC) at Wright-Patterson AFB, Ohio. Its charter was to provide technical support and conduct research and development (R&D) programs in applied Civil Engineering. AFCEC was subsequently transferred to the Air Force Systems Command and was moved to Tyndall AFB, Florida in 1972. A realignment transferred most of the Air Force Civil Engineering R&D mission to AFCEC in 1975. This included the Environics Directorate from Kirtland AFB, New Mexico, which had responsibility for environmental quality R&D. Subsequent realignments carried Environics through the Civil and Environmental Engineering Development Office (CEEDO) until a massive realignment in 1978 created the Air Force Engineering and Services Center (AFESC) as a separate operating agency and made Environics a division of the Engineering and Services Laboratory. Air Force Materiel Command (AFMC) was formed through the combination of the Logistics and Systems Commands in 1992 and R&D functions within AFESC were aligned with the AFMC product centers. Environics was placed into the Human Systems Center's Armstrong Laboratory, with headquarters at Brooks AFB, Texas. The laboratory, technical, and support divisions were retained as an operating location at Tyndall AFB, along with the remnants of AFESC, renamed the Air Force Civil Engineering Support Agency (AFCESA). Current organizational charts for Armstrong Laboratory (AL) and the AL Environics Directorate can be found in Figures 1 and 2.

C. DIVISIONS OF THE ENVIRONICS DIRECTORATE

1. Environmental Research (EQL): The Environmental Research Division consists of scientists and researchers responsible for formulating research plans and conducting fundamental research to meet the environmental technology needs of the Air Force. The division operates a state-of-the-art research laboratory equipped with a variety of sophisticated instruments. Technical staff includes scientists of numerous disciplines. Research activities are focused on: (1) Investigating the fate and transport of Air Force chemicals in soil and groundwater; (2) Developing fundamental understanding of microbial processes to convert toxic organic materials into harmless products; (3)

ARMSTRONG LABORATORY
ORGANIZATIONAL CHART

Armstrong Laboratory (AL)
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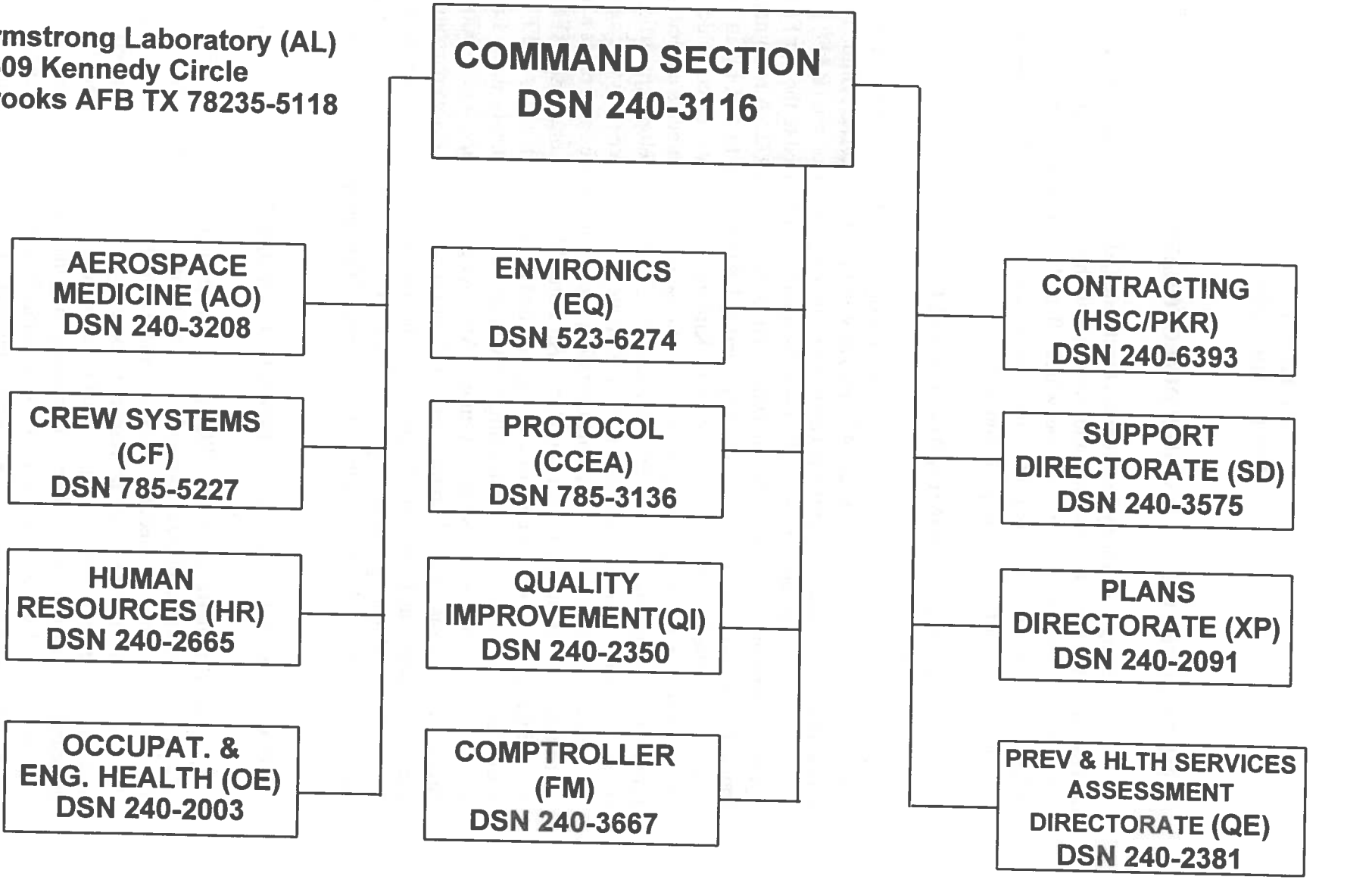

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ENVIRONICS DIRECTORATE

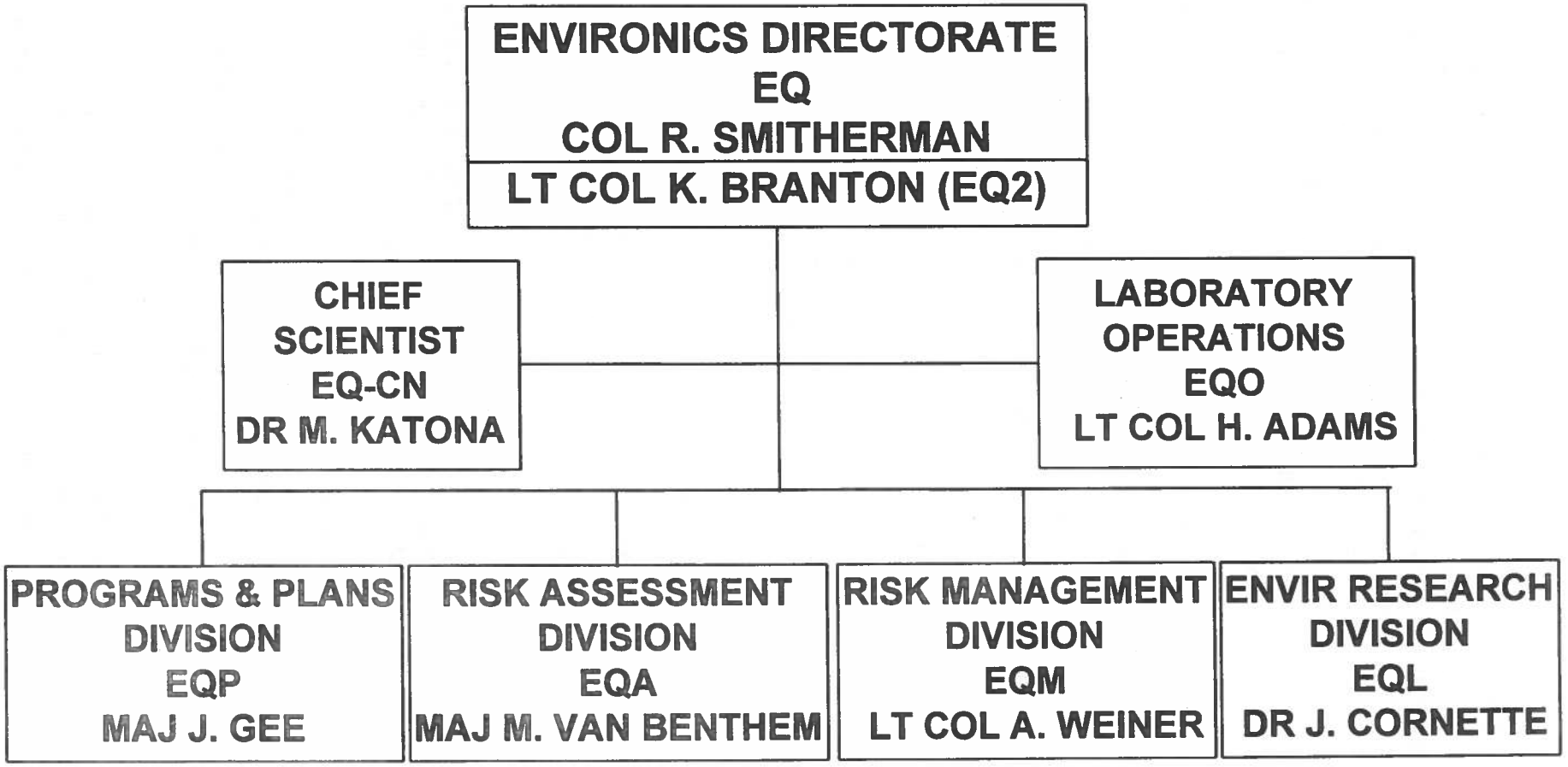

Figure 2. Environics Directorate

Performing photochemical studies of Air Force fuels and chemicals to determine atmospheric interactions; (4) Minimizing the cost of environmental characterization and monitoring; (5) Developing improved analytical procedures to identify and quantify specific Air Force chemicals in complex matrices; and (6) Exploiting advanced catalytic chemical reactor systems for destruction of a variety of Air Force waste materials. The extended research base that supports this laboratory includes investigators from colleges and universities throughout the United States, as well as cooperating research partners in private institutions, industry, and other federal laboratories.

2. Environmental Risk Assessment (EQA): The project managers of the Environmental Risk Assessment Division develop technologies for cleaning up contaminated Air Force sites worldwide. These technologies include biological, chemical, or physical treatment systems for on-site destruction of contaminants. To limit future liability to the Air Force, research has focused on enhancing three critical capabilities: (1) More efficient remedial action technologies; (2) Rapid site characterization and monitoring tools; and (3) More accurate models for predicting transport, migration, and fate of fuels and chemicals in soil and groundwater. Some examples are bioventing of soil to bring about accelerated biodegradation of fuel contaminants and use of a cone penetrometer with a transportable laser spectrometer for rapid, accurate, and cost-effective characterization of contaminated Air Force sites. The focus is on the development of technologies that can treat or monitor the contaminants in place (*in situ*), avoiding costly groundwater pumping or soil excavation.

3. Environmental Risk Management (EQM): The project managers of the Environmental Risk Management Division focus their efforts on developing technologies to measure and minimize environmental impacts of volatile and particulate airborne pollutants and hazardous constituents of liquid and solid wastes. Examples include organic compounds and solvents, rocket propellants, aircraft fuels and emissions, and weapon systems materials used in Air Force operations. Research is directed at minimizing hazardous wastes resulting from AF industrial operations and pursuing new methods of curtailing generation of toxic wastes in existing electroplating and other industrial processes. Key efforts include developing substitutes for toxic and environmentally damaging processes and materials and categorizing the behavior and fate of atmospheric pollutants, with particular emphasis on modification of transport mechanisms and processes. Our efforts are exemplified by testing and implementing the use of ion vapor deposition and spray casting in Air Force Logistics Center electroplating operations to replace chromium, cadmium, cyanide, and other toxic materials which necessitate expensive treatment and disposal; development of methods to reduce nitrous oxide emissions from jet engine test cells; and biodegradation of rocket fuels to bring about cost-effective and environmentally acceptable recovery of ammonium perchlorate for resale and reuse.

4. Programs and Plans (EQP): The multitalented staff of the Programs and Plans Division supports the Directorate's engineers and scientists by identifying the needs of the Major Air Commands, translating these needs into integrated programs to provide

technologies that will meet these needs, and providing functional program support.This division acts as the focal point for international cooperative research projects and defense data exchange agreements, provides expertise in immediate and long-range planning, technical editing, publishing services, and scientific and technical information program management (EQPP). The functional support staff provides financial management, contract management and computer support (EQPM). In addition, this division provides technical library services to the Directorate (EQP-TIC).

D. ACQUISITION SUPPORT PERSONNEL

Acquisition support is available to EQA and EQM Project Managers through the research support contract. Acquisition support personnel have expertise and experience in acquisition management, systems engineering, and test management. Acquisition support personnel perform and assist project officers to develop acquisition strategies, evaluate alternatives, structure projects, prepare statements of work and requests for proposal, and monitor contractor performance.

E. ACQUISITION PROFESSIONAL DEVELOPMENT

1. Acquisition Professional Development Program (APDP): The Acquisition Professional Development Program Guide provides information on the purpose, structure and benefits (including career benefits) of the APDP.

There are eight functional areas and three levels of APDP certification. Systems Planning, Research, Development, and Engineering - Science & Technology (SPRD&E) is the appropriate functional area for certification of most AL/EQ Project Managers. Project Manager positions in AL/EQ are coded to require Level I APDP certification and the Division Chief positions require Level II certification. The highest level of certification is Level III.

Level I certification in SPRD&E requires a Bachelor's degree and at least one year experience in science or engineering (not necessarily in acquisition) and a basic course in acquisition management (ACQ-101). Level II certification requires Level I certification, 3 semester hours of business, two years of experience in science or engineering with at least one year in an acquisition position, and successful completion of two intermediate courses (SYS 201 and ACQ-201 or equal). Level III certification requires Level II certification, 6 semester hours of business, 4 years experience with at least 3 years in acquisition, and completion of an advanced management course (SYS-301). See Figure 3.

2. Acquisition Courses: A variety of acquisition and R&D related courses are potentially available to the Project Manager. Three courses - SAS 010, Laboratory Acquisition Management Course, SYS 100, Introduction to Acquisition Management, and SYS 201 (DSMC 28), System Engineering Management - may be of particular

Systems Planning, Research, Development and Engineering

SPRD&E APDP Requirements

Effective 1 Jan 1995

	Level I	Level II	Level III
Ed.	Bachelor's (Sci / Engr)	Bachelor's (Sci / Engr) + 3 SH Bus	Bachelor's (Sci / Engr) + 6 SH Bus
Exp.	1 Year S & E	2 Years (1 Acq & 1 S & E)	4 Years (3 Acq & 1 S & E)
Tng.	ACQ-101	SYS-201 and ACQ-201	SYS-301

Figure 3. SPRD&E APDP Requirements

interest to new Project Managers. SAS 010 is a 2-week course specifically tailored to acquisition in the AFMC Laboratory system. AL/EQ-CCQ (Unit Training Monitor) should be consulted for information on course availability and to request slots to attend acquisition courses.

F. THE PROJECT MANAGEMENT PROCESS

The remainder of this Handbook presents the elements of the Project Management Process from project conception through work unit close-out and technology transition. The process is represented by a flow diagram at Appendix A. As you proceed through the remainder of this Handbook, refer to Appendix A to maintain perspective of how the element you are learning about fits into the overall process. Remember that project management is many times a rigid process and often times a creative process, but most often a blend of both. This Handbook is to be a guide to help the Project Manager, not a "cookbook" with the instant recipe to be blindly followed for guaranteed project success.

REFERENCES
INTRODUCTION

1. Acquisition Professional Development Program Guide, 15 July 1994, AFPEO/CM (now SAF/AQXD)

2. DoD 5000.52M, Acquisition Career Development Program, November 1991

SECTION II
PLANNING, PROGRAMMING, AND BUDGETING

A. PLANNING

The planning, programming, and budgeting activities required to conduct environmental quality research and development are team efforts involving the project managers, Programs and Plans personnel (EQP), and the AL/EQ senior management. This section will describe the sequence of planning events which must be addressed to initiate new research projects and monitor ongoing research projects.

1. Needs Identification: Validated user needs, identified in the first step of the Air Force Materiel Command (AFMC) Technology Master Process (TMP), are the basis of our environmental quality R&D program. Justification for our research comes from two primary sources: the Air Force Environment, Safety, and Occupational Health (ESOH) Needs Process and formal Air Force requirements documents. Most validated needs come through the ESOH Needs Process conducted by the ESOH Technology Planning Integrated Product Team (TPIPT). The ESOH TMP (see Appendix B for flow charts) implements the AFMC TMP for environmental research, development, and acquisition. EQPP personnel participate in the ESOH Needs Process, including visiting users to identify or document needs and by attending TPIPT meetings along with EQA/M.

Some user needs, which may or may not be unique to the Army or Navy, fall under AL/EQ's areas of research responsibility resulting from the Project Reliance agreements.[1] Such needs come to the responsible laboratory in prioritized order. If research funding is insufficient to address all current user needs, the laboratories are expected to concentrate resources on the high- and medium-priority needs first. User needs may also come through the formal Air Force planning documents (Mission Need Statements (MNSs), Operational Requirements Documents (ORDs), Logistics Needs (LNs), or MAJCOM Mission Area Plans (MAPs)); however, these are rare. Finally, the need for some of our basic research is based on a forecast of future technology requirements, often pending environmental legislation or Air Force or DoD policies.

2. Needs Resolution: Needs identified from one of the above sources may or may not require research and development solutions. The Air Force needs list is revised to remove those which can be addressed by off-the-shelf technologies, current research programs, or military adaptation of existing technology. New research projects are initiated as a last resort.

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[1] Project Reliance is a Department of Defense initiative to eliminate duplicative research in the Department of Defense and concentrate research in areas of expertise.

3. R&D Planning Activities: Certain steps must be taken to start and maintain our environmental quality research projects. All of these steps are shown on the program management process flow chart at Appendix A. These required actions span the life of the research project from planning to technology transition/transfer (see Section V) to the user community.

The following steps are required to initiate a new project (not necessarily in sequential order):

a. A literature search must be conducted to determine that the planned research isn't being done by others and to learn what other technology is available. This search is normally conducted by the Technical Information Center using both manual methods and electronic databases.

b. An R&D Case File must be opened and maintained for the life of the project. This file is a chronological record of the project milestones from planning through technology transition/transfer (see Section V). Requirements for the contents and format of the R&D Case File are detailed in AFI 61-206, Research and Development (R&D) Case Files, 8 November 1995, Draft. See Section VI.

c. A project team should be established early in the project planning phase. Membership on this team would normally include the user, contractor, Air Force Agency (HSC/YAL, AFCEE, or other), and perhaps MAJCOM representatives, project manager, and EQP personnel. This team would meet initially to review the project objectives, milestones, deliverables, and other pertinent information. The early team meetings should include discussions on how and when the technology will transition from 6.2 to 6.3 to 6.4 and transfer to users outside the DOD. See Section V also. Remember, technologies with little or no user advocacy will not be used and all your hard work will be wasted. Decisions on who will be the System Program Office, technology recipient, and eventual user(s) are critical to the planning phase and must be established early. The project manager determines the frequency and location of the team meetings.

d. After estimating the cost of the exploratory development (6.2) and advanced development (6.3) research efforts, project managers must evaluate the various funding options available. See Appendix C for Government Cost Estimate. These funding options will include In-house Laboratory Independent Research (ILIR) Program (see Section V), Science and Technology (S&T), Small Business Innovation Research (SBIR), Strategic Environmental Research and Development Program (SERDP), AFMC/CEV, etc. A funding source is established before project commencement; others may be added during the life of the project (such as an approved SERDP proposal).

e. The Directorate's internal project approval and tracking process consists of a central database (AL/EQINFO) with distributed update and retrieval. This database provides the current baseline for the total EQ program. Controls within the database restrict update capability to those management levels with the authority to approve those

updates. The database is structured to encompass all the project information required for a project such that output products can be tailored to meet the many information needs of the Directorate from a single source. The EQ information database will be the source for project information used at the annual Technology Area Review (TAR). The information will be reviewed by EQP, the Director, Deputy Director and Chief Scientist prior to the TAR and approved by the same persons following the TAR presentations. Refer to Appendix D for a Draft Environmental Quality Information Database Handbook, 7 May 96.

f. All projects continuing into the next fiscal year (FY+1) or starting in FY+1 are briefed at the TAR (described in Section IV) by the Focused Technology Area Manager (FTAM) or EQA and EQM project managers. The briefing materials for these projects are prepared by the project managers and are an integral part of the internal approval process. TARs are described in detail in the Program Execution section. See Section IV.

g. Each year, starting in December, EQA and EQM are tasked by EQPP to provide descriptive information for the Human Systems Technology Area Plan (TAP). This annual plan, which contains narrative project descriptions and funding information for 6.2 and 6.3 research planned for the current FY through FY+7, is the program approval document for AFMC/ST and SAF/AQT. It is comprised of two parts - narrative research descriptions by technology area including macro-level (level 1) roadmaps (shows major research areas by FY without funding) which are submitted to SAF/AQ no later than 1 April and the annexes including, but not limited to, level 2 roadmaps (lists all projects with funding by FY), Technology Investment Plans (TIPs) (see Section III), and financial summaries), which are submitted no later than 1 August to allow for budget adjustments which affect these documents. EQPP, the AL/EQ OPR for the TAP, distributes the AFMC/ST TAP guidance with the annual tasking letter. This guidance is similar from year to year with only minor variations.

h. TIPs are the program planning documents approved by AFMC/ST or AL/CC for new start contractual solicitations or external efforts less than $25 million of S&T (6.2 and 6.3) funding. New starts of $25 million or more require an Acquisition Investment Plan (AIP) in lieu of the TIP and are approved by SAF/AQT. A TIP/AIP must be approved before funds can be committed for any specific contract action (RFPs, etc.) All of the FY+1 TIPs/AIPs are included as an annex in the TAP. EQPP is also the OPR for TIPs/AIPs. Guidance is found in Appendix E.

i. A Work Unit Information System (WUIS) worksheet must be completed during the project planning phase to enter project information into the Defense Technical Information Center's database of ongoing and completed DoD research. The initial WUIS worksheet is submitted to the EQPP secretary for entry into the database. A copy of the completed EQ Form 0-2, AL/EQ Coordination Form for WUIS Form, and WUIS worksheet are returned to the project manager to be filed in the R&D Case File. Samples of the WUIS worksheet and EQ Form 0-2 are included in Appendix F. Refer to the

Armstrong Laboratory Work Unit Management Handbook and the Armstrong Laboratory *Project Manager's Guide to the Scientific and Technical Information (STINFO) Program and Technical Publications Process*, AL-EQ-HBK-61-202A, for additional information on the requirements for work unit documentation.

j. All project proposals must be evaluated for adverse environmental impacts. The project manager completes an AF Form 813, Request for Environmental Impact Analysis, and submits it to the AL/EQ Environmental Officer for approval as well as to the Laboratory Director. The evaluation normally results in a Categorical Exclusion (CATEX) due to the small amounts of contaminants used/released for our research purposes. The approved form must be maintained in the R&D Case File.

k. Good technology is often put on the shelf because there is no place for it to go following advanced development. The way to avoid this is to market the technology to those organizations that can perform the next phase of the development. These organizations are typically the Logistics Systems Division (HSC/YAL) of the Human Systems Program Office, The Air Force Center For Environmental Excellence (AFCEE), or directly to a specific user (an Air Logistics Center or Base Civil Engineer Environmental Flight). Technology transition planning should be identified and initiated early in the project planning phase and transition planning and funds programming continued during project execution. Planned technology transition (see Section V) is critical to <u>every</u> project. A Technology Transition Plan (TTP) must be prepared for 6.3 S&T projects with funding greater than $2M, duration less than 4 years, and that will result in an Advanced Technology Demonstration (ATD) (see Section V). (<u>Note</u>: this latest guidance significantly reduces the number of TTPs required; previous guidance said for all ATD projects regardless of value). The TTP should be completed before the start of the FY in which the project enters 6.3. EQPP and the project managers produce these plans as a cooperative effort, following the guidance in S&T OI 80-1, Technology Transition Plans, 15 Oct 93. See Appendix G. This guidance does not eliminate the need to plan for technology transition for projects not meeting these criteria. Continuous dialog with the technology recipient during development will ensure the data needed for technology transition is available when the project is ready for transition. Contracts, MIPRs, and agreements should include the appropriate CDRLs for specifications and drawings needed for transition. The Project Manager is responsible for preparing the technical and programmatic sections of the TTP while EQPP will develop and coordinate the Technology Transition Plan (obtaining gaining organization approval of the TTP) prior to the beginning of the Advanced Development phase.

l. Each year, project managers are tasked to provide project input for the Air Force Environment, Safety, and Occupational Health (ESOH) Research, Development and Acquisition (RD&A) Strategic Plan. The Air Force ESOH RD&A Strategic Plan feeds into the Tri-Service Environmental Quality R&D Strategic Plan. These plans capture the Air Force and DoD planning strategies for environmental research and development. Environmental planners in both agencies use the prioritized user needs to establish recommendations for resource allocation. The Tri-Service Environmental

Quality R&D Strategic Plan is furnished to Congress for review of the Services' research programs. HSC/XRE is the office of primary responsibility (OPR) for producing the Air Force Plan; the Tri-Service plan is produced on a rotational basis by the three Services. Most of the required EQ project information is extracted from the EQ information database and the TAP roadmaps. Some data fields for the Strategic Plan datasheets may be slightly different from the above sources.

m. Defense Technical Area Plan (DTAP): The DDR&E executive will request an annual program review (Washington area) by the Tri-Service "Pillars" (Cleanup, Compliance, Pollution Prevention, Conservation & Stewardship). The Pillar Chiefs brief their respective areas; our Division Chiefs attend to support their pillar (EQA for Cleanup, EQM for Pollution Prevention and Compliance).

4. Recurring Program Reviews: Each year, the Directorate participates in numerous annual program reviews. The Division Chiefs will require project managers to prepare briefing materials and/or to attend the reviews and brief.

a. The first of these is the TAR briefings to the AL/EQ senior management discussed previously.

b. Contract Business Strategy Reviews (BSR): The BSR is a review of all 6.2 and 6.3 contract new starts for the next fiscal year. It is conducted normally in January. The purpose of the BSR is for the directorates to brief their new contract business strategy to BSR members and receive formal guidance. The BSR is chaired by the Armstrong Laboratory Director. Members include the AL Chief Scientist, Directorate Directors and Chief Scientists, HSC/PKR, and AL/XPP as secretariat.

c. The Spring Review is conducted annually by the Technology Executive Officer (TEO) (HQ AFMC/ST) to approve the S&T program described in the Human Systems TAP. The Division Chiefs will request briefing materials in a prescribed format and contents.

d. During June and July following the Spring Review, the planning cycle encompasses the 6.3 Reviews at the MAJCOMs. The MAJCOMs may select some AL/EQ projects to review (usually Advanced Technology Demonstration (ATD) projects only) because of special interest or need for more information. Project managers may be called on to brief the selected programs. Close coordination is necessary before these briefings to ensure that they are relevant to the user, in terms of reference and understanding. After the reviews are completed, the MAJCOMs score the programs on a scale of 6 to 10 (10 being the highest), according to the program's importance to the command. The scores indicate how well the program meets the user's needs, as well as how it is put together with respect to cost, risk, and schedule. This scoring is important in prioritizing the 6.3 programs in the Air Force, because of limited funds. Programs which

receive low scores (<8.0) are vulnerable to cancellation. AFMC will attempt to fund all ATDs which make the MAJCOM "top 10" priorities.

e. New SERDP proposals and the status of ongoing SERDP-funded projects must be briefed each year by the Division Chiefs. Location is the Washington area. Project managers provide briefing materials/status information to their Division Chief.

f. SERDP proposals exceeding $1M in the first FY of the project must be briefed by the project manager to the SERDP Scientific Advisory Board (SAB). This board evaluates the science and payoffs of the proposed technology and will either approve the funding as requested or adjust it (usually decrease but may be increased also).

g. The Air Force ESOH RD&A Strategic Plan Review Board is held each year at various locations. HQ USAF/CEV chairs the meeting which is conducted by HSC/XRE. Division Chiefs, or their designated representatives, attend to defend the relative ranking of the AL/EQ projects (by pillar). Other attendees are the users, MAJCOM CEV/EM, the Air Logistics Center/EMs, AFCEE, HSC/YAL, and other laboratory representatives.

h. The Tri-Service Strategic Plan review board meets on an as-needed basis to receive briefings, by pillar, and to approve the proposed user need prioritizations (and the projects which address them). Division Chiefs usually attend and may request others to attend and/or prepare briefing materials. The review usually occurs in the Washington area.

B. PROGRAMMING

1. Major Force Program (MFP): The DOD budget is comprised of 11 groupings of related resources called Major Force Programs (MFPs). They represent an aggregate of resources that reflect a capability of DOD. MFPs cross Service lines. Our research activities come under MFP 6, Research, Development, Test and Evaluation (RDT&E).

2. Program Elements: MFPs are subdivided into Program Elements (PEs). The PE, a six-digit code that identifies a specific mission within the MFP, is the basic building block of the DOD Future Years Defense Plan (FYDP) representing a combination of personnel, equipment, and facilities which constitutes a specific military capability or support activity. PEs are used throughout DOD. At the DOD level, the PE is the smallest subdivision at which costs are collected, summarized, and subsequently grouped by MFP. This allows actual performance to be measured against allocations so DOD managers can make budget decisions. A research project will have a PE that is used in all financial transactions. Our current PEs are 62202F (Exploratory Development) and 63723F (Advanced Development). The first digit of the PE identifies the MFP; the second digit the Research and Development (R&D) category; the third digit the commodity area; the fourth and fifth digits represent a program, and the sixth digit identifies the component. See Figure 4.

Program	6_____	Research & Development (MFP 6)
R&D Category	_1_____	Research
	_2_____	Exploratory Development
	_3_____	Advanced Development
	_4_____	Engineering and Manufacturing Development
	_5_____	Management and Support
	_6_____	Operational Systems Development
R&D Commodity Area (applicable to MFP 6 only)	__1____	Research (Military Sciences)
	__2____	Aircraft and Related Equipment
	__3____	Missiles and Related Equipment
	__4____	Military Astronautics
	__5____	Ships and Small Craft
	__6____	Ordnance and Combat Vehicles
	__7____	Other Equipment
	__8____	Management and Support
Program Identifier	___XX_	Serial Identification Number
Component	_____A	Department of the Army
	_____C	Ballistic Missile Defense Organization
	_____D	Office of the Secretary of Defense
	_____E	Defense Advanced Research Projects Agency
	_____F	Department of the Air Force
	_____H	Defense Nuclear Agency
	_____N	Department of the Navy
Example	63723F	Environmental Quality Advanced Technology

Figure 4. Illustration of the MFP 6 Program Element Structure (R&D)

3. Planning, Programming, and Budgeting System (PPBS): The Department of Defense (DOD) Planning, Programming, and Budgeting System is the resource management system used by the Secretary of Defense (SECDEF). The function of the PPBS is to develop a plan for meeting future defense needs, identify programs to satisfy those needs, and forecast the budget needed to implement the program. The DOD budget then becomes part of the President's Budget (PB) which is submitted to Congress. The FY86 DOD Appropriation Act implemented biennial appropriations for DOD and requires a 2-year budget submission in January of the odd-numbered years.

The programming phase is the point in the PPBS process where the Air Staff matches available resources against the most critical validated requirements to develop the Program Objective Memorandum (POM). The POM process is the vehicle through which EQ requirements are validated, and the accompanying resources are programmed

in the FYDP. Air Force Materiel Command (AFMC) develops its portion of the POM by ranking and prioritizing their programs based on inputs from the field and using commands. AFMC also uses "disconnect" and "initiative" support papers as an integral part of the POM process. Disconnects are requests for funding to rectify research programs with major unfunded technology gaps. Initiatives are funding requests for "desired" research if additional funding becomes available. Both disconnects and initiatives are defined by strict criteria and submission format.

4. AL/EQ's Role in PPBS: The Environics Directorate is tasked every 2 years to provide our POM input to Armstrong Laboratory who provides it, in turn, to AFMC. EQP personnel compile the projected funding, including disconnects and initiatives, for your research efforts to be conducted 2 years in the future. They develop their respective program element inputs in conjunction with the Director, the Budget Program Activity Code (BPAC), and you, the project managers. Program justifications, impact statements, and budget reduction scenarios are all worked at the Directorate level. AL/XPP integrates the inputs from all the Directorates and prepares a final package for the Laboratory Director's review and approval.

The programming of funds must include cost estimates for 6.4 (Engineering and Manufacturing Development) and 6.5 (Management and Support) R&D Categories. Because these two categories have been significantly underfunded in recent years, we must help the Human Systems Program Office (SPO) HSC/YA, develop cost estimates for them. Then the SPO and the users POM for the funding to bring the technologies on line when they're needed. This should be a high-priority issue for the Project Team.

C. BUDGETING

The Office of the Secretary of the Air Force, Director of Science and Technology (SAF/AQT) and the Air Force Material Command, Director of Science and Technology (AFMC/ST) are accountable for how the laboratories manage their allocated funding. They both track the S&T funding obligations (liabilities incurred) and expenditures (payments made) on a monthly basis and will reduce the Directorate's funding ceiling for future FYs with no hesitation if the quarterly percentages aren't attained consistently. That's why it's important for project managers to budget their shares of the Division's funding allocation and to have a spending plan for it. The bottom line is that if your obligations or expenditures fall behind without valid reasons, those funds may be taken from you by AL/EQ senior management and used for other projects.

EQP will assist the Divisions in preparing their budgets for 2 years into the future. They work with the Division Chiefs and project managers to spread the Division's funding ceiling over the planned research projects. The spending plan for your project, however, is primarily your responsibility to structure, defend, and track. EQPM tracks obligations and expenditures and reports this information in the monthly Financial Management Review (FMR). EQPM will assist you with available contracting options and tracking activities to ensure that your funding is utilized effectively and on schedule.

REFERENCES
PLANNING, PROGRAMMING, AND BUDGETING

1. Air Force Instruction (Draft) 61-206, Research and Development (R&D) Case Files

2. Air Force Instruction 61-105, Jul 1994, Planning for Science and Technology

3. Science and Technology Operating Instruction (S&T OI) 80-1, 15 Oct 1993, Technology Transition Plans

4. Armstrong Laboratory Work Unit Management Handbook

5. Project Manager's Guide to the Scientific and Technical Information (STINFO) Program and Technical Publications Process, AL-EQ-HBK-61-202A

SECTION III
CONTRACTING

A. PLANNING FOR THE CONTRACT

1. Pre-contract Actions: Before initiating a contracting action, the following actions must be completed: assignment of a Job Order Number (JON), Request for Environmental Impact Analysis (AF Form 813), submission of a Work Unit Information Summary (WUIS), and a literature search. If any of these items were not completed as part of the planning process, they must be completed before initiating contracting actions.

2. Technology Investment Plan (TIP): A Technology Investment Plan (TIP) is a program planning document approved by AL/CC and is required for each planned contractual effort funded with Science and Technology (S&T) dollars under $25 million. For contractual actions of $25 million or more, the TIP is replaced by an **Acquisition Investment Plan (AIP)**, a program planning document similar to the TIP, which must be approved by AFMC/ST. A TIP/AIP must be approved before funds can be committed for any specific contract action (request for proposal (RFP), etc.) If a TIP/AIP has not been previously approved covering the contracting mechanism to be used, a TIP/AIP for the specific effort/contract must be submitted and approved. All of the FY+1 TIPs/AIPs are included as an annex in the Technology Area Plan (TAP). If a TIP/AIP was not approved as part of the TAP, an out-of-cycle TIP/AIP must be submitted and approved before contracting the effort. Current approval time is 30-45 days. EQPP and EQPM personnel should be consulted concerning TIP/AIP requirements and status for a particular effort and the projected contracting mechanism.

3. Planning for the Contracting Process: The contracting process begins when a contracting mechanism is identified. The projected contracting mechanism, the technical approach, and project milestones should be reviewed and, if necessary, updated. Based on the anticipated contracting mechanism, the schedule for contracting can be projected and support from acquisition support personnel can be obtained. The contracting schedule determines when the contract will be awarded and thus determines when funds are obligated and when expenditures will start. Typical procurement times for various contracting actions are shown in Figure 5.

