NAVY TRAINING SYSTEM PLAN

FOR THE

ADVANCED ARRESTING GEAR

ENGINE REPLACEMENT PROGRAM

N88-NTSP-A-50-0127/I

FEBRUARY 2002

ADVANCED ARRESTING GEAR ENGING REPLACEMENT PROGRAM

EXECUTIVE SUMMARY

The Advanced Arresting Gear (AAG) will provide the U.S. Navy with the ability to recover all existing and projected carrier based tailhook-equipped air vehicles well into the twenty-first century. The AAG will be back fit on existing CVN 68 class aircraft carriers and forward fit on CVNX class carriers. The AAG is responsive to the CVNX MNS (M070-88-96).

The Advanced Arresting Gear Engine (AAGE) replacement program will be designed to improve arresting gear structural integrity margins of safety from current MK-7 levels to values needed for future Fleet operational requirements. In addition, the new AAGE will be designed to provide a total life cycle cost savings by reducing both operational and maintenance costs when compared to the MK-7 Arresting Gear. The AAGE will also provide new operational capabilities, including the ability to safely and efficiently recover both heavier and/or faster aircraft and lightweight unmanned air vehicles (goal) that may enter the Fleet in the coming years.

The AAGE is currently in the Concept and Technology Development phase of the Defense Acquisition System (DAS) until March 2002. The DAS System Development and Demonstration starts with a Milestone B decision in May 2002 and will continue until July 2007, followed by a Milestone C decision in August 2007. Production and Fielding is scheduled from October 2007 and beyond. Initial Operational Capability must occur when the first ship installed with AAG is deployed in 2010.

The AAG system consists of four units, where a unit is defined as a single recovery wire and associated equipment. It is envisioned that the AAG deck configuration will utilize a "3 + 1" recovery wire configuration, where a maximum of three recovery wires are rigged on three of the units at any given time. The remaining unit may be utilized as a spare, enabling a recovery wire to be rigged in the event one of the other units becomes unavailable.

A primary goal of the AAGE is to allow recovery operations to be executed using significantly fewer sailors in the arresting gear crew. The AAGE system will have an embedded Health Monitoring (HM) system and an embedded performance monitoring system**.** Using Conditional Based Maintenance (CBM) and HM will allow for the monitoring and diagnosis of the Catapults and Arresting Gear. CBM/HM will instrument critical parameters and use the data obtained to determine the "health" of the systems. Using these techniques, maintenance requirements can be determined conditionally rather than the current event or time-driven method.

In this early phase of development, no formal training concept has been defined.

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LIST OF ACRONYMS

AAG	Advanced Arresting Gear
AAGE	Advanced Arresting Gear Engine
ABE	Aviation Boatswain's Mate (Launching and Recovery Equipment)
ADMACS	Aviation Data Management And Control System
AG	Arresting Gear
ALRCS	Aircraft Launch and Recovery Control System
ALRE	Aircraft Launch Recovery Equipment
AZ	Aviation Maintenance Administrationman
BIT/BITE	Built-In Test/Built-In Test Equipment
CBM	Conditional Based Maintenance
CDP	Cross-Deck Pendent
CNO	Chief of Naval Operations
CROV	Constant Runout (Control) Valve
CVN	Aircraft Carrier, Nuclear
CVNX	Aircraft Carrier, Nuclear, Experimental
DAS	Defense Acquisition System
DT	Developmental Test
EM	Electrician's Mate
EMALS	ElectroMagnetic Aircraft Launch System
FLOLS	Fresnel Lens Optical Landing System
FY	Fiscal Year
HM	Health Monitoring
IAGCS	Integrated Arresting Gear Control System
IC	Interior Communications Electrician
IETM	Interactive Electronic Technical Manual
IFLOLS	Improved Fresnel Lens Optical Landing System
IOC	Initial Operational Capability
JCTS	Jet Car Test Site
MCBOMF	Mean Cycles Between Operational Mission Failures

ADVANCED ARRESTING GEAR ENGING REPLACEMENT PROGRAM

LIST OF ACRONYMS

MS	Maintenance Support
NA	Not Applicable
NAMTRAU	Naval Air Maintenance Training Unit
NATTC	Naval Air Technical Training Center
NAWCADLKE	Naval Air Warfare Center Aircraft Division Lakehurst
NAWCTSD	Naval Air Warfare Center Training System Division
NEC	Navy Enlisted Classification
NTSP	Navy Training System Plan
OPEVAL	Operational Evaluation
OPO	OPNAV Principal Official
P3I	Pre-Planned Product Improvement
PMA	Program Manager, Air
QA	Quality Assurance
RFT	Ready For Training
RALS	Runway Arrested Landing Site
SDD	System Development and Demonstration
TBD	To Be Determined
TD	Training Device
TTE	Technical Training Equipment

ADVANCED ARRESTING GEAR ENGING REPLACEMENT PROGRAM

PREFACE

This Initial Navy Training System Plan (NTSP) is an early look at the Advanced Arresting Gear Engine (AAGE) replacement program, and is the first iteration of the Initial NTSP for the AAGE program. This document explores the various employment and support alternatives currently under consideration. Since it is relatively early in the acquisition process, some definitive data was unavailable for inclusion in this version. This NTSP is a product of the Training Planning Process Methodology, as outlined in OPNAV Publication P-751-3-9-97.

