

# **CCS-C Acquisition Lessons Learned**

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**SMC Chief Engineer Council (CEC) 2005**

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# Agenda



- Overview
- Acquisition Strategy Development
- Approved Acquisition Strategy
  - Demo Phase
  - CFI
  - Development Phase
- Program Status
- Lessons Learned
- Summary
- Conclusions



# Program Objectives



## ■ Schedule

### ■ Threshold

- Meet WGS and AEHF Launches
- 2005 replace Air Force Satellite Control Network (AFSCN) Command and Control Segment (CCS) S-band system

### ■ Objective

- 2004 replace AFSCN CCS-C

## ■ Costs - Reduce current operations (Ops) and sustainment

### ■ Threshold

- No increase in Ops costs
- 50% reduction in sustainment costs

### ■ Objective

- Opportunity for a 30% reduction in Ops costs
- 75% reduction in sustainment costs

## ■ Risks - Minimize in development, operations, and sustainment



# Command & Control System- Consolidated (CCS-C)



## Mission

Develop, deploy and sustain an integrated MILSATCOM Satellite Control System

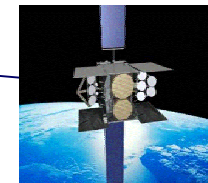
✓ Core TT&C  
Jun 03



✓ DSCS  
Nov 04



Milstar  
Sep 05



WGS  
Feb 06



AEHF  
May 07

## Capabilities

- Launch and S-Band on-orbit command and control of MILSATCOM satellites
- Integrated satellite operations center
  - DSCS III, Milstar, WGS, AEHF



# Caveats



- **ACAT 3**
  - Quick Milestone decisions with MC as PEO Authority
  - Small, efficient SPO
  - Judicious use of Acquisition Reform Lightning Bolts
- **Low Technical Risks**
  - MILSATCOM S-band TT&C
- **TT&C and Legacy expertise available to SPO**
- **Reliance on large COTS system reduces sustainment flexibility, but still best value**
  - Cheaper to buy new system
- **Highly motivated contractor – entree into Air Force**



# *Acquisition Strategy Development*



- **Extensive market survey**
  - Mature commercial, GOTS, & NDI systems & components available
- **Thorough risk assessment**
  - Programmatic vs. Technical
- **Looked at past and current NSS and Commercial Ground System (GS) Acquisitions**
  - GS acquisitions overshadowed by Satellite element
  - Large software-intensive systems often incur high costs and schedule slips
  - Use of custom software results in large sustainment cost
  - Use of IR&D based systems have limited Gov't Rights

***New Approach Needed to Mitigate Risks***



# *Acquisition Strategy Development (cont'd)*



- Explored many contract types, terms and conditions
- Government (Gov't) cost and schedule estimates based on market survey vs. new development
- Broad and open industry discussions
  - Updated Gov't risks, cost and schedule
  - Encouraged teaming with legacy/new system experts
- RFP development and source selection participants
  - AX, JAG
  - AFSPC/DR
  - Users on Acquisition Strategy Panel (ASP) and Source Selection Advisory Committee (SSAC)

***Small, Separate Ground System Acquisition Allowed  
Acquisition Flexibility and Expanded the List of Potential Bidders***



# Acquisition Strategy Overall



- **DoD FAR Part 15**
  - **Demonstration Phase - FFP**
  - **Four-year Development Phase**
    - **FFP for COTS hardware/software/installation**
    - **CPAF for development**
  - **Five year Sustainment Phase – CPAF**
- **Proposals/contract cover entire effort (Demonstration-Sustainment)**
  - **Call for Improvement (CFI) down-select not full and open**
- **High Level Requirement Spec (FRD)**
  - **Prioritized requirements to allow best value proposals**
  - **Legacy requirements bubbled up with SV documentation as reference**
  - **New Satellite programs led IPTs for ICDs**
- **Demonstration Evaluation Criteria defined in RFP**

***Contract Included Full Scope with CFI Down-select***





# *Demonstration Phase Defined to Mitigate High Risks*



- Retained competition advantages longer and reduced proposal uncertainties
- Validate proposed system and processes
  - Demonstration of core and high risk requirements
  - Draft system/subsystem specs and architecture/design
- Engineering studies => program plans
  - Ops concept – tasks, skill levels, and manpower reductions
  - Training concept – classroom, computer, and SIM training
  - Product improvement & upgrade process - identifying, communicating, selecting, integrating, testing, and installing product upgrades
  - Transition plan – incremental transition of legacy and new satellite families
  - HMI assessment – compliance with SMC standard
- Operator feedback on system usability

