

UNCLASSIFIED

PE NUMBER: 0207412F
 PE TITLE: Modular Control System

Exhibit R-2, RDT&E Budget Item Justification	DATE February 2008
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BUDGET ACTIVITY 07 Operational System Development	PE NUMBER AND TITLE 0207412F Modular Control System
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Cost (\$ in Millions)	FY 2007 Actual	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate	Cost to Complete	Total
Total Program Element (PE) Cost	9.202	24.791	60.590	21.163	22.514	21.969	22.192	Continuing	TBD
485L Theater Air Control System Imp (TACSI)	9.202	24.791	60.590	21.163	22.514	21.969	22.192	Continuing	TBD

(U) A. Mission Description and Budget Item Justification

The Battle Control System-Mobile (BCS-M) (PE 0207412F) is a Family-of-Systems (FOS) that supports mobile ground-based command and control (C2). The Battle Control Center (BCC) is one element of the BCS-M and replaces the legacy AN/TYQ-23 Modular Control System (MCS) now operational in the Air Force's Control and Reporting Centers (CRC). BCS-M also supports development of the AN/TRC-215 Remote Radio Secure Voice System (RRSVS) and a replacement for the AN/TPS-75 long-range, tactical ground radar. The AN/TPS-75 replacement is known as Three Dimensional Expeditionary Long Range Radar (3DELRR).

The BCC C2 execution node supports the Joint Forces Air Component Commander (JFACC) and is interoperable with elements of the Theater Air Control System (TACS) to include the Tactical Air Control Party (TACP), Air Support Operations Center (ASOC), Airborne Warning and Control System (AWACS), Joint Surveillance Target Attack Radar System (JSTARS), and the Air Operations Center (AOC). In addition, the BCC is tasked to operate with Joint ground-based and airborne C2 nodes as well as Air Force and Joint tactical aircraft. As the tactical execution arm of the AOC, the BCC conducts OCONUS persistent C2 missions as well as supporting specialized CONUS Homeland Defense "gap-filler" missions; key capabilities are theater air defense, airspace surveillance, aircraft identification, airspace management, and tactical data link management. Support and execution of all of these missions hinges on a capable radar enabling the BCC.

BCS-M is a low density/high demand rapidly deployable ground C2 asset. Currently the USAF CRCs are fully employed in Operations IRAQI FREEDOM, ENDURING FREEDOM, and NOBLE EAGLE. CENTAF is urgently advocating the need to update and replace the legacy MCS equipment/capabilities to support ongoing operations.

The BCS-M Program Office (ESC) uses an incremental development and acquisition strategy to further advance C2 capabilities on the battlefield. BCS-M acquisition activities include, but are not limited to: requirements analysis, modeling and simulation, risk reduction, acquisition planning, enterprise integration, and prototype development (i.e., radio/radar/data link remoting, software development, radar development, future communications requirements). For its development of the BCC, the BCS-M program office capitalized on technologies and lessons learned from the Area Cruise Missile Defense (ACMD) Advanced Capabilities Technology Demonstration (ACTD). The BCC's battle management software is being developed in coordination with the BCS-Fixed program, leverages capabilities from the AWACS 40/45 Program, and integrates evolutionary upgrades carried forward from the legacy CRC. This program will institute development, testing, and implementation of international standards (to include NATO standardization agreements) to ensure joint, allied, and coalition interoperability. The BCS-M Program Office implements an incremental fielding of critical needs in order to deliver a product to the war-fighter as soon as possible.

The program is in Budget Activity 7 because the CRC is a fielded, operational system that is being replaced.

