SPAWAR
Systems Center
San Diego

Video Enabling the Combatant Commander's Headquarters

Justin Lee

Arthur Nakagawa

SPAWAR
Systems Center
San Diego

Introduction

- Headquarters for the 21st Century (HQ21)
  - » C4I Systems Design and Installation in New HQ for USPACOM
- Br… …VA)
  Se…
  - »
  - »
- Si… …Q
  - »
  - »

SPAWAR
Systems Center
San Diego

Outline

- A-V Requirements
- The Battle Cell Concept
- A-V Service Model
  - » Audio service plane
  - » Video service plane
  - » Briefing service plane
  - » Control service plane
- Major Challenges
- Summary

SPAWAR
Systems Center
San Diego

A-V Requirements

- Deliver an Integrated A-V Systems Architecture
  - » Advanced Collaboration and Visualization
  - » Consolidated, Standardized and Centrally Managed
- Implement the Battle Cell Concept
- Execute Crisis Actions
  - » From Disaster Relief to Major Theater War
  - » Monitor and Address Multiple Crises Simultaneously
  - » Coalition Enabled
- Support Multiple Classifications

SPAWAR
Systems Center
San Diego

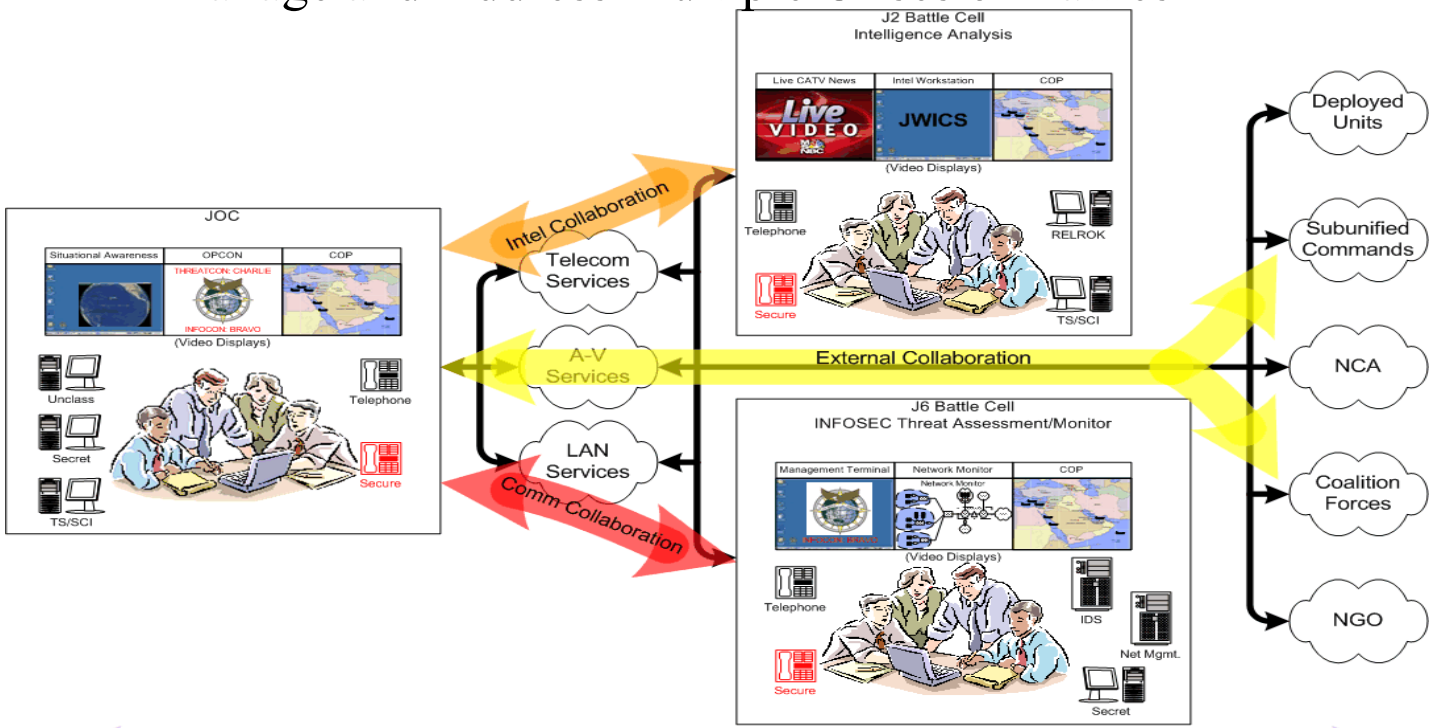
Outline

- A-V Requirements
- The Battle Cell Concept
- A-V Service Model
  - » Audio service plane
  - » Video service plane
  - » Briefing service plane
  - » Control service plane
- Major Challenges
- Summary

