Pragmatic C4ISR Approach from the US Army CECOM Security Assistance Perspective: Coalition Interoperability

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CECOM Bottom Line: THE WARFIGHTER

Overview

- Background
- Coalition Interoperability Problem Space
- Pragmatic Architectural and Engineering Strategy and Tactics
- Potential Solution Sets

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Background

- Competing “national” priorities preclude easy integration
  - Homogenous coalition capabilities are excessively costly
- Foreign Military Financing
  - This is US grant funds for the purchase of military equipment, supplies and services
  - Use of FMF to achieve coalition interoperability
    - Emphasizes purchase of US manufactured equipment
    - Heavily reliant on COTS solution or export version of US equipment
      - Often precludes the sale of “same-as US” equipment due to releaseability or export restrictions

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Coalition Interoperability Problem Space

- **Operational**
  - Due to state of flux of many forces and nations' prosperity, operational requirement definition is often not given the due diligence that is needed
  - Doctrine is rapidly evolving
    - Soviet to Western
    - Heavy metal to light and lethal
- **Systems**
  - Standards compliance does not automatically infer interoperability
    - Differences in standards implementation corrupts interoperability's chance for success
  - Communications
    - Ad hoc communications interoperability based on standards compliance is a misconception
    - Common COMSEC capabilities are not readily (or cheaply) available
  - Information
    - Common problem is different interpretations (even within the same language!) of the same information - symantics

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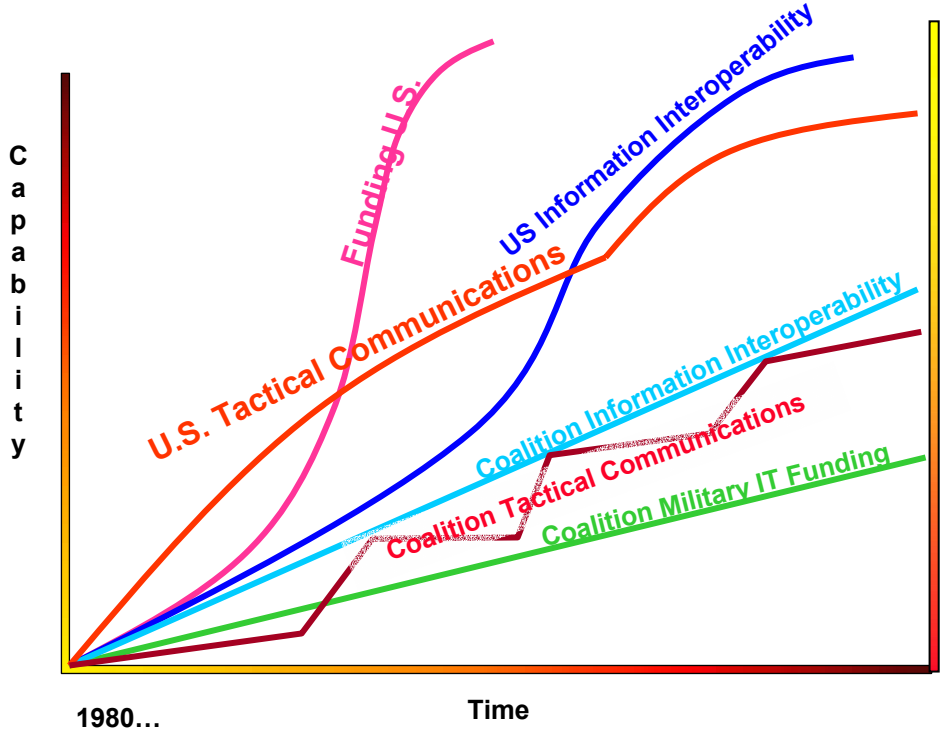
Expanding Interoperability Gap

