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TEAM ENSURE

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Generic
YOUNG SPIRIT | SENIOR MIND

MooD
SMARTER DECISIONS

Reply
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Architecture for the Frontline

Integrated-EA 2012

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Architecture (archit) for the Frontline (FL) Storyboard

1 Introduction to FL archit

- **Who – presenters – 2 non-architects**
- **What – Afghan Tac C4ISTAR**
- **How – illustrations via 3 vignettes**
  - **iot describe features of FL archit**
- **Lims – bottom up – challenges MODAF rulebook**

2 2008 illustration - JERNEC

Formal MODAFs:

OV-1
OV-2
OV-3
OV-5

Features
Formal MODAFs
Unclas
Office tools
Top down
Designed for exploitation
One-off

But not exploited

3 2011/12 illustration – HQ Visualiser tool

For FL user
Driver: op trg need
Built in Flash for DII
Immersive
Loosely drawn from OV/SVs - not purist MODAF
Enduring end to end

Features
Unclas
PC and DII tool
Bottom up development
Driven by op processes
Designed for exploitation
Unconventional archit

Exploited by FL

4 Vignette 1 – Preparing the Force

People Process Technology

Trg system 4 block model: people (trainee, trainer), process (design), technology (simulation system)
Problem analysis and recs drew on archits

Archit Views as middle step
formal/informal
To structure analysis
OV-1 tac base ISTAR
OV-2 HQ functional relsps
OV-4 HQ Org Charts
OV-5 Process workflows
SV-1 HQ Laydown

Exploitation
ISTAR CONUSE
Formal doctrine pubs
Trg Notes / TTPs
Trg presentations
Computer based trg – DII
METLs>processes>CTOs>TTPs>iTOs>apps

Hence HQ Visualiser

5 Vignette 2 – C4I Coherence

People Process Technology
Multiple people, processes and apps – requiring simplification
HQs to roles
HQs to processes
Roles to processes
Processes to applications
Roles to applications

Archit Views as middle step
formal/informal
To structure analysis
OV-2 HQ functional relsps
OV-4 HQ Org Charts
OV-5 App process workflows
SV-1 App nodal links

Exploitation

CIS CONUSE
SOIs/EWPs
Individual trg cses

6 Vignette 3 – Trg System Technology Insertion

Technology

Technical system designs
Records
Standardisation of design
Low cost
COTS based

Archit Views as middle step
formal/informal
To structure analysis
OV-1 tac base ISTAR
SV-1 HQ Laydown
SV-1 logical nodes network, server, client archit
SV-2 CATT UML

Exploitation

Trg system design
Trg system pack and rebuild
Inventory management

7 Summary and conclusions

Archit for FL Messages

Bottom up
Archit approach uses MODAF as mid step only
- **– purposeful activity not activity in its own right**
- **– final archit products are user specific**

FL user need focussed — non purist
Accessible – desktop apps
Exploit COTS
Brief and simple
Low classification
Widely promulgated to all
Spiral development – hi refresh tempo
Enduring &end to end
Exploitation needs – design, integ, trg, TTPs

Only build what user needs ⇨ reuse high

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Introduction

- Aim

  To consider the value of architecture in support to frontline operations

- Presented by
  - (Recent/former) frontline operators - non-architects
- Drawing from studies for
  - Land tactical C4ISTAR capability and collective training systems
- Approach
  - Case studies, illustrating the architectures provided / required
    1. C4ISTAR collective training study 2008
    2. Preparing the Force 2011-12
    3. C4I Coherence 2011-12
    4. Technology insertion into training systems 2011-12
  - **In order to describe the key features of architectures useful to the frontline**
- Warning
  - Does not take a purist MODAF approach to architecture development

