Space and Missile Systems Center

Enterprise Ground Services
(EGS)
Overview and Standards

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- Initiating discussion on Architecture and Standards leading to the desired end state

- EGS Overview and System View
- Navigating to the End State
- Ground Software Standards for Space Systems
- Ground Services Standards Recommendations
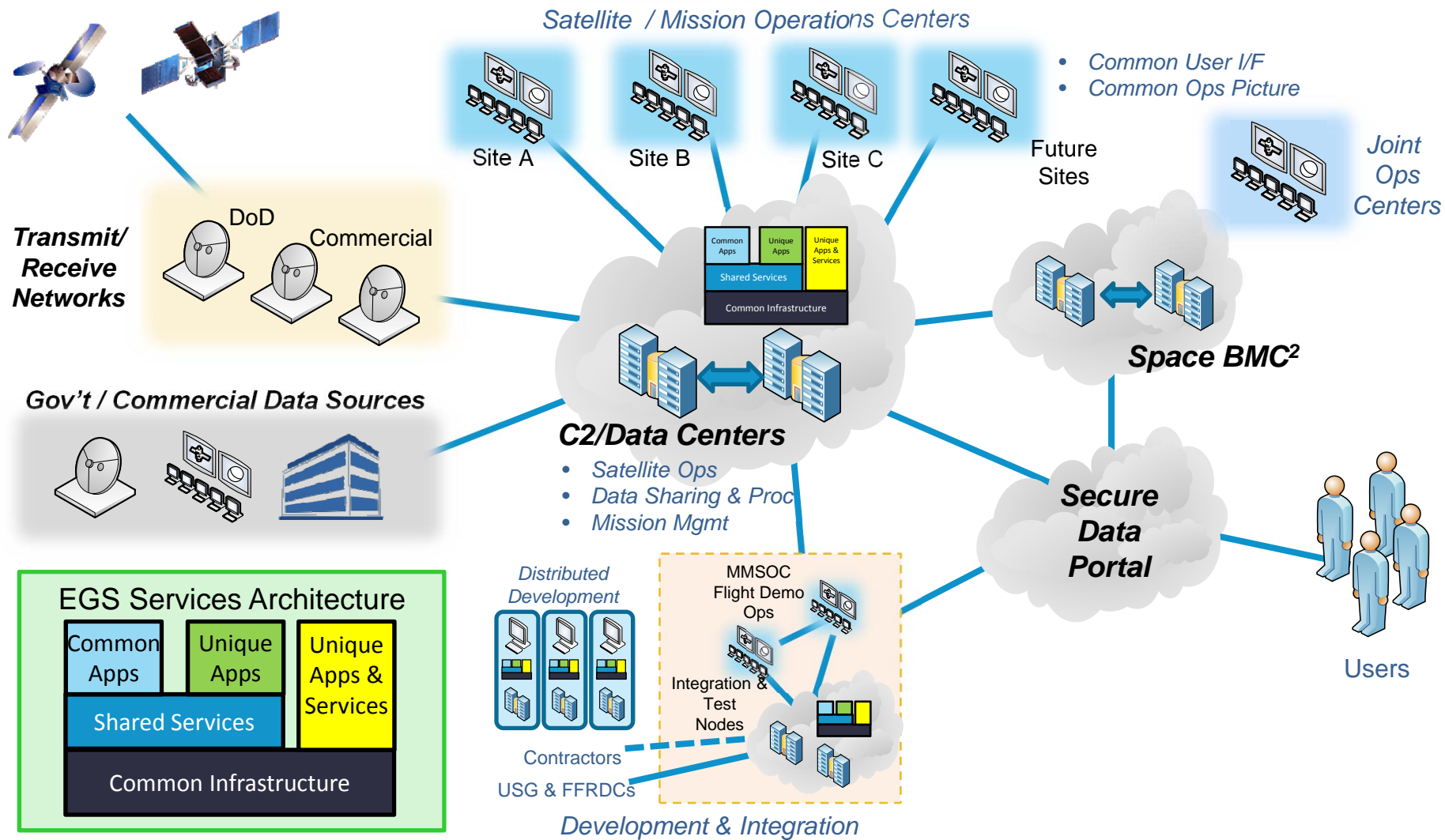- EGS Dynamic & Open Collaboration Site