PART I - TECHNICAL PROGRAM DATA

A. NOMENCLATURE-TITLE-PROGRAM

1. Nomenclature-Title-Acronym. Advanced Arresting Gear Engine (AAGE) Replacement Program

2. Program Element. 0603512N

B. SECURITY CLASSIFICATION

1. System Characteristics ..... Unclassified
2. Capabilities ..... Unclassified
3. Functions ..... Unclassified

C. MANPOWER, PERSONNEL, AND TRAINING PRINCIPALS

OPNAV Principal Official (OPO) Program Sponsor ..... CNO (N78)

OPO Resource Sponsor ..... CNO (N78)

Functional Mission Sponsor (if applicable) ..... CNO (N78)

Developing Agency ..... NAVAIRSYSCOM (PMA251)

Training Agency ..... CINCLANTFLT (N71)
CINCPACFLT (N70)
CNET (ETS-23)

Training Support Agency ..... NAVAIRSYSCOM (PMA205)

Manpower and Personnel Mission Sponsor ..... CNO (N12)
NAVPERSCOM (PERS-4, PERS-404)

Director of Naval Training ..... CNO (N795)

D. SYSTEM DESCRIPTION

1. Operational Uses. The Advanced Arresting Gear (AAG) will provide the U.S. Navy with the ability to recover all existing and projected carrier based tailhook-equipped air vehicles well into the twenty-first century. The AAG will be back fit on existing Aircraft Carrier, Nuclear

(CVN) 68 class aircraft carriers and forward fit on Aircraft Carrier, Nuclear, Experimental (CVNX) class carriers. The AAG is responsive to the CVNX Mission Needs Statement (M070-88-96).

2. Foreign Military Sales. No foreign military sales are planned at this time.

E. DEVELOPMENTAL TEST AND OPERATIONAL TEST. The Developmental Test (DT) and Evaluation program will be divided into four major divisions, contractor laboratory testing, Jet Car Test Site (JCTS) testing (DT-I, DT-II), Runway Arrested Landing Site (RALS) testing (DT-III), and environmental testing (DT-IV). Shipboard certification testing and Operational Evaluation (OPEVAL) will be conducted at the completion of developmental testing.

The Concept and Technology Development phase of the Defense Acquisition System (DAS) began in Fiscal Year (FY) 01 and will continue into FY02 (18 months). The System Development and Demonstration (SDD) phase will begin in mid-FY02 and continue through FY08 (77 months).

The SDD system will initially be surface-mounted at the Naval Air Warfare Center Aircraft Division, Lakehurst (NAWCADLKE), New Jersey, the JCTS for testing with deadloads. Following successful completion of an initial DT program, the system will be moved and installed at the RALS for follow-on DT, Technical Evaluation (TECHEVAL), and OPEVAL.

F. AIRCRAFT AND/OR EQUIPMENT/SYSTEM/SUBSYSTEM REPLACED. The AAGE replacement program will develop and field a new arresting gear engine to replace the current MK-7 Shipboard Arresting Gear System. The AAGE will be designed to be backfit on existing CVN 68 class aircraft carriers with applications for forward fit on future aircraft carriers.

G. DESCRIPTION OF NEW DEVELOPMENT

1. Functional Description. The new AAGE will be designed to improve arresting gear structural integrity margins of safety from current MK-7 levels to values needed for future Fleet operational requirements. In addition, the new AAGE will be designed to provide a total life cycle cost savings by reducing both operational and maintenance costs when compared to the MK-7 arresting gear. The AAGE will also provide new operational capabilities, including the ability to safely and efficiently recover both heavier and/or faster aircraft and lightweight unmanned air vehicles (goal) that may enter the Fleet in the coming years.

2. Physical Description. The AAG Basic System for an aircraft carrier is composed of four AAG engines (three pendant engines and one barricade engine), and one basic operational control system. The AAG Basic System will also include the operator workstations and external interfaces that the AAG requires. The AAG system will interface with the current MK-7 sheave damper, fairlead, and deck sheave systems, as well as the purchase cable and Cross-Deck

Pendants (CDP). The AAG basic System will be upgradeable to the Pre-Planned Product Improvement (P3I) System with minimal redesign.