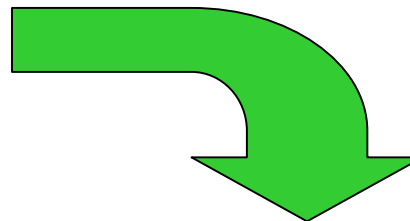
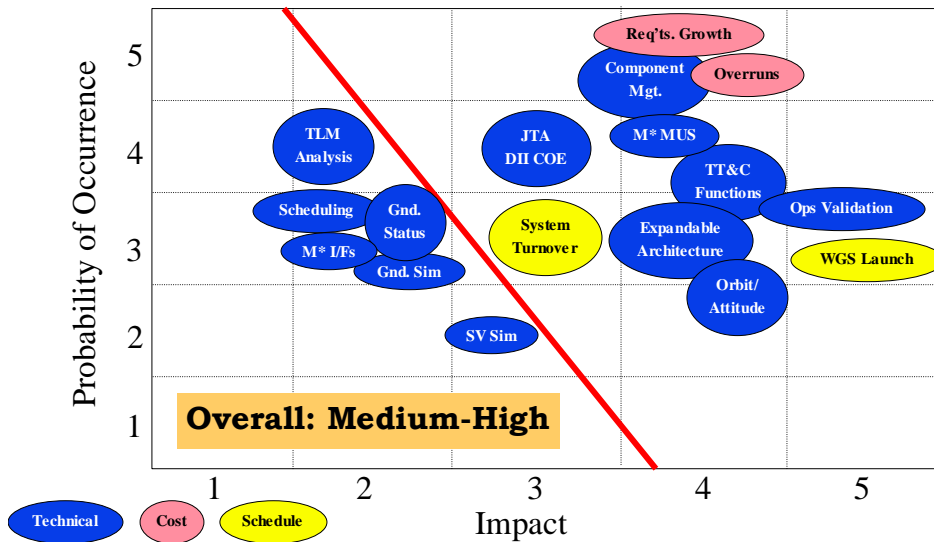
***Fly (Demonstration) Before You Buy***



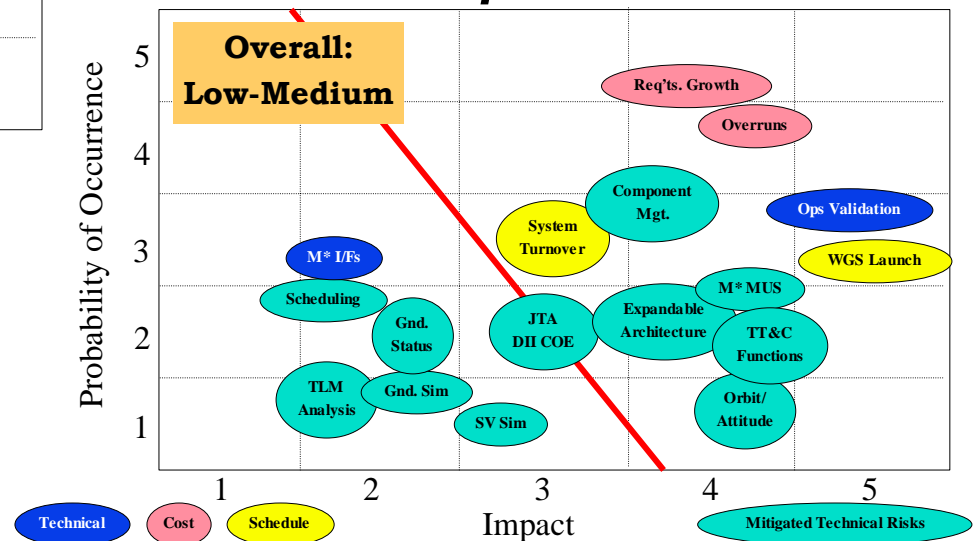
# Program Risk Summary



## Pre-Demonstration Phase



## Development Phase



**Demo Phase Significantly Reduced Risks**



# Acquisition Strategy Elements



- **Key proposal elements**
  - Draft Requirements Spec and software design
  - What requirements the proposed system currently meets and plan for development/integration of others
  - Updated Risk Management Plan for proposed system
  - Approach to meet Gov't detailed Demonstration Guide and Verification Plans
    - Demo of high risk functions
    - Results a significant CFI discriminator
- **Key contract elements**
  - GFP
  - CWBS & CSOW
  - IMP and CDRLs with Gov't approval at key milestones
  - Separate CLINS for each deliverable
  - Interface specification development support with expected ECP
- **SV contract modifications for interface definition/test**