SPAWAR
Systems Center
San Diego

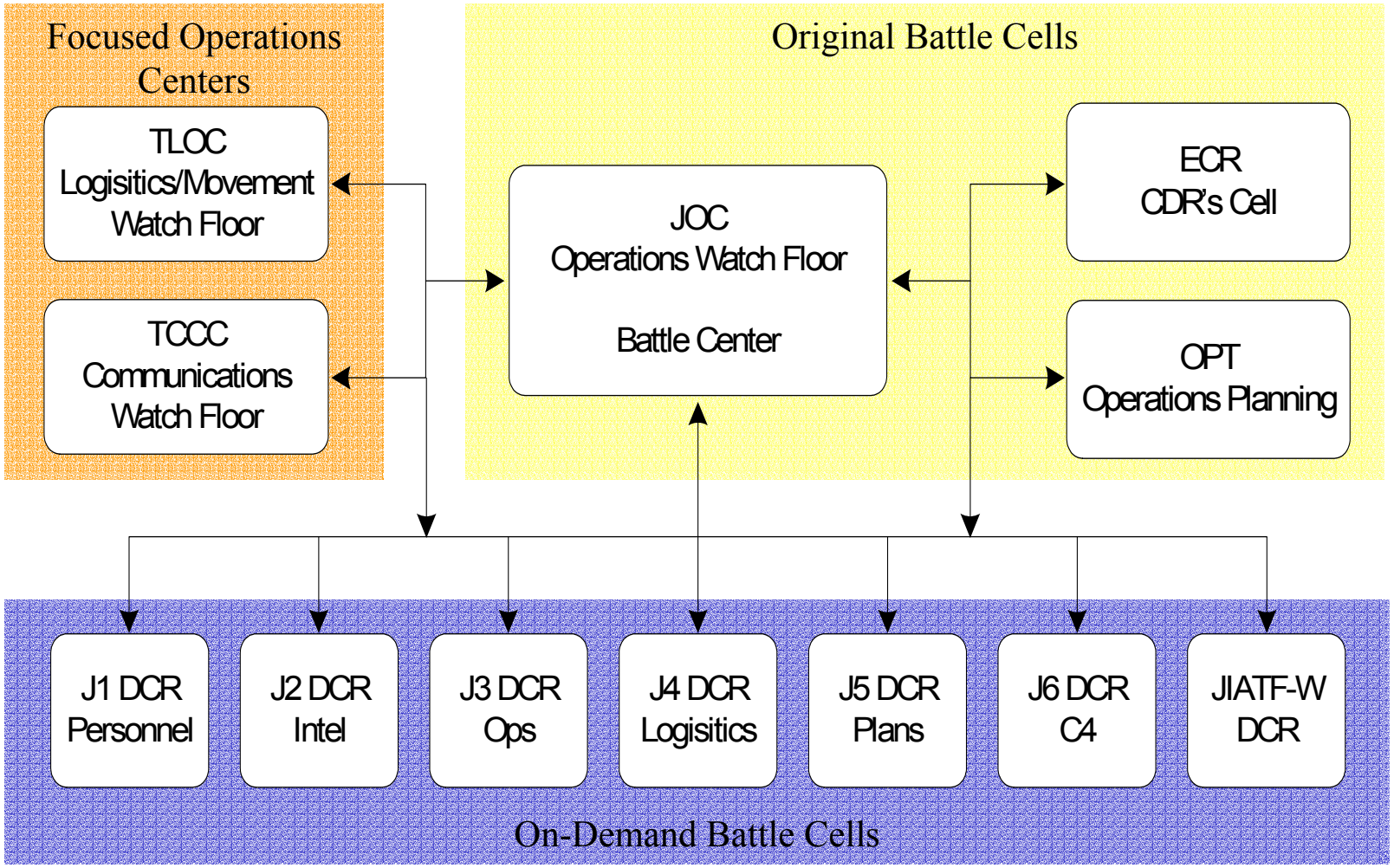
The Battle Cell Concept

- Supports Joint and Coalition Systems that Operate from Operational Cells
  - » JOC is the Center of Operations
    - Virtual extensions of the JOC or "Virtual JOC Presence"
      - Manage and Address Multiple Crises or Battles



SPAWAR
Systems Center
San Diego

The Battle Cell Concept



SPAWAR Systems Center San Diego

The Battle Cell Concept Independent Operations (1 of 2)

- Overall A-V Systems Architecture designed to take advantage of a Distributed Environment
  - » Independent Entities able to communicate with each other and external organizations
- Most Battle Cells are Normally Directorate-Level Conference Rooms (DCR)
  - » Function as conference rooms most of the time
  - » Able to perform crisis action on-demand

SPAWAR Systems Center San Diego

The Battle Cell Concept Independent Operations (2 of 2)

- Requires the Following Capabilities:
  - » Multiple Video Displays
  - » Audio Amplification
    - Voice Reinforcement
    - Media Audio
  - » Video Sourcing
    - Computer Display
    - DVD/VCR
  - » CATV
  - » Integrated Control of A-V Systems
  - » Network Access
    - Unclass, Secret and TS/SCI
  - » Unclass and Secure Voice Communications