The AAG P3I System will be comprised of the following P3I block upgrades, in order of preference:

- Option (1): Enhanced Control System for the Basic AAG system with the following capabilities: conditioned based maintenance, automated diagnostic troubleshooting and prognostic capability, reach-back maintenance capability, Interactive Electronic Technical Manuals, continuous system status condition monitoring, Built-In Test/Built-In Test Equipment (BIT/BITE), embedded operator training, and other enhancements. The Enhanced Control System will include the capability to provide for an Integrated Arresting Gear Control Station.

- Option (2): Redesigned sheave damper system (may be an active control system) with capabilities compatible with the Enhanced AAG Control System.

- Option (3): New high-strength, lightweight Purchase Cable and CDP.

The AAG system consists of four units, with a unit defined as a single recovery wire and associated equipment. It is envisioned that the AAG deck configuration will utilize a "3 + 1" recovery wire configuration, where a maximum of three recovery wires are rigged on three of the units at any given time. The remaining unit may be utilized as a spare, enabling a recovery wire to be rigged in the event one of the other units becomes unavailable.

3. New Development Introduction. The AAG will be developed in two blocks. Block I will meet the requirements for CVN 68 class backfit and CVNX 1. Block II will meet the requirements for CVNX 2 and follow-on ships. Block II will build upon Block I. Commonality between the two blocks will be maintained to the maximum extent.

4. Significant Interfaces. It is currently envisioned that the AAGE will have interfaces with other current or future shipboard systems. Some of the systems listed below are still in the design and development phase and may not be installed in fleet ships prior to AAGE being designed and fielded. If these systems are in place, Aviation Data Management And Control System (ADMACS) will be the single interface for AAGE for all these systems. If these systems are not in place on a ship, the required inputs and outputs will be handled within the AAGE Control System:

- *Advanced Launch and Recovery Control System (ALRCS):* The ALRCS program is a related program concurrently in initial development by NAVAIR. ALRCS will provide the infrastructure that will enable the AAGE control system, the ElectroMagnetic Aircraft Launch System (EMALS) control system, and a future Steam-Cat control system to interface with one another. The AAGE contractor will be responsible for providing the controls, displays, workstations, and interfaces necessary for the AAGE System to operate. The AAGE performance specifications

will include ALRCS design performance requirements and Interface Control Documents. The AAGE Team envisions that the AAGE Control System will use an open architecture design such that it will be compatible with a future ALRCS open architecture control system (AAGE goal). ALRCS will adopt the AAGE Control System as the recovery portion of ALRCS.

- *ADMACS:* ADMACS is a shipboard information management system for Aircraft Launch and Recovery Equipment (ALRE) and Air Operations data and information. The AAGE may use ADMACS for sending and receiving data both within the AAGE sub-systems (as appropriate) and with outside systems on the ship (for wind information, etc.).

- *Digital Wind:* The AAGE will get wind information from the MORIAH system. The ADMACS system will be used to get the MORIAH wind data to the AAGE.

- *IFLOLS:* The Improved Fresnel Lens Optical Landing System (IFLOLS) is a replacement for the current Fresnel Lens Optical Landing System (FLOLS) system. IFLOLS is currently being installed on Fleet carriers. Interface with IFLOLS is needed to enable an Arresting Gear/IFLOLS Cross Check functionality (which is an AAGE requirement). Also, the AAGE may use the IFLOLS flat panel display/control workstation in Pri-Fly as the primary input-display for AAGE in Pri-Fly.

- *Cross Check System:* The current Cross Check System is a manual pushbutton system, with manual inputs from the Pri-Fly Arresting Gear (AG) Operator and from the FLOLS Operator. When both operators correctly depress a button indicating the AG system and the FLOLS system are both properly set for the next aircraft type to recover, a light will indicate on the Air Boss's small display indicating both systems are set for the next aircraft. The current Cross Check System is an open loop system (i.e., it does not get electronic feedback from either the MK-7 AG or the FLOLS. The ALRE Team is redesigning the current Cross Check System. This new Redesigned Cross Check System provides a closed loop feedback from the MK-7 AG to verify the Constant Runout (Control) Valve (CROV) setting and verify battery conditions. It will also provide an automated function that will actually move the CROV setting to the correct weight setting following input from the Pri-Fly AG Operator. The Redesigned Cross Check System is dependant on the IFLOLS System being installed on the ship since it will use the IFLOLS workstation in Pri-Fly (a flat panel input-display). The AAGE Program will incorporate all the required functions of the new Redesigned Cross Check System into the AAGE control system such that a separate Cross Check System will no longer be required.

