PE NUMBER: 0207417F
PE TITLE: Airborne Warning and Control System (AWACS)

Exhibit R-2, RDT&E Budget Item Justification	DATE February 2004
BUDGET ACTIVITY 07 Operational System Development	PE NUMBER AND TITLE 0207417F Airborne Warning and Control System (AWACS)

	Cost ($ in Millions)	FY 2003 Actual	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	Cost to Complete	Total
	Total Program Element (PE) Cost	163.725	267.846	288.787	131.308	85.578	83.257	74.450	Continuing	TBD
411L	Airborne Warning & Control System (AWACS)	163.725	267.846	288.787	131.308	85.578	83.257	74.450	Continuing	TBD

(U) A. Mission Description and Budget Item Justification

A. Mission Description

The funding set forth in this document investigates, develops, and integrates system improvements to enable the E-3 AWACS to remain an effective Battle Management airborne surveillance system for command and control of combat forces and for strategic defense of the U.S. This PE funds the following efforts:

Modernization Programs: (RDT&E, AF)

1) The Integrated DAMA (Demand Assigned Multiple Access) / GATM (Global Air Traffic Management) Program seeks to make communications and navigation improvements required to meet current mandated DAMA SATCOM (Satellite Communication) and Air Traffic Control (ATC) requirements.

A) DAMA SATCOM is a CJCS mandated Ultra-High Frequency (UHF) satellite communications upgrade consisting of two new UHF DAMA terminals and new Radio Frequency (RF) components, to mitigate co-site interference, replacing the two non-DAMA UHF SATCOM radios on each aircraft. The DAMA enhancements will expand user availability of severely limited DoD UHF SATCOM channels, improving the interoperability and efficiency of DoD UHF SATCOM systems.

B) GATM is an FAA/International Civil Aviation Organization (ICAO)/EUROCONTROL mandated ATC upgrade consisting of new VHF radios with 8.33 kHz channel spacing, Aircraft Collision Avoidance System (ACAS)/Mode-S IFF and Reduced Vertical Separation Minimum (RVSM) capability. The ATC enhancements will permit more aircraft to fly closer together in congested airspace worldwide, particularly in European airspace. Non-compliance already results in airspace restrictions and denials, impacting AWACS' ability to support worldwide response in situations requiring immediate on-scene command and control (C2) battle management.

2) Block 40/45 is replacing AWACS 1970's vintage mission systems that are experiencing Diminishing Manufacturing Sources (DMS) issues, are difficult and expensive to upgrade, and limit overall AWACS system performance. The Block 40/45 upgrade will improve quality and timeliness of sensor data to the shooter, improve Combat Identification (CID), provide sensor fusion capability in support of the Single Integrated Air Picture (SIAP) via multi-sensor integration (MSI), improve AWACS contribution to Time Critical Targeting via Data Link Infrastructure, resolve radar electronics DMS, and enable more effective, faster upgrades via an open systems architecture. The Block 40/45 risk reduction effort, which was completed in FY03, reduced the risk of utilizing new technology to meet the AWACS Block 40/45 Operational Requirements Document (ORD). Block 40/45 transitioned from the risk reduction phase into the System Development and Demonstration (SD&D) phase during FY03.

3) Command & Control, Intelligence, Surveillance and Reconnaissance (C2ISR): C2ISR System Architecture Improvements provide timely enhancements to improve critical areas of the AWACS mission system, primarily in three areas:

A) Mission Capable (MC) rate improvement: Reliability, Maintainability & Availability (RM&A) analysis and development projects provide system improvements that boost the below-standard MC rate of this critical C2 platform and increase airframe longevity in order to support its flight commitment to end of operational life. Such efforts focus on increasing reliability of the air vehicle, command, control, computer, sensor systems and infrastructure improvements as well as providing solutions to diminishing manufacturing sources. Efforts will also focus on reduction of maintenance man-hours along with periodic depot maintenance improvements to increase aircraft availability. Programs will focus on risk reduction, development and fielding.

