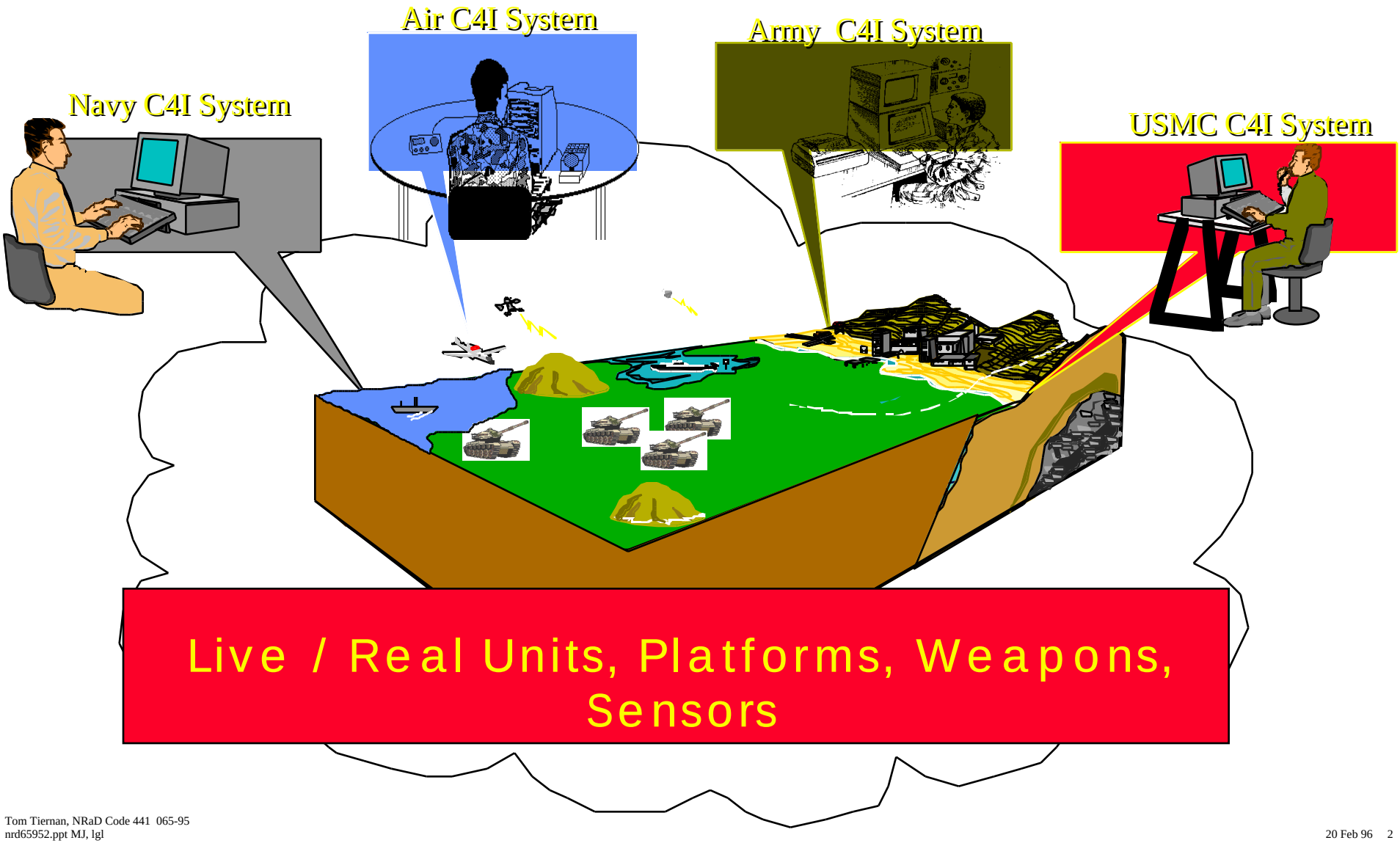
Modular Reconfigurable C4I Interface *(MRCI)*

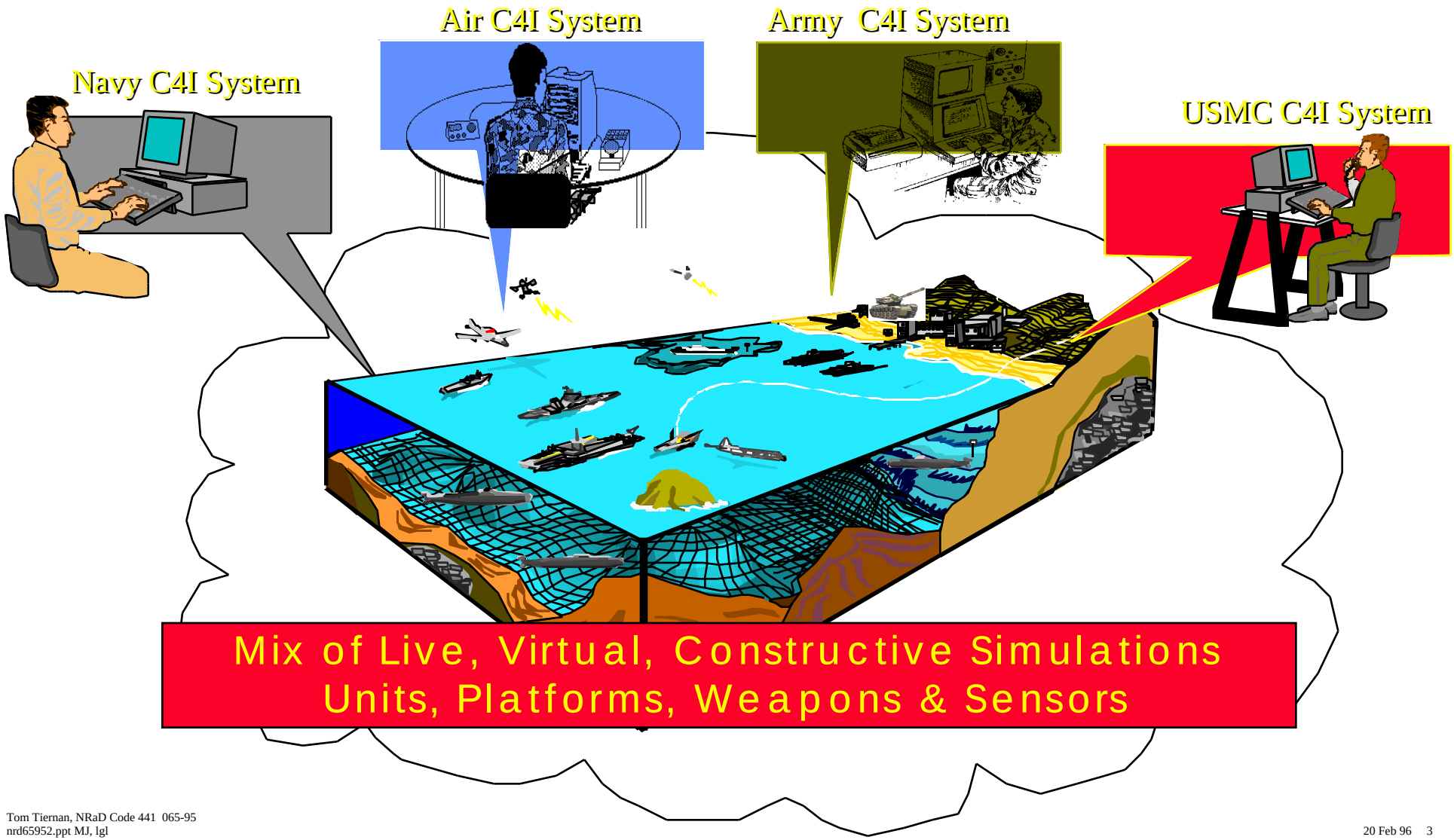
Program Plan

21-22 February 1996

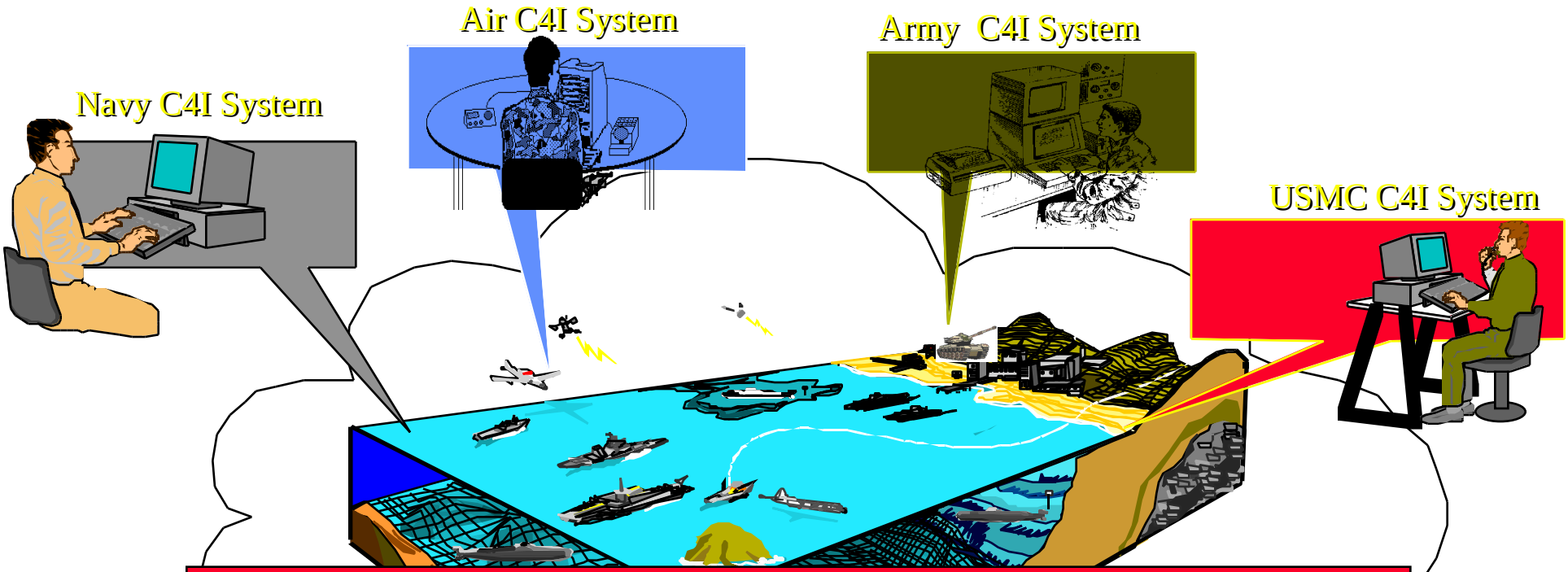
Real World


Air C4I System
Army C4I System
Navy C4I System
USMC C4I System
Live / Real Units, Platforms, Weapons, Sensors

