Common AV & Payload CSCI Top Level Design

Section 5

NSWCDD

Agenda

- Architectural Review
- Top Level Requirement Analysis
- Top Level Design
  - **Section 1: Overview**
  - Section 2: RTP CSCI
  - Section 3: DataServer CSCI
  - **Section 4: Common AV & Payload CSCI**
  - Section 5: DII CSCI
  - Section 6: Route & Payload Planner CSCI
  - Section 7: DCM CSCIs

Common AV & Payload CSCI

- Description
  - The TCS will be in an open architecture and be capable of being hosted on computers that are typically supported by the using Service. [ORD003]
  - The software will provide a high resolution, computer generated, graphics user interface that enables a UAV operator that is trained on one system to control different types of UAVs or UAV payloads with minimal additional training. [ORD002]
  - The software developed will be Defense Information Infrastructure/Common Operating Environment (DII-COE) compliant, …
  - The initial core of software will be generically written to provide Level Five interaction for both TUAV and MAE UAVs and establish the architecture for future tactical UAVs. [ORD013]
  - Since not all recipients of UAV information require all levels of TCS capabilities, the software, and software related hardware, if required, will be developed so that it is scaleable to meet users' needs. [ORD014]
  - Etc.

Key Design Driver
Scalability

- ⇨ Requirement:
  - Provide a common software core that is *scalable* to meet the needs of different Command Echelons and Field Units
  - Provide users with only that functionality required for the job at hand

Scalability

⇨**Design Approach**:

Allocate functionality based upon:

– "*User* View" versus "*Functional* View"

- Who are our customers/users
- What are their needs
- Identify software packages that support those needs

Customer HCI Matrix

- Who are our customers/users
  - Five identified customers
    - MC - Mission/Theater/Battle Field Commanders
    - AVC/MPC - AV Commanders, Mission Payload Commanders
    - AVO/MPO - AV Operators, Mission Payload Operators
    - Clients - Any Users/Customer that want to monitor a UAV flight & Imagery
    - Sw Maintainer - User responsible for the configuration of TCS workstation(s)
- What are their needs
  - Generalized UAV functionality into 62 User/HCI categories (See Handouts)
- Identify software packages, CSCs, that support those needs
  - Developed a matrix indicating which customer needs

