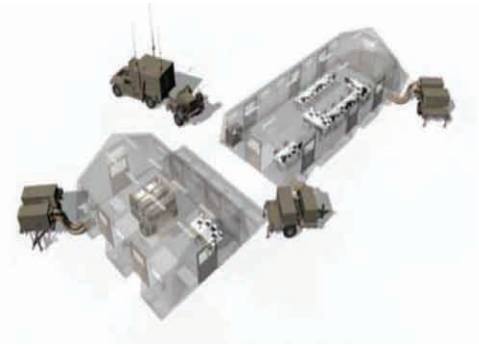
Common Aviation
Command and Control System (CAC2S)



The Common Aviation Command and Control System (CAC2S) provides a complete modernization replacement for the Command and Control (C2) equipment of the Marine Air Command and Control System (MACCS) which is nearing the end of its service life. CAC2S replaces single mission, stove-piped military specification, legacy systems while providing commonality in training and logistics support. CAC2S fulfills joint net-ready capability standards required of all DOD C2 systems and remedies the operational, technical, and performance deficiencies of the existing MACCS. The main capability of CAC2S will be in the Tactical Air Command Center (TACC), Direct Air Support Center (DASC), and Tactical Air Operations Center (TAOC).

The CAC2S will provide a complete and coordinated modernization of the equipment of the MACCS. CAC2S will eliminate current dissimilar systems and provide the Aviation Combat Element with the necessary hardware, software, and facilities to effectively command, control, and coordinate air operations while integrated with naval and joint C2. CAC2S will be comprised of standardized modular and scalable tactical facilities, hardware, and software that will significantly reduce the physical size and logistical footprint of the MACCS. In 2005, the Marine Requirements Oversight Council chose CAC2S along with Command and Control Personal Computer as foundation components of MAGTF C2. This decision paves the way for improved integration across the MAGTF.

CAC2S will have three HMMWV-based components: the Processing and Display Subsystem (PDS), the Communications Subsystem (CS), and the Sensor Data Subsystem (SDS). The three combine to create one complete air C2 system. The Marine Corps restructured the CAC2S program in May 2009 to reduce technical risk. It adopted a revised acquisition strategy, implementation of which is in two phases.

Phase I will leverage the Combat Operations Center program and the MRQ-12 HMMWV based communications system supporting the MACCS today to create the PDS and CS of CAC2S. The development of the more technically challenging SDS will be developed and fielded in Phase II. The SDS will fuse sensor inputs from expeditionary radars, as well as real-time and near real-time data from ground force C2 centers, weapon systems, unmanned aerial vehicles (UAVs), and planned F-35B Joint Strike Fighters, into a common operational picture of the battlespace.

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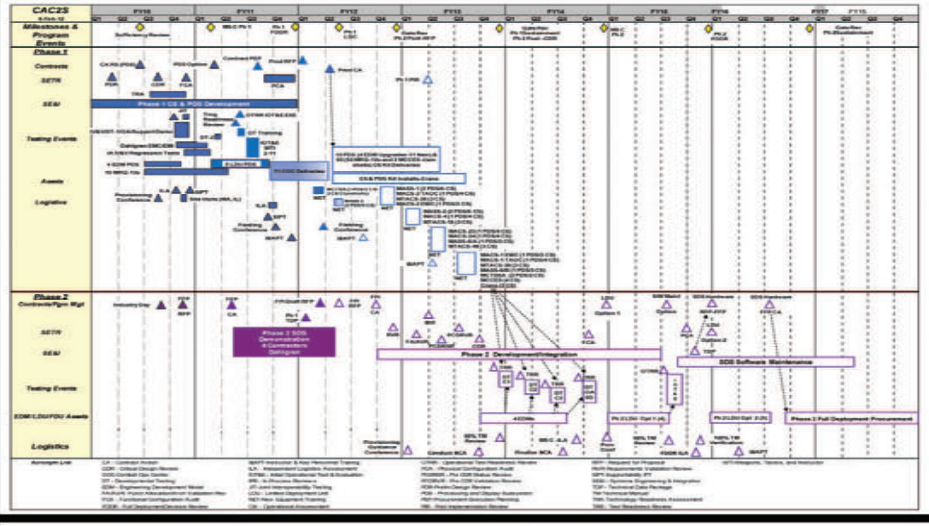
Common Aviation Command and Control System (CAC2S) Program Overview