B) C2ISR enhancement and integration: AWACS seeks to fulfill the requirements of Joint Vision 2020 as well as Expeditionary Air Force (EAF) and other Task Force Concept of Operations to meet the needs of the operator. AWACS seeks to enhance network-centric warfare capabilities with other C2ISR systems by horizontally integrating machine-to-machine interfaces into AWACS in order to digitize the kill chain. Sensor and communications improvements, such as IFF interrogator/transponder and the ability to send, receive and fuse the air (and ground) picture via data link to fighter aircraft, will be developed through rapid prototyping, modeling, simulation and participation in live and simulated Joint exercises (e.g., Joint Combat Identification Evaluation Team (JCIET) and Joint Distributed Engineering Plant (JDEP). Collaborative efforts with other sensor platforms through capabilities such as network-centric operations will also enhance horizontal integration efforts. Certain near-term efforts, required by the operator to improve the timeliness and accuracy of information passed to/from fighter aircraft in the engagement zone and to provide consistent and re-playable mission data once the mission is complete, are quick reaction capabilities that can be developed & fielded to support the next air war. The program includes concept exploration, technology development and demonstration efforts that support continuous improvements to C2ISR capabilities of manned & unmanned platforms, space, data links and advanced Battle Management decision tools. C2ISR continues to support and develop self-protection capabilities to enable current and future threat deterrence. Fielding strategies will provide for immediate field retrofit when able, otherwise fielding will occur in subsequent modernization programs. All programs are designed to integrate with & transitions into the next C2ISR Platform. The E-3 will serve as lead platform to support the development of the Mark XXIIA Mode 5 IFF capability carried out in PE 63742F, Comabt ID Technology.

4) The Training, Support, and Infrastructure programs cover an array of cross cutting programs and activities in support of AWACS modification and enhancement programs. These programs include managing the AWACS developmental infrastructure, support equipment development, modernization planning/analysis, and trainer/simulator integration and concurrency. The Radar Systems Integration Lab/Software Development Facility must be maintained, operated and supported by contract to provide customers with a functioning APY 1/2 radar configuration in support of AWACS radar development, production and sustainment support equipment technologies and test strategies to ensure concurrent capability to sustain current, modified and upgraded E-3 equipment. Trainer/simulator concurrency analysis and definition is required to ensure trainers and simulators are kept current with the AWACS baseline. Associate contractor agreements are needed to establish concurrency between prime integrators and training service providers.

5) Test System 3/Integration Labs: The E-3 AWACS testbed aircraft, Test System 3 (TS-3, tail number 73-1674), the Avionics Integration Laboratory (AIL) and the AWACS Development Laboratory (ADL) are Government owned/contractor managed, maintained and operated assets. These test-ready assets support AWACS modernization and sustainment programs, including advanced projects, and allow AWACS to participate in live-fly and ground-based simulation exercises such as Joint Expeditionary Force Experiment (JEFX) and JDEP. They also support multiple international projects on a fee basis, including French, RSAF and NATO.

Exhibit R-2, RDT&E Budget Item Justification	DATE February 2004
BUDGET ACTIVITY 07 Operational System Development	PE NUMBER AND TITLE 0207417F Airborne Warning and Control System (AWACS)

6) NAVWAR (Navigation Warfare) is mandated by CJCSI 6140.01 (15 Nov 98) and requires all DoD GPS users to incorporate NSA Selective Availability Anti-Spoofing Module (SAASM), make provisions for the transition to 'black keys', eliminate requirements to acquire GPS satellites using the civil signal (C/A) incorporate new technology into the navigation sensor. AMP (Avionics Modernization Program) completes the FAA/ICAO/EUROCONTROL mandated air traffic control system upgrades and equips the E-3 fleet with flight deck and other avionics capabilities that will allow AWACS to comply with mandated global Required Navigation Performance (RNP) surveillance and communication standards. Non-compliance will result in airspace restrictions and denials, which will impact AWACS' ability to support worldwide responses to situations requiring immediate on-scene C2 battle management. The AMP modifications to the flight deck include the addition of data link communications, voice and data link digital radios, improved visual displays and flight management system, as well as automatic position reporting via data link. Replacement of critical avionics subsystems, unsustainable beyond 2010, will be included in the AMP. The program will focus on risk reduction, development and fielding.

