CHESS
Commander's HandhEld Support System

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Agenda

- Context
- Information Requirements
- System Functionalities
- Design of User Interface Structure
- High Level Architecture
- Conclusion

Enabling a concept of "Commander on the move"

- In order to remain effective, Commanders must maintain situational awareness, have the ability to remain fully involved in the decision making process linked to both the conduct of current operations and support to the planning process

- Regardless of where they find themselves, Commanders are required to provide timely direction to their staff

Design Approach

- Identification of the requirements of information that commanders need to receive and send

- Identification of the existing systems that provide this information

- Identification of the strategy to be used for the design of the decision support user's interface

- Elaboration of the structure of the screen that would respect the strategy

- Implementation of the screens and their underlying functionalities

Information Requirements

- To maintain situational awareness at all times, retain the ability to make decisions and exert command authority and, finally, contribute to their headquarter operational planning process, commanders need to be able to:

    - Have access to information related to the context of an operation as well as to the execution of an operation

    - Have access to information related to the planning of an operation

    - Provide to their staff commander's intent guidance and/or clarification and/or direction

    - Obtain advice related to the planning of an operation

    - Obtain advice related to the execution of an operation

Information to Maintain Baseline Situation Awareness

- Information provided by the following system:
  - Command View
    - Access to briefings and documents
    - Notification and alert

Information to Retain the Ability to Make Decisions and Exert Command Authority

- Information provided by the following systems:
  - Command View
    - Notification and alert
    - Access to briefings and documents
    - Access to mission plans
    - Access to mission reference documents
  - Incident Management System
    - Notification and access to information about incidents in specific zones of interest
   - Geo-referenced information of incidents in specific zone of interest
    - Access to incidents outside their zone of interest
  - EMPA
    - Monitor the progress of a given operation
    - Remain involved in the process of amending the plan to achieve mission success
    - Contribution to hasty planning, cycles, review and approval of fragmentary orders (Frag O) or other instructions

Information to Contribute to Headquarters Operational Planning Process

- Information provided by the following systems:

  - COPlanS
    - Access to planning process battle rhythm;
    - Provide directive and guidance
    - Access to information and outputs of the different stages of the CFOPP (initiation, orientation, COA development, plan development)
    - Approve the different outputs (ex. plan)

  - Command View
    - Access to briefings

  - Incident Management System (IMS)
    - Notification and access to information about incidents in his zone of interest
    - Geo-referenced information of incidents in his zone of interest

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Interactions with Existing Information Systems

Command View

• Provides baseline information at strategic and operational level
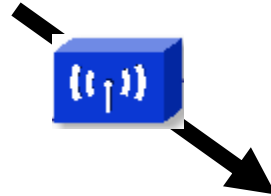
•List of Campaign/Operation Plans
•Campaign/Operational Plans
•Battle Rhythm
•OPP stages information and outputs (Initiation, Orientation, COA Development)
•Plan CCIR's
•Plan Risks

COPlanS
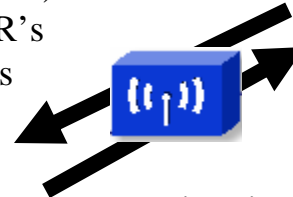
• Directives
• Approval

IMS
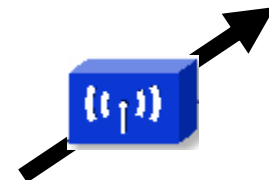
•Incidents list
•Incidents map
•Incidents details

EMPA
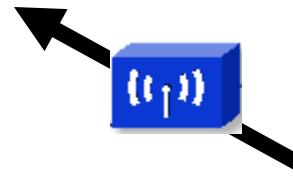
•Global operations information
•Plan execution status

Generic System Functions

- Provide user identification mechanism to preserve the continuity of the chain of command and maintain its integrity

- Provide access to different communications mechanisms and networks

- Provide commanders with the capability to transmit and receive information in an environment with limited bandwidth and unstable connectivity

