

**DoD ATS Selection Process**  
**2016**  
**Revision A**

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## References

- (a) DoD Instruction 5000.02 of 07 January 2015
- (b) MIL-PRF-32070A of 10 January 2012
- (c) 2012 DoD Automatic Test Systems Master Plan endorsed by DASD MPP
- (d) USD(AT&L) Memorandum of 28 July 2004 Note
- (e) USAF Memorandum of 26 November 2007 Note
- (f) OUSD(A&T) Memorandum of 02 February 2004 Note
- (g) Federal Acquisition Regulations, Volume I, March 2005

**Note:** References (d), (e), and (f) are included not as policy references but as important historical data points.

## Acronyms

ACAT	Acquisition Category
ALO	ATS Leadership Office
AMB	ATS Management Board
AoA	Analysis of Alternatives
ARI	ATS R&D IPT
ASN (RDA)	Assistant Secretary of the Navy (Research, Development and Acquisition)
AT&L	Acquisition, Technology & Logistics
ATE	Automatic Test Equipment
ATS	Automatic Test System(s)
BSTF	Base Shop Test Facility
CASS	Consolidated Automated Support System
CARD	Cost Analysis Requirements Description
CBA	Cost and Benefit Analysis
CDR	Critical Design Review
CDRL	Contract Data Requirements List
CFA	Cognizant Field Activity
CI	Critical Interface
DAB	Defense Acquisition Board
DASD MPP	OSD AT&L Deputy Assistant Secretary of Defense for Maintenance Policy and Programs
DFAR	Defense Federal Acquisition Regulations
EA	Executive Agent
EAO	Executive Agent Office
eCASS	electronic CASS
ED	Executive Directorate
ECP	Engineering Change Proposal
E&MD	Engineering & Manufacturing Development
FAT	First Article Test
FoT	Family of Testers
GFE	Government Furnished Equipment
ID	Interface Device
IFTE	Integrated Family of Test Equipment
ILS	Integrated Logistics Support
IOC	Initial Operating Capability
IPT	Integrated Product Team
ISE	In-Service Engineering
ITA	Interface Test Adapter
JSECST	Joint Service Electronic Combat Systems Tester
JTA	Joint Technical Architecture
LCC	Life Cycle Cost
LORA	Level of Repair Analysis
LRU	Line Replaceable Unit
LRFS	Logistics Requirements Funding Summary

MCATES	Marine Corps Automatic Test Equipment System
MDA	Milestone Decision Authority
MOA	Memorandum of Agreement
NAWCAD LKE	Naval Air Warfare Center Aircraft Division, Lakehurst NJ
NAVAIR	Naval Air Systems Command
NGATS	Next Generation Automatic Test System
NxTest IPT	Next Generation ATS IPT
OSD	Office of Secretary of Defense
OTPS	Operational Test program Set
O&S	Operation & Support
PEO	Program Executive Officer
PLCCE	Program Life Cycle Cost Estimate
PM	Program Manager
PMA	Program Manager Air
POC	Point of Contact
P&D	Production & Deployment
R&D	Research & Development
ROM	Rough Order of Magnitude
RTCASS	Reconfigurable Transportable CASS
SAE	Service Acquisition Executive
SRA	Shop Replaceable Assembly
SRU	Shop Replaceable Unit
TPS	Test Program Set
UUT	Unit Under Test
VDATS	Versatile Depot Automatic Test System
WRA	Weapons Replaceable Assembly

## **1. Purpose**

This document provides the procedures and tools needed by the DoD Program Manager (PM) to implement the requirements of reference (a) to “minimize unique Automatic Test Equipment (ATE) by utilizing designated DoD Automatic Test System families for all ATE hardware and software in DoD field and depot operations.” In support of this policy and under the guidance of the OSD AT&L Deputy Assistant Secretary of Defense for Maintenance Policy and Programs (DASD MPP), this document provides processes for conducting a Cost and Benefit Analysis to select the optimum Automatic Test System (ATS) family to meet a weapon system support requirement and for preparing requests for deviation to the DoD ATS acquisition policy when the selection process yields a non-Family ATS solution. PMs may obtain assistance and advice on the processes contained herein from their Service’s ATS Leadership Office (ALO) member and should contact the ALO early in the ATS acquisition process.

## **2. Scope**

The scope of this document applies to all ATSs acquired within DoD for use at all levels of maintenance and for use at the factory (in either a production role or a support role) when provided as Government Furnished Equipment (GFE).

## **3. Definitions**

### **A. Automatic Test System (ATS)**

A fully-integrated, computer-controlled suite of electronic test equipment and instrumentation hardware, software, documentation, and ancillary items designed to verify at any level of maintenance the functionality of Unit Under Test (UUT) assemblies. The term “UUT” includes, but is not limited to, Shop Replaceable Unit (SRUs), Line Replaceable Units (LRUs), Shop Replaceable Assemblies (SRAs), Weapons Replaceable Assemblies (WRAs), circuit cards, aircraft “black boxes,” and other removable components from weapon system platforms or support systems. An ATS combines the following three elements:

(1) Automatic Test Equipment (ATE). An integrated assembly of stimulus, measurement, and switching components under computer-control that is capable of processing software routines designed specifically to test a particular UUT or group of UUTs. ATE software includes operating system software, test executive software, and instrument control software.

(2) Test Program Set (TPS). ATE interface hardware and other ancillary equipment that connects the UUT to the ATE, plus test program software specific to the UUT with required documentation. The TPS software directs all test functions including fault isolation and diagnostics, and can certify the condition of a UUT. Ancillary hardware consists of cables, probes, holding fixtures and peculiar instrumentation.

(3) Test Environment. The test environment includes a description of the ATS architecture, programming and test specification languages, compiler, development tools and

provisions for capturing and using UUT design requirements and test strategy information in the generation and maintenance of TPS software.

## **B. ATS Family**

An ATS Family consists of ATSs that are interoperable and have the capability to support a variety of weapon system test requirements through common and flexible hardware and software architectures that permit addition or expansion of testing capability with minimal impact to the ATS logistics support profile, system software, and TPSs. DoD ATS Families are formally designated as such by Office of the Secretary of Defense (OSD).