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

	<u>FY 2007</u>	<u>FY 2008</u>	<u>FY 2009</u>
(U) Previous President's Budget	8.743	16.505	23.695
(U) Current PBR/President's Budget	9.202	24.791	60.590
(U) Total Adjustments	0.459	8.241	
(U) Congressional Program Reductions			
Congressional Rescissions			
Congressional Increases		8.500	
Reprogrammings	0.700		
SBIR/STTR Transfer	-0.241	-0.259	

(U) **Significant Program Changes:**

- Funding increases from FY07 to FY08 and out because of parallel common software development activities.
- Funding increases from FY08 to FY09 because Three Dimensional Expeditionary Long Range Radar (3DELRR) (formerly Radar Replacement) will be in progress.
- The FY08 President's Budget zeroed out the USMC acquisition for a new long range radar. The acquisition strategy for the Radar Replacement component of the BCS-M program had been based on the USAF and USMC jointly developing system requirements with each service expected to procure the resulting product. The FY08 change in USMC funding drives the need to revise this strategy.
- The increase in FY08 RDT&E reflects an FY08 Congressional transfer of \$8.5M from procurement to RDT&E to support the development of a BCS-M replacement radar (3DELRR) and continued software upgrades to the Battle Control Center (BCC).
- The increase in FY09 RDT&E reflects an FY09 ZBT of \$37.4M from procurement to RDT&E to support the development of a BCS-M replacement radar (3DELRR) and continued software upgrades to the BCC. Subsequent funding adjustments for the program will be addressed during the FY10 POM process, primarily to replace lost USMC RDT&E funding.

Exhibit R-2a, RDT&E Project Justification

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BUDGET ACTIVITY 07 Operational System Development				PE NUMBER AND TITLE 0207412F Modular Control System			PROJECT NUMBER AND TITLE 485L Theater Air Control System Imp (TACSI)		
Cost (\$ in Millions)	FY 2007 Actual	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate	Cost to Complete	Total
485L Theater Air Control System Imp (TACSI)	9.202	24.791	60.590	21.163	22.514	21.969	22.192	Continuing	TBD
Quantity of RDT&E Articles	0	0	0	0	0	0	0		

(U) **A. Mission Description and Budget Item Justification**

The Battle Control System-Mobile (BCS-M) (PE 0207412F) is a Family-of-Systems (FOS) that supports mobile ground-based command and control (C2). The Battle Control Center (BCC) is one element of the BCS-M and replaces the legacy AN/TYQ-23 Modular Control System (MCS) now operational in the Air Force's Control and Reporting Centers (CRC). BCS-M also supports development of the AN/TRC-215 Remote Radio Secure Voice System (RRSVS) and a replacement for the AN/TPS-75 long-range, tactical ground radar. The AN/TPS-75 replacement is known as Three Dimensional Expeditionary Long Range Radar (3DELRR).

The BCC C2 execution node supports the Joint Forces Air Component Commander (JFACC) and is interoperable with elements of the Theater Air Control System (TACS) to include the Tactical Air Control Party (TACP), Air Support Operations Center (ASOC), Airborne Warning and Control System (AWACS), Joint Surveillance Target Attack Radar System (JSTARS), and the Air Operations Center (AOC). In addition, the BCC is tasked to operate with Joint ground-based and airborne C2 nodes as well as Air Force and Joint tactical aircraft. As the tactical execution arm of the AOC, the BCC conducts OCONUS persistent C2 missions as well as supporting specialized CONUS Homeland Defense "gap-filler" missions; key capabilities are theater air defense, airspace surveillance, aircraft identification, airspace management, and tactical data link management. Support and execution of all of these missions hinges on a capable radar enabling the BCC.

BCS-M is a low density/high demand rapidly deployable ground C2 asset. Currently the USAF CRCs are fully employed in Operations IRAQI FREEDOM, ENDURING FREEDOM, and NOBLE EAGLE. CENTAF is urgently advocating the need to update and replace the legacy MCS equipment/capabilities to support ongoing operations.

The BCS-M Program Office (ESC) uses an incremental development and acquisition strategy to further advance C2 capabilities on the battlefield. BCS-M acquisition activities include, but are not limited to: requirements analysis, modeling and simulation, risk reduction, acquisition planning, enterprise integration, and prototype development (i.e., radio/radar/data link remoting, software development, radar development, future communications requirements). For its development of the BCC, the BCS-M program office capitalized on technologies and lessons learned from the Area Cruise Missile Defense (ACMD) Advanced Capabilities Technology Demonstration (ACTD). The BCC's battle management software is being developed in coordination with the BCS-Fixed program, leverages capabilities from the AWACS 40/45 Program, and integrates evolutionary upgrades carried forward from the legacy CRC. This program will institute development, testing, and implementation of international standards (to include NATO standardization agreements) to ensure joint, allied, and coalition interoperability. The BCS-M Program Office implements an incremental fielding of critical needs in order to deliver a product to the war-fighter as soon as possible.

