

**Net Centric Enterprise Services (NCES)
applicability to Service Oriented
Architectures (SOA) within the DoD Satellite
Command and Control (SATCOM)
Community of Interest (COI)**

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Introduction

- Emerging Net Centric standards have the potential to tie together many aspects of the DoD but are intended for communities of interest (COI) that provide or share information within a broad enterprise.
- DoD Satellite Command and Control (SATCOM) has strict data boundaries but may be able leverage modern architecture methodologies to maximize software and data reuse within the DoD or with the Global Information Grid (GIG) enterprise.
- Service-oriented architectures and event-driven architectures (EDAs) have the potential to bridge the architecture gaps between legacy and next generation systems while providing compatibility with Net Centric Enterprise Services (NCES) concepts.

Community of Interest Definition

- As defined in the DoD Net-Centric Data Strategy¹ Communities of Interest are task oriented, and include data providers and/or consumers that share a common language. They are either expedient data-driven or institutional process-driven communities and can fall within one or more functional entity.

¹Department of Defense Net-Centric Data Strategy, DoD CIO, 9 May 2003

DoD Satellite Command and Control Community of Interest Characteristics

Expedient	<i>Data Centric, Timely, Focused</i> Satellite Operations Command & Control Anomaly Resolution Trending/Analysis	<i>Data Centric, Timely, Joint</i> Mission Operations Payload Control Network Management Situational Awareness
	<i>Process Centric, Long Term, Focused</i> Maintenance Training	<i>Process Centric, Long Term, Joint</i> Acquisition CONOPS Validation Born Joint Initiatives Integration and Test
	Functional	Cross-Functional/Joint

DoD SATCOM Meets COI Criteria in Multiple Categories

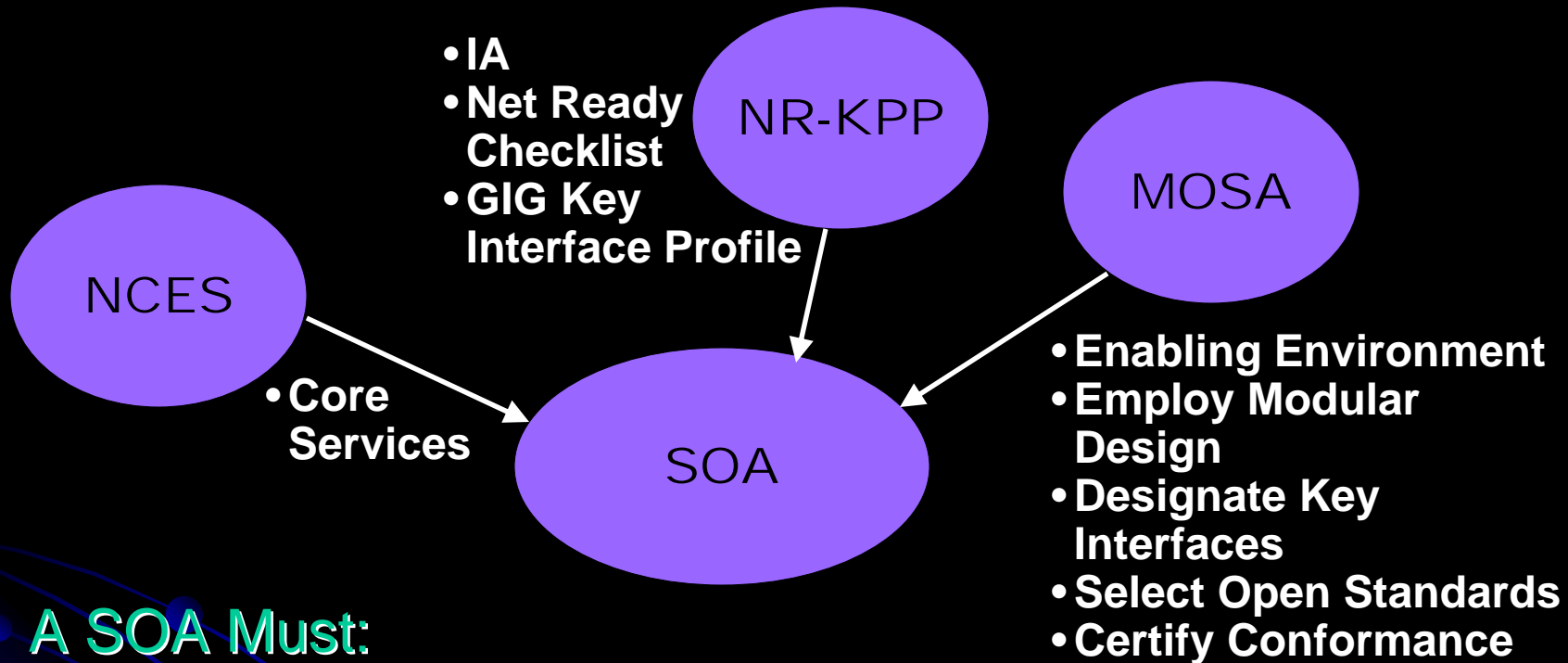
Dependencies and Constraints

- Common functions, services, or data has many benefits but isn't necessarily feasible or allowable
 - Common functions/services/data create dependencies that must be identified and managed from project start
 - Typically forces need to support multiple baselines
 - Information Assurance concerns must be considered
 - Need to know, denial of service, etc
 - Exposure of mission data can benefit ops and support
 - Exposure of fault data improves correlation timelines and supports external needs such as situational awareness
 - Shared processes improve the broader organization
 - Application of CMMI to operations and sustainment