7) Comm projects provide the AWACS system with an effective method for electronically transmitting and receiving critical mission information such as the Air Tasking Order (ATO). Comm projects will focus on engineering and retrofitting the entire fleet.

This program is in Budget Activity 7, Operational Systems Development, due to efforts supporting a fielded, post Milestone III operational weapon system.

(U) B. Program Change Summary ($ in Millions)

		FY 2003	FY 2004	FY 2005
(U)	Previous President's Budget	169.649	270.397	289.544
(U)	Current PBR/President's Budget	163.725	267.846	288.787
(U)	Total Adjustments	-5.924	-2.551	
(U)	Congressional Program Reductions			
	Congressional Rescissions		-2.551	
	Congressional Increases			
	Reprogrammings	-5.924		
	SBIR/STTR Transfer			

(U) Significant Program Changes:

Funds were reduced in FY03 and FY05 to support other Air Force efforts. Increase from FY03 to FY04 reflects Block 40/45 ramp-up from Risk Reduction to SDD.

Exhibit R-2a, RDT&E Project Justification			DATE: February 2004
BUDGET ACTIVITY: 07 Operational System Development	PE NUMBER AND TITLE: 0207417F Airborne Warning and Control System (AWACS)	PROJECT NUMBER AND TITLE: 411L Airborne Warning & Control System (AWACS)	

	Cost ($ in Millions)	FY 2003 Actual	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	Cost to Complete	Total
411L	Airborne Warning & Control System (AWACS)	163.725	267.846	288.787	131.308	85.578	83.257	74.450	Continuing	TBD
	Quantity of RDT&E Articles	0	0	0	0	0	0	0		

(U) A. Mission Description and Budget Item Justification

A. Mission Description

The funding set forth in this document investigates, develops, and integrates system improvements to enable the E-3 AWACS to remain an effective Battle Management airborne surveillance system for command and control of combat forces and for strategic defense of the U.S. This PE funds the following efforts:

Modernization Programs: (RDT&E, AF)

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A) DAMA SATCOM is a CJCS mandated Ultra-High Frequency (UHF) satellite communications upgrade consisting of two new UHF DAMA terminals and new Radio Frequency (RF) components, to mitigate co-site interference, replacing the two non-DAMA UHF SATCOM radios on each aircraft. The DAMA enhancements will expand user availability of severely limited DoD UHF SATCOM channels, improving the interoperability and efficiency of DoD UHF SATCOM systems.

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Exhibit R-2a, RDT&E Project Justification		DATE February 2004
BUDGET ACTIVITY **07 Operational System Development**	PE NUMBER AND TITLE **0207417F Airborne Warning and Control System (AWACS)**	PROJECT NUMBER AND TITLE **411L Airborne Warning & Control System (AWACS)**

critical areas of the AWACS mission system, primarily in three areas:

A) Mission Capable (MC) rate improvement: Reliability, Maintainability & Availability (RM&A) analysis and development projects provide system improvements that boost the below-standard MC rate of this critical C2 platform and increase airframe longevity in order to support its flight commitment to end of operational life. Such efforts focus on increasing reliability of the air vehicle, command, control, computer, sensor systems and infrastructure improvements as well as providing solutions to diminishing manufacturing sources. Efforts will also focus on reduction of maintenance man-hours along with periodic depot maintenance improvements to increase aircraft availability. Programs will focus on risk reduction, development and fielding.