- *Flight Deck Status Light:* The AAGE control system will automatically interface with the Flight Deck Status Light such that the light can not indicate a clear deck (green light on) if the AAGE is not ready to safely recover the next aircraft.

5. New Features, Configurations, or Material. The AAGE program will also look at other new technology, as cost and technical risks permit, such as the use of new, high-tech materials for the purchase cable, CDP, or other new technologies and materials. Previous work has shown significant dynamic load reductions can be realized by utilizing high strength, low weight, purchase cables and/or CDPs. Higher elasticity as well as low inertia tends to reduce the magnitude of the impact generated kink wave. The primary limiting factor for these high strength, low weight materials has been life. The materials must be capable of surviving the harsh and abrasive sea environment.

H. CONCEPTS

1. Operational Concept. A primary goal of the AAGE is to allow recovery operations to be executed using significantly fewer sailors in the arresting gear crew. The AAGE Team's current vision of the proposed operational concept may only require the following operators for normal operations:

- Pri-Fly Recovery Operator - This operator also performs the necessary functions for operation of the IFLOLS.
- Arresting Gear Officer - At the current deck edge position for the Basic AAGE System and in the Integrated Arresting Gear Control System (IAGCS) for the AAGE P3I Enhanced Control Option.
- AAGE Monitor - Below deck for the Basic AAGE System, in the IAGCS for the AAGE P3I Enhanced Control Option.
- AAGE Retract Operator - Required for the AAGE Basic System. For the AAGE P3I System, the AAGE Monitor will perform this function.

2. Maintenance Concept. The AAGE system will have an embedded Health Monitoring (HM) system, an embedded performance monitoring system, an embedded BIT/BITE check system, an embedded Interactive Electronic Technical Manual (IETM), and troubleshooting maintenance aids. It will have a HM and troubleshooting display console located in the Arresting Gear Work Center spaces and in the V-2 Maintenance Control Office spaces. The AAGE system will also have an embedded routine that tracks hits on individual CDPs that must be changed after every 100 aircraft traps on the CDP. The AAGE will also have an embedded system for tracking any other system component that has a limited life (e.g., purchase cable, etc.).

a. Organizational. Using Conditional Based Maintenance (CBM) and HM will allow for the monitoring and diagnosis of the Catapults and Arresting Gear. CBM and HM will instrument critical parameters and use the data obtained to determine the "health" of the systems. Using these techniques, ALRCS will be able to determine when maintenance is required rather than the current event or time-driven Preventive Maintenance method. With CBM, the maintenance actions themselves may not change, but the frequency of the maintenance actions will be reduced.

(1) Preventive Maintenance. ALRE logisticians are looking at the maintenance actions that are performed and will attempt to use the CBM philosophy to reduce maintenance frequency and cost. As stated above, ALRCS will be able to determine when maintenance is required through performance and condition monitoring.

(2) Corrective Maintenance. As Corrective Maintenance requirements are determined, they will be added to updates to this document.

b. Intermediate. ALRE will explore a Reach Back Maintenance capability. This concept will allow data in various formats to be transmitted ashore to the activity that can provide assistance in direct support of diagnosing catapult or arresting gear problems.

c. Depot. Depot level and other major maintenance and repair are available through Voyage Repair Teams provided by Naval Aviation Depots, NAWCADLKE, and Naval shipyards.

d. Interim Maintenance. NAWCADLKE will provide interim maintenance support.

e. Life Cycle Maintenance Plan. After the Design Phase is complete, NAWCADLKE will draft a life cycle maintenance plan.

2. Manning Concept. Manpower requirements for the V-2 Division are based on total workload requirements. With a daily operating period of 16 hours, Quality Assurance (QA) and Maintenance Support (MS) capabilities must be available 24 hours per day. The V-2 Division operates with separate work centers for QA, MS, and operation of ALRCS. The V-2 Division is manned with:

- Aviation Boatswain's Mate (Launching and Recovery Equipment) (ABE) for operation and maintenance of ALRE
- Electrician's Mates (EM) to maintain the ALRE electrical systems
- Interior Communications Electricians (IC) to maintain the visual landing systems
- Aviation Maintenance Administrationmen (AZ) to perform the administrative, managerial, trend analysis, and clerical tasks of the division

This same mix of personnel will support the AAGE system. The AAGE will require no operators in the arresting gear engine rooms during recovery operations (threshold requirement). The only operators required for the AAGE Basic System should be a single Primary Flight Control operator, an Arresting Gear Officer, an operator that can monitor all AAGE engines at an integrated console, and one operator to perform the retract function.

a. Estimated Maintenance Man-Hours per Operating Hour. The Mean Cycles Between Operational Mission Failures (MCBOMF) for the system for AAG must not be

less than 16,500 cycles (threshold) and 29,500 cycles (objective). One cycle equals one arrestment-retract-ready sequence. A system operational mission failure occurs if and when a failure results in less than two recovery wires (units) being operationally ready for the next cycle, given a Mean Logistics Delay Time (MLDT) of 60 hours.