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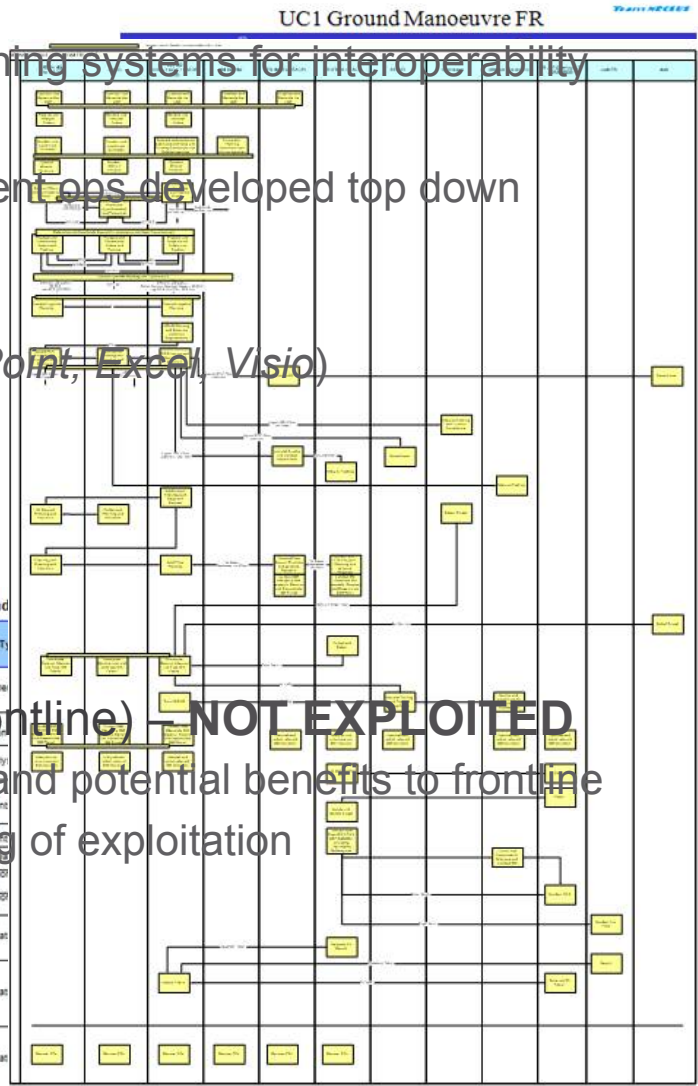
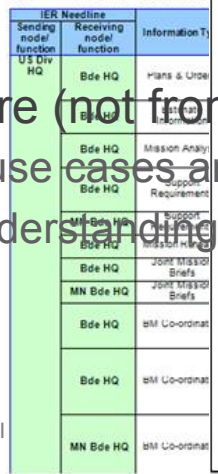
Case Study 1: C4ISTAR/Collective Training Interoperability

- Joint Enablers for the Realisation of Network Enabled Capability (JERNEC)
- Study aim:
  - To describe changes required to C4ISTAR and training systems for interoperability
- Formal MODAF architecture approach offered
  - For a set of 6 representative use cases for contingent ops developed top down
  - Designed for exploitation by frontline and industry
    - Easily shared – UNCLASSIFIED
    - Built in standard *MS Office* tools (*Word, PowerPoint, Excel, Visio*)
  - Detailed descriptions of generic frontline vignettes
    - Visualised in OV-1a, described in OV-1b
    - Nodal relationships explored in OV-2s
    - Information exchange flows in OV-3s
    - Activities and processes in OV-5s
- Controlled by MOD HQ & research centre (not frontline) – **NOT EXPLOITED**
  - Despite many Industry requests for the use cases and potential benefits to frontline
  - MOD had no mechanism, appetite or understanding of exploitation
  - One off study and MODAF set





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Case Study 2: HQ Visualiser Tool – 2011-2012

- Tool to teach frontline operators the architectures of their headquarters
  - Combines physical, organisational (roles), process and system views
- Not a 'traditional' 'pure' architecture
- Drawn from OV/SV architectures
  - Unconventional architecture approach
- Designed for exploitation by frontline:
  - Built in *Flash* for MOD PCs and Defence Information Infrastructure (DII)
  - Low classification
  - Immersive tool
  - Developed bottom up with user
  - Driven by frontline processes
- Controlled by Army HQ
  - Updated every 6 months
  - Enduring 'architecture' support
  - **WIDELY EXPLOITED**

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Case Study 2: Prepare the Force for Op HERRICK

- PTG Tactical C4ISTAR Programme – Training line of development
- CCD Aim:
  - To capture the training system requirements for Op HERRICK collective mission specific training
- People, processes and technology

E2E Training System			
Trainees	***Trainers***	***Training Design***	***Technical Environment***
Training audience, unit personnel, augmentees and generated personnel	Training staff, technical support, Theatre mentors and subject matter experts	Objectives, exercise events, data and doctrine	Building infrastructure, networks, hardware, software and simulation systems
People		***Processes***	***Technology***