## **C. ATS Technical Framework**

ATS technical framework is the framework upon which an open system architecture for ATS is implemented. It defines key interfaces for an ATS using commonly accepted specifications or standards which may be defined by industry consensus and are utilized by many suppliers. An effective ATS open system architecture relies on physical modularity and functional partitioning of both hardware and software. The result of this approach is the adoption of ATS designs which are easily modified or upgraded without major impact to the unchanged portion of the ATS or its TPSs, and which promote transportability/interoperability of TPSs. Reference (b), MIL-PRF-32070A of 10 January 2012, provides the performance specification requirements for TPS development within the DoD.

## **4. Policy Overview**

Reference (a) requires that sustainment planning must be an integral element of the capability requirements and acquisition process from inception and as such that the program manager “minimize unique automatic test equipment (ATE) by utilizing designated DoD automatic test system families for all ATE hardware and software in DoD field and depot operations.”

The intent of reference (a) is to define an acquisition environment that makes DoD the smartest, most responsive buyer to meet our warfighters’ needs while reducing the total cost of ownership. With regard to automatic testing, this is to be accomplished through the use of approved DoD ATS Families as the preferred choice to satisfy automatic testing support requirements. Use of approved DoD ATS Families minimizes the life cycle cost of providing Automatic Test Systems for weapon systems support at DoD field, depot, and manufacturing operations, and promotes joint service Automatic Test Systems interoperability. Reference (c) elaborates on DoD ATS policy, goals and strategy.

Approved DoD ATS Families were designated by references (d) and (e) and are as follows:

- Consolidated Automated Support System (CASS) Family of Testers (FoT)
- Integrated Family of Test Equipment (IFTE)
- Marine Corps Automatic Test Equipment System (MCATES)

- Joint Service Electronic Combat Systems Tester (JSECST)
- Versatile Depot Automatic Test System (VDATS)

Reference (c) provides each Services' strategy for standardizing on these approved DoD ATS Families and was endorsed by DASD MPP. Attachment (4) provides the selection and sustainment process for the CASS FoT within Naval Air Systems Command (NAVAIR). Requests for designation of additional families may be approved provided that the criteria specified in paragraph 8.B are met.

When Weapon System Program Managers are defining contract strategy for new or modified weapon systems, consideration should be given to the target DoD ATS Family member up front to include requiring the ATS Family in the factory. Using an ATS Family member or compatible test system in the factory provides two significant benefits to the weapon system program. First, it allows the test program written for factory acceptance test and other purposes to easily migrate and be re-used at the depot or field levels of maintenance. Historically, because of different test systems at the factory and depot/field, the test programs have been re-written and different physical interface hardware was needed, driving up program costs. The second benefit helps to ensure maximum test and diagnostics compatibility between the government and industry. Utilization of the same test and diagnostics strategy across the field, depot, and factory will help reduce "Can Not Duplicate" conditions between maintenance levels.

## **5. ATS Organization**

As a result of a General Accounting Office audit of DoD automatic testing, reference (f), directed that Navy (Naval Air Systems Command PMA260) serve as the DoD ATS Executive Directorate (ATS ED) and perform the functions previously performed as the DoD ATS Executive Agent Office.

The DoD ATS Organization is graphically depicted in Figure 1. Each Service has an ATS Leadership Office (ALO) with oversight of their Service's implementation of the ATS policy. The O-6 level ATS Management Board is a joint-Service board comprised of representatives from the Army (PM Force Projection/PD TMDE), Navy (NAVAIRSYSCOM, PMA260), Marine Corps (MARCORSYSCOM (PMM-115.4, PdM-TMDE)), and Air Force (AFLCMC/WNA). Each Service's AMB representative is the Service lead on all DoD ATS matters for that Service. The AMB, chaired by the Director of the ATS ED, provides advice and recommendations to the ATS ED and to Weapon System Program Managers and their Integrated Product Team(s) (IPT).

The AMB also reviews ATS policy deviation requests and provides recommendations to the appropriate decision authority. Several ATS IPTs have been established under the ATS ED and AMB to carry out the main technical functions of the ATS ED. ATS IPTs are activated and deactivated as determined by the AMB. Key points of contact within the ATS ED and each Service ATS organization are provided in Attachment (3) and are available to assist and advise Weapon System IPTs on these processes. Each Service ATS Leadership Office (ALO) includes

Subject Matter Experts in the areas of the selection process itself including preparation of the required CBA.