Program Description

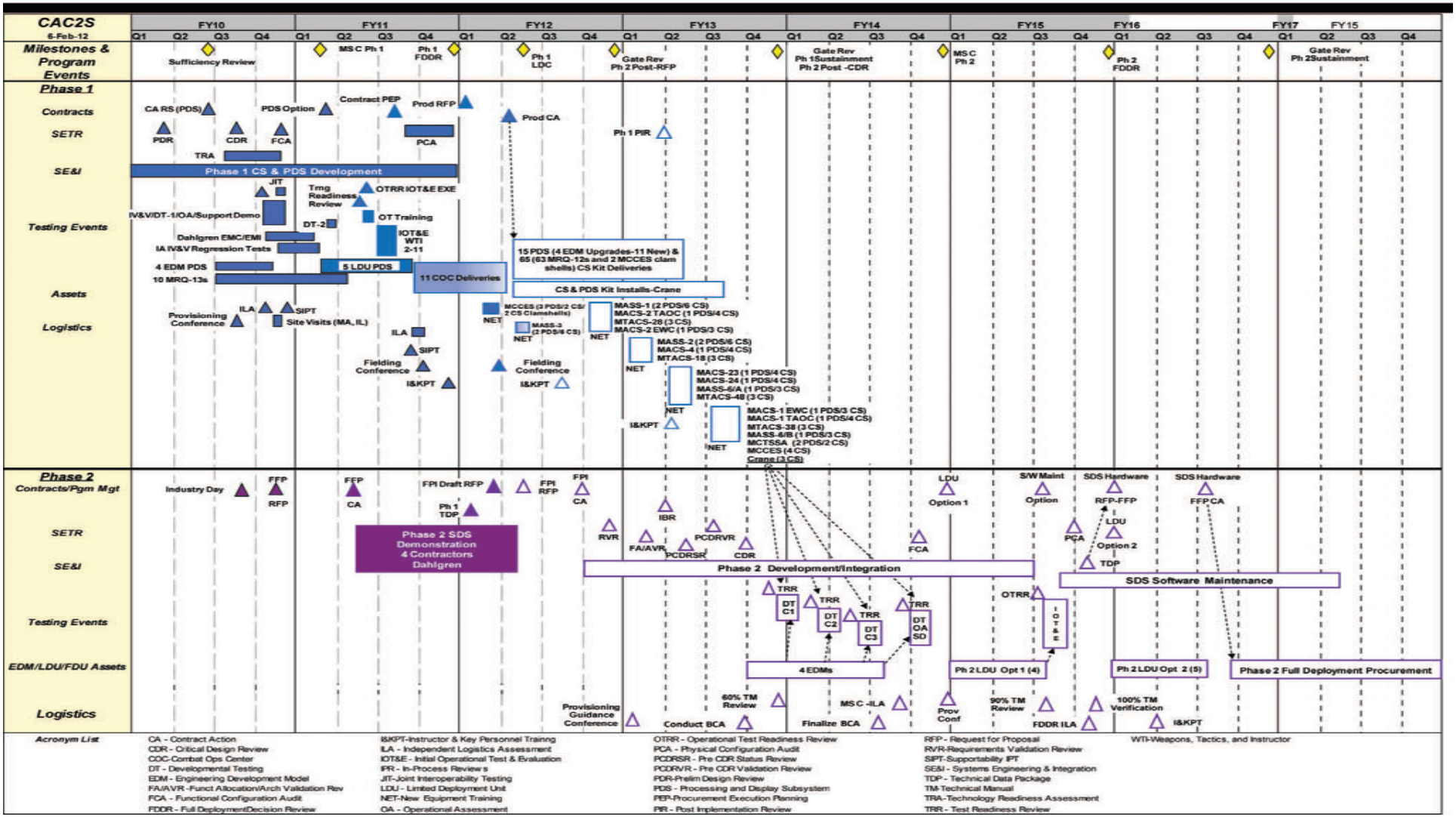
The Common Aviation Command and Control System (CAC2S) is a coordinated modernization effort to replace the existing aviation command and control equipment of the Marine Air Command and Control System (MACCS) and to provide the Aviation Combat Element (ACE) with the necessary hardware, software, equipment, and facilities to effectively command, control, and coordinate aviation operations. The CAC2S system will accomplish the MACCS missions with a suite of operationally scalable modules to support the Marine Air Ground Task Force (MAGTF), Joint, and Coalition Forces. The CAC2S integrates the functions of aviation command and control into an interoperable system that will support the core competencies of all Marine Corps warfighting concepts. Increment I of the CAC2S will be accomplished through a two phased approach. Phase 1 will accommodate fielding of operationally relevant capabilities by upgrading fielded MACCS equipment with mature, ready technologies and will establish an initial product baseline Processing and Display Subsystem and Communications Subsystem. Phase 2 is structured to accommodate the integration of technologies necessary for the CAC2S Sensor Data Subsystem to meet remaining ACE Battle Management and Command and Control requirements. Phase 2 completion will result in the delivery of the full CAC2S Increment I capabilities.