- The scoping, problem analysis, demonstrations and assessment processes drew on a detailed set of architectures, which were:
  - A required step to develop the frontline's required output
  - Not designed from a purist view of MODAF, policy or architectural guidance
  - A mix of formal and informal views
  - Focussed on providing structure for design, analysis, doctrine and training
  - The basis for preparing the user for the frontline in Afghanistan

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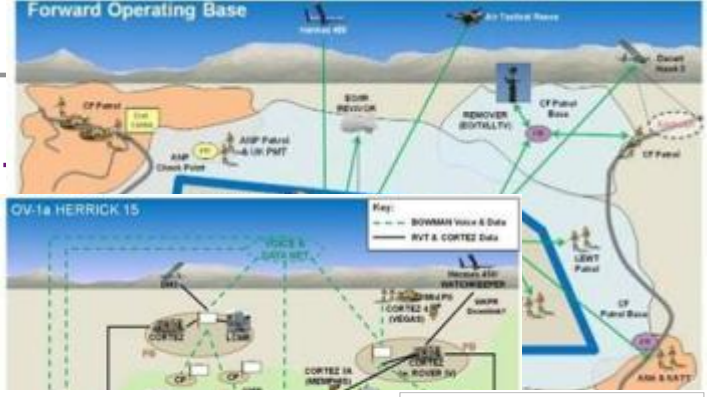
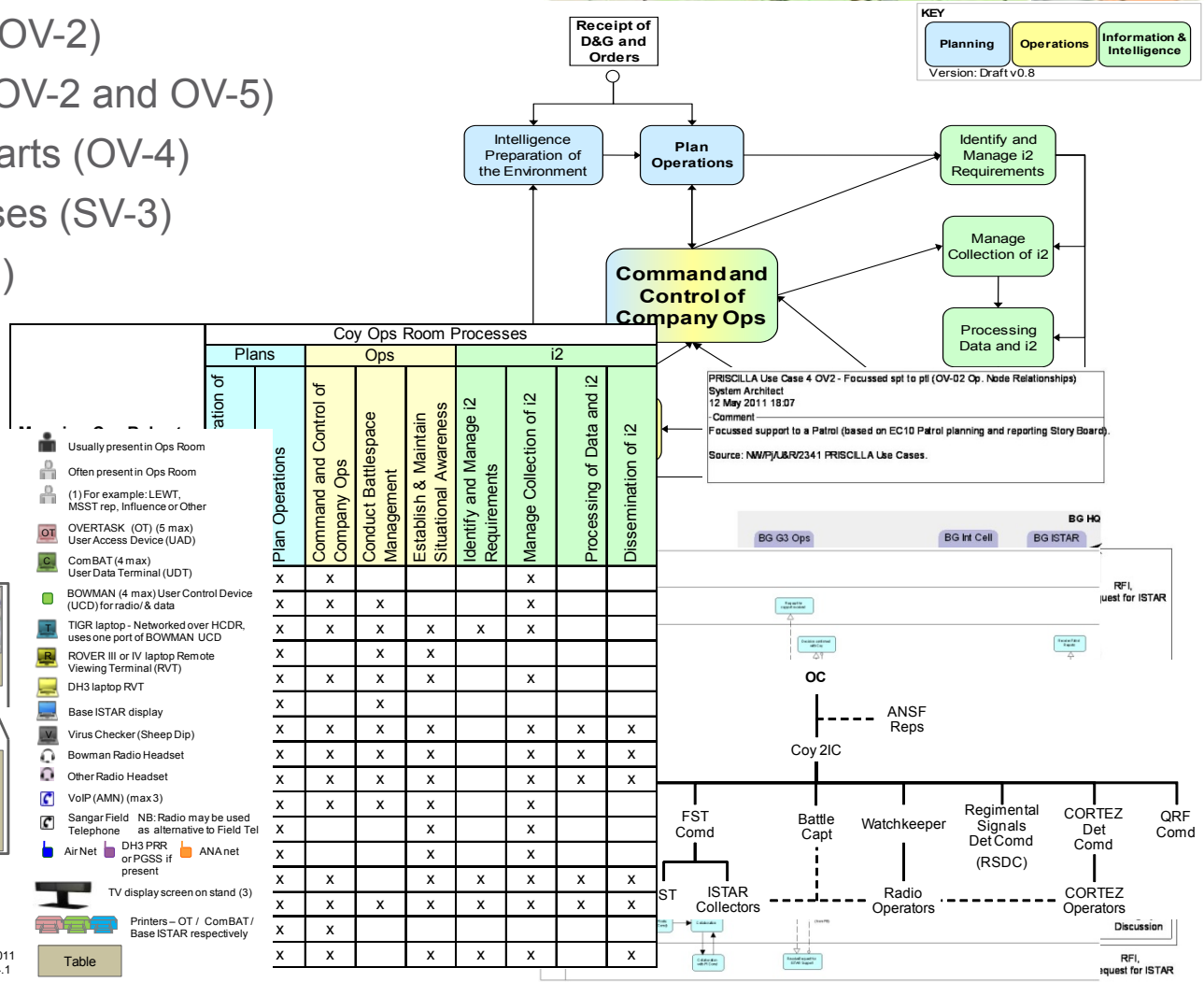
Case Study 2: Architecture development