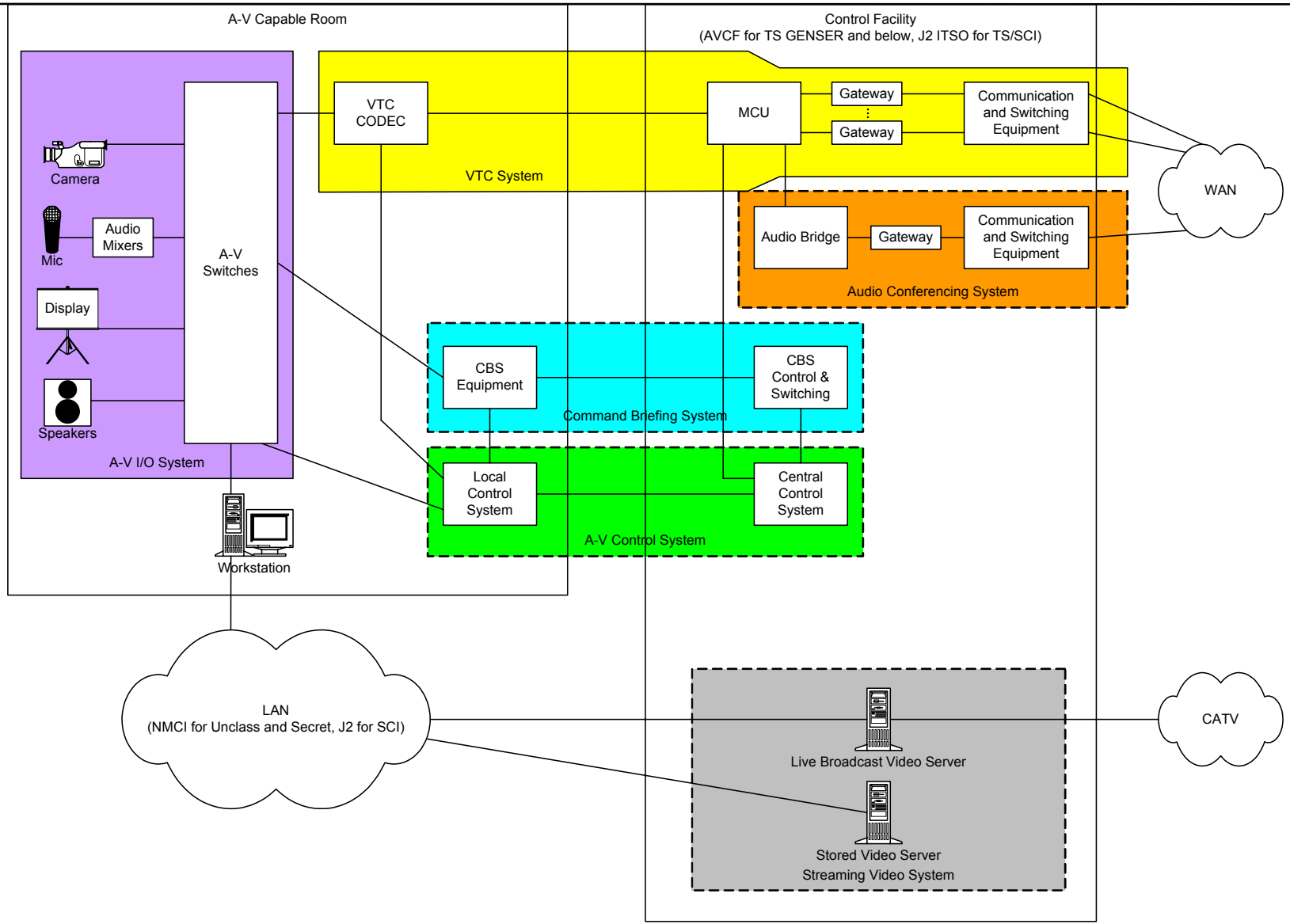
SPAWAR Systems Center San Diego

The Battle Cell Collaborative Operations

- Add Collaborative Communications Systems to Conference Rooms
  - » Command Briefing System (CBS)
    - Intra-building, Multi-screen Briefing System
      - – Up to 3 video sources are shared amongst participating rooms (i.e. all rooms see same 3 video sources)
    - Supports multiple security levels up to TS/SCI, one at a time
  - » Video Teleconferencing (VTC)
    - Provides internal and external video collaboration at multiple security levels
    - Unclassified, Secret, TS/SCI (JWICS) and Special Purpose
    - On-site multipoint conferencing units

SPAWAR Systems Center San Diego

The Battle Cell Concept
A-V Systems Architecture



SPAWAR
Systems Center
San Diego

Outline

- A-V Requirements
- The Battle Cell Concept
- A-V Service Model
  - » Audio service plane
  - » Video service plane
  - » Briefing service plane
  - » Control service plane
- Major Challenges
- Summary

SPAWAR
Systems Center
San Diego

A-V Service Model Overview (1 of 2)

- A-V Systems Architecture Provides Significant A-V Capabilities
  - » Needs to be designed with operations and management in mind
- Use Data Networking Model
  - » Delivery of standard services on a standard platform
- Make A-V a Service
  - » Deliver standard A-V services with a standard user interface
  - » Standardize systems, equipment and operations

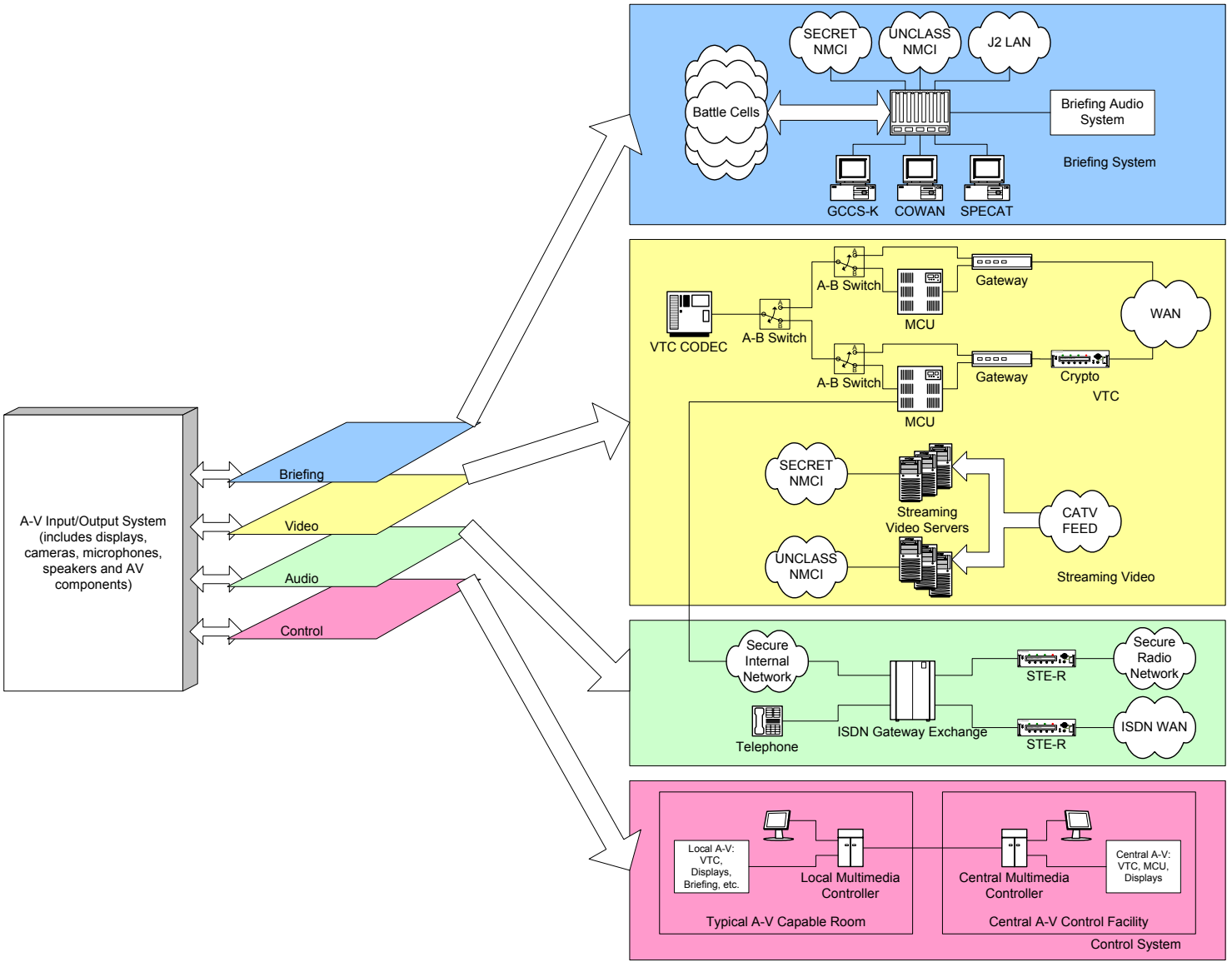
SPAWAR
Systems Center
San Diego

A-V Service Model Overview (2 of 2)