» Basis for CSCs

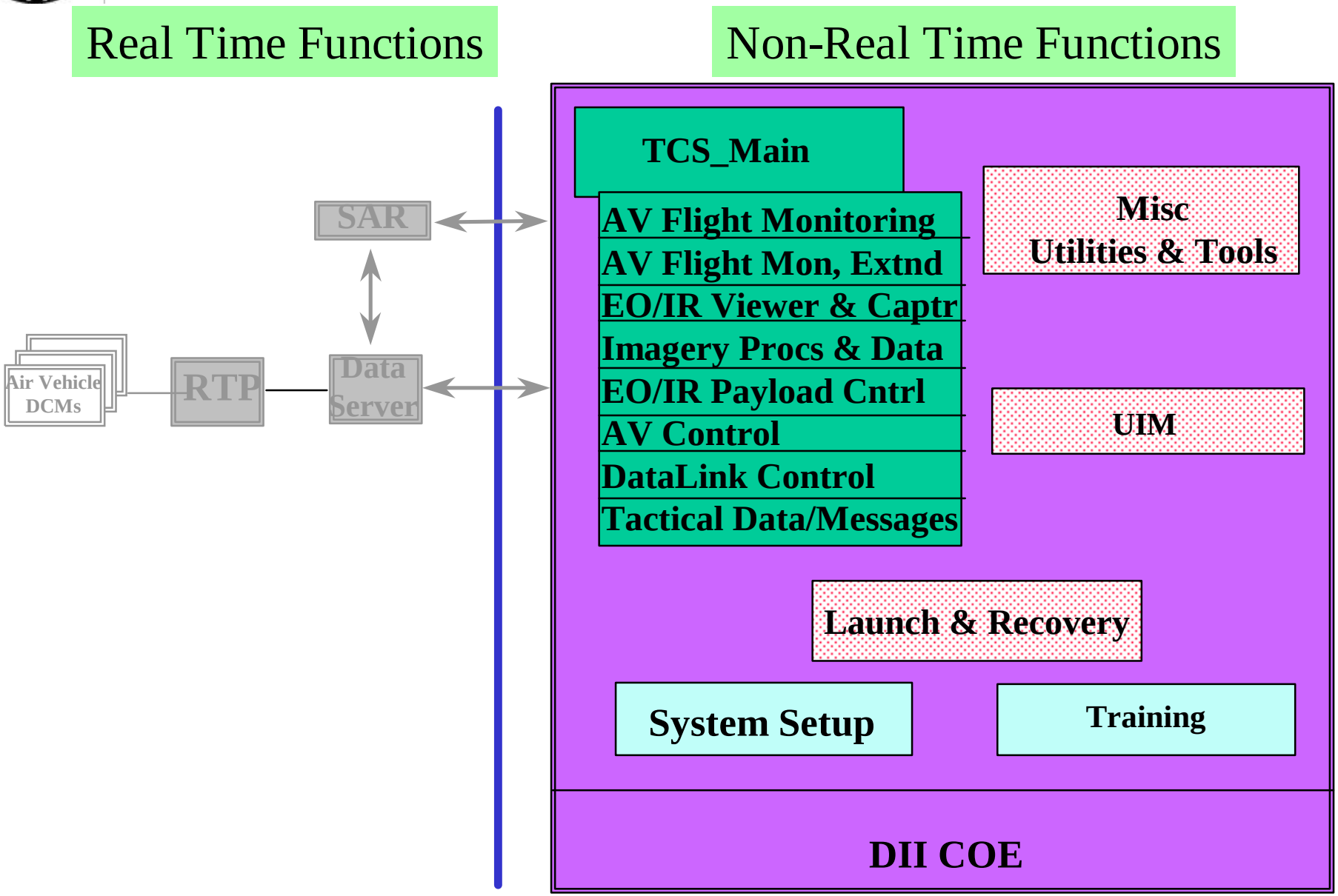
Customer HCI Matrix

Customer	MC	AVC/MPC	AVO	MPO	client	SW maintainer
AV Flight Monitoring (1-5, 34, 62)	X	X	X	X	X	
Extended AV Flight Monitoring (6, 56, 58, 60)		X	X	X		
EO/IR Payload Imagery Viewing (8-11)	X	X	X	X	X	
EO/IR Payload Imagery Data Acq. (12-16)		X		X	X	
Coarse EO/IR Payload Control (22, 23)			X	X		
Fine EO/IR Payload Control (17-21, 57, 61)				X		
AV Control (7, 25-33, 59)			X			
Data Link Control (35-44)			X			
Data Link Resource Management (45)		X				
Collection Tasking and Retasking (24)		X			X	
SW Setup & Test (46-55)						X

Identified CAP CSCs for Block 0

- TCS_Main
- AV Flight Monitoring
- AV Flight Monitoring; Extended
- EO/IR Imagery Viewer & Capture
- EO/IR Payload Control
- Imagery Processing and Data Extraction
- Tactical Data/Messages
- AV Control
- Data Link Control
- Training
- System Setup
- Launch & Recovery
- UIM
- Misc Utilities & Tools

CAP CSCs Diagram



CAP CSCs

- TCS_Main
  - Responsible for general startup, dynamic loading, execution, & termination of CSCs
- User Interface Manager
  - Responsible for all HCI Displays
    - Operator entry screens, HUD displays, etc.
- Misc Utilities & Tools
  - Network I/O, File I/O, Test Drivers, etc.

CAP CSCs (Continued)

- AV Flight Monitoring
  - AV status data
  - Data Link status data
  - Graphical display of AV-Icon, flight route, payload swath, GDT
- AV Flight Monitoring, Extended
  - Detailed AV Status data
  - AV Alerts and Warnings Messages

CAP CSCs (Continued)

- EO/IR Imagery Viewer & Capture
  - NTSC viewing via a video board
  - Display of downlink data and Image geo-position data
  - Video image capture
    - NITF 2.0 format
- EO/IR Payload Control
  - Operator commands for controlling an EO/IR payload
    - Course control via virtual stick
  - Fine commands for EO/IR payload
    - Stick control of the payload

CAP CSCs (Continued)

- Imagery Processing and Data Extraction
  - Display NITF 2.0 images and header and support data elements as applicable
  - Allow operator annotation of images with annotation data store in proper CGM format
  - Allows operator to designate targets for generation of tactical data/picture
- Tactical Data/Messages
  - Generate track/target data for DII's Tactical Picture
  - Generate tactical messages for output to C4I systems base upon identified tracks/targets

CAP CSCs (Continued)

- AV Control
  - Route Plan data upload to AV
  - “Fly to Destination” commands
  - General AV commands for auxiliary systems such as
    - Lights, IFF, etc
  - Stick commands for to DCMs for AV flight control
  - Emergency Operation Commands
- DataLink Control
  - Operator commands for controlling the datalink
    - ON/OFF, RF Channel, RF Power, etc.

CAP CSCs (Continued)

- Training
  - Responsible of all user help and training aids
- Launch & Recovery
  - Adds additional functionality to AV Control CSC for launch & recovery of UAV
- System Setup
  - Responsible for system setup information
    - Network configuration data, system/hardware configuration data, etc.