- Architecture developments:
  - Tactical base ISTAR op views by roulement (OV-1)
  - HQ process maps (OV-2)
  - HQ process flows (OV-2 and OV-5)
  - HQ organisation charts (OV-4)
  - HQ roles to processes (SV-3)
  - HQ laydowns (SV-1)





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Case Study 2: Exploitation

- Base ISTAR Concepts of Use
- Formal doctrine publications: *Army Field Manual ISTAR*
- Training notes and tactics and procedures
- Training presentations
- Collective training objectives
- Computer based training on training LANs and MOD DII
  - ***HQ Visualiser tool***

Characteristics

- Bottom up – developed with and accepted by users
- Products developed for specific analytical and user needs
- Not always following formal MODAF guidance
  - Made to measure
  - Made for exploitation purpose (analysis, doctrine, training)
  - Minimum classification (to suit exploitation means, eg DII)
  - Visualisation

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Case Study 3: C4I Coherence for Op HERRICK

- PTG Tactical C4ISTAR Programme – communications and information systems (CIS) Coherence for Op HERRICK 17
- Aim:
  - To develop evidence for C4I tactics and procedures in order to simplify and clarify the H17 CIS Concept of Use (mapping apps to tasks to roles)
- People, process and technology
  - Multiple HQ roles in multiple processes with a choice of multiple applications
  - Requirement for clearer tasks to roles, tactics and procedures for tasks and an application for a task
- The problem analysis and recommendations were developed from a detailed set of architectures, which are:
  - A required step to develop the frontline's required output
  - Not designed from a purist view of MODAF, policy or architectural guidance
  - A mix of formal and informal views
  - Focussed on providing structure for analysis, doctrine (concepts of use, tactics and procedures) and training
  - The basis for providing the user with a simple, practical concept of use for the frontline in Afghanistan