- Consolidate, Standardize and Centrally Manage
- Large A-V "Network" Delivers Services
  - » Network provides four service planes
    - Briefing, audio, video and control
  - » Each plane delivers a standard set of services
  - » Every room has same look and feel
- Standard Architecture Implements Standard A-V Services that are Centrally Managed

SPAWAR
Systems Center
San Diego

A-V Service Model



SPAWAR
Systems Center
San Diego

A-V Service Model
Audio Service Plane

- Secure Audio Conferencing
  - » Secret audio bridge able to conference audio-only participants into VTCs
  - » Capable of supporting a wide variety of secure communcation devices
    - STE-R
    - DRSN
    - Secure radio terminals (i.e. KY-68)
    - Secure GSM

SPAWAR
Systems Center
San Diego

A-V Service Model
Video Service Plane (1 of 2)

- GENSER Video Teleconferencing (VTC)
  - » 3 Separate VTC Systems
    - Unclassified, Secret and Special Purpose
    - Standard VTC architecture – each VTC system is identical
  - » H.323-Based VTC On-campus
    - Dedicated Ethernet/IP networks for each classification (unclass, secret and special purpose)
  - » Local Multipoint Conferencing Unit (MCU)
    - Supports up to 32 endpoints and 8 conferences simultaneously
  - » H.320-Based External Connectivity
    - Shared ISDN circuits (consolidated comm. Resources)
    - KIV-7 Encrypted Links for Secure VTC
    - Supports DVS-G, VIXS and Commercial Connectivity

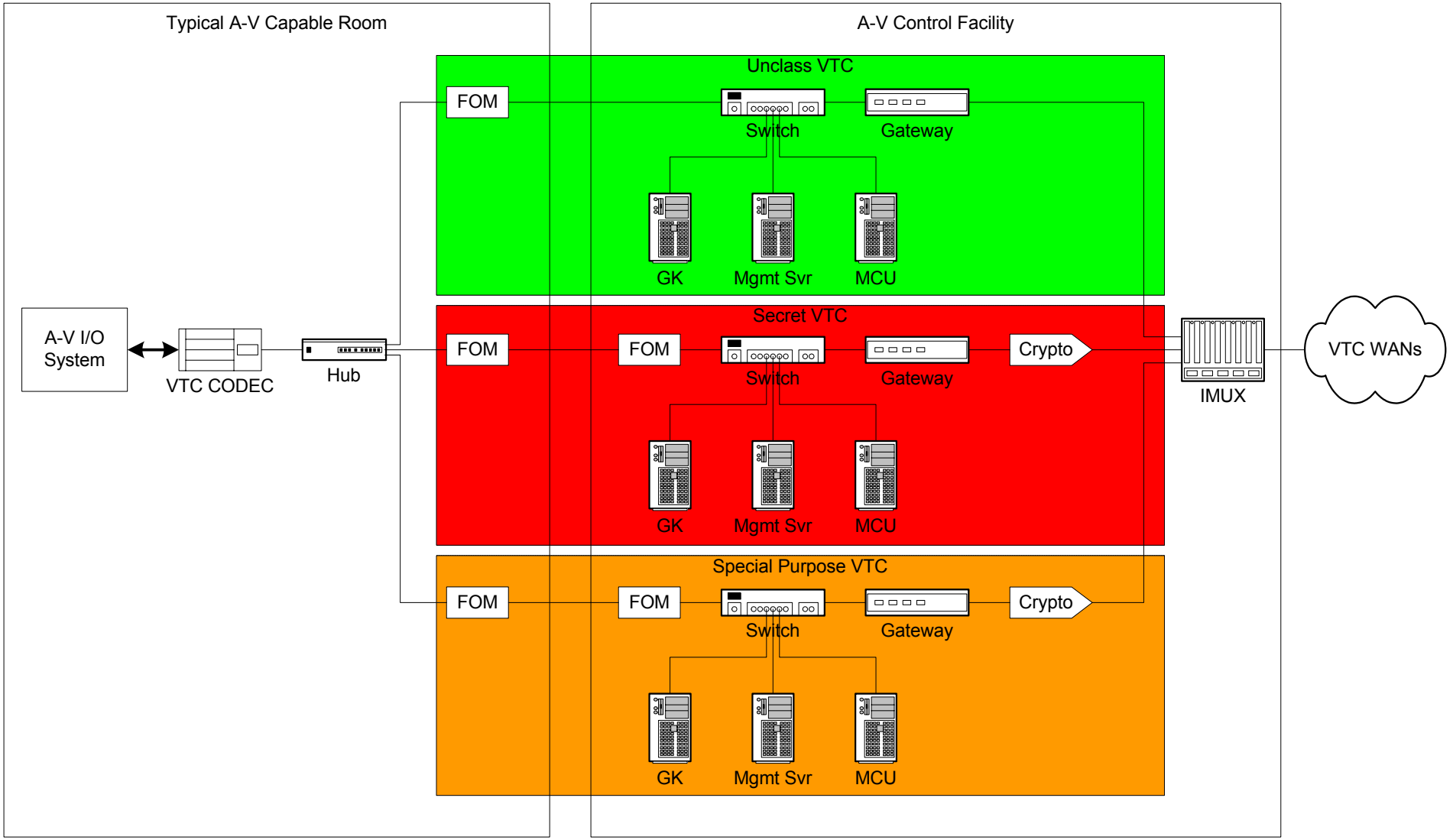
SPAWAR
Systems Center
San Diego

A-V Service Model
Video Service Plane (2 of 2)

- TS/SCI VTC
  - » Based on JWICS H.323 VTC Architecture
    - Tier 0 Connectivity to JWICS VTC Network
      - Access to JWICS MCU Services
    - Tier 1 Connectivity to Local TS/SCI Network
      - Local MCU
      - PACOM theatre intelligence VTC network access
    - QoS-enabled networks