- EGS is an initiative to:
  - Improve AFSPC capability
  - Focus operators on mission effects vice routine tasks
  - Expose data to enable exploitation by applications & services
  - Create a set of government owned architecture, standards and interfaces
  - Use early prototyping activities to test and enforce their use on legacy and future AFSPC ground systems
  - Transition legacy AFSPC ground systems and ensure future ground systems build to a common ground architecture

EGS System View
Envisioned End State

Satellite / Mission Operations Centers

- Common User I/F
- Common Ops Picture

Site A
Site B
Site C
Future Sites

Joint Ops Centers

Transmit/ Receive Networks

DoD
Commercial

Common Apps
Unique Apps
Unique Apps & Services
Shared Services
Common Infrastructure

Space BMC²

Gov't / Commercial Data Sources

C2/Data Centers
- Satellite Ops
- Data Sharing & Proc
- Mission Mgmt

Secure Data Portal

Users

EGS Services Architecture

Common Apps	Unique Apps	Unique Apps & Services
Shared Services		
Common Infrastructure		

Distributed Development

MMSOC Flight Demo Ops

Integration & Test Nodes

Contractors

USG & FFRDCs

Development & Integration

Navigating to the End State

- ## Current landscape
  - Technology is mature
  - Precedents for relevant enterprise systems exist
    - Proven commercial space operations
  - Similar transitions underway by other gov't agencies
  - Multi-Mission Satellite Operations Center (MMSOC) currently provides command and control for multiple Research and Development missions

- ## Each mission set presents unique, but not insurmountable engineering challenges

- ## Transitioning is the real challenge
  - Timeline for optimal transition varies by legacy mission/program
  - Requires sustained commitment via phased approach

Ground Software Standards for Space Systems

- Using well-known non-proprietary standards allows the acquirers of space system ground stations to select the best software and hardware at any given moment to support the hosted missions and not be locked into any particular contractor.
  - *Drive to Open Systems Architecture*
- Some techniques that may be valuable in ground stations are service oriented frameworks, cloud based techniques and the use of Enterprise Service buses for communication.
- Many companies, FFRDCs and government agencies have been developing service oriented systems on their own and have generated a wealth of experience
- As technology advances, there will be a need over time to modify or include new standards
- SMC/AD will establish a collaboration environment to collect recommendations and comments on standards

Ground Services Standards Recommendations

- This evening's activity is a first attempt to capture this community's experience to help the Air Force put in place the best possible open standards

- The goal is to recommend a set of standards for the future EGS.

- The standards to be addressed include but are not limited to the following categories:
  - Middleware
  - Virtualization
  - Enterprise Service bus choices
  - External interface management (pub/sub, etc.)
  - Security related standards
  - Satellite standards (telemetry, command scripting etc.)

EGS Dynamic Collaboration Site

- The collaboration environment will become the primary mechanism for communication with industry on standards and non-competitive information exchange

- Multiple industry exemplars exist on standards collaboration environment
  - Consultative Committee for Space Data Standards (CCSD-S) http://cwe.ccsds.org/fm/default.aspx
  - Object Management Group (OMG) Space Domain Task Force http://www.omg.org/space

EGS values industry insight and requires understanding of impacts to industry – please participate

- Posting RFI in FedBizOpps – March 2016

- SBSS Follow-On Industry Day – March 2016

- National Space Symposium – 11 April 2016

- MMSOC User Forum – June 2016

- 2016 Space Policy and Architecture Symposium Sponsored by NDIA – TBA

Questions

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