- US
  - Lag between funding and producing, results in non-linear Rate of Return
    - Simpler fixes produce rapid capability results and interoperability improvements
    - Later funding increases address items that produce more refined or difficult-to-achieve results
- International
  - Technology infusions incorporate lessons learned
  - Produce a linear capability RoR
- Differences in funding rates and national focus means there will not be capability or interoperability parity



Czech military funding to be reduced to 1.9% from 2.2% of GDP!
(Interfax-Europe 6/10/03)

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An Approach to Narrowing the Gap

- Use of FMF Funds to
  - Help nations baseline their existing capabilities,
  - Identify new missions and their supporting architectural requirements, and
  - Develop a system-of-systems modernization roadmap that specifically addresses the Nation's national and international interoperability needs
    - The focus is on systematically developing recommendations for system purchases
- Will minimize vertical, limited-use, procurements
  - No wasted effort
- Scope and depth of effort is directly related to funding
- Architectures based on DoD C4ISR Framework and NATO NC3TA

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Architectural and Engineering Initial Analysis

- **Pre - Project efforts**
  - **Perform site surveys to identify coalition partner interoperability requirements**
    - **Funded by Nations as separate project**
    - **Combatant Commands have a vested interest and may alternatively co-fund**
    - **Identifies mission needs**
    - **Develop conceptual operations and systems views**
  - **Used to guide drafting verbiage with in-country Security Assistance Officer to aid the Nation in task specification**

Example

1. THIS LETTER OF REQUEST IS SUBMITTED BY THE NNNNNNNNN MINISTRY OF DEFENSE TO REQUEST A LETTER OF OFFER AND ACCEPTANCE FOR A COMMUNICATIONS ANALYSIS TO ACCURATELY EVALUATE THE NEEDS OF NNNNNNNNNN'S MINISTRY OF DEFENSE. PROCURING COMMUNICATIONS EQUIPMENT UTILIZING FOREIGN MILITARY FINANCING IS THE TOP PRIORITY OF THE NNNNNNNNNN MINISTRY OF DEFENSE.

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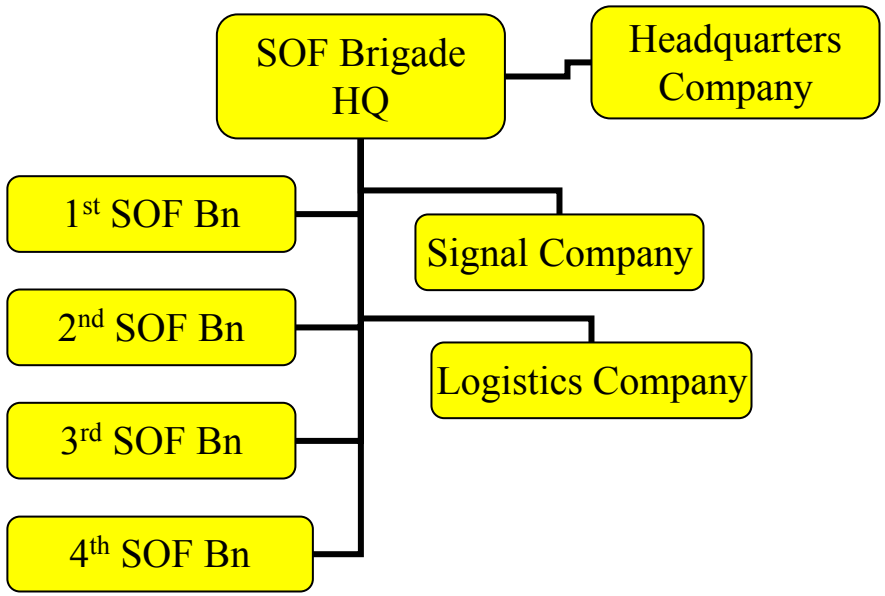
Architectural and Engineering Initial Analysis (cont'd)