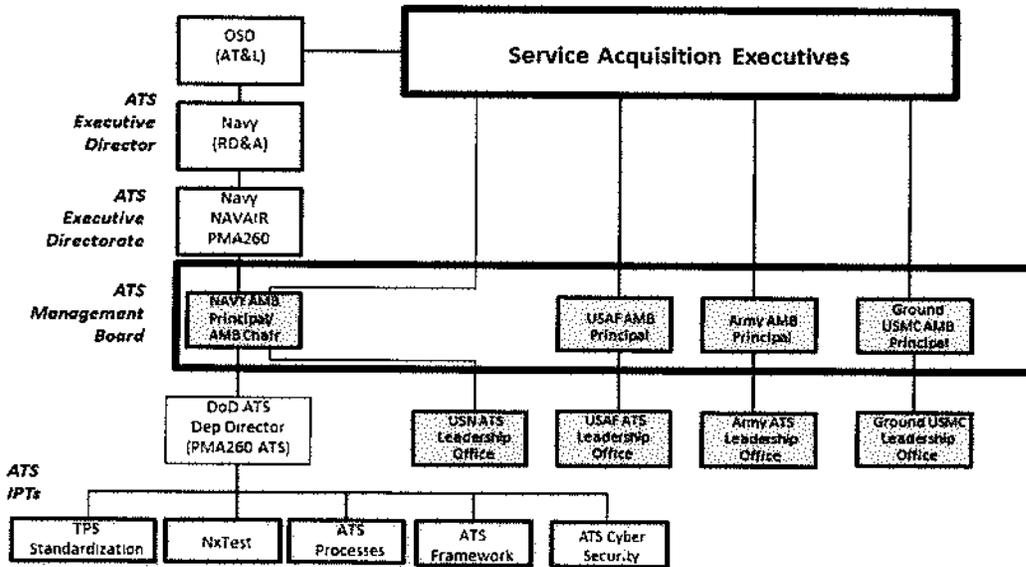


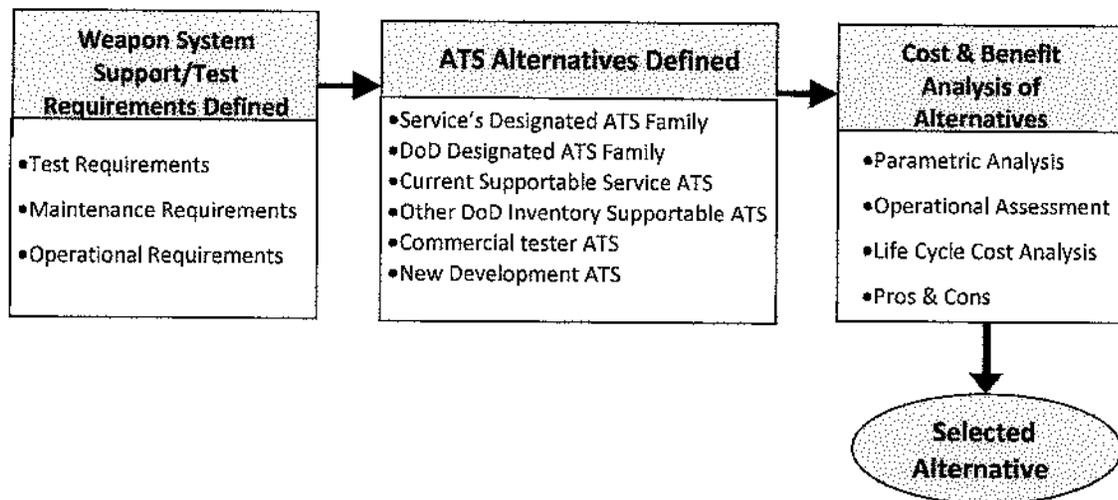
Figure 1: DOD ATS Organization

## 6. ATS Master Plan

The ATS Executive Directorate published the reference (c) DoD ATS Master Plan which was endorsed by DASD MPP and addresses the implementation of DoD ATS acquisition policy, investment strategy, and modernization strategy. The Master Plan also describes each of the ATS families currently in the DoD inventory and is available at <http://www.acq.osd.mil/log/mpp/ats.html>.

## 7. ATS Selection Process

When there is an ATS requirement, whether during the development or upgrade of a weapon system, rehosting of TPS, replacement due to ATS obsolescence, or modification of an ATS; an appropriate ATS solution must be selected. The process shown in Figure 2 provides a structured approach to ATS selection. This process consists of four primary steps: Definition of weapon system support/test requirements, Definition of ATS alternatives, Cost & benefit analysis of alternatives, and Alternative selection.



**Figure 2. ATS Selection Process**

### **A. Requirements Definition**

The selection process begins with an understanding of the weapons system test requirement, i.e., parametric (performance), maintenance and operational test requirements for the targeted units to be tested. Test requirements must be identified early during acquisition planning for new systems and integrated into the support planning for the weapons system. PMs must take responsibility for identifying test requirements and coordinating with the ATS Leadership Office within their Service to ensure requirements are captured.

### **B. Identification of Support Alternatives**

Once the test requirements are thoroughly defined, potential ATS alternatives can be considered. The intent of the policy is the selection of ATS in a DoD context: i.e., DoD's investment in ATS must be leveraged within the Service and/or across the Services. The following hierarchy is provided for the selection of ATS consistent with DoD ATS acquisition policy:

- Service's Designated ATS Family
- DoD Designated ATS Family
- Current supportable Service ATS (approved Policy Deviation Request is required)
- Other DoD inventory ATS (approved Policy Deviation Request is required)
- Commercial\* tester ATS (approved Policy Deviation Request is required)
- New development ATS (approved Policy Deviation Request is required)

For each non-ATS Family alternative considered, a narrative description of that alternative should be provided that summarizes, as a minimum, the following:

- Test technologies employed
- Unique test capabilities provided not available in DoD designated ATS Families
- Packaging
- Architecture
- Framework compliance
- Intended operating environment
- Other DoD users of the tester
- Logistics support package/plans for support of the ATS over the life of the system

\* For the purpose of this document, “commercial” in the term “ATS Commercial Tester” is as defined in reference (g), Federal Acquisition Regulations (FAR) Volume 1 of March 2005. Per reference (g), “Commercial Item” is defined as follows: *“Any item, other than real property, that is of a type customarily used by the general public or by non-governmental entities for purposes other than governmental purposes, and*

*(i) Has been sold, leased, or licensed to the general public; or*

*(ii) Has been offered for sale, lease, or license to the general public”*

### **C. Cost & Benefit Analysis of Alternatives**

The final step of the ATS selection process is an Analysis of Alternatives to ensure that the ATS chosen is the most cost beneficial to the Service and to DoD over the weapons system’s life cycle. The alternatives to be considered by the program office in the trade-off must include the Service’s designated ATS Family member, and may include ATS Families from the other Services as appropriate. The Cost & Benefit Analysis of Alternatives does not need to be completed if the solution planned is a DoD ATS Family member.

The Cost & Benefit Analysis of Alternatives should consist of a parametric analysis comparing weapon system technical specification requirements and tester capabilities, an operational assessment to review any possible operational constraints or requirements on either the weapon system or the ATS under consideration, a life cycle cost analysis, and an assessment of the benefits and shortcomings or “pros and cons” of each alternative. To assist the PM with the cost and benefit Analysis of Alternatives, the ATS ED has developed and provided guidance in Attachment (1).

## **8. DoD ATS Families**

### **A. Family Evaluation**

The definition of ATS alternatives begins with evaluation of the DoD ATS Families focusing on the Service’s designated ATS Family. The ATS Family PMs will provide cost, schedule, and performance information regarding their ATS programs to the Service ALO assisting with the evaluation. The cognizant weapon system/ATS PM is ultimately responsible for the evaluation. However, throughout the ATS selection process, the Service ALO acts as a liaison to the ATS Family PM, assists in the decision making process, and advises the weapon system/ATS PM regarding the documentation for this process. If the information provided by

the ATS Family PM reveals an obvious cost, schedule, or performance deficiency with their system, the Service ALO can make recommendations and assist in preparing an abbreviated Policy Deviation Request on this basis. The abbreviated request will follow the same process but may forego the more detailed analysis otherwise required. Additionally, the ATS ED is available for assistance at any step of this process. Any questions regarding this process should be directed to the points of contact provided at Attachment (3).