- Provide commanders with a notification, alarm and inter-application through different context adapted mechanism to draw their attention to important or time sensitive information

- Receive, store, view and send electronic documents

- Manage personal information including contacts, appointment schedule, calendar, meetings, tasks, emails

Command Support Functions

- Support situational awareness : Situation awareness (past, present, and even predicted) will be accessible from heterogeneous data streams (audio, speech, text, video, maps, etc.) through different access means

- Participate in the planning process: Access to plans and consultation of planning status

- Receive notifications related to the status of on-going planning activity, new incidents, mission success criteria, decision points and associated triggers, availability of key planning products

- Specific text-based chats with other planning personnel, subordinate commanders, current operations staff, superior commanders

- Conduct audio conversations while viewing briefing documents

- Receive a full briefing presentation remotely

Design of User Interface

- Gong and Tarasewich (2004)
  - Consistency
  - Reversal of actions
  - Error prevention and simple error handling
  - Reduce short-term memory load
  - Design for multiple and dynamic contexts
  - Design for small devices
  - Design for limited and split attention
  - Design for speed and recovery
  - Design for "top-down" interaction
  - Allow for personalization
  - Design for enjoyment

CHESS Strategy

- Basic Design Guideline

  - Keep the URLs of site entry points short

  - Provide only minimal navigation at the top of the page

  - Ensure that content appears and behaves properly in landscape mode as well as portrait mode

- CHESS Strategy

  - Give access primarily to information required by Commanders

  - Minimize the number of clicks to have access to any information

  - Do not present twice the same information, even if it comes from different native applications

Identification of the Sources of Information

Command View	• Provides baseline information at strategic and operational level (briefs, etc.)
IMS (Incident Management System)	• Incidents list • Incidents details
Command View + EMPA	• List of Current Operations
Command View + EMPA	• Current Operations status
EMPA	• Plan progression details
Command View + COPlanS + EMPA	• Description of Campaign/Operational Plans
COPlanS	• List of Campaign/Operational Plans • Battle Rhythm • OPP stages information and outputs (Initiation, Orientation, COA Development) • Plan CCIR's • Plan Risks