4. Acquisition Strategy Panel: An Acquisition Strategy Panel (ASP) is required for all efforts that will be contracted. The purpose of the ASP is to determine the method of contracting to be used for a particular project. Ideally, the ASP should be convened at least 18 months before the desired date of contract award. The Acquisition Strategy Panel consists of the Contracting Officer or Contracting Officer's Representative, the Project Manager, a Representative from EQPM and any others needed to make an informed contracting decision. The Acquisition Strategy Panel can range from a formal panel to telephone conversations between the Contracting Officer/Contracting Officer's Representative and the Project Manager depending on the Contracting Officer, the contracting mechanism and the anticipated dollar value. Contracting questions and issues

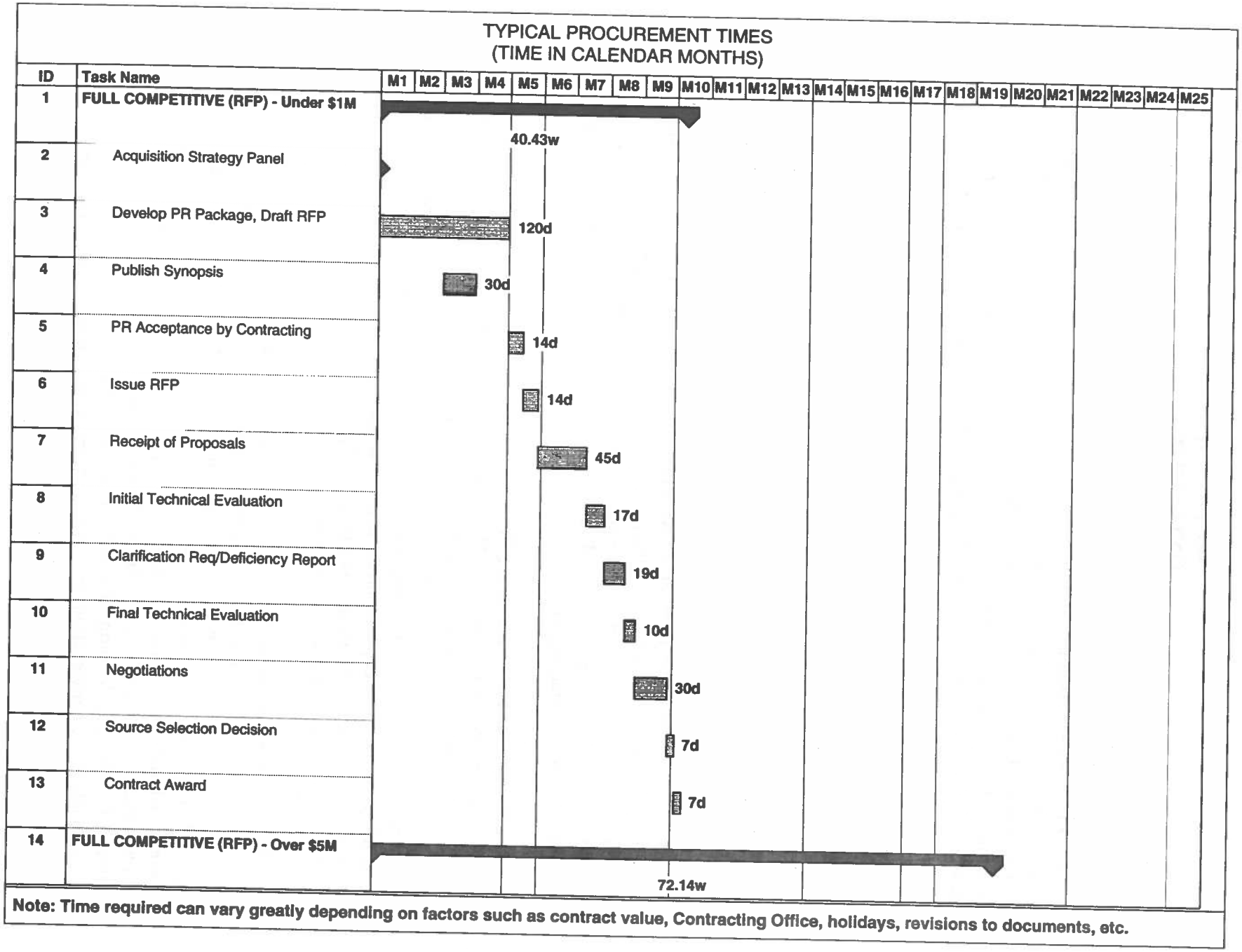


Figure 5. Typical Procurement Times

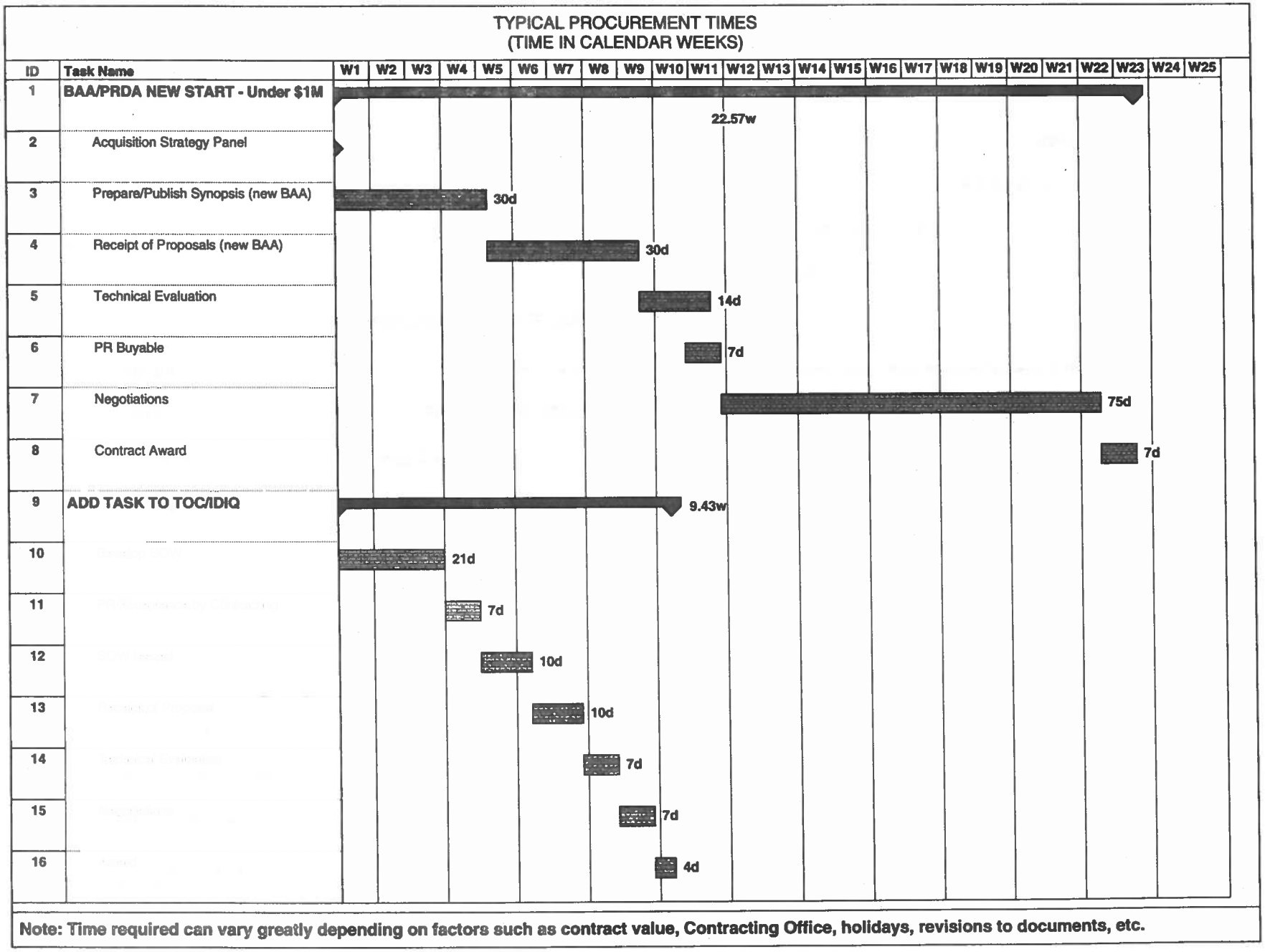


Figure 5 (Continued). Typical Procurement Times

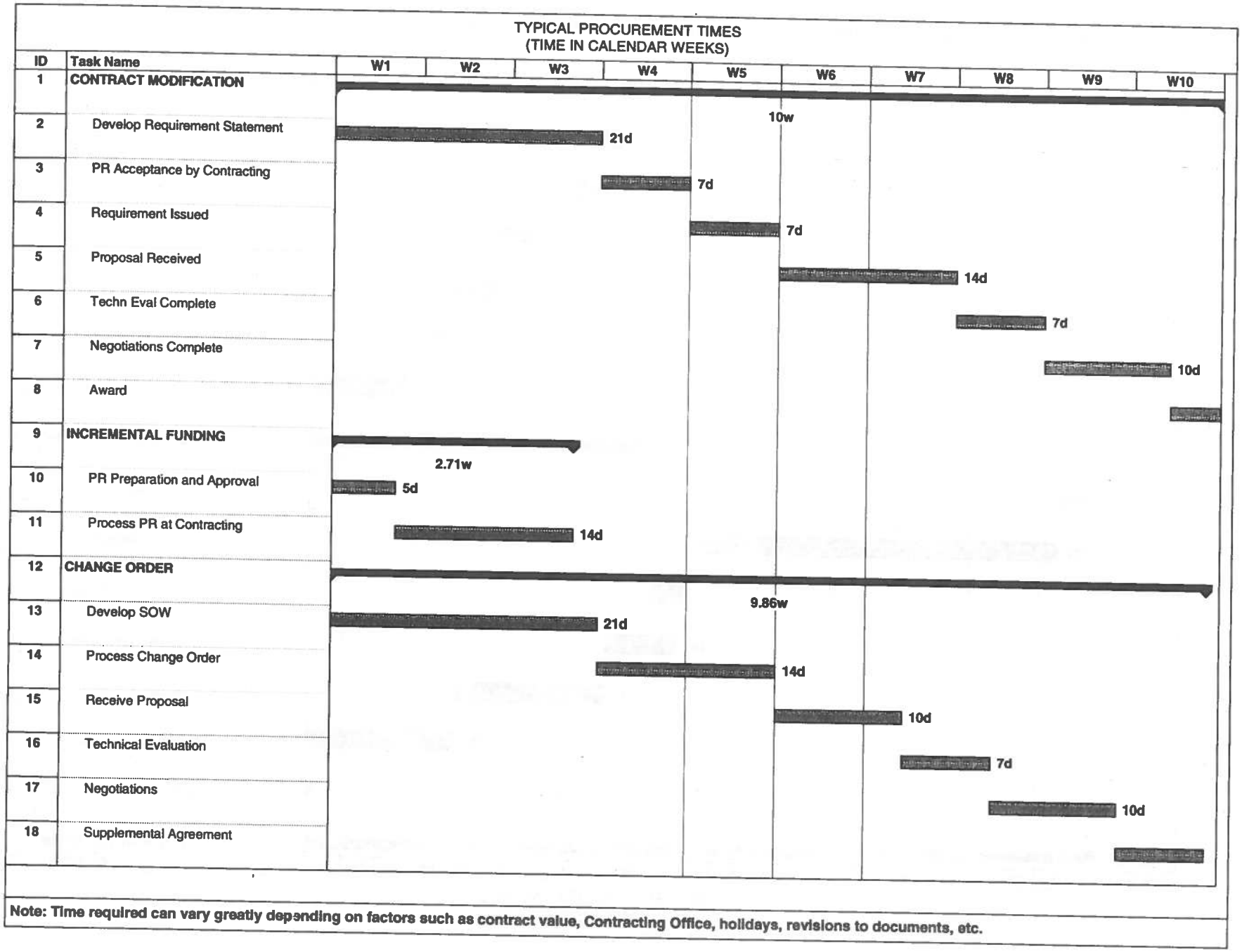


Figure 5 (Concluded). Typical Procurement Times

should be aired and resolved. This is also the time to determine whether the Contracting Officer will approve special contracting considerations such as the Justification and Approval (J&A) and Determination and Findings (D&F) for a sole source contract.

Note: Contracting Office time frames normally start when a complete Purchase Request package is received in the Contracting Office. Accounting or financial system audits, although part of the Contracting Office's timeframe, may be affected by auditing agency schedules or deficiencies in the contractor's accounting procedures.

5. Commerce Business Daily: Information pertaining to current or planned procurements is communicated to potential vendors through the Commerce Business Daily. A Sources-Sought Synopsis solicits qualified sources for a planned contracting action. Solicitations are advertisements of a contracting action. A Request for Information can be published to determine interest in or capabilities to perform R&D in a particular area. None of these constitutes obligation by the Government.

6. Foreign Disclosure: If work will or may be performed by a foreign-owned company, the foreign disclosure process must be completed. The purpose of foreign disclosure regulations is to prevent disclosure of sensitive or secret military information. If work will be subject to foreign disclosure requirements, the Foreign Disclosure point of contact (POC) in EQPP should be consulted well in advance and additional time should be allowed for foreign disclosure clearances (See Section VI for additional information).

B. TYPES OF CONTRACTS

The Procuring Contracting Officer (PCO) will determine the type of contract after consulting with the Project Manager. The type of contract must be compatible with the technical requirements of the work and must provide incentives necessary for successful completion of work.

1. Firm-Fixed Price (FFP): A Firm-Fixed-Price (FFP) contract commits the Air Force to pay a specified total price upon completion of the work and acceptance of the items or reports required. It gives the contractor the greatest incentive to reduce costs and maximize profits. It places performance risk on the contractor and reduces the Air Force's administrative tasks. Because of the indefinite nature of most Research and Development procurements, costs cannot be estimated realistically enough to justify the use of an FFP contract.

2. Cost-Reimbursement: There are five types of cost reimbursement contracts; Cost-Plus-Fixed-Fee (CPFF), cost-plus-award-fee (CPAF), cost-plus-incentive-fee (CPIF), cost-sharing, and cost. CPFF is the type of cost reimbursement contract usually used in AL/EQ. The Research Support Contract is a cost-plus-award-fee (CPAF) contract. A reimbursable contract places a burden of responsibility for both performance and cost control on the Air Force. Federal Acquisition Regulations incorporated by reference into the contract describe allowable and unallowable costs. Cost reimbursable

contracts result in a significant administrative burden for both the Air Force and the contractor. A CPFF contract places a burden of responsibility for both performance and cost control on the Air Force. Specifics within the Federal Acquisition Regulation (FAR) incorporated into the contract describe allowable and unallowable costs. A CPFF contract results in a significant administrative burden for both the Air Force and the contractor.

Cost-Plus-Fixed-Fee (CPFF): Under a CPFF contract, the Air Force pays the contractor actual allowable costs, plus a fixed fee. The Air Force is obligated to reimburse the contractor for allowable costs, whether or not performance is satisfactory. If the contractor cannot finish within estimated costs, and the Air Force elects to provide additional funds for completion, the amount of the fixed fee is not changed.

Cost-Plus-Award-Fee (CPAF): A CPAF contract, like a CPFF contract, provides for reimbursement of the contractor's allowable costs. Instead of a fixed-fee, an award fee is paid based on subjective evaluation of a contractor's performance at stated time(s) during the performance period. The maximum award fee and plan for determining the award fee are specified in the contract.

Cost-Plus-Incentive-Fee (CPIF): A CPIF contract, like a CPFF contract, provides for reimbursement of the contractor's allowable costs. Instead of a fixed-fee, an incentive fee is paid based on performance incentives clearly spelled out and objectively measurable. Fee range should be negotiated to give the contractor an incentive over various ranges of cost performance. Total fee usually cannot exceed the statutory limits allowed in the Federal Acquisition Regulation.

3. Level of Effort: The term level of effort refers to contracting for a fixed quantity of a product or service, usually man-hours. Work can be performed until the number of hours contracted for or the authorized funding is expended. If the project is not completed when the ordered quantity is expended, additional funds must be added to purchase additional man-hours or work on the project must stop.

C. CONTRACTING MECHANISMS

1. Full-Competitive (Request for Proposals or RFP): The full competitive contracting mechanism solicits responses from vendors using a Request for Proposal (RFP). The main advantage lies in being able to obtain the widest response, resulting in the best contract value that meets Air Force needs. The competitive RFP mechanism is best suited for efforts that can be clearly described and that will result in a specific well-defined product.

This method requires the most planning, the most work, and the longest lead time, but provides the project manager the greatest amount of control and flexibility. Tradeoff of cost for technical quality during the evaluation of proposals must be fully justified. The contracting process usually starts with a Sources-Sought Synopsis published in the

Commerce Business Daily to identify qualified contractors who will subsequently be provided the RFP. The Solicitation, Information for Offerors, Evaluation Criteria, Statement of Work (SOW), Specifications, and Contract Data Requirements List make up the RFP. A Source Selection Plan may also be required prior to RFP release. Proposals are evaluated and deficiencies and clarifications are resolved. See Appendix H for technical evaluation guidelines. Total dollar value of the contract determines many steps in the contracting process for this mechanism. Set-asides for small and small disadvantaged businesses may result in limited competition.

2. Sole Source Contract: A Sole Source contract solicits a response from only one contractor. In addition to the SOW and CDRLs, the Project Manager will draft the Justification and Approval (J&A) for the Contracting Officer's approval. The J&A documents that there is only one available source and the efforts made to locate additional qualified sources. A patent position to which the Government does not have rights (work leading to patent was not paid for by the Government) will help justify a sole source contract. If the Contracting Officer agrees, the contracting office prepares a Determination and Findings (D&F). Successful award of a sole source contract is not assured until Contracting Officer and Competition Advocate approvals are obtained. Sole source contracting can take as long as using an RFP and the contracting action could be disapproved, leaving the Project Manager to start over. As with the RFP mechanism, EQPM and the contracting office should be contacted well in advance.

3. Unsolicited Proposals (UP): Potential contractors will occasionally ask about submitting a proposal without responding to a solicitation. The proposal, if submitted, would then be an Unsolicited Proposal. Unsolicited Proposals must be received though the Contracting Office. UPs are difficult because they must meet strict regulatory requirements. UPs must truly originate with the contractor and must be unique and innovative. If the work to be proposed is of real interest, and an appropriate solicitation is available, the offeror should be encouraged to submit the proposal as a response to an advertised solicitation in the Commerce Business Daily. If it is not of real interest, both the Project Manager and the offeror's time and effort will be wasted.

4. Indefinite Delivery/Indefinite Quantity (ID/IQ) and Task Order Contract (TOC): An ID/IQ or TOC contract provides a contractual vehicle for procuring research as needed. The initial contract is awarded using the full competitive/Request for Proposals mechanism. After contract award, additional work (tasks/delivery orders) can be added relatively easily. The prime contractor may perform the work himself or subcontract to obtain facilities or expertise not present in the contractor's organization, making ID/IQ and TOC contracts very flexible.

AL/EQ's current ID/IQ contract is divided into five technical areas: Area 1, Environmental Monitoring, Sensors, and Detection; Area 2, Environmental Modeling; Area 3, Chemical/Process Engineering; Area 4, Biological Treatment Technology; and Area 5, Chemical/Physical Treatment Technology.

The first step for adding work to an ID/IQ or TOC contract is to prepare a Statement of Work and a government cost estimate (GCE). See Appendix C. A Contract Data Requirements List (CDRL) is also required for any data deliverables not included as part of the basic contract (see Appendix I). The Purchase Request (AF Form 9), along with the SOW, CDRL and GCE, is forwarded to the Contracting Office. The contractor proposes his cost, based on the SOW and the existing contract. Costs can then be negotiated, the task/delivery order awarded, and funds placed on contract. If available funds are insufficient, a narrower SOW can be negotiated.

In addition to being a relatively easy and rapid contracting mechanism, ID/IQ or TOC contracts are useful for problems that require additional definition or comparison of competing technologies to determine the best approach and these tasks exceed the Project Manager's available time or expertise. The contractor will have an established track record after a year of so of performance under an ID/IQ or TOC. The cost of additional overhead is a significant disadvantage when a large portion of a task will be subcontracted.

5. Broad Agency Announcement (BAA) and Program Research and Development Announcement (PRDA): BAAs are used to solicit proposals in a broad area of interest; PRDAs are used for a broad area of interest but with a specific goal included. The contractor's proposal normally becomes the statement of work (SOW). The project manager prepares the contract data requirements lists (CDRLs) for data deliverables. See Appendix I. Time and effort required for contracting is reduced compared to a RFP. Advanced Technology Development (6.3A or equivalent) efforts should be focused enough that a PRDA, rather than a BAA, will be appropriate. The Contracting Officer determines whether the solicitation will be a BAA or a PRDA.

6. Small Business Innovation Research (SBIR): The SBIR program is a DoD solicitation and a three-phase program - Phase I, Proof of Concept; Phase II, Technology Development; and Phase III, Commercialization - open to qualified small businesses. Please recognize that SBIR contracts are not intended as alternatives to the other contracting mechanisms available to us as project managers. The small business retains data rights for 5 years after contract completion. The data rights effectively limit further development to the performing small business. SBIR funding provided by the AF SBIR program is currently limited to $80K for Phase I and $750K for Phase II. Other DoD and government agency funded SBIR programs may differ from the AF SBIR program with regards to funding levels and procedures. There is no AF SBIR program funding available for Phase III. However, AL/EQ science & technology (S&T) funding may be used for Phase III in combination with contractor funding from a variety of sources, i.e. business, private backing, etc. The number of proposals that receive SBIR funding is limited by availability of SBIR funds, particularly in Phase II. Other funding can be used in place of or to supplement SBIR funding. SBIR projects must be approved by an Armstrong Laboratory SBIR selection board, regardless of the funding source. Solicitations for Phase I proposals are normally published twice each year, once in October and once in April, although the Air Force generally does not participate in the

spring solicitation. The solicitation is organized into topics. In addition to environmental R&D in a general Armstrong Laboratory topic, 3 or 4 specific topics from the Environics Directorate are published each year. Phase II proposals are submitted at the sponsoring agency's request, following completion of a Phase I contract. The contractor's proposal becomes the Statement of Work and the Project Manager prepares the CDRL(s). For more information on the SBIR program, consult EQPP or the most recent SBIR solicitation.

7. Small Business Technology Transfer (STTR): The STTR program is similar to the SBIR program, but has only one announcement per year. Under the STTR program, small businesses team with universities to develop and transfer technology based on the university's research. More detailed information can be obtained from the most recent STTR solicitation or by consulting EQPP.

8. Cooperative Efforts: The primary mechanism for cooperative research with industry is the Cooperative Research and Development Agreement (CRDA). Advantages of cooperative agreements include leveraging of Air Force funding, experience and expertise provided by industry and improved technology transfer. In identifying and planning for cooperative agreements, four questions should be answered: "What does the Air Force provide?" "What does industry provide?" "What does the Air Force gain?" What does industry gain?" Access to lab facilities, technical expertise and government equipment are examples of possible Environics Directorate contributions to cooperative agreement. Demonstration sites, scientific manpower and operations manpower are examples of possible industry contributions. AL/CC is the approval authority for CRDAs and other cooperative agreements.

9. Research Support Contract.

a. Direct Support Group (DSG) Contract: Research and development efforts can be performed under a DSG of the Research Support Contract. The DSG is also used to provide acquisition support to EQA and EQM (see Section I. D.), and to provide planning support to EQPP. The contractor provides scientific, technical, and acquisition support manpower in accordance with position descriptions and contract limitations on the number of positions. The government provides facilities and technical oversight.

If a project is to be successful, the Project Manager must communicate to DSG contract personnel and their management the detailed objectives, project plans and tasks for the project. A project schedule should be agreed to. Contractor personnel are assigned to individual task orders (task order contract) which are broad descriptions of the area in which work will be performed. Contract modification is not required for changes in work as long as the work remains within the scope of the original task order contract. The Procuring Contracting Officer (PCO) makes the determination and should be consulted as early as possible. Thus, the DSG contract is responsive to Air Force needs. Other advantages are relatively easy contracting and rapid startup if DSG contractor personnel are already available. The Research Support Contract can also be

useful when the problem requires additional definition, when competing technologies need to be compared to determine the best approach, and when these tasks exceed the Project Manager's available time or expertise. Startup for efforts that require hiring of additional contractor personnel, adding new individual Task Orders, or adding new position descriptions will take longer.

b. Supplemental Support Group (SSG) Contract: Efforts which cannot be performed under a DSG contract can be performed under a SSG of the Research Support Contract. The contractor will either perform the work off-site using corporate resources or subcontract the work. The requirements for adding work to the SSG are the same as for adding a task to a task order contract (TOC) or ID/IQ contract.

D. FUNDS TRANSFER/OBLIGATION DOCUMENTS

1. AF Form 616, Funds Cite Authorization (FCA): An FCA is used to send funds to another Air Force organization for performance of work. FCAs do not go through the contracting office. Work to be performed should be specified on the AF Form 616 or by attaching a Statement of Work or other documentation. Periodic and final reporting requirements, along with any other deliverables, should also be specified. If a large effort is to be performed under an FCA, documentation of agreement on responsibilities, such as by a Memorandum of Understanding (MOU) or Memorandum of Agreement (MOA), is recommended. Upon acceptance of an FCA by the receiving organization, the funds are committed but not obligated. Funds are obligated when the receiving organization expends them or obligates them with a contract or AF Form 9 purchase.

2. DD Form 448, Military Interdepartmental Purchase Request (MIPR): A MIPR is used to send funds to DoD and other government agencies. Functionally, it is the same as an FCA. The use of MIPRs is limited when dealing with non-DoD agencies. Prior to sending funds to a non-DoD government agency, a Determination and Findings (D&F) must be prepared and approved. A D&F is justification for the use of DoD funds by a non-DoD agency, e.g. Environmental Protection Agency (EPA), National Oceanographic and Atmospheric Agency (NOAA), etc. There is no assurance that a D&F will be approved. In general, if the funds will merely be placed on contract by the non-DoD agency, the D&F will not be approved. If the work is to be performed in government facilities by government employees, and the work cannot be performed by the private sector, a strong case can be made and the D&F may be approved. Joint funding for work of mutual interest may also be sufficient to obtain D&F approval. In Armstrong Laboratory, AL/CC is the approval authority. The restrictions do not apply to sending funds to other DoD agencies.

There are numerous examples of MIPRs. One example is funds sent to the National Defense Center for Environmental Excellence (NDCEE). The mission of NDCEE is to demonstrate pollution prevention technologies under simulated factory conditions and transfer the technologies to both DoD industrial organizations and to industry. NDCEE is located in Johnstown, PA and is operated by a contractor. The Contracting Office is in

the Army's Armament Research, Development and Engineering Command (ARDEC) at Picatinny Arsenal, NJ. Adding work to the NDCEE contract is identical to adding work to an ID/IQ or TOC contract, except that the government cost estimate is sent to the contractor along with the SOW. Sending the GCE to the contractor is unique to the NDCEE contract. Funds are sent to ARDEC on a DD Form 448, Military Interdepartmental Purchase Request (MIPR).

3. AF Form 185, Project Order: A project order is a mechanism to fund work performed in-house by another government agency, similar to a FCA or MIPR, but not used for "contracted" work. The advantage of a Project Order is that funds are obligated upon acceptance by the receiving organization.

4. See EQPM (Program Control) personnel for assistance in completing funds transfer and obligation documents.

E. ORDERING SUPPLIES AND EQUIPMENT

1. AF Form 9, Request for Purchase and AFMC Form 36, Purchase Request: The Purchase Order is used for purchasing supplies, equipment, services, and facilities construction and maintenance for research projects and division needs. The time required for AF Form 9 purchases depends on the cost and availability of the supplies, equipment, services, and facilities. An equivalent form, AFMC Form 36, is submitted to AFMC contracting offices.

2. Credit Card: A credit card is maintained in EQL. It is used for routine purchase of laboratory supplies that are not ordered through the National Stock Number System.

3. Research Support Contract (RSC): The material and supplies Contract Line Item Number (CLIN) in the RSC can be used for purchasing materials and supplies needed for DSG research efforts. The current RSC does not have a CLIN for equipment, and equipment must be purchased through government channels. The RSC can be used only when it is not feasible to purchase the supplies/equipment through government channels. Time limitations are not adequate justification if the purchase could have been anticipated in time to use government channels. Consult the contract monitor in EQPM if there are questions of whether specific items are supplies or equipment. Fabrication of major equipment, such as a field demonstration system, can be contracted through the Supplemental Support Group (SSG) of the RSC.

F. SUBCONTRACTING BY THE PRIME CONTRACTOR

Prime contractors may choose to subcontract work that is beyond their capabilities. The Air Force's only legal and contractual relationship is with the prime contractor. The Air Force is not a party to subcontracts (privity) and involvement with subcontracting issues is limited. However, subcontractor performance affects overall performance, schedule and cost, and the Air Force has an interest in the subcontracting process. For

almost all contracts, the Air Force's interest in the subcontracting process is adequately represented by the provisions of the prime contract (written or incorporated by reference), the Statement of Work and the project schedule. The contractor is expected and trusted to choose a suitable source. In general, subcontracting will be of special interest only when a major portion of the R&D effort will be subcontracted and even then only in special situations. The Project Manager may need to represent the Air Force's technical and programmatic interests. If the Air Force's interest in subcontractor selection and the subcontract SOW/schedule may need special representation, the Project Manager should consult the Division Chief and then work through the Contracting Office. *The Contracting Office should have the lead role, with the Project Manager supporting the Contracting Office on technical and programmatic issues.* Subcontracting as it relates to program execution is discussed in Section III, Program Execution.

G. PURCHASE REQUEST PACKAGE

The elements of the Purchase Request (PR) Package for five commonly used contracting mechanisms are shown in Table 1. The funding document transmits funds required for the contract. The funding document will be an AF Form 9, Request for Purchase or AFMC Form 36, Purchase Request (contracting office under AFMC). Work to be performed under the contract is specified in the Statement of Work or in the Proposal and the performance schedule gives the time allowed for completion of work. The Contract Data Requirements List (CDRL) documents data deliverables. The PR must include documentation (usually letters) of the availability of any Government Furnished Equipment or Services. Information for the Contracting Officer provides the Contracting Officer with information needed to negotiate and award the contract. Information for the contracting Officer is also used to highlight areas of concern to the Project Manager. As an example, if we want the Contracting Officer to negotiate the proposed cost down to funds budgeted, areas and amounts for cost negotiation would be recommended. For an ID/IQ or TOC contract, the cost estimate forms the basis for price negotiations with the contractor. Technical and Cost Evaluations communicate the results of our evaluation of a contractor's proposal. Time and effort devoted to the Purchase Request Package will be well spent. A complete and well-documented PR package will allow the contracting office to proceed with the contracting action and will result in the earliest possible completion of the contracting action.

H. ROLE OF THE CONTRACTING OFFICER (CO)

The Contracting Officer (CO) (government contracting official) is responsible for publishing the solicitation, preparing contract documents, receiving proposals, negotiating the contract and administration of the contract. The CO ensures that the contracting process is conducted in accordance with applicable regulations and laws including the Federal Acquisition Regulations (FAR). The CO has sole responsibility for the contract, with authorization coming from his warrant, and may delegate work to a Contracting Specialist or Buyer. However, the final decision and final responsibility remain with the Contracting Officer. Only the CO can obligate funds or change the

TABLE 1
ELEMENTS FOR PURCHASE REQUEST PACKAGE

	BAA or PRDA	SBIR or STTR	Research Support Contract (DSG)	Research Support Contract (SSG)	ID/IQ or TOC
Purchase Request	X	X	4	X	X
Statement of Work			1	X	X
Proposal (serves as SOW)	X	X			
Performance Schedule	3	3	1	X	X
CDRLs	X	X	1	X	2
Information for Contracting Officer	X	X			
Cost Estimate			5	X	X
Technical Evaluation	X	X			
Cost Evaluation	X	X			X
Documentation of Any Gov't Furnished Equip/Support	X	X		X	X
Estimated Time to Award					

Notes:

1. Detail provided in PR package and contract documents may be inadequate for good project management.
2. If data items not required under basic contract are needed.
3. Schedule contained in proposal may be used.
4. Purchase request for entire in Research Support Contract is submitted by EQPM.
5. Negotiated costs are already part of the contract. May be required when new position description is being added.

contract. The term Contracting Officer's Representative (COR) may refer to the Contracting Specialist or to an individual representing the CO in another aspect such as technical aspects. For a given contract, the CO will be AL/EQ's first contact with the Contracting Office. After a Contracting Specialist or Buyer is assigned, he will normally become the Point of Contact for AL/EQ.

I. DISCUSSIONS WITH VENDORS

The Project Manager can discuss all technical information requested by a contractor (vendor), however, the only person who can obligate the Government is a CO. If you have done a synopsis for a contract of any type, calls from a contractor should be referred to the CO. The contractor can ask his questions on both technical aspects and cost at that time. The CO or Contract Specialist will discuss those things regarding the contract, can write the technical questions and give them to the Project Manager to answer. If the Contract Specialist refers a contractor directly to you, you should annotate the questions and answers and give them to the CO. The purpose of this is to ensure that one contractor does not have information other contractors do not have. (This also prevents protests). If the information given changes the requirement or embellishes the requirement, then the CO will put out an Amendment to the solicitation to give the word to all proposers. If you don't have a solicitation ongoing and just receive questions on areas of interest, feel free to discuss these with vendors. **CAUTION:** Just discuss technical aspects. If there is any doubt, consult with the CO or refer the contractor/vendor to the CO. **NEVER** give a contractor/vendor a Government cost estimate. A Project Manager should never discuss money, delivery or performance, or up front knowledge that you will be seeking a contract in the near future. The only time a vendor should know about an upcoming contract is through the Commerce Business Daily synopsis.

J. CONTRACT NEGOTIATIONS

The Project Manager supports the CO in the negotiations with the contractor. Project Manager assistance may be required in technical aspects of the project, project schedule or costs. Depending on the difficulty and complexity of negotiations, Project Manager involvement may range from simple clarification to concurrence with major technical, schedule or cost changes.

REFERENCES
CONTRACTING

1. Federal Acquisition Regulations (FAR)

2. Defense Federal Acquisition Regulation (DFAR) Supplements

SECTION IV
PROGRAM EXECUTION

A. PROJECT MANAGEMENT

The program execution phase of the program is the phase where active research and development (R&D) is being accomplished. Active R&D may be accomplished in the laboratory by government personnel, by other agencies of the government, or by contractors through contracted research. Regardless of the method of accomplishing the R&D, the Project Manager must ensure that progress is made toward the final goal of the project. To ensure progress, the Project Manager must be cognizant of the status of the research in relation to the resources provided (funding and manpower). The Project Manager ensures progress by keeping aware of the status of the project, comparing planned progress with resource expenditures and milestones achieved, providing guidance where necessary to bring the project to a successful conclusion. The following activities can be used for managing either in-house or contract projects with varying degrees of formality.

1. Kick-Off Meeting: The first activity to be performed for any research project is to have a project/contract kick-off meeting or team meeting. The purpose of the meeting is to ensure a mutual understanding of what the project is and what is expected to be accomplished. It is a good idea to conduct the kick-off meeting within 30 days after initiating active research on the project. The kick-off meeting should be called by the Project Manager and attended by as many of the people directly involved in the project as practical. For contract work, the kick-off meeting should be conducted as directed in the contract. This kick-off meeting is normally conducted at the contractor's facility and is chaired by the responsible Government Contracting Officer (Administrative Contracting Officer (ACO) or Procuring Contracting Officer (PCO)). Limitations of funds may require that the Project Manager represent all Government functions mentioned earlier. At the beginning of the kick-off meeting, notify the contractor that only the Contracting Officer can change any provisions of the contract and that no contract changes will result from this meeting. During the meeting, the Government should review each section of the contract to ensure the contractors are fully aware of their responsibilities to the Government and what they can expect from the Government. Particular attention should be paid to the Statement of Work (SOW) and Contract Data Requirements List (CDRL). Minutes of the kick-off meeting should be taken and published by the Contracting Officer or Project Manager. If required by the Contract Data Requirements List (CDRL), the contractor may take and publish minutes. Contract modifications needed as a result of the kick-off meeting must be issued by the ACO/PCO subsequent to the kick-off meeting. Close the meeting by again notifying the contractor that only the Contracting Officer can change any provisions of the contract.

2. AL/EQ Team Meeting: An AL/EQ team meeting should be called by the Project Manager and should include the Principal Investigator and the following AL/EQ

personnel: Technology Area Manager, Financial Analyst, Contract Specialist, STINFO Manager, and Program and Plans representative. Others may participate as required.

3. Progress Monitoring: Throughout the life of the project, the Project Manager is responsible for monitoring the progress of the project. This can be accomplished by reviewing reports from those performing the research, or by having periodic meetings (Team Meetings, Program Reviews, Design Reviews, etc.) with those conducting the research. Reports from those performing the research can be in the form of contributions to the Monthly Activity Report for in-house work, deliverable CDRL data from a contract, or periodic reports required by a Military Interdepartmental Purchase Request (MIPR) (DD Form 448), Project Order (AF Form 185) or Fund Cite Authorization (AF Form 616). Refer to the CDRL to determine the format, content, and frequency of the reports. You should monitor receipt of each CDRL data item and compare the status in the periodic report with the project schedule and anticipated status agreed upon in the kick-off meeting or contract/proposal. You should further investigate deviations from the expected status with the Principal Investigator, and mutually agreeable recovery plans/actions should be instituted. When deviations are due to subcontractors, the Project Manager must work through the prime contractor to achieve corrections. The Government has no contract with the subcontractor, only with the prime contractor. Actions may include formal notices to the contractor through the Contracting Officer. Discuss this alternative with the Contracting Specialist assigned to your project BEFORE beginning any formal action with the contractor. Ignoring deviations or accepting unrealistic get well plans will only allow the deviation to grow, resulting in a larger problem with less room for corrective action. A checklist for assessing the project is included as Figure 6. It may be necessary or required by the contract to conduct Program Reviews. Program Reviews are more formal presentations of program status and projected activities for the next period. Program Reviews should include all aspects of the project to include technical, management, and resources, and should include as many Government individuals associated with your project as practical, including the users. The cognizant ACO should always be notified before you visit the contractor's facility and be invited to participate. During the conduct of the project, it may become necessary to modify the contract between the Government and the contractor. NOTE: Only the Contracting Officer may change the contract between the Government and the contractor. If the Project Manager directs the contractor to do work contrary to the contract, this may be considered a "constructive change" to the contract, making the Project Manager personally liable for any costs incurred. Modifications to the contract follow procedures similar to those used for originally obtaining the contract. Refer to Section III for further guidance.

4. In-House Progress Monitoring: In-house projects often require more direct involvement by the Project Manager than projects conducted through other agencies or contractors. For an in-house project, the Project Manager must obtain a commitment from the performing Division on the resources to be used, the schedule to be maintained, and the product to be produced. Formalizing this commitment is a challenge for the Project Manager and requires constant vigilance to ensure the commitment is being

PROJECT MANAGER'S CHECKLIST

Program Documentation

Has the appropriate program planning documentation been input into the AL/EQINFO Database? Approved? Current?

Has a Request for Environmental Impact Assessment, AF Form 813, been submitted? Approved?

Has this project been entered into the Work Unit Information System (WUIS)? If not, submit WUIS worksheet. Update WUIS annually or when significant events occur.

Has a JON (Job Order Number) been assigned? Submit EQ Form 2, EQ Coordination Form for WUIS Form.

Has a TIP (Technology Investment Plan) or Acquisition Investment Plan (AIP) been submitted for new starts? Approved?

Funding

What is the current approved funding profile? Provide dollars by fiscal year and source (e.g., S&T {6.2, 6.3}, SERDP, DERA, outside agency, etc.)

Provide a budget for use of all funds.

Program Execution

Will this program be worked In-house? Other Agency? Contract Research Support?

If In-house, is manpower available? Plans for new manpower approved?

If other agency, has Memorandum of Understanding (MOU) been coordinated? How will funds be transferred?

What is contract vehicle? (ARA/BDM Support Contract, SBIR, BAA, ID/IQ, Other contract?)

Contracting

Has Acquisition Strategy Panel (ASP) been conducted?

Is Acquisition Plan approved?

Has Synopsis been published in the Commerce Business Daily (CBD)?

Figure 6. Project Manager's Checklist

Has Purchase Request (PR) Package been prepared? Purchase Request (AF Form 9/AFMC Form 36), Statement of Work (SOW), Contract Data Requirements List (CDRL), Information for Offerors (Section L), Evaluation Criteria (Section M), Government Cost Estimate

Source Selection Plan prepared? Approved?

Source Selection Evaluation Team identified? Notified? Facility identified?

Source Selection Evaluation Guide prepared? Approved?

Customer/User Interface

To what requirement/ESOH Need(s) does this project respond?

Who is customer interface? (Organization, Name, Office Symbol, Phone Number)

Has this project been discussed with the customer? Does he support this effort?

Is a field test/demo required? Location identified? Has a MOU been coordinated?

Technology Transition

Who will receive the product of this project? (Organization, Name, Office Symbol, Phone) Does this office agree?

Do the products of this project meet the needs of the technology recipient? (Specifications, Drawings, Manuals, Design Guides, Reports) Are the required data items called out in the contract/MIPR/MOU?

If a 6.3 Advanced Technology Demonstration (ATD), has a Technology Transition Plan (TTP) been prepared? Approved?

Has receiving organization programmed funding?

Figure 6 (Concluded). Project Manager's Checklist

fulfilled. When support contractor resources are applied to the project through the Direct Support Group, the Project Managers must ensure that the Task Directive for that task includes the work they expect; it may be supplemented by Project Manager guidance or supplementary expansion of the task description under the auspices of technical guidance from the Contracting Officer's Technical Representative. Task Directives are updated annually concurrent with the calendar/contract year. Supplemental Support Group tasks have individual Task Directives and provide the explicit guidance needed by the support contractor to complete the tasking.

B. TERMINATION

During the course of a project, it may become necessary to terminate the effort. This could be a result of a requirements change by the Air Force, or the thesis of the project being disproved, or another project having satisfied the requirement, or any other of a myriad reasons. Typically, efforts are terminated for the convenience of the Government (T for C) or for default by the contractor (T for D). The rules concerning termination are dependent upon contract type, but typically are structured to be fair to both the Government and the contractor. The Administrative Contracting Officer is a key individual to any decision to terminate a contract. In some instances it is less costly to let a contract go to completion or to the end of an option period rather than terminate the contract.

C. BUDGETING/FUNDING

At the conception of each project, a funding profile was projected and the first year budget was prepared expanding the projected use of first year funds for the project. During the first quarter of the fiscal year, the budget for the following fiscal year should be projected in the same manner as the initial year's budget. Care must be taken to account for all potential items of expense in the budget such as laboratory equipment, supplies, travel, assessments, funding for other Government agencies, contractor costs (in-house or other), etc. Shortages or overages should be identified to management for adjustment among projects. Prior year funding cannot be applied to a current or future year requirement without forward funding approval. Future year's effort should not be paid for with current year funds without forward funding approval. Future funding requirements should be reviewed at this time to ensure the funds profile remains consistent with project execution. The Office of the Secretary of Defense has established goals for obligating (placing orders, awarding contracts, etc. requiring future payment) and expending (rendering payment) research and development (appropriation 3600) funds. They should be 63% obligated by March of year 1 and 16% expended, 80% obligated and 32% expended by June, and 91% obligated and 46% expended by September. All funding activity should be closely coordinated with EQPM. Two years before a project is scheduled to transition to the next funding phase (6.2 to 6.3, 6.3 to 6.4) close coordination is required with the technology receiving organization to ensure proper programming of funds for them to receive the technology and continue development/ implementation.