### **B. Criteria for New DoD ATS Families**

The use of ATS Families is encouraged and is in compliance with the DoD ATS acquisition policy. However, if the analysis yields a non-family solution and the weapon system/ATS PM believes the solution demonstrates characteristics similar to those of an ATS Family, there are provisions for introducing a new ATS Family into the DoD inventory.

An ATS Family consists of ATSS that are interoperable and have the capability to support a variety of weapon system test requirements through flexible hardware and software architectures. For a tester to be considered as a new ATS Family the following criteria must be met:

1. The tester must be capable of supporting multiple weapon systems and there must be planning in place for implementation as such
2. The tester must have flexible hardware and software architectures that are expandable and tailorable with minimal impact to existing logistic support profiles and TPSs
3. The tester must provide a capability to satisfy a Service performance or operational requirement that cannot be accommodated within the existing DoD ATS family structure,
4. The tester must provide a more cost effective/beneficial ATS solution than use or modification of an existing DoD ATS family member
5. The tester must be re-procurable and must have a dedicated government management office with a process in place to ensure that long-term tester viability is maintained and that the tester will evolve to satisfy future requirements

In general, new ATE may be added to an existing DoD ATS Family if the following two criteria are met:

1. The criteria specified above for designation of new ATS families
2. The tester must contain the critical hardware and software elements to ensure TPS interoperability between the proposed ATE and the parent designated ATS family

Organizations desiring to initiate action to establish a new DoD ATS Family must contact the Service ALO.

## 9. Policy Deviations and Deviation Requests

### A. Deviation Criteria

A Policy Deviation Request is required prior to the acquisition or modification of any ATS in the following cases:

1. Development or procurement of a new ATS that is not part of a designated DoD ATS Family
2. Re-procurement of an existing ATS that is not part of a designated ATS Family; when government owned, from factory to field
3. Modification to an existing ATS that is not part of a designated ATS Family when the modification adds capability to the ATS for testing additional UUTs
4. Development or procurement of new TPSs for use on ATS that is not part of a designated ATS Family
5. Modification or rehost of an existing TPS for use with ATS that is not part of a designated ATS Family when the change/rehost adds significant capability to the ATS for testing additional UUTs

Table (1) below summarizes the requirements for policy deviation requests.

<b>Situation/Desired ATS Solution</b>	<b>Policy Deviation Request Required?</b>
Utilizing/Procuring DoD-designated ATS Family member	No
Sustainment effort that does not add capability to the ATS for testing additional UUTs	No
Development or procurement of new TPSs for use on ATS that is not part of a designated ATS Family	Yes
Reprocurement of existing ATE that is not part of a designated ATS Family	Yes
Modification of existing ATS that is not part of a designated ATS Family when the modification adds capability for testing additional UUTs	Yes
Procurement of Non-ATS Family Commercial Tester	Yes
Procurement of or rehost onto other DoD inventory ATS	Yes
Development of new ATS	Yes

**Table 1. Requirements for Policy Deviation Requests**

## **B. Policy Deviation Process**

The Service ALO will provide support to weapon system IPTs as required to assist in the ATS selection process and to ensure compliance with any internal Service regulations and/or policies. When the ATS selection process yields a non-DoD Family Tester solution, a Policy Deviation Request shall be required. The Policy Deviation Request preparation and approval process is as follows:

The Service ALO will provide support to the applicable service level weapon system IPT to assist in conducting a Cost & Benefit Analysis of Alternatives and to prepare a Policy Deviation Request in accordance with Attachments (1) and (2) of this selection process guide.

1. If the Policy Deviation Request is to request the use of an existing Service non-ATS Family ATE without adding additional capability or acquiring additional ATE but only to add new TPSs, the Service may disposition an abbreviated Policy Deviation Request locally. The Service ALO shall notify the AMB of the disposition of any Policy Deviation Requests processed internal to the Service. If there is a program conflict, the Service ALO representative has the option of sending the ATS Policy Deviation Request to the AMB for disposition.
2. If the Policy Deviation Request includes adding capability to the existing Service non-ATS Family ATE or developing or procuring a new non-ATS Family ATE, the Service ALO shall forward the Policy Deviation Request to the AMB for review and disposition.
  - a) If the initial analysis reveals an obvious cost, schedule, or performance deficiency with a DoD FoT solution, the Service ALO can make recommendations and assist the system/ATS PM in preparing an Abbreviated Policy Deviation Request to be approved at the service level. Abbreviated requests will follow the same process but may forego the more detailed technical and cost analysis otherwise required.
  - b) If a Policy Deviation request is forwarded to the AMB and the AMB concurs with the Policy Deviation Request, the AMB will approve the Policy Deviation Request.
  - c) If the AMB disagrees with the Policy Deviation Request, the AMB will make a recommendation to the MDA not to approve the Policy Deviation Request.
    - o The MDA may approve the Policy Deviation Request and return it to the PM/PEO for acquisition action or disapprove the Policy Deviation Request and return it to the PM/PEO for reconsideration.

For all Joint Service Programs, any ATS Policy Deviation Requests should be submitted to the AMB for review and disposition.

Existing Service waivers for the use of other than approved DoD ATS Families remain in effect. However, Program Managers will plan for bringing legacy ATS systems into compliance with the DoD ATS technical framework when it makes operational sense and/or is cost effective to do so.

### **C. Policy Deviation Form**

A notional form to process the Policy Deviation Request is provided as Attachment (2) and either this form or a Service designated alternate shall be completed before the deviation request begins the coordination process. The form provides a means to address the issues related to the selection of the ATS and to provide the results of any analysis that may be required to identify the cost, schedule, parametric, and/or operational deficiencies that led to a decision not to select a DoD ATS Family as a solution. It also provides a means to document approval or disapproval by the appropriate decision authority. A copy of this form can be downloaded from the ATS ED Web Site at <http://www.acq.osd.mil/log/mpp/ats.html>.