- We identify the organizational and equipment (TO&E-type) structure, current and objective missions, and obtain insight into the government, economy, etc., derived from:
  - Survey
  - Various open sources, such as:
    - CIA World Factbook
    - US State Department Background Notes
    - Library of Congress' Country Studies
- All of this information in turn helps us to synthesize our understanding of the Nation's mission needs, in the form of:
  - Operational overviews – mission nodal interoperations
  - System overviews – applied technologies
  - High-level system architecture – combining information from TO&E, nodal interoperations, and applied technologies
  - Technical overview – potential suite of applicable standards

Organizational Structure Example



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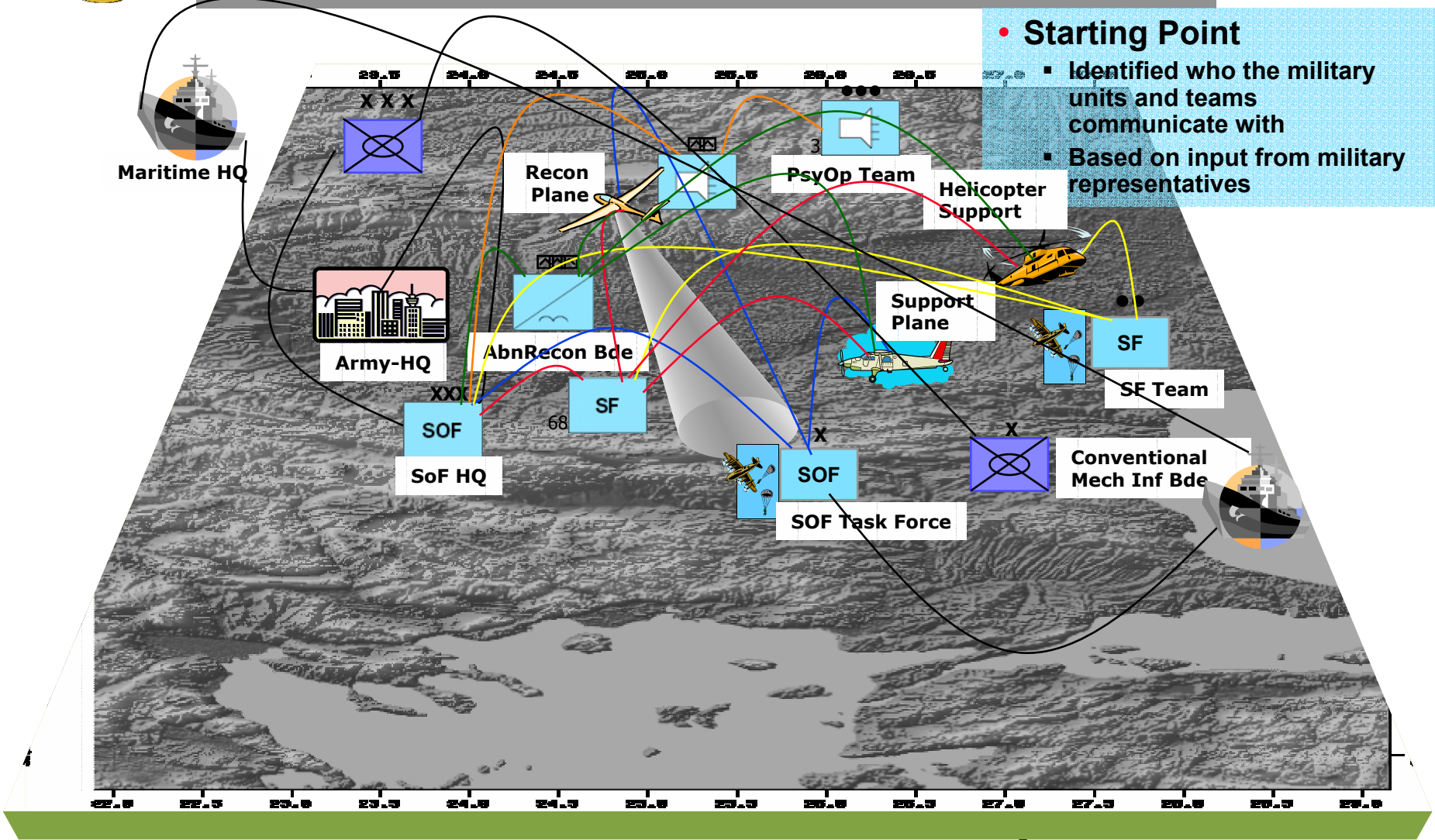
Operational Overview Example