D. PLANNING UPDATES

Throughout the life of a project, the Project Manager is responsible for the accuracy and current status of the planning documentation initially prepared in the planning phase of the project. If at any time during the execution phase of the project it becomes necessary to change the objectives, approach, method of performance, schedule of major milestones, resources programmed for a project, etc., the Project Manager must update this program planning documentation into the AL/EQINFO Database. It will be helpful to file copies of documented changes throughout the planning phase and a final update after contract award for continuity purposes. See Appendix D for the Draft Environmental Quality Information Database Handbook.

E. TECHNOLOGY AREA REVIEW (TAR)

All projects continuing into the next fiscal year (FY+1) or starting in FY+1 are briefed at the TAR by the Technology Area Manager (TAM) or EQA and EQM project managers. The TAR is a key step in the project approval process and gives EQ management an opportunity to review the status and management of each project and its contribution to the EQ mission. It also provides the opportunity for the Director to provide guidance to the Division Chiefs, TAMs and Project Managers, and to integrate and redirect the total EQ program. The TAMs must prepare for the TAR with current technical and management information for each project being reviewed. This briefing can be as simple as five or six charts per project providing a concept of the project, a description of the technical effort, a schedule for performing the project, an explanation of the funding for the project, and any issues or concerns with the project.

F. USER INTERFACE

Projects are initiated to solve user problems. User problems surface as needs in the ESOH needs survey. The users are the advocates for the projects that are being conducted to answer the needs they have identified. To continue support (and funding) for a project, a Project Manager must have the support of the users. The best way to foster this support is to be in continuous dialog with the users. Keep the user informed about the progress of the project and the prospects for the future. Invite the users to attend as many meetings pertinent to your program as possible. The facilities of the users should be strongly considered for sites to demonstrate the emerging technology and are a way to further involve the users in the technology development. If one Air Force organization has identified a need, it is possible that other organizations have the same or similar needs that your project can answer. The Project Manager can then build a support base for a project, ensuring its continuation to a successful conclusion. Monthly is not too often to update your users of progress on your project.

G. CUSTOMER SATISFACTION SURVEY

Each year Armstrong Laboratory distributes surveys to each customer of the Laboratory to ascertain their satisfaction with the Laboratory's performance over the past year. The customer assesses such items as responsiveness, applicability of technology to their needs, degree of interaction with the Laboratory, etc. The Customer Satisfaction Survey is helpful to ensure continued support of your program by Laboratory management which translates to continued funding for your project.

REFERENCES
PROGRAM EXECUTION

1. MIL-HDBK-245C, Military Handbook, Preparation of Statement of Work (SOW)

2. ESL-HB-88-01, Project Officer's Handbook, AFESC (predecessor to AFCESA) Engineering & Services Laboratory, Jul 88

3. Project Manager's Handbook, Air Force Armament Laboratory, Jan 82

4. Air Force Materiel Command (AFMC) Technology Transfer Handbook, 1994

5. Defense Acquisition Acronyms and Terms (Glossary), Defense Systems Management College (DSMC), Sep 91

6. The Program Manager's Notebook, Defense Systems Management College (DSMC), Undated

7. Phillips Lab Project Manager's Handbook,

8. MIL-STD-1521B, Technical Reviews and Audits for Systems, Equipment, and Computer Software

9. AFI 61-203, The Work Unit Information System (WUIS)

10. Federal Acquisition Regulations (as supplemented)

SECTION V
TECHNOLOGY TRANSITION/TRANSFER

A. INTRODUCTION

The ultimate objective of any research effort is to provide technology to the field to address a need identified by a user. The technology transition and transfer processes are established to effectively and efficiently move technology out of the laboratory and apply it in the field to address one or more needs. The differences between these two processes will be discussed in the next section; however, one commonality cannot be over stressed; the success of technology transition/transfer depends on up-front planning and coordination. Technology transition/transfer must be an integral part of the planning phase for each project and an extensive discussion of this important area is included in the Planning, Programming and Budgeting section of this handbook.

B. OVERVIEW

1. Technology Transition: Generally, technology transition is the transition of technology from one acquisition phase to another. This may be from 6.2 to 6.3 within a single laboratory, between 6.3 and a Systems Program Office (SPO) for 6.4 Engineering and Manufacturing Development (EMD), or from the laboratory directly to an Air Force user. Technology transition is ultimately successful upon incorporation of the technology into a user application to address a specific need.

2. Technology Transfer: Technology transfer is the process by which facilities, equipment, or other resources relating to scientific or technological developments of a federal laboratory are provided or disclosed by any means to another industrial organization. These include corporations, partnerships, industrial development organizations, public or private foundations, and nonprofit organizations including universities, etc., to enhance or promote technological or industrial innovation for a commercial or public purpose.

3. Comparison: While there are many similarities between technology transition and transfer, the most obvious difference is that technology transition occurs within the Air Force or DoD, while technology transfer goes outside DoD. Both processes, however, have the same objective - to provide the broadest and fastest dissemination of new technologies as possible to address needs.

C. TECHNOLOGY TRANSITION

1. What Is It?: As stated above, technology transition is simply the movement of technology from one acquisition phase to another. The problems arise when it is perceived as a one-time linear handover process between developer and user, whether the user is the 6.3 manager in the lab, the SPO, or the ultimate field user. Technology

transition is a continuous, "handholding," iterative flow process from initial technology program planning to operational implementation of the technology. Technology transition has rightly been described as a "contact sport." Ultimate success in moving a technology through the acquisition cycle depends on early and frequent coordination with the "user" who has a need that the technology is intended to address, and the "technology recipient" who will receive the technology at the completion of the current development phase.

2. Definition of Terms: The following are frequently used terms in dealing with technology transition: Technology transition is not limited to Science & Technology (S&T) funded projects. In reality and in practice, the same principles apply to all research efforts whether funded by S&T or any other source. The same emphasis on planning and coordination is essential to smoothly and efficiently moving the technology through the development and acquisition cycle to the field.

a. Advanced Technology Demonstration (ATD): A 6.3 S&T funded laboratory project with the specific objective of meeting the users' defined needs through risk reducing "proof-of-principle" demonstrations conducted at the subsystems or higher level in an operationally realistic environment. A recent change to this definition limits ATD projects to those lasting less than 4 years and costing more than $2 million. For AL/EQ, this restriction of the definition will significantly limit the number of ATD projects.

b. Critical Experiment: A 6.3 S&T funded laboratory project in which technical feasibility is demonstrated at the component or subsystem level and generally in a laboratory environment. With the recent change to the ATD definition, this category will now encompass the most of our 6.3 S&T projects.

c. Technology Recipient: AFMC centers are the usual recipients of the technology developed and demonstrated by the laboratory. Other recipients could include HQ USAF and MAJCOMs. Laboratories are the logical recipient for projects transitioning from 6.2 to 6.3, and can be the recipient for a 6.3 project transitioning to a higher level 6.3 project.

d. Technology Transition Plan (TTP): An agreement between the laboratory, the customer or user, and the technology recipient that documents the specific tasks that must be successfully completed before technology acceptance. Formal TTPs are only required for ATD projects; however, some level of agreement should be developed to document transition agreements between the lab, SPO, user/customer, and other involved parties for each project.

e. Technology Master Process (TMP): An end-to-end process for technology development, transition, and application/insertion. The TMP ensures that the technology needs for both internal and external AFMC customers are identified and prioritized, that a balanced portfolio of dollar-constrained technology projects is formulated to address the most critical technology needs, and that a corporate review and approval process occurs

before the technology projects are executed. The TMP is the driving force behind the needs development/review/prioritization process and the program development and approval process to address the needs.

3. Who Are The Players?:

a. The Laboratory Project Manager: The laboratory project manager is the critical player in the technology transition process. Assuming a project is addressing a need and is not a "tech push" project, the first step in the technology transition process is contacting the user(s) that generated the need(s) that the project is addressing. This serves several purposes: first, this coordination ensures that you fully understand the need and that the project (or projects) is correctly focused to address that need; second, the user is aware of the lab efforts to address their need and is more likely to continue to support and advocate for the need and your project if they are involved and participating; and third, they can program funds to implement the technology based on your schedule.

b. The User: The second critical player is the user. As previously stated, the ultimate success of any technology development is the field application of that technology to address an Air Force need. Successful transition of a technology through the development process to ultimate field application will not simply occur by accident. It requires continuous detailed planning, coordination, and "hand holding" to make it happen. The user is a critical player throughout this process. The user initiates the whole process by identifying, documenting, and advocating for a need through the Environment, Safety, & Occupational Health (ESOH) Technical Planning Integrated Product Team (TPIPT) needs process. This process is part of the Technology Master Process (TMP) explained in the Planning, Programming and Budgeting section of this book. Frequently, laboratory personnel will work with a user in the needs development process to ensure that areas of particular concern are documented in the needs process and that we understand the problem and get a head start in developing programs to address the problem. The users must be kept informed of progress to address their need and, as the project manager, you must keep informed of any changes in the need. Most critically, users must understand, plan for, and program funds for the ultimate incorporation of your technology into their operations.

c. The Technology Recipient: The third critical player is the technology recipient. In some cases, the user may be the technology recipient, but more often the technology recipient may be the Systems Program Office (SPO), HSC/YAL, the Air Force Center for Environmental Excellence (AFCEE), or some other intermediate agency. Again, users must be involved from the outset of the planning stages so that their requirements can be included in the project and they can adequately plan for an orderly transition. For example, if adequate data deliverables for the next phase of development are not included in your initial contract, the SPO may not accept transition of the project or you may be required to modify your contract to add these requirements at a significant increase in cost and schedule. If the SPO has not been involved in your project planning and has not programmed funds for continuation into the next phase, there may be a delay

of several years while funds are programmed or the technology may simply end up as a report on the shelf. The key is planning and coordination.

4. Technology Transition Planning: Technology transition planning is not something that begins near the end of the 6.3 phase of a project. Rather, it must begin as part of the initial thought process at the project's inception. The process and players will vary from project to project and will be somewhat dictated by factors such as funding type, contract mechanism, project phase, etc., but it should always be a part of any project planning. In some cases technology transition may be a driver in other decisions, such as using S&T funds on a SBIR contract since the Government does not have rights to the data for four years following completion of the SBIR, so the technology cannot be directly transitioned for Air Force use. The two major divisions in technology transition planning are Advanced Technology Demonstration (ATD) projects and others.

a. ATD Projects: Because of their higher value and criticality to the users, ATD projects have special technology transition processes. S&T OI 80-1, included as Appendix G, defines the processes involved with an ATD. The major difference is that ATD projects require preparation and coordination of a TTP prior to the expenditure of any 6.3 funding for the ATD. EQPP has coordinated procedures for the processing of TTPs with the SPO and HQ AFMC. The procedures are attached, along with S&T OI 80-1 and a sample TTP. Part of the procedures for an ATD call for the formation of a Product Working Group (PWG) for the project. This is the responsibility of the project manager, with the assistance of EQPP. This working group should be formed a minimum of 9 months before the start of the 6.3 effort to meet the milestones for the TTP. Most of the members of the PWG should already be aware of the project through previous involvement in the 6.2 phase (the user, SPO, etc.) Within EQ, the project manager drafts section 1 of the TTP, EQPP with assistance of the project manager will then complete the TTP and process it for coordination.

b. Other Than ATD Projects: For projects other than ATDs, the formal technology transition procedures are not yet in place, but are generally the same as for ATDs on a less formal basis. Throughout the project, coordination with the user, SPO, AFCEE, and/or other involved agencies is the critical factor.

Probably the most critical time for coordination is in the planning for the 6.3 effort:

- Coordinate with the user to ensure that the scope and focus of the project as designed addresses the need or the portion of the need intended, and that the project is integrated into the total solution package for the need.

- Coordinate with the technology recipients to ensure that they agree to accept transition of the technology at the completion of your project; that you have established success criteria for completion of your project; that you have included their requirements for deliverables (specifications, drawings, operating procedures, etc.) in your contract; and that they have programmed funds for the

next development phase.

The format for documenting these agreements is not yet established but may take the form of coordinated letters, memos, or even a formal TTP if the parties so choose. The mechanism for the coordination process is also flexible and may range from informal to a formal PWG. EQPP is the focal point for technology transition and will assist you in the planning process. Further information can be found in Appendix G. Patent information is found in Appendix J.

D. TECHNOLOGY TRANSFER: On the eve of the twenty-first century, our nation faces many political, economic, and defense challenges. As in the past, the technologies developed by the Air Force will solve many of the national defense problems. However, many of the technologies also have utility and application beyond the Air Force. Our country's industries, academia, and state and local Government agencies can greatly benefit from sharing our technical knowledge and expertise. We call that sharing of Air Force technology with the private sector "technology transfer."

The Air Force Materiel Command (AFMC) has an energized technology transfer process developed by a command-wide process action team (PAT). This process addresses technologies that exist in our laboratories and product, test, and logistics centers. The technology transfer process provides the private sector access to skilled and knowledgeable people, new processes and techniques, and facilities and equipment often not available elsewhere. Transferring Air Force-developed technology with potential commercial applications is part of the AFMC mission.

Academia, industry, and the Government all realize many benefits from technology transfer activities. Cooperative Research and Development Agreements (CRDAs) with private industry and academia improve the knowledge and productivity of Government and private sector employees. These cooperative efforts result in better products for the taxpayer and improve the nation's economic competitiveness. Licensing of patent rights and other intellectual property provides royalty income for laboratories and centers. Twenty percent of the royalties are paid to the inventor(s) and the balance may be used by the laboratory for certain specified technology transfer purposes such as awards, education, and training. By using Government facilities, private industry and academia have access to state-of-the-art technologies, personnel, resources, and specialized equipment not available elsewhere. Assistance to state and local governments establishes the Air Force as a good neighbor and saves taxpayer money. The AFMC Technology Transfer Program is a definite win-win enterprise.

E. TRANSFER MECHANISMS: Agencies can transfer technology several ways. A common means is through everyday, informal interchange, or consultation among scientific and technical peers. However, more structured, formal means are available.

Organizations can structure standard contracts to promote technology transfer. One example of such a structure is using incentives to reward the contractor for transfer of technology associated with the contract. However, transfer is more commonly associated with CRDAs, SBIRs, inventions, patents, and licensing agreements. In addition, as a result of Congressional and Presidential policies enacted for 1993, new avenues for technology transfer have opened under the general umbrella of Defense Conversion activities. Technology transfer in these scenarios will usually occur through mechanisms known as cooperative agreements and other transactions. The terms "CRDA" and "cooperative agreement" as used in this Handbook are not synonymous. These are two different instruments with differing purposes and procedures.

Some types of technology transfer are more applicable to the laboratories while others are more related to the centers. The following examples are not inclusive, but the more common types are:

- Information exchange
- Use of Government facilities for research, manufacturing, repair, or testing
- Exchange programs for transfer of people to or from an Air Force agency
- Cost-shared contracts where the Air Force, private industry, academia, or other Government agencies share the cost of a joint effort
- License agreements where the Air Force transfers less-than-ownership rights to intellectual property and permits recipient use of the property
- Participation in consortia where scientists and engineers from the Air Force, private industry, and academia work together on R&D programs
- Grants for research by academia or private industry
- SBIR grants that fund participation by small businesses in Government programs
- Technical assistance provided to universities, colleges, and high schools to improve public education

F. DEFINITION OF TERMS: What follows are explanations of some significant technology transfer terms to help you understand the elements of transferring technology. For precise, legal definitions of these terms, please consult your Judge Advocate General (JAG) at HSC/JAG.

1. Cooperative Research and Development Agreement (CRDA):
An agreement between a federal laboratory (or laboratories) and a non-federal party or parties) in which the laboratories provide people, services, facilities, equipment,

intellectual property, or other resources with or without reimbursement (but not funds to non-federal parties). Under the agreement, the non-federal parties may provide the same resources (as well as funds) toward research and development consistent with the missions of the laboratory(ies). A CRDA does not include a procurement contract or cooperative agreement (as defined in sections 31 U.S.C. §§ 6303-6305).

2. Federal Laboratory Consortium for Technology Transfer (FLC): An organization of federal laboratories and centers that identifies and mobilizes resources to provide the environment, organization, and mechanisms to help public and private sector parties use federally developed technology.

3. In-house Laboratory Independent Research (ILIR) Program: A program that provides discretionary funds for Air Force laboratory directors to use in pursuing high risk, high payoff research opportunities. This program permits Air Force laboratories to maintain an aggressive research program vital to their role as leaders in national research. The Air Force intends this program to be unencumbered by programmatic justification and budgetary documentation before beginning work. It relies instead on the discretion of the laboratory directors who annually report their achievements and the status of their projects of the past year to an Air Force evaluation panel chaired by the AFMC Chief Scientist.

4. Intellectual Property: A generic term encompassing the intangible property rights that the laws of patents, copyrights, trademarks, unfair competition, and trade secrets afford an owner or licensee. Those rights also cover technical data and computer software under Government contracts.

5. Patent: A grant from the Federal Government to an inventor. In exchange for the inventor providing an enabling disclosure of the invention and complying with other legal requirements, the Government awards the inventor with the right to exclude others from making, using, or selling the claimed invention for a period of time, up to 17 years.

6. Scientific and Technical Information (STINFO): STINFO is information related to research, development, engineering, testing, evaluation, production, operation, use, and maintenance of military products, services, and equipment for military systems. STINFO includes all production, engineering, and logistics information. Documentation shared with the worldwide scientific and engineering community through the DoD STINFO program is often a foundation for technology transfer.

7. Small Business Innovation Research (SBIR): A program under which a portion of a federal agency's research or research and development is reserved for award to small business through a uniform, two-phase process.

REFERENCES
TECHNOLOGY TRANSITION/TRANSFER

1. Air Force Materiel Command (AFMC) Technology Transfer Handbook, 1994

2. AFPD 61-3, Domestic Technology Transfer, 29 July 1994

3. AFI 61-303, Licensing Inventions Made Under Cooperative Research and Development Agreements, 25 July 1994

SECTION VI
FOREIGN DISCLOSURE

A. INTRODUCTION

The disclosure policy of the United States Government is to treat classified and technical or sensitive unclassified material information as a national security asset which must be conserved and protected, and which may be shared with foreign entities only where there is a clearly defined advantage to the United States. The policy of the United States is also to avoid giving a false impression of its willingness to make available classified material, technology, or information.

B. PROGRAM RESPONSIBILITY

The AL/EQ Foreign Disclosure Policy Officer located in EQPP will answer any questions or clarify any policy upon request.

C. TERMS EXPLAINED

1. Foreign Nationals: All persons not citizens of, not national of, nor immigrant aliens to, the United States.

2. Representative of a Foreign Interest: Citizens or nationals of the United States or immigrant aliens who, in their individual capacity, or on behalf of a corporation, are acting as representatives, officials, agents, or employees of a foreign government, firm, international organization (e.g., NATO) corporation, or person.

3. Foreign Disclosure Policy Officer (FDPO): The office within an AFMC organization that is assigned overall responsibility to implement Air Force and AFMC foreign disclosure policies and procedures and arrange for the authorized release of military information to foreign governments and foreign nationals.

4. Joint Information: Military information over which two or more US Government departments or agencies have control or jurisdiction.

5. Combined Military Information: Military information that, by agreement, is shared by the United States and another government or international governmental organization.

6. Delegation of Disclosure Authority Letters (DDLs): Letters issues by HQ SAF/IA to establish guidelines and provide authority to major commands to release classified US military information to foreign governments or international organizations on a continuing basis. Authority is then delegated to the FDPO at AFMC field organization by means of DDLs.

7. Department of State International Traffic in Arms Regulations (ITAR): Rules and regulations controlling the export of arms, ammunition, implements of war, and related technology. The ITAR prohibits the export of technical data relating to arms, ammunition, and implements of war on the Munitions List without approval of the Department of State.

8. Export License: Granted by the Commerce Department to contractors who wish to market a product or technology outside the United States or subcontract portions of work to a foreign firm that may have significant military or economic potential.

9. Militarily Critical Technologies List (MCTL): Identifies those technologies whose export could increase the military capabilities of potential adversaries to the detriment of US National Security. Technologies are categorized as "Most Critical," "Very Critical," and "Emerging Technologies."

10. Criteria for "Most Critical" vs "Very Critical" Technology: The primary military criterion that distinguishes a "most critical" technology from a "very critical" technology is the world-wide leadership position the U.S. possesses in the "most critical" technologies. Two other criteria were considered:

a. Foreign Availability: This criterion assesses the availability of critical technologies from noncontrolled sources and from non-U.S. sources subject to multilateral control.

b. Control Feasibility: This criterion considers a variety of commercial and technological pressures which, while not directly critical to the military *per se*, strongly influences the control environment. These include:

- Extent of current controls
- Transactional control feasibility (nature of the technology and effective transfer mechanisms)
- Commercial pressure
- Market pressures
- Political pressure (extent of commercial exploitation, degree of proprietary protection)

D. VISITS TO USAF FACILITIES BY FOREIGN NATIONALS

1. Foreign National Access: Only SAF/IA may grant foreign nationals or their representatives access to USAF installations. Access is granted via a visit authorization

issued to the FDPO. When foreign visitors arrive unannounced, the FDPO must be contacted immediately for instructions.

2. Invitation to Foreign Nationals: Personnel wanting to invite foreign nationals to their installations must first request authorization to do so from SAF/IA in accordance with AFSC Supplement 1 to AFR 200-9, paragraph 11G(5)(c), 15 July 1988. A minimum of 30 days is required to process and forward such invitations. These invitations are processed through foreign disclosure channels which includes the HQ AFMC/STI.

3. Communist-controlled Countries: Foreign nationals from Communist-controlled countries may visit USAF facilities only under special circumstances and must have approval of the Secretary of Defense.

E. DISCLOSURE OF MILITARY INFORMATION

Military information may not be disclosed to foreign nationals or their representatives except through a foreign disclosure office with delegated disclosure authority by SAF/IA in conjunction with visit approvals. Disclosure is effected by means of:

1. Disclosure Through Visits: Visit authorizations (VAs) granted by SAF/IA contain terms of disclosure and level of information which may be disclosed, e.g., classified, unclassified (oral, visual, only, etc.). Briefings intended for distinguished foreign visitors should generally be unclassified on an oral and visual basis only.

2. Disclosure Through Travel by Military Personnel or DoD Civilians (includes government contractors who travel for the US Government): The Air Force Form 198, Request for Travel Outside CONUS is completed by the traveler specifying the purpose of the visit and giving specific details on information to be released. The FDPO authorizes, in Block 25, the classification of information which may be disclosed by the traveler. Additionally, all unclassified information to be disclosed in speeches, presentations, or briefings, must be cleared by a Public Affairs Office. The EQPP STINFO Program Manager is designated as the HSC/PA focal point for public affairs release. This person will either grant routine release or, if necessary, forward the document to HSC/PA for clearance.

3. Disclosure at Symposiums or Conferences: USAF personnel presenting paper or speaking at symposiums or conferences whether in CONUS or overseas must have their information, including abstracts, approved for public release by EQPP STINFO, the HSC/PA focal point, if the meeting is open to the public. If the conference or symposia is open to foreign nationals, all USAF information must be processed for foreign release through disclosure channels.

4. Disclosure of Documents and Materials: The FDPO must approve disclosing any AFMC information and material, whether or not the documents have been approved

for previous disclosure. The FDPO must ensure that the information or materials are releasable for each disclosure situation.

F. FOREIGN PARTICIPATION IN TECHNICAL MEETINGS

1. Definition: A scientific or technical meeting is defined as any formally scheduled assembly (conference, seminar, symposium, exhibit, convention, or gathering) for the oral or visual presentation and discussion of scientific and technical information.

2. Criteria for Inclusion: Foreign nationals and contractors of countries who have signed bilateral agreements offering opportunities to compete for DoD business must be considered for participation in technical meetings. Permission to include or exclude foreign nationals must be requested through FDPO channels.

a. Air Force Sponsorship: Air Force organizations sponsoring or cosponsoring any technical meeting related to acquisitions or designed to project future requirements may not exclude foreign nationals or contractors from nations who have signed bilateral Memoranda of Understanding on Reciprocal Defense Procurement, without a Waiver from the Under Secretary of the Air Force (SAF/US).

c. FDPO Responsibilities: The FDPO is cognizant of the requirements for either reviewing projected briefings to determine whether there are any restrictions to full allied participation or for requesting a waiver to restrict foreign nationals for attending.

REFERENCES
FOREIGN DISCLOSURE

Foreign Disclosure Officer's Handbook, AFMC/IA, Nov 95

SECTION VII
CASE FILE MANAGEMENT

A. REASONS FOR CASE FILE

Research and Development (R&D) Case Files are maintained for all research efforts. R&D Case Files:

1. Provide a permanent record of each work unit, i.e. give a cradle-to-grave record of authorizations, environmental assessments, cost data, progress reports, research results, lessons learned, etc.

2. Ensure continuity when a change in project manager takes place.

3. Present a comprehensive record for management reviews of the project.

4. Fulfill a management inspection requirement.

5. Most important, they help you to track your projects.

B. PROCEDURES FOR MANAGING CASE FILES

1. Further Sources of Information: Detailed procedures for managing R&D case files are found in **AFI 61-206 (Draft), Research and Development Case Files** (see Appendix K), and the **AL/XPP Work Unit Management Handbook**. This handbook contains an excellent **Life of a Work Unit Checklist** that should be followed from establishment of a work unit through publication and distribution of the final technical report. AFI 61-206 provides examples of forms required by the Air Force Instruction.

2. Annual Inspection: At least 50 percent of our case files will be inspected annually by the EQ/CCQ Functional Area Records Manager (FARM). This person will assure that the same case files are not inspected two years in a row. **AF Form 3971, R&D Case File Checklist** (See Appendix K) will help you to assess the completeness of your case file.

3. Disposition of Case Files: Disposition of case files will be according to current Records Management Procedures. A case file will not be considered complete until the final technical report is published.

a. Adequate Records Required: Since case files are a significant management inspection item, we need to assure that adequate records are kept. Appendix K contains a copy of **AF Forms 3972A, 3972B, and 3972C, Contents/Index of the Research and Development File Folder.**

b. Who to See for Help: Any questions concerning case files can be answered by your Functional Area Records Manager in EQ/CCQ.

C. RESEARCH AND DEVELOPMENT (R&D) CASE FILE MANAGEMENT GUIDE

1. Purpose of the R&D Case File: R&D case files provide a permanent record of each work unit (e.g., authorizations, environmental assessments, cost data, progress reports, research results, etc.)

2. Importance of the R&D Case File: The file provides a detailed, accurate record and continuity of the effort or investigation; the ability to determine funds expended, effort expended, and progress vs. schedule; and information for project transition/transfer.

3. Project Officer's Responsibilities: Project Officers have specific responsibilities for records and are required to: initiate the official files for the project, task or work unit; maintain and retire such files in accordance with AFI 61-206 (Draft), Research and Development Case Files. These files are subject to inspection.

4. Procedures: Upon being assigned an R&D effort, the project officer is to establish a file for that effort using the appropriate folder and forms which can be obtained from the Division FARM. The FARM or records technician is available to assist in setting up the case file.

a. Materials Required:

(1) Six-part folder

(2) AF Forms 3972A, 3972B, and 3972C, Contents/Index of the Research and Development File Folder. (See Appendix K).

(3) AF Form 3970, R&D Record Book, for in-house efforts (see AFI 61-206).

(4) AF Form 3971, R&D Case File Checklist.

b. File documents in the alphabetical sections of the R&D case file in accordance with the filing sequence printed on the AF Form 3972.

c. When filing materials that will not fit into the appropriate sections of the R&D case file, or when the contents of any alphabetical section of this folder exceed the normal capacity of that section, use standard draft folders to contain the overflow. Overflow folders must be adequately identified with the Job Order Number and the applicable section.

d. Ensure all torn or mutilated documents are repaired, all extraneous materials are removed, and all documents are securely fastened in folders. Be sure to remove paper clips and other temporary fasteners.

e. Stamp the appropriate classifications on the top and bottom of the front and back covers and on the outside tab of the R&D case file when the file contains classified documents and ensure its protection in a designated safe for classified documents. Unclassified case files will be marked on the outside tab, for example: 79301221 (U) Clinical Evaluation of G-Sensitive Medical Conditions in Aircrew.

f. Upon termination, inactivation, or closure of an R&D effort, the project officer will retain the R&D case file in his office files for not more than one year. At the end of the one-year hold status, the R&D case file must be retired using SF 135, Records Transmittal and Receipt. The FARM will forward the case file to the Base Staging Area for retention until it is eligible for retirement to the Washington National Records Center. Before retiring the case file, the project officer ensures that all records are in order, only one copy of each document, including a copy of the final technical report or canceled notice is in the record, and classified records are accounted for and reviewed for possible downgrading or reclassification.

g. Upon assignment, discharge, or termination of employment, the project officer will ensure that all records are in order and that classified records are accounted for and reviewed for possible downgrading or declassification.

6. Project/Task/Work Unit Case Files: R&D Case Files contain documentation as listed on the AF Forms 3972A, 3972B, and 3972C, Contents/Index of the Research and Development File Folder.

a. The Project Case File:

(1) Listing of each approved task under the project and its current status.

(2) Documentation applicable for the entire project: Procurement Plans; Justifications and Authorizations; Program Management Directives; Program Direction; Program Management Plans; and other documentation as applicable.

(3) Actions and decision pertaining to the project.

(4) Summary data concerning progress and status of effort.

(5) Final results and findings of each higher level review, including responses to action items.

b. The Task Case File:

(1) Listing of each work unit under the task and its current status. The four status categories are active, canceled, completed, and closed.

(2) Actions and decisions pertaining to the task.

(3) Summary of technical and financial data concerning progress and status of the task.

(4) Record of higher level review.

c. Work Unit Case Files:

(1) For in-house efforts:

(a) DTIC literature survey authentication and results.

(b) AF Form 813, Request for Environmental Impact Analysis.

(c) Documentation of work unit planning, initiation, actions and decisions on the Research and Development Work Unit Information System Worksheet.

(d) Summary data concerning progress and status of the effort.

(e) Documentation of results.

(f) Milestone chart.

(g) Job Order Cost Report.

(2) In addition to the above, contractual efforts also require:

(a) Copy of contract.

(b) Contractor's progress reports.

(c) Correspondence pertaining to the contract.

(d) Documentation reflecting actions taken during technical monitoring of contract, to include trip reports, memoranda of telephone communications, etc.

(e) Copy of original Statement of Work (SOW).

(f) Copy of final report and DD Form 250 for completed contracts.

7. Lifetime Cycle for Work Units:

a. Contractual Work Units: Contractual work units have a six-month period from the end of the actual RDT&E effort to the distribution of the technical report. Date for receipt of the initial draft report is specified in Block 12, DD Form 1423, Contract Data Requirements List (CDRL).

b. In-house Work Units: In-house work units also have a six-month period from end of the actual RDT&E effort to distribution of the resulting publication or receipt of the final product. Final product due date is specified in the Work Unit Information System.

c. Completed Work Unit Case Files: Completed work unit case files are held in the organization's files for one year and then sent to the local staging area. Task files are retired one year after completion of all work units in the task. Project files are retired one year after completion of all tasks in the project. The Division FARM should maintain a copy of each SF 135 submitted in order to historically document all retired records of the directorate.

REFERENCES
CASE FILE MANAGEMENT

1. AFI 61-206 (Draft), Research and Development Case Files, 5 September 1995

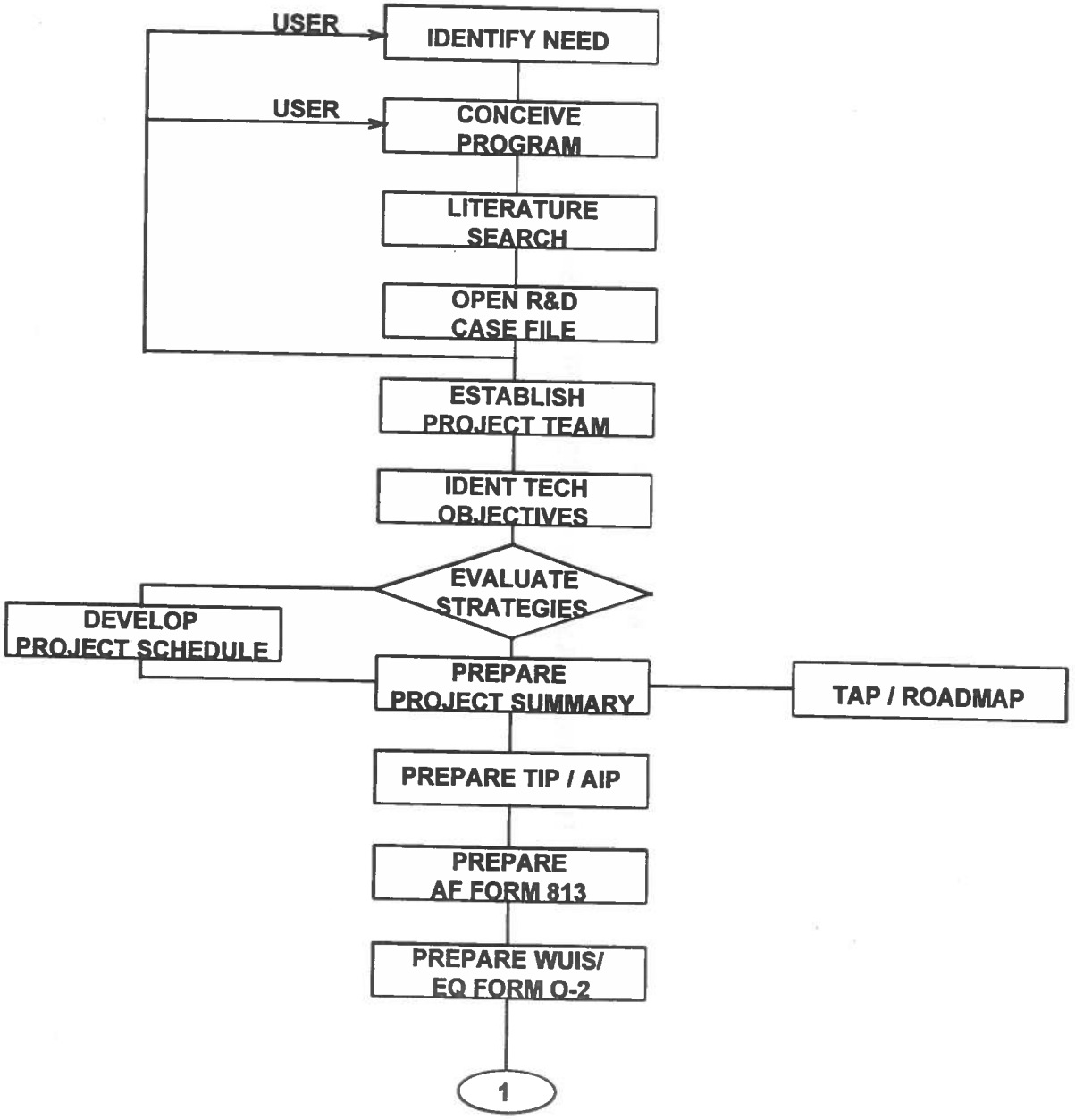
2. AL/XPP Work Unit Management Handbook, November 1994