## **Attachment 1: Guide to Conducting a Cost & Benefit Analysis of Alternatives**

An ATS Cost & Benefit Analysis of Alternatives should consist of the following: (1) a parametric analysis, (2) an operational assessment, (3) a life cycle cost analysis, & (4) a “pros and cons” assessment to highlight any additional benefits and/or shortcomings of each alternative.

### **(1) Parametric Analysis**

As part of the ATS selection process, an objective, analytical comparison of Unit Under Test (UUT) parametric test requirements versus the test capability of candidate testers must be performed. The analysis must identify UUT test requirements that the candidate testers cannot meet, the cost to add the delta to a standard tester, and discuss how the test capability will be provided (new or reuse ancillary items, active interface devices, etc).

For each UUT, data should be collected for all applicable test categories by technical/engineering personnel familiar with the design and operation of the system UUTs.

While it is recognized that the collection of UUT test requirement data can be the most time-consuming and difficult part of the process, the collection of the most complete and accurate data available is essential to obtain useful and valid results. It is also recognized that the level of parametric data available for a given weapon system or set of UUTs is directly dependent on its life cycle phase. For each specific program phase of the weapon system’s acquisition, the following guidance is provided for collecting test requirement data:

- Technology Development Phase: During the pre-Milestone B phase, parametric test requirement data will typically consist of the parametric data envelope of the weapon system as a whole. ATS analysis at this time may even be limited to identifying any unique operational or environmental ATS requirements need to support the system (man-portable, for example).
- System Development & Demonstration (SD&D) Phase: During the Pre-Milestone C SD&D phase, parametric test requirement data should be available for each WRA/LRU and SRA/SRU. This parametric test requirement data can be found in the contractual specification for each WRA/LRU and SRA/SRU at the time of the Critical Design Review (CDR).
- Production & Deployment (P&D) Phase: During the post-Milestone C P&D phase, parametric test requirement data should be available for each WRA/LRU and SRA/SRU. This parametric test requirement data should be based on actual parametric data for each WRA/LRU and SRA/SRU at the time of the First Article Test (FAT).
- Operations & Support (O&S) Phase: During the O&S phase, parametric test requirement data should be available for each WRA/LRU and SRA/SRU. This parametric test requirement data should be based on actual parametric data for each fielded WRA/LRU and SRA/SRU.

The UUT test requirement data is next compared to the test capabilities for the ATS Family members under consideration. The analysis should include an assessment of the limitations of a target ATE station to fully support a UUT without Interface Device (ID)/Interface Test Adapter (ITA) or TPS intervention. Evaluation of these limitations should be performed by engineering or technical personnel familiar with the weapon system UUTs and/or the target ATS platforms. The evaluation of limitations assists in comparing suitability of various ATE platforms to support a weapon system's test requirements.

For each alternative considered, the Cost & Benefit Analysis of Alternatives should summarize the results of the parametric analysis and provide a technical assessment of each of the candidate testers' ability to provide overall support to a weapon system & highlight any shortfalls of a given alternative to satisfy any weapon system test requirements. If all alternatives under consideration provide the required test capability to provide overall support to the weapon system, (i.e. - - program office is not seeking a waiver or deviation because of insufficient test capabilities within the existing DoD ATS Families), Cost & Benefit Analysis of Alternatives can simply state that all alternatives provide sufficient test capability to support the weapon system.

## **(2) Operational Assessment**

Operational constraints must be evaluated in conjunction with the UUT test requirements. Operational requirements such as transportability (e.g., man-portable), environmental (e.g., excessive temperature, EMI or humidity), or deployability (e.g., rapidity of deployment) of the candidate ATE may be factors in the determination of an effective ATS solution. For each alternative considered, the Cost & Benefit Analysis of Alternatives should summarize how each of the candidate testers meets or does not meet the operation requirements that must be satisfied to provide overall support to a weapon system in its intended environment & highlight any shortfalls of a given alternative to satisfy any operational requirements. If all alternatives under consideration satisfy the operational requirement (i.e., the program office is not seeking a waiver or deviation because none of the existing DoD ATS Families can perform within the intended operational environment), Cost & Benefit Analysis of Alternatives can simply state that all alternatives will perform within the intended operational environment.

## **(3) Life Cycle Cost Analysis**

A Life Cycle Cost Analysis must be prepared to capture all ATS non-recurring investment and recurring sustaining costs over the life cycle. The life cycle cost analysis should be provided in Excel format and as a minimum address the following cost categories:

<b>NON-RECURRING INVESTMENT COSTS</b>	<b>RECURRING SUSTAINING COSTS</b>
1.1 ATE Development	2.1 Manpower
1.2 ATE Production	2.2 Sustaining Training
1.3 TPS Development	2.3 ATE Support/Maintenance
1.4 TPS Production	2.4 ATE In-Service Engineering
1.5 Initial Training	
1.6 Interim Support	
1.7 Initial ATE Support/Maintenance	

To ensure that the cost estimating methodology applied is consistent across all ATS alternatives, substantiating documentation to support all assumptions, sources of information, basis of estimates and calculations must be maintained and available upon request. Life Cycle Cost Analyses may be performed using present or then-year dollars as long as a consistent methodology is applied across all alternatives. The quality and completeness of costing information will be used as an indicator of the validity of the cost analysis. Definitions for each cost category that must be considered as well as acceptable cost estimating methodologies for each cost category are provided as follows:

## **1.0 Non-Recurring Investment Costs:**

Investment costs include those costs associated with the development and acquisition of all required ATE and TPSs, initial ATE operator/maintainer training, interim weapon system support, and the acquisition of all required ATE support/maintenance equipment. Any costs associated with extending the service life of the ATE and/or TPSs for their intended life cycle, i.e., the service life of the weapon system(s) supported are also included.

### **1.1 ATE Development Costs:**

Definition: ATE development costs include all costs associated with the development and testing of the ATE, including non-recurring engineering, ILS, technical data, and documentation. Any future investments required to upgrade or sustain ATE should also be considered. Unique modifications required to provide additional capability to support the candidate weapon system(s) testing requirements on the DoD ATS Families should be reflected in the costs of TPSs. For DoD ATS Families, the development cost is considered sunk.