# *Call For Improvement Elements*



- **Updates to first proposal**
  - **Cost, Schedule, Risk Plan**
  - **Draft Specification and Design (final spec 60 days ACA)**
  - **IMP accounting for Demo Phase experience/Gov't comments**
  - **IMS**
- **Updates to Demonstration Phase CDRLs**
  - **Specification**
  - **High risk Program Plans**
- **New Items**
  - **Approach to correct Demonstration Phase deficiencies**



# *Development Phase Elements*



- **System Specification Authentication**
  - Contractor resolved all comments written during source selection
- **Incremental Design Reviews**
  - **System Design Review**
  - **Critical Design Reviews for each deliverable**
    - Core TT&C Subsystems
    - DSCS, Milstar, WGS, AEHF satellite families
- **Configuration Control Board**
  - Membership from each Satellite SPO
  - Coordination with key stakeholders on all modifications



# *Development Phase Execution*



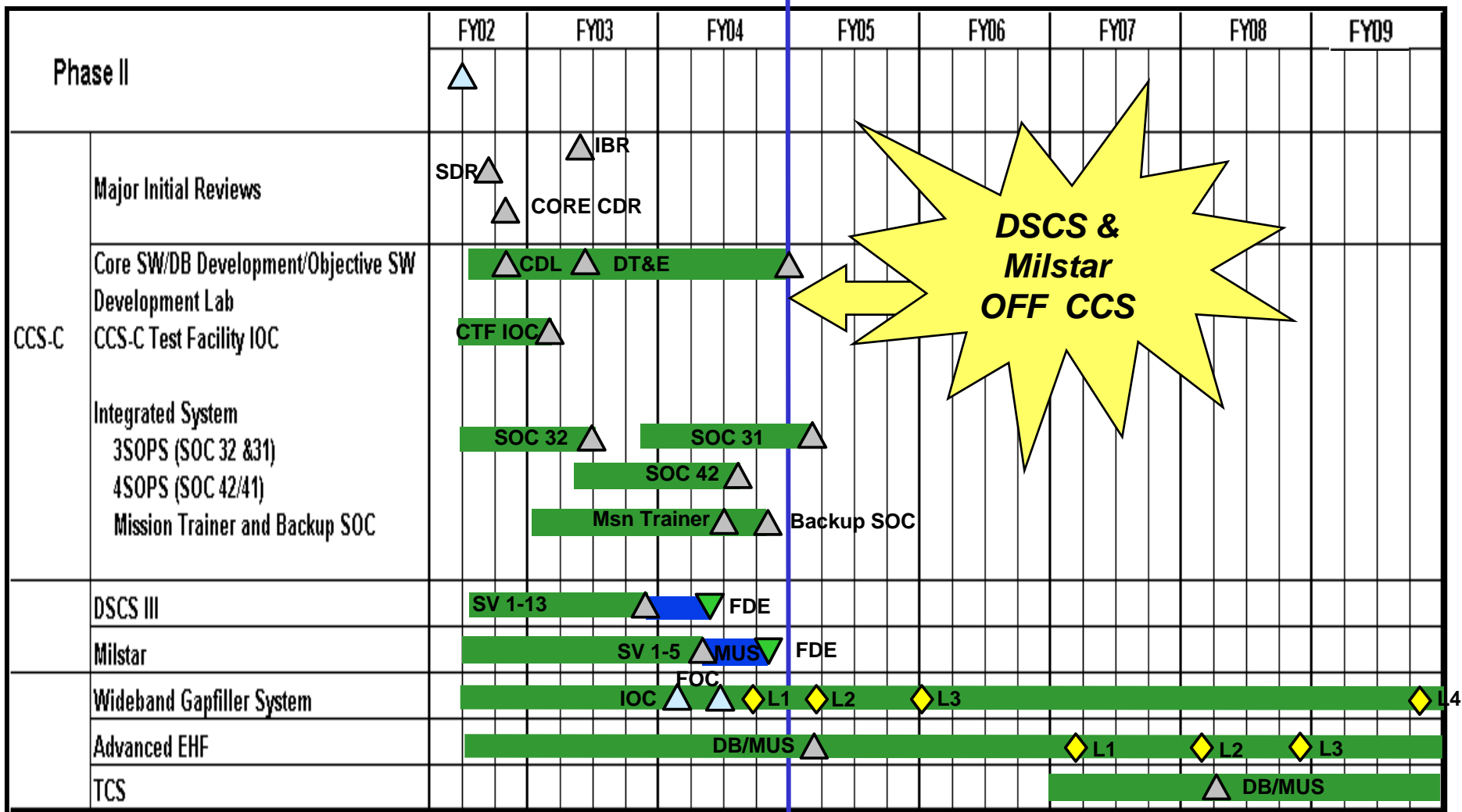
- **Integrated Product Teams by Life Cycle Phase**
  - **ISI and Gov't Co-Chairs**
    - System Engineering
    - Development
      - Sub-IPTs by functional area: T&C, Orbit, Satellite-Specific
    - Ops & Logistics
    - Test Planning Working Group (DT&E, Ops Evaluations, and FDE)
  - **Satellite SPO IPTs**
    - Led by satellite contractor
    - Initial focus on interface
      - Space/Ground Interface definition
      - Ground interfaces
    - Evolved into resolution of system integration and test issues