3. AFPD 61-2, Scientific and Technical Information, 7 April 1993

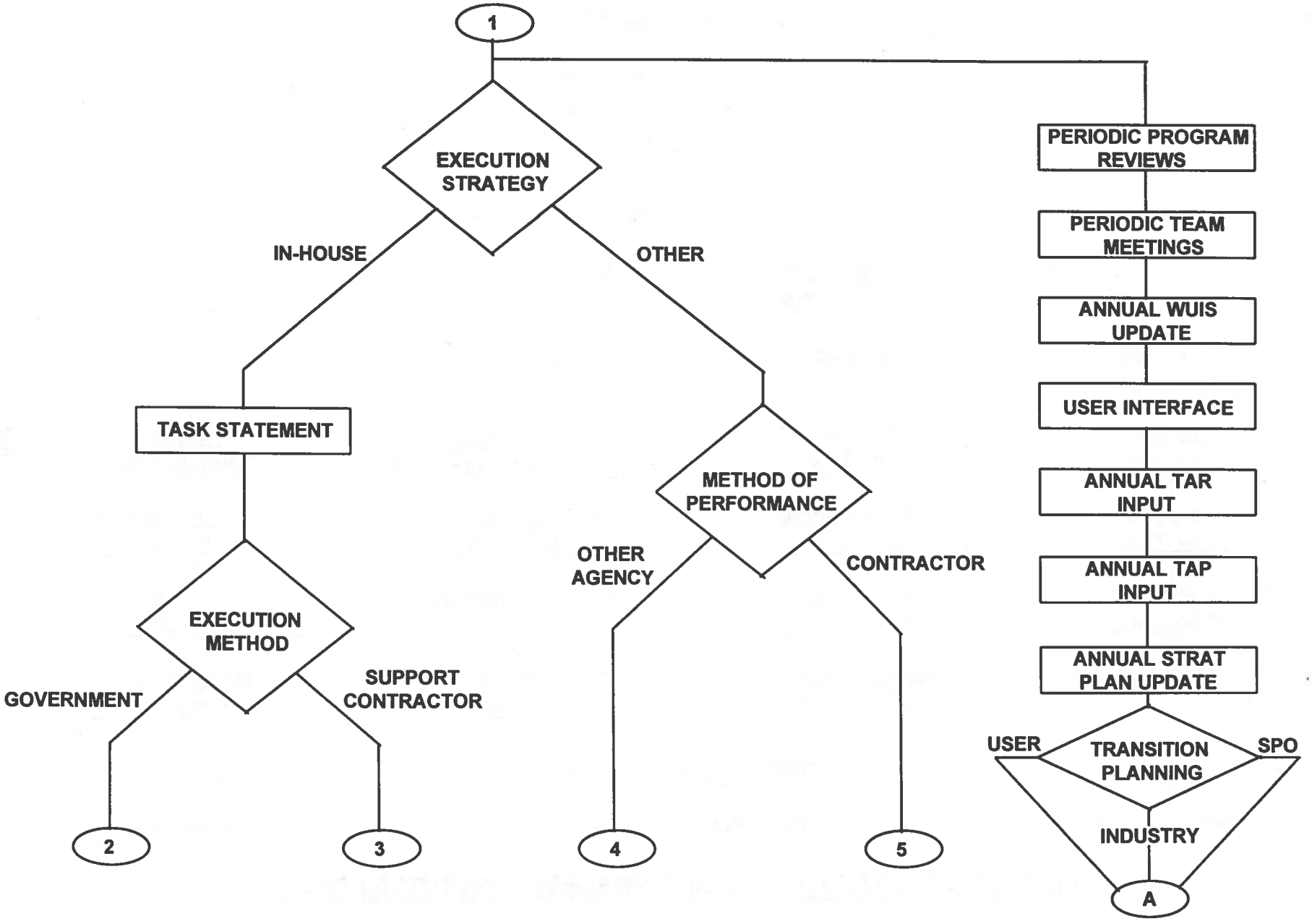
APPENDIX A

THE PROGRAM MANAGEMENT PROCESS

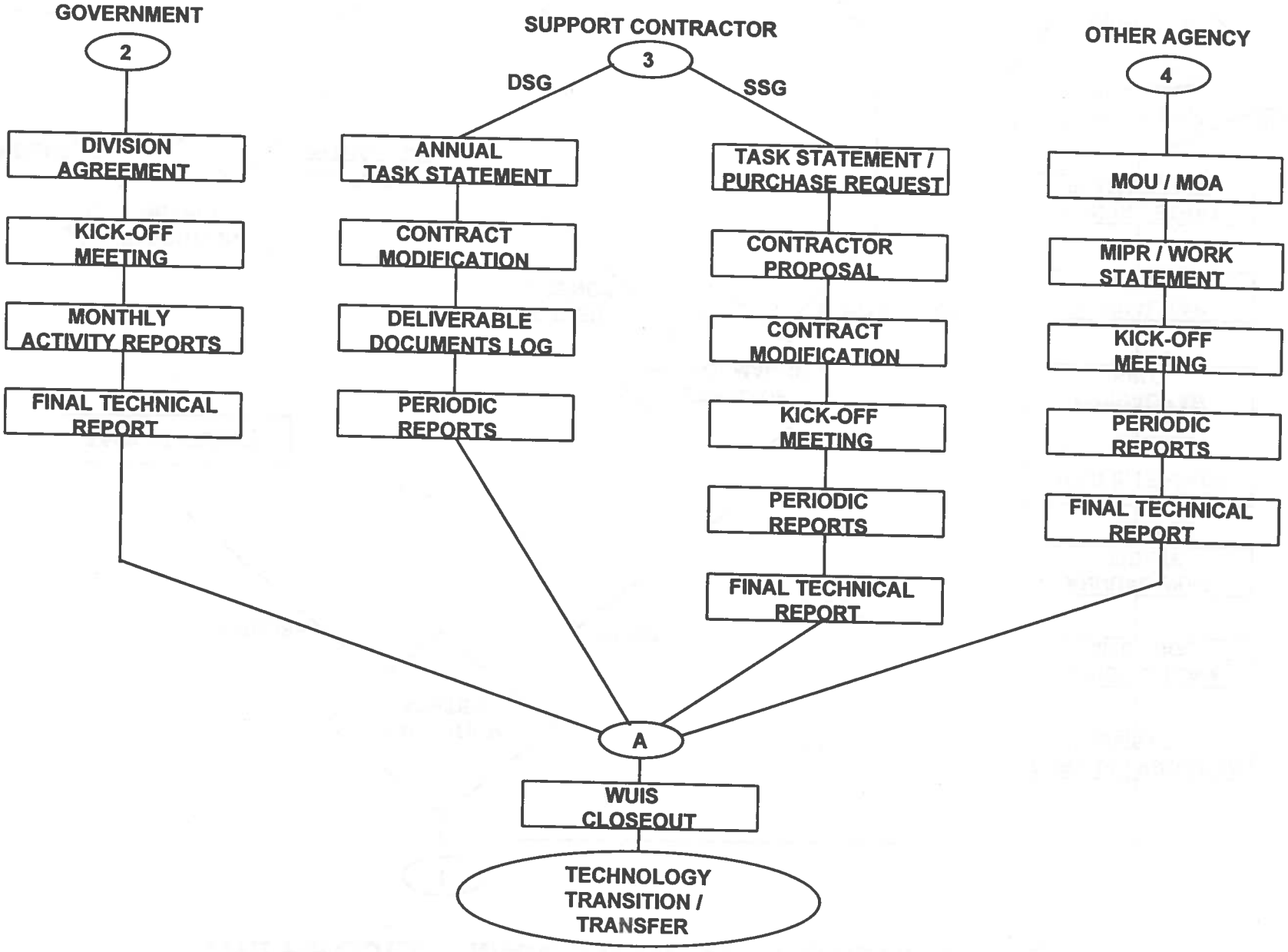
THE PROJECT MANAGEMENT PROCESS



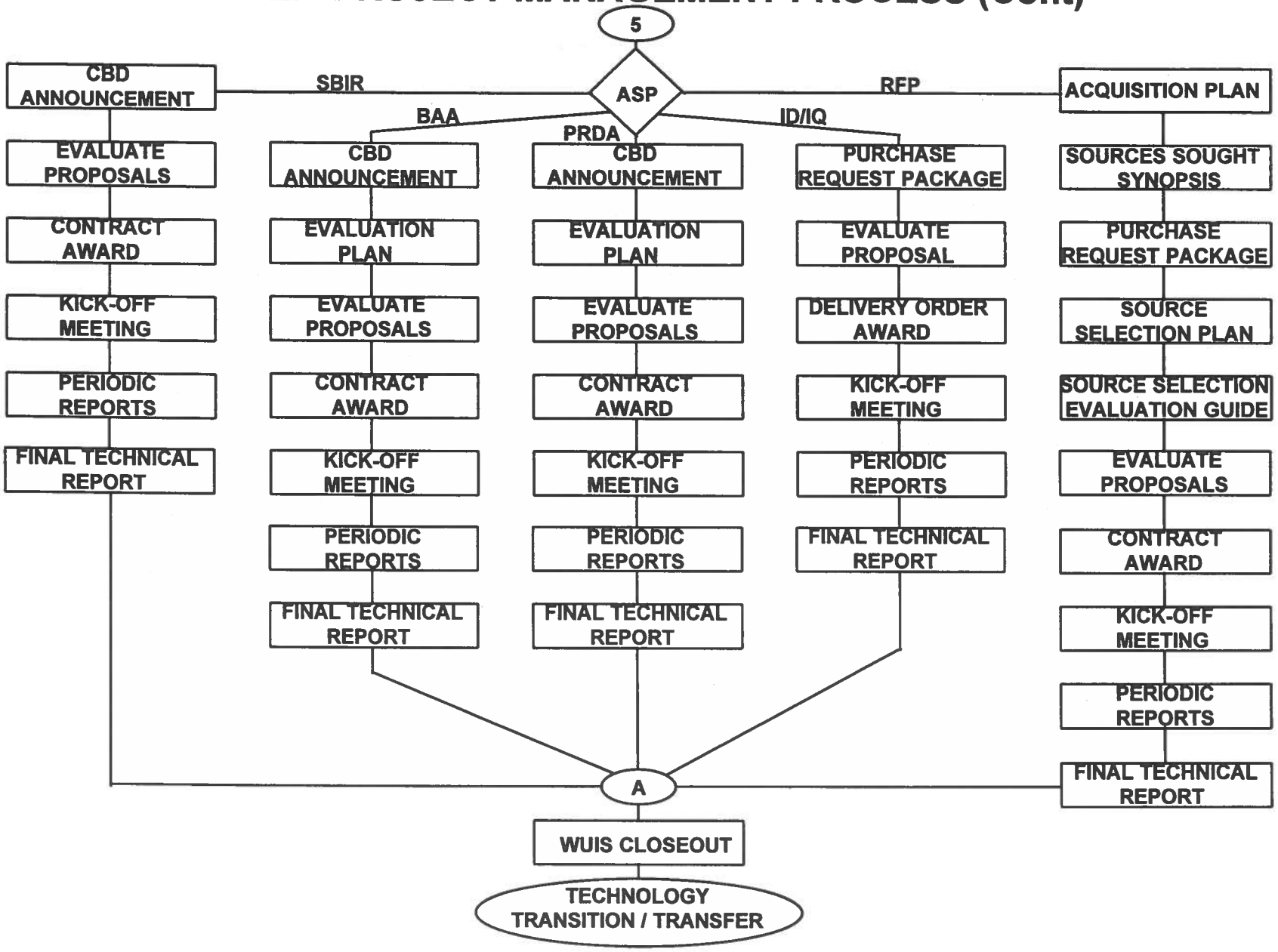
THE PROJECT MANAGEMENT PROCESS (Cont)



THE PROJECT MANAGEMENT PROCESS (Cont)



THE PROJECT MANAGEMENT PROCESS (Cont)



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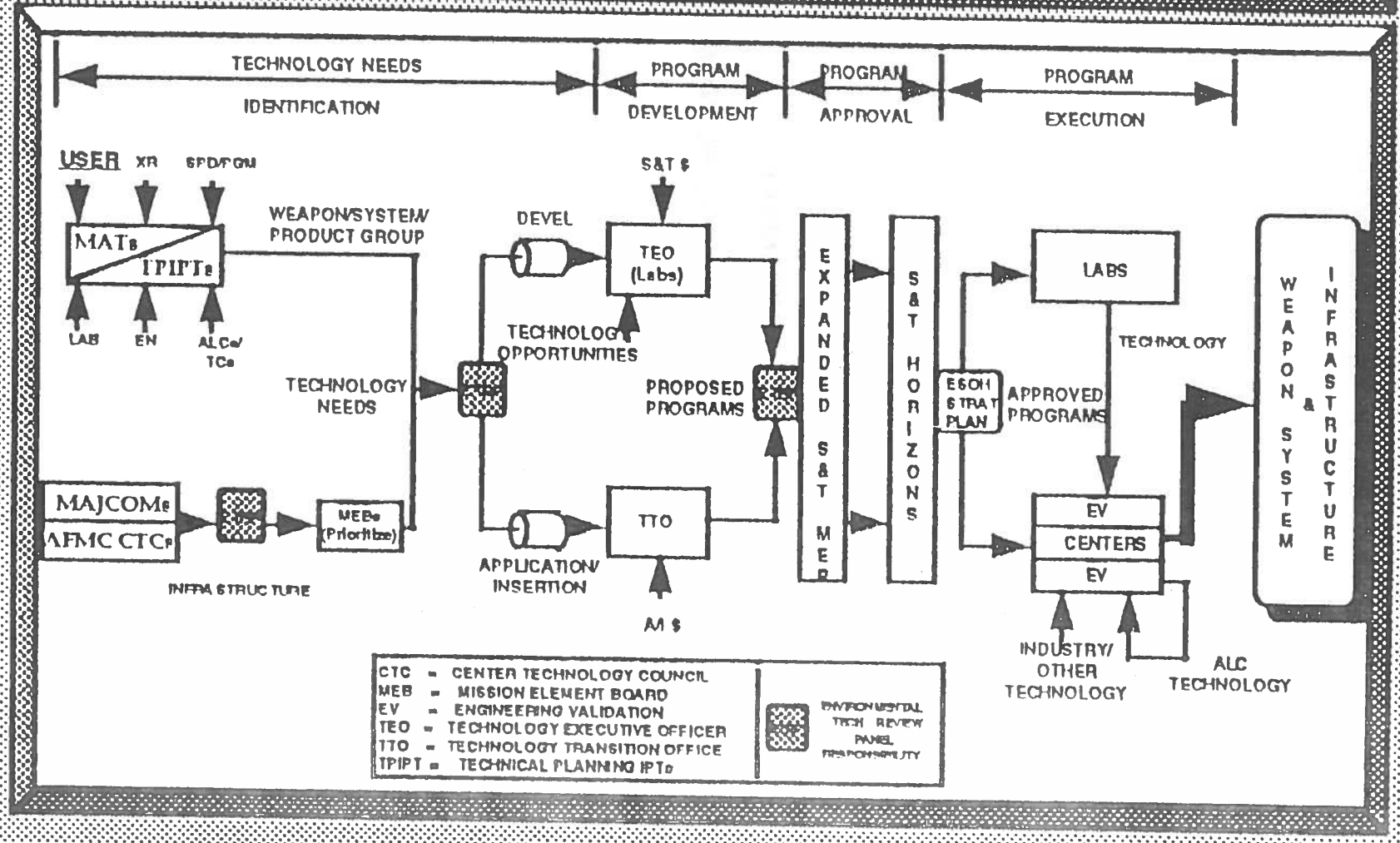
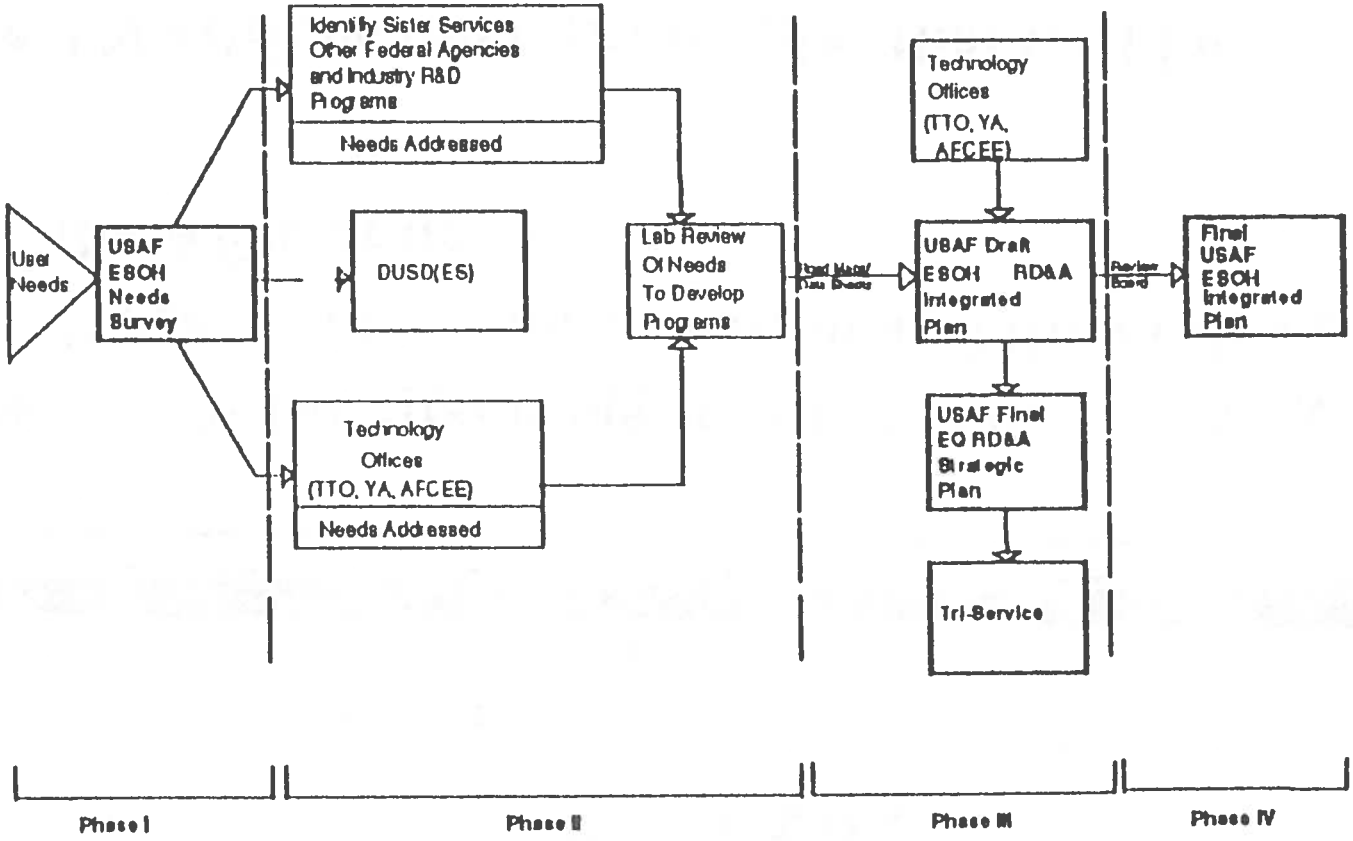
APPENDIX B

TECHNOLOGY NEEDS PLANNING

TNS FY95
TECHNOLOGY MASTER PROCESS



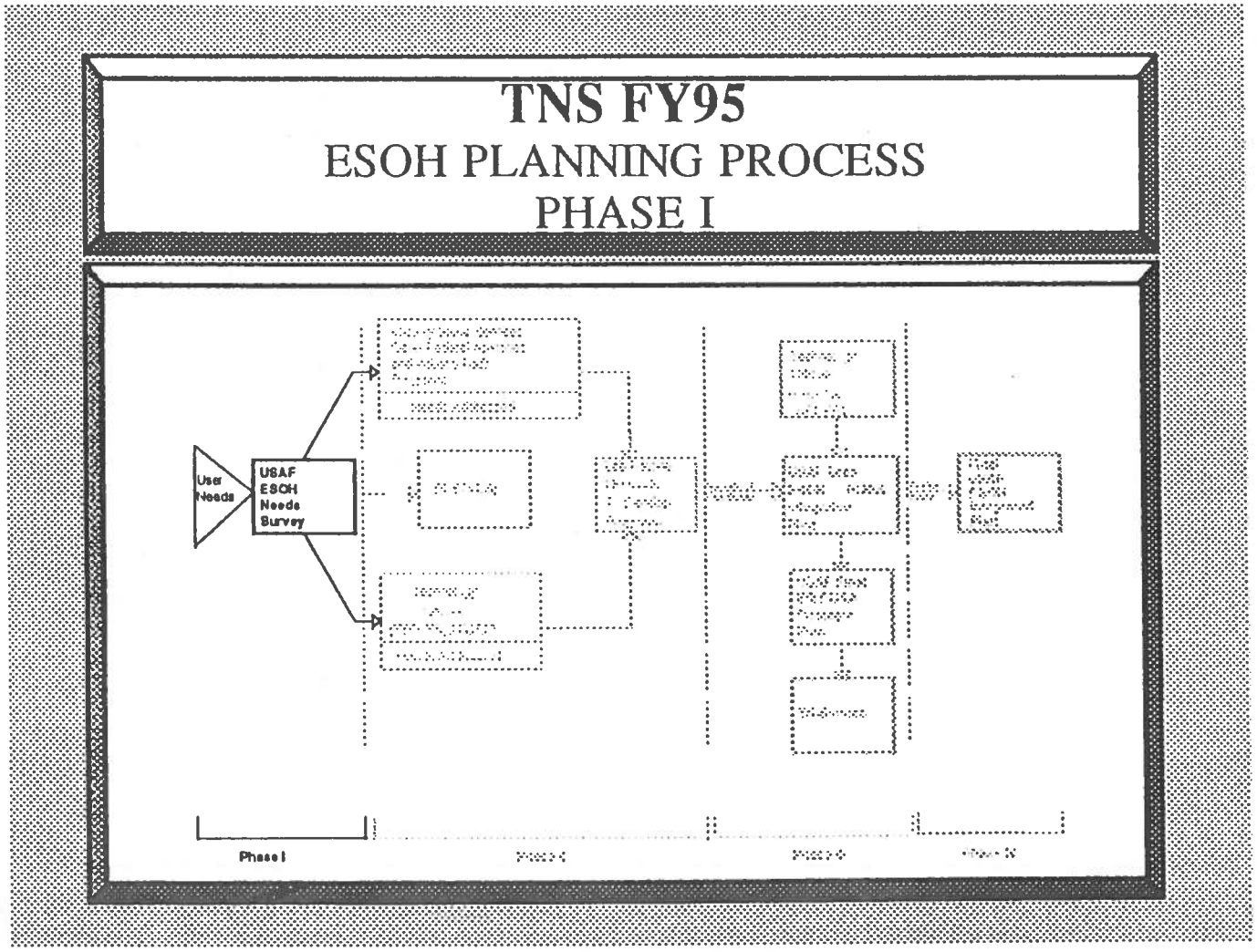
TNS FY95
ESOH PLANNING PROCESS



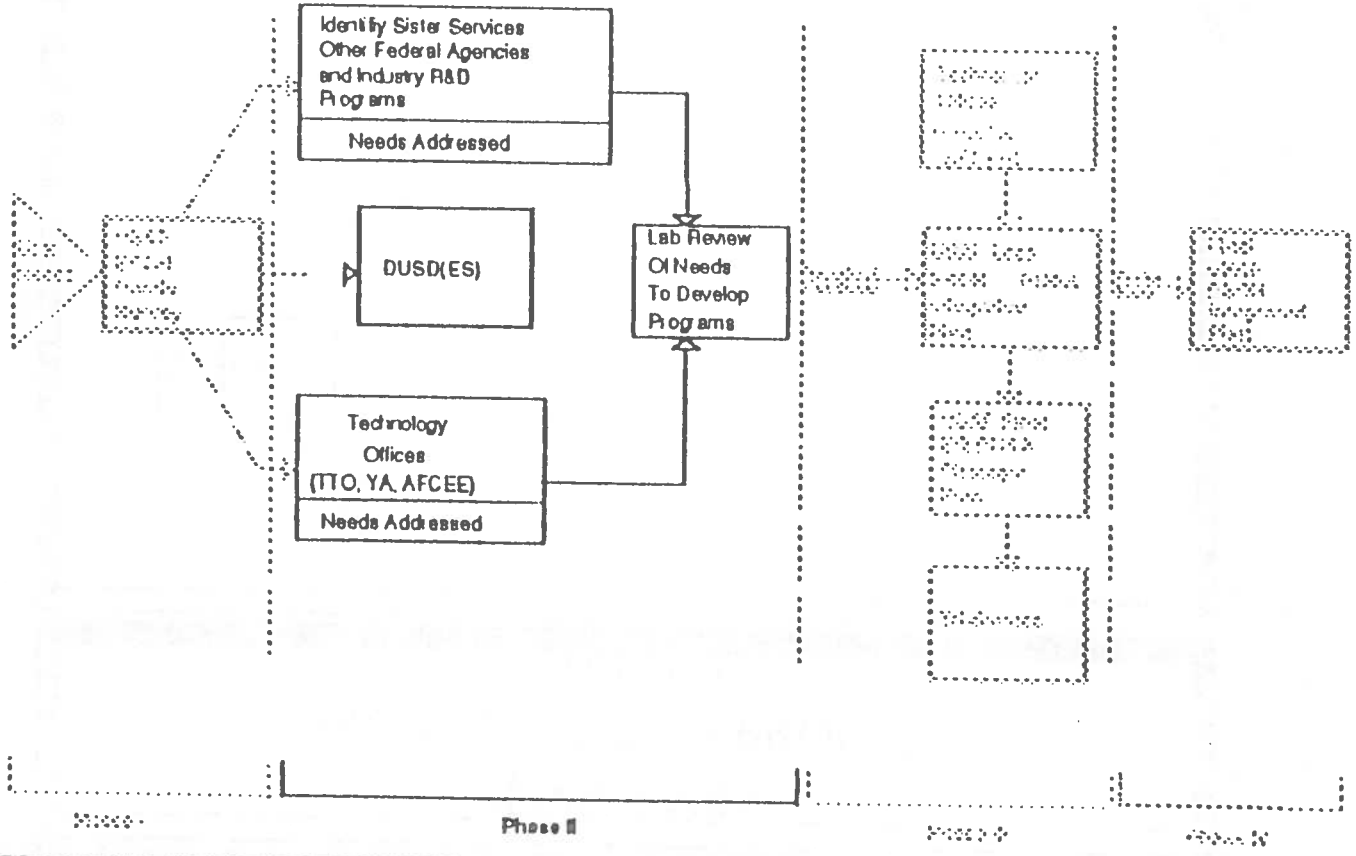
TNS FY95
ESOH PLANNING PROCESS
PHASE I

- TNS is the first phase of the *ESOH Planning Process* in the identification and the ranking of the AF user needs

- TNS drives the technologies that will be developed in Air Force, DoD and private sector


TNS FY95
ESOH PLANNING PROCESS
PHASE I
User Needs
USAF ESOH Needs Survey
Phase I

TNS FY95
ESOH PLANNING PROCESS
PHASE II



TNS FY95
ESOH PLANNING PROCESS
PHASE II

Review Needs :

Step 1: TNS to Technology Offices to identify Off-the-Shelf Technologies

Step 2: Environmental Technical Support Center assessed R&D efforts of other Services, Agencies, and Industry

Step 3: TNS to Labs for review to identify on-going programs and develop new programs

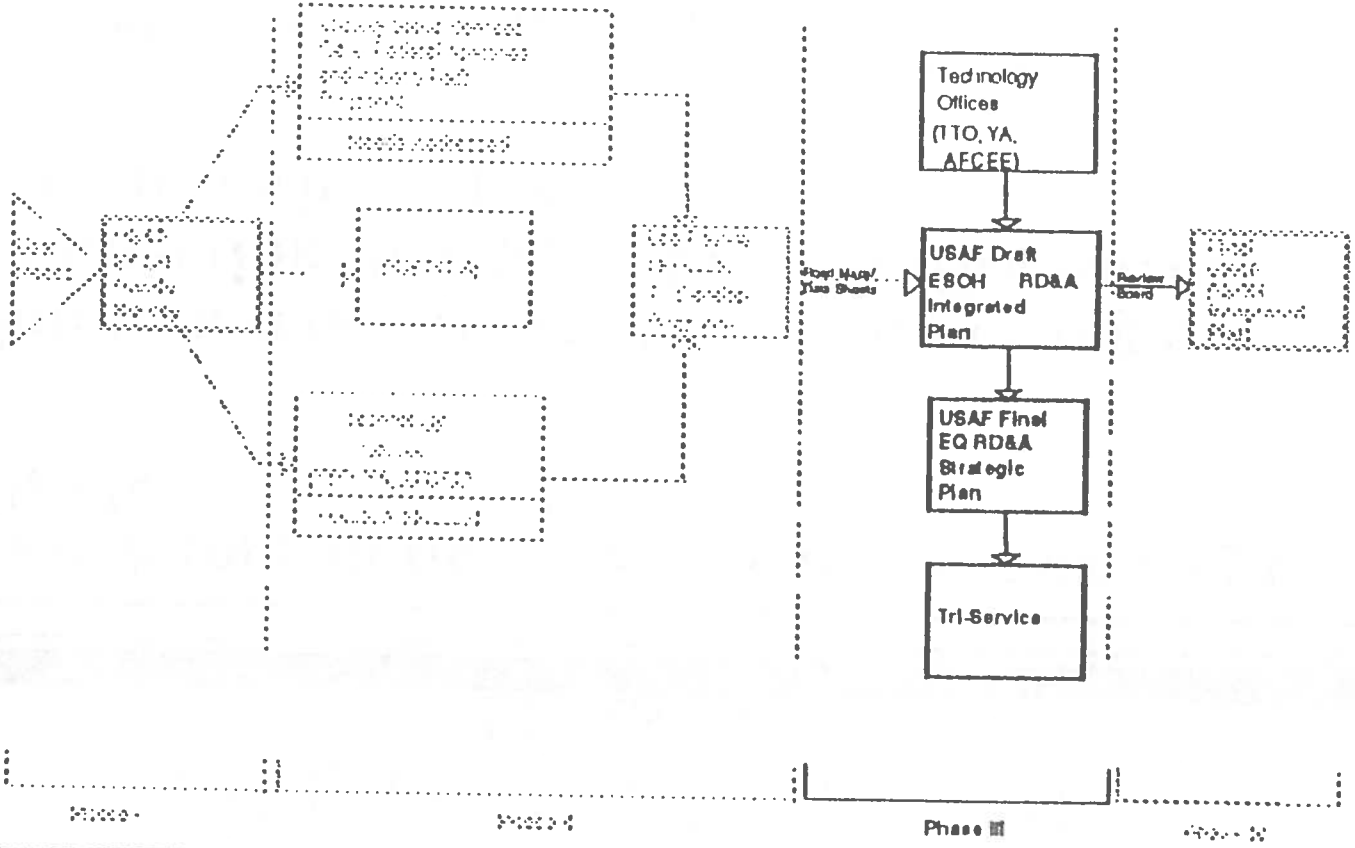
TNS FY95
ESOH PLANNING PROCESS
PHASE II

- **Widest dissemination of TNS results increases the probability of resolving users' Needs**
- **FY95 TNS results will be made available to other Services, Agencies, industry and academia**
- **TNS FY95 results will become available on DECIM**

TNS FY95
ESOH PLANNING PROCESS
PHASE II

- Search for solution sets w/ emphasis on High Needs
- Solution sets may involve: policy change, engineering change, and/or modification of existing technologies
- Review of on-going programs at DoD laboratories for solution sets
- If no adequate solutions exist, Laboratory will propose RD&A program to resolve needs

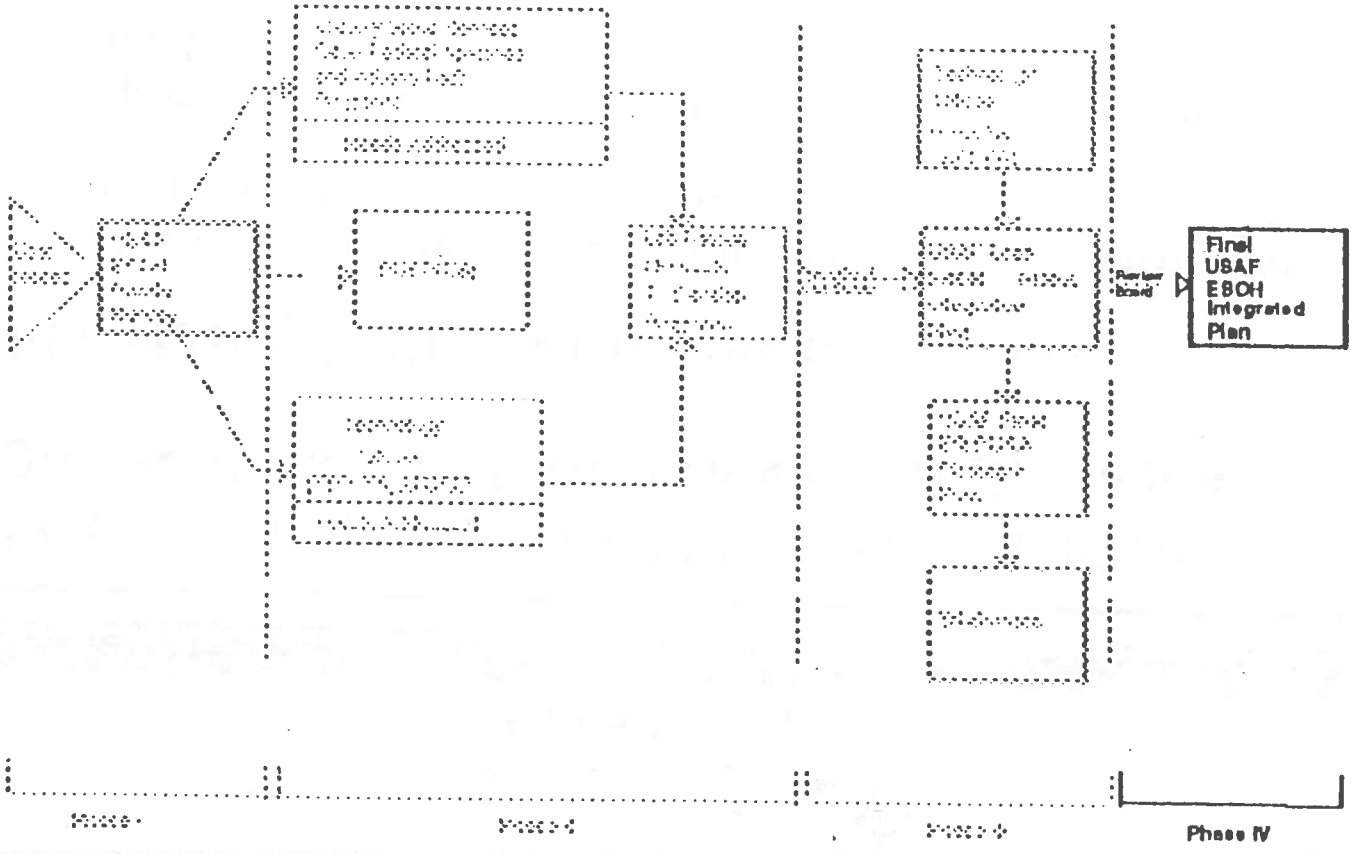
TNS FY95
ESOH PLANNING PROCESS
PHASE III



TNS FY95
ESOH PLANNING PROCESS
PHASE III

- **Development of USAF EQ Strategic Plan to define RD&A solution sets to <u>High</u> Needs**
- **EQ Strategic Plan provides the users:**
  - ability to leverage RD&A programs by coordinating on Technology Development Plans
  - opportunity to advocate and fund programs meeting their needs
  - access to all AF laboratories
  - opportunity to leverage R&D efforts outside of AF
  - effectively compete for funding outside of AF (e.g. SERDP, ESTCP, ETI, etc.)

TNS FY95
ESOH PLANNING PROCESS
PHASE IV



TNS FY95
ESOH PLANNING PROCESS
PHASE IV

- **Final phase of the *ESOH Strategic Planning Process* is the development of ESOH Integrated Plan**
- **ESOH Integrated Plan combines strategic programs from Safety and Occupational Health with Environmental Quality**

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APPENDIX C

GOVERNMENT COST ESTIMATE

GUIDANCE FOR DEVELOPING GOVERNMENT COST ESTIMATES

A. GENERAL

Independent Government Cost Estimates (IGCE) are required as part of the purchase request package for some contracting mechanisms such as RFP, ID/IQ or TOC contracts. IGCE cost estimates will be more detailed than estimates developed during the planning process. Although not required, a cost estimate with similar detail should be considered for in-house projects. A detailed cost estimate provides a tool to track against actual costs and allow corrective actions early in the project rather than running out of funds prior to completion.

B. METHODOLOGY

There are three primary methodologies for developing cost estimates. Parametric cost estimating uses historical data to develop cost estimating relationships which can then be used to model future costs. Analogy cost estimating uses historical cost data from like procurements and adjusts costs in a detailed manner to account for differences between systems. Grass-roots, or bottoms-up, cost estimating primarily uses expert judgment and past contract data to estimate labor, material, equipment, travel, computer and other direct costs. These costs are then burdened using direct, indirect and overhead rates to calculate a total estimated cost.

Because the work to be performed under each environmental R&D contract is different and unique, the grass-roots method of cost estimating is normally used. The general procedure for developing the cost estimate is as follows. An example IGCE for a project performed at NDCEE is attached.

List major tasks, schedule (timeline) and cost categories
List needed labor categories
Estimate hours by labor category and calculate labor costs
Estimate material costs
Estimate equipment costs
Project travel requirements and calculate travel costs
Apply labor rates to labor hours
Calculate burden for direct, indirect and overhead rates
Calculate profit/fee
Add costs to calculate total costs

Note: A spreadsheet program may be helpful for cost estimating.

When estimating costs, consider the complexity and difficulty of the effort and the scale and number of pieces of equipment. Labor estimates should include time for project management functions. If the contractor is known (e.g. NDCEE or ID/IQ contract), actual rates can be used. If the contractor is not known, average rates from other projects can be used. While

indirect and overhead rates may vary widely between contractors, the overall burdens are often quite close. Don't forget to adjust historical and projected rates for inflation.

C. ASSISTANCE

Our acquisition support personnel have extensive acquisition experience and are an invaluable resource for developing detailed cost estimates. The best cost estimate will result from an informal panel consisting of the Project Manager and 2-3 acquisition support personnel familiar with the project (whoever assisted with the SOW).

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APPENDIX D

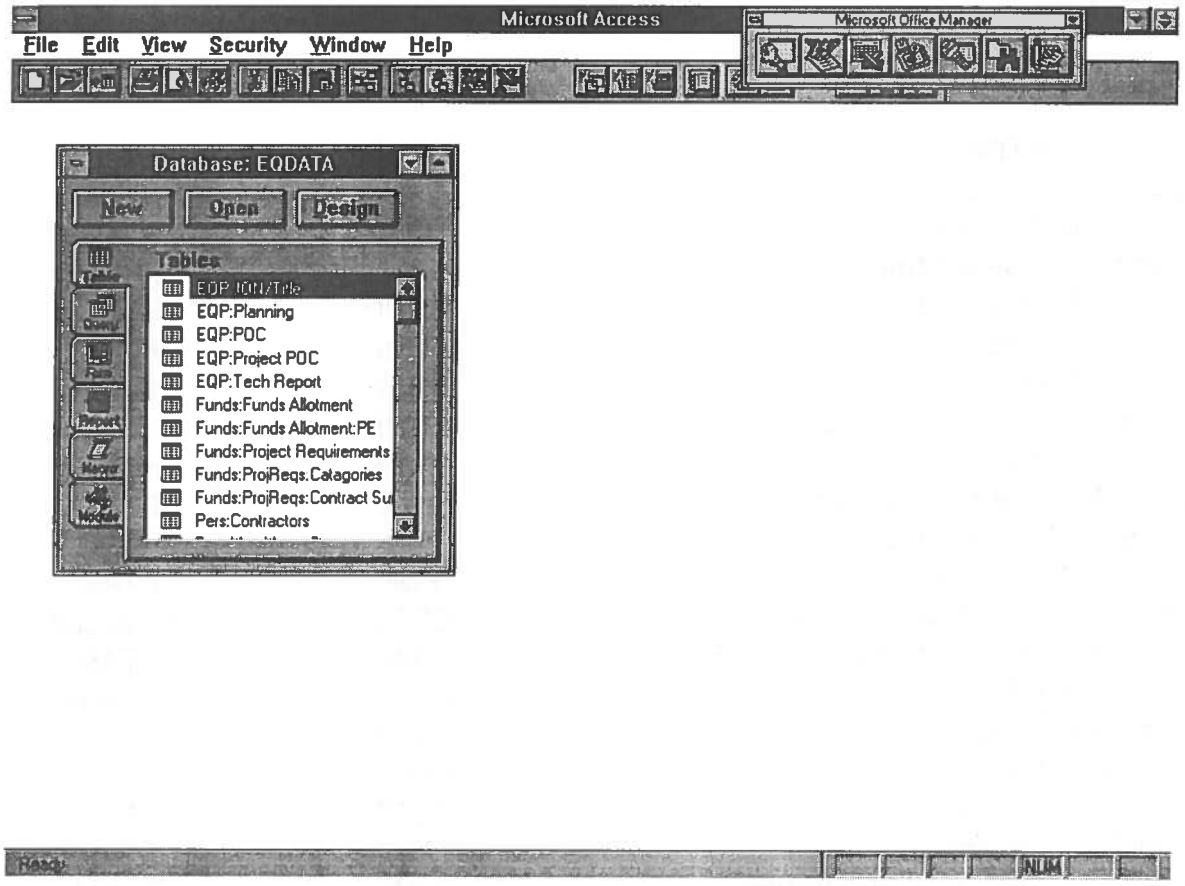
DRAFT ENVIRONMENTAL QUALITY INFORMATION DATABASE HANDBOOK

DRAFT ENVIRONMENTAL QUALITY
INFORMATION DATABASE HANDBOOK
17 MAY 1996
HANDBKF2.doc

Table of Contents

Introduction

The Armstrong Lab Environmental Quality (EQ) Information Database is the single repository for work unit and program planning and execution information for all the divisions within AL/EQ. The overall database is currently composed of two individual databases: (1) EQ Data and (2) EQ Info. The EQ Data database stores all the raw data for each work unit and program. From this information EQPP will prepare custom reports, provide analyses, and implement application development. An example of the tables in this database are shown below. The EQ Info database contains applications that will enable Project Managers to edit, add, and delete information relative to each of their projects.



For security and control, certain sections of the database, such as those relating to funding, have been designed such that only certain individuals may make updates. These sections will be static; and therefore, they may only be viewed and printed. Table 1 specifically defines who is responsible for each table. Finally, even though using the database will be straight forward to most users, the following information will be detailed while giving a general overview.