The MCBOMF for an individual unit must not be less than 1,400 cycles (threshold) and 1,800 cycles (objective). The MCBOMF is based on a 3 + 1 wire configuration. The AAG must meet an organizational maintenance level Mean Time To Repair of 1.00 hour (threshold) and less than 1.00 hour (goal).

b. Proposed Utilization. AAG is designated as a non-continuous operating system. The system must, however, be capable of recovery operations at any time in support of carrier based tailhook equipped fixed-wing air operations.

c. Recommended Qualitative and Quantitative Manpower Requirements. At this point in the development of the AAGE, it is anticipated that there will not be any immediate change to the current manning aboard CVN ships. There is a possibility that some reduction in manpower may be realized after final system design and if the CBM philosophy is adopted. Results of additional analysis will be reflected in revisions to this document.

4. Training Concept. AAGE is currently in the Concept and Technology Development phase of the DAS and as such, no final training concept can be defined. When the system specification become final, the training concept can be further addressed. Current plans are to determine the training methodology after contract award. The following training concept is based on the ALRCS, as the AAGE will be an integral part of this system.

Formal training courses are currently available for ABE Class A and C schools. These courses will require revision to include the new electronic sensors. The current maintenance course for Steam Catapult Electrician will require a major revision. The proposed electronic sensors are within the scope of EM Navy Enlisted Classification (NEC) 4672 but are currently not taught to the level required to maintain the ALRCS. The AZ training should be updated to reflect the electronic sensors and provide procedures for data collection and analysis.

As part of an Advanced Technology Demonstrator, Naval Air Warfare Center Training Systems Division (NAWCTSD), Orlando, Florida, is exploring embedded training as a concept for ALRCS operator training for use aboard future generation aircraft carriers and other Navy platforms.

a. Initial Training. Initial training will be required for OPEVAL personnel so they can successfully perform testing functions. Navy Instructors will also require initial training so that they can establish organic follow-on training.

Title	**AAGE Initial Training**
Description	This introductory course provides AAGE system operation and maintenance training for Instructors and key personnel.

Location	To Be Determined (TBD)
Length	TBD
RFT date	TBD
TTE/TD	TBD
Prerequisites	ABE, EM, or AZ Rating

b. Follow-on Training

(1) Operator. Follow-on training for shipboard operators in the V-2 Division will be integrated into the existing training courses for the ABE rating listed below. It is estimated that the addition of AAGE training data into these courses will not significantly increase course lengths.

Title	**Aviation Boatswain's Mate Launch and Recovery Equipment Class A1**
CIN	C-604-2012
Model Manager ...	Naval Air Technical Training Center (NATTC) Pensacola
Description	This course provides training to the ABE, including: ° Basic Hydraulics ° Packing and Seals ° Safety Wire and Torquing Applications ° NAVAIR Manuals ° Basic Aviation ° Hazardous Materials in Aircraft ° Flight Deck Clothing ° 3M System ° PQS ° Tool Control Upon completion, the student will be able to assist in the operations and maintenance of the Catapult and Arresting Gear Systems in a shipboard environment under supervision.
Location	NATTC Pensacola
Length	39 days
RFT date	Currently available (ACLRS revisions are required 90 days prior to Initial Operational Capability (IOC))
Skill identifier	None

TTE/TD	Additional TTE and TDs to support ALRCS are TBD.
Prerequisites	° Airman Recruit, Airman Apprentice, Airman, or ABE Rating ° Paygrades E-1 through E-4 ° ASVAB Test Scores: 5/6/7 AR+MC+SI=130, and 8/9/10/11/12/13/14/15/16/17 AR+MC+AS=130

Title	**Aircraft Launch and Recovery Equipment C13 Catapult Class C1**
CIN	C-604-2014
Model Manager ...	NATTC Detachment, Lakehurst
Description	This course provides training to the ABE, including: ° Type C MK-13 MOD 0 Catapult Operation ° Type C MK-13 MOD 1 Catapult Operation ° Type C MK-13 MOD 2 Catapult Operation Upon completion, the student will be able operate Type C MK-13 series catapults aboard CV and CVN type ships under limited supervision.
Location	NATTC DET Lakehurst
Length	44 days
RFT date	Currently available (ACLRS revisions are required 90 days prior to IOC)
Skill identifier	NEC 7004
TTE/TD	Additional TTE and TDs to support ALRCS are TBD.
Prerequisites	° ABE Rating ° Paygrades E-4 through E-9 ° C-604-2012, Aviation Boatswain's Mate Launch and Recovery Equipment Class A1 or ° DoD Personnel from a Shipyard, Test Facility, and/or Engineering Development Center.