Screen structure
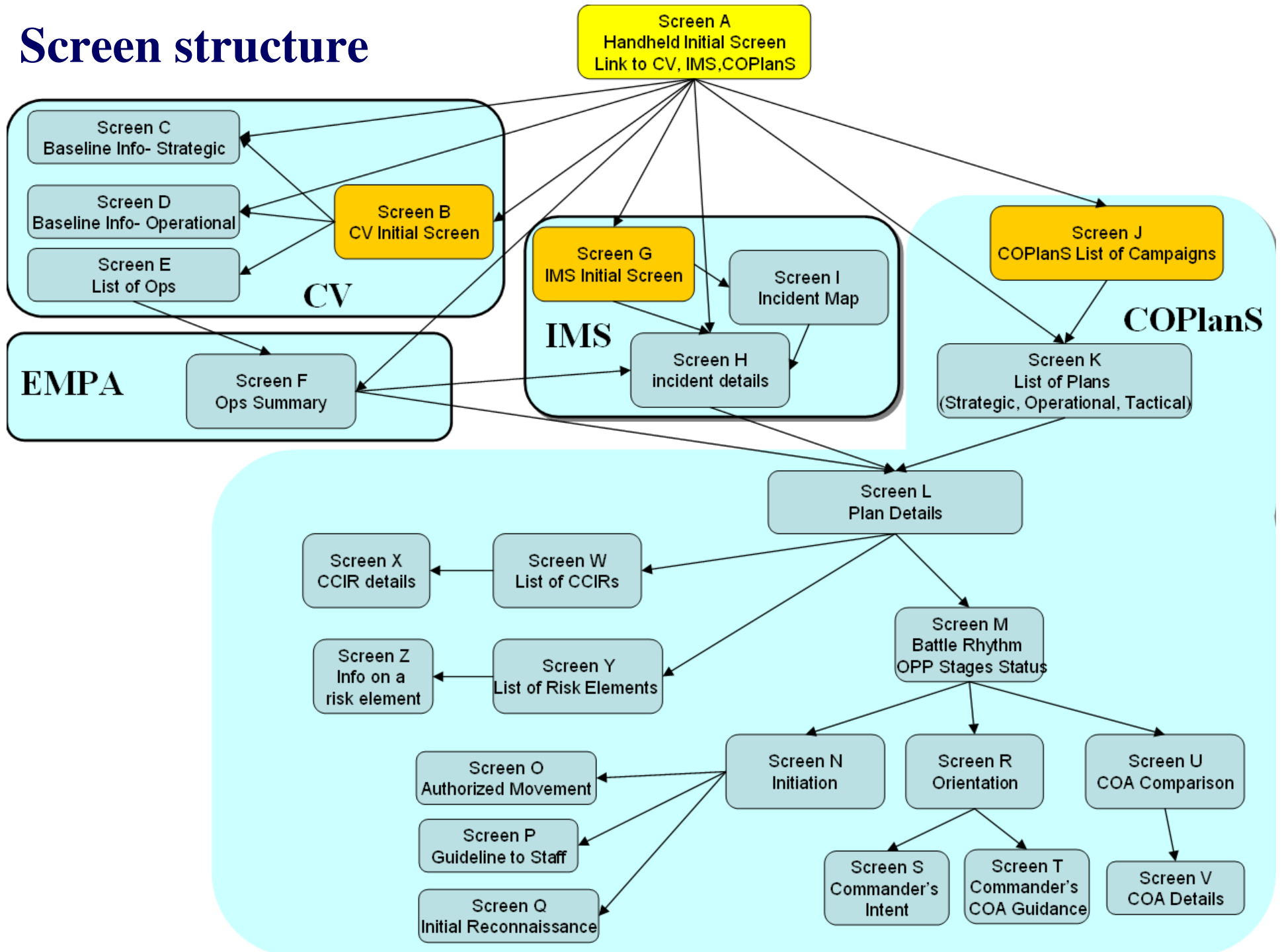
Screen A
Handheld Initial Screen
Link to CV, IMS, COPlanS

CV

Screen C
Baseline Info- Strategic

Screen D
Baseline Info- Operational

Screen E
List of Ops

Screen B
CV Initial Screen

EMPA

Screen F
Ops Summary

IMS

Screen G
IMS Initial Screen

Screen I
Incident Map

Screen H
incident details

COPlanS

Screen J
COPlanS List of Campaigns

Screen K
List of Plans
(Strategic, Operational, Tactical)

Screen L
Plan Details

Screen X
CCIR details

Screen W
List of CCIRs

Screen Z
Info on a
risk element

Screen Y
List of Risk Elements

Screen M
Battle Rhythm
OPP Stages Status

Screen O
Authorized Movement

Screen N
Initiation

Screen R
Orientation

Screen U
COA Comparison

Screen P
Guideline to Staff

Screen Q
Initial Reconnaissance

Screen S
Commander's
Intent

Screen T
Commander's
COA Guidance

Screen V
COA Details

Starting with

Ending with

Baseline SA Information

Incidents

Current Ops

Plans

Plans

Left panel:

CANADACOM | JTFG   Canada

Home > Campaigns

Campaign	OP PODIUM
Strategic Plans :	• OP PODIUM (Strat Lvl)
Operational Plans :	• OP PODIUM (Op Lvl) • OP BOISFLOTANT (VOI CONPLAN) • CONPLAN DRIFTWOOD • TEST CONPLAN DRIFTWOOD (Dated 23 Oct 08) • CONPLAN DRIFTWOOD (JCDS21 Rebuild Demo) • CONPLAN DRIFTWOOD (Dated 23 Oct 08) • CONPLAN DRIFTWOOD (27 March 09)
Tactical Plans :	
Description :	CF Assistance to Law Enforcement Agencies (ALEA) and ceremonial assistance to Heritage Canada for the 2010 Vancouver Olympic Games.