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(U) <u>B. Accomplishments/Planned Program (\$ in Millions)</u>	<u>FY 2007</u>	<u>FY 2008</u>	<u>FY 2009</u>
(U) Continue development & delivery of evolutionary upgrades to the BCS to include, but not limited to, advanced planning, Modular Control System (MCS) upgrades, enhanced radio/radar/data link remoting, transition of ACMD technology into BCS-M, leveraging capabilities from BCS-F and AWACS 40/45, integrating evolutionary upgrades into BCS-M, and sensor replacement/upgrade, known as Three Dimensional Expeditionary Long Range Radar (3DELRR).	6.422	18.902	53.347
(U) Test and evaluation in support of BCS-M		1.276	2.609
(U) Continue Program (i.e., travel, supplies, equipment, miscellaneous)	0.307	0.409	0.410
(U) Continue Systems Engineering/Technical Support	2.473	4.204	4.224
(U) Total Cost Increase in Systems Engineering/Technical support due to realignment.	9.202	24.791	60.590

(U) <u>C. Other Program Funding Summary (\$ in Millions)</u>	<u>FY 2007</u> <u>Actual</u>	<u>FY 2008</u> <u>Estimate</u>	<u>FY 2009</u> <u>Estimate</u>	<u>FY 2010</u> <u>Estimate</u>	<u>FY 2011</u> <u>Estimate</u>	<u>FY 2012</u> <u>Estimate</u>	<u>FY 2013</u> <u>Estimate</u>	<u>Cost to</u> <u>Complete</u>	<u>Total Cost</u>
(U) Other APPN									
(U) OPAF PE 0207412F (Other Procurement Air Force, WSC 833040, Theater Air Control System Improvement	38.271	24.881	31.282	72.854	88.479	85.085	86.764	Continuing	TBD

(U) **D. Acquisition Strategy**
The Battle Control System (BCS) Family of Systems is utilizing an incremental development and acquisition strategy to further advance C2 capabilities supporting future aerospace operations.

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Exhibit R-3, RDT&E Project Cost Analysis