SPAWAR Systems Center San Diego

A-V Service Model
Video Service Plane



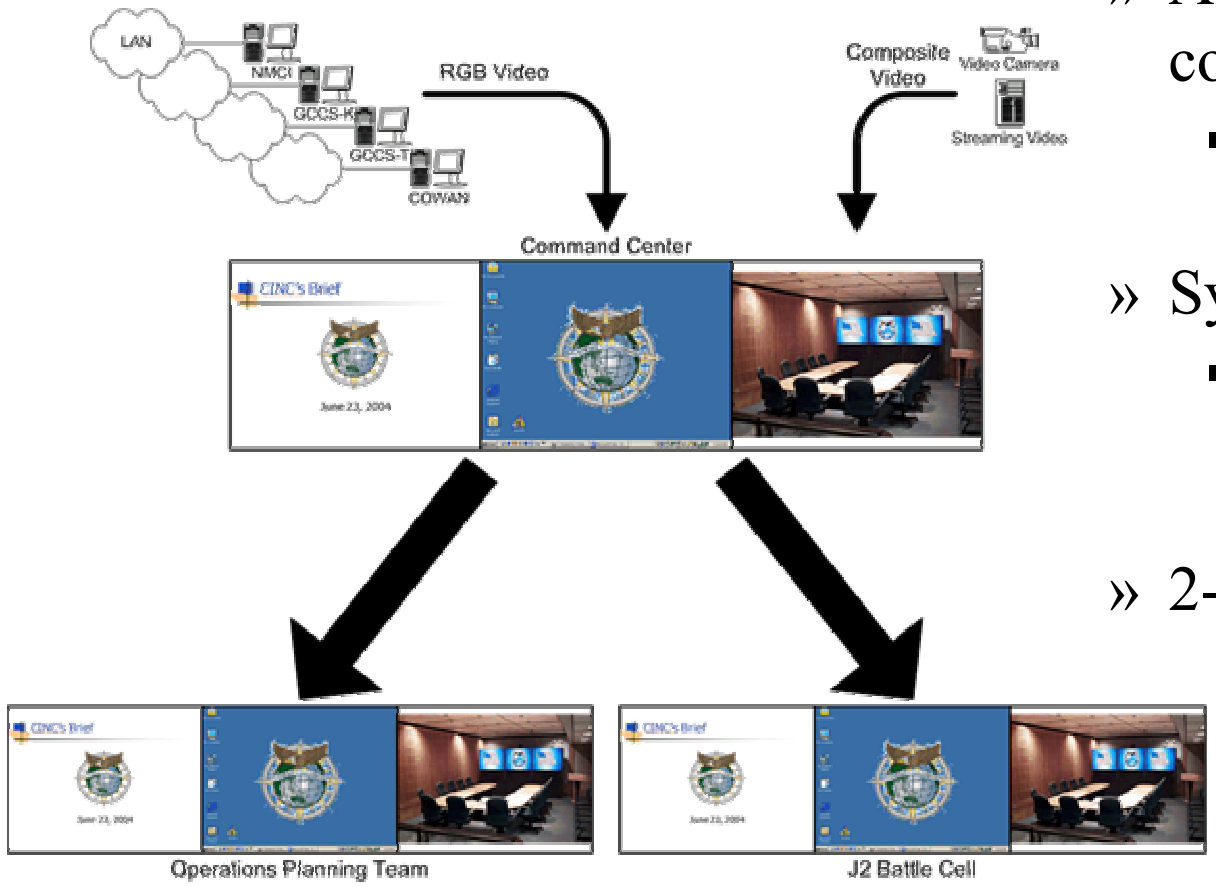
SPAWAR
Systems Center
San Diego

A-V Service Model
Briefing Plane

- Command Briefing System (CBS)
  - » Distributed Briefing System built on a multiple security level platform
    - Enables command-wide, directorate level, briefing capabilities for a wide variety of situations
    - Shares video sources and conferences audio between battle cells
    - Supports multiple security levels from secret to TS/SCI, one at a time
    - Supports up to 3 separate conferences at the same security level

SPAWAR
Systems Center
San Diego

A-V Service Model
Briefing Plane



- CBS Operational Example
  - » All battle cells share a common view
    - Video sources shared between all conferees
  - » Synchronous viewing
    - Changes in "Master" display are replicated in real-time in all rooms
  - » 2-way audio conferencing