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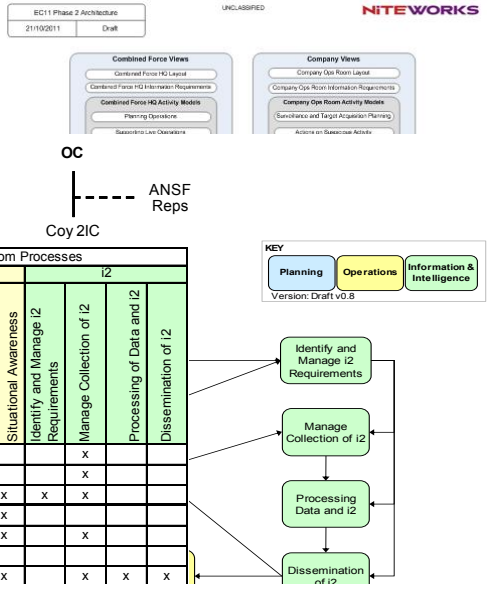
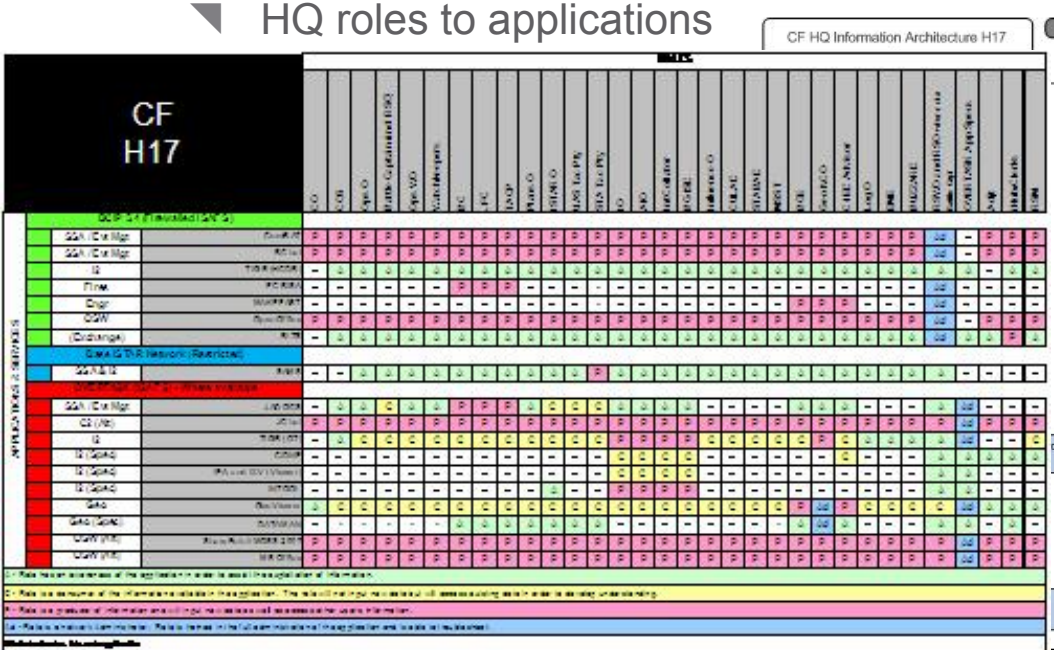
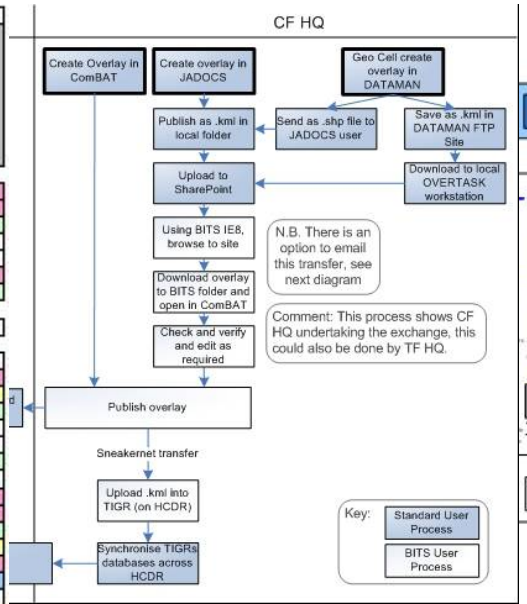
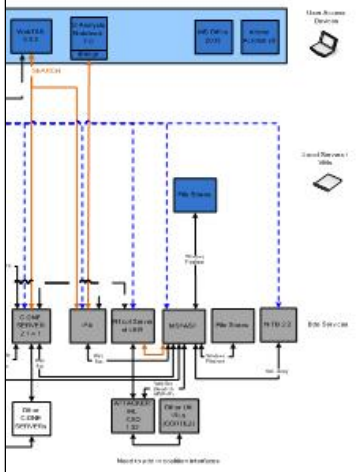
Case Study 3: Architecture development as a middle step

- Architecture developments:
  - All Views architecture scope (AV-1)
  - HQ organisation charts – roles - (OV-4)
  - HQ process maps (OV-2)
  - HQ roles to processes
  - HQ CIS system views (SV-1)
  - HQ processes to applications
    - Application process flows (OV-5)
  - HQ roles to applications









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Case Study 3: Exploitation

- H17 CIS CONUSE reissue - simplified
- Standard Operating Instructions (SOIs) for applications processes
- Application Electronic Working Practices (EWPs)
- Information Management/Exploitation (IM/IX) tactics and procedures
- Individual Training Course training objectives
- Collective Training Objectives

Characteristics

- Bottom up – developed with and accepted by users
- Products developed for specific analytical and user needs
- Not always following formal MODAF guidance
  - Made to measure
  - Made for exploitation purpose (analysis, doctrine, training)
  - Common simple formats
  - Minimum classification
  - Visualisation