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<u>(U) Cost Categories</u> (Tailor to WBS, or System/Item Requirements) (\$ in Millions)	<u>Contract Method & Type</u>	<u>Performing Activity & Location</u>	<u>Total Prior to FY 2007 Cost</u>	<u>FY 2007 Cost</u>	<u>FY 2007 Award Date</u>	<u>FY 2008 Cost</u>	<u>FY 2008 Award Date</u>	<u>FY 2009 Cost</u>	<u>FY 2009 Award Date</u>	<u>Cost to Complete</u>	<u>Total Cost</u>	<u>Target Value of Contract</u>
(U) <u>Product Development</u>												
Development of Evolutionary Upgrades - Integration, contractor testing & system delivery, BCC	MIPR	NAWC/Aircra ft Division, Patuxent River, MD		4.528	Jan-07	6.050	Dec-07	11.151	Nov-08	Continuing	TBD	TBD
Development of Evolutionary Upgrades - Incremental Development, BCC	CPIF & CPAF/SS	Thales Raytheon Systems, Fullerton, CA		0.558	Mar-07	8.172	Dec-07	15.987	Nov-08	Continuing	TBD	TBD
Development of Evolutionary Upgrades - Risk Reduction, 3DELRR	T&M	Technology Services Corp., Silver Spring, MD		0.300	Feb-07						0.300	0.300
Development of Evolutionary Upgrades - Risk Reduction, 3DELRR	T&M	Sensis Group, East Syracuse, NY		0.568	Nov-06						0.568	0.568
Development of Evolutionary Upgrades - Risk Reduction, 3DELRR	MIPR	AFRL, Rome, NY				3.710	Mar-08	0.120	Oct-08	Continuing	TBD	TBD
Development of Evolutionary Upgrades - Prototyping, 3DELRR	FFP	TBD						23.589	Apr-09	Continuing	TBD	TBD
Development of Evolutionary Upgrades - Remote Radio Spiral 3	MIPR	AFRL, Rome, NY		0.468	Dec-06	0.470	Dec-07	0.100	Oct-08	Continuing	TBD	TBD
Development of Evolutionary Upgrades - Remote Radio Spiral 4; JTTRS Integration	MIPR	AFRL, Rome, NY						0.700	Oct-08	Continuing	TBD	
Development of Evolutionary Upgrades - Remote Radio Spiral 4; JTTRS Integration	MIPR	NAWC/Aircra ft Division, Patuxent River, MD						0.700	Oct-08	Continuing	TBD	TBD
Development of Evolutionary Upgrades - Mode 5/S	TBD	TBD				0.500	Mar-08	1.000	Feb-09	Continuing	TBD	TBD
Subtotal Product Development			0.000	6.422		18.902		53.347		Continuing	TBD	TBD
Remarks:												
(U) <u>Support</u>												
Program Office Support	Various	Various		0.307	Oct-06	0.409	Oct-07	0.410	Oct-08	Continuing	TBD	TBD
Systems Engineering	FFP	MITRE, Bedford MA		1.365	Oct-06	1.748	Dec-07	1.704	Oct-08	Continuing	TBD	TBD
Technical Support	T&M	Various		1.108	Dec-06	2.456	Jan-08	2.520	Jan-09	Continuing	TBD	TBD
Subtotal Support			0.000	2.780		4.613		4.634		Continuing	TBD	TBD
Remarks:												

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Project 485L

Exhibit R-3 (PE 0207412F)

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Exhibit R-3, RDT&E Project Cost Analysis

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(U)	<u>Test & Evaluation</u>										
	46th Test Wing/Other Test Activity	Various	Various			1.276	Dec-08	2.609	Nov-09	Continuing	TBD
	Subtotal Test & Evaluation			0.000	0.000	1.276		2.609		Continuing	TBD
	Remarks:										0.000
(U)	Total Cost			0.000	9.202	24.791		60.590		Continuing	TBD

Exhibit R-4, RDT&E Schedule Profile

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BCS-Mobile	FY07	FY08	FY09	FY10	FY11	FY12	FY13
<i>Remote Radio</i>							
<i>Spiral 3</i>	IOC ★			FOC ★			
<i>Spiral 4</i>						IOC ★	
<i>BCS Common Software¹</i>							
<i>Increment 3 Common S/W</i>	Release 3.1			Inc 3 MS C ★			
	Release 3.2						
		Release 3.3					
<i>Increment 4/5 Common S/W</i>				Inc 4 MS B ★			
<i>Battle Control Center²</i>							
<i>Incremental IOC/FOC</i>					IOC Inc 3 ★		FOC Inc 3 ★
<i>3DELRR</i>							
<i>Risk Reduction Activities</i>							
<i>Development</i>		MS A			MS B		
		★	★	"Fly Off" Contract Awards	★		

¹ Software Increments 1 & 2 were delivered to BCS-F
² BCC incremental upgrades will come from the BCS Common Software development

IOC: Initial Operational Capability
 FOC: Full Operational Capability
 MS: Milestone
 Inc: Increment
 S/W: Software

Major Event or Milestone ★
 Ongoing Activity

As of Jan 2008

Exhibit R-4a, RDT&E Schedule Detail

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(U) Schedule Profile

(U) BCS-M Remote Radio Spiral 3 IOC

(U) BCS-M Remote Radio Spiral 3 FOC

(U) BCS Common Software Increment 4 MS B

(U) BCS-M 3DELRR Milestone A

(U) BCS-M 3DELRR Prototyping Fly-Off Contract Awards

FY 2007

1Q

FY 2008

3Q

FY 2009

3Q

4Q

2Q