Phase 1		Phase 2	
Event	Date	Event	Date
FDD	4QFY11	MS C	4QFY14
LDC	2QFY12	FDD	3QFY16

Program Status

- CAC2S Phase 1, Full Deployment Decision ADM was signed 25 Oct 2011.
- CAC2S Phase 1 fielding to MASS -3 is in progress.
- CAC2S Phase 2 engineering/integration and demonstration efforts (by the four Phase 2 contractors) in the MCTSSA STIL and Dahlgren SIL were completed Dec 2011.

Common Aviation Command and Control System (CAC2S) Program Overview



Common Aviation
Command And Control System (CAC2S)

CAC2S' Top Three Program Technology Issues:

1. Global Track Manager Database - Management of multi-sourced tracks that are available from anywhere in the Marine Air Command and Control System (MACCS). The agencies of the MACCS are often dispersed geographically and receive track data from multiple sources. In order to effectively share ground and air track information throughout the MACCS, better tools for management of a synchronized global track database must be developed.

2. Hardware Infrastructure Design - Smaller physical footprint and more efficient power usage. More mobile communication systems. A critical requirement for the future MACCS is a smaller, mobile tactical footprint with more efficient power generation and management. Even though operator spaces and communication assets have become smaller, the HMMWV based power generation still requires a significant footprint often requiring vehicles just to tow generators. Technology improvements in power generation and management as well as smaller communication form factors will improve tactical mobility and sustainment.

3. Multiple Interface Formats - Data interfaces or translators to fuse and display track data from multiple sources. The MACCS is uniquely required to integrate and display for controllers and commanders data from numerous sources such as ground and air tracks, air defense information, and intelligence information from numerous sources. This growing volume of data must be fused into a single coherent display to aid in rapid decision making.

1. Global Track Manager Database:

1.a No Active S&T Initiatives for CAC2S

1.b Potential S&T Initiatives for CAC2S

Small Business Innovation Research (SBIR)

- Sensor Data Fusion for Intelligent Systems Monitoring and Decision Making (Air Force Phase I SBIR)
- Sensor Data Fusion (Missile Defense Agency Phase I SBIR)

2. Hardware Infrastructure Design:

2.a No Active S&T Initiatives for CAC2S

2.b Potential S&T Initiatives for CAC2S

TARDEC

- Ground Vehicle Power & Mobility (GVPM) Vehicle Integrated JP8 Fuel Cell APU System