M&S World


Air C4I System
Army C4I System
Navy C4I System
USMC C4I System
Mix of Live, Virtual, Constructive Simulations
Units, Platforms, Weapons & Sensors

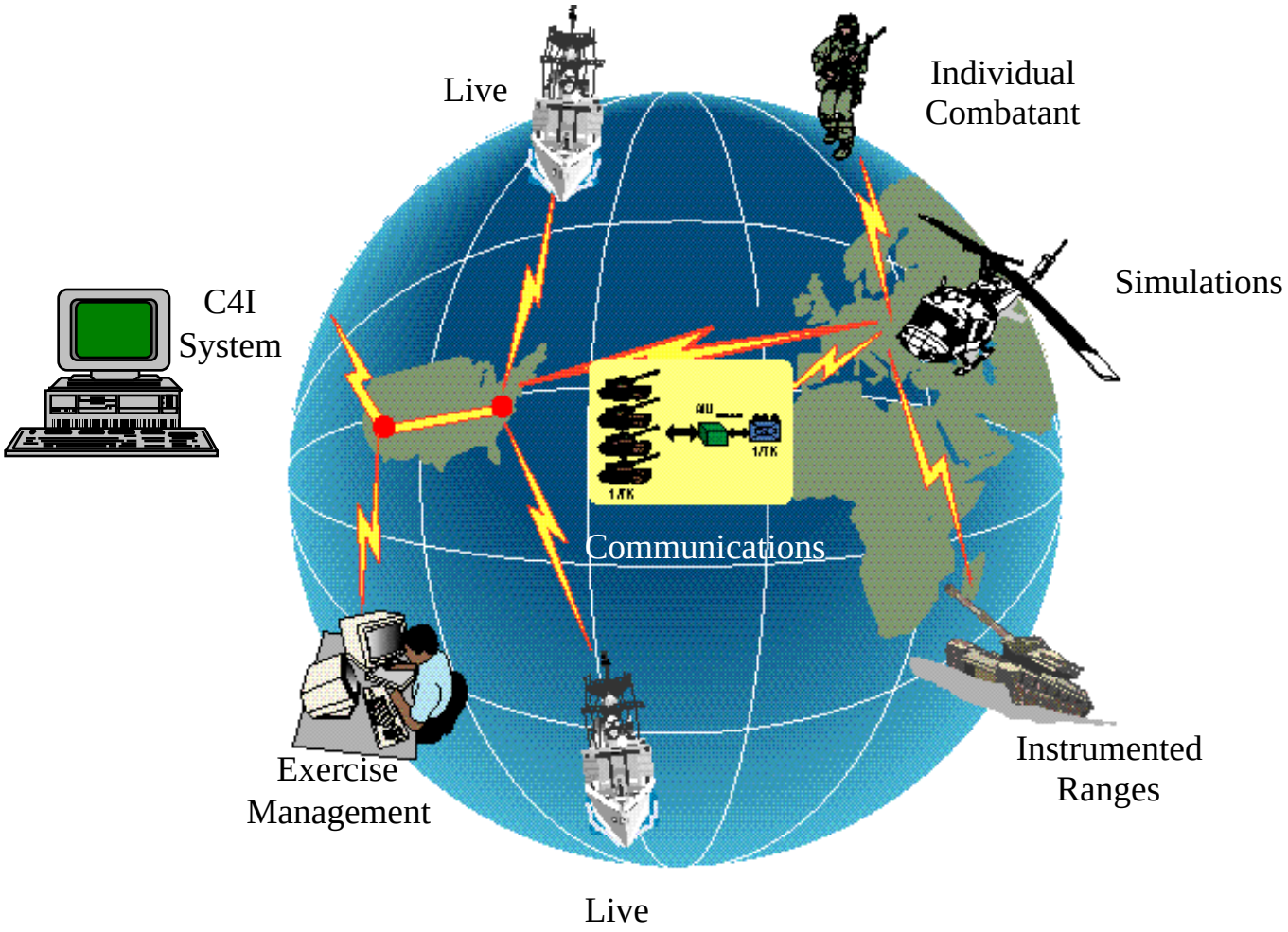
Intent of MRCI



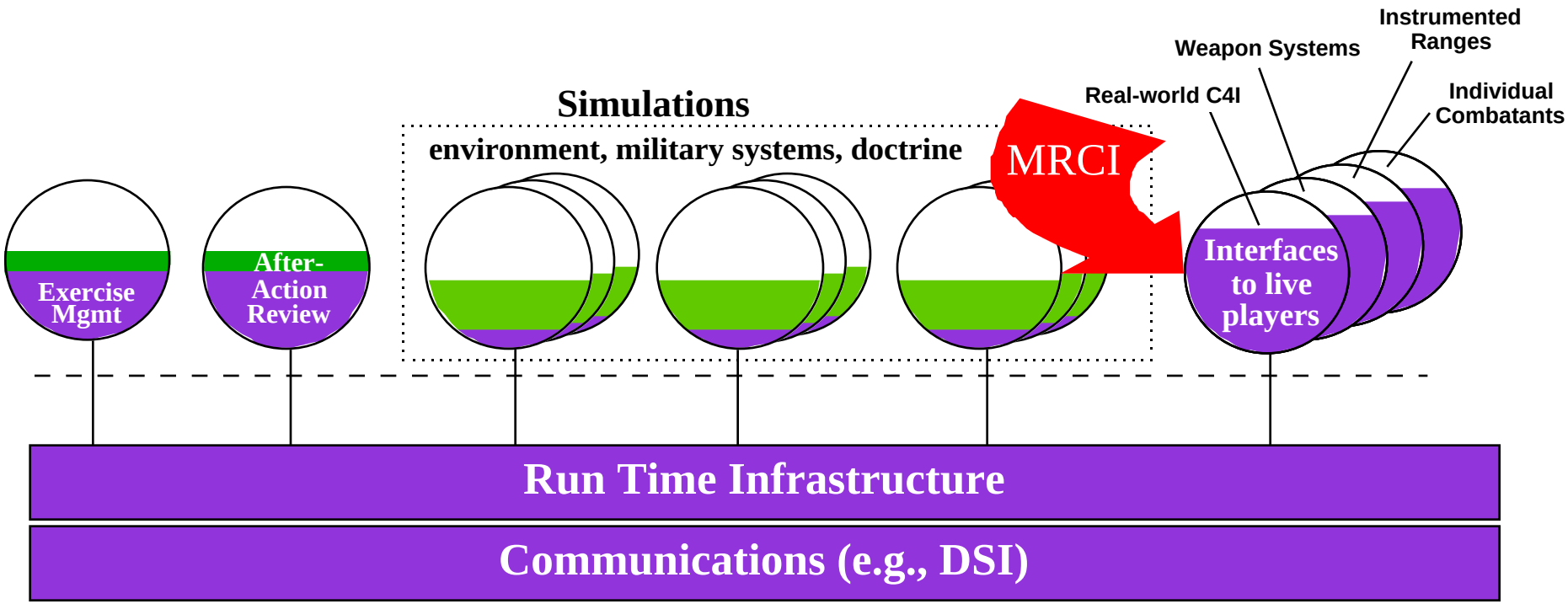
It doesn't matter if the forces are live or simulated, the "Decision Makers" should participate via their real C4I system.