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Case Study 4: Training system technology insertion

- PTG Tactical C4ISTAR Programme – Training line of development
- CCD Aim:
  - To capture the training system requirements for Op HERRICK collective mission specific training
- Technology
  - To design technical architecture for training systems
    - Low cost, rapid development
    - Commercial-off-the-shelf (COTS) insertion
  - To capture changes from spiral development
  - To record training system technical implementation
  - To standardise design for re-use
  - To inform future programmes
- The problem analysis and recommendations were developed from a detailed set of architectures, which are:
  - A required step to develop the frontline's required output
  - Not designed from a purist view of MODAF, policy or architectural guidance
  - A mix of formal and informal views

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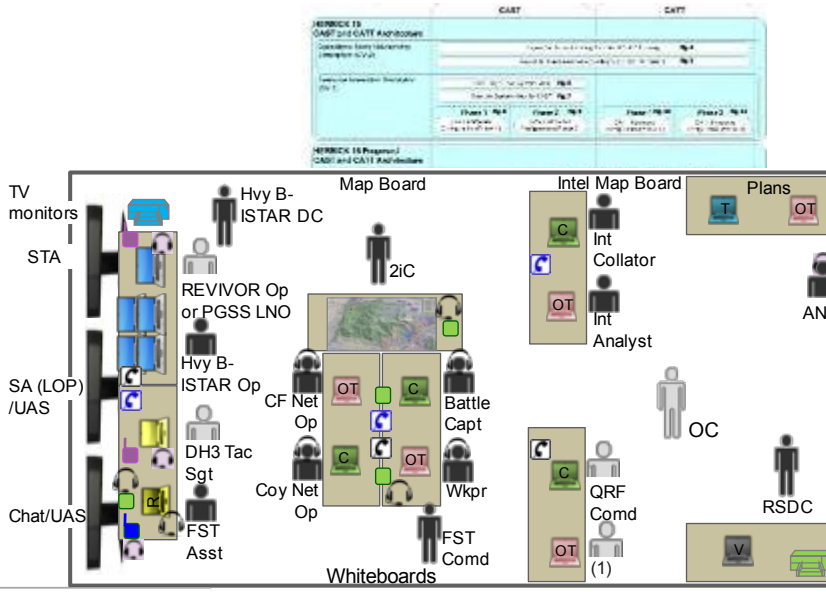
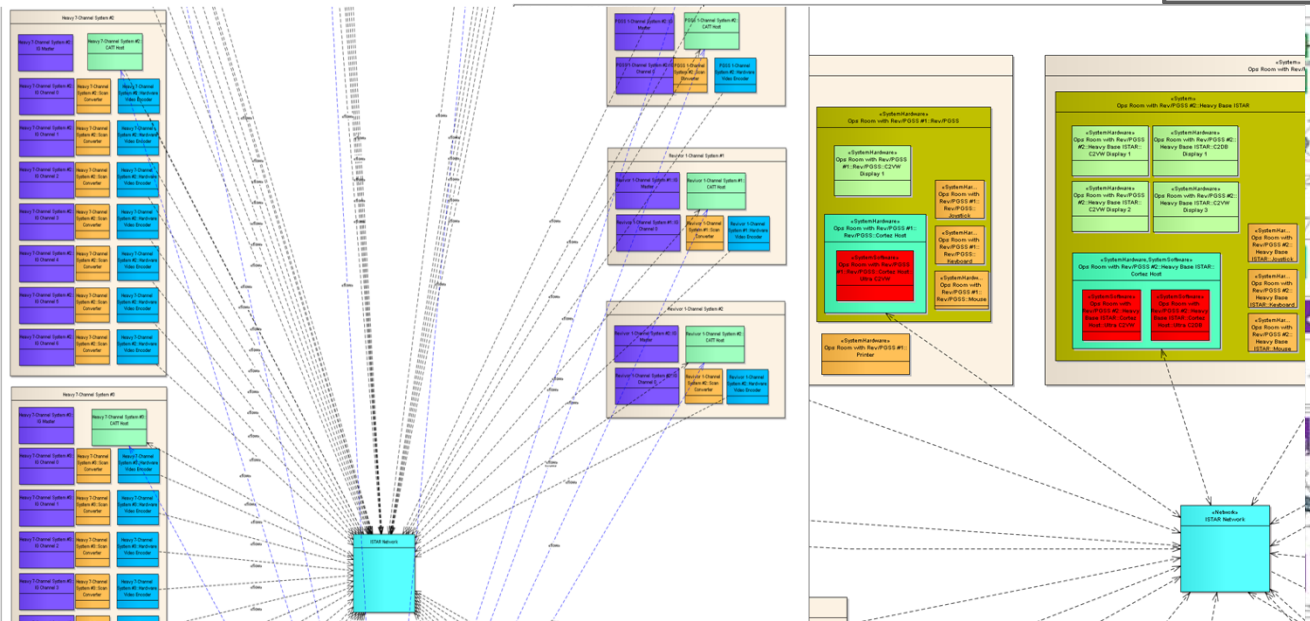
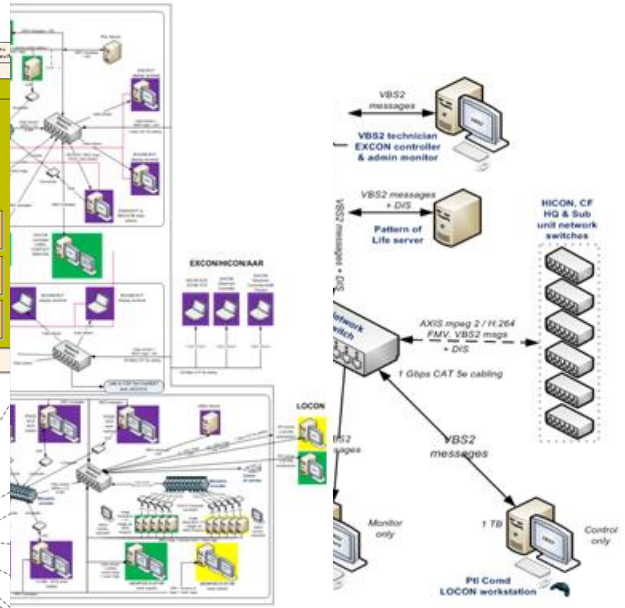
Case Study 4: Architecture development as a middle step