# Initial Program Schedule



## Objective



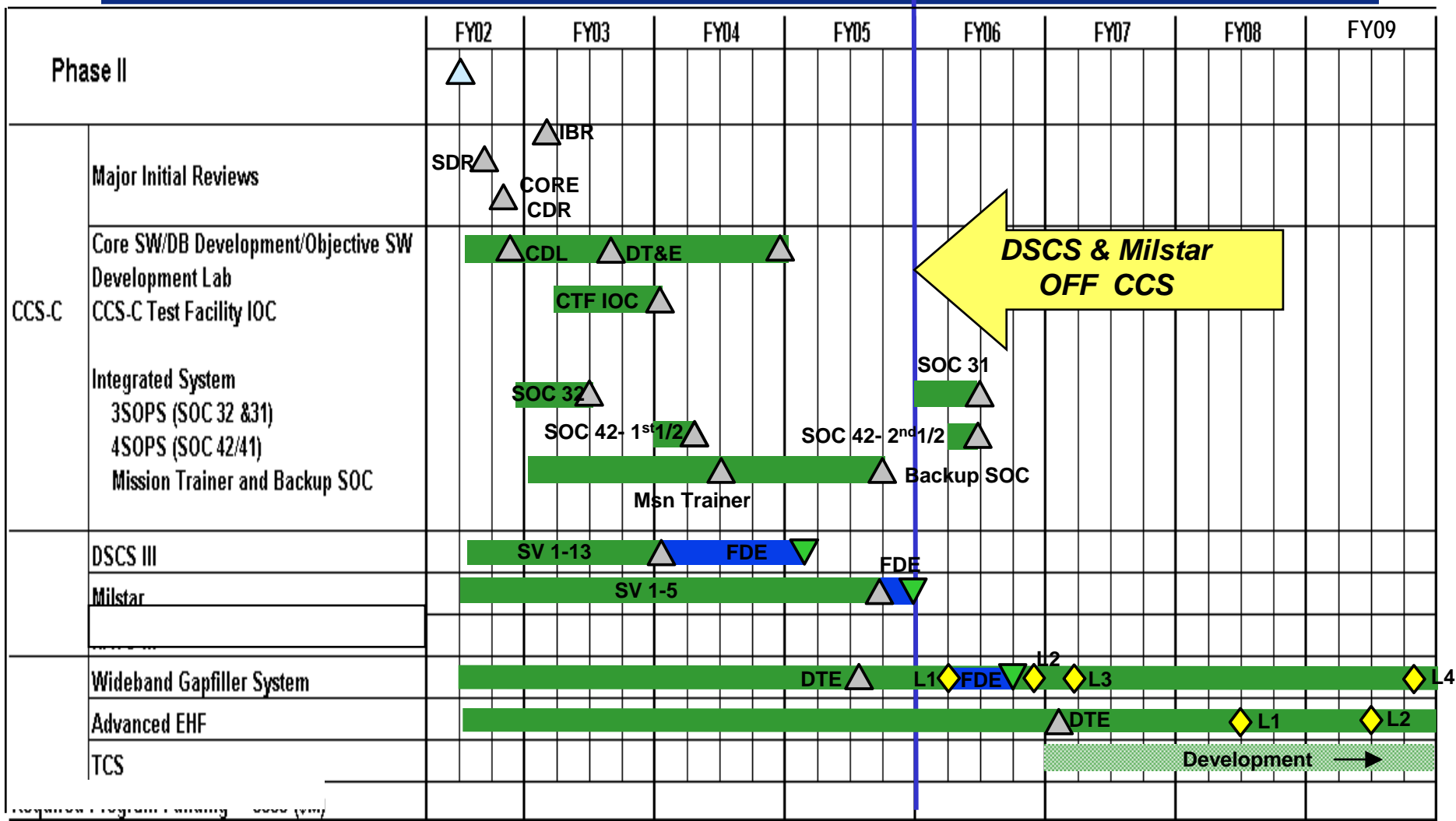
**DSCS & Milstar OFF CCS**



# Current Program Schedule



**Threshold**



**DSCS & Milstar OFF CCS**

As of 30 Jun 04

CCS-C Acquisition





# Major Schedule & Cost Drivers



- **DSCS – 8 months**
  - Squadron underestimated ops procedures (pass plans)
  - Lack of Ops personnel to perform procedure validation and Ops Evals
- **Milstar – 12 months**
  - Major flight database updates
  - NSA error in developing KG-29 algorithm
  - Very large increase in pass plans
- **WGS – 18 months (est.)**
  - Vehicle delays
  - Delivery schedule of final OOH and SEH does not support procedure development



# ***Major Schedule & Cost Drivers (Cont'd)***



- **AEHF – 17 months (est.)**
  - **Vehicle delays**
- **SOC-31 – 12 months**
  - **Gov't (50th Space Wing) site preparation delay**
- **Security Requirements**
  - **KI-17: failure of NSA to deliver working, speed-enhanced units**
  - **Cross Domain Solution: new development requirements & extensive certification process**
  - **DoDD 8500.1 and DODI 8500.2: new development requirements**



# *Lessons Learned*

## *What Worked*



- **Demonstration Phase Reduced Risks**
  - Plan demo of High Risk requirements
  - Require demo of proposed system with live or sim SV data
  - Refine cost, schedule, and requirements spec
  - Develop plans for high risks not demonstrated
  - Define detailed sustainment plan pre-CA
  - Evaluate as much as possible in Demo Phase vs. CFI Source Selection
- **Current market survey and industry involvement**
- **Strong technical team looking across factors**
- **Gov't risks included in contractor risk plan**
- **IPTs led by SV contractor for new ICD development**
- **On-site facility and transition manager**
- **Highly motivated and capable contractor with product that delivered as promised**
- **Just say “NO” to requirements creep**



# *Lessons Learned*

## *What Could Have Worked Better*

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- **Increase SPO, AFSPC, and User resources to support acquisition**
  - **Baselining CONOPS prior to CFI**
  - **Demo evaluations**
  - **RFP and CFI preparation**
