

Assessing Net Centricity in a FoS/SoS Environment

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Network Centric Warfare History

- Defined in “Network Centric Warfare” by David Alberts and others 1999,* used several key ideas:
 - Geographically-dispersed forces
 - Massing of effects not forces
 - Knowledgeable
 - Shared awareness
 - Ability to self-synchronize
 - High performance infostructure

*Network Centric Warfare, 2nd edition, David Alberts, John Garstka, Frederick Sten, DoD C4ISR Cooperative Research Program, Wash DC

Net Centricity: How has it evolved?

- Has an element of interoperability
 - NR-KPP, CJCSI 6212.D/E/F
- Has an element of standards
 - TV-1 and TV-2 standards
- Has an element of commonality in data
 - DDMS standard
- Has an element of connected networks
 - GIG

Net Centric Testing History

- Before 2000s setup and tear down for distributed testing/training was a long involved process
- During mid-2000s test networks were permanently stood up:
 - JTEN for training at JFCOM
 - DREN/SDREN for high performance computing
 - JMETC for LVC testing

Net Centric Today

- Positives:
 - Transport layer is robust and reliable
 - TCP/IP accepted protocol on all Program of Record's and test networks
 - HWIL facilities participate in test scenarios across a networked environment
 - Quality of Service (QoS) is being used on networks
- Negatives:
 - Net Centric compliance is still a paperwork drill (NR-KPP)
 - Testing is still focused on platform centric testing
 - Security requirements when connecting SoS continues to be very hard

Net Centric Today (cont'd)

- Platforms using Net Centric ideas in many ways:
 - Between mission computers (conversion from 1553 to IP)
 - Datalinks such as CDL, SATCOM links have IP capability (ATM is going away)
 - Having platforms connect and disconnect from a network
 - Ability to move data directly to the requesting node on the network