The intent of MRCI is to build the C4I

Components


Live
Individual Combatant
C4I System
Simulations
Communications
Exercise Management
Instrumented Ranges
Live

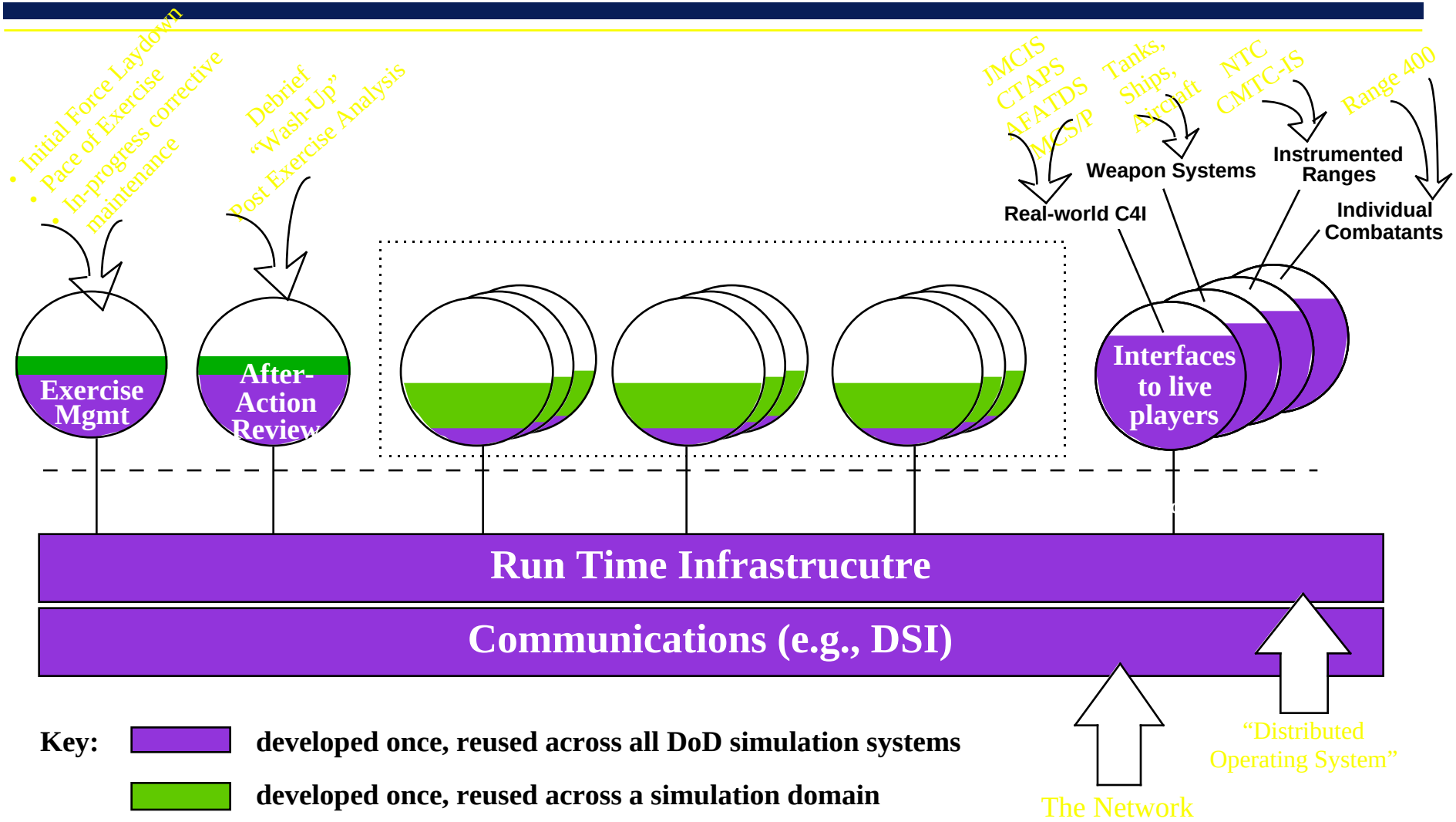
MRCI within HLA



Key:

- developed once, reused across all DoD simulation systems
- developed once, reused across a simulation domain
- unique

MRCI Examples



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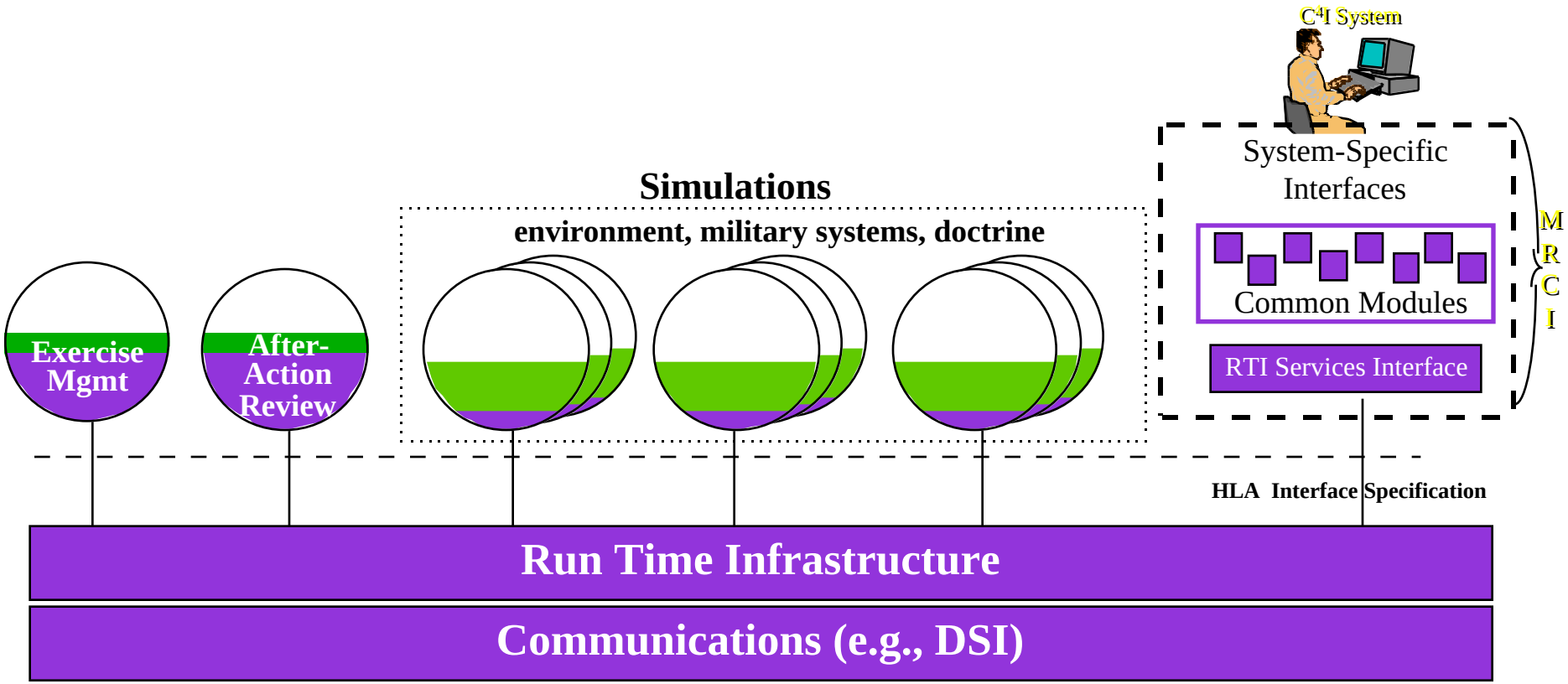
C^{4}I Interface



Key:

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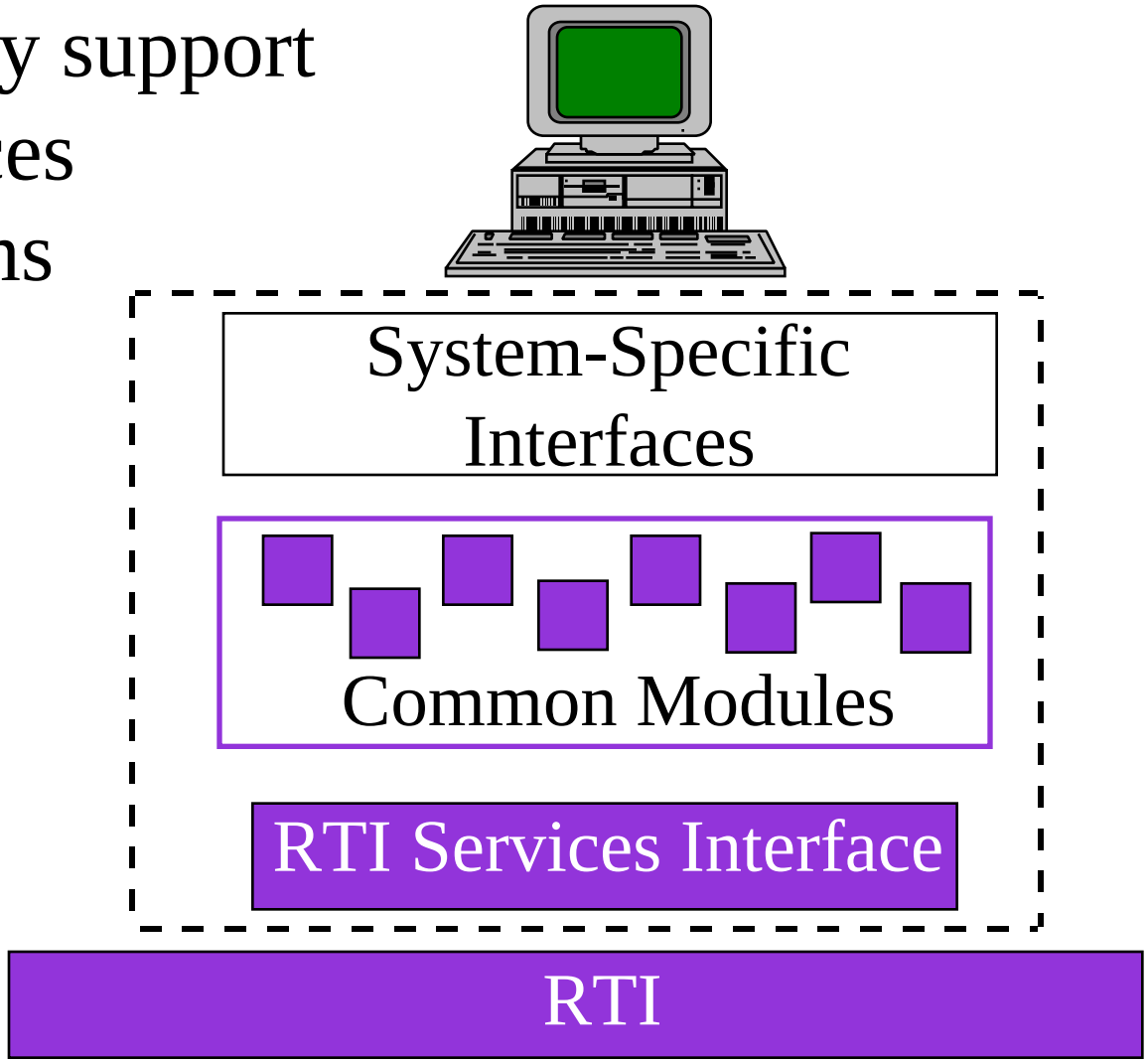
MRCI Purpose

