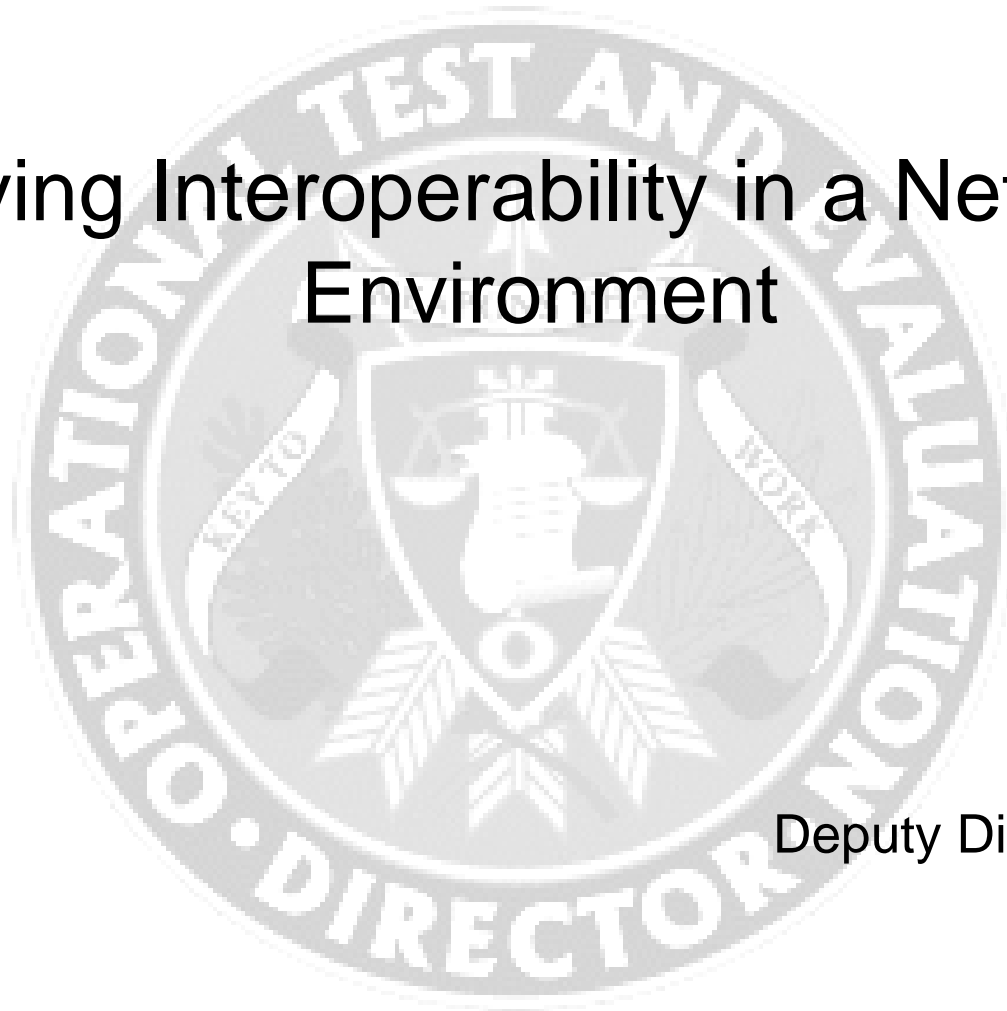




Achieving Interoperability in a Net-Centric Environment



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Perspective



- A view from one who is responsible for assessing how we do translating ideas into reality...
- The Director, Operational Test & Evaluation has two distinct but related missions:
 - A Statutory mission as part of the acquisition process to assess the Operational Effectiveness, Suitability and Survivability of systems for “use in combat by typical military users”
 - Congressional direction to conduct an annual assessment of the Interoperability and Information Assurance of fielded systems as they perform in Combatant Commander and Service exercises



The Challenge

- Within the U.S. Department of Defense, we oversee 33 major multi-platform command and control programs as well as 10 platform-centric programs that are in some phase of development or fielding
- There are over 30 sovereign nations represented here today
- Everyone supports the idea of inter-operability, the hard part is actually becoming interoperable



Put Another Way...



- Interoperability is no longer simply, frequency, modulation and language
- We are rapidly moving from signal flags and radio-telephony to complex command and control
- We are becoming increasingly reliant on sophisticated technology for routine business



The Move Towards a 21st Century Internet Community



- **Monthly Growth in US Internet Users:**
 - Dec 06 – 1,093 million;
 - Sep 07 – 1,245 million;
 - Mar 08 – **1,408 million** (Nielsen//NetRatings, The Nielsen Company)
- **US E-commerce:**
 - Accounted for \$1,568 billion of US manufacturing shipments in 2006, up from \$1,344 billion in 2005 - **an annual increase of 16.7 percent** *
 - * US Dept. of Commerce, Economics and Statistics Administration, US Census Bureau
- **Before 1970, Cadets at USMA were issued slide rules:**
 - In the 70's they were issued hand held calculators
 - Since the 80's they are issued computers
 - These computer-literate cadets are now senior U.S. Army leaders



Interoperability Observations



- Clearly defined Standards are critical – but not sufficient
- Functional interoperability may differ from technical interoperability
 - Terminals/platforms may be fully interoperable; however, users may never see the data
- Developmental test often focuses on software – physical architecture is often not accurately represented
 - Commercial products may not work properly with the actual architecture (satellite vs fiber; cryptography; multiple firewalls)



Interoperability Observations



- Physical architecture can be critical
 - Proximity of servers can dramatically impact performance
 - Timing can be critical as modern systems take advantage of higher clock speeds
- But software is not necessarily easy either
 - Interfaces are sometimes poorly defined particularly for Legacy systems
 - Data conversion has typically proven to be more complex than envisioned



Interoperability & Assurance



- Natural tension –often depicted as opposite sides of the same coin – false dichotomy?
 - Assurance is more than just protecting against penetration
 - A more holistic approach is needed to balance access vs. assurance
- Recent events have heightened focus on Information Assurance (IA)
 - Increased reliance on unclassified networks for administrative, logistics and support
 - Increased sophistication of threats



Testing Challenges



- Difficult to accurately replicate large complex networks in a test environment
- Use of live/virtual/constructive environment is essential to realistically assessing C4ISR performance at the operational/tactical commander's level (division commander/carrier strike group commander) and above



Recommendations



- Adopt common (commercial) standards to the greatest extent possible
- Enforce standards compliance
- Train users/administrators
- Take advantage of opportunities to exercise together