Enablers: NCES, SOA and EDA

- Several ongoing activities will support synergies across DoD SATCOM COI
 - Net Centric Enterprise Services (NCES) provide collaboration, enterprise, discovery, messaging, and other services to the GIG
 - Within DoD SATCOM, NCES services are best leveraged in the sharing of information in a timely manner
 - Service Oriented Architectures (SOA) are architectures that are designed to provide shared services or to allow efficient substitution of services as systems or technologies mature
 - Satellite ephemeris generation is an example service that could be common to several systems
 - Event Driven Architectures (EDA) use triggers to initiate a response
 - Notification to logistics to order a new part based on fault data trending towards product end of life

SOA Must Reflect NCES, NR-KPP, & MOSA



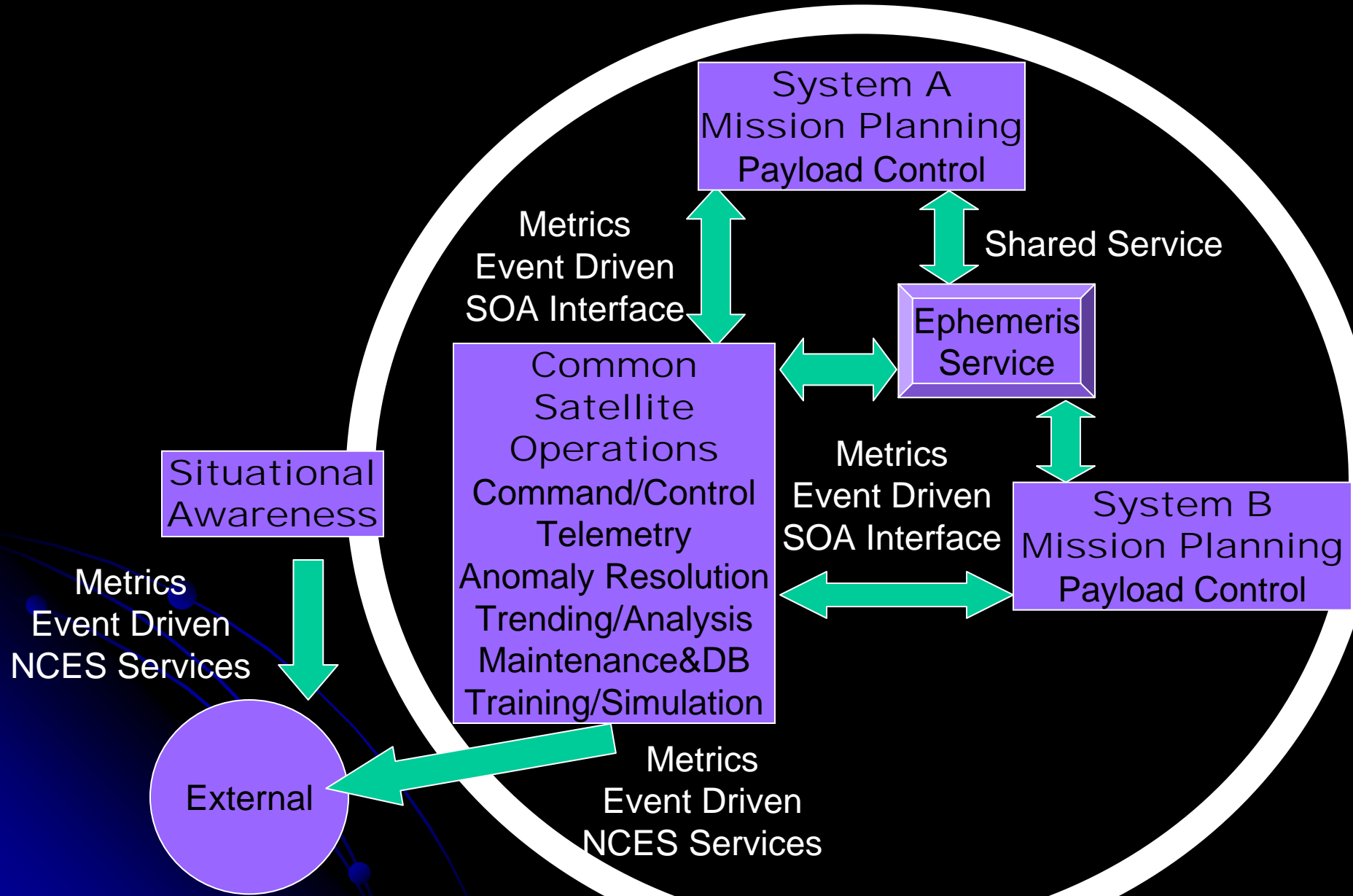
• A SOA Must:

- Utilize NCES Core Services when they mature
- Determine Key Interfaces
- Evaluate architecture using Net Ready Checklist
- Ensure “Key” interfaces conform to “Open” Standards

Ephemeris Service Example

- Ephemeris Service could be a Data Provider to:
 - Mission Planning
 - Satellite Operations
 - Users (Antenna Pointing)
 - Other Segments
- Ephemeris Service could be a Data Consumer of:
 - NCES Services
 - Astronomical Data Services (Solar System Ephemerides)
- Ephemeris Service Interface Characteristics
 - Web based
 - Interface based on XML , WSDL, and SOAP
 - Registered as a Service Provider

Ephemeris Service Flow Diagram



Conclusion

- DoD Satellite Command and Control qualifies as a Community of Interest that is both data and process driven
- Common functions, services, and data can be shared within DoD or externally with respect for organizational or security boundaries
- Net Centric Enterprise Services can be leveraged to expose SATCOM data and share external data to shorten decision timelines and streamline process
- Service Oriented Architectures can be utilized to both to eliminate redundant functions and to decouple interfaces
- Event Driven Architectures enable just-in-time data sharing that supports satellite control, mission management, and situational awareness