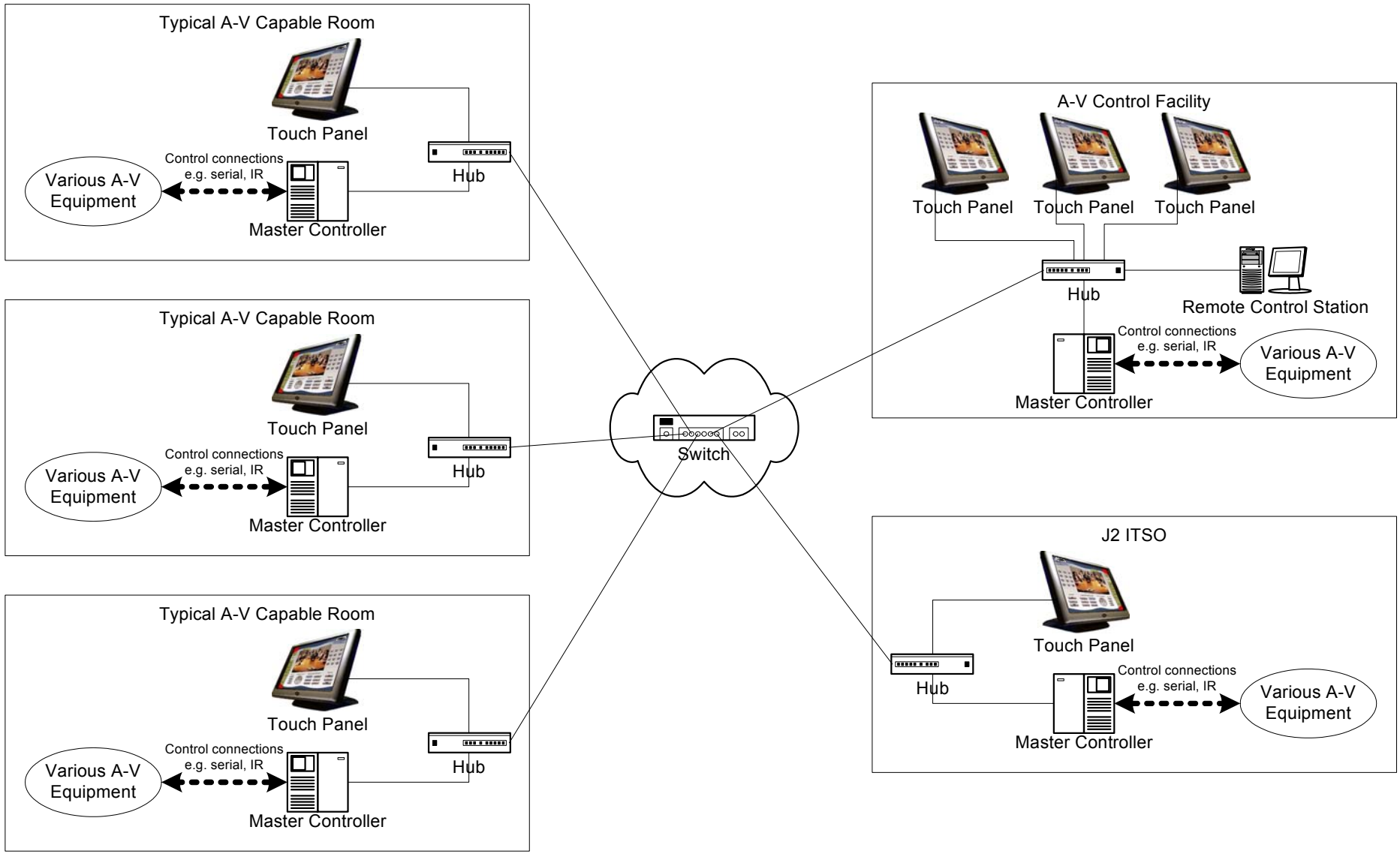
SPAWAR Systems Center San Diego

A-V Service Model Control Plane

- A-V Control System
  - » Local A-V Control System
    - Integrates control of all A-V systems within a battle cell
    - Provides a single, user friendly, icon-based user interface (UI)
    - Same look and feel in every battle cell ➔ standard UI
  - » Remote A-V Control
    - Each battle cell's local control system is connected to a control network
    - Allows each local control system to communicate with each other and exchange information
      - Security level
      - User authentication
      - Room Status
      - Remote control from central A-V control facility

SPAWAR
Systems Center
San Diego

A-V Control System Control Plane



SPAWAR
Systems Center
San Diego

Outline

- A-V Requirements
- The Battle Cell Concept
- A-V Service Model
  - » Audio service plane
  - » Video service plane
  - » Briefing service plane
  - » Control service plane
- Major Challenges
- Summary