List of Tables/Responsibilities

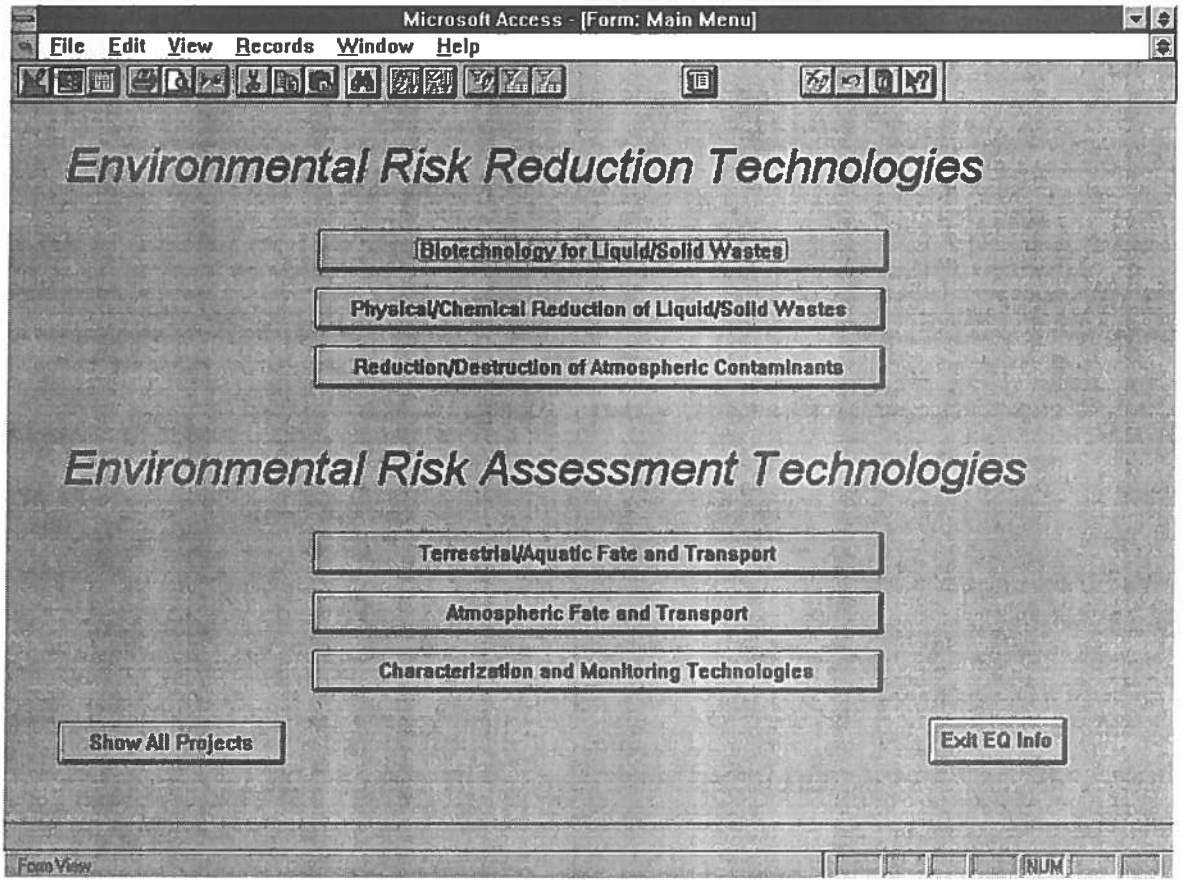
Tables store data in the MS Access environment. Permissions for editing, viewing, adding, and deleting of records are controlled by system level permissions set by the EQ Information Systems Administrator. The OPR is responsible for the accuracy of the information in the MS Access tables shown in Table 1. The groups listed in Table 1 have permission to edit the data contained in the tables. When individuals join the EQ Info Work Group they are assigned to groups. Individuals are assigned to one or many groups based on the level of editing they are required to perform.

TABLE 1

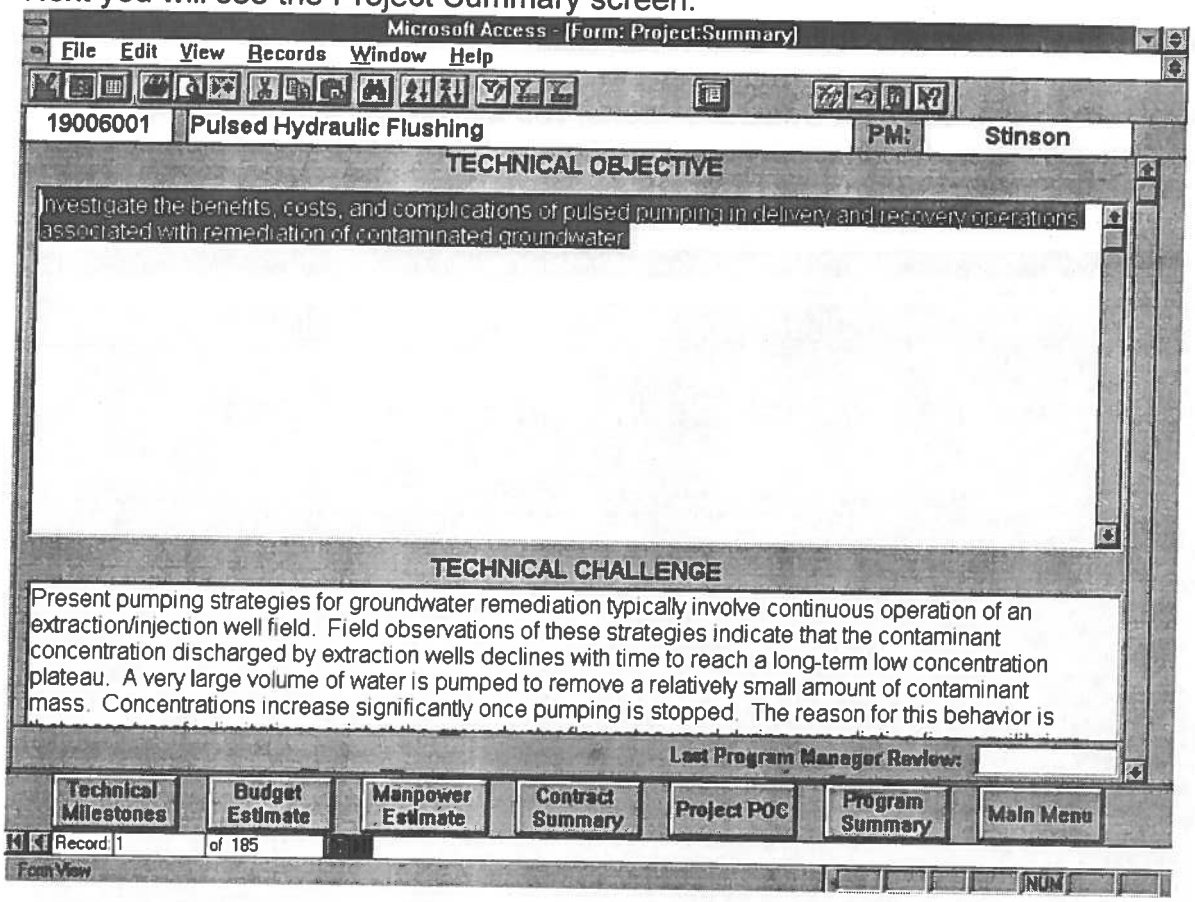
TABLE	OPR	GROUPS
EQP: JON/Title	EQPP	Planning
EQP: Project POC	PMs	FTAM
EQP: Tech Report	EQPP	Tech Edit
Funds: Funds Allotment	EQPP	Financial
Funds: Funds Allotment: PE	EQPP	Financial
Funds: Project Requirements	PMs	FTAM
Funds: Proj Reqs: Categories	EQPP	Planning
Funds: Proj Reqs: Contract Summary	EQPP	Contract
Pers: Contractors	EQPP	Financial
Pers: Man-Years: Contractor	PMs	FTAM
Pers: Man-Years: Govt	PMs	FTAM
Pers: Project Officers	PMs	FTAM
Pers: Project Officers: Rates	EQPP	Financial
Pers: Project Summary	PMs	FTAM
ProjSum: FTA	EQPP	Planning
ProjSum: Programs	EQPP	FTAM
ProjSum: RD Categories	EQPP	FTAM
ProjSum: Sub-Subthrust	EQPP	FTAM
ProjSum: Taxonomy	EQPP	FTAM
ProjSum: Technical Milestones	PMs	FTAM

Working with Projects: Updating the Database

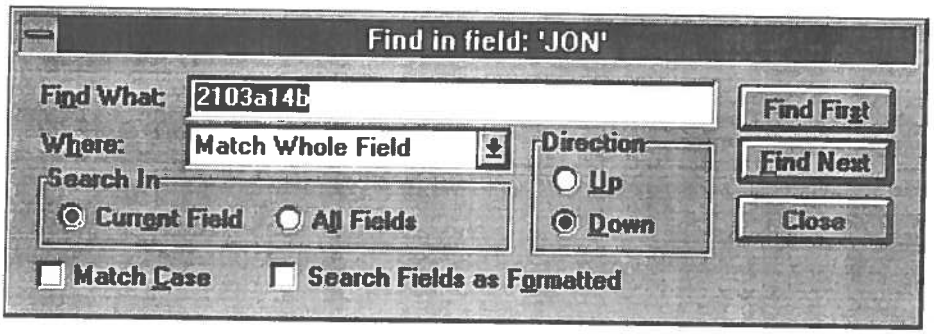
When the EQ Information Database opens, you will see the screen below. This screen allows you to choose a grouping of projects or, if you click on the Show all Projects button, you can view all the projects in the database.



Next you will see the Project Summary screen.



A click of the right mouse button on either the JON or the Project Title calls up the "Find" capability and allows you to select the specific project that you need. After entering either the JON or a portion of the work unit title, click on the Find First button to begin the search and then click on Close. After changing the record, the data will automatically be saved when the database closes.



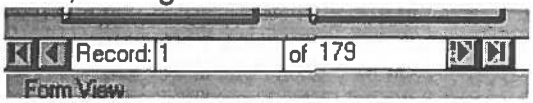
Project information can be viewed by using the control bars at the side of each record or by pressing the "Page Down" key. The following fields are part of the project summary screen: (1) Technical Objective, (2) Technical Challenge, (3) Aspect of Program Addressed by Project, (4) Technical Approach, (5) Product and Decision Criteria, (6) Transition Plan and (7) Status. An additional field is included to allow the project manager to enter the date the record was last reviewed.

There are currently seven buttons at the bottom of the first screen that provide further information on each project. These buttons are as follows: (1) Technical Milestones, (2) Budget Estimate, (3) Manpower Estimate, (4) Contract Summary, (5) Project POC, (6) Program Summary, and (7) Main Menu.

Clicking on 

will close the database and return the user to Windows. There will be an additional button added to this screen which will enable the user to input POC information.

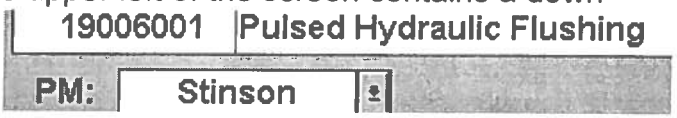
Also, the right and left arrow buttons at the bottom left of the screen



will enable the viewer to obtain a specific record. The two outside arrows will take the user to the first (using the left outside arrow button) or to the last record (using the right outside arrow button).

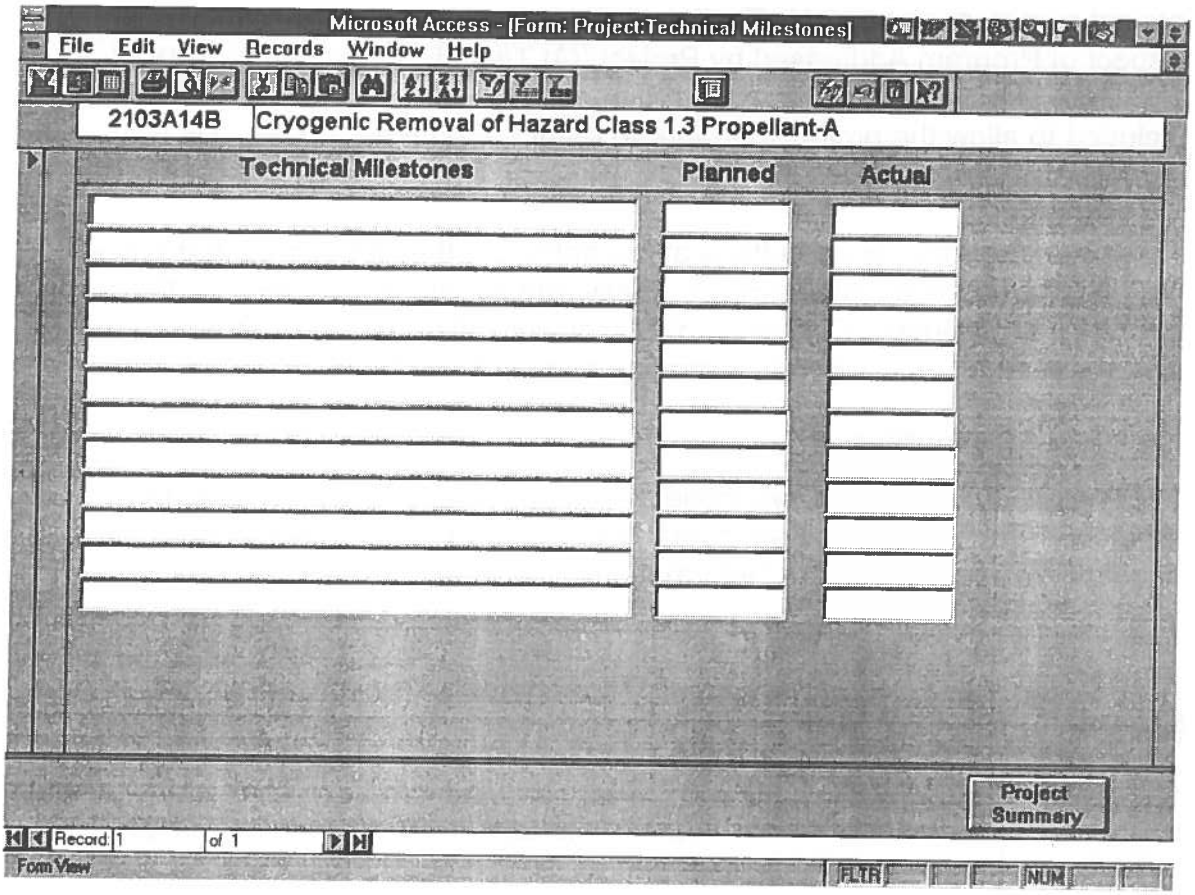
Note that a single click on the Project Summary button at any time will bring the viewer back to the Project Summary Screen. Also, each section can be accessed by using the scroll bar.

The Project Manager section in the upper left of the screen contains a down arrow. A single click on this arrow

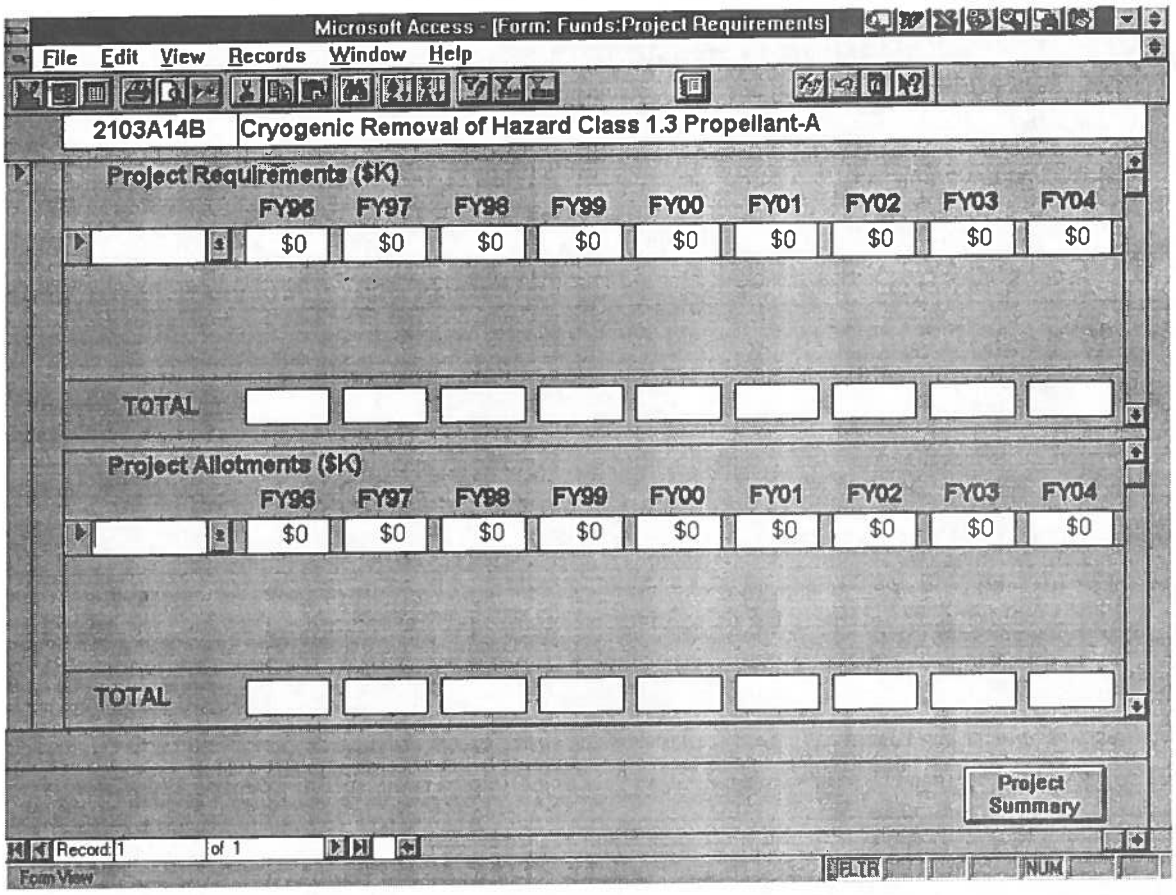


displays a list of all the project managers from which one can be chosen.

The Technical Milestones button will display planned versus actual milestones.

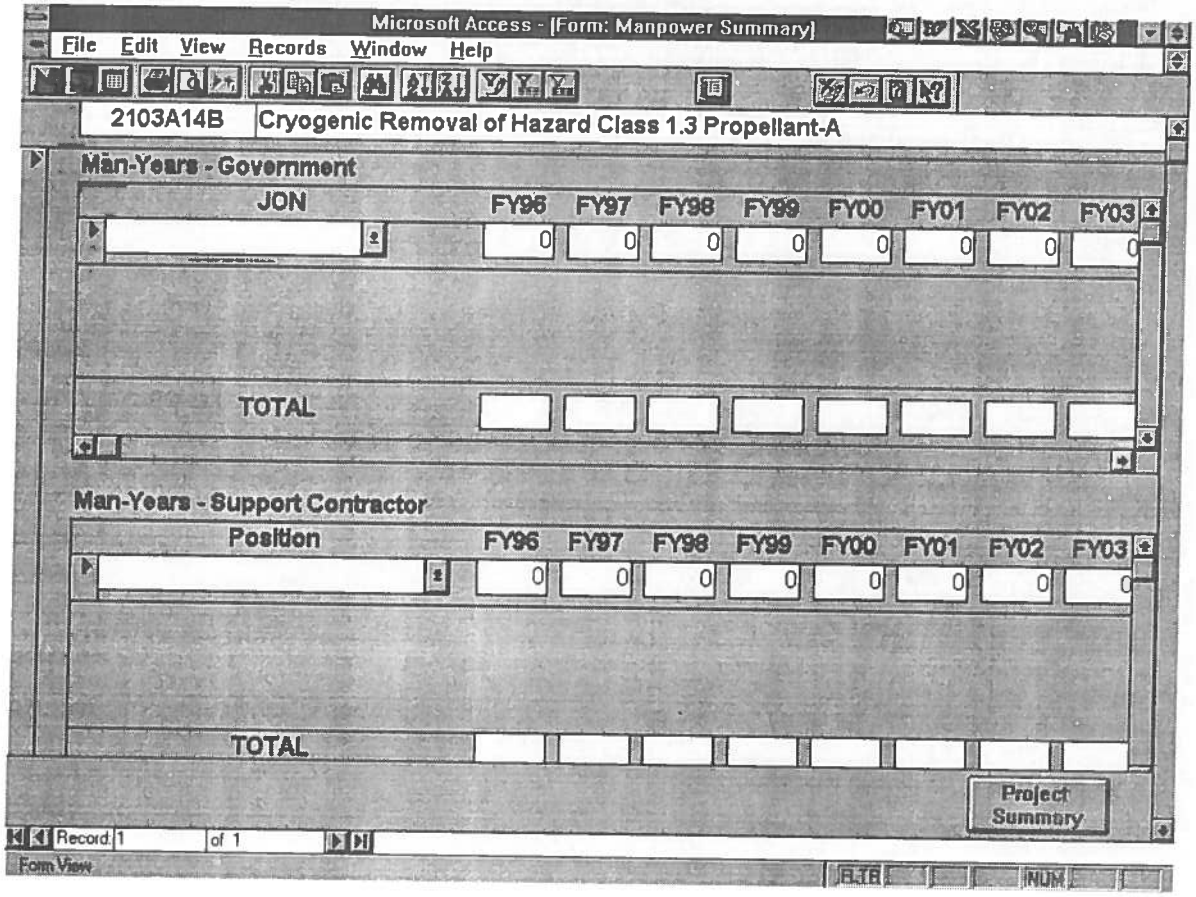


Clicking on Budget Estimate displays planned versus actual funding for each project.

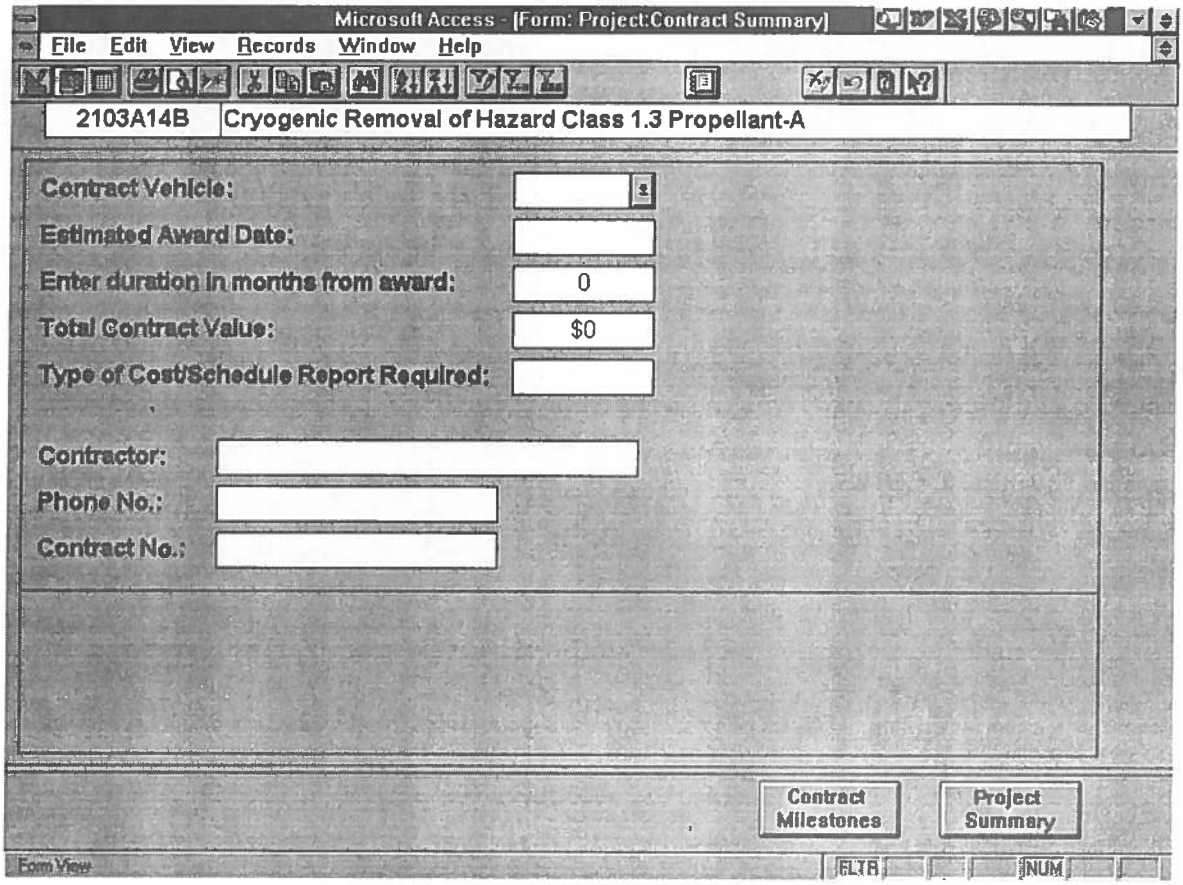


Project managers are responsible for the Project Requirements updates; however, the Project Allotments will be the responsibility of AL/EQP and provided to the project manager in "Read Only" format. A single click on the arrows in the Project Requirements drop down box in the upper-left corner of the screen will display a specific breakout of how the funding will be spent, such as the kind of contract being used, DSG/SSG personnel, travel, etc.

A single click on [Manpower Estimate] will bring up the Manpower Summary screen. Using this screen each project manager will track both their government and contractor support. The drop down boxes are provided for the quick entry of the names of government personnel and contract positions.

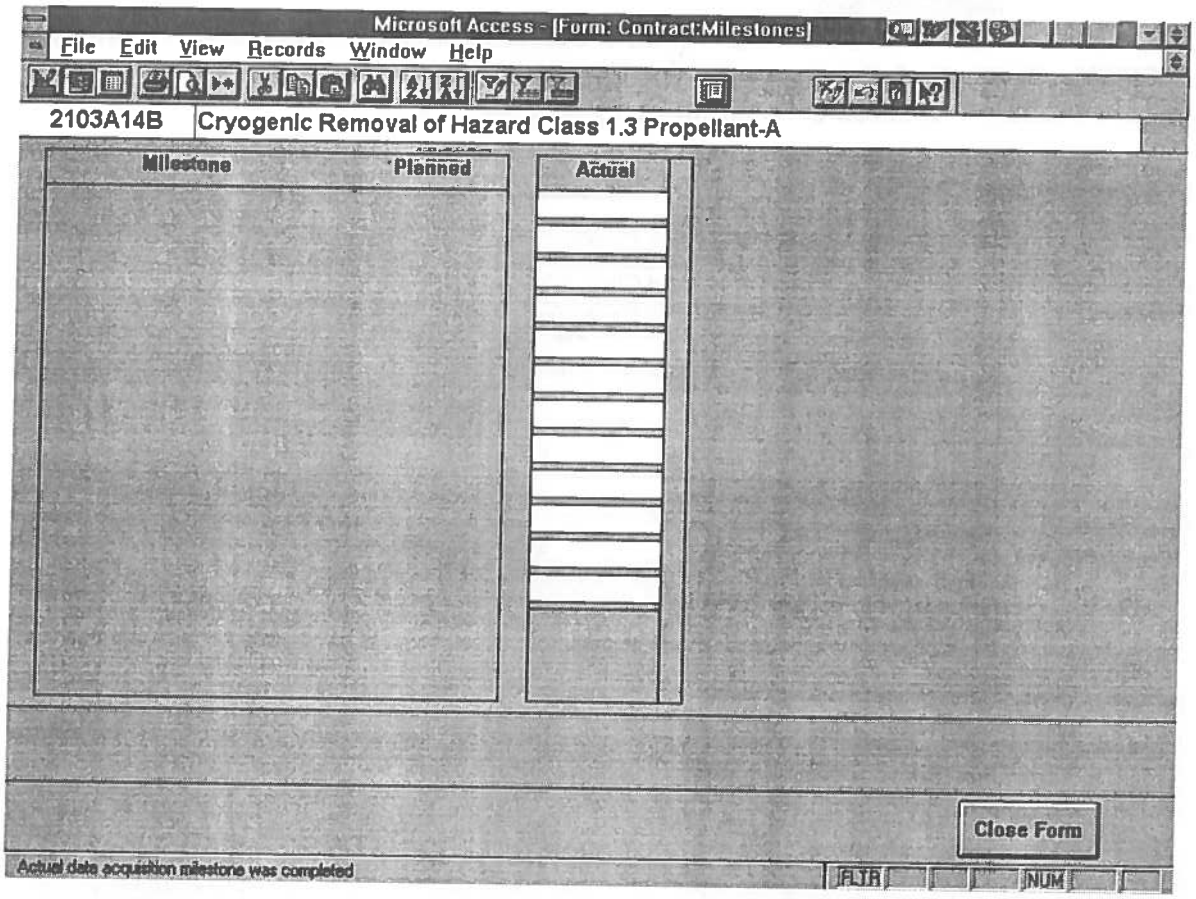


One click on Contract Summary brings up a screen similar to the one below. Contract summary information is entered by the EQPM contracting section after the project manager decides on a contracting vehicle.



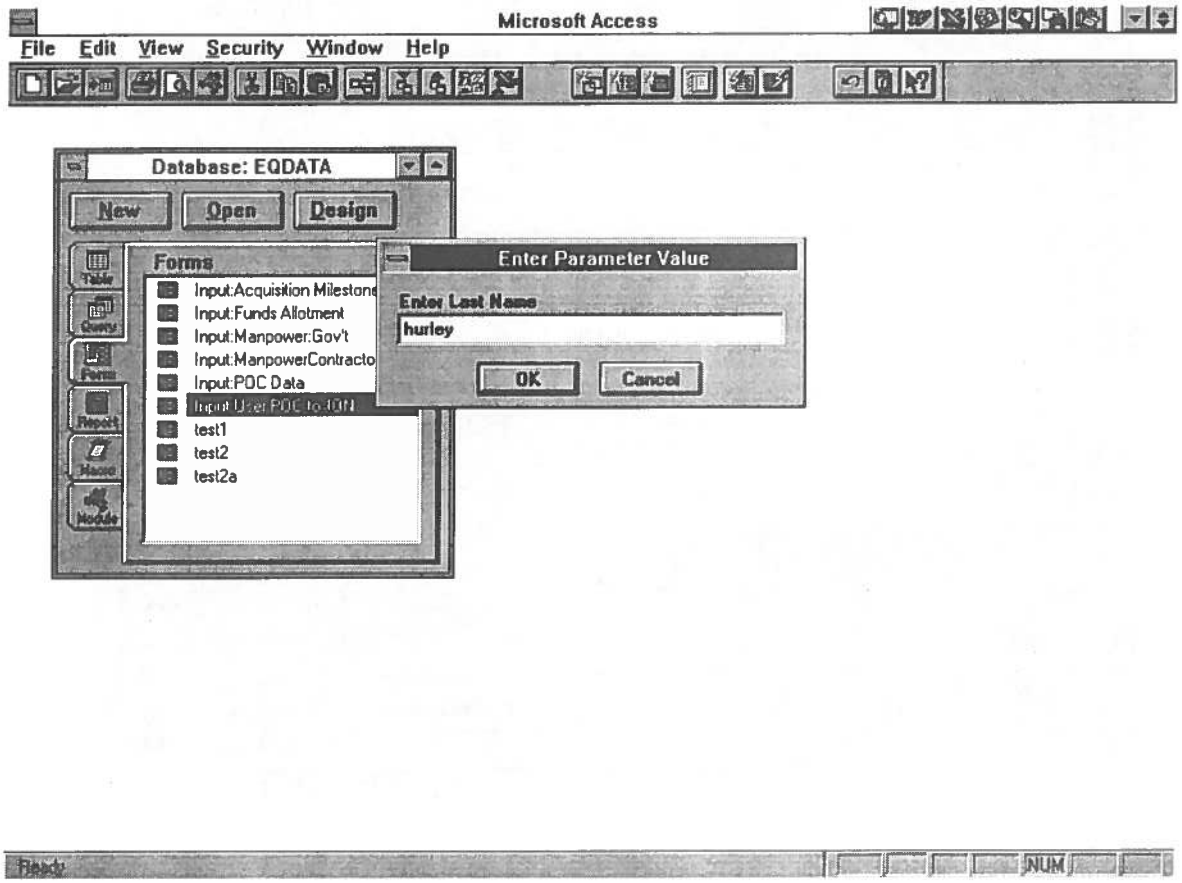
Note that in the bottom right-hand corner a Contract Milestones button is shown. This button will open a screen that shows the tentative acquisition milestones based on the contracting vehicle and estimated contract award date.

One click on this button will bring up the planned versus actual milestones.

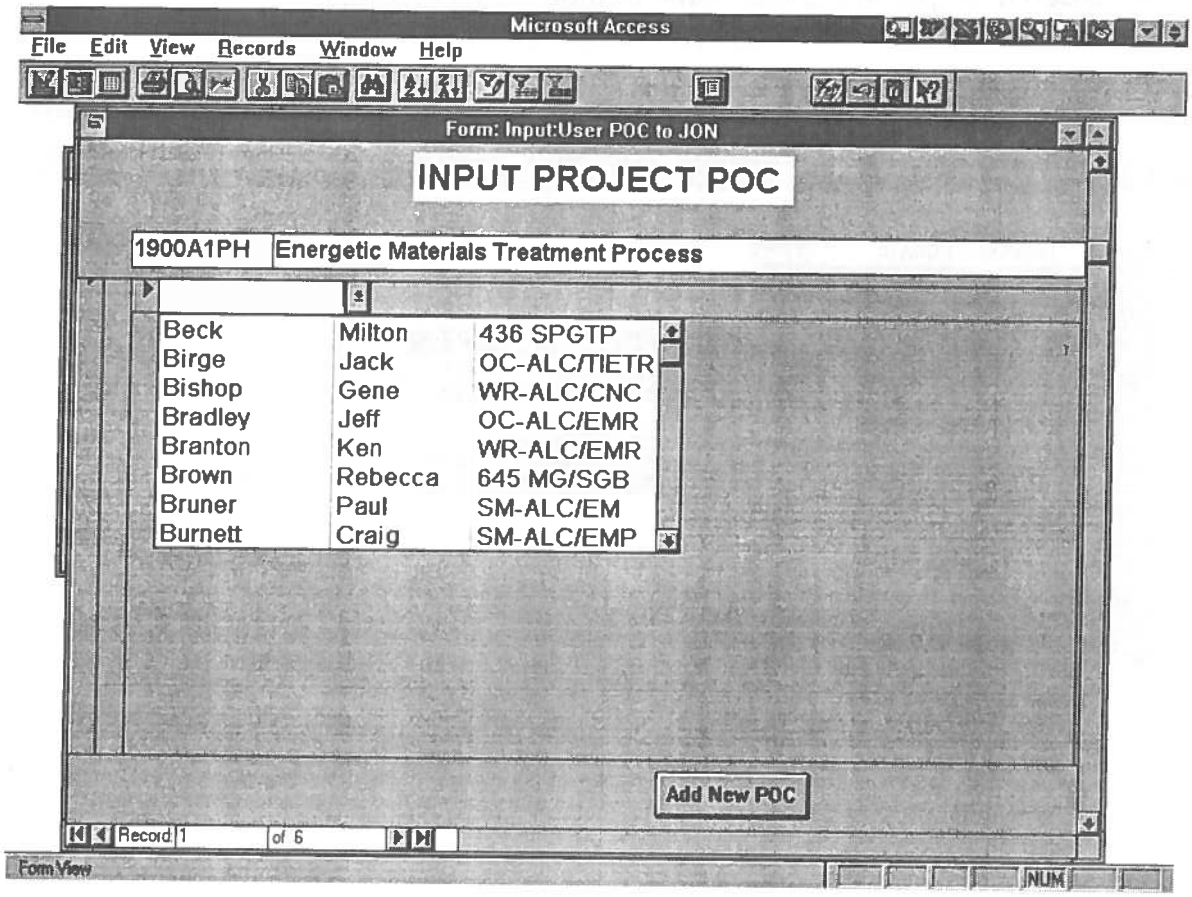


Point of Contact Data (Adding, Deleting, and Printing POC Information)

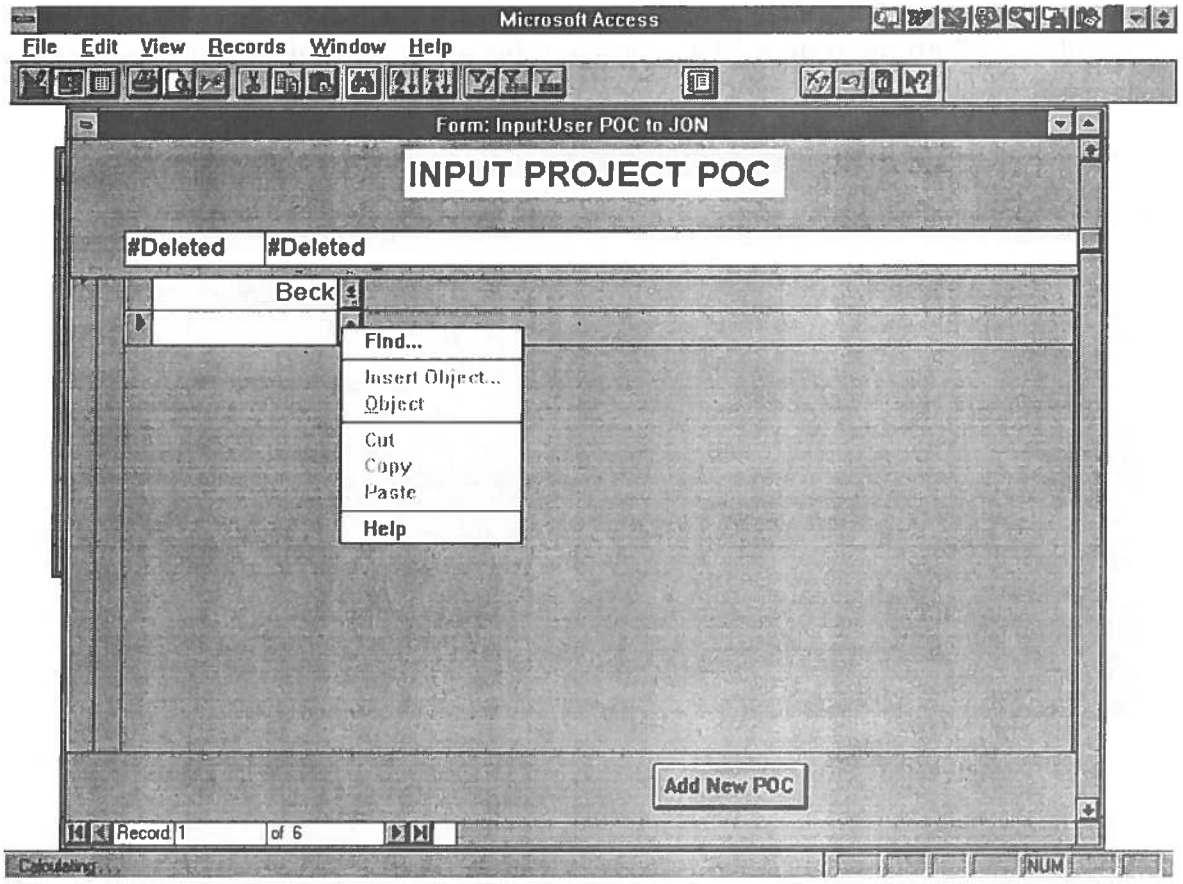
The Point of Contact (POC) data for projects may be added, deleted, and printed using the following screens. To add a POC, select the POC Input button on the main screen and type in the last name of the Project Manager.