Title	**Aircraft Launch and Recovery Equipment Arresting Gear**
CIN	C-604-2025
Model Manager ...	Naval Air Maintenance Training Unit (NAMTRAU), North Island
Description	This course provides the aircraft launch and recovery technician with sufficient knowledge of the MK-7 Arresting Gear System, including: ° Operational Phases ° Component Identification ° Basic Troubleshooting ° Safety Precautions Upon completion, the student will be able to perform arresting gear maintenance in a shipboard environment under close supervision.
Location	° NAMTRAU Norfolk ° NAMTRAU North Island
Length	9 days
RFT date	Currently available (ACLRS revisions are required 90 days prior to IOC)
Skill identifier	None
TTE/TD	Additional TTE and TDs to support ALRCS are TBD.
Prerequisites	° ABE Rating ° Paygrades E-1 through E-9 (May be a Non-Designated Airman Striking for ABE Rating)

Title	**Aircraft Launch and Recovery Equipment Arresting Gear**
CIN	C-604-2029
Model Manager ...	NATTC DET Lakehurst
Description	This course provides training to the ABE, including: ° MK-7 MOD 2 Arresting Gear Operation ° MK-7 MOD 3 Arresting Gear Operation ° MK-7 MOD 4 Arresting Gear Operation Upon completion, the student will be able to operate MK-7 series arresting gear aboard CV and CVN type ships under supervision.
Location	NATTC DET Lakehurst
Length	24 days
RFT date	Currently available (ACLRS revisions are required 90 days prior to IOC)
Skill identifier	NEC 7005
TTE/TD	Additional TTE and TDs to support ALRCS are TBD.
Prerequisites	° ABE Rating ° Paygrade E-4 ° C-604-2012, Aviation Boatswain's Mate Launch and Recovery Equipment Class A1

Title	**Aircraft Launch and Recovery Equipment Refresher**
CIN	C-604-2016
Model Manager ...	NAMTRAU North Island
Description	This course provides training to the Personnel Qualification Standards (PQS) qualified ABE, including: ° Type C MK-13 Series Catapult Operation Upon completion, the student will be able operate MK-13 series catapults aboard CV and CVN type ships under limited supervision.
Location	° NAMTRAU Norfolk ° NAMTRAU North Island
Length	11 days

RFT date	Currently available (ACLRS revisions are required 90 days prior to IOC)
Skill identifier	None
TTE/TD	Additional TTE and TDs to support ALRCS are TBD.
Prerequisites	° ABE Rating ° Paygrades E-5 through E-9

(2) Maintenance

Title	**Aircraft Launch and Recovery Equipment - Catapult Basic**
CIN	C-604-2024
Model Manager ...	NAMTRAU North Island
Description	This course provides training to ABE, EM, and AZ personnel, including: ° Basic Catapult System ° Catapult Operational Phases ° Component Identification ° Basic Troubleshooting ° Operation and Maintenance Publications ° Safety Precautions Upon completion, the student will be able to perform basic catapult maintenance functions aboard CV and CVN ships under close supervision.
Location	° NAMTRAU Norfolk ° NAMTRAU North Island
Length	10 days
RFT date	Currently available (ACLRS revisions are required 90 days prior to IOC)
Skill identifier	None
TTE/TD	Additional TTE and TDs to support ALRCS are TBD.
Prerequisites	° ABE Rating ° Paygrades E-1 through E-9 (may be a Non-Designated Airman Striking for ABE rating)

Title	**Aircraft Launch and Recovery Equipment Maintenance Technician**
CIN	C-604-2028
Model Manager ...	NATTC DET Lakehurst
Description	This course provides training to the ABE, including: ° ALRE Maintenance Administration ° Maintenance Programs and Practices ° Safety ° General Maintenance and Upkeep ° Hydraulic System Maintenance ° Jet Blast Deflectors ° Aircraft Recovery Equipment ° Barricades Upon completion, the student will be able to maintain and repair the catapult and arresting gear aboard CV and CVN ships without supervision.
Location	NATTC DET Lakehurst
Length	88 days
RFT date	Currently available (ACLRS revisions are required 90 days prior to IOC)
Skill identifier	NEC 7006
TTE/TD	Additional TTE and TDs to support ALRCS are TBD.
Prerequisite	° ABE Rating ° NEC 7004 or 7005 ° Paygrades E-5 through E-9