- **Starting Point**
  - Identified who the military units and teams communicate with
  - Based on input from military representatives

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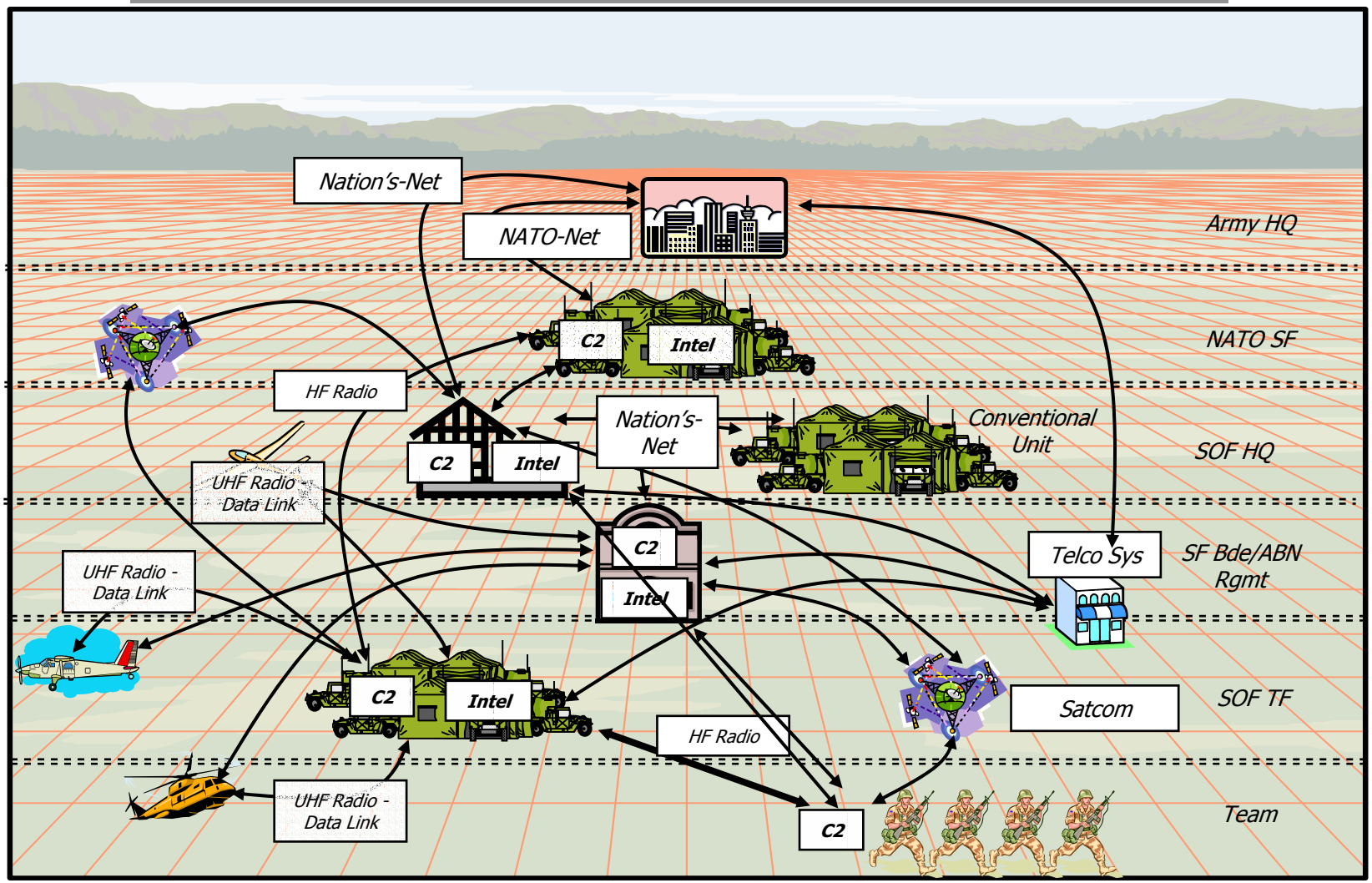
System Overview – Allocating Technologies