    - **Accurate estimate of pass plans and procedures**
  - **Source Selections**
  - **HMI development**
  - **Training and Transition**
  - **Committed personnel for full Demo and Development phases**
- **Increase support to SV-Ground IPTs from legacy satellite and ground system developers and users**
  - **ICD development and test**
  - **Satellite constraints and database knowledge**
  - **Coordination of new satellite databases/requirements (e.g. major MILSTAR SV software/database change)**



# ***Lessons Learned What Could Have Worked Better (cont'd)***

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- **Requirement Trades Not a Discriminator**
  - **Contractors felt they needed to meet all to be competitive**
    - **Objective, Threshold, Prioritized**
- **Don't reinvent detailed legacy requirements**
- **Authenticate spec at CFI vs. ACA**
- **GFP delivery on time, meets requirements and supported**
- **Budget for component refresh in sustainment**

***Note: More detailed lessons learned available***

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# Summary



- **Fully scoped program with Demo Phase**
  - Reduced proposal uncertainties and program risks
  - Increased cost for 2 contractors in demo phase
  - Minimal schedule impact (~4 months) for CFI Source Selection
- **Stakeholder involvement at all steps is an essential factor for system buy-in**
  - From acquisition strategy development through transition to Ops
- **Gov't does not need to be integrator**
  - Satellite Contractor led IPTs
- **CCS-C acquisition strategy was a success**
  - Challenged the way we “always do it”
  - Competition resulted in greater capability at lower cost
  - Contractor performance has been exceptional; 80-90% of cost growth and schedule delay has been the result of Gov't miscommunication or lack of coordination

***CCS-C: an Acquisition and Technical Success***



# Conclusions



- **A separate ground system contract successful for four MILSATCOM satellite families**
  - More acquisition strategy flexibility
  - Broader range of bidders
  - Picked ground system (vs. SV) experts
- **Demonstration Phase with CFI downselect provided extensive benefits**
  - Reduced acquisition risks