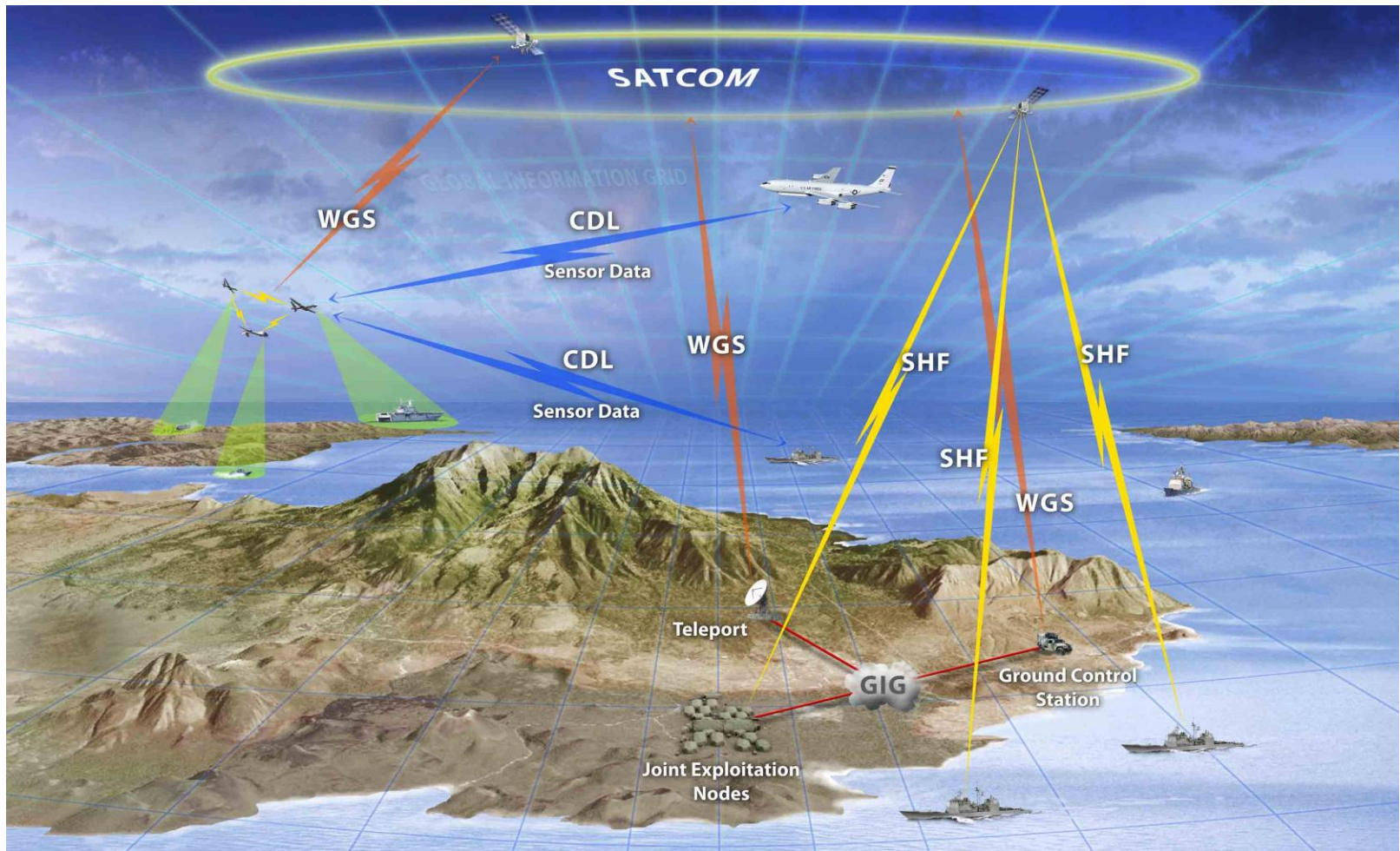
FoS Net Centricity

- Family of Systems Net Centricity should focus on the interactions of the systems across platforms
 - PORs do not currently specify FoS Netcentric performance specs
 - Systems engineers must develop FoS Net Centric requirements to insure interoperability across platforms
 - PORs are on different acquisition timelines thus schedules don't align for requirements development

How to test FoS Net Centricity?

- NR-KPP
 - Only specified for a single platform
 - If each platform gets a NR-KPP certification then are all platforms “Net Ready”?
- Do a capstone test with some # of platforms within the FoS to assess Net Centricity
 - Need definition of what to test?
- What level of testing is needed for FoS Net Centricity Testing?