SPAWAR
Systems Center
San Diego

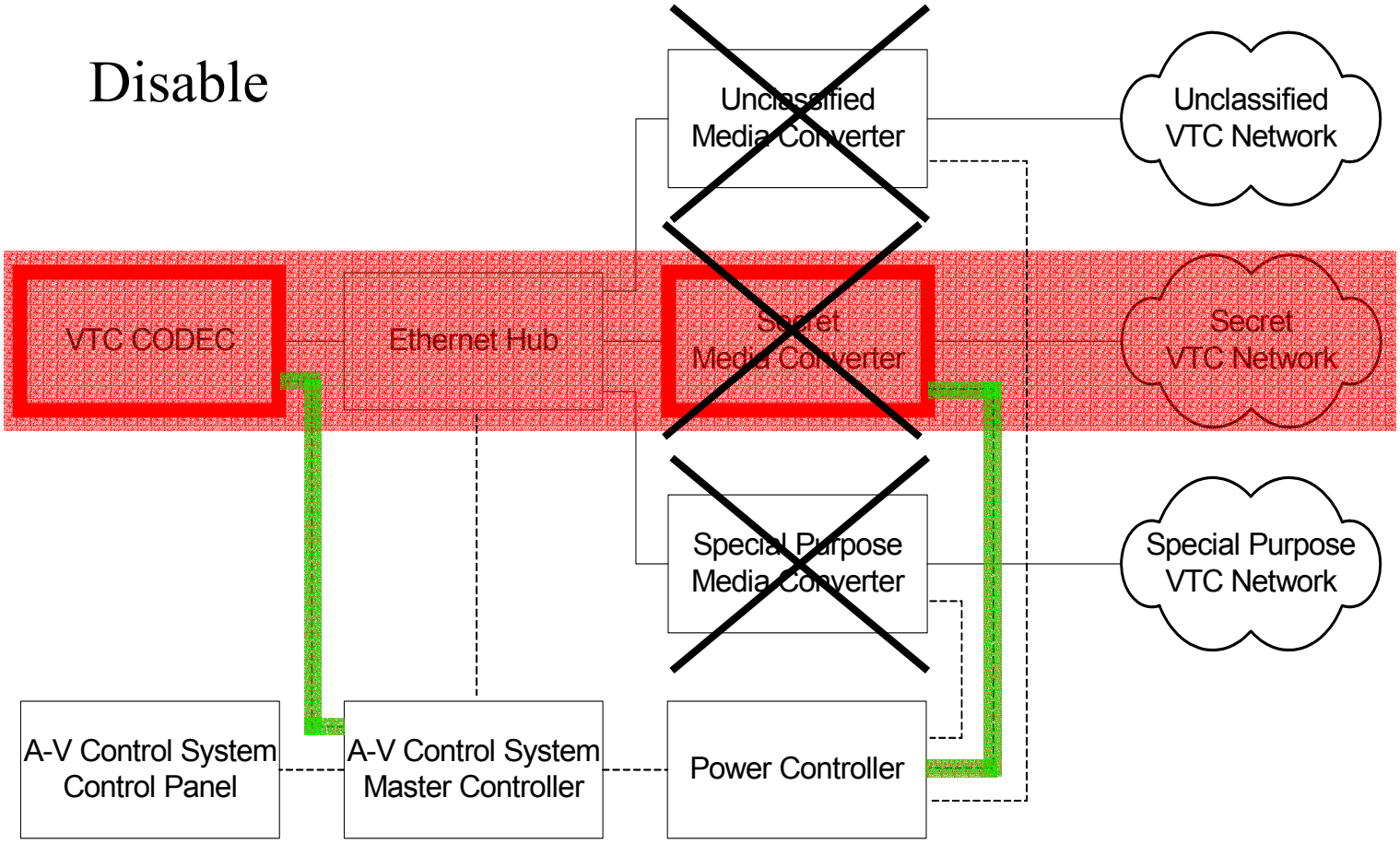
Major Challenges

- Operating at Multiple Security Levels
- VTC Protocol: H.320 vs. H.323

SPAWAR
Systems Center
San Diego

Major Challenges: Security
VTC Security

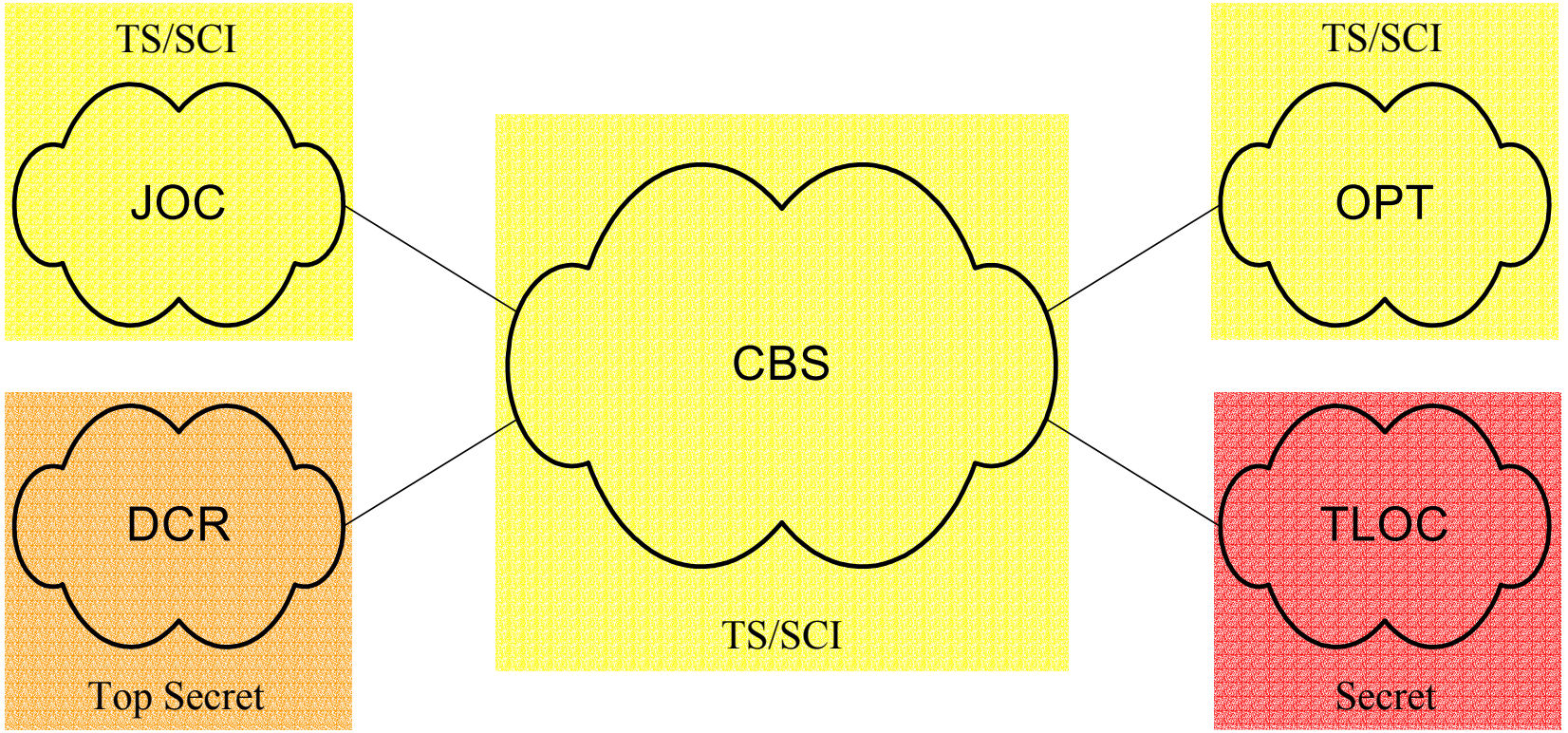
- Multiple Classifications of VTC Sharing a Single CODEC