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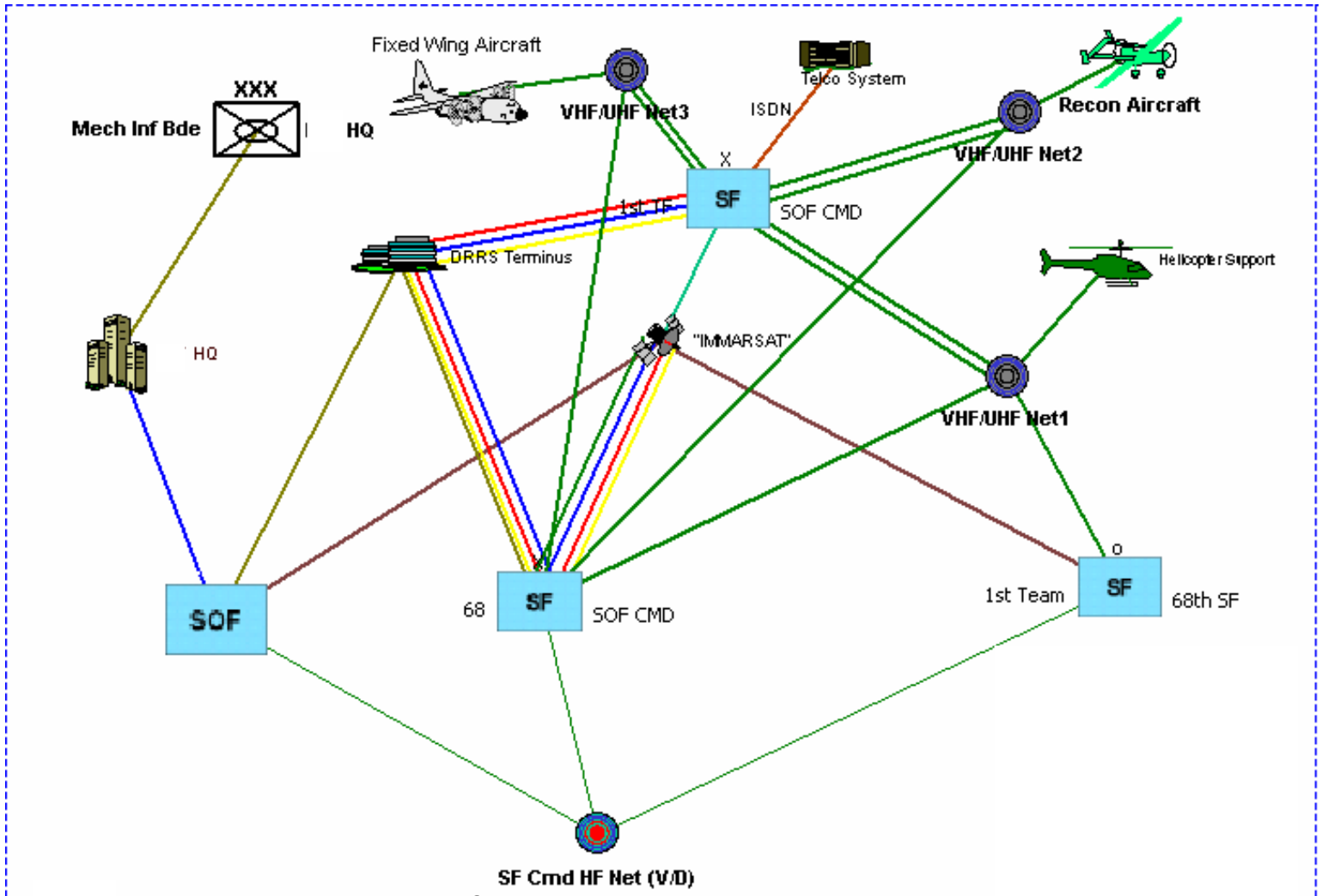
High-level System Architecture Example - SO Task Force