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Exhibit R-2a, RDT&E Project Justification		DATE February 2004
BUDGET ACTIVITY **07 Operational System Development**	PE NUMBER AND TITLE **0207417F Airborne Warning and Control System (AWACS)**	PROJECT NUMBER AND TITLE **411L Airborne Warning & Control System (AWACS)**

6) NAVWAR (Navigation Warfare) is mandated by CJCSI 6140.01 (15 Nov 98) and requires all DoD GPS users to incorporate NSA Selective Availability Anti-Spoofing Module (SAASM), make provisions for the transition to 'black keys', eliminate requirements to acquire GPS satellites using the civil signal (C/A) incorporate new technology into the navigation sensor. AMP (Avionics Modernization Program) completes the FAA/ICAO/EUROCONTROL mandated air traffic control system upgrades and equips the E-3 fleet with flight deck and other avionics capabilities that will allow AWACS to comply with mandated global Required Navigation Performance (RNP) surveillance and communication standards. Non-compliance will result in airspace restrictions and denials, which will impact AWACS' ability to support worldwide responses to situations requiring immediate on-scene C2 battle management. The AMP modifications to the flight deck include the addition of data link communications, voice and data link digital radios, improved visual displays and flight management system, as well as automatic position reporting via data link. Replacement of critical avionics subsystems, unsustainable beyond 2010, will be included in the AMP. The program will focus on risk reduction, development and fielding.

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This program is in Budget Activity 7, Operational Systems Development, due to efforts supporting a fielded, post Milestone III operational weapon system.

(U) B. Accomplishments/Planned Program ($ in Millions)	FY 2003	FY 2004	FY 2005
(U) Accomplishments/Planned Programs	0.000	0.000	
(U) Continuing Test System-3/AITS support and program sustaining efforts	21.034	17.906	26.720
(U) Completing Block 40/45 Risk Reduction effort, continuing SD&D effort	114.369	219.315	249.020
(U) Completing Integrated DAMA/GATM (IDG) SD&D (combination of ATC Compliance & SATCOM DAMA)	22.996	26.817	
(U) Continuing C2ISR System Architecture Improvements, Advanced Projects, MC Rate Improvements	5.326	3.808	5.267
(U) Starting Navigational Warfare (NAVWAR) SD&D			7.780
(U) Total Cost	163.725	267.846	288.787

(U) C. Other Program Funding Summary ($ in Millions)

	FY 2003 Actual	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	Cost to Complete	Total Cost
(U) AF RDT&E									
(U) Other APPN									
(U) Aircraft Procurement, AF, E-3 Mods	28.093	52.842	36.025	57.457	145.848	186.340	173.355	Continuing	TBD
(U) E-3 Initial Spares, AF	5.393	8.324	8.862	6.965	7.161	7.415	7.609	Continuing	TBD
(U) Replacement Supt Equip									

Exhibit R-2a, RDT&E Project Justification		DATE February 2004
BUDGET ACTIVITY **07 Operational System Development**	PE NUMBER AND TITLE **0207417F Airborne Warning and Control System (AWACS)**	PROJECT NUMBER AND TITLE **411L Airborne Warning & Control System (AWACS)**

(U) D. Acquisition Strategy

Most major programs (IDG, Block 40/45, NAVWAR, TS-3 and lab support) will be sole source to Boeing aircraft in Seattle, Wa.

Exhibit R-3, RDT&E Project Cost Analysis

DATE: February 2004

BUDGET ACTIVITY: 07 Operational System Development

PE NUMBER AND TITLE: 0207417F Airborne Warning and Control System (AWACS)

PROJECT NUMBER AND TITLE: 411L Airborne Warning & Control System (AWACS)