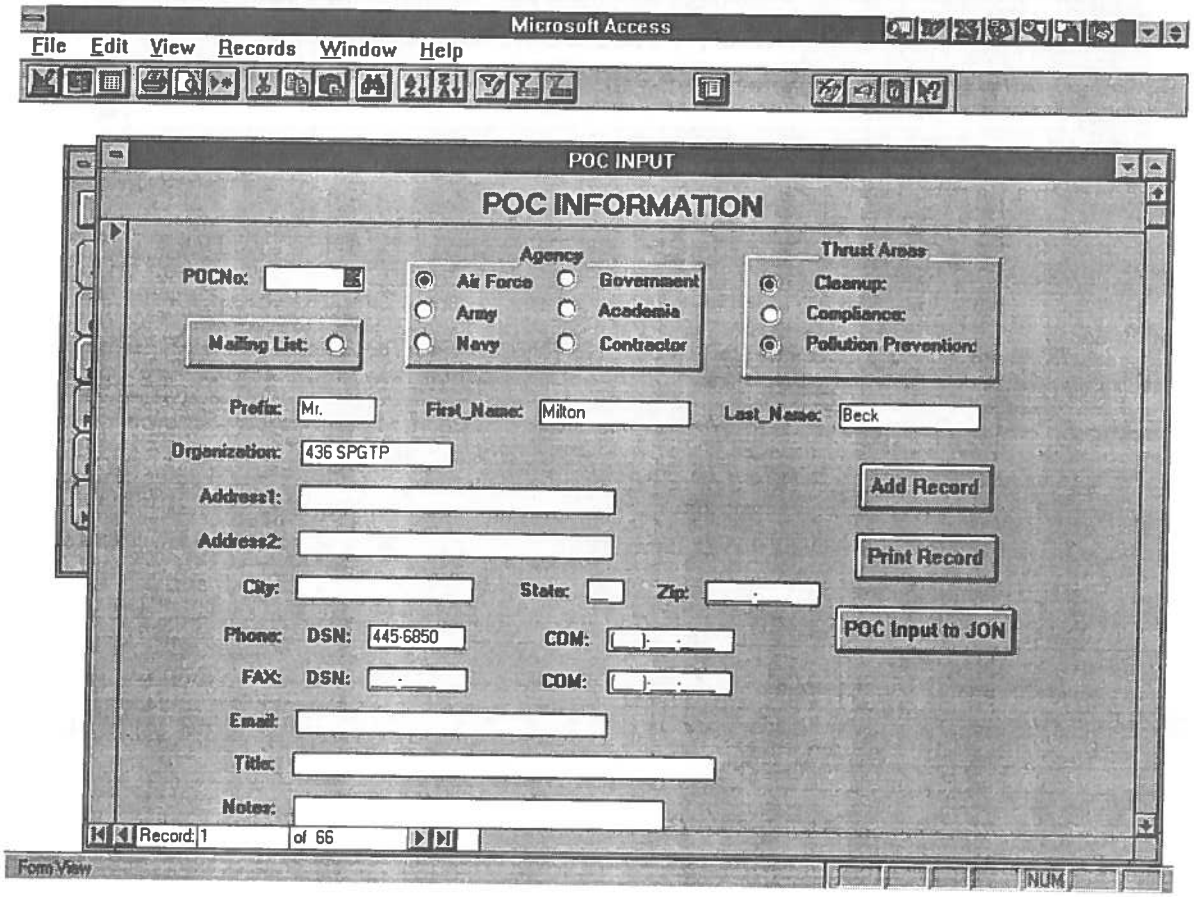
Using the screen below users can scroll through their JONs and Projects using the lower left-hand arrows. When the arrow in the dropdown box is clicked, the POCs currently in the database can be viewed. The POCs can be scrolled by using the POC scroll bar and select one or more POCs for that given project.



By clicking on the right mouse button, the "Find" capability can be used. The last name of the individual POC desired can be input rather than scrolling.

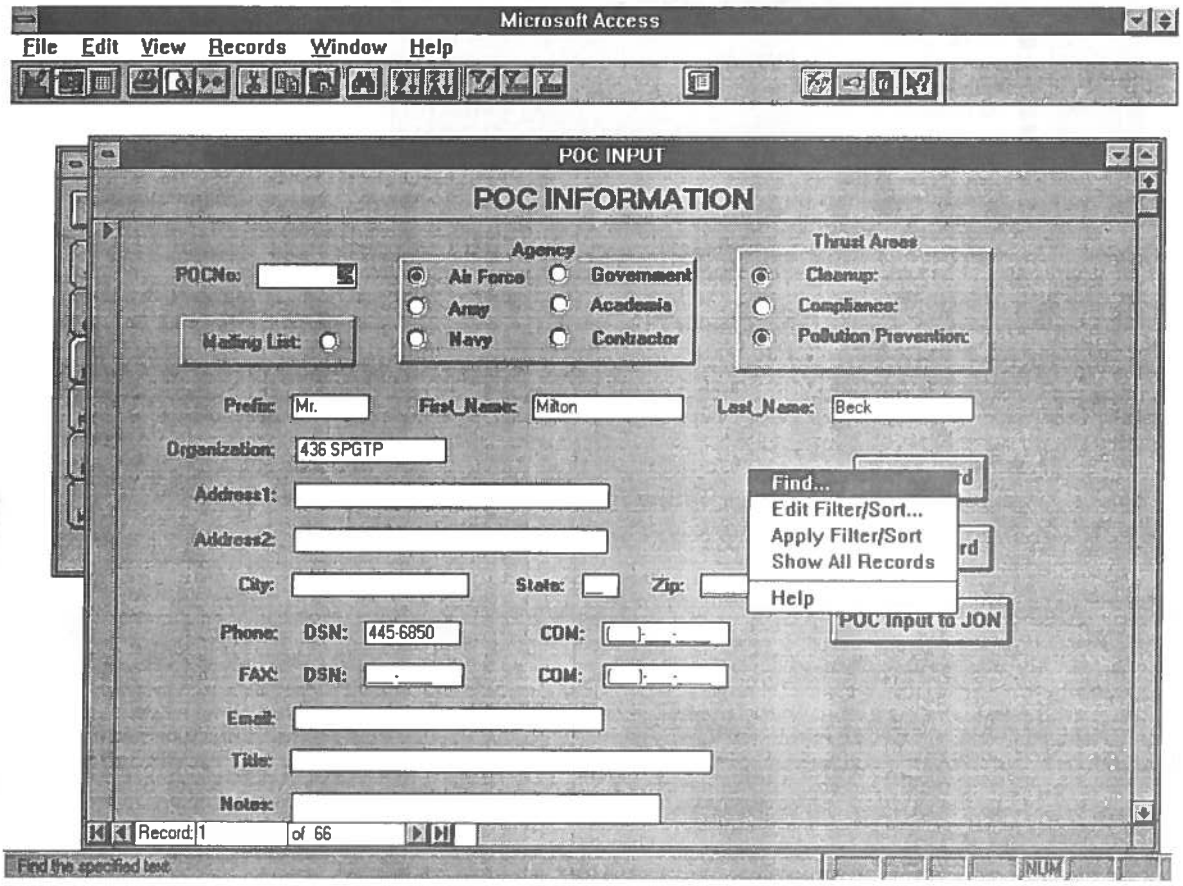


To add a POC not in the database, click once on the Add New POC button on the Form: Project Summary screen and the following screen comes up. Using this POC Input Information screen, the user can add as many POCs as required. To add a new set of information to the database, click on the Add Record button and then enter the information on the form for each POC. If the user is unable to get complete information on a POC, please advise EQP and they will try to get the remaining information.

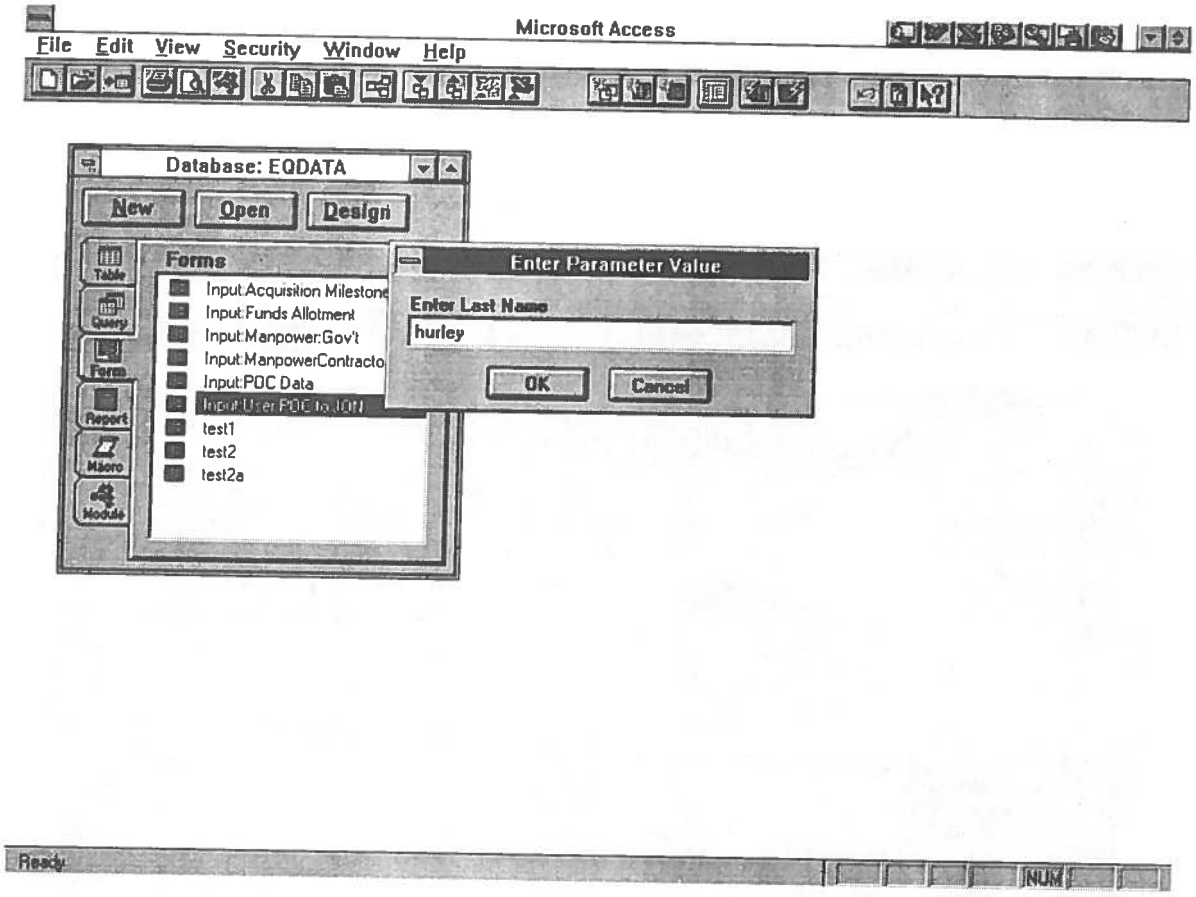


By clicking once on the Print Record button shown on the form, the user can print the current POC information.

Also, the user can access the "Find" capability to call up a particular POC and get information.

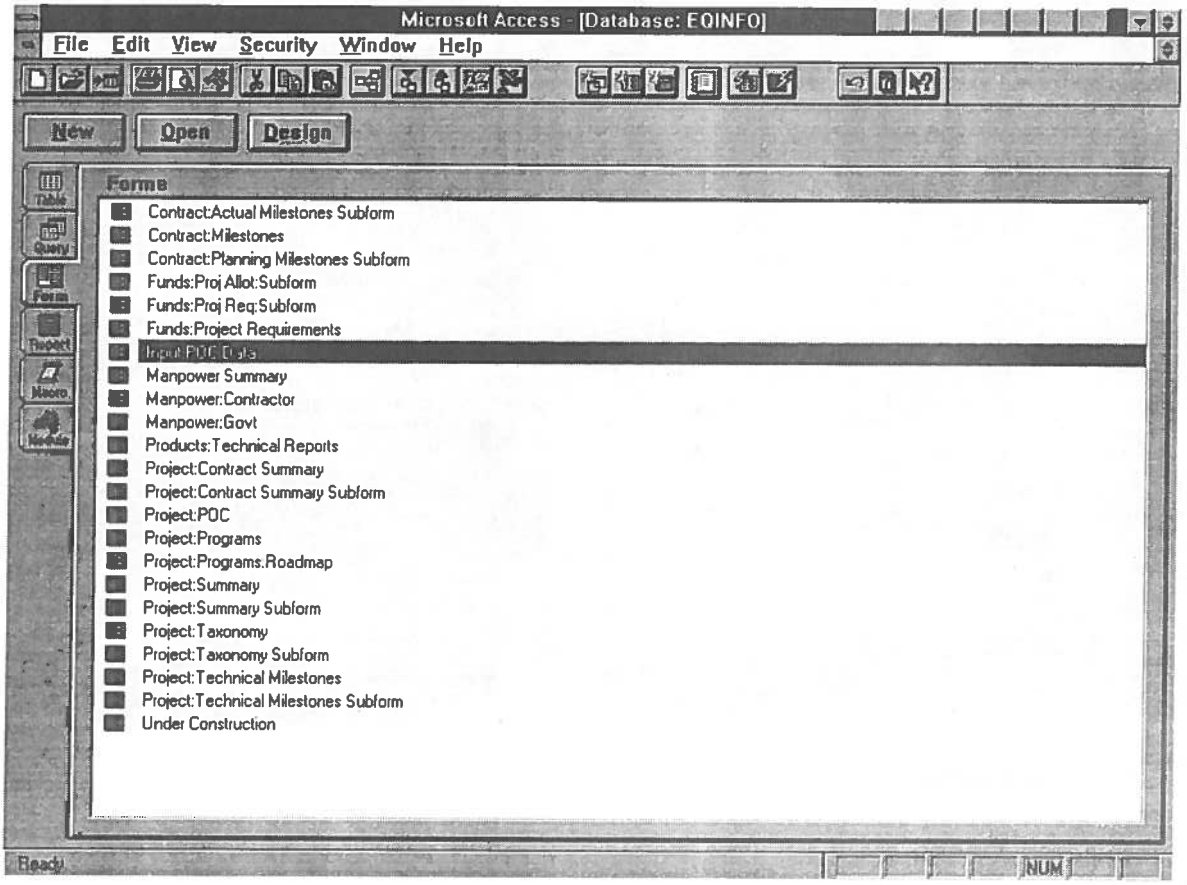


To add the new POC to a project, click once on the POC Input to JON button and then re-enter the Project Manager's last name. Once the Project Manager's name is entered, one click on the OK button will return the user to the Form: Input: User POC to JON.

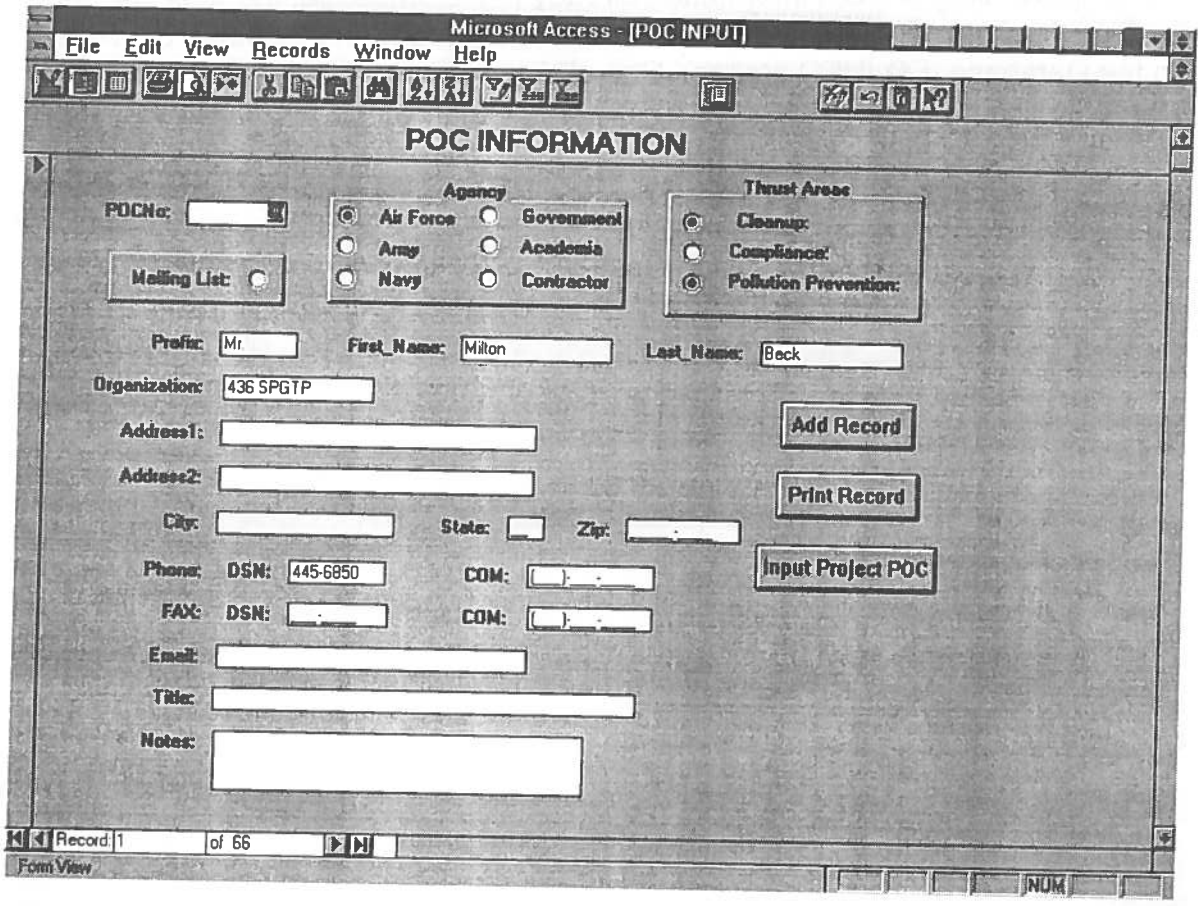


To return to the Projects Summary Form, click once on the Project Summary button.

For simple editing of POC information already in the database, the user will need to close the Form: Project: Summary screen and go to Forms: Input: POC Data on the Database: EQ INFO screen. One click on the Open button will call up the screen below.



The following screen on which editing changes can be made will be called up.



Toolbar Capabilities

The custom toolbar on the EQ Information Database will allow the user to do the following: find, sort ascending, sort descending, edit filter/sort, apply filter sort, and show all records.

TOOLBAR ICONS WILL BE INSERTED

EQP Technical Support

EQP personnel will provide support to users by providing the following capabilities: printing projects, assisting in obtaining additional POC information, adding/deleting projects, and changing JON numbers.

APPENDIX E

TECHNOLOGY INVESTMENT PLAN (TIP)

TECHNOLOGY INVESTMENT PLAN
OR
ACQUISITION INVESTMENT PLAN

TITLE: TIP/AIP NO:

Program Manager: Name, Office Symbol, DSN #

Roadmap Reference: Tech Area/Thrust/Subthrust or Roadmap Number ID (i.e., Conventional Armament/Ordnance/Hard Target Penetration)

Program Element(s): Project(s):

Funding in $1000s:	FY9(X-1)	FY9(X)	FYXX	FYXX	FYXX	FYXX	FYXX	FYXX
PE 62XXXF	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx
PE 63YYYF	yyy	yyy	yyy	yyy	yyy	yyy	yyy	yyy
TOTAL 6.2/6.3 S&T	XYX	XYX	XYX	XYX	XYX	XYX	XYX	XYX
ARPA/BMDO, etc.	aa	aa	aa	aa	aa	aa	aa	aa
PE 61102F	zz	zz	zz	zz	zz	zz	zz	zz
TOTAL OTHER	AZ	AZ	AZ	AZ	AZ	AZ	AZ	AZ
TOTAL PROGRAM	xyaz	xyaz	xyaz	xyaz	xyaz			

TECHNICAL PROGRAM DESCRIPTION:

OBJECTIVE: Describe:

(1) A general problem statement;
(2) Limitations/restrictions of current technology;
(3) Limitations of current basic knowledge (for 6.1 efforts);
(4) Related work and/or prior coordination;
(5) Needs to be addressed in this effort;
(6) Payoff to the Air Force describing what capability this work could provide or what products will be transitioned.

TECHNICAL APPROACH: Describe:

(1) Major tasks of this effort;
(2) Methodology used to perform this task;
(3) Major milestone dates and products. The methodology and milestones should contain sufficient detail to allow evaluation of the approach.

ACQUISITION INFORMATION:

Estimated (RFP, BAA, or PRDA) Release Date: dd mmm yy (choose one)
Estimated Contract Award Date: dd mmm yy
Contract Type and Duration: (i.e., CPFF, 24 months)

NOTES:

1. The format is mandatory, including the one inch margins. **ALL TIPs MUST BE LIMITED TO ONE PAGE.** Standardization is necessary in order to efficiently route the TIPs through the TEO and AFAE staffs.

2. Present descriptions in a logical, straight forward manner.

APPENDIX F

WORK UNIT INFORMATION SYSTEM (WUIS) WORKSHEET

AL/EQ COORDINATION FORM FOR WUIS FORM		DATE: 95 / 03 / 15
PROJECT OFFICER: Brent C. Roberts, Lt	OFFICE SYMBOL: AL/EQW	TELEPHONE: (904) 283-6290

DIVISION COORDINATION

ROUTING	NAME	DATE	COMMENTS
~~3 BRANCH CHIEF~~		/ /	
2 DIVISION CHIEF	Robert Laloe, LTC	16 MAR 95	
		/ /	

EQP COORDINATION

ROUTING	NAME	DATE	COMMENTS
4 EQPM (BUDGET)	Meyer	03/17/95	
5 STINFO (EQPI)	Tessman	17 MAR 95	
6 DTIC RECORDING	Shoaf	12 APR 95	* See Below

RETURN WUIS FORM TO PROJECT OFFICER FOR ENTRY INTO CASE FILE

7 PROJ OFFICER		/ /	

PROCEDURES:

A. A WUIS FORM IS REQUIRED FOR THE START OF EACH AL/EQ APPROVED RDT&E RESEARCH EFFORT AND IS REQUIRED ANNUALLY FOR UPDATES.
B. THE PROJECT OFFICER FILLS OUT THE WUIS FORM WITH APPROPRIATE INFORMATION DESCRIBING THE RDT&E EFFORT.
C. THE WUIS FORM IS THEN COORDINATED THROUGH THE APPROPRIATE BRANCH/DIVISION AS REQUIRED FOR REVIEW AND APPROVAL.
D. AN APPROVED AF FORM 813 WILL BE ATTACHED TO THE WUIS FORM.
E. THE WUIS FORM NEXT GOES TO EQPM FOR AN ASSIGNED JON NUMBER, THEN TO THE STINFO OFFICER FOR QUALITATIVE REVIEW, AND THEN FOR RECORDING OF DATA INTO THE DTIC SYSTEM.
F. THE WUIS FORM IS TO BE RETURNED TO THE PROJECT OFFICER FOR INCLUSION IN THE RDT&E EFFORT'S CASE FILE.

COMMENTS:

ADD " THIS EFFORT WILL RESULT IN AT LEAST ONE TECHNICAL REPORT ".

* Update Annually.

USE REVERSE SIDE AND/OR SEPARATE SHEET FOR ADDITIONAL COMMENTS

WUIS Online Worksheet

1. Act. Number: DF	1A. Act. Code	2. Trans Type: M	3. Status of Effort: N	4. Perf. Method: C	5. Perf Type: S	6. Date of Summary: YYMMDD
7. Pred. Sum. Date: YYMMDD	8. Start Date YYMMDD	9. End Date YYMMDD	10. Effort Sec. Code: U	11. Effort Sec. Add. Notice:	12. Record Sec. Code: U	13. Rec. Sec. Add. Notice:

14. Classification Authority:	15. Regrading Code:	16. Regrading Date: YYMMDD
17. Regrading Event:		18. Dist Code: A
19. Dist Reason: PB	20. Title:	

21. Sub Rec. Ind.	22. Linking Accession Number	23. Local Control Number	24. Search Data
25. Subject Categories	26.1 Mission Area Code	26.2 Function Code	26.3 Technology Code

27. Resp. Org. Source Code: 426402	27.1 Responsible Organization Name: Armstrong Laboratory

27.2 Responsible Organization Component Name: Environics Directorate

27.3 Responsible Organization Location: 139 Barnes Dr, Suite 2, Tyndall AFB FL 32403-5323

27.4 Responsible Individual Name	27.5 Resp. Indiv. Off. Sym. AL/EQW	27.6 Resp Indiv. Phone (904)283-	27.7 Resp Indiv. DSN No. 523-

28. Perf. Org. Source Code	28.1 Performing Organization Name

28.2 Performing Organization Component Name

28.3 Performing Organization Location

28.4 Prin. Invest. Name	28.5 Prin. Invest. Off. Sym.	28.6 Prin. Invest. Phone ( )	28.7 Prin. Invest. DSN No.

28.8 Associate Investigator Names

30. Primary PE No.	30. 1st Contrib. PE No.	30. 2nd Contrib. PE No.
30A. Primary Proj. No.	30A. 1st Contrib. Proj. No.	30A. 2nd Contrib. Proj. No.
30B. Primary Task No.	30B. 1st Contrib. Task No.	30B. 2nd Contrib. Task No.

30. Primary Funding Data			31. 1st Contributing Funding Data			32. 2nd Contributing Funding Data			Contract Rollup Indicator
Fiscal Year	Dollars	Work Years	Fiscal Year	Dollars	Work Years	Fiscal Year	Dollars	Work Years	
C1	C2	C3	C1	C2	C3	C1	C2	C3	C
D1	D2	D3	D1	D2	D3	D1	D2	D3	D
E1	E2	E3	E1	E2	E3	E1	E2	E3	E
F1	F2	F3	F1	F2	F3	F1	F2	F3	F
G1	G2	G3	G1	G2	G3	G1	G2	G3	G
H1	H2	H3	H1	H2	H3	H1	H2	H3	H

34. Contract/Grant/Trans. No.		34.1 Contract Effective Date YYMMDD		34.2 Contract. Expiration Date YYMMDD:	
34.3 Cont Face Value $ K	34.4 Cont Cum. to Date $ K	35. Key Words			
36. Obj. Class Code U	36.1 Objective:				
37. Approach Class. Code U	37.1 Approach:				
38. Progress Class. Code U	37.1 Progress:				
39. Product Set No.:	39.1 Prod. Title Class. Code: U	39.2 Product Title:			
39.3 Product ID/Report Number:			39.4 Product AD Number:		
39.5 Product Indicator: Y	40. Dom. Tech. Trans.: H1	41. Study Category: 5		42. Spec. Study Sub.: FE	
44. Prim. Proj. Serial Number:	45. Int. Sources Con.: Y	46. Processing Date (system generated)	47. Receipt Date (system generated)	48. Descriptors Class Code (system generated)	48.1 Descriptors (system generated)
49. Thrust Areas: Cleanup					

Guidance for Preparing AF Form 813's for R&D projects

Section I, Proponent Information: to be filled out by the proponent (project officer)

Block 3, Title of Proposed Action: Normally the project title.

Block 4, Purpose and Need for Action: Describe the problem and the requirement. This is the place to reference environmental regulations, discharges, hazardous waste volumes, costs of complying with environmental regulations, etc. Merely referencing the TPIPT needs statement is not satisfactory. Save discussion of the solution and the associated R&D effort for block 5. Continue on back of form as necessary.

Block 5, Description of Proposed Action and Alternatives: Describe the solution to be investigated in the R&D effort, work planned for the effort, environmental impacts of the R&D effort and environmental impacts (usually benefits) for implementation of the solution by the user. Depending on the particular project, including the following information will be helpful in providing the certification: location/contracting mechanism for effort, responsibility for compliance with environmental regulations and whether confined to the laboratory or a field test/demonstration. Also include any environmental analysis or permitting to be included in the project itself. Continue on back of form as necessary.

If the technical approach is to be determined as part of the project, ie. based on literature search and paper evaluation of commercially available technologies as part of an IDIQ task, so state and limit the scope of the Form 813 to the selection, lab work and field data collection (such as collecting soil samples). This will allow approval based on the Categorical Exclusion for work confined to the laboratory. Submit another Form 813 prior to field testing.

See also discussion of Section III, Block 18.

Section II, Preliminary Environmental Survey:

Blocks 7-16: Completed by the Environmental Planning Function signing in block 19. When filled out by Unit Environmental Coordinator, may have different effects for R&D effort and field implementation in some categories.

Section III, Environmental Analysis Determination: Completed by appropriate Environmental Planning Function.

Block 17: Work confined to the lab, provided all environmental regulation are complied with, qualifies for a Categorical Exclusion and further analysis is not required.

Atch 2

Block 18, Remarks: For 813's certified by the AL/EQ Unit Environmental Coordinator this block will usually contain one of the following:

For work confined to the lab: Reference for the Categorical Exclusion, ie. AFR 19-2, Atch 7, Para 2w Lab Exclusion

For R&D involving field work: Unit Environmental Coordinator certification with a comment to coordinate with the appropriate Environmental Planning Function, ie. the Environmental Planning Function (normally CES/CEV at base where field work will be done) prior to field work and any appropriate supporting comments. Project Officer and/or researchers are responsible for coordinating with the appropriate Environmental Planning Function prior to starting field work. The Project Officer and/or researcher are also responsible for submitting an AF Form 813 and obtaining approval of the Form 813 prior to starting field work, if required by the Environmental Planning Function.

Block 19, Environmental Planning Function Certification: Environics Directorate, Unit Environmental Coordinator for AF From 813's. Appropriate environmental planning function (usually CES/CEV) when base certification is required for field tests or demonstrations.

Distribution of AF Form 813's to Tyndall Environmental Planning Function (325 CES/CEV): For projects performed off-base, whether at a contractor's facilities or at another base, 325 CES/CEV does not receive a copy. For in-house projects performed at Tyndall, but confined to the lab, the Environics Directorate, Unit Environmental Coordinator signs block 19 certification. Because the work will be performed on-base, a copy of the signed AF Form 813 is forwarded to the 325 CES/CEV for information. 325 CES/CEV provides the block 19, Environmental Planning Certification for projects performed on-base that are not confined to the lab. Examples include the Ammonium Perchlorate bioreactor and past groundwater remediation demonstrations.

Atch 2

REQUEST FOR ENVIRONMENTAL IMPACT ANALYSIS	Report Control Symbol RCS:

INSTRUCTIONS: *Section I to be completed by Proponent; Sections II and III to be completed by Environmental Planning Function. Continue on separate sheets as necessary. Reference appropriate item number(s).*

SECTION I - PROPONENT INFORMATION

1. TO *(Environmental Planning Function)*	2. FROM *(Proponent organization and functional address symbol)*	2a. TELEPHONE NO.
3. TITLE OF PROPOSED ACTION		
4. PURPOSE AND NEED FOR ACTION *(Identify decision to be made and need date)*		
5. DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES *(DOPAA) (Provide sufficient details for evaluation of the total action.)*		
6. PROPONENT APPROVAL *(Name and Grade)*	6a. SIGNATURE	6b. DATE

SECTION II - PRELIMINARY ENVIRONMENTAL SURVEY. *(Check appropriate box and describe potential environmental effects (including cumulative effects.) (+ = positive effect; 0 = no effect; - = adverse effect; U = unknown effect)*	+	0	-	U
7. AIR INSTALLATION COMPATIBLE USE ZONE/LAND USE *(Noise, accident potential, encroachment, etc.)*				
8. AIR QUALITY *(Emissions, attainment status, state implementation plan, etc.)*				
9. WATER RESOURCES *(Quality, quantity, source, etc.)*				
10. SAFETY AND OCCUPATIONAL HEALTH *(Asbestos/radiation/chemical exposure, explosives safety quantity-distance, etc.)*				
11. HAZARDOUS MATERIALS/WASTE *(Use/storage/generation, solid waste, etc.)*				
12. BIOLOGICAL RESOURCES *(Wetlands/floodplains, flora, fauna, etc.)*				
13. CULTURAL RESOURCES *(Native American burial sites, archaeological, historical, etc.)*				
14. GEOLOGY AND SOILS *(Topography, minerals, geothermal, Installation Restoration Program, seismicity, etc.)*				
15. SOCIOECONOMIC *(Employment/population projections, school and local fiscal impacts, etc.)*				
16. OTHER *(Potential impacts not addressed above.)*				

SECTION III - ENVIRONMENTAL ANALYSIS DETERMINATION

17. ☐ PROPOSED ACTION QUALIFIES FOR CATEGORICAL EXCLUSION (CATEX) # _____ ; OR
☐ PROPOSED ACTION DOES NOT QUALIFY FOR A CATEX; FURTHER ENVIRONMENTAL ANALYSIS IS REQUIRED.

18. REMARKS

19. ENVIRONMENTAL PLANNING FUNCTION CERTIFICATION *(Name and Grade)*	19a. SIGNATURE	19b. DATE

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APPENDIX G

TECHNOLOGY TRANSITION PLAN (TTP)

DEPARTMENT OF THE AIR FORCE
Headquarters Air Force Materiel Command
Wright-Patterson AFB OH 45433-5006

S&T OI 80-1

15 Oct 1993

Research and Development

TECHNOLOGY TRANSITION PLANNING

This instruction establishes the process for AFMC centers to transition technology from Air Force Science and Technology projects conducted by the laboratories to organizations responsible for development and application in systems. Technology transition planning is only one of the necessary processes to implement the concept and effect expeditious application of technology to meet Air Force needs. The focus is on orderly, phased transitions to give the user the technology option to satisfy part of his needs quickly, at an acceptable risk, in addition to having the comprehensive technology available. This instruction is consistent with AFPD 61-1, Management of Science and Technology. Other complementary processes, outside the purview of this instruction, guide the product center development plans offices' and laboratories' assessment of concept options, capability needs, and technological opportunities to initiate Science and Technology projects. This instruction does not address technology transfer and disclosure processes necessary to protect technology information dissemination to unauthorized parties.

1. *Terms Defined.*

a. Advanced Technology Development (ATD). Science and Technology (S&T) work funded in Air Force 6.3A Program Elements (DOD Budget Activity Code 2).

(1) Advanced Technology Transition Demonstration (ATTD). A laboratory project in a 6.3 ATD-funded program with the specific objective of meeting the users' defined needs through risk reducing "proof of principle" demonstrations conducted at the subsystems or higher level in an operationally realistic environment. Technology recipients are defined in paragraph 1.c *below*.

(2) Critical Experiment (CE). A laboratory project in a 6.3 ATD-funded program in which technical feasibility is demonstrated at the component or subsystem level and generally in a laboratory environment. CEs may lead to subsequent ATTDs.

b. Technology Transition (T2). In general, T2 is the transition of technology from one acquisition phase to another. Specifically, T2 is the transition of technology from the sponsoring laboratory (technology developer) to a technology recipient (see paragraph 1.c below). Transition ultimately is successful upon incorporation of technology into a system. For purposes of this instruction, T2 is considered as occurring through the following two steps, each of which requires appropriate oversight to ensure maximum payoff is realized from the S&T program.

(1) Technology Demonstration. Technology demonstration is the responsibility of the laboratory and occurs upon the successful completion of the terms and conditions of the technology transition plan (see paragraph 1.d below). This step of T2 does not depend upon actual incorporation of the technology into a system.

(2) Technology Application. Technology application is the responsibility of the technology recipient and involves any required further development of the technology (e.g., in a demonstration/validation program) as well as the actions associated with specification, development, and acquisition of systems incorporating the technology.

c. Technology Recipient. AFMC centers or their equivalents in other DOD acquisition agencies are the usual recipients of the technology developed and demonstrated by the laboratory. Other recipients could include HQ Air Force, operational major commands (MAJCOMs), support and training MAJCOMs, and agencies where capability needs are addressed by laboratory technology programs. Industry is a technology recipient since the primary means of inserting technologies into systems is through contractors who become expert in those technologies and who propose

to employ them in carrying out system developments. In certain circumstances, a laboratory can also be a recipient in transitioning technology from a 6.3 ATD program to a higher RDT&E category when the laboratory has been designated to execute the follow-on program.

d. Technology Transition Plan (TTP). An agreement between the laboratory; the product center, test center, or air logistics center; the T2 planning OPR; and the technology recipient that documents the specific tasks that must be successfully completed prior to technology acceptance.

e. Technology Area Plan (TAP). An annual documentation of a laboratory's objective, approach, program plans, and resources to develop and demonstrate technology in a defined area.

f. Technology Master Process (TMP). An end-to-end process for technology development, transition, and application/insertion. The TMP ensures that the technology needs for both internal and external AFMC customers are identified and prioritized, that a balanced portfolio of dollar-constrained technology projects is formulated to address the most critical technology needs, and that a corporate review and approval process occurs before the technology projects are executed.

2. Background Information.

a. Air Force S&T Program. The objective of Air Force S&T development is the continuing discovery, exploitation, demonstration, and rapid transition of technology to users to meet operational needs. Conceptually, Air Force technology is developed and refined in three distinct phases described in AFR 80-1: basic research, exploratory development, and advanced development. The third phase consists of demonstrations (such as brassboard or breadboard hardware, software, simulations, functional models, experimentally confirmed concepts) and the preparation of products (such as handbooks, criteria, techniques, etc.) that show the maturity of technologies that can transition into demonstration/validation, full-scale development, and sometimes directly into Air Force combat or support capability. Traditionally, the laboratory has had no control over or direct responsibility for technology application in systems. Accordingly, a measurement of AFMC laboratory success in readying technology for application is completion of technology demonstrations planned in cooperation with one or more product divisions who agree to take the results and advocate the technology insertion into systems. However, laboratory responsibilities do not end with successfully demonstrated technologies. The labs must continue to advise the technology recipient as technology is inserted.

b. Transition Processes. The primary pathways through which transition occurs include the following:

(1) Transition Through Industry. Since most system development and acquisition are carried out through contractors, the principal T2 mechanism involves efforts by the laboratory to develop technology using one or more industrial firms who are then familiar with and competent to employ the technology in question. These firms may then propose and execute designs embodying the technology. Transition through industry is usually accomplished using laboratory contracts and cooperative research and development agreements, supplemented by distribution of technical reports and data, by communication via symposia and technical literature, and by other appropriate means of disseminating laboratory results.

(2) Transition through SPOs and ALCs. In addition to the industrial channel, close cooperation between laboratories and SPOs/ALCs is essential to successful T2 so that program managers and engineers in the SPOs have complete and current information on relevant technologies. This may include delivery to a SPO of a specific hardware, software, or information product where the laboratory has the expertise and resources to meet a defined SPO requirement. More generally, this channel involves laboratory participation in SPO program formulation, technical requirements analysis, specification writing, source selection, and similar activities to ensure that the most advanced level of technology consistent with considerations of risk, performance, cost, and schedule is employed in a given system development.

(3) Transition to Center Infrastructure. For technology needs identified through the TMP, the recipient of the technology may be a product, test, or air logistics center. In these cases, close cooperation is also required between laboratories and centers to ensure the technology being developed will meet the

centers' need. Centers should conduct planning and programs to ensure resources are available to transition the technology at the appropriate time.

(4) Transition through Other Users. In some instances, the special capabilities of a laboratory and the urgency of an operational requirement make it appropriate for a laboratory to develop products for delivery to a MAJCOM or other user. However, the normal and preferred approach is the transition of technology to the center responsible for development and acquisition of systems in a given operational category.

3. Policy.

a. The primary mission of AFMC labs is to develop and mature technology options for insertion into Air Force weapon and support systems, to include center infrastructure. The focus of technology transition is to provide a range of acceptably demonstrated technology options, each with well-understood benefits and risks which the MAJCOM, the AFMC center, or the non-AFMC recipient can exploit in subsequent system support or infrastructure application. Transition begins when the specific tasks documented in the TTP are satisfactorily completed and is completed when the technology is incorporated in a system application.

b. Product centers, test centers, and ALCs will establish a T2 process through their Center Technology Councils (CTCs). In developing the process, centers will ensure that maximum payoffs from laboratory technology developments are achieved and that system developments incorporate all appropriate advanced technologies.

c. Laboratories will ensure each ATTD effort is covered by a TTP. Other 6.3 ATD projects should also be covered by a TTP at the discretion of the laboratory commander. For 6.3 ATD projects not covered, the laboratory commander will document the rationale to the Technology Executive Officer (TEO).

d. Laboratories will also ensure that all S&T efforts (6.1, 6.2, or 6.3A) where the technology recipient is an AFMC center are covered by a TTP, including S&T efforts supporting needs identified through the TMP. These TTPs will be, in general, shorter and less detailed for 6.1 and 6.2 efforts than the TTPs written for ATTDs. TTPs are not required for efforts where the technology recipient is a laboratory (such as a 6.2 effort that will transition to 6.3) or for technology push efforts that have no identifiable technology recipient.

e. TAPs will reflect projected T2 products.

f. The TEO (HQ AFMC Director of Science and Technology) will consider T2 opportunities as a factor in the allocation of S&T resources.

4. Organizational Responsibilities.

a. HQ AFMC/ST will:

(1) Serve as the HQ AFMC OPR for technology transition to assure the command T2 objectives are met.

(2) Through HQ AFMC/STP, serve as the headquarters OPR for TTP policy and guidance.