... to cost effectively support "seamless" interfaces between C^4I systems and simulations

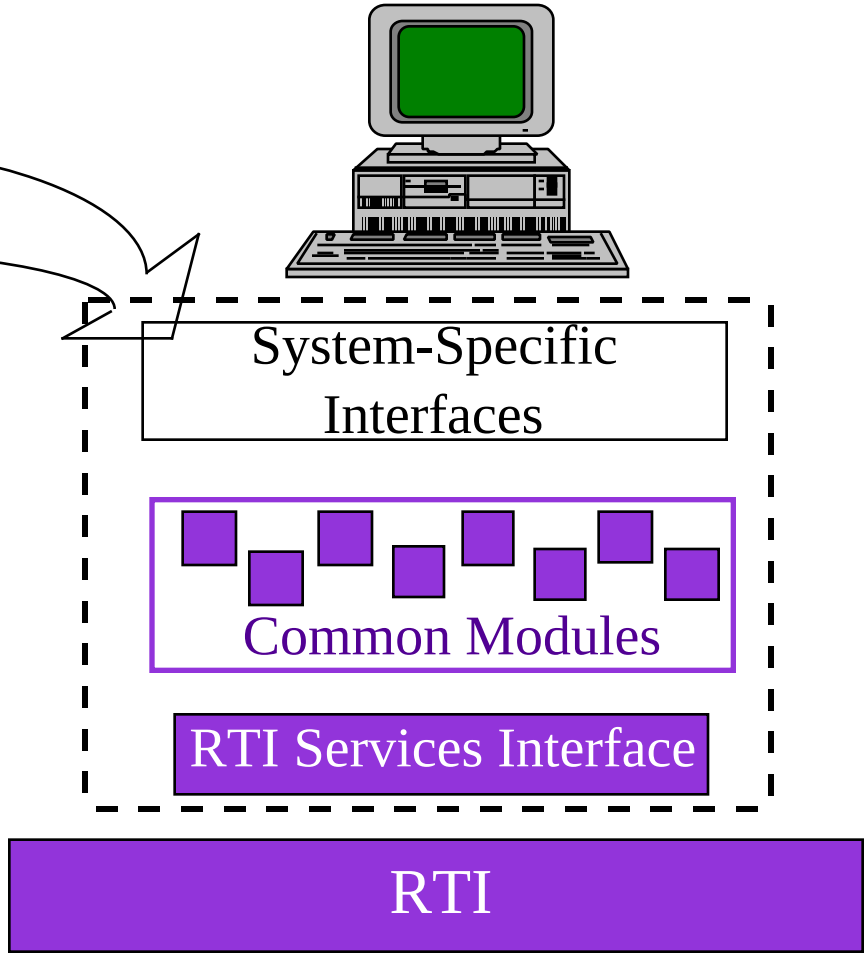


Interface Specification

DMSO

Interface Spec & Software

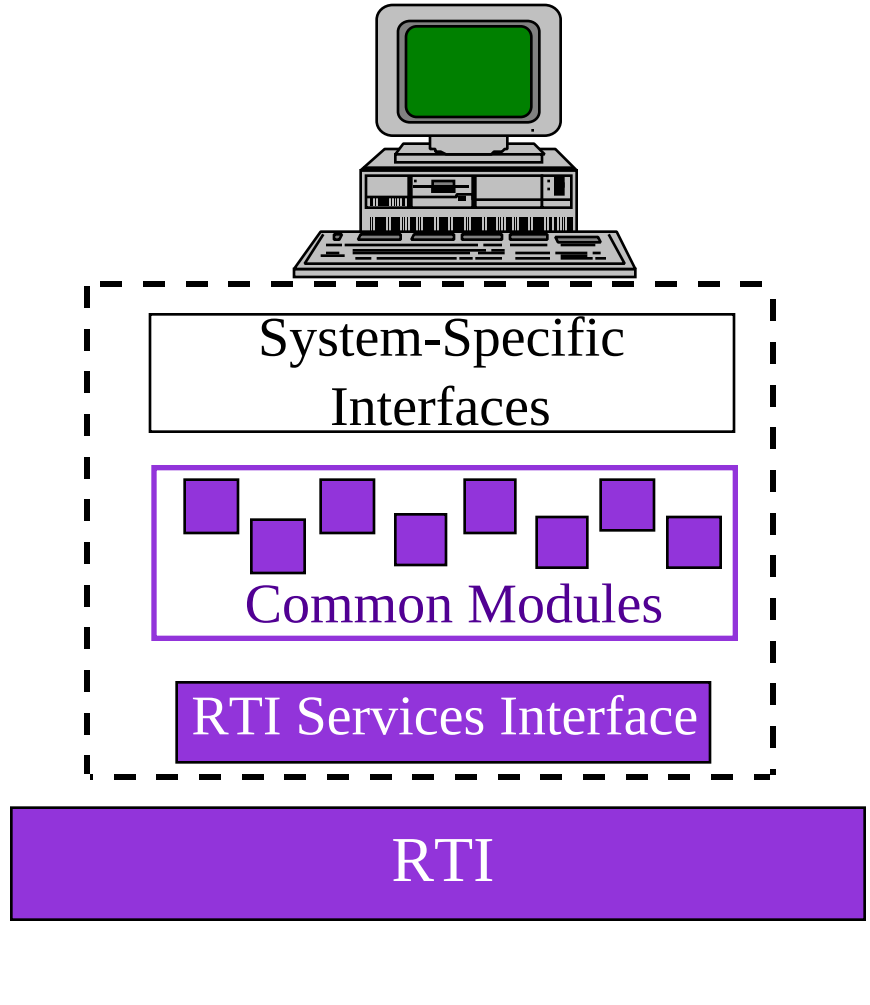
1. Intro/Purpose
2. Applicable Documents
3. Interface Summary Cross-Index
4. Signal Definition List
5. Narrative Signal Flow Table
6. Interdigital Processor Communications
7. Data Unit Description
8. Message Definition



Run-Time Infrastructure

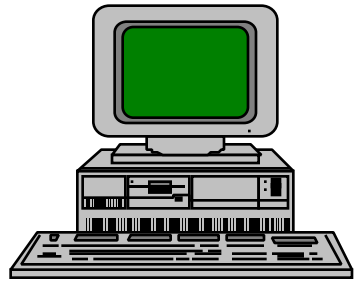
HLA RTI

1. Federation Management
   e.g., Create, Pause, Resolve, Save,...
2. Declaration Management
   e.g., Publish Object, Subscribe, Control,...
3. Object management
   e.g., ID Request, Instantiate, Delete,...
   Send Interaction, Provide Attribute Value,...
4. Ownership Management
   e.g., Request Attribute Ownership Divestiture, Request Delete Privilege Acquisition,...
5. Time Management
   e.g., Set Federation Time, Request, Time Advance, ...



Common Modules

MRCI Common Module Examples	
Technical Functions	Operational Functions
• Attribute Extrapolation • Data Collection • Implementing propagation effects	• Message & Datalink -Translation -Building -Transmission -Labeling



System-Specific Interfaces

Common Modules

RTI Services Interface

RTI

What's Most Important to... DMSO

DMSO

- MRCI
  - Common Modules
  - RTI Services Interfaces

developed once, reused across all DoD simulation systems

- Integration & Test

Programs/Joint/Services

- Specific C4I Systems
  - System-Specific Interfaces to MRCI

Unique C4I systems

- Employ

‘96 Plan

- Get started
- Develop MRCI Technical Framework
- Conduct experiments for scope/context
  - Synthetic Theater of War (STOW)
    - * From DIS 2.X to HLA
  - Joint Training Confederation (JTC)
    - * From ALSP to HLA
- Gain “lessons learned”

Note, the DMSO primary product is the MRCI

‘96 Expectations

DMSO

Anticipated Lessons Learned

- To address to what extent interface modules are common and reconfigurable
- Bring community together to begin to address C4I <-> Simulation Interfacing
- To gain an understanding of the common requirements
- To make progress, through experimentation, in determining how much is common

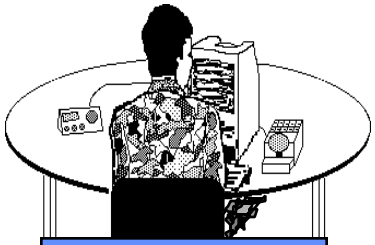
‘96 Experiments

DMSO

- Four experiments planned
  - Air Force CTAPS <- HLA & MRCI -> AWSIM/R
  - Air Force CTAPS <- HLA & MRCI -> AFSAF
  - Army MCS/P & AFATDS <-HLA & MRCI -> CBS
  - Army MCS/P & AFATDS <-HLA & MRCI -> Army Synthetic Forces & CFOR
- DMSO is committed to carrying the common portions forward
- Programs/Services should carry “system specific aspects” forward