Acceptable estimating methodologies: Formal contractor cost proposal, escalated historical buys of similar equipment, parametric hardware/software models, or engineering cost estimates.

### **1.2 ATE Production Costs:**

Definition: ATE production costs include all recurring costs to satisfy the inventory objective.

For DoD ATS Families, only a fair share of this cost, based upon the workload required to support the weapon system(s) at the scheduled sites, should be reflected.

Acceptable estimating methodologies: Actual contract costs, formal contractor cost proposal, escalated historical buys, parametric hardware/software models, or engineering cost estimates. For DoD ATS Families, the latest ATE production costs can be obtained from the appropriate program office.

### **1.3 TPS Development Costs:**

Definition: All costs associated with the development and testing of TPSs including ILS, technical data, and documentation are included under TPS Development Costs. Any costs associated with modifying these TPSs to accommodate future ATE modifications should also be considered.

Acceptable estimating methodologies: Actual contract costs, formal contractor proposal, escalated historical buys, or certified cost estimates. The Navy uses a Cost Analysis Requirements Description (CARD) to document the basic technical, programmatic, and operational baselines of the program. The CARD's technical/programmatic baseline is the foundation for the formal program costs prepared by the certified cost analysis group and documented in the Program Life Cycle Cost Estimate (PLCCE). Assistance in generating TPS development costs for DoD ATS Family testers may be obtained from the appropriate program office and cost analysis group. The office preparing the cost analysis must show that equivalent TPS development tasks are considered across each ATE platform to ensure consistency among TPS cost estimates.

Note: TPS development and production costs should be equivalent across ATE platforms with similar test capabilities and may be considered a "wash." When shortfalls exist with a tester platform to fully support a UUT, the costs to provide additional test capability can be captured as either a TPS or ATE Development/Production cost. For DoD ATS Family members, these costs should be determined with assistance from the technical POC for the ATS Family member.

### **1.4 TPS Production Costs:**

Definition: TPS production costs include all recurring costs to meet the TPS inventory objective.

Acceptable estimating methodologies: See 1.3 TPS Development Costs.

### **1.5 Initial Training:**

Definition: Initial training includes all non-recurring costs associated with establishing training schools/courses and initial field-level ATE operator/maintainer personnel training. For DoD ATS Families, the cost to develop training courses is considered sunk. Any costs associated with TPS developer training should be included and separately itemized in 1.3 TPS Development Costs.

Acceptable estimating methodologies: Formal contractor proposal, escalated historical training cost data, or logistics estimates. For DoD ATS Families, the latest ATE training costs can be obtained from the appropriate Program Office.

### **1.6 Interim Support Costs:**

Definition: Interim support costs are those costs associated with supporting the weapons system until TPSs are available. Assuming TPSs can be made available at the same

time for all ATS alternatives, this cost should be considered a “wash.” Where selection of one ATS alternative results in a delay in providing ATS support to the weapons system; the delta cost to provide interim support should be identified.

Acceptable estimating methodologies: Formal contractor proposal, escalated historical logistics cost data, or logistics estimates.

### **1.7 Initial ATE Support/Maintenance Costs:**

Definition: Initial ATE support/maintenance costs include all non-recurring and recurring costs associated with procuring initial support capability for the ATE itself (support of support equipment, spares, depot repair capability and software support, for example). A description should be provided of the ATE's maintenance plan with support equipment requirements itemized. Initial ATE support/maintenance requirements should be driven by the planned ATE maintenance philosophy. Costs to be considered under various ATE maintenance philosophies are as follows:

- Contractor ATE Support – Initial maintenance/calibration contract and spares pool investment.
- Organic ATE Support – Calibration standards, support equipment, provisioning spares investment, and special tools/fixtures. For DoD ATS families, only the incremental costs associated with providing this capability at new/existing sites should be considered.

To ensure consistency among LCC analyses, the same ATE maintenance philosophy should be considered for all ATE alternatives.

Acceptable estimating methodologies: ATE's Logistics Requirement Funding Summary or other logistics funding information document, formal contractor proposal, escalated historical logistic cost data, or logistics estimates. For DoD ATS Families, the latest Initial ATE support/maintenance costs can be obtained from the appropriate program office.

### **2.0 Recurring Sustaining Costs:**

Sustaining costs include all costs associated with operating and maintaining the ATS over its intended life cycle. These costs should be priced annually across the life of the ATE which is typically assumed to be 20 years.

### **2.1 Manpower:**

Definition: Manpower consists of the annual cost of ATE operator and maintainer personnel over the life cycle. Assuming that the DoD ATS Family tester and the proposed ATE have sufficient test capability, comparable test times can be expected. The weapon system failure rate will not vary between different ATE. Consequently, operator cost should be equivalent across alternatives and may be considered a “wash.” Maintainer and technician support costs should be driven by the ATE maintenance philosophy under

consideration. ATE maintenance personnel costs are expected to decrease at sites where ATE is already in place to support another program.

Acceptable estimating methodologies: ATE's Logistics Requirement Funding Summary or other logistics funding information document. For DoD ATS Families, the latest ATE manpower requirements can be obtained from the appropriate program office.

## **2.2 Sustaining Training:**

Definition: This cost includes sustained training of operators, maintainers, and technicians over the life cycle. For ATE operated and maintained by military personnel, this is usually one third of initial training, reflecting a tour length of 3 years. Due to lower turnover rates, these costs are expected to decrease when civilian personnel are utilized.

Acceptable estimating methodologies: ATE's Logistics Requirement Funding Summary or other logistics funding information document.

## **2.3 ATE Support/Maintenance:**

Definition: The annual cost of intermediate and depot level maintenance repair and calibration actions on the ATE. If the ATE will be supported through a maintenance contract with the ATE prime contractor, then back-up documentation should be provided to show what is included in the contractor support package and the expected operational availability. In order to select the most cost beneficial alternative, the Program Manager's office performing the ATS selection should evaluate all feasible support maintenance philosophies for the alternatives being considered in the CBA.

Acceptable estimating methodologies: ATE's Logistics Requirement Funding Summary or other logistics funding information document. For DoD ATS Families, the projected annual ATE support/maintenance costs can be determined with assistance from the appropriate program office based on the planned ATE support philosophy.