SPAWAR
Systems Center
San Diego

Major Challenges: Security
CBS Security

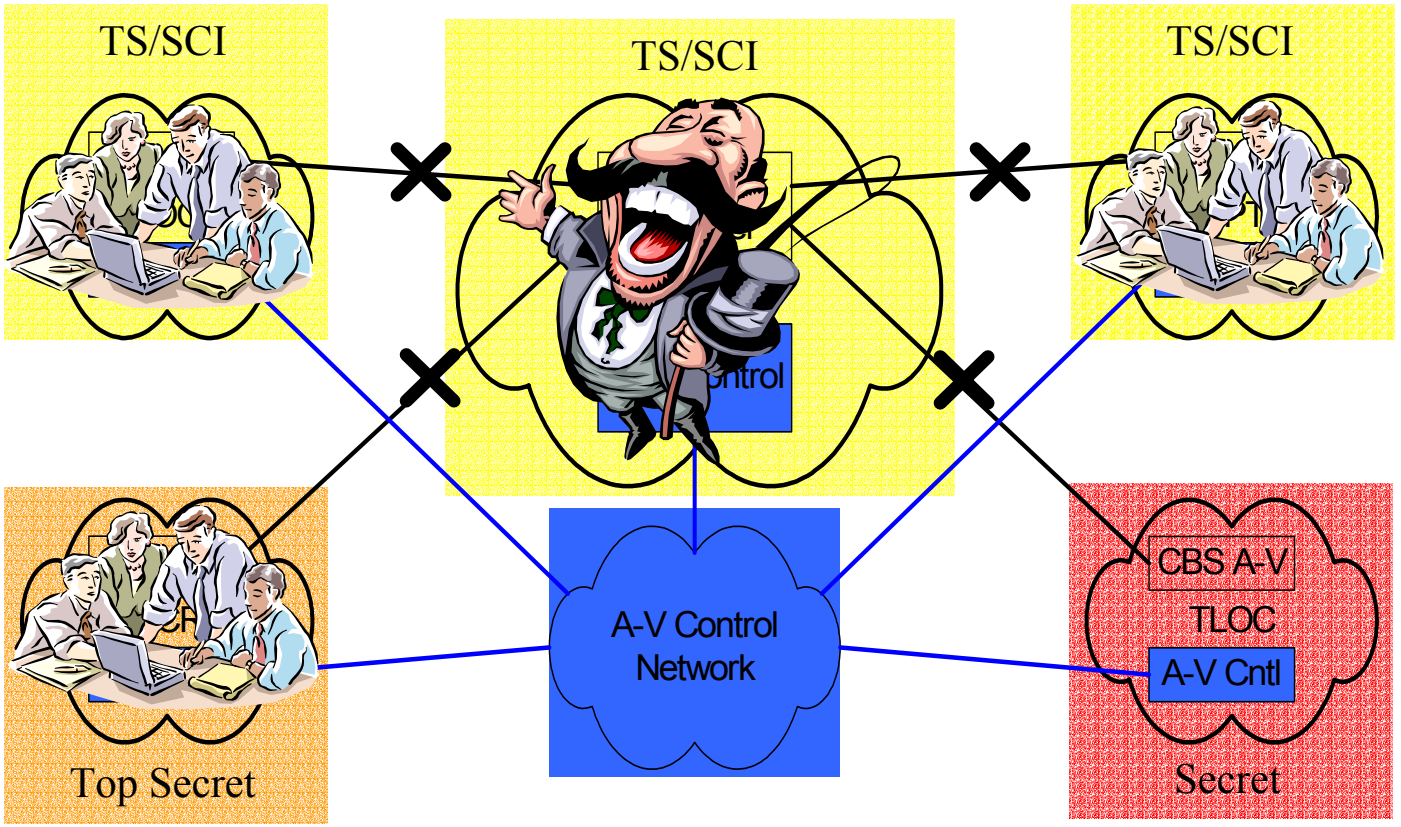
- The Problem…



SPAWAR Systems Center San Diego

Major Challenges: Security
CBS Security

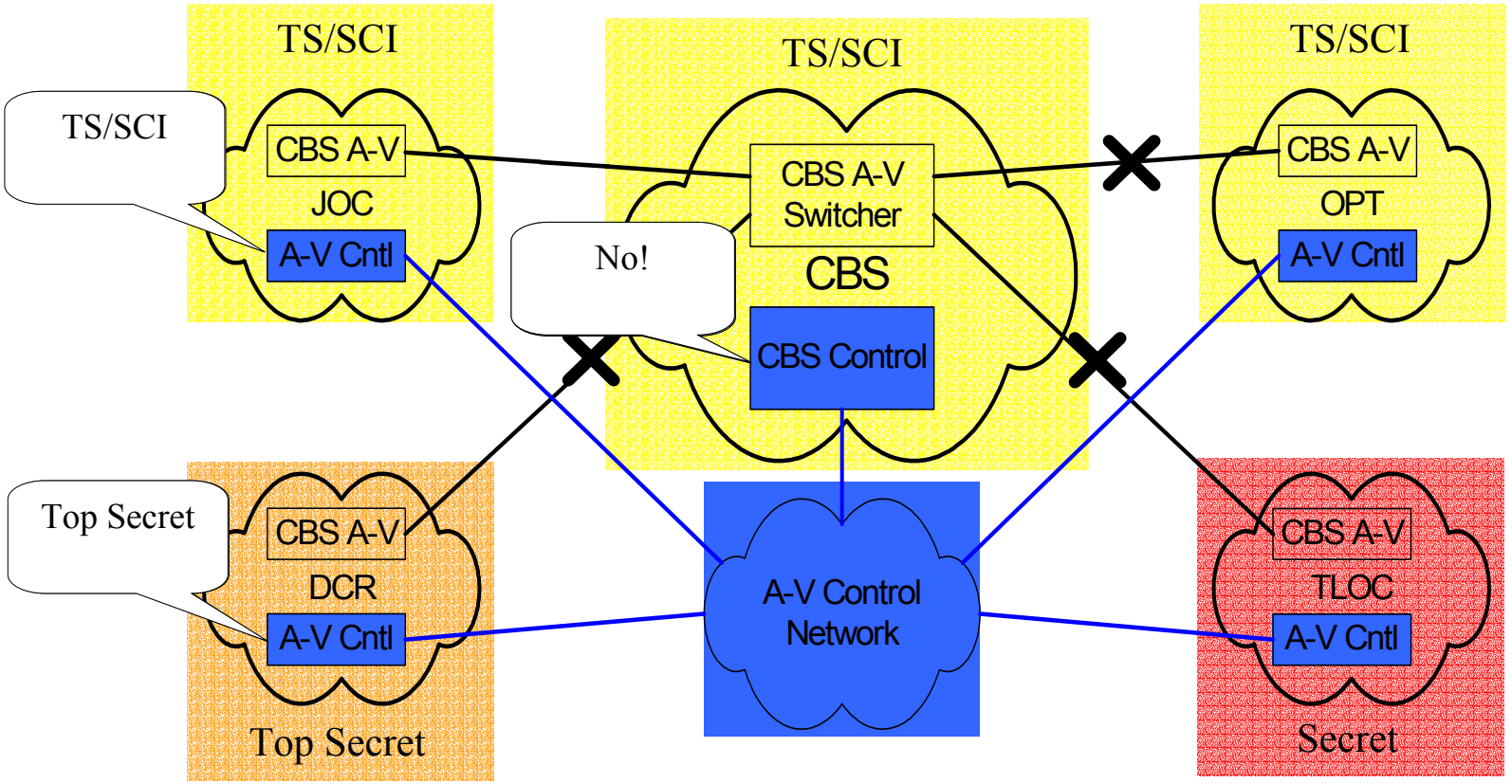
1. User login required
   - User level access in rooms
   - Administrator level access at CBS



SPAWAR Systems Center San Diego

Major Challenges: Security
CBS Security

2. Rooms must be at the same security level as CBS
   - Only after verification are A-V transceivers powered on and rooms connected to CBS



SPAWAR
Systems Center
San Diego

Major Challenges
H.320 versus H.323

H.320:

- Established standard
- Most common protocol used today
  - » VTC technicians familiar with O&M
- VTC WANs are H.320 based
  - » DVS-G
  - » VIXS

H.323:

- Industry accepted as future of VTC
  - » More development being done for H.323
- Network-based
  - » Convergence!
  - » Desktop VTC integration
- More features
  - » Network-based tools
  - » Web-based management
- JWICS VTC Network uses H.323

SPAWAR
Systems Center
San Diego

Summary

- The Video-Enabled Headquarters
  - » High Availability of A-V Information
  - » Collaborative Environments
- A-V Systems Architecture
  - » Delivers multitude of A-V systems on an integrated platform
  - » Consolidated and centrally managed
- A-V Service Model
  - » Standardized services
  - » Efficient operations