(U) Cost Categories (Tailor to WBS, or System/Item Requirements) ($ in Millions)	Contract Method & Type	Performing Activity & Location	Total Prior to FY 2003 Cost	FY 2003 Cost	FY 2003 Award Date	FY 2004 Cost	FY 2004 Award Date	FY 2005 Cost	FY 2005 Award Date	Cost to Complete	Total Cost	Target Value of Contract
(U) Product Development												
(U) Boeing (Block 40/45 Risk Reduction)	SS/CPAF	Boeing - Seattle, WA	37.509	90.558	Oct-01					0.000	128.067	
(U) Boeing (Block 40/45 SD&D)	SS/CPAF	Boeing - Seattle, WA	0.000	22.286	Jul-03	216.627	Oct-03	245.957	Oct-04	Continuing	TBD	
(U) Boeing (PDMA)*	SS/Multiple	Boeing - Seattle, WA	58.149		N/A					Continuing	TBD	
(U) Boeing (C2ISR Sys Arch Imp)	SS/FPIF & CPAF	Boeing - Seattle, WA	35.876	3.154	N/A	1.538	Nov-03	3.118	Nov-03	Continuing	TBD	
(U) Boeing (IDG)	SS/Multiple	Boeing - Seattle, WA	6.467	20.846	Apr-02	24.602	Oct-03			0.000	51.915	
(U) Boeing NAVWAR/AMP	SS/Muliple	Boeing - Seattle, WA	0.000					7.188	Nov-04	Continuing	TBD	
Subtotal Product Development			138.001	136.844		242.767		256.263		Continuing	TBD	0.000
Remarks: * N/A based on Program Depot Maintenace Airframe (PDMA) Acquisition Strategy which includes multiple contracts with multiple organizations with overlapping and continuing performance periods. Note: Total Program does not include NATO funds.												
(U) Support												
(U)Support/ITSP MITRE, travel, other	Competitive Multiple	AWACS Program Office - Hanscom AFB, MA	583.138	14.746	N/A	11.276	N/A	10.164	N/A	Continuing	TBD	
Subtotal Support			583.138	14.746		11.276		10.164		Continuing	TBD	0.000
Remarks:												
(U) Test & Evaluation												
(U) Test System-3 ADAPT Contract/AITS Contract / Other test activities	SS/Multiple	Boeing - Seattle, WA	379.607	12.135	N/A	13.803	N/A	22.360	N/A	Continuing	TBD	
Subtotal Test & Evaluation			379.607	12.135		13.803		22.360		Continuing	TBD	0.000
Remarks:												
(U) Management												
											0.000	
Subtotal Management			0.000	0.000		0.000		0.000		0.000	0.000	0.000
Remarks:												
(U) Total Cost			1,100.746	163.725		267.846		288.787		Continuing	TBD	0.000

Exhibit R-4, RDT&E Schedule Profile		DATE: February 2004
BUDGET ACTIVITY: 07 Operational System Development	PE NUMBER AND TITLE: 0207417F Airborne Warning and Control System (AWACS)	PROJECT NUMBER AND TITLE: 411L Airborne Warning & Control System (AWACS)