## **2.4 ATE In-Service Engineering (ISE):**

Definition: ATE ISE includes all annual recurring costs incurred for the government or a contractor to provide sustaining engineering (e.g., resolving engineering investigations and parts obsolescence issues) and logistics (e.g., maintaining technical manuals) support. This cost category should include the costs of establishing and operating a Cognizant Field Activity (CFA), or similar engineering/logistics ISE activity, for the ATE as well as any annual software licensing fees. This cost category is considered sunk for DoD ATS Family testers because ISEs are established and annual operating costs will not vary with the number of stations and/or sites.

Acceptable estimating methodologies: ATE's Logistics Requirement Funding Summary or other logistics funding information document.

#### **(4) “Pros and Cons” Assessment**

Finally, a “Pros and Cons” assessment should be provided to highlight any benefits and/or shortcomings of each alternative not already captured as part of the parametric assessment, operational assessment, or life cycle cost analysis. Factors considered in the “Pros and Cons” assessment may include but should not be limited to the following:

- Ease of Use (the extent to which the ATS facilitates the operator’s ability to use the system)
- TPS Transportability (the ability to rehost an existing TPS on a DoD Standard ATE)
- Upgradeability or the ability of a test system to be improved incrementally through software and or hardware additions to expand support capability or performance
- Age of Alternative ATS
- Vertical Commonality (the extent to which the ATE will be used to support the weapon system at field, depot, and factory levels such that the non-recurring investment in the ATS can be minimized)
- Horizontal Commonality (the extent to which the ATE is used by other weapon systems either within a Service or DoD)
- Ease of TPS Development (the extent to which the engineering effort associated with TPS development is facilitated)
- Adaptability (the ability of a test set to be reconfigured to test a UUT not previously tested on that system)

## Attachment 2: Notional DoD ATS Policy Deviation Request Form

From: Program Manager, \_\_\_\_\_  
To: Service Milestone Decision Authority  
Via: Service ATS Management Board Representative  
DoD ATS Management Board

Title: ATS Recommendation for \_\_\_\_\_  
[State the system(s) requiring support]

Background: [State the support requirement in terms of parametric, operational and maintenance level requirements, the ACAT level and milestone phase of the weapon system, and the program status of the proposed Non-Standard ATS alternative]

Alternatives Considered: [State the ATS options considered in the analysis]

Problem/Issue: [Present the cost, schedule, and/or parametric/operational deficiency in capabilities as justification for not using a DoD ATS Family as the support solution]

Discussion: [Provide any additional supporting background, rationale, or justification]

Recommendation:

Back-Up Information: (as required)

- 1) Parametric Analysis
- 2) Operational Assessment
- 3) Life Cycle Cost Analysis
- 4) Summary of Pros and Cons
- 5) Any Additional Substantiating Data

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Approved

Disapproved

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*Service Milestone Decision Authority*

## Attachment 4: Consolidated Automated Support System Family of Testers Selection and Sustainment Process

Ref: (a) OPNAVINST 3960.16A NAVY TEST, MEASUREMENT, AND DIAGNOSTIC EQUIPMENT (TMDE), AUTOMATIC TEST SYSTEMS (ATS), AND METROLOGY AND CALIBRATION (METCAL)

1. This attachment describes the process for obtaining support for weapon systems using the Consolidated Automated Support System (CASS), the Navy's standard family of automatic test equipment.
2. Aviation Support Equipment Program Manager (PMA260) budgets for and manages the acquisition of all Common Support equipment (CSE) (e.g., CASS itself) and the Operation Test Program Sets (OTPSs) being offloaded from legacy Automatic Test Equipment (ATE) to CASS. Life-cycle support and sustainment of CSE, including CASS, is the responsibility of PMA260. The respective weapon systems Program Managers (PMs) budget for and manage the acquisition of OTPSs for new weapons systems, their subsystems and components, as well as the sustainment of the OTPSs including those "Offloaded" legacy ATE OTPSs transitioned from PMA260.
3. Figure 1 provides an overview of the NAVAIR ATE and TPS acquisition process. The steps in the ATE acquisition process are described in this attachment.