Experiment #1

CTAPS <--> AWSIM/R



CTAPS

System-Specific Interface

X Z

RTI Services I/F

AWSIM/R/JTC

ALSP Interface

ALSP HLA Adaptor

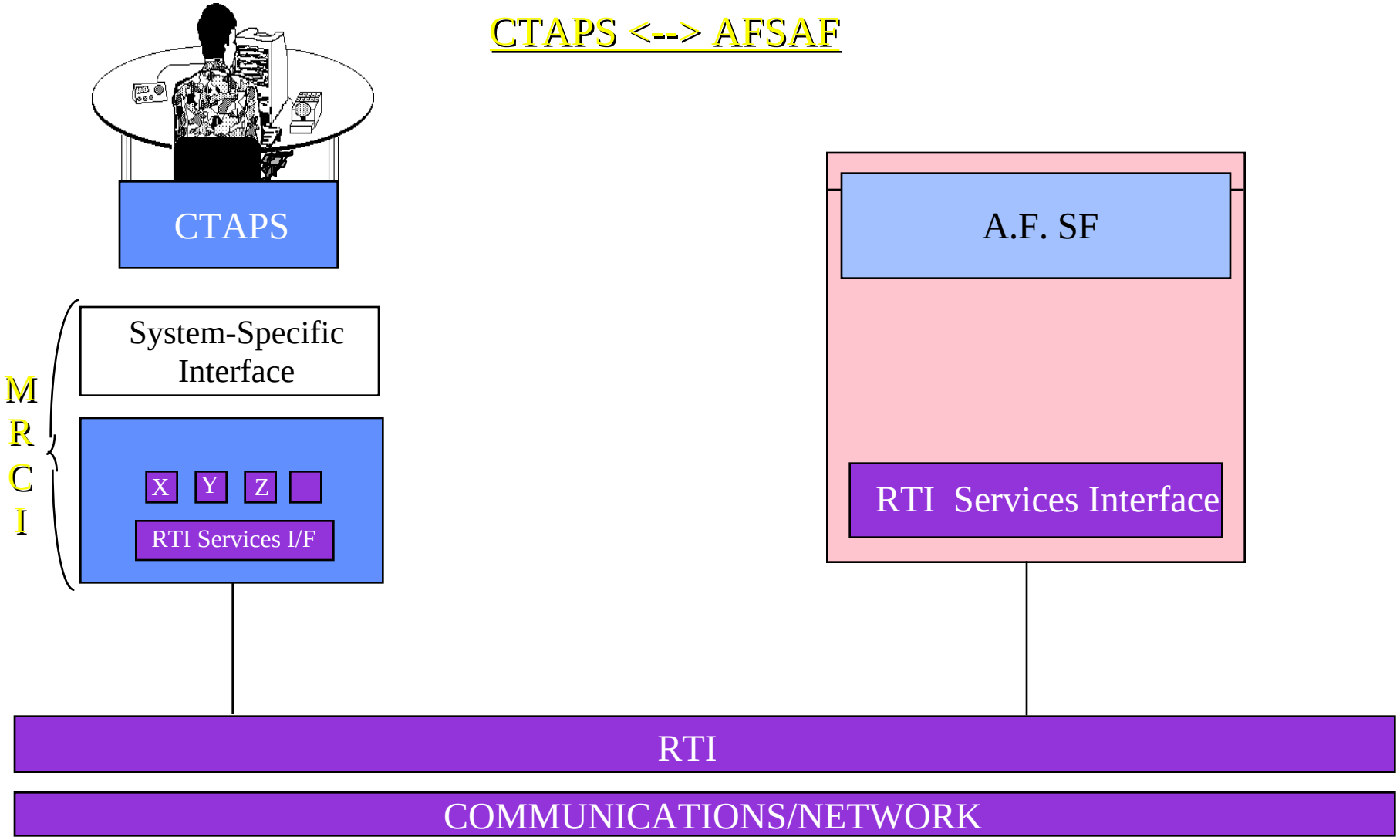
RTI

COMMUNICATIONS/NETWORK

Experiment #2

DMSO

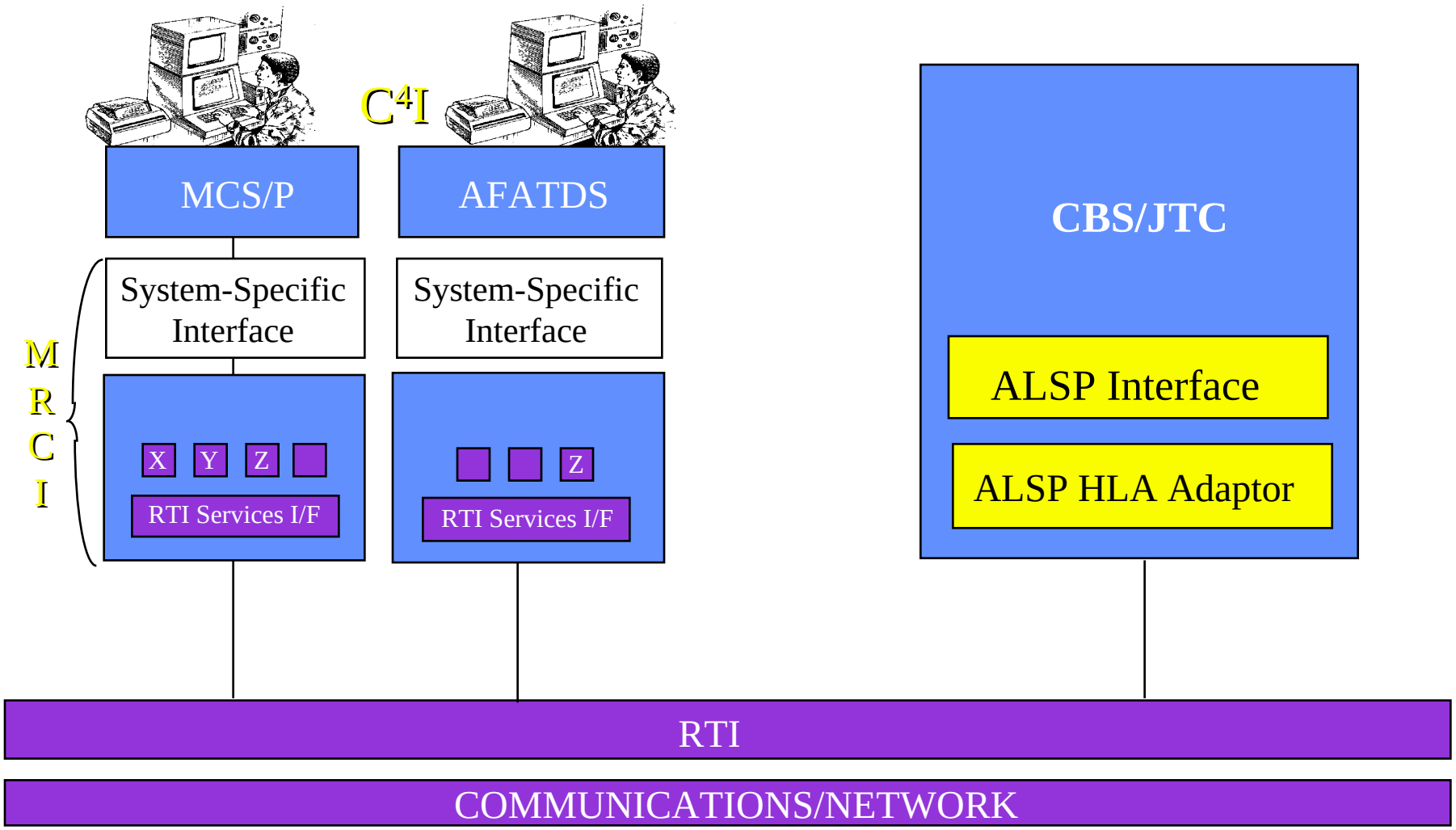
CTAPS <--> AFSAF



Experiment #3

DMSO

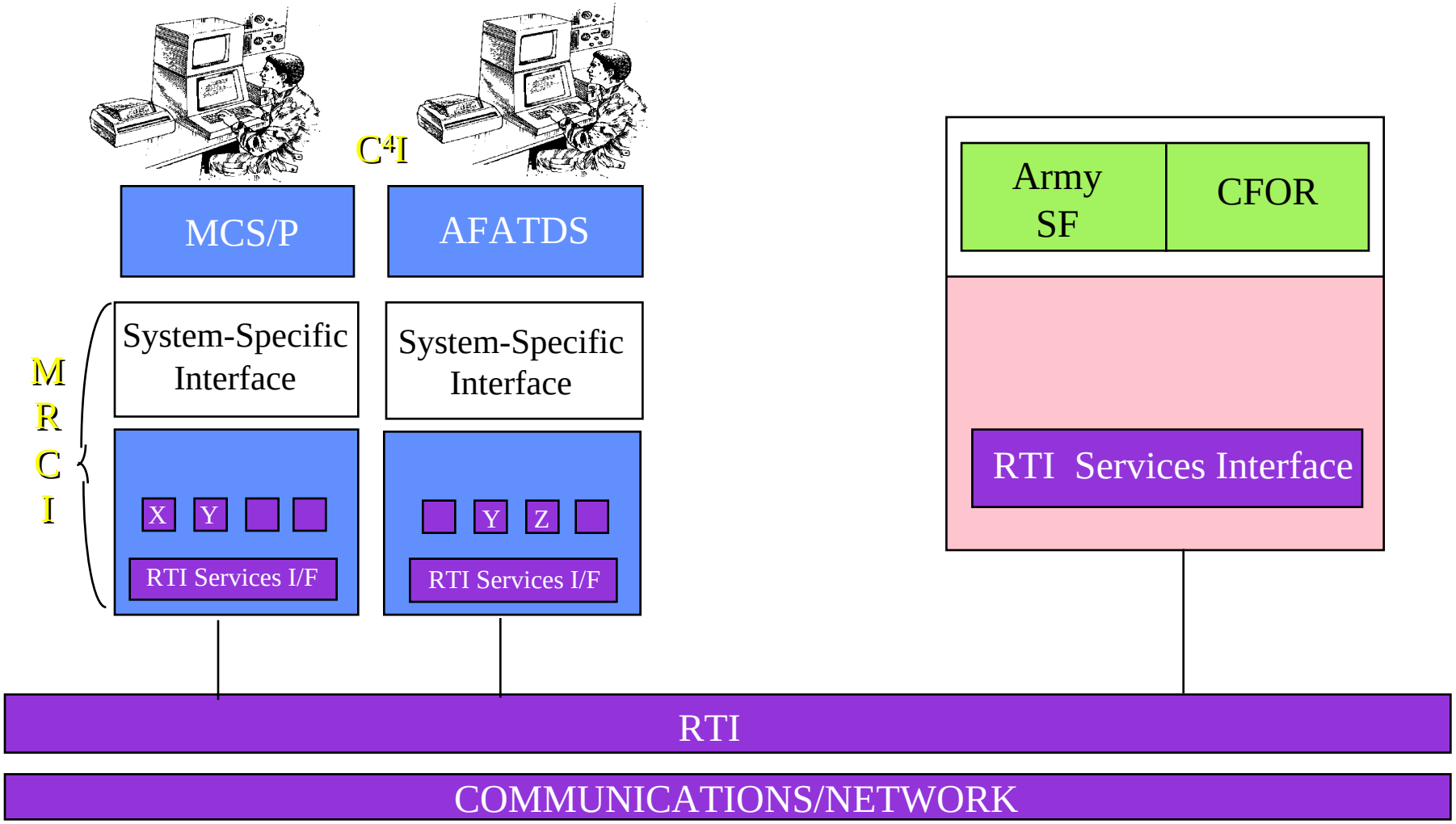