SOF System Architecture

Applicable Technical Specifications Overview Example

Capturing application of, and mapping standards to, architectural components, aids in defining procurement requirements

Service Area	Service	Standard
HF Communications	Radio Hardware	STANAG 4203
	Automatic Link Establishment	MilStd 188-141A
	Phase Shift Keying	STANAG 4285
		MilStd 188-110A
	Transmission Protocols	STANAG 5066
		FedStd 1052
VHF Communications	Radio Hardware	STANAG 4204 MilStd 188-242
Telephone Communications	Digital Telephone Switch Hardware	STANAG 4206
	Digital Telephone Switch Gateway	STANAG 4206-4212
Messaging	Email	RFC 0821 Simple Mail Transfer Protocol. Aug-01-1982
	Message Formats	ADatP3
Mapping	Map Formats	ADRG
	Symbology	MilStd 2525b
		NATO APP 6.0
Computers	Operating System	NATO COE
Routers and Ethernet Switches	Routing Protocol	RFC 2453 RIP Version 2. G. Malkin. November 1998.
		RFC 2328 OSPF Version 2. J. Moy. April 1998.
		RFC 1584 Multicast Extensions to OSPF March 1994
	Ethernet	10/100BaseTX
	Internet Protocol	RFC 0760 DoD Internet Protocol. Jan-01-1980.
	Transport Control Protocols	RFC 0761 DoD Transmission Control Protocol, Jan-01-1980
	Virtual LANs	IEEE 802.10
		IEEE 802.1Q
	Security	RFC 1631 Network Address Translator May 1994

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Architectural Aids – Solution Sets

- Solution Sets are tailorable, predefined, generic Command and Control/CIS System Architectures for
  - Combat units (focused on Situation Awareness/C2)
  - Combat Support units (focused on Fire Support/C2)
  - Peacekeeping units
  - Special Operations units
- Current Status
  - Peacekeeping Solution Set defined with core Coalition Wide Area Network (CWAN) interface and telecommunications capabilities; minimal C2 capability consisting of email messaging
  - Other sets (including Blue Force Tracking - Army) being defined