(3) Annually review all TTPs to ensure validity and consistency with technology investment strategy. Provide feedback to the laboratories before spring program reviews.

(4) Maintain a repository for all TTPs in HQ AFMC/STP for headquarters use.

(5) Designate which TTPs will require user MAJCOM signature.

(6) Develop and maintain command-level metrics for technology transition.

b. AFMC centers will:

(1) Establish a formal T2 process in coordination with the appropriate laboratories.

(2) Be responsible for any needed development of transitioned technology beyond 6.3 ATD.

(3) Ensure the center development plans office participates in the T2 process to identify potential concepts for technology exploitation and to assess operational implications of technology with MAJCOM users.

(4) Designate a T2 planning OPR. The T2 planning OPR will:

(a) Administer the T2 planning process in conjunction with the technology recipient.

(b) Ensure specific tasks, conditions, and criteria in the TTP are sufficient to transition a technology to the intended technology recipient. The plan will include where appropriate transition options enabling the recipient to apply some technology elements early for a partial solution to his needs. Criteria must address transition risks related to further hardware and software development, producibility, and supportability to ensure a balanced technology transition package is available to the recipient.

(c) Certify to the center commander, TEO, and laboratory commander that transition readiness is complete and technology is endorsed for system application when the stated TTP criteria have been met.

(d) Be the principal coordinator for the insertion of transitioned technology into system, support, or infrastructure applications.

(e) As applicable, use the T2 process for transition of laboratory technology developed in other than 6.3 ATD programs.

(f) Support the maintenance of command-level technology transition metrics.

c. Laboratories will:

(1) Participate fully with centers as they establish formal T2 planning processes. When transitioning technology to other than its parent product center, the laboratory will follow the T2 process of the receiving center or non-AFMC recipient.

(2) Prepare all TTPs in the format described in the attachment to this OI.

(3) Designate a T2 focal point. That office will:

(a) Administer the T2 process for the laboratory.

(b) Ensure the technical efforts cited for transition complete the critical set of specific tasks agreed upon in the TTP.

(c) Maintain a record of TTPs, completed technology transitions, and procedures for reference and support of command and field-level metrics. Provide copies of active TTPs to HQ AFMC /STP.

OFFICIAL

RICHARD R. PAUL
Brigadier General, USAF
Director, Science & Technology

1 Atch
Format for Technology Transition Plan (TTP)

SUMMARY

This operating instruction clarifies the responsibilities of HQ AFMC/ST, AFMC centers, and AFMC laboratories for technology transition planning and insertion into Air Force systems. It establishes the requirement for a Technology Transition Plan and implements command policy for each product center to establish a Technology Transition Planning process with the laboratories.

Technology Transition Plan
PE 63XXXF
Advanced Technology Transition Demonstration, Critical Experiment, or leave blank for 6.2 program
TITLE

Section I: Technology Capability Description

A. Objective/Approach/Payoff
B. Technology Deliverables
C. Funding
D. Schedule/Technology Availability Date

Section II: Transition Criteria

A. Performance Parameter Measures
B. Quantitative Goals
C. Level of Demonstration
D. Affordability
E. Producibility
F. Supportability
G. Data Documentation Deliverables
H. Other Deliverables

/ EACH SUBSECTION OF SECTIONS I, II, AND III IS WRITTEN IN PARAGRAPH STYLE. QUANTITATIVE INFORMATION SHOULD BE INCLUDED AS NECESSARY.
/ TOTAL PAGES ARE NOT SPECIFIED; USE WHATEVER IS NECESSARY.

Section III: Transition Strategy

A. Transition Opportunities (specific targets and application dates)
B. Laboratory Responsibilities
C. Technology Recipient Responsibilities
D. MANTECH Strategy (required at discretion of center Chief Engineer)
E. Industrial Strategy
F. MAJCOM (User) Strategy (required only when requested by the TEO)

Section IV: Commitment

The _____ Laboratory — Signed: _____ Date: _____

The _____ Center (T2 OPR) — Signed: _____ Date: _____

The Technology Recipient* _____ — Signed: _____ Date: _____

The _____ Center** (Center Commander) — Signed: _____ Date: _____

The Air Force Technology Executive Officer** — Signed: _____ Date: _____

The MAJCOM** _____ — Signed: _____ Date: _____

* Program Office, etc.
** Signature only when requested by the TEO

** TOTAL PAGE ARE

TECHNOLOGY TRANSITION PLAN

FOR

SPRAY CASTING DEVELOPMENT AND DEMONSTRATION

PROGRAM ELEMENT 63723F

PROJECT: 2103

PREPARED BY:

ARMSTRONG LABORATORY
ENVIRONICS DIRECTORATE
(AL/EQS) DSN 523-6232

DATE: 10 JULY 1992
REVISION 1: 15 MARCH 1993
REVISION 2: 13 MAY 1994

Technology Transition Plan
PE 63723F/PROJECT 2103
JON 21037122 & JON 2103H302
Advanced Technology Transition Demonstration

"SPRAY CASTING DEVELOPMENT AND DEMONSTRATION"

SECTION I: TECHNOLOGY CAPABILITY DESCRIPTION

A. OBJECTIVE/APPROACH/PAYOFF

The objective of this effort is to develop and demonstrate spray casting as a replacement technology for electroplating processes as a means to reduce the amounts of hazardous wastes produced as a part of metal finishing processes utilized within the DoD support agencies. Project 21037122 will develop the spray casting technology in which metal coatings will be applied in molten form to parts requiring surface coatings of specialized metals to preclude corrosion, enhance finish adhesive properties, or reduce wear on critical components. Project 2103H302 will be a field demonstration of the technology at an Air Logistics Center (ALC). Both SA-ALC and WR-ALC use maintenance processes that could benefit from this technology. (Revision 2 added possible demonstration at SA-ALC.) Two demonstrations using different parts at each ALC will be conducted if the funds available will support both locations (to be determined after contract award). Coordination to define the demonstration at SA-ALC and WR-ALC is underway.

Spray casting is a process in which molten metal is aspirated into the throat of a converging/diverging nozzle where it is broken up into fine droplets and sprayed onto the part to be plated. The size, temperature, velocity, and concentration of these droplets can be controlled by varying the operating parameters (i.e., gas temperature, supply pressure, and melt temperature). The droplets are partially cooled in flight, and compacted against a base metal to form a thin coating. The equipment will be developed to validate optimum melt temperatures for metal coatings, develop base metal temperature controls, and determine optimum conditions for coating applications. There will be a complete process validation and a design package for field demonstration. Once developed, a demonstration unit will be constructed and installed at WR-ALC, Robins AFB, GA and/or SA-ALC, San Antonio, TX (coordination in progress) for evaluation as a replacement for selected chromium electroplating operations. (Revision 2 added possible demonstration at SA-ALC.) Involvement of operational personnel with this process will provide significant user input for incorporation into the process.

The benefits (payoff) of spray casting are potentially a broader application than conventional electroplating, and significantly reduced amounts of hazardous waste. Conventional electroplating technologies are limited to those metals with

A. OBJECTIVE/APPROACH/PAYOFF (con't)

convenient electrochemical potential. Spray casting will not have this limitation. The spray casting process is also expected to be able to eliminate many "bath" type electroplating processes, reduce the need for hazardous chemicals in the work environment, eliminate the hazardous waste clean-up which results from the electroplating processes now used, and minimize production costs by reducing coating times and chemical and hazardous waste disposal costs. There is a potential savings of over $500K/year at an ALC by reducing electroplating hazardous waste handling requirements.

This effort responds to AFLC Statement of Operational Need (SON) 01-82, Reducing the Quantity of Hazardous Wastes, and to subsequent correspondence supporting projects to identify a replacement technology for electroplating. This effort also responds to the Air Force set and proposed goals to reduce hazardous waste by 50 percent and 100 percent respectively. This project received the highest priority rating (29.73) in the pollution prevention and compliance area of the USAF Environmental Quality Research, Development and Acquisition Strategic Plan.

B. TECHNOLOGY DELIVERABLES

Specifications and drawings for the demonstration unit will be provided by the AL/EQ research support contractor. A final report detailing results, economics, design information, and recommendations, and an operations and maintenance manual will also be delivered.

C. FUNDING (Revision 2 includes $2000K added to the program in FY 94 in place of an FY 96 requirement of $1250K that was shown in the 15 Mar 93 TTP.)

Funding for these projects is as shown below (all amounts in $K):

PROJECT 21037122

	FY91	FY92	FY93	FY94	FY95	FY96	TOTAL
6.3	600	650	0	0	0	0	1250
SERDP(92)*			650				650

PROJECT 2103H302

6.3		175	2400	300	208	3083

	FY97	FY98	FY99	FY00	FY01	TOTAL
6.4	(1200)	(3000)	(3000)			(7200)
3080			(1800)	(2100)	(2100)	(6000)

*Strategic Environmental Research and Development Program (funds received in FY 92/expensed in FY 93)

( ) - unfunded (unfunded notation added during Revision 2)

D. SCHEDULE/TECHNOLOGY AVAILABILITY DATE (Revision 2 changes include extending the completion of the following actions: (1) developing the spray casting technology from Oct 92 to Sep 94; (2) designing of the demonstration unit from Aug 93 to Oct 95; (3) building of the demonstration unit from Aug 94 to Feb 96; (4) installing the demonstration unit from Apr 95 to Jul 96; and (5) publishing the final report from Sep 96 to Jul 97.) The following schedule combines significant milestones from both projects 21037122 and 2103H302:

Develop Spray Casting Technology	Nov 91-Sep 94
Design Demo Scale Unit	Jan 93-Oct 95
Coating Characteristics Refined	Jul 93-Aug 95
Build Demonstration Unit(s)	Oct 95-Feb 96
Install Demonstration Unit(s)	Mar 96-Jul 96
Demonstration at ALC(s)	Jul 96-Mar 97
Final Documentation Complete	Jan 97-Jul 97

SECTION II: TRANSITION CRITERIA

A. PERFORMANCE PARAMETER MEASURES

Conventional electroplating processes result in required treatment of used electroplating baths, and large quantities of rinse water. The treatment process results in the generation of large volumes of hazardous waste, which must be disposed of at an approved hazardous waste disposal facility. The performance measures for this effort will be the ability of spray casting to replace conventional electroplating processes and reduce or eliminate the associated hazardous waste generation, and to reduce the overall cost of the plating process.

B. QUANTITATIVE GOALS

This technology offers the potential to reduce or eliminate hazardous waste generated by industrial electroplating shops, particularly chromium containing wastes. An individual ALC has a potential savings of over $500K/year in the cost of handling and disposing of hazardous waste. Another potential benefit of spray casting is the ability to apply platings to metals which are not compatible with the conventional electroplating process.

C. LEVEL OF DEMONSTRATION

The initial development will validate optimum melt temperatures for metal coatings, base metal temperature controls, and determine optimum conditions for coating applications. The system will then be installed at an ALC for field demonstration on operational equipment. Refinements in the process will be made based on demonstration results and user inputs.

D. AFFORDABILITY

Individual spray casting units are expected to cost approximately $500K/unit. Based on analysis for the USAF Environmental Quality RD&A Strategic Plan, payback will be 3.9 years. With the increasing emphasis on environmental quality and the increasing strictness of regulations, especially regarding disposal of hazardous waste in landfills, the cost and liability associated with the wastes from the electroplating process can be expected to increase making this alternative technology even more attractive.

E. PRODUCIBILITY

There will not be any unique manufacturing processes required to manufacture the equipment involved in this process. Spray casting will be based on commercially available manufacturing technologies adapted to this process.

F. SUPPORTABILITY

This system will be used in an industrial plant environment and be based on commercial technologies and built to commercial standards. These factors plus the fielding of operations and maintenance manuals with the systems will enhance supportability.

G. DATA/DOCUMENTATION DELIVERABLES

Specifications and drawings for the demonstration unit will be delivered for use in the Engineering and Manufacturing Development (EMD) process. A final report detailing results, economics, design information, and recommendations, and an operations and maintenance manual will also be developed and delivered.

H. OTHER DELIVERABLES

The demonstration system will be available for continued evaluation and testing.

SECTION III: TRANSITION STRATEGY

A. TRANSITION OPPORTUNITIES

All of the Air Logistics Centers within AFMC with metal plating requirements, all of the services within DoD, and all industrial complexes within the commercial sector are potential customers for this technology. This project is being conducted in collaboration with Boeing Aerospace Corporation, DOE, WR-ALC, SA-ALC, HQ AFMC, and REPTECH who are all interested in the application of this technology.

B. LABORATORY RESPONSIBILITIES Division?

The Environmental Compliance Branch, Environics Directorate, of the Armstrong Laboratory (AL/EQS), is responsible for program management of the 6.3 effort. They will ensure that the data deliverables from this effort are adequate and in the format required by HSC/YAQ for transition into 6.4 EMD.

C. TECHNOLOGY RECIPIENT RESPONSIBILITIES

HQ AFMC, the recipient for the technology, will be responsible for ensuring the user requirements are input into the development process, and for directing the incorporation of the spray casting process into the industrial process. The recipient will also direct the change of all appropriate technical orders to reflect the spray casting process.

D. INDUSTRIAL STRATEGY

The performing agency for the 6.3 effort will be a support contractor. The 6.4 EMD and 3080 acquisition phases will be managed by the Environmental Management Directorate, Human Systems Center (HSC/YAQ), which will then transition the product to HQ AFMC for incorporation into the industrial complex and follow-on support. Tasks associated with these phases include: 1) identifying hardware to meet the development specifications and user requirements; 2) integrating and demonstrating the system in the operational environment; 3) assessing the cost effectiveness and environmental waste reduction of the spray casting process; 4) developing procedures to integrate the system into the existing industrial complexes; 5) developing technical data for system operation and maintenance; 6) developing system support requirements; 7) obtaining user approval prior to production; and others.

SECTION IV. COMMITMENT TO TRANSITION

The purposes of this Technology Transition Plan are to (1) provide for the mutual understanding between the supplier and the customer for the transitioning of the described technology, and (2) support the USAF initiative to accelerate transition within the Air Force community whenever possible.

Both the technology supplier and the customer for the technology agree that their mutual intent is the delivery of technology that will meet the customer's needs and for the customer (recipient) to integrate the technology.

The Air Logistics Center(s) (ALC) supporting the demonstration agree(s) to budget and fund for any upgrades or modifications to the equipment (provided by the research agency) that are identified during the demonstration as necessary for the continued operation of the equipment after the demo. HSC/YAQ agrees to ensure funds are budgeted in time to support Engineering and Manufacturing Development HQ AFMC/LGP agrees to ensure funds are budgeted to support the system provided during the research and to procure systems needed for other AFMC ALCs or industrial operations. (This paragraph added in Revision 2.)

This is not a binding contract. The parties involved recognize that factors beyond their control, such as cost direction and schedule changes, can lead to reassessment of the intent to transition this technology to the customer's systems.

CERTIFICATION:

For the Environics Directorate (AL/EQ)

Neil J. Lamb. Date 26 Mar 93

NEIL J. LAMB, Colonel, USAF
Deputy Director, Environics Directorate

For the Program Office (HSC/EM)

Eric L Stephens Date 2 April 93

ERIC L. STEPHENS
Director, Environmental Management

For the Recipient (AFMC/CEV)

Thomas J Walker Date 16 Apr 93

THOMAS J. WALKER, Colonel, USAF, BSC
Chief, Environmental Management Division
Directorate of Civil Engineering

FY 94 AMENDMENT TO
SPRAY CASTING DEVELOPMENT AND DEMONSTRATION
TECHNOLOGY TRANSITION PLAN
ARMSTRONG LABORATORY
PE 63723F
PROJ 2103

This amendment contains the following changes from the 15 March 1993 TTP (The TTP paragraph identifier is shown in parenthesis following the change):

a. SA-ALC was identified as a possible demonstration site (Section IA, paras 1 and 2).
b. Revision 2 adds a $2 million funding increase in FY 94 to replace a FY 96 $1.25 million requirement and identifies the 6.4 and 3080 requirements as unfunded (Section IC).
c. The final project completion was extended from Sep 96 to Jul 97 and several interim delivery dates were changed slightly (Section ID).
d. Change references from HSC/EM to HSC/YAQ (throughout the TTP).

A. ARMSTRONG LABORATORY PROGRAM MANAGER (AL/EQS)

Michael N. Jones DATE: 24 Jun 94
MICHAEL N. JONES, Capt, USAF

B. ARMSTRONG LABORATORY (AL/CC)

_____ DATE: _____

C. HUMAN SYSTEMS CENTER (HSC/XR)

_____ DATE: _____

D. TECHNOLOGY RECIPIENT (~~WR-ALC~~/TIM)

DATE: 18 Aug 94
ALFRED E. WOODS, LT COL, USAF

E. TECHNOLOGY RECIPIENT (SA-ALC/LPP)

George Valenzuela DATE: 9 Aug 94
GEORGE VALENZUELA

F. TECHNOLOGY RECIPIENT (HQ AFMC/LGP)

Cecil J. Glenn DATE: 17 Aug 94
CECIL J. GLENN

AS OF: 15 Mar 95

TECHNOLOGY TRANSITION PLAN

PROCESSING PROCEDURES AGREEMENT

This agreement establishes procedures for obtaining approval by HSC/YAQ, HQ AFMC/CEV and HQ AFMC/LGP for Technology Transition Plans (TTPs) which describe the demonstration and follow-on implementation phases of research conducted by the Armstrong Laboratory Environics Directorate (AL/EQ).

Background:

- Technology Transition Plans (TTPs) are prepared by an AFMC laboratory for advanced technology demonstrations that will use 6.3 S&T funds, will last less than four years, and will cost more than $ 2 million. (NOTE: The demonstration length and dollar limit are new requirements effective in FY 95. TTPs prepared in the past did not have these time or dollar limits.)

- The format and content of the TTP are established by HQ AFMC/ST. (Attachment 1 is an example of a TTP that is applicable to an AFMC industrial operation. It was signed, per the original policy, by the Laboratory, the SPO, and HQ AFMC/CEV. During the annual update, the certifications of an ALC and HQ AFMC/LGP were added per direction of AFMC/ST.)

- A TTP describes an intended technology demonstration to be conducted by AL/EQ or a support contractor and identifies technical or other criteria for transition of the technology, completion schedules for the demonstration, and transition actions for implementation of the technology. When signed by the laboratory, the SPO, and the user representative, it represents the good faith effort to deliver and to implement the technology within the constraints of funds availability.

- The laboratory goal is to have a TTP for an advanced technology demonstration prepared, processed, and certified prior to the expense of any 6.3 S&T dollars for the demonstration.

- Previous policy was that TTPs for demonstrations of processes that had application primarily at AFMC industrial/maintenance operations were reviewed and certified by HQ AFMC/CEV as the focal point for environmental matters in the Command.

HQ AFMC/ST directed that any TTP which involves a technology that has application at an ALC or other AFMC installation industrial or maintenance process be also coordinated with the HQ AFMC/LG staff.

TTP PROCESSING PROCEDURES AGREEMENT (con't)

Proposed Review Process

1. AL/EQ project managers responsible for the demonstration of new technologies that will benefit AFMC installations will obtain approval to conduct their demonstrations directly with their points of contact at the ALC/bases involved.

2. AL/EQP will prepare TTPs based on the description, funding profile, and schedule, provided by the project managers. The TTP will specify the AFMC base(s) and office(s) that will support the demonstration.

3. AL/EQ project managers will form and chair Product Working Groups (PWGs) consisting of representatives from the program office, AFCEE (for remediation projects), the user, and other participants on a project-by-project basis. The PWG will refine the draft laboratory TTP and establish exit criteria to transition the technology into implementation/further development. This PWG will prepare a charter signed by division chiefs (format at attachment 1), and will remain active through the initial stages of Engineering and Manufacturing Development (EMD)/implementation or until coordination is no longer needed. When the technology transitions to EMD, HSC/YAQ will assume chairmanship of the PWG.

4. AL/EQ will sign the TTP certifying the laboratory's plan.

5. Copies of the certified TTP will be sent to the SPO, and to the ALC/base(s) involved for coordination and certification that they support the action and schedule presented in the plan. They will FAX certification pages to AL/EQP.

6. AL/EQP will add SPO and ALC/base certification pages to the TTP and send it to HQ AFMC/CEV and LGP. AFMC/CEV will review and certify the plan and forward the certification page to LGP who will append the certification page to their copy of the TTP, sign the TTP, and send the package back to AL/EQP.

7. AL/EQP will distribute a final TTP with all certifications to the offices involved.

8. AL/EQP will monitor progress of the technology demonstration and forward TTP amendments and/or annual updates to all appropriate offices.

1 Attachment:
PWG Charter Format

CHARTER FORMAT

As a minimum, the PWG charter shall include the goals, objectives, and members' roles and responsibilities. This document will be signed by each member's division chief and turned in to the organizational technology transition focal points.

The following format is suggested for more detailed charters:

I Mission: Describe the mission of this PWG, including the specific technology area to be addressed. Specify the participating organizations (operational user, TPIPT, lab branch, and program office division).

II Goals and Objectives: State the goals and objectives of this PWG, desired outcomes and products.

III Approach: Describe how the PWG will plan, communicate and act to achieve the goals and objectives. Include operating procedures and groundrules, milestones and projected transition points, and development of criteria to determine when the PWG has completely achieved its goals.

IV Constraints and Concerns: List any manpower, or other resource constraints on the PWG, including time/schedule limitations, funding, scope of authority, and limits on available options. Also address any concerns of the customer or participating organizations that have potential impact on the operation, goals or objectives of the PWG.

V Roles and Responsibilities: For each participating organization in Section I, describe the role of the organization in the PWG and detail the responsibilities of the individual members. Include manpower and other resources or support to be provided by each organization.

VI Risk Management: Describe how the PWG will plan to minimize and manage risk to ensure smooth and effective transition of the technology to the customer.

VII Metrics: Describe how the PWG will track, measure, take appropriate corrective action, and report on its progress in achieving its goals and objectives.

Attachment 1

APPENDIX H

TECHNICAL EVALUATION GUIDELINES

A. EVALUATION OF PROPOSALS

Evaluation of proposals can typically be broken down into three areas: technical, cost and management. Evaluation of the proposal will be a major part of the basis for a positive or negative recommendation for the Contracting Office to proceed with contract negotiations. The evaluation, along with Information to the Contracting Officer, can be used to identify items for contract negotiation. If the proposal is not accepted, the evaluation may be used to debrief the vendor. Past performance may also be an area of evaluation on some procurements. Some factors that may be considered in evaluating of proposals include the following:

1. Technical Evaluation

Does the proposed research address the Air Force requirement?
Does the vendor understand the problem and the requirement?
Is the proposed technical approach sound? Are the technical risks commensurate with the stage of development and difficulty of the effort?
Personnel qualifications and experience?
Subcontractor/consultant qualifications and experience?
Does technical effort logically lead into next stage of development?
Will results of technical effort provide information required for future decisions?

2. Management Evaluation

What experience does the vendor/vendor's personnel have managing efforts that are of similar size and difficulty?
Does vendor's proposal indicate sound technical and project management?
Will the management result in early identification and correction of potential problems?
If work will be subcontracted, does the vendor have a system for tracking and controlling subcontractor performance?
Does vendor's proposal provide for reporting of sufficient information to allow sound project management? Technical status and progress? Cost?
Review meetings (normally quarterly)? Location of review meetings? Kickoff and end of project meetings?

3. Cost Evaluation

Are overall costs appropriate?
Is the cost estimate complete?
Are labor hours appropriate and adequate?
Are labor categories reasonable?
Are labor rates and costs reasonable? (Consider overhead as the distribution of costs between direct labor and overhead can vary dramatically.)

Are travel costs reasonable? Do they cover all anticipated meetings? Are locations appropriate?
Are equipment and supply costs reasonable?
Are the rates and factors verified? Auditable? DCAA appraisal? (Usually requested by Contracting Office. If not already done, may delay contract award.)
If a government cost estimate (GCE) was prepared, how do the vendor's proposed costs compare with the GCE?

Some procurements have specific evaluation criteria. Criteria for evaluating SBIR proposals can be found in the current SBIR solicitation. Evaluation of SBIR proposals are documented on HSC Form 3 which is available in computer format. Proposals submitted in response to a Request for Proposal are evaluated according to the Evaluation Criteria in the Source Selection Plan and the Evaluation Standards in the Source Selection Evaluation Guide. The proposals are evaluated against the standards, not against each other. Complete guidance for source selection is contained Appendix BB of the Federal Acquisition Regulation (FAR) available in AL/EQPM.

Examples of BAA and SBIR proposal evaluations follow. Note that the cost analysis section is not completed if an SBIR proposal is not recommended for funding.

DI-CMAN-81246	Advanced Change Study Notice
DI-MGMT-81275	Technical Videotape
DI-MGMT-81334	Contract Work Breakdown Structure

* For final report, tailor IAW STINFO Handbook. Always tailor out delivery to DTIC.
** Applicable to contracts over $100,000 value and 6 months in duration.
*** Leads to requirement for accounting system to support Cost/Schedule Control Systems Criteria (C/SCSC).

APPENDIX J

INVENTION AND PATENT WORKSHOP FOR AIR FORCE EMPLOYEES

INVENTION AND PATENT WORKSHOP FOR AIR FORCE EMPLOYEES

INTRODUCTION

The Patents Division is a HQ USAF organization with offices in Washington,D.C., Hanscom AFB, MA, and Wright-Patterson AFB, OH. We are specifically staffed and organized to provide you with the following services:

- Identifying potential inventions (Note: most subject matter including computer software is now recognized as patentable).
- Filing and obtaining patents.
- Negotiating patent licenses, cross licenses and related agreements.
- Performing state of the art technology searches of U.S. Patent and Trademark Office records.

Feel free to contact me or the following Patents Division staff members for assistance in any of these areas. Our address and telephone is: AF/JACPD, Area B, Bldg 11, Rm 100, Wright-Patterson AFB, OH 45433-5000; AUTOVON 785-2838, or (513) 255-2838.

- Charles Bricker (chemistry)
- Bernard Franz (electronics)
- Gerald Hollins (electronics)
- Bob Scearce (physics/mechanical)
- Fred Sinder (physics/mechanical)

Thomas L Kundert

THOMAS L. KUNDERT
Chief, Patent Prosecution Office
Office of The Judge Advocate General

PART I

NEW LAW INCREASES EMPHASIS ON FEDERAL LABORATORY INVENTIONS

I. FEDERAL TECHNOLOGY TRANSFER ACT OF 1986 (P.L. 99-502).

A. Gives agencies and laboratory directors latitude to enter into cooperative research and development agreements and to negotiate patent licenses.

1. Authorizes exchange of personnel, services, facilities, equipment or other resources toward the conduct of specified R&D effort consistent with lab mission.

2. Does not include procurement contracts/grants.

3. Preference for small business and businesses in U.S.

B. Royalty income from patent licensing and assignment is distributed directly to inventors and producing laboratory.

1. At least 15% to the inventors.

2. Balance to laboratory to be used for additional awards, incidental expenses, further scientific exchange or education/training consistent with mission.

C. Makes technology transfer a job requirement of every laboratory scientist and engineer.

1. Must be positively considered in job descriptions, performance evaluations, promotions.

2. Must implement cash awards program to reward employees for technology transfer accomplishments, inventions and other scientific achievements (using existing incentive award statutory authority).

D. Increases Office of Research and Technology Applications (ORTA) involvement in laboratory management development program.

1. At least one full time equivalent ORTA position required for each lab having 200 or more full time scientific, engineering and related positions.

2. ORTA personnel included in overall lab management development program to ensure full participation by managers in technology transfer process.

3. ORTA personnel participate where feasible in regional, state or local technology transfer efforts.

E. Provides home for the Federal Laboratory Consortium (FLC) within the National Bureau of Standards.

1. Agencies to fund FLC next 5 years (beginning FY 87) at rate of 0.005% of their R&D budget.

2. FLC to use 10% of budget for demonstration projects in technology transfer.

3. Membership consists of federal laboratories.

4. FLC not to engage directly in transfer of technology but to support and assist laboratories in this function.

PART II

LICENSING OF FEDERALLY OWNED PATENTS

I. AIR FORCE POLICY (AFR 110-33). "Federally owned inventions in the custody of the Department of the Air Force normally will best serve the public interest when they are developed to the point of practical application and made available to the public in the shortest possible time. Nonexclusive, partially exclusive, or exclusive licenses for the practice of these inventions may be granted to applicants who agree to develop and/or market the inventions. All Air Force inventions normally will be made available for the granting of licenses to responsible applicants."

A. Conditions of license grant.

1. Duration of license specified in agreement.

2. Fields of Use:
   a) Make, use, sell;
   b) Territorial or geographical restrictions.

3. Scope of license:
   a) Extends to subsidiaries;
   b) Nonassignable without prior permission;
   c) Right to grant sublicense.

4. Requirement for a plan to develop or market the invention.

5. Manufacture in U.S.

6. Accounting and reporting by licensee of royalties or efforts to develop/market invention.

B. Basic Types of License.

1. Exclusive License:
   a) Royalties;
      i) Lump sum downpayment;
      ii) Prepaid royalty;
      iii) Running royalty.
   b) Only one licensee per field of use;
   c) Right of enforcement:
      i) Licensee action against third party infringers;
      ii) Air Force joined as party in interest.

2. Nonexclusive License.
   a) Royalty bearing or other consideration;
   b) Permission to practice invention in field(s) of use;

c) No right of enforcement:
   i) Government must institute action against third party infringers;
   ii) Requires Justice Department intervention.

C. Agency Requirements for granting Exclusive Licenses.

1. Public notice with opportunity for written objections;
2. Interests of Federal Government and public must be served.
3. Practical application, a necessary incentive for risk capital, not achievable under nonexclusive license.
4. Terms no greater than reasonably necessary to promote use.
5. Cannot grant if substantially lessen competition or result in undue concentration (Antitrust).
6. Preference for small business.
7. Periodic Reporting.
   a) Government may terminate license if:
      i) Steps toward practical application not taken;
      ii) Breach of Agreement.

II. DISTRIBUTION OF PATENT ROYALTIES.

A. Applies to all laboratory inventions, including those licensed under cooperative research agreements.

B. Head of agency distributes royalties.

1. At least 15% to inventors.

2. Balance to laboratory where invention occurred, to be used:
   a) For payment of expenses (licensing, marketing services);
   b) To reward scientific, engineering, technical employees;
   c) To further scientific exchange;
   d) For education and training of employees.

3. Payments not to exceed $100,000 per year to any one person without Presidential approval.

4. Balance to laboratory reduced 75% if FY payments exceed 5% of combined laboratory budget of agency.

5. Agency may implement regulations for royalty distribution:
   a) Guaranteed minimum to inventors each year that royalties are received;
   b) Percentage share to inventors each year that royalties exceed threshold amount;
   c) Fiscal year total payments to inventors exceed 15% of royalties received by Agency;
   d) Reward other laboratory employees who contribute to technical development of licensed invention.

PART III

OVERVIEW OF PATENT LAW

I. PATENT DEFINED.

A. Nature of a U.S. patent grant.

1. A grant by the government through the Patent and Trademark Office (35 USC 1-6) protecting new and useful inventions or discoveries (35 USC 101,102,103).

2. Covered by Federal Law* - basis in the Constitution:

THE CONSTITUTIONAL PROVISION

Art 1, Sec 8. The Congress shall have power ... To promote the progress of science and useful arts, by securing for limited times to authors and inventors the exclusive right to their respective writings and discoveries.

3. A contract between inventor and government wherein the inventor discloses his discovery in exchange for a limited time duration monopoly (35 USC 154,155).

4. The patent shall issue upon showing of entitlement by inventor (35 USC 102,131,151).

5. Has attributes of personal property and rights may be transferred or assigned (35 USC 261).

6. Has force and effect only within U.S.

B. Rights conferred by a patent grant.

1. Right to exclude others from making, using, or selling; does not necessarily reserve to inventor right to make, use or sell his own invention (35 USC 154,271).

2. Scope of patent is defined by the claims.

3. Different from Trade Secrets:
   a) Disclosure in confidence by agreement;
   b) No protection from independent discovery or reverse engineering;
   c) Limited applicability.

*Applicable U.S. Code or CFR sections are in parentheses ().

C. Kinds and terms of patents are governed by statute.

1. Utility patent - 17 year term (35 USC 101,154), but special circumstances may extend term in FDA regulated cases (35 USC 155); includes new and useful:
   a) Process;
   b) Machine;
   c) Article of manufacture;
   d) Composition of matter;
   e) Improvement in any of the above;
   f) Computer program which is part of a), b) or c);
   g) Microorganisms produced by genetic engineering.

2. Plant patent - 17 year term: any distinct and new variety of asexually reproduced plant, including cultivated sports, mutants, hybrids, and newly found seedlings, other than a tuber propagated plant or a plant found in an uncultivated state, ...(35 USC 161).

3. Design patent - 14 year term: any new, original and ornamental design for an article of manufacture ...(35 USC 171).

4. Statutory Invention Registration (35 USC 157, 37 CFR 1.293-297).
   a) Publication of the invention for defensive purposes;
   b) Specification meets 35 USC 112 content requirements.

II. CONDITIONS FOR PATENTABILITY.

A. Who may obtain a patent.

1. "Inventor" (U.S. Const); "A person" (35 USC 102); "Whoever invents" (35 USC 101,161,171).

2. A patentee may be the inventor or his assignee or successor in title (35 USC 100(d)).

B. Requirements - statutory.

1. Novelty: the invention must be "new" (35 USC 101), a contrivance or combination not previously existing.

2. Utility: the invention must be "useful" (35 USC 101).

3. Bars to obtaining patent (35 USC 102):
   a) Known or used by others in U.S. or patented or described in printed publication (anywhere) before invention by applicant;

III. SOLICITING LICENSEES.

A. Promotional aids for advertising/publicizing new technology items.
   1. Technical publications.
   2. Brochures and technical briefs.
   3. Professional marketing/licensing services.
   4. Trade shows.

B. Selecting licensee candidates.

   1. Preferred profile of potential licensee:
      a) Manufacturing capability;
      b) Relevant market;
      c) Highly motivated.

   2. Must take into account restrictions in section I, supra.

C. Development of Continuing Relationships

   1. Licensee is most at risk - must balance against scope of opportunity.
   2. Licensor (government) main objective to bring invention into practical (commercial) application.
   3. Foster workable agreements.

IV. COOPERATIVE RESEARCH AGREEMENTS UNDER P.L. 99-502.

A. Optional with Agency to make separate determination of mission of each of its laboratories.

B. Not a procurement contract or grant involving expenditure of Government funds. Instead:

   1. Laboratory commits:
      a) Personnel;
      b) Services;
      c) Facilities, equipment, other resources (<u>except funds</u>).

   2. Laboratory receives:
      a) Funds;
      b) Personnel;
      c) Services;
      d) Property.

C. Permits Federal Laboratories (consistent with mission) to enter into R&D agreements with:

   1. State or local governments.
   2. Industry.

3. Public/private foundations.
4. Nonprofit organizations (including universities).
5. Other persons.

D. Research Agreement Provisions.

1. Patent licenses.
   a) Existing or future inventions;
   b) Grant back clauses;
   c) Cross licenses.
2. Know how, including technical service and assistance.

E. Agency to Resolve conflicts of interest for employees.

1. Address in policy/regulations.
2. Refer problems for Congressional solution.

F. Preference for small businesses and businesses in U.S.

G. Agency head has 30 days to modify or disapprove agreements.

b) Patented or described in printed publication in U.S. or foreign country or in public use or on sale in U.S. more than one year before U.S. application;
c) Applied for by one who did not invent the subject matter sought to be patented;
d) Made in U.S. by another who had not abandoned, suppressed or concealed it.

4. Not obvious (35 USC 103): differences between the invention sought to be patented and the prior art are such that the invention as a whole, when made, is not obvious to one of ordinary skill in the art to which the invention pertains.

5. Full disclosure is required (35 USC 112).
a) Quid pro quo for limited monopoly;
b) Best mode;
c) Enablement.

6. "Flash of genius" is <u>not</u> required (35 USC 103).

7. A person domiciled in U.S. and serving in a foreign country in connection with operations on behalf of U.S. is entitled to the same rights or priority with respect to an invention as if made in U.S. (35 USC 104).

8. Examples of non-patentable subject matter:
a) Printed matter per se, business forms;
b) Mental processes, intended results, mere ideas;
c) Computer programs to extent they are a) or b);
d) Methods of doing business, advertising schemes;
e) Perpetual motion machines;
f) Mere discoveries, e.g., previously existing unknown products of nature or scientific principles per se.

III. THE PATENT APPLICATION.

A. Application is in writing and includes a specification, drawing, oath or declaration, and fee (35 USC 111).

1. Specification (35 USC 112).
a) a written description of the invention, and of the manner and process of making and using it;
b) full, clear, concise, exact terms to enable one skilled in the art to make and use the invention;
c) best mode contemplated by the inventor;
d) concludes with one or more claims particularly pointing out and distinctly claiming the invention;
e) format governed by code - suggested arrangement: Title, Cross-Reference, Summary, Description of Drawings, Detailed Description, Claims, Abstract (37 CFR 1.71-79).

2. Drawings.
   a) Required if nature of case so admits and necessary to understand the invention (35 USC 113);
   b) Strict requirements of form (37 CFR 1.81-88);
   c) Must illustrate every feature claimed.

3. Models normally not required, except:
   a) For composition of matter cases, specimens or ingredients may be required;
   b) Deposit of cultures of microorganisms in approved depository to meet 35 USC 112;
   c) To demonstrate operability under 35 USC 101.

4. Oath or Declaration.
   a) In writing, signed by applicant(s);
   b) Asserts first and original, sole/joint inventorship;
   c) States citizenship of applicant(s);
   d) Read and understands the application;
   e) Acknowledges duty of disclosure of known prior art.

5. Fees - governed by statute (35 USC 41).
   a) Filing of application (minimum $340);
   b) Issue fee ($540);
   c) Maintenance fees after issue (4 yr - $450, 8 yr - $890, 12 yr $1340) to keep patent in force;
   d) One-half for small entity inventors.

B. Patent Office Handling of Applications.

1. Applications are examined in order of receipt (37 CFR 1.101 et seq) - Exceptions:
   a) Verified showing of potential hardship;
   b) Invention important to public (e.g., EPA).

2. Rejection of claims by the Examiner must state grounds and provide references relied upon (35 USC 132).

3. Responses to office actions must be timely (less than 6 months) or application deemed abandoned (35 USC 133); amends specification and claims and makes arguments but may not add new matter to disclosure (35 USC 132).

4. Inventor participation in amendment process may include evaluation of references, execution of affidavits, etc.

C. Correction to issued patent.

1. Patent Office mistake - certificate of correction issued as part of patent (35 USC 254).

2. Applicant mistake (35 USC 255) involving:
   a) Typographic, clerical or other minor error;
   b) Good faith mistake;
   c) Fee required;
   d) Certificate issues - discretionary.

3. Misjoinder of inventor (35 USC 256):
   a) Error and no deceptive intent;
   b) Patent not thereby invalid.

4. Major defect requires reissue.

D. Foreign Filing.

1. Must file within 12 months of U.S. application to preserve priority date.

2. License for applications filed in foreign countries.
   a) Within six months of U.S. filing (35 USC 184);
   b) If not obtained patent in U.S. is barred and patent issuing on unlicensed application invalid (35 USC 185);
   c) Unauthorized filing/publication of secrecy order application - $10,000 fine and/or 2 year prison (35 USC 186).

E. Secrecy Orders by Government agencies (35 USC 181).

1. Application reviewed by head of an interested agency.
2. Prosecution in secrecy.
3. Notice of allowability - no issue.
4. Yearly review of need for continuing secrecy order.
5. Applicant may apply to lift.
6. Patent issues when order is lifted - term begins.
7. May be paid for government use of invention (35 USC 183).