Exploration & Development (E&D)
- Integrated Power & Propulsion

Other
- On-Board Vehicle Power Systems Development

3. Multiple Interface Formats:

3.a No Active S&T Initiatives for CAC2S

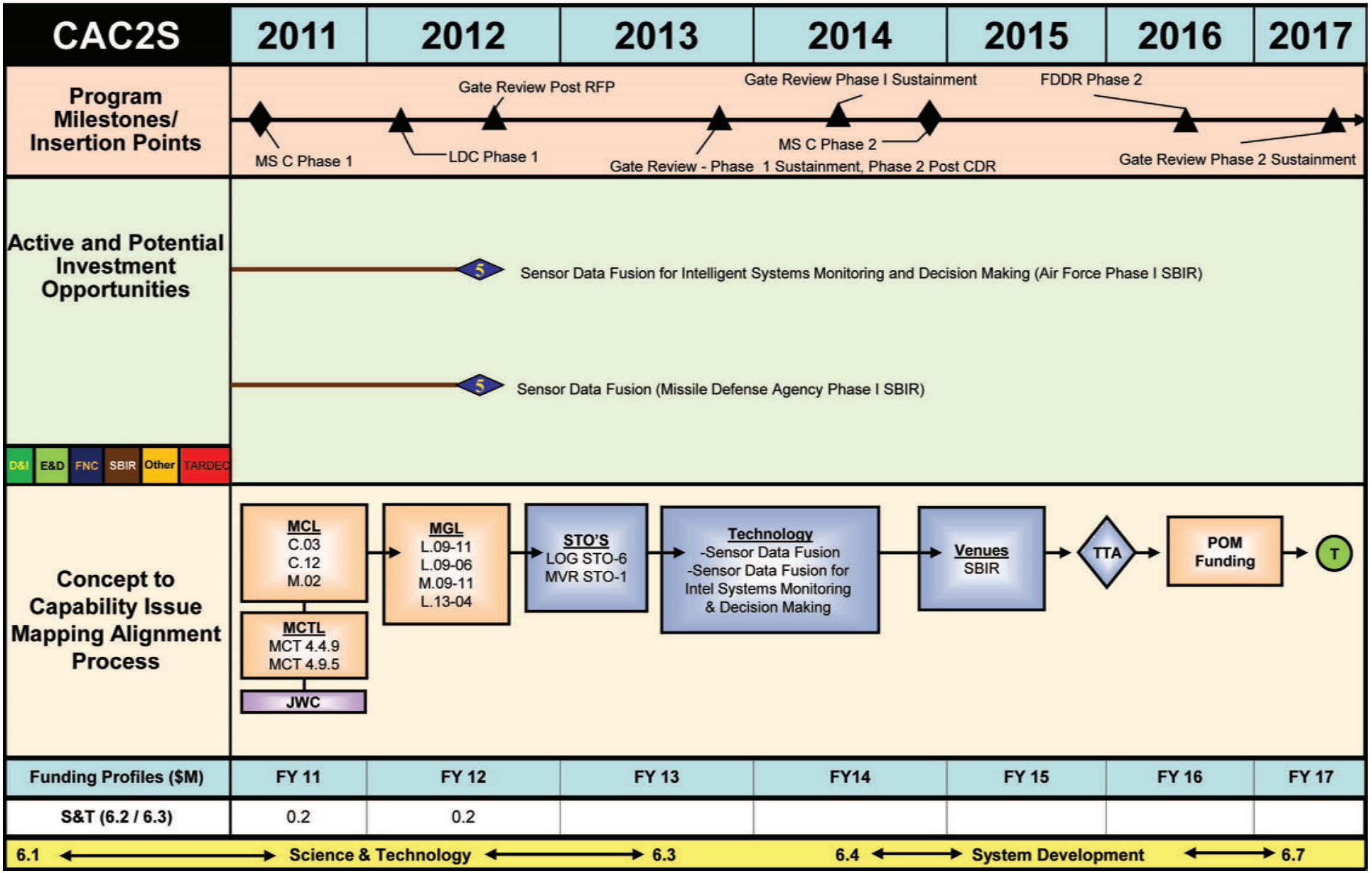
3.b Potential S&T Initiatives for CAC2S

Discovery and Intervention (D&I)