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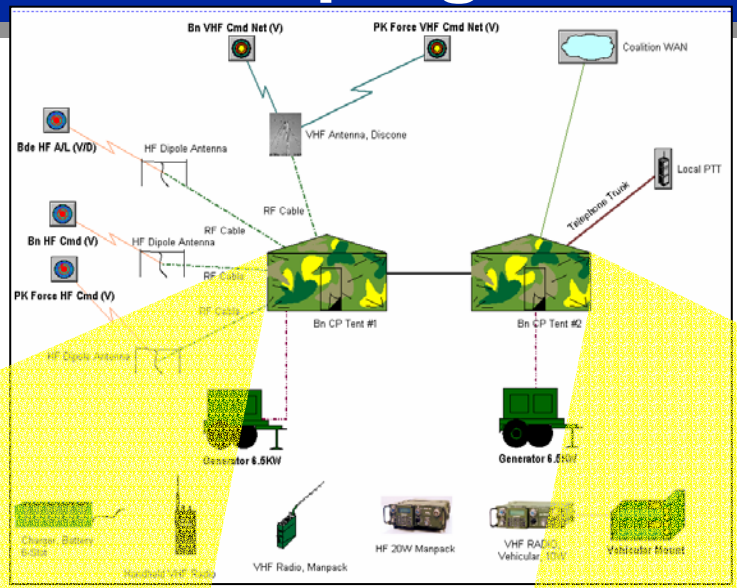
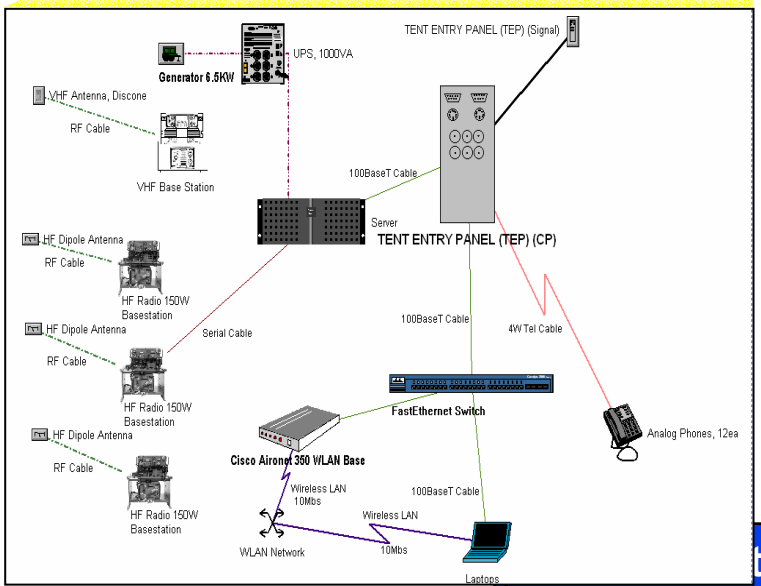
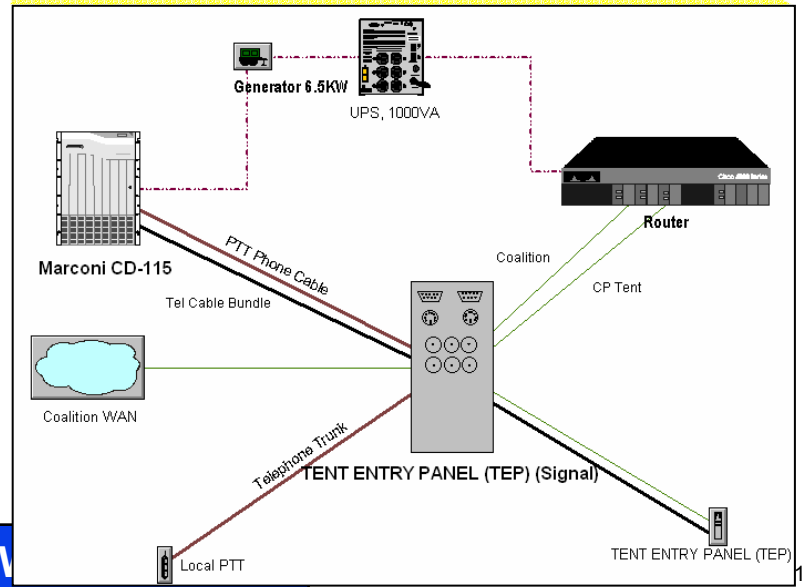
Potential Solution Set Concept – Peacekeeping Battalion







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What does this all give us?

- An initial concept of what is <u>really</u> needed
- A preliminary understanding of how it would be used
- Customer discussion points to enable us to modify and refine the solution set further
  - Helping to insure that the Nation <u>gets value</u>
  - Promoting Nations' strategic and tactical capability evolution
  - Promoting coalition interoperability

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