MCS/P & AFATDS <--> CBS



Experiment #4

DMSO

MCS/P & AFATDS <--> CFOR & ARMY SF

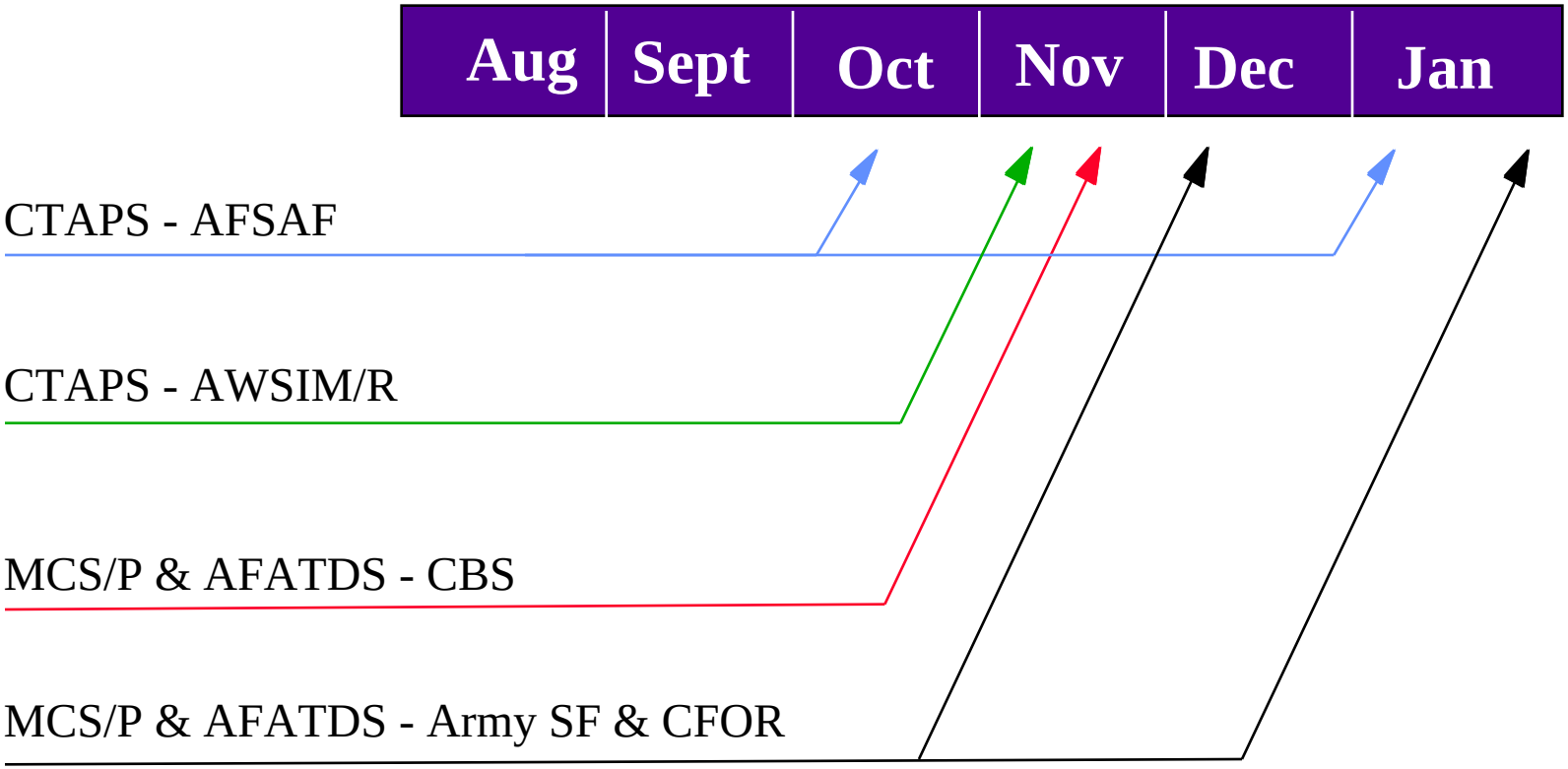


'96 Experiments Schedule

DMSO

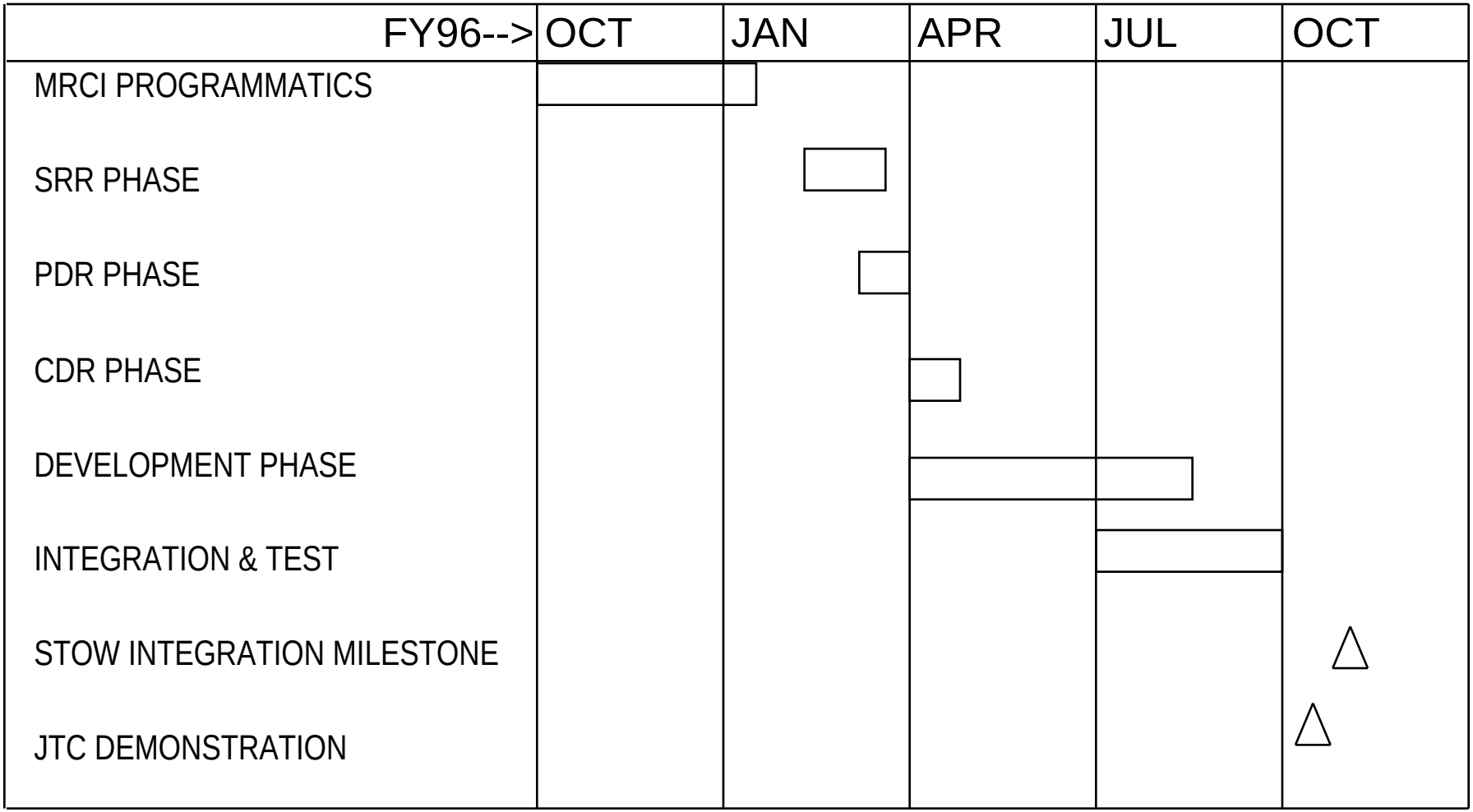
- Draft -

1996



‘96 Schedule

DMSO



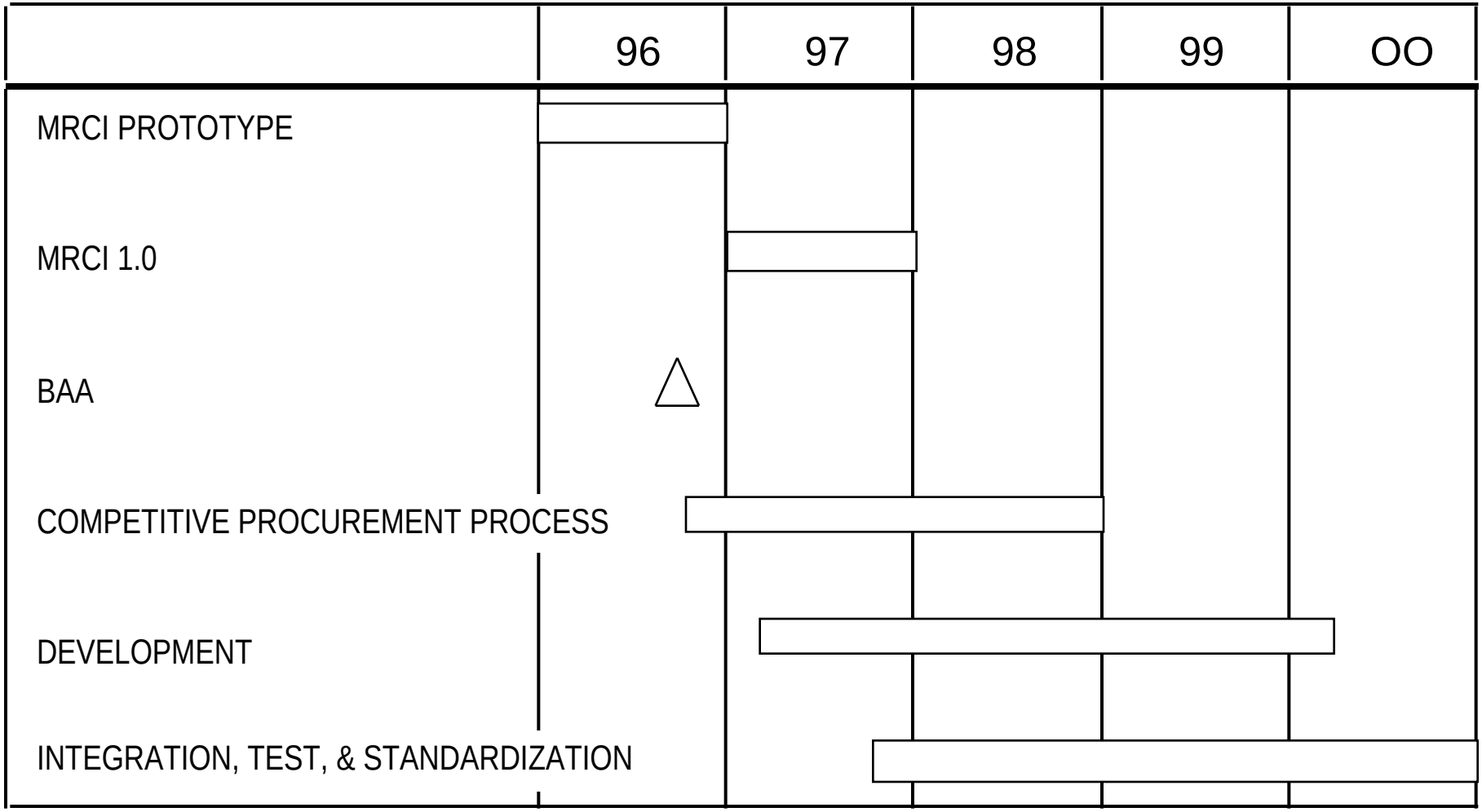
‘96 Calendar of Events

DMSO

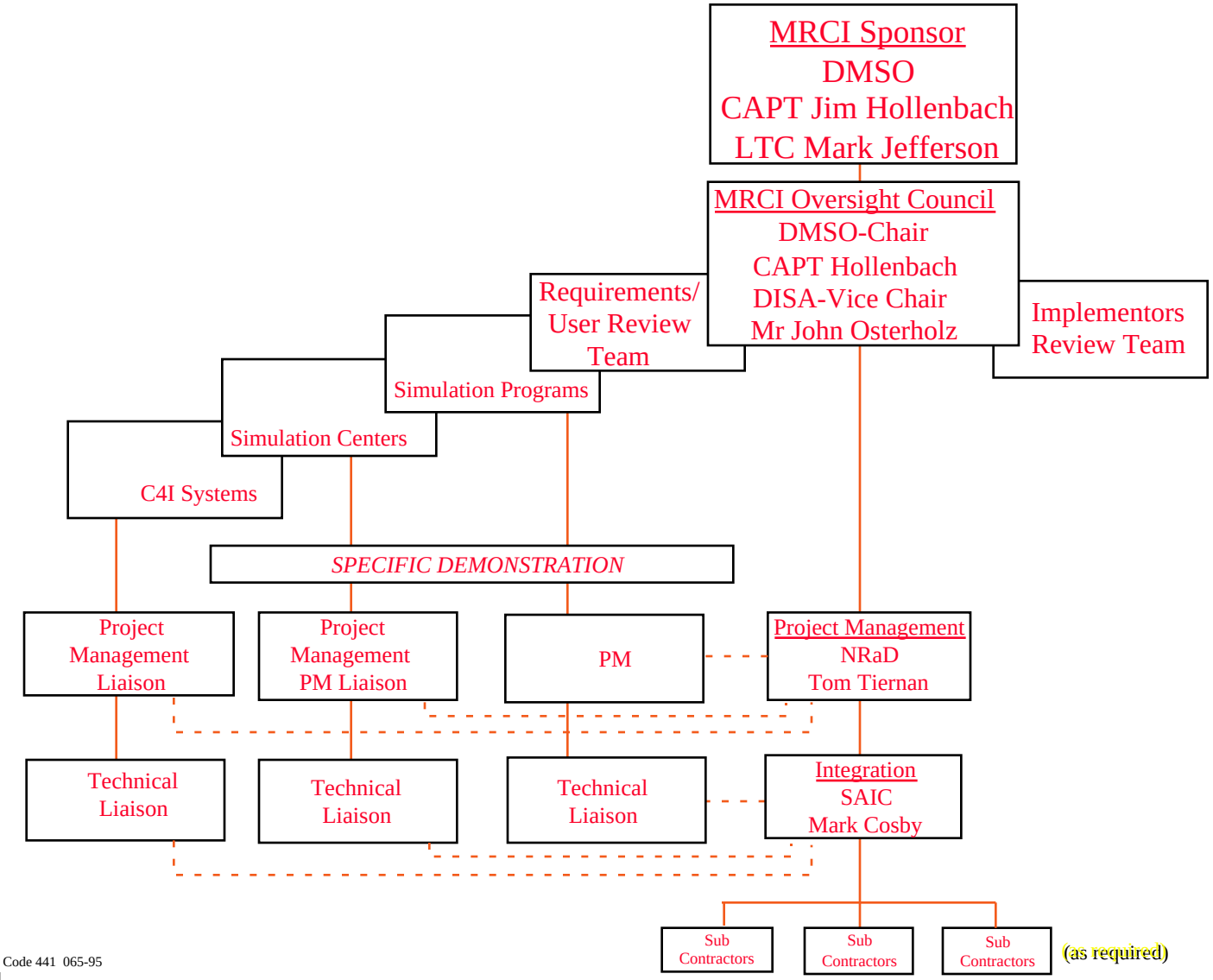
EVENT	DATE
Interim System Requirements Review (SRR)	21-22 Feb
System Requirements Review (SRR)	19-Mar
Program Design Review (PDR)	23-Apr
Critical Design Review (CDR)	5-Jun
STOW Test Readiness Review (TRR) I	16-Jul
STOW^{4}C I Integration Milestone (IM)	TBD
JTC Test	TBD
JTC Demo	TBD
Test Readiness Review (TRR) II	TBD
STOW^{4}C I Integration Milestone (IM)	TBD