- Adaptive networks

Future Naval Capability (FNC)
- Self Organizing Networks

Other
- NUCLEUS Effort

CAC2S Technical Issue #1 Global Track Manager Database



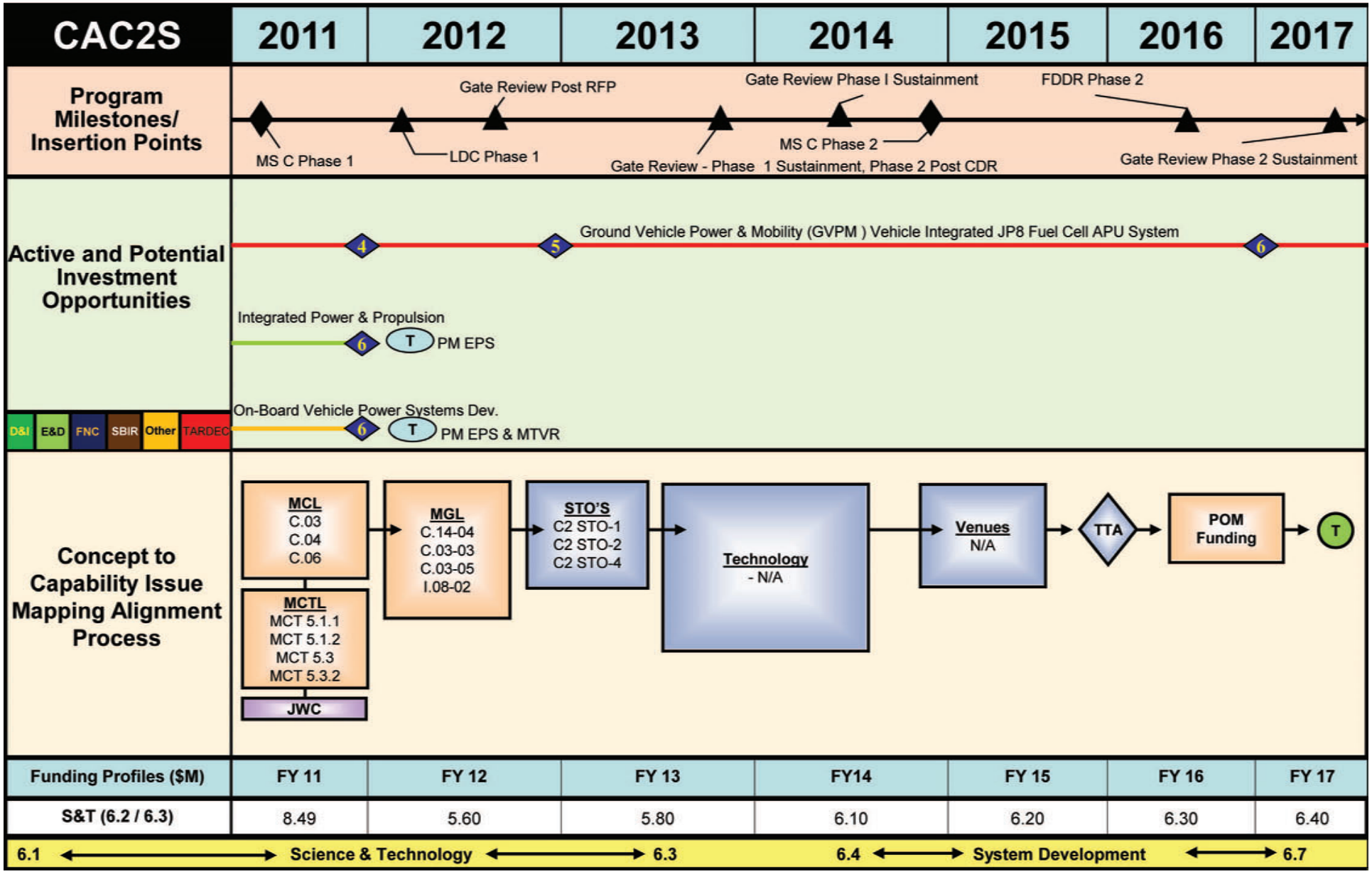
Funding Profiles ($M)	FY 11	FY 12	FY 13	FY14	FY 15	FY 16	FY 17
S&T (6.2 / 6.3)	0.2	0.2					

