Practical Software and Systems Measurements

Architecture Interoperability Measures

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Vail, Co
Interoperability Workshop
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Workshop Objectives

- With input from the group:
  - Define the interoperability problem domain
    - See examples
  - Discussion on whether interoperability is a PSM problem
  - Examine example for interoperability measures
    - Interoperability ICM

Workshop Agenda

- We have the balance of the afternoon to examine this issue Introductions
  - 1 hr – Brain storm and Bound the problem
  - 1/2 hr – Is this a PSM type problem?
  - 1 hr - Interoperability
  - 1/2 hr – Reach conclusions,
    - What do we tell PSM folks
    - What are the directions to be pursued?

Levels of Interoperability

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Virtual Distributed Combat System

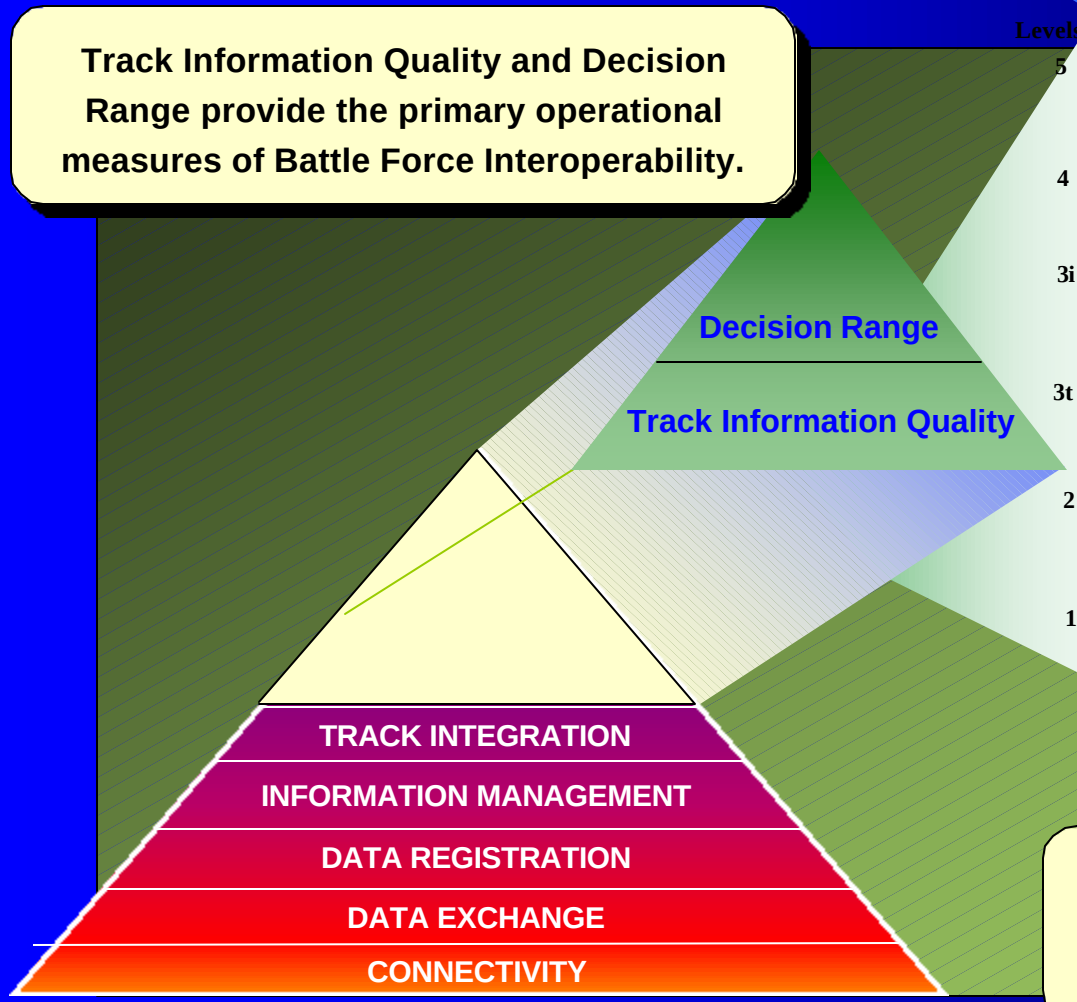
Real-Time Sensor Data Integration

Command and Planning

Connectivity and Communications

Metrics Relationships

Track Information Quality and Decision Range provide the primary operational measures of Battle Force Interoperability.



Project 801 Metrics Pyramid

Track Information Quality

Levels	Consistency	Correctness
5	Composite track	Engagement quality data exchanged among units
4	Single common track & ID for all units	Correct ID + Accuracy
3i	Single common ID among all units	Correct ID
3t	Single common track among all units	Accuracy good for coordination
2	Track number reported and received by force	coarse track accuracy
1	Track is held by one unit	none

Underlying 801 Metrics provide "root cause" engineering information supporting Battle Force Interoperability metrics of Decision Range and Track Information Quality

Questions

- What types (levels?) of interoperability are there?
- What types of Interoperability are we interested in measuring?
- Is it a point measure or a process measure?
- Is there a general problem or are there problem domains (commercial vs military vs banking etc)?
- Is there a general solution or only domain solutions?

Questions

- What project interoperability evidence is available for collection/examination?
- Could it be applied at sundry life cycle points?
- At what point in the architecture design/development/life cycle can it be applied?
- Is this problem interwoven with the COTS problem?
  - If it is can they be dealt with separately?
  - How do we deal with technological innovation?
  - How do we deal with technological obsolescence?

Questions

- How do we specify an interoperability measure (in a contract/to our project)?

NUWC Approaches

- Open System Architecture (OSA) Measures defined
  - Interoperabilty plus other qualitative measures started
  - Developed an OSA ICM
  - Developed set of measures

Common Open System Issues–Categories–Measures Mapping

Issues	Category	Measures
Interoperability The ability of the software applications to interchange and use data/information	Standards	Standards explicitness
		Standards maturity
		Standards vendors supporting
		Standards feature coverage
		Standards Sufficiency
	Profiles	Profile explicitness
		Profile width
		Profile coverage
		Profile extensions
		Use during product selection
		Profile Sufficiency
		Profile Documentation
	Products	Products available supporting
		Product performance
		Platforms supported
	Conformance	Degree of conformance
		Prod-to-Prod interoperability

Portability The ease with which a system can be transferred from one organizational, hardware or software environment to another	Interfaces	Number of important interfaces
		Number of open interfaces used
		Number of standard features used
		Effort
	Environment interface selection	Conformance to standard/Profile
	Application specific features	System specific features (appl)
		Implementation language
		Other program quality character
	Standards	Quality of Standards
		Profiles: appli, conformance, doc
	Testing/Qualification	Conformance Testing
		Product port demo
		Product performance demo
	Tools	Cross Compilers
		Other tools
Scalability Extend or add existing OSI (8 combinations Xref CDFET)	Technologies/standards supported	Interface sufficiency
	Testing	Paper design study
		Models
		Prototype testing
	Cost of Scaling	Cost of Scaling