U.S. AIR FORCE

AWACS Major Modification Schedule

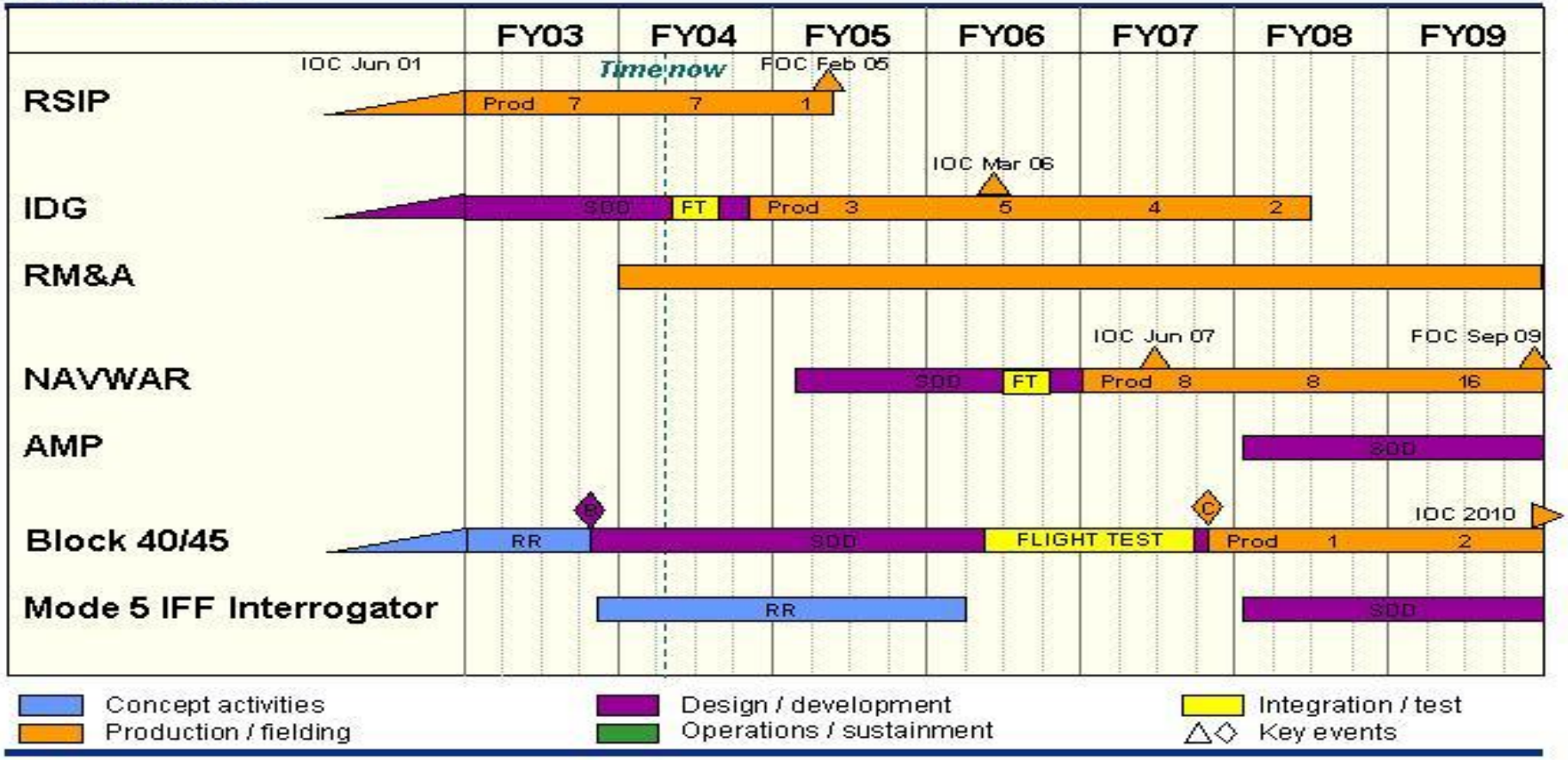

Exhibit R-4a, RDT&E Schedule Detail		DATE February 2004
BUDGET ACTIVITY **07 Operational System Development**	PE NUMBER AND TITLE **0207417F Airborne Warning and Control System (AWACS)**	PROJECT NUMBER AND TITLE **411L Airborne Warning & Control System (AWACS)**

(U) **Schedule Profile**	FY 2003	FY 2004	FY 2005
(U) BLOCK 40/45 MILESTONE B Decision	4Q		
(U) BLOCK 40/45 SD&D Contract Award	4Q		
(U) BLOCK 40/45 Risk Reduction Complete	4Q		
(U) IDG AIL Integration & Testing Start		1Q	
(U) IDG Test Aircraft Modification Start		1Q	
(U) 40/45 Initial Design & Manufacturing Review (IDMR)		2Q	
(U) IDG Ground & Flight Testing		3Q	
(U) IDG Production Contract Award		4Q	
(U) 40/45 Final Design & Manufacturing Review (FDMR)		4Q	
(U) NAVWAR SD&D Contract Award			1Q
(U) RSIP FOC			1Q
(U) 40/45 Test Aircraft Modification Start			2Q
(U) NAVWAR Software Development Progress Review			3Q
(U) IDG Production Aircraft Modification Start			4Q