6.1 ⟷ Science & Technology ⟷ 6.3 6.4 ⟷ System Development ⟷ 6.7

CAC2S Technical Issue #1 Global Track Manager Database

MCL	C.03 Achieve Situational Understanding C.12 Share Situational Understanding M.02 Maneuver to engage kinetically	
MCTL	MCT 4.4.9 Conduct Tactical Electrical Supply MCT 4.9.5 Supply Electrical Power	
MGL	L.09-11 Alternate Power Sources L.09-06 On-Move Power Generation M.09-11 Exportable Power For On-Board Systems L.13-04 Power generation/ distribution	
STO'S	LOG STO-6 Materials for reduced maintenance MVR STO-1 Fuel efficient and power generating vehicle systems	
Technology	Active: -N/A	Potential: -Sensor Data Fusion -Sensor Data Fusion for Intel Systems Monitoring & Decision Making
Venues	SBIR	
Army		
TTA	No TTA is required for the projects listed	T Transition target for: N/A
POM Funding	MCCDC Integration Division	
T	Transition to a program of record	Comments/Issues:

CAC2S Technical Issue #2 Hardware Infrastructure Design



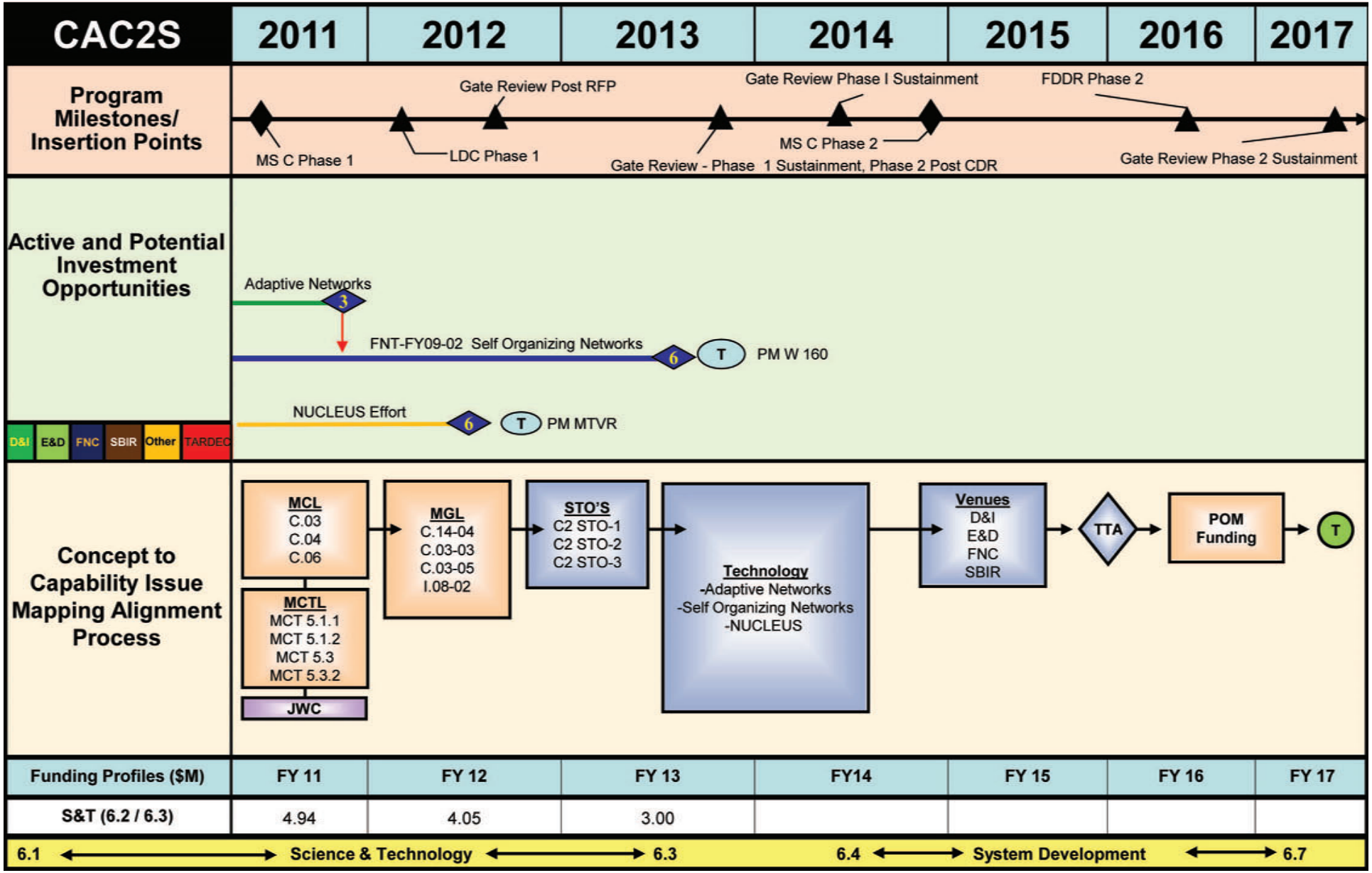
Funding Profiles ($M)	FY 11	FY 12	FY 13	FY14	FY 15	FY 16	FY 17
S&T (6.2 / 6.3)	8.49	5.60	5.80	6.10	6.20	6.30	6.40