- Architecture developments:
  - *All Views* architecture scope (AV-1)
  - HQ laydowns (SV-1)
  - Network logical nodes (SV-1)
    - Per trial, by room, aggregated site
    - Client architecture
    - Server architecture







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Case Study 4: Exploitation

- Record of trials
- Training system design for acquisition
- Training system rebuild (repeatability for pack up)
- Inventory management
- Technical staff training
- Future acquisition programmes (Future Command and Staff Training)

Characteristics

- Bottom up – developed with engineers
- Products developed for specific assessment and engineer needs
- Not always following formal MODAF guidance
  - Made to measure
  - Made for exploitation purpose (design, acquisition and build)
  - Visualisation

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Key Features

- Case studies (Prepare the Force, C4I Coherence and Training System Technology Insertion) were inter-related
  - Multiple industry project teams working towards common objectives
- Re-use of architecture work was a force multiplier
  - Teams had common tools and approaches to architecture development
  - Initial products could be refined and spirally developed before re-use on task
- Industry was embedded with frontline users
- Users were intimately engaged in tasks during architecture development
- Architectures were developed across a combination of trials, demonstrations and workshops
- Architectures were critical means to:
  - Visualise problems
  - Define options
  - Assess options
  - Define solutions
  - Capture and develop doctrine, including tactics and procedures
  - Visualise for training

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Architecture for the Frontline Messages

- Frontline user need is paramount
  - MODAF architecture policy and requirements are subordinated
- Bottom up (not top down) development
  - Not slaved to purist approach/ formal architecture framework
- Architecture used as mid step only
  - Value added purposeful activity only: for analysis; for user
- Architecture products are user specific
  - Accessible by user on desktop applications
  - Accessible by user through low classification
  - Displays operational information in a consistent manner
  - Displays information in short, common and simple formats
  - Visualises complexity simply for user – for procurement, doctrine and training
  - Promulgated widely to all potential users
  - Refreshed regularly for spiral development (use of COTS)
  - Simple products, easy to update
  - Reflect end-to-end requirement capture and enduring industry support

Only build what user needs ⇨ high reuse

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Architecture for the Frontline

Questions

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