II. RIGHTS OF GOVERNMENT EMPLOYEES IN INVENTIONS.

A. Defined by Executive Order (EO 10096, 10930) promulgated by regulation (AFR 110-33).

1. Government entitled to entire interest if invention is:
   a) Made during working hours;
   b) With government facilities, funds, etc.;
   c) Direct relation to or in course of official duties.

2. Government takes title presumptively if employee's duty is:
   a) To invent or improve;
   b) To perform research;
   c) To supervise, direct or coordinate research;
   d) To perform liaison in research field.

B. Determination of Rights made by Agency (HQ USAF/JACP).

1. Employee may appeal adverse determination.
2. Retention of title by employee must be approved by Patent and Trademark Office.

C. Inventions by Contractor.

1. Ownership normally determined by Patent Rights Clause of the contract.
2. Contractor has option to retain title, but must file.
3. Government has royalty-free, nonexclusive license.
4. Review by Government project engineer.

D. Inventions jointly made by more than one person.

1. Each co-inventor contributes materially to invention.
   a) Doesn't include those merely following instructions;
   b) Separate claims may be by separate inventors.

2. Co-inventors may be mix of government and contractor employees (joint effort under R&D contract).

III. PATENT PROCESSING FOR AIR FORCE EMPLOYEES.

A. Disclosure and Record of Invention (AF Form 1279, original + 2 copies), with corroborating witnesses.

1. Include attachments (photos, charts, reports etc).
2. List of known prior art.
3. Information on Air Force use.
4. Signed by all inventors.
5. Two witnesses.

B. Employee Rights Questionnaire (AF Form 1280) needed only when employee wishes to retain title.

C. Invention Evaluation (AF Form 1981) completed by cognizant technical office.

1. Not completed by inventor.

2. Request assistance from supervisor:
   a) Likelihood of use of invention by Air Force;
   b) Strong showing needed;
   c) Estimates may be used.

D. Invention and Patent Awards

1. Cash invention ($100) and Patent ($300) (AFR 900-4).
2. Royalty sharing under new law (PL 99-502)

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APPENDIX K

CASEFILE MANAGEMENT

R & D Case Files

- **What are they?**
  - Files maintained on each effort or investigation resulting from a Research & Development program designed to increase scientific knowledge for future military applications
  - Files which provide a complete case history of each R&D program, broken down into Project, Task and Work Units
- **Why are they important?**
  - To substantiate legal sufficiency and funds expended; to provide technical and management review for future technology needs; and protect research continuity to eliminate duplication of effort

R & D Case Files

- **Why (con't)**
  - Provides a paper trail as to where, how, and why taxpayer money is being spent
  - Potential exists for Fraud, Waste and Abuse
- **Auditors, IGs**
  - Inspect these files closely to evaluate management controls and effectiveness

BY ORDER OF THE
?06
SECRETARY OF THE AIR FORCE
1995

AIR FORCE INSTRUCTION 61-

DRAFT 8 NOVEMBER

Scientific/Research and Development

RESEARCH AND DEVELOPMENT (R&D) CASE FILES

This instruction implements AFPD 61-2, *Scientific and Technical Information*, and AFPD 37-1, *Air Force Information Management*. It establishes policies, responsibilities, and procedures for initiating, managing, maintaining, and retiring R&D case files, the complete case histories of R&D efforts. R&D efforts include work done under contract (including Small Business Innovation Research (SBIR) efforts); in-house (including In-house Laboratory Independent Research (ILIR)); grants, cooperative agreements, and other transactions; and Cooperative Research and Development Agreements (CRDAs). It allows documentation of in-house work units with AF Form 3970, **R&D Record Book**, It applies to the life of an R&D effort, including advanced development, from initiation to completion. It does not apply to acquisition management, or civil engineering. Publication of this instruction does not require revising the structure of existing R&D case files; however, staging and retiring requirements do apply. Send comments and suggested improvements on AF Form 847, **Recommendation for Change of Publication**, through channels, to SAF/AQT, 1919 South Eads Street, Suite 100, Arlington VA 22202-3053. Coordinate supplements to this instruction with SAF/AQT before publication. Major Commands (MAJCOMs), field operating agencies (FOAs), and direct reporting units (DRUs) send one copy of their supplement to SAF/AQT, 1919 South Eads Street, Suite 100, Arlington VA 22202-3053; other commands furnish one copy of each supplement to their next higher headquarters.

1. Concept. Air Force R&D increases scientific knowledge and builds the technological and developmental bases for future military applications. R&D produces records that are key management tools for monitoring the programs, planning technology directions, and identifying future technology needs. R&D case files constitute the complete case history of RDT&E and similar efforts, account for funding, and are key documents for establishing patent rights for Government research, and are often used as evidence in court proceedings.

2. Responsibilities.

2.1. The Air Force has the responsibility to protect RDT&E records. The Air Force develops procedures to manage R&D case files from initiation to completion of the efforts and retire them to the National Archives.

2.2. Commanders and Directors. Designate an Office of Primary Responsibility (OPR) to oversee the local implementation of this instruction.

2.3. OPRs Designated by Commanders and Directors:

- Confirm the applicability of this instruction to their organizations.
- Prepare implementing guidance (in the form of supplements to this instruction or operating instructions) that assigns responsibilities and list the types of projects that require R&D case files.
- Establish internal procedures and methods of control for R&D case file management.
- Approve deviation of the standardized Index to the R&D case file. (See paragraph 6.3 for mandatory inclusions.)
- Provide R&D case file maintenance training to project, task, or work-unit scientists, engineers or managers (hereafter referred to as S&E/project managers), and Functional Area Records Managers (FARMs).
- Maintain copies of R&D case file lists provided by the FARM.
- Maintain a record of the date that the FARM conducted the most recent review of each R&D case file.

2.4. Chief of the Office of Record:

- Has overall responsibility for managing, disposing of, and retiring records within the office of record.
- Develops procedures to ensure that all that R&D case files are reviewed prior to the departure of the person maintaining them. Reviews the R&D case file to make sure that the person's successor does not receive an incomplete or unsatisfactory R&D case file. If possible, assigns or designates an interim replacement prior to the departure of the current S&E/project manager to ensure continuity. ***NOTE:*** Until identifying a replacement, maintain the R&D case file in a "HOLD" status and place all incoming information for that R&D case file in a standard kraft folder marked:

TO BE FILED IN R&D CASE FILE _____

Certified by: SAF/AQT (Col A. Michael Higgins)
Pages:

OPR SAF/AQT (Dr C.J. Chatlynne)
xx/Distribution F

- Establishes procedures to prevent unauthorized removal, destruction, or loss of any material in the R&D case file.

2.5. S&E/Project Manager

- Documents every R&D effort accurately in R&D case files to provide complete histories and protect the Government in legal obligations and financial rights. ***NOTE:*** They may delegate daily maintenance responsibilities.
- Files the Request for Literature Search reflecting the statistical page, keyword strategy, and search control numbers and dates in the R&D case file. (Literature searches are covered in AFIs 61-201 and 61-203. AFI 61-203 also covers the requirements to submit Work Unit Information Summaries.) Also includes a statement that the S&E/project manager reviewed and considered the literature search results. Retains the complete literature search in a supplemental folder marked "nonretireable" until the R&D case file is staged/retired.

NOTE: You do not need to maintain R&D case files for:

- -- Procurement of supplies or equipment.
- -- Ongoing, repetitive data collection and analyses.
- -- Equipment installations.
- -- Programming or computational support.
- -- Maintenance and support services.
- -- Routine engineering (including engineering, mathematical, or design calculations, or routine, repetitive (non-original or non-innovative) or supporting analyses).
- -- Conducting conferences and symposia.
- -- Identification numbers created solely for labor, travel, or supplies
- -- Support efforts. The S&E/project manager at the supporting, participating, testing or other activity not having prime responsibility maintains an R&D support case file. ***EXCEPTION:*** In cases where there were spin-offs that were not reported or provided to the supported agency, or if the supported agency is not keeping a permanent record of the effort, then the supporting Air Force activity maintains the permanent record by establishing an R&D case file rather than an R&D support case file in order to preserve the records.

- Informs the Chief of the Office of Record, the Records Technician, and the FARM, when establishing new R&D case files. Keeps them informed of changes in the status of R&D case files.
- Places interim and final technical reports in the R&D case file. (Technical reports are covered in AFI 61-202.)
- Makes sure all records are included as part of the R&D case file, staged, and shipped per local instructions. According to local instructions, prepares waiver requests when it is necessary to keep the R&D case file for a completed effort in the office to support another ongoing R&D effort.
- Takes corrective action required on staff assistance visits/quality assistance visits (SAV/QAV) reports and files all AF Forms 3971, R&D Case File Checklist, that have been completed on the effort in a supplemental folder to Section A. Mark this supplemental folder "non-retireable."
- Makes sure R&D case files are always accessible to anyone with a need-to-know. If they are in a locked file, make sure the records technician has a key. If kept in a desk drawer, the desk drawer must be identified with a drawer label so that the location of the file will be obvious.
- Establishes contingency plans to locate or reassemble vital information in case the R&D case file is lost.

2.6. Records Managers:

- Spot check during SAVs/QAVs to confirm that R&D case files are being maintained in accordance with this and other applicable instructions.
- Advise, assist, and train functional area records managers, records technicians, and S&E/project managers as required.
- Develop and disseminate local procedures for staging and retiring R&D case files .
- Determine the effectiveness of the FARM R&D case file program during SAVs/QAVs.

2.7. FARMs:

- Makes sure people in the functional area who maintain R&D case files receive training.
- Each January prepare a listing of all active R&D case files established in the functional area. This listing will include the name of the responsible S&E/project manager, his or her office symbol, the identification number of the file, contract numbers (if applicable), and termination date (if known).
  - -- Annotate the listing when an effort is closed out or becomes inactive to ensure that the file is properly staged/retired. Also annotate the listing when receiving and approving waiver requests from S&E/project managers to keep the file in the local area (para 6.2).
  - -- Provide a copy of the listing to the OPR designated in paragraph 2.3.
  - -- At the end of each calendar year, annotate the listing to reflect which efforts you reviewed and the date of the review. Provide a copy of the listing to the OPR designated in paragraph 2.3.
- Complete an annual administrative review of at least 50 percent of all active R&D case files within the functional area. Document reviews on the AF Form 3971, **R&D Case File Checklist**. Review each R&D file at least every other year. Give the original to the S&E/project manager to file in the R&D Case File. Keep a copy of the most current checklist and follow up to make sure any noted deficiencies are corrected.
- Review the SF 135, **Records Transmittal and Receipt**, for completeness and accuracy, sign the SF 135, and stage/retire the R&D case files for the functional area according to local instructions. See AFI 37-138, **Records Disposition—Procedures and Responsibilities**, for instructions on the SF 135.

2.8. Records Technician:

- Assist in the daily maintenance of the R&D case files as requested.

- Make sure that the office file plan lists Table 80-2, Rule 1 or 2 of AFMAN 37-139 (formerly AFR 4-20, vol 2). Attach a list of R&D case files to the office file plan and give a copy to the FARM. Keep the list updated.
- Obtain a Records Information Management System (RIMS) prepared Disposition Label from your FARM and affix it to either the 6-part folder or guide card per local instructions. This label clearly identifies the file and contains disposition instructions. Also affix a disposition label to any parts of the R&D case file that are kept in a different location. This will preclude inadvertently disposing of any record.
- Affix file folder labels to the R&D case file, to all supplemental folders, and to any records that belong to the case file that are kept in a different location. This will ensure that all records are brought together when the effort is completed and staged/retired as a complete file. See paragraph 4 for information to include on the label.
- Prepare Standard Form 135, **Records Transmittal and Receipt**, for staging/retiring R&D case files in accordance with AFI 37-138, and give it to the FARM with the records to be staged or retired.

3. Identifying the R&D Case File.

3.1. Place an identification number on the file folder label and affix it to the tab of each six-part folder to ndicate whether the R&D case file is a project, task, or work unit file. This identification number is as follows:

- Project. The first four digits of an established major HQ USAF R&D program.
- Task. The first four digits of the major HQ USAF R&D program and two digits assigned and approved according to local procedures.
- Work Unit. The first four digits of the major Air Force R&D program, the two additional task area digits, and two more digits assigned and approved according to local instructions.

3.2. Include a brief title of the endeavor on the tab of the six-part folder. Also include the contract number (if any).

4. Forms in the R&D Case File.

4.1. AF Form 3970, R&D Record Book (for In-House Efforts).

4.1.1. Use of the R&D Record Book is mandatory to document progress on all in-house efforts when there is a probability for development of an invention; improved technology of an extraordinary nature; or development of hardware, software, methods, or designs that the Air Force may acquire legal rights to on completion of the effort. Indicate the use or nonuse of AF Form 3970, **R&D Record Book**, on the back of the index used for an in-house effort.

4.1.2. If a patentable item is developed, the S&E/project nanager must file AF Form 1279, **Disclosure and Record of Invention**, and other required forms with the judge advocate, according to Air Force Instruction 51-303, *Intellectual Property--Patents, Trademarks, and Copyrights*,

4.2. AF Form 3971, R&D Case File Checklist.

4.2.1. Use this checklist (or locally developed equivalent) to help identify discrepancies during administrative review. Correct discrepancies within 30 days. Keep the original copy of the checklist in a supplemental kraft folder to section A. Mark this folder "Non-retireable" and destroy it when staging/retiring the R&D case file.

4.2.2. The FARM keeps a copy and provides the original to the S&E/project manager for necessary action and filing in the R&D case file. ***NOTE:*** The FARM annotates completion of the review on the R&D case file listing.

4.3. AF Form 3972, Contents/Index of the Research and Development File Folder.

4.3.1. This is the top document in section A of the R&D case file folder. It must be an accurate index of all the records. There are three versions of the form:

- AF Form 3972a applies to extramural efforts (contracts, including SBIR).
- AF Form 3972b applies to technology transfer instruments, including CRDAs and cooperative agreements.
- AF Form 3972c applies to in-house efforts including ILIR.

Select the preprinted index that is appropriate for your effort. Remember, however, that your effort may not have all the items listed on the index, or you may have some records that are not listed. (See paragraph 6.3 for mandatory inclusions.) Highlight items printed on the index as they are put into the file. If what you are filing is not listed and it is a permanent record, write it in the appropriate section of the index and highlight it.

4.3.2. Use the back of the index to list permanent records not filed in or with the R&D case file folder. Do not list non-retireable material on the back of the index. List supplemental folders that are a permanent part of the file on the back of the index or on bond paper and attached to the index. For each item or group of items that are kept in a different location, give the building, room, and other information necessary to locate the records. Records located in other areas must have a disposition label identifying them as part of the R&D case file and a file label containing the title and identification number of the R&D case file to which it belongs.

4.3.3. OPRs identified in paragraph 2.3 may authorize use of a nonstandard index in unusual circumstances.

5. Filing Procedures.

5.1. File each R&D project, task, and stand-alone supporting work unit in a separate R&D case file folder.

- In some cases R&D efforts may have multiple work-unit numbers assigned. Establish one R&D case file to document the effort and file a list of the supporting work units in Section A.
- If there is no work-unit number assigned, establish the R&D case file using the contract number.

5.2. File only those documents that qualify for permanent retention in the 6-part folder. When the sections of the R&D case file folder are filled to capacity--approximately 1/2-inch per section or a total of 3 inches for the entire folder--use supplemental folders (standard letter-size, pronged kraft folders). You may file the supplemental

folders as chronological continuations of, or by subject 'n, the particular section. File all items of temporary value in supplemental files marked "Non-retireable." Include on the tab of the supplemental folders all information on the R&D case file folder tab, the section to which the supplemental folder belongs.

5.3. Maintain classified R&D case file in the same format as unclassified R&D case files; however, stamp the highest classification of the material filed within the 6-part folder on the tab and on the front and back cover. Mark the folder label and the front and back of each supplemental folders with the highest classification of the material filed therein or UNCLASSIFIED if no classified material is in the folder. If any part of an R&D case file is classified, retire the entire file as a classified file for record continuity. Type the following information on the face of the SF 135, **Records Transmittal and Receipt**, to stage/retire the classified R&D case file:

> All classified documents have been reviewed for possible downgrading or declassification. Where proper, classification changes have been shown on each document.

5.4 Task Ordering (Subtask Ordering) and Delivery Order Contracts.

5.4.1 Task (Subtask) Ordering Contracts and Delivery Order Contracts are unique and require careful management of records in order to avoid duplication of basic contractual/procurement records yet preserve records that may be unique to a specific task (subtask) or delivery order. These types of contracts are managed by an S&E/Project Manager (designated as the Contracting Officer's Representative (COR) or Contracting Officer's Technical Representative (COTR)) who is responsible for the overall contract R&D Case File. These contracts contain a general statement of work (SOW) that covers, in broad terms, the work to be performed. The COR/COTR is responsible for monitoring the entire contract and must keep task (subtask) or delivery order logs, track the dollars/time/materials of each specific effort against the overall contract limits, etc.

- An individual task (subtask) or delivery order SOW initiates a specific work area outlined in the basic contract SOW. The contractor provides a technical/cost proposal to present how they will complete the work required. This process is similar to a scaled down contract award. Keep records of the award process for each task (subtask) and delivery order.
- An S&E/Project Manager designated as the Technical Project Officer (TPO), or Task/Subtask Officer manages these specific tasks (subtasks), or delivery orders.

5.4.2 Maintaining R&D case files for Task Ordering (Subtask Ordering) and Delivery Order Contracts.

- The S&E/Project Manager Designated as the COR or COTR:
  - -- Maintains the R&D case file for the entire contract in a 6-part folder, with an Index in Section A.
  - -- Issues a letter to each individual responsible for a task (subtask) or delivery order instructing that individual to keep official records on that part of the effort and to turn in the records upon completion or cancellation of that part of the effort.
  - -- Keeps a log documenting the number of each task (subtask) or delivery order issued against the basic contract, the name of the technical project officer/task (subtask) officer and the location where that individual keeps the official portion of the R&D case file for that particular part of the effort. This may be recorded on the reverse of the Index or on a separate sheet attached to the Index filed in Section A.
  - -- Makes sure that each task (subtask) or delivery order technical project officer/task (subtask) officer maintains records covering that particular part of the effort in supplemental folders.
  - -- Periodically conducts managerial reviews of records being kept by task (subtask) or delivery order TPOs to make sure they are adequate.
  - -- When the task (subtask) or delivery order closes, the COR or COTR makes sure that each technical project officer turns those records in. These will be kept with the basic contract level R&D case file as supplemental folders. (The COR or COTR will review the records and destroy any that the TPO kept that are duplicates of any already in the contract level R&D Case File.)
  - -- When the entire effort is completed, the COR or COTR will ensure that the records for all tasks (subtasks) or delivery orders are retired together with the contract level R&D Case File.
- The S&E/project manager designated as the Task (Subtask) or Delivery Order TPO/Task (Subtask) Officer:
  - -- Maintains records in supplemental folders to document all actions pertinent to the specific task (subtask) or delivery order. These folders will be letter size kraft folders labeled as described in paragraph 3. Add the number of the task (subtask) or delivery order and the office symbol and name of the COR or COTR to the file folder label.
  - -- Turn in all records generated by the task (subtask) or delivery order to the COR or COTR when the effort is closed out.

  NOTE: Follow similar procedures with Broad Agency Announcements and PRDAs

5.5. Cooperative R&D Agreements.

5.5.1. CRDAs vary widely:

- Some CRDAs are limited to allowing a partner to use a Government facility or equipment and few records are generated other than the CRDA itself.
- Some CRDAs involve large commitments by the Government and the partner, generating many records.

5.5.2. When the S&E/project manager determines that the CRDA will not generate records that support maintaining a 6-part folder, use a pronged kraft folder.

Attach a sheet of plain bond paper labeled "index" on the left side of the folder—either hand written or typed—and add a description of each item as it is filed on the right side of the folder in chronological order. Use supplemental kraft folders when the thickness exceeds ½ inch and write the inclusive dates of the contents of the folder on the label in pencil. *NOTE:* The retireable R&D case file must contain the CRDA bearing the original signatures.

5.5.3. Local procedures determine whether the CRDA technical monitor or the Office of Research and Technical Application maintains the CRDA R&D case file.

NOTE: Regardless of the volume of records and the type of folder, the records constitute an R&D case file that is subject to all applicable requirements in this instruction.

6. Retiring R&D Case Files.

6.1. R&D case files become inactive when the following occurs and all deliverables are received:

- Effort is terminated or canceled (retire only if money was spent), or
- Contract is completed and DD Form 250 **Material Inspection and Receiving Report** is signed. (*NOTE:* Do not sign the DD 250 until you receive all final deliverables.), and
- Final work unit summary is accomplished.

6.2. One year after the R&D case file becomes inactive, the S&E/project officer contacts the FARM for instructions on staging/retirement. If the S&E/project officer needs the file for a follow-on or parallel effort, he or she sends a waiver request to the Records Manager or OPR designated in paragraph 2.3 for approval to keep the file in the office for an additional period of time. Use Standard Form 135, **Records Transmittal and Receipt**, to send inactive case files to the base staging area or to the Washington National Records Center. NOTE: Keep a copy of the SF 135 that shows the location number assigned by the Washington National Records Center to assist in retrieving records.

6.3. At the time of staging/retirement, gather all permanent records directly related to the effort and include them with the 6-part folder. Destroy all non-retireable files when retiring the R&D case file. Include the following documentation in or with the folder on retirement:

- A copy of the final technical report which is signed, dated, and accepted by the proper authority.
- Environmental/Safety documentation.
- Literature search analysis (statistical page, keyword strategy, search control numbers, and dates).
- Contract Award and procurement documentation, if applicable, which includes:
  - -- Accepted Cost and Technical Proposals
  - -- DD Form 254, **DOD Contract Security Classification Specification** (if applicable)
  - -- DD Form 250, **Material Inspection and Receiving Report**
  - -- Authorization Documents (these are usually the initial and final computer record of the work unit tracking system).
- All supplemental folders, properly identified.
- R&D Record Books (if applicable)

NOTE: If any of the required documents are missing at the time of retirement, the current S&E/project officer or Chief of the Office of Record must prepare a memo for record stating why they are missing and file the memo in the R&D case file folder. This is important in case the R&D case file is retrieved.

6.4. Destroy all non-retireable reference files when retiring the R&D case file.

7. Forms Prescribed.

AF Form 3970, **R&D Record Book**
AF Form 3971, **R&D Case File Checklist**
AF Form 3972, **Contents/Index of the Research and Development File Folder.**

NAME

1 Attachment
1. Glossary of References, Abbreviations, Acronyms, and Terms

GLOSSARY OF REFERENCES, ABBREVIATIONS, ACRONYMS, AND TERMS

Section A--References

AFI 37-138, *Records Disposition--Procedures and Responsibilities*
AFI 51-303, *Intellectual Property--Patents, Trademarks, and Copyrights*
AFI 61-201, *The Local Scientific and Technical Information Process*
AFI 61-202, *United States Air Force Technical Publications Program*
AFI 61-203, *The Work Unit Information System*
AFMAN 37-139, *Disposition of Records--Standards* (formerly AFR 4-20, vol 2)

Section B--Abbreviations and Acronyms

Abbreviations and Acronyms	Definition
FARM	Functional Area Records Manager
R&D	Research and Development
RDT&E	Research, Development, Test, and Evaluation

Section C--Terms

Project (Four-digit number)--Major R&D program, a subdivision under a Program Element and assigned for execution to an AFMC R&D management activity.

R&D Case Files

R&D Case File (Table 80-2, Rule 1 of AFMAN 37-139 (formerly AFR 4-20, vol 2)): Authorization records, requirements, plans, schedules, contractual and procurement records, drawings, specifications, photographs, technical progress summaries and reports, technical documentary reports, management reports on R&D efforts and engineering services, operating reports. These contain technical and related administrative, fiscal personnel and logistical information, notices of cancellation and related correspondence, including R&D project record books. These items are accumulated and maintained as a complete record by a project, task area or work unit scientist, engineer or officer having prime responsibility for an approved R&D effort from its initiation through development, design and testing to completion. The R&D case file comprises the official record copies and is staged and retired.

R&D Support Case File (Table 80-2, Rule 2 of AFMAN 37-139 (formerly AFR 4-20, vol 2)): Contents are the same as the R&D case file, except that they are accumulated and maintained by supporting, participating, testing or other activity not having prime responsibility. Abolish this record 3 months after termination or completion of the support activity's participation in the R&D effort by giving the R&D support case file to the supported activity having responsibility for maintaining the official R&D case.

Permanent Record (retireable)--Records in the R&D case file are the official record copies required to document the case history and protect the Government in legal obligations and financial rights. Contract files kept by the Contracting Center have an short retention period before they are destroyed; therefore, the contractual records in the R&D case file become the best evidence rule in an adversary matter. The U.S. Court of Claims has held that if an agency does not see fit to preserve its procurement documents, the court will adopt as reasonable the plaintiffs' estimate of liability.

Nonpermanent Records (non-retireable)--Records in the R&D case file that are only relevant while the effort is ongoing. It includes interim budget reports, canceled purchase requests, reference documents, extra

copies of selected records, transmittal letters, internal budget exercises, and any monthly reports that are summarized in interim or final reports.

Research and Development--In the context of this instruction, research and development (R&D) is intended to be broad, inclusive, and generic, covering all Research, Development, Test & Evaluation and similar projects that involve investigations, studies, and comparable efforts that must me maintained in an R&D Case File and retired to the National Archives. Projects that fall into this category include--but are not limited to--RDT&E contracts and in-house efforts, Cooperative Research and Development Agreements (15 U.S.C. 3710a), Cooperative Agreements (10 U.S.C. 2371), Other Transactions (10 U.S.C. 2358), and testing services provided under 10 U.S.C. 2539b.

R&D Case File Folder--This is a specialized folder divided into six sections. The top document in section A is AF Form 3972, **Contents/Index of the Research and Development File Folder**. Procure folders from the General Services Administration (NSN 7530-990-8884). The R&D case file has two parts, the permanent file and the reference file.

Permanent File (Retireable)--The official record copy of all pertinent documents to represent a complete case history of the Project, Task, or Work Unit from initiation to completion. All contractual documents are a permanent part of the retireable section of the R&D case file.

Reference File (Non-Retireable)--File containing those records required while the work effort is in progress but not considered of value for retirement, because they do not add to the completeness or are not pertinent to the case history. Related technical reports and budget exercises may be a part of this file.

R&D Record Book (AF Form 3970)--This is a bound notebook used to formally document distinctive accomplishments, events, ideas, discoveries, observations, data, etc., resulting only from in-house efforts. This is a legal document that is a critical part of the R&D case file.

Task (Six-digit number)--Technological subdivision of a R&D project.

Work Unit (Eight-digit number)--Subdivision of a task. A specific R&D effort, with a defined objective and completion date, performed under contract/grant (extramural) or in-house. In this instruction, work units are also called efforts or investigations.

Work Unit Information Summary--A set of data elements that describes, for distinct Research, Development, Test, and Evaluation (RDT&E) efforts, what is being accomplished, the performer, location, sponsor, cost, and progress-to-date. For the purpose of the Work Unit Information Summary, a work unit is the smallest segment into which RDT&E efforts are divided for local administration or control. Each work unit has a specific objective, definite duration, and results in an end product. It is technically distinct in scope, objective, and duration from other RDT&E efforts with which it may be aggregated for either financial, administrative, or contracting purposes. Work Unit Information Summaries are contained in the Work Unit Information System, a work-in-progress database maintained by the Defense Technical Information Center.

□

R&D CASE FILE CHECKLIST	ORGANIZATION CODE	DATE
PROJECT OR ADP NUMBER	TASK NUMBER	WORK UNIT NUMBER
TRACT NUMBER	PROJECT MANAGER	CHECKED BY

NO.	ITEM	YES	NO	N/A
I-1	R&D CASE FILE IS INCLUDED IN THE OFFICE FILE PLAN?			
I-2	LABEL IDENTIFYING THE R&D CASE FILE AND STATING DISPOSITION INSTRUCTIONS AFFIXED TO THE 6-PART FOLDER OR TO A GUIDE CARD IN FRONT OF THE FOLDER AND ON ANY RECORDS BELONGING TO THE R&D CASE FILE KEPT IN SEPARATE LOCATIONS?			
I-3	FILING IS CURRENT?			
I-4	IDENTIFYING INFORMATION (PROJECT, TASK, WORK UNIT, AND/OR CONTRACT NUMBER, AND A BRIEF TITLE OF THE EFFORT) ON TOP OF THE 6-PART FOLDER AND ON ANY RECORDS BELONGING TO THE R&D CASE FILE KEPT IN SEPARATE LOCATIONS			
I-5	APPROPRIATE SECURITY CLASSIFICATION IS STAMPED ON FOLDER?			
I-6	PAPERS ARE FILED IN CHRONOLOGICAL ORDER WITH LATEST ON TOP?			
I-7	FILE IS FREE OF DUPLICATE COPIES? EXCEPTION: RATE INSTANCES WHERE DUPLICATION IS NECESSARY SUCH AS ORIGINALS AND COORDINATION COPIES OF ENDORSEMENTS.			
I-8	CLASSIFIED COVER SHEETS, HAND RECEIPTS, MAIL CONTROL AND ROUTING SLIPS ARE REMOVED FROM DOCUMENTS? EXCEPTION: THOSE SHOWING COORDINATION OR DOCUMENT TRANSACTION.			
I-9	AUTHORIZED INDEX IS THE TOP DOCUMENT IN SECTION A?			
I-9a	CURRENT INFORMATION IS ENTERED IN THE APPROPRIATE BLOCKS OF THE INDEX?			
I-9b	WHEN FILING A RECORD NOT PREPRINTED ON THE INDEX, IT IS ADDED IN PEN TO THE APPROPRIATE SECTION AND HIGHLIGHTED?			
I-9c	PERMANENT MATERIAL (INCLUDING SUPPLEMENTAL FOLDERS) NOT FILED IN THE 6-PART FOLDER IS IDENTIFIED ON THE BACK OF THE INDEX OR ON A SEPARATE ATTACHMENT?			
I-9d	THE BLOCK ON THE BACK OF THE INDEX IS CHECKED TO INDICATE IF THE R&D RECORD BOOK IS USED?			
I-10	WHEN A SECTION OF THE 6-PART FOLDER IS FILLED TO CAPACITY (APPROXIMATELY 1/2 INCH) OR THE PROJECT MANAGER FILES CERTAIN ITEMS BY SUBJECT, SUPPLEMENTAL FOLDERS ARE ESTABLISHED?			
I-10a	SUPPLEMENTAL FOLDERS ARE NUMBERED SEQUENTIALLY BY SECTION NUMBER, PROPERLY LABELED, AND PLACED BEHIND THE 6-PART FOLDER.?			
I-10b	RECORDS THAT ARE NOT NEEDED AS A PERMANENT PART OF THE R&D CASE FILE ARE KEPT IN SUPPLEMENTAL FOLDERS AND **"NON-RETIREABLE"** IS NOTED ON THE FOLDER TAB?			
	PROOF OF DTIC LITERATURE SEARCHES ARE IN THE FILE? (DTIC FORM 64 OR EQUIVALENT)			
	ENVIRONMENTAL IMPACT ANALYSES ARE IN THE FILE?			
I-13	THIS CHECKLIST AND ALL OTHERS USED TO VERIFY ANNUAL OR SPECIAL REVIEWS OF THE FILE ARE IN A SUPPLEMENTAL FOLDER TO SECTION A WITH THE TAB MARKED **"NON-RETIREABLE"**? NOTE: DISCREPANCIES PREVIOUSLY NOTED HAVE BEEN CORRECTED?			
I-14	RECORDS DOCUMENTING TECHNICAL MANAGEMENT REVIEWS ARE IN THE FILE?			
I-15	CURRENT WORK UNIT INFORMATION SUMMARY (DTIC INPUT) IS IN THE FILE?			
I-16	DRAFT COPIES OF TECHNICAL REPORTS AND NOTES ARE KEPT IN THE FILE UNTIL THE PUBLISHED VERSION IS FILED AND THE DRAFTS ARE THEN DISCARDED?			
I-17	FILE/DESK DRAWERS OR CABINETS HOUSING R&D CASE FILE ARE ADEQUATELY LABELED?			
I-18	FACSIMILE OR OTHER HEAT-SENSITIVE COPIES CONVERTED TO XEROGRAPHIC COPIES?			
I-19	APPROVING/AUTHORIZING DOCUMENTS (INITIAL AND CURRENT MANAGEMENT INFORMATION SYSTEM PRINT OUT FOR THE WORK UNIT) ARE IN THE FILE ?			
	ITEMS THAT APPLY ONLY TO IN-HOUSE EFFORTS WHERE R&D RECORD BOOK IS REQUIRED			
II-1	R&D BOOK IS ON FILE?			
II-2	THE BOOK NUMBER AND NAME ARE CORRECTLY ENTERED ON THE BACK OF THE INDEX?			
II-3	ENTRIES ON THE FRONT COVER ARE CORRECT AND CURRENT?			
II-4	APPROPRIATE SECURITY CLASSIFICATION MARKINGS ARE AFFIXED IF THE BOOK HAS CLASSIFIED ENTRIES?			
II-5	ALL PAGE/ENTRIES ARE SIGNED AND DATED BY THE PERSON MAKING THE ENTRIES?			
II-6	ENTRIES ARE MADE IN INK AND UNUSED PORTIONS OF PAGES ARE CROSSED OUT?			
II-7	ERRORS ARE CROSSED OUT AND INITIALED (NOT ERASED)?			
	ITEMS THAT APPLY ONLY TO EXTRAMURAL EFFORTS *(CONTRACTS, ETC.)*			
III-1	ACCEPTED TECHNICAL/COST/MANAGEMENT PROPOSALS, AGREEMENTS, ETC., ARE IN THE FILE?			
III-2	EVALUATIONS OF SUCCESSFUL PROPOSALS ARE IN THE FILE?			
III-3	BASIC CONTRACT AND ALL ITS MODIFICATIONS/AMENDMENTS ARE IN THE FILE?			
III-4	CONTRACT PROGRESS/STATUS REPORTS ARE IN THE FILE?			
III-5	SIGNED COPIES OF ALL DD FORMS 250 ARE IN THE FILE?			
	TASK/SUBTASK/DELIVERY ORDER CONTRACTS HAVE A LIST SHOWING TITLE, PROJECT MANAGER, OFFICE SYMBOL, AND LOCATION OF EACH TASK/SUBTASK/DELIVERY ORDER ISSUED AGAINST THE CONTRACT?			

MARKS

CONTENTS/INDEX OF THE RESEARCH AND DEVELOPMENT FILE FOLDER
EXTRAMURAL EFFORTS
(File data in chronological order on the tabs indicated)

1. IDENTIFICATION NUMBER	
ACE AN "X" IN THE APPROPRIATE BOX)VANCED DEVELOPMENT PROGRAM PROJECT ☐ TASK ☐ WORK UNIT	3. RESPONSIBLE OFFICER
4. OFFICE SYMBOL	
5. CONTRACT NO.	6. TITLE

7. INDEX OUTLINE *(Highlight items as they are put in the file. Attach other applicable indexes.)*

A. SUMMARY INFORMATION
- LIST OF SUPPORTING WORK-UNIT NUMBERS
- INDEX
- SUBTASK LOG *(if applicable)*
- CHRONOLOGICAL LIST OF IMPORTANT EVENTS
- LIST OF DRAWINGS
- LIST OF MOTION PICTURE FILMS, VIDEO TAPES, ETC.

B. PLANNING/AUTHORIZATION/IMPLEMENTATION
- AF FORM 1537, WEAPON SYSTEM BUDGET ESTIMATE
- AF FORM 830, PROCUREMENT DIRECTIVE
- AF FORM 616, FUND CITE AUTHORIZATION
- PB/BA AUTHORIZATION OF INITIATION ACTIONS
- SYSTEMS SAFETY PERMIT
- TEST HAZARD ANALYSES
- BUDGET ESTIMATE AGREEMENT
- TECHNOLOGY INVENTMENT PLAN *(TIP)*
- LOGISTICS NEEDS
- AFMC FORM 277, REIMBURSABLE ORDER/REQUEST FOR SUPPORT FROM OTHER AGENCIES (OR EQUIVALENT)
- MEMORANDUM OF AGREEMENT
- DD FORM 448, MILITARY INTERDEPARTMENTAL PURCHASE REQUEST *(MIPR)*
- DD FORM 448-2, ACCEPTANCE OF MIPR
- USAF PROGRAM MANAGEMENT DIRECTIVE

C. SPECIAL REQUIREMENTS *(File documents together for convenience in management reviews)*
- WORK UNIT INFORMATION SUMMARIES *(AFI 61-203)*
- AF FORM 1104, PROGRAM SCHEDULE *(or equivalent)*
- LITERATURE SEARCH DATA *(DTIC Search Control Numbers, Analyses, etc.)*

ENVIRONMENTAL IMPACT ANALYSIS
- CONTRACT STATUS REPORTS/COST REPORTS
- PROGRAM MANAGEMENT REVIEW RECORDS
- SPEND PLAN
- CONTINGENCY PLAN FOR PROTECTION OF CRITICAL R&D DATA OR PROJECT OFFICER MEMO *(If applicable.)*

D. CONTRACTING/PROCUREMENT
- PURCHASE REQUEST
- SOLE SOURCE JUSTIFICATION
- PROGRAM R&D ANNOUNCEMENT *(PRDA)*
- STATEMENT OF WORK
- SUBTASK STATEMENTS
- DD FORM 254, CONTRACT SECURITY CLASSIFICATION SPECIFICATION
- DD FORM 1707, INFORMATION TO OFFERORS
- UNSOLICITED PROPOSAL
- CONTRACT AMENDMENTS/MODIFICATIONS
- AF FORM 9, REQUEST FOR PURCHASE
- ACCEPTED PROPOSAL *(Technical, Cost, Management)*
- PROPOSAL EVALUATIONS
- STATEMENT OF CAPABILITY
- AF FORM 185, PROJECT ORDER
- QUALITY ASSURANCE (Over $5M)
- DD FORM 882, REPORTS OF INVENTIONS & SUBCONTRACTORS
- EVALUATION CRITERIA, TECHNICAL INVESTMENT PLAN
- DD FORM 250, MATERIAL INSPECTION & RECEIVING REPORT
- CONTRACT TERMINATION AUTHORITY
- CONTRACTOR PERFORMANCE DOCUMENTATION *(Award Fee)*

E. TECHNICAL R&D/ENGINEERING DATA *(Including reports)*
- STANDARDS & SPECIFICATIONS
- DRAWINGS/RELEASES/CHANGE REQUESTS
- GRAPHS/BLUEPRINTS/PHOTOGRAPHS
- JOURNAL ARTICLES *(preprints, photocopies)* INCLUDING SF FORM 298, REPORT DOCUMENTATION PAGE, PUBLIC RELEASE APPROVALS
- TECHNICAL REPORTS/TECHNICAL NOTES
- TASK REPORTS
- TEST REPORTS *(Original Test Reports & Results)*
- ADP QUARTERLY REPORTS
- CRITERIA RECORDS
- CONTRACTOR STATUS/PROGRESS REPORTS
- WAIVERS

ENERAL
OPTIONAL SAFETY INFORMATION
- GENERAL CORRESPONDENCE, MESSAGES, NOT FILED IN OTHER SECTIONS
- TRIP REPORTS/TELEPHONE CONVERSATIONS
- PRESENTATIONS *(Hard copies)*
- CONFERENCE PAPERS AND MEETING NOTES

8. SPECIAL INSTRUCTION AND REMARKS. LIST AND LOCATION OF MATERIAL NOT FILED IN RESEARCH AND DEVELOPMENT FOLDER. *(For example, drawing numbers of drawings filed elsewhere or that have been microfilmed, photographs, motion picture film, video tapes, computer print outs, and so forth. Use plain bond paper for continuation sheet.)*

9. AF FORM 3970, R&D RECORD BOOK		REQUIRED		NOT REQUIRED
BOOK NUMBER	ISSUED TO		BOOK NUMBER	ISSUED TO

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