6.1 ⟷ Science & Technology ⟷ 6.3 6.4 ⟷ System Development ⟷ 6.7

CAC2S Technical Issue #2 Hardware Infrastructure Design

MCL	C.03 Achieve situational understanding C.04 Communicate commanders intent and guidance C.06 Synchronize execution across all domains	
MCTL	MCT 5.1.1 Provide and Maintain Communications MCT 5.1.2 Manage Means of Communicating Information MCT 5.3 Direct, Lead, Coordinate Forces/Operations MCT 5.3.2 Establish Means to Command and Control	
MGL	C.14-04 Communications Infrastructure C.05-05 Knowledge Sharing Process	C.03-03 Shared Situational Awareness (SA) I.08-02 Database Sharing and Synchronization
STO'S	C2 STO-1 Converged service networks with assured, robust communications linking all echelons of the MAGTF C2 STO-2 Multilevel information security and information assurance C2 STO-4 Improved situational awareness for warfighters at all echelons	
Technology	Active: -N/A	Potential: -N/A
Venues		
Army	CERDEC R.CER.2010.03 Cognitive Protocols for Cognitive Networks STTC R.STT 2010.02 Embedded Training for Command and Control for Mounted and Dismounted ETCC-M/D	
TTA		T Transition target for: N/A
POM Funding	MCCDC integration division	
T	Transition to a program of record	Comments/Issues:

CAC2S Technical Issue #3 Multiple Interface Formats



Funding Profiles ($M)	FY 11	FY 12	FY 13	FY14	FY 15	FY 16	FY 17
S&T (6.2 / 6.3)	4.94	4.05	3.00				

6.1 ⟷ Science & Technology ⟷ 6.3 6.4 ⟷ System Development ⟷ 6.7

CAC2S Technical Issue #3 Multiple Interface Formats

MCL	C.03 Achieve situational understanding C.04 Communicate commanders intent and guidance C.06 Synchronize execution across all domains		
MCTL	MCT 5.1.1 Provide and Maintain Communications MCT 5.1.2 Manage Means of Communicating Information MCT 5.3 Direct, Lead, Coordinate Forces/Operations MCT 5.3.2 Establish Means to Command and Control		
MGL	C.14-04 Communications Infrastructure C.05-05 Knowledge Sharing Process	C.03-03 Shared Situational Awareness (SA) I.08-02 Database Sharing and Synchronization	
STO'S	C2 STO-1 Converged service networks with assured, robust communications linking all echelons of the MAGTF C2 STO-2 Multilevel information security and information assurance C2 STO-3 Improved situational awareness for warfighters at all echelons		
Technology	Active: -N/A	Potential: -Adaptive Networks -Self Organizing Networks -NUCLEUS effort	
Venues	FNC, D&I		
Army			
TTA		(T) Transition target for: PM MAGTF C2, CNS	
POM Funding	MCCDC integration division		
(T)	Transition to a program of record	Comments/Issues:	