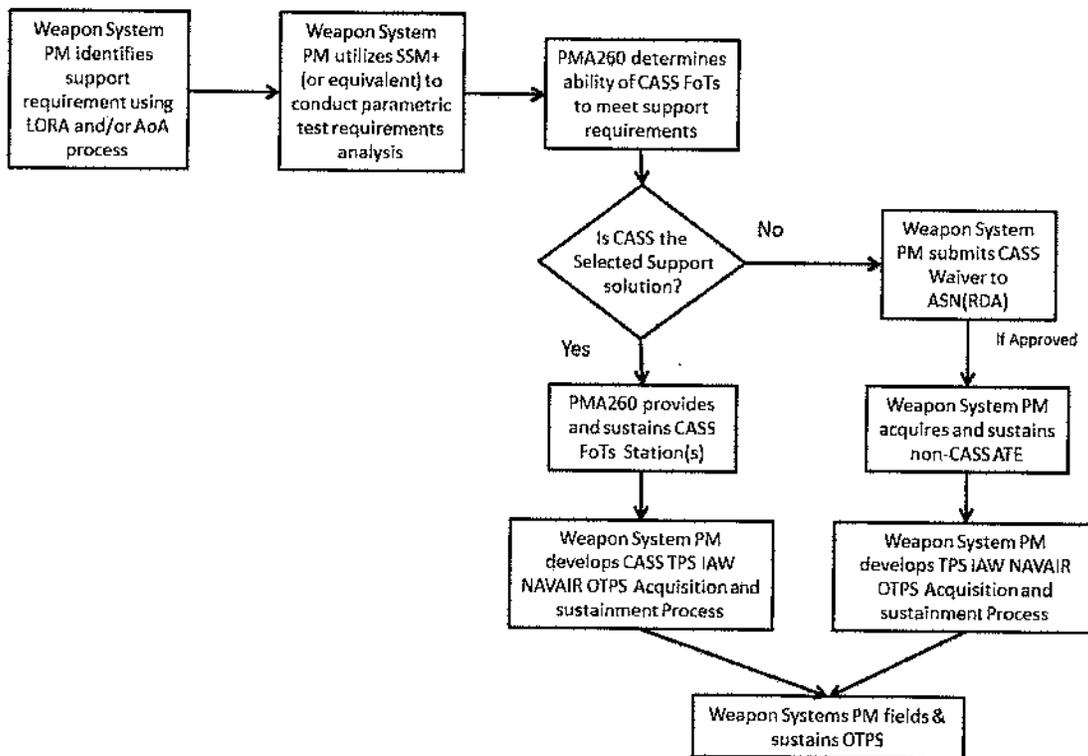


Figure 1. NAVAIR ATE and TPS Acquisition Process

4. Determine Weapon Systems Support Requirements

a. Test requirements must be identified early during acquisition planning for new systems and integrated into support planning for weapons system. The process begins with an understanding of the test requirements, i.e., parametric, maintenance, logistics, and operational test requirements for the targeted weapon system units, referred to as the Units Under Test (UUTs). As part of the weapon system or sub-system acquisition, programs typically acquire a formal document that defines test requirements including test performance, test conditions, and diagnostic requirements to align and verify proper operation of a UUT. The defined test requirements are the basis for development of the test programs used on CASS.

b. Once test requirements are thoroughly defined, support solutions can be considered.

c. The Level of Repair Analysis (LORA) and/or an Analysis of Alternatives (AoA) are used to document the weapon system support requirements. The LORA, which is an economic model, determines the level of maintenance at which the ATE should be employed. Key elements are the weapon system's reliability and cost. AoA's compare alternate support concepts, such as "O to D", Reliability Improvement Program (RIP), unique SE solution, CASS, etc.

## 5. Satisfying Weapons Systems Support Requirements with ATE

### a. CASS Family Background

(1) Per reference (a), the CASS FoTs is the Navy's standard Automatic Test Systems for electronics and avionics support. CASS is in use throughout the Navy: both afloat and ashore at Navy Aircraft Intermediate Maintenance Departments (I-level), at Fleet Readiness Centers (FRCs), at United States Marine Corp (USMC) Marine Air Logistics Squadrons (MALs), at OTPS development sites, and by Foreign Military Sales (FMS) countries.

(2) CASS is a Family of Testers (FoTs) that currently includes three generations of test systems. The original CASS with its five configurations, the Reconfigurable Transportable CASS or RTCASS and its three configurations and the latest generation, the eCASS, with its four configurations is the replacement system for the CASS generation of testers. Each generation of test systems is designed to easily "migrate" the fielded weapon system OTPSs from one generation to the next. The CASS FoTs are general purpose automatic test systems designed to provide a broad spectrum of maintenance test capability for electronics Weapon Systems.

(3) The CASS FoTs currently supports weapon systems from the F/A-18, AV-8B, EA-6B, E-2, T-45, H-60, H-1, H-53 and V-22 aircraft.

### b. Determination of CASS Requirements

(1) To determine which configuration(s) of CASS will optimally satisfy the weapon system support requirements, PMA260 has developed the System Synthesis Model

(SSM+). SSM+ is a parametric model that maps UUT test requirements to CASS test capabilities and CASS stations configurations. The tool identify any test capability limitations as exceptions. PMA260 also has a Workload Model for determining the number of CASS FoTs needed at each site. The Workload Model considers many factors including: the program's Weapons System Planning Document (WSPD), the mean-time-between failure (MTBF) data for the Units Under Test, and the run time of the OTPSs. The CASS Implementation Plan (CIP) database tracks quantities and locations of CASS FoTs stations, CASS FoTs ancillary, and OTPSs at each user site.

(2) An operational assessment is conducted to review and document any operational constraints or requirements on either the weapon systems or the CASS FoTs support under consideration. Mobility, transportability requirements, and facility limitations, are examples of an operational constraint.

(3) If, after completion of the SSM+ (or similar process), PMA260's analysis indicates: 1) that a CASS FoTs member, without significant modification, cannot satisfy the weapon system's test requirements, 2) the OTPS developer cannot design the necessary capability into the OTPSs to provide support via the CASS FoTs, and 3) the only solution is to design and develop a new unique ATE solution (Peculiar Support Equipment/PSE), then a waiver must be requested. The program must obtain the waiver to use the non-CASS solution from Assistant Secretary of the Navy (Research, Development and Acquisition) ASN(RDA) via, PMA260 using NAVAIR 13630. The Weapon System PM will then acquire the ATE following standard Department of Defense and Navy acquisition processes. Considering the ATE acquisition is classified as PSE, sole responsibility for development, testing, acquisition and sustainment rests with the Weapon System PM.

(4) In accordance with reference (a), weapon systems and/or electronic subsystem contracts requiring factory support must require CASS FoTs or CASS-compatible equipment in the development or manufacturing facility for production acceptance. This will enhance the vertical transportability of Test Program Sets (TPSs) from the factory to the organic maintenance facility and promote common testing at factory, depot, and intermediate levels of maintenance.

c. CASS Stations

(1) PMA260 will provide CASS stations and required ancillary equipment for Fleet support.

(2) With adequate advance notification, PMA260 will fund and manage the acquisition of any additional CASS stations and ancillary equipment needed to develop and field weapon system OTPSs.

(3) CASS stations required for life cycle support of weapon systems at commercial contractor or organic depot facilities must be funded or acquired by the commercial contractor or the weapon system program. If CASS stations are available, PMA260 may provide stations as Government Furnished Equipment (GFE) to a commercial support contractors or organic depots. All support costs are the responsibility of the Weapon System PM.

(4) CASS station and ancillary equipment requirements for both OTPS development and operational sites will be documented in the CIP at program initiation and updated, at milestone reviews.

(5) The Weapon System Program is required to provide ready-for-issue (RFI) UUTs as GFE for use during the OTPS development process and all relevant test data/documentation.

6. CASS Station Sustainment

a. During the OTPS development process, the Weapon System Program is responsible for supporting the GFE CASS FoTs stations and CASS ancillaries used by the OTPS developers. PMA260 and Naval Supply Weapons Systems Supply (NAVSUP WSS) Command have implemented a CASS Performance Based Logistics (PBL) contract which will be made available to the Weapon System Program for supporting the CASS stations used during OTPS development.

b. Operational CASS stations are supported through the CASS PBL contract. PMA260 also provides for sustainment of CASS ancillary equipment and station software.