Long Term Schedule

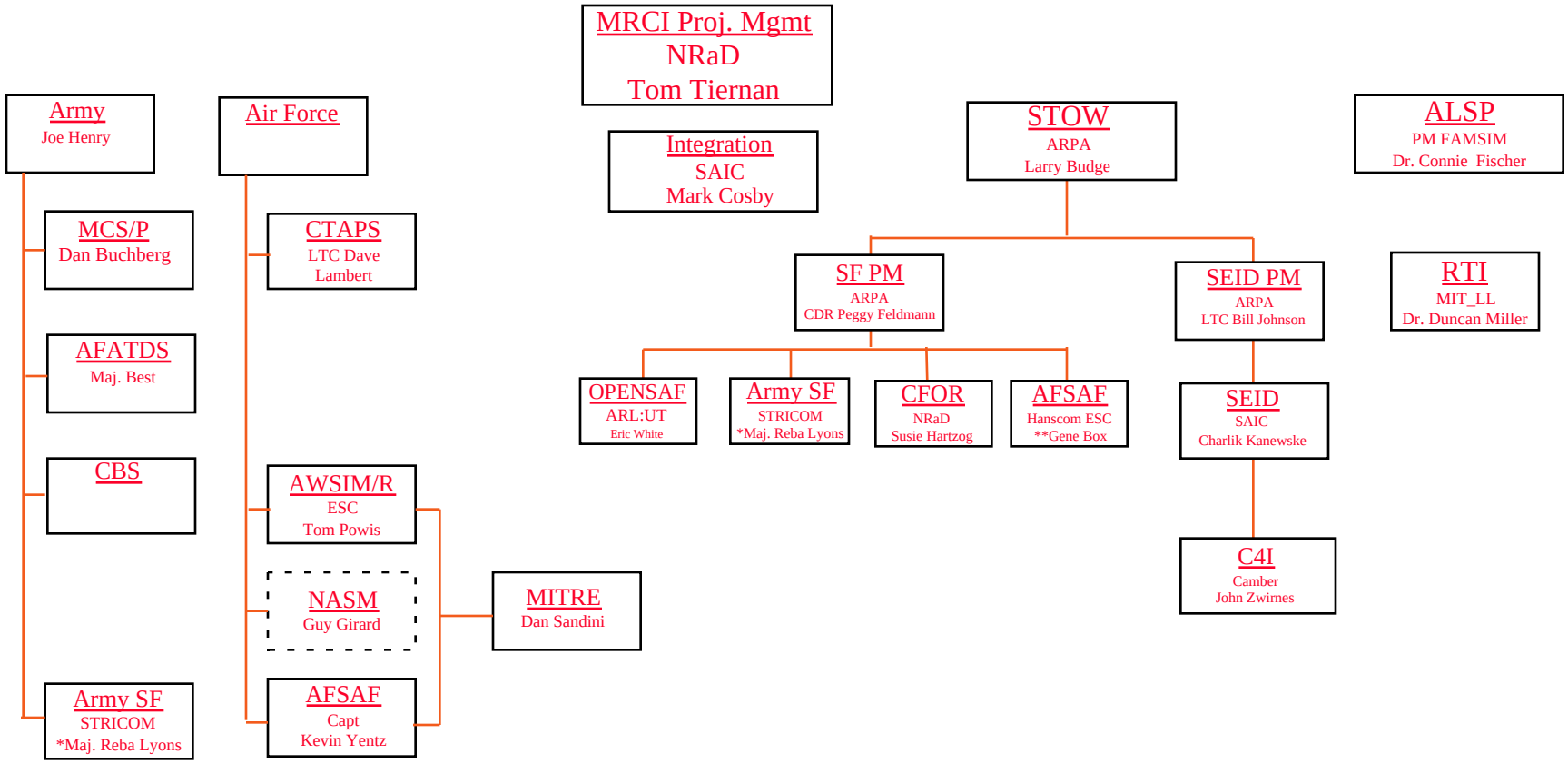
DMSO



Organization



'96 Integration/Experiment Organization

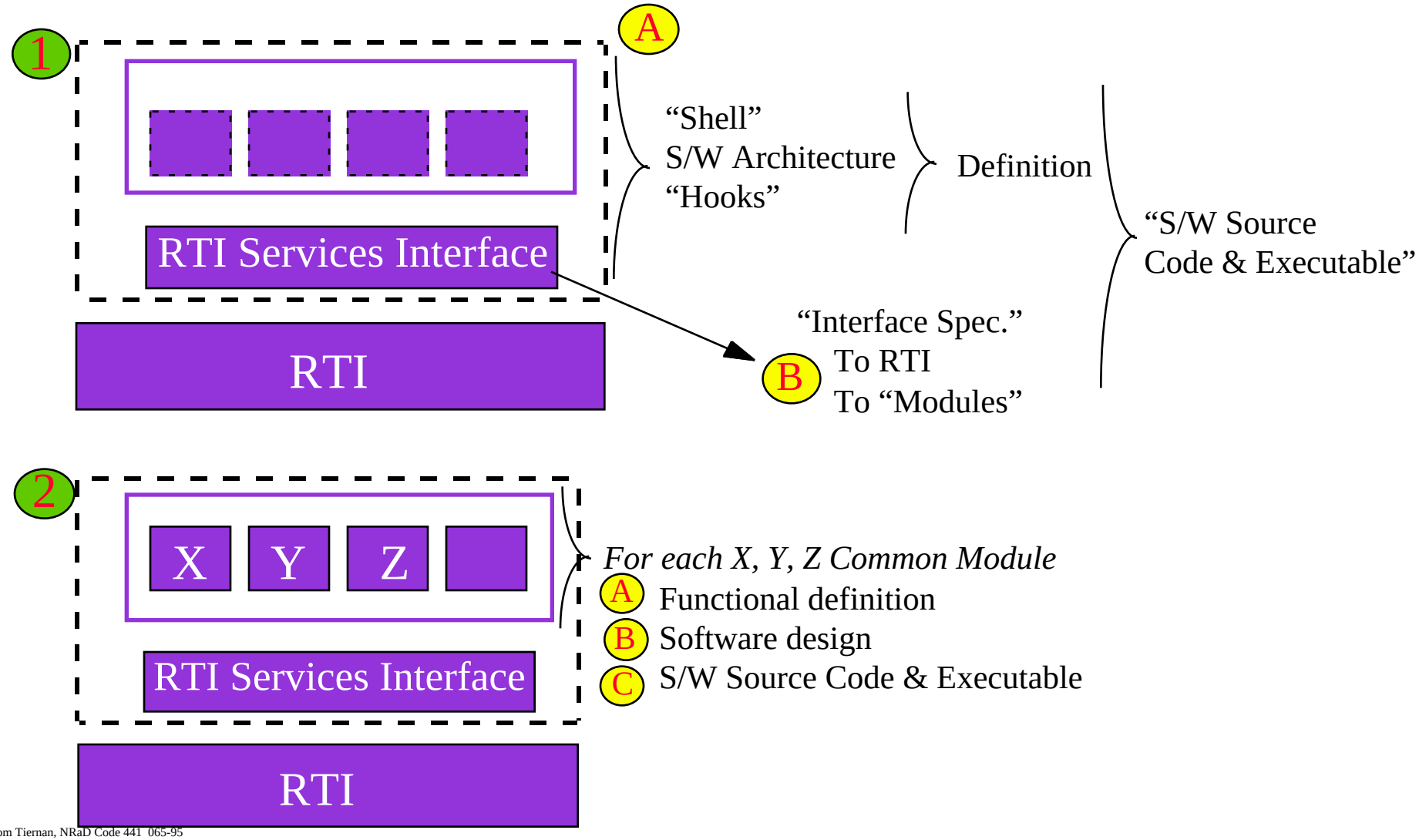


Achieving Openness

DMSO

1. Establish oversight council/review teams
2. Conduct Experiments ‘96
3. Follow on via competitive process
4. Establish transition path
5. Good documentation

Documentation



Documentation (cont'd)

DMSO

3

1. CTAPS
2. MCS/P
3. AFATDS

System-Specific Interface

X Y Z

RTI Services I/F

A Interface Spec.
1. CTAPS
2. MCS/P
3. AFATDS

B S/W Source Code & Executable
1. CTAPS
2. MCS/P
3. AFATDS

4 Data Flow Diagrams (To/From)
- A MCS/P AFATDS <--> CFOR & Army SF
- B MCS/P AFATDS <--> CBS
- C CTAPS <--> A.F. SF
- D CTAPS <--> AWSIM

5 Demo/Test "FOM"

6 WBS uplan

MRCI
Technical Documentation

DMSO

#	TITLE
1	Program Plan
2	System Requirements Document
3	System Specification
4	Design Trade Study
5	Demo/Test "FOM"
6	WBS & MicroPlanner
7	Functional Flow Diagram 1
8	Functional Flow Diagram 2
9	MRCI/RTI Interface Specification
10	MRCI Software Design Document
11	Computer Software Product (Source Code & Executable)
12	System Architecture (H/W, S/W, People)
13	CTAPS Interface Document
14	CTAPS Interface Software

MRCI Technical Documentation (cont'd)

DMSO

#	TITLE
15	MCS/P Interface Document
16	MCS/P Interface Software
17	AFATDS Interface Document
18	AFATDS Interface Software
19	Test Plan 1
20	Test Plan 2
21	Test Plan 3
22	Test Plan 4
23	Test Results 1
24	Test Results 2
25	Test Results 3
26	Test Results 4
27	Software Trouble Reports
28	Final Report

Documentation Notes

DMSO

- Key
  - 1 CTAPS <-> AWSIM/R
  - 2 CTAPS <-> AFSAF
  - 3 MCS/P & AFATDS <-> CBS
  - 4 MCS/P & AFATDS <-> Army SF & CFOR
- Administrative Documentation
  - Monthly Report
  - SRR/PDR Review Data Package
  - Agendas, Minutes, etc.
  - Work Breakdown Structure
  - Microplanner Charts

Documentation Distribution

DMSO

1. Meetings
2. E-mail
3. www.dmso.mil
4. MSRR

Risk

DMSO

- Measured in
  - Probability of Failure
  - Consequence of Failure
- Failure to recognize, monitor, & control risk, can result in:
  - Reduced capability
  - Increased cost
  - Slipped schedule

Risk to DMSO

- Risk Factors
  - New concept (R&D)
  - Multiple dependencies
    - * HLA (High Level Architecture)
    - * RTI (Run-Time Infrastructure)
    - * STOW (Synthetic Theater of War)
    - * JTC
      - » RTI Interface

Risk to Programs/Services

DMSO

- Risk Factors
  - Program reliance on MRCI
  - Transition
    - > Planning
    - > Logistics

Risk Mitigation

DMSO

- Oversight Council/Review Teams
- WBS & Critical Path Management
- Procedures
  - Test Readiness Reviews
  - Lab Tests
  - Experiments
- Open Approach
  - Documentation
  - Community Awareness/Involvement

Summary

- Goal of MRCI is to develop a reusable set of technical tools to support seamless interfaces between C4I systems and simulations
- Significant risk due to multiple dependencies
- Schedule
  - ‘96 -> 4 experiments
  - ‘97 -> additional experiments & competitive follow on
  - ‘98+ -> transition system-specific aspects while DMSO continues to support opportunities for open, reusable MRCI infrastructure