Title	**CV Catapult Electrician**
CIN	C-604-2013
Model Manager ...	NATTC DET Lakehurst
Description	This course provides training to the EM, including: ° Arresting Gear and Deck Accessories ° Catapults ° Electrical Schematics ° General Maintenance and Upkeep ° Safety ° Quality Assurance ° Technical Publications Upon completion, the student will be able to maintain and repair the catapult and arresting gear electrical systems aboard CV and CVN ships under limited supervision..
Location	NATTC DET Lakehurst
Length	26 days
RFT date	Currently available (ACLRS revisions are required 90 days prior to IOC)
Skill identifier	NEC 4672
TTE/TD	Additional TTE and TDs to support ALRCS are TBD.
Prerequisite	° EM Rating ° Paygrade E-4 ° Ultimate Duty Assignment to an Aircraft Carrier

(3) Officer

Title	**Aircraft Launch and Recovery Equipment Officer**
CIN	C-2G-2010
Model Manager ...	NATTC DET Lakehurst
Description	This course provides training to selected officers including: ° Basic Hydraulics ° Catapult and Arresting Gear Wire Rope and Fittings ° Electrical Devices ° Familiarization with Steam Catapults ° Arresting Gear and Visual Landing Aids System ° Detailed Instruction in ALRE Bulletins ° Computation ° Performing Aircraft Launching Procedures Using Aircraft 11F12 Training Simulator Upon completion, and attaining PQS qualification, the student will be able to safely perform operations of the catapult and arresting gear equipment during actual flight operations without supervision.
Location	NATTC DET Lakehurst
Length	17 days
RFT date	Currently available (ACLRS revisions are required 90 days prior to IOC)
Skill identifier	NOBC 8614 Catapult and Arresting Gear Officer
TTE/TD	Additional TTE and TDs to support ALRCS are TBD.
Prerequisites	Officers Selected by the Chief of Naval Operations

Title	**Aircraft Launch and Recovery Equipment Maintenance Officer**
CIN	C-604-2011
Model Manager ...	NATTC DET Lakehurst
Description	This course provides training to selected CWO/LDOs and selected ABEs including: ° Common Duties and Responsibilities ° ALRE Maintenance Administrative Matters ° Technical Publications Library Organization and Management ° Catapult Maintenance ° Arresting Gear Maintenance and Visual Landing Aids Maintenance ° ALRE Maintenance Management ° 3M and Ship Alterations Upon completion the student will be able to manage and supervise the administration and quality assurance of aircraft launch and recovery equipment maintenance ashore and afloat in accordance with the ALREMP.
Location	NATTC DET Lakehurst
Length	38 days
RFT date	Currently available (ACLRS revisions are required 90 days prior to IOC)
Skill identifier	None
TTE/TD	Additional TTE and TDs to support ALRCS are TBD.
Prerequisites	° Officers Selected by the Chief of Naval Operations or ° ABE Rating ° Paygrades E-7 through E-9

(4) Other

Title	**Aircraft Launch and Recovery Equipment Quality Assurance Administration**
CIN	C-604-2017
Model Manager ...	NAMTRAU Norfolk
Description	This course provides training to the ABE, EM, or Aviation Maintenance Administrationman, including: ° ALRE Quality Assurance Program Overview ° Quality Assurance Instructions and Directives ° Quality Assurance Record Maintenance ° Quality Assurance Reports ° Monitoring Procedures Upon completion, the student will be able to administer and maintain a Quality Assurance Program aboard CV and CVN ships under all conditions of readiness under limited supervision.
Location	° NAMTRAU Norfolk ° NAMTRAU North Island
Length	5 days
RFT date	Currently available (ACLRS revisions are required 90 days prior to IOC)
Skill identifier	None
TTE/TD	Additional TTE and TDs to support ALRCS are TBD.
Prerequisites	° AZ Rating ° Paygrades E-4 through E-6 ° Assigned to the V-2 Division or ° ABE, IC, EM Ratings ° Paygrades E-6 through E-9

c. Student Profiles

SKILL IDENTIFIER	**PREREQUISITE SKILL AND KNOWLEDGE REQUIREMENTS**
ABE	° C-604-2012, Aviation Boatswain's Mate Aircraft Launching and Recovery Equipment Class A1

SKILL IDENTIFIER	PREREQUISITE SKILL AND KNOWLEDGE REQUIREMENTS
EM	° A-662-0159, Electrician's Mate "A" School ° A-651-0118, Engineering Common Core ° A-651-0119, Engineering Electrical Core
AZ	° C-555-2010, Aviation Maintenance Administrationman Class A1

d. Training Pipelines. No new training pipelines or tracks have been identified at this early stage in the acquisition process, but the following courses have been identified as requiring revisions:

CIN	COURSE TITLE
C-2G-2010	Aircraft Launch and Recovery Equipment Officer
C-604-2011	Aircraft Launch and Recovery Equipment Maintenance Officer
C-604-2012	Aviation Boatswain's Mate Launching and Recovery Equipment Class A1
C-604-2013	CV Catapult Electrician
C-604-2014	Aircraft Launch and Recovery Equipment C13 Catapult Class C1
C-604-2016	Aircraft Launch and Recovery Equipment Refresher
C-604-2017	Aircraft Launch and Recovery Equipment Quality Assurance Administration
C-604-2024	Aircraft Launch and Recovery Equipment – Catapult Basic
C-604-2025	Aircraft Launch and Recovery Equipment – Arresting Gear
C-604-2028	Aircraft Launch and Recovery Equipment Maintenance Technician
C-604-2029	Aircraft Launch and Recovery Equipment – Arresting Gear

I. ONBOARD (IN-SERVICE) TRAINING

1. Proficiency or Other Training Organic to the New Development. TBD

a. Maintenance Training Improvement Program. TBD

b. Aviation Maintenance Training Continuum System. TBD

2. Personnel Qualification Standards. PQS will be developed by the PQS development center as required.

3. Other Onboard or In-Service Training Packages. The curriculum package for both operator and maintenance personnel must be delivered to the user activity and schoolhouses 90 days prior to IOC. As stated earlier, NAWCTSD is exploring embedded training as a concept for ALRCS operator training for use aboard future generation aircraft carriers and other Navy platforms.

J. LOGISTICS SUPPORT

1. Manufacturer and Contract Numbers. TBD

2. Program Documentation

- Operational Requirements Document for AAGE, dated 6 September 2001
- System Specifications for AAGE dated 30 July 2001
- Program Plan and Plan of Action and Milestones (POA&M) for AAGE draft dated 13 December 2000

3. Technical Data Plan. Preliminary operator and maintenance manuals will be required, as well as final operation and maintenance manuals with illustrated parts breakdowns, to be prepared by NAWCADLKE. Manuals will be developed in accordance with a Technical Manual Contract Requirement generated by the Naval Air Technical Data and Engineering Service Command. The formal technical manuals will be ready for printing and distribution approximately 90 days after receipt of verification of fleet comments. Commercial manuals will be used where applicable.

4. Test Sets, Tools, and Test Equipment. TBD

5. Repair Parts. TBD

6. Human Systems Integration. The Human Systems Integration program will be organized to achieve the effective integration of personnel into the design of the system. The human engineering effort will include, but not necessarily be limited to, active participation in the following three major interrelated areas of system development: analysis, design and development, and test and evaluation. The use of Non-Developmental Item, Commercial Off-The-Shelf (COTS), and Government Off-The-Shelf (GOTS) hardware, software, and firmware common to other systems on the ship should not require new personnel specialties but rather an extension of these skill levels. Further, the use of highly reliable, integrated, common support systems should result in the more efficient use of operating and support personnel.

K. SCHEDULES

1. Program Phases. DAS Concept Exploration and Technology Development runs from the present to March 2002. System Development and Demonstration starts with a Milestone B decision in May of 2002, and will continue until July 2007. A Milestone C decision will follow in August 2007, with Production and Fielding scheduled to begin in October 2007.

2. Initial Operational Capability. IOC must occur when the first ship installed with AAG is deployed in 2010.

3. Full Operational Capability. Full Operational Capability must occur when the Navy Support Date for the AAG has been achieved.

4. Installation and Delivery Schedules. TBD

5. Foreign Military Sales and Other Source Delivery Schedule. Not Applicable (NA)

6. Training Device and Technical Training Equipment Delivery Schedule. TBD

L. GOVERNMENT-FURNISHED EQUIPMENT AND CONTRACTOR-FURNISHED EQUIPMENT TRAINING REQUIREMENTS. NA

M. RELATED NTSPs AND OTHER APPLICABLE DOCUMENTS

DOCUMENT OR NTSP TITLE	DOCUMENT OR NTSP NUMBER	PDA CODE	STATUS
Initial NTSP for ALCRS	NA	PMA251	Initial Oct 99
NTSP for ADMACS	N78-NTSP-A-50-0009/D	PMA251	Draft Mar 01
NTSP CV/CVN for ALRE	N88-NTSP-A-50-8509D/D	PMA251 PMW185	Draft Jul 01
NTSP for MORIAH	N88-NTSP-A-50-0001/A	PMA251	Approved Dec 00
Program Plan and Plan of Action and Milestones	NA	PMA251	Draft Dec 00

APPENDIX A - POINTS OF CONTACT

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