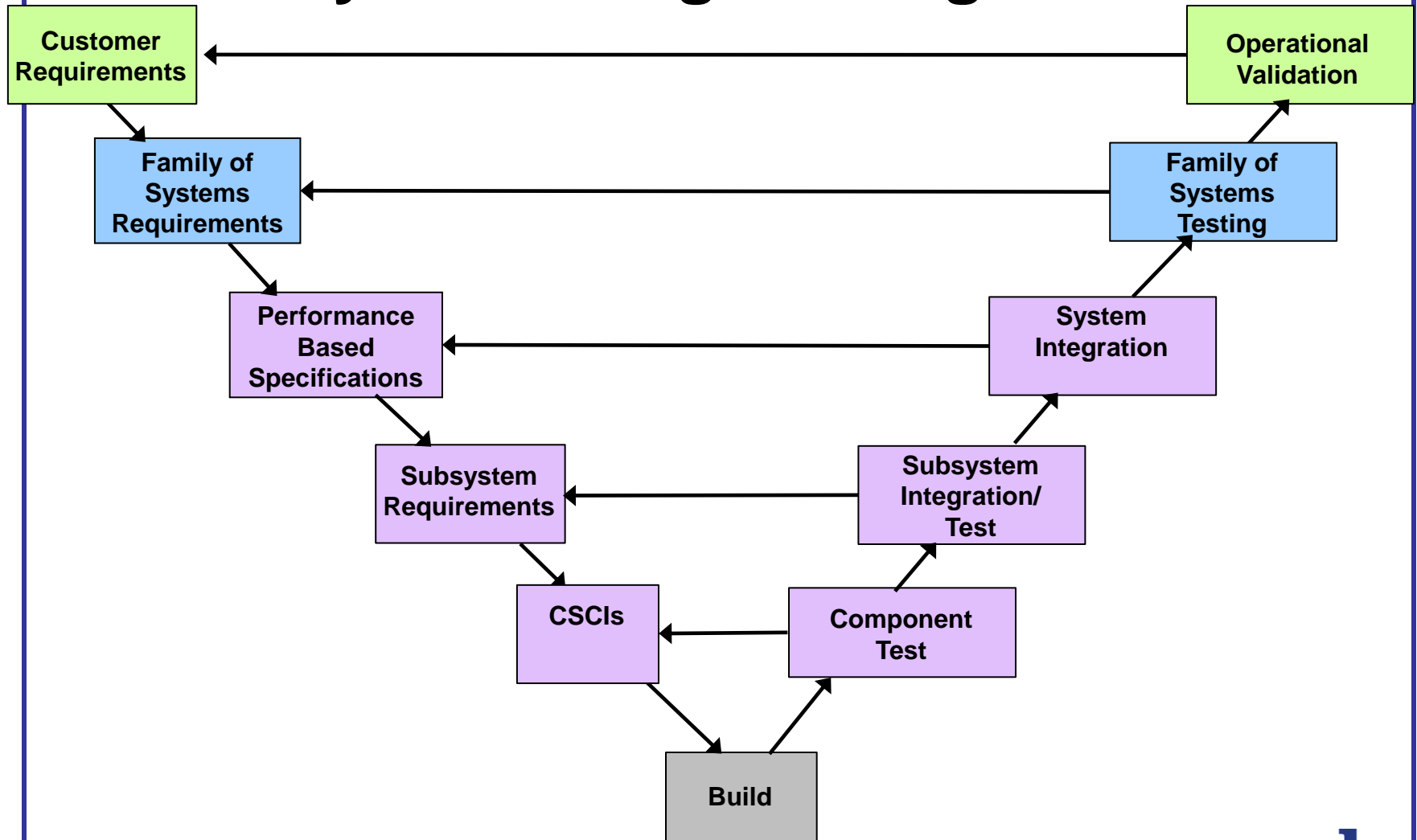
FoS Net Centric Testing



Proposal for Net Centric FoS Testing

1. PORs must identify requirements for Net Centric FoS Testing (make it a KPP)
2. Systems organizations (i.e. SPAWAR) must be involved in Net Centric requirements and testing
3. Program Managers must be required to test with other FoS as part of milestone decisions
4. Systems Integration Labs must be used early for risk reduction testing

Systems Engineering V



Next steps in Requirements and Testing: Agility

- Agility is the capability to successfully cope with and/or exploit changes in circumstances
 - How to design in agility?
 - What are the costs of agility?
 - What are the accepted metrics of agility?
 - What are the quantitative links between levels of agility and performance and effectiveness?

Agility in Net Centric T&E

Two types of Agility in a Net Centric system (for example)

1. Ability to use Net Centric system in a different mission
 - Example: Using existing sensor in a new environment and disseminate to a new Net Centric infostructure
2. Ability to add Net Centric capability to enhance current mission
 - Example: Add new or upgraded sensor to a Net Centric platform and use existing Net Centric infostructure

Measures of Agility for Net Centric Systems

1. Measure of Agility for Net Centric Systems:
 - Ability to disseminate desired data 90% of the time to new users within 24 hrs. or within mission planning cycle
 - Ability of new users to exploit desired data 90% of the time within 24 hrs. or within mission planning cycle
2. Measure of Agility for Net Centrics:
 - Ability to incorporate new Net Centric capability 90% of the time in existing Net Centric platform within 24 hrs. or within mission planning cycle
3. Measure of Agility for Net Centric FoS
 - Ability to incorporate different platform in existing Net Centric FoS within 24 hrs or mission planning cycle

Questions?