Right panel:

CFNOC   Canada

Home > Campaigns > OP PODIUM

CCIRs Battle Rhythm TRA

Plan	OP PODIUM (Strat Lvl)
Higher Headquarter Plan :	
Campaign :	OP PODIUM
Planning Level :	Strategic Military
Type :	Domestic
Force Employment Scenario :	Support to Law Enforcement
Classification :	NATO Unclassified
Hidden :	No
Exercise :	Yes
Commander :	j5_usr
Key Informations :	Notional
D-Day :	10/16/08 8:00 PM
Description :	Strategic Plan for CF assistance to law enforcement agencies during 2010 Vancouver Olympic Games.

Plan Information / CCIRs

Plan Information / Battle Rhythm

CFNOC

Home > Campaigns > OP PODIUM

ⓘ CCIRs 👣 Battle Rhythm ⚡ TRA

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Canada

CFNOC

Home > Campaigns > OP PODIUM > OP PODIUM (Strat Lvl)

Plan	Status	Start Date	End Date
Initiation	Completed	10/6/08 3:33 PM **planned** : 10/6/08 3:33 PM	10/6/08 3:33 PM **planned** : 10/6/08 3:33 PM
Orientation	Completed	10/6/08 3:33 PM **planned** : 10/6/08 3:33 PM	10/7/08 8:08 AM **planned** : 10/7/08 3:33 PM
COA Development	Completed	10/7/08 8:08 AM **planned** : 10/7/08 3:33 PM	10/10/08 11:34 AM **planned** : 10/8/08 3:33 PM
Plan Development	Completed	10/10/08 11:34 AM **planned** : 10/8/08 3:33 PM	10/10/08 11:35 AM **planned** : 10/9/08 3:33 PM
Plan Review	Completed	10/10/08 11:35 AM **planned** : 10/9/08 3:33 PM	10/10/08 11:36 AM **planned** : 10/10/08 3:33 PM

Battle Rhythm / Initiation

Battle Rhythm
/ Orientation

Battle Rhythm / COA Development

Left panel:

CFNOC   Canada

Home > Campaigns > OP PODIUM > OP PODIUM (Strat Lvl)

Plan	Status	Start Date	End Date
Initiation	Completed	10/6/08 3:33 PM **planned** : 10/6/08 3:33 PM	10/6/08 3:33 PM **planned** : 10/6/08 3:33 PM
Orientation	Completed	10/6/08 3:33 PM **planned** : 10/6/08 3:33 PM	10/7/08 8:08 AM **planned** : 10/7/08 3:33 PM
COA Development	Completed	10/7/08 8:08 AM **planned** : 10/7/08 3:33 PM	10/10/08 11:34 AM **planned** : 10/8/08 3:33 PM
Plan Development	Completed	10/10/08 11:34 AM **planned** : 10/8/08 3:33 PM	10/10/08 11:35 AM **planned** : 10/9/08 3:33 PM
Plan Review	Completed	10/10/08 11:35 AM **planned** : 10/9/08 3:33 PM	10/10/08 11:36 AM **planned** : 10/10/08 3:33 PM

Right panel:

CANADACOM   JTFG   Canada

Home > Campaigns > OP PODIUM > CONPLAN DRIFTWOOD > Battle Rhythm

COAs	Selected COA - JTFG Supported RCMP Interdiction	COA 1 - JTFP supports RCMP Interdiction	COA 2 - JTFG Supported RCMP Interdiction
Ranking	1	1	1
Selected	⊙	○	○

Criteria	Weight			
Operations Complexity	7.0			
Command and Control Complexity	9.0			
Sustainability	5.0	-1	-1	-1
Logistics Complexity	3.0			
Collateral Damage	8.0			

Deliverables

InfoBrief.ppt   309.76 KB   10/23/08 7:14 AM

DecisionBrief.ppt   249.856 KB   10/24/08 10:10 AM

Troops-to Tasks Analysis.xls   440.742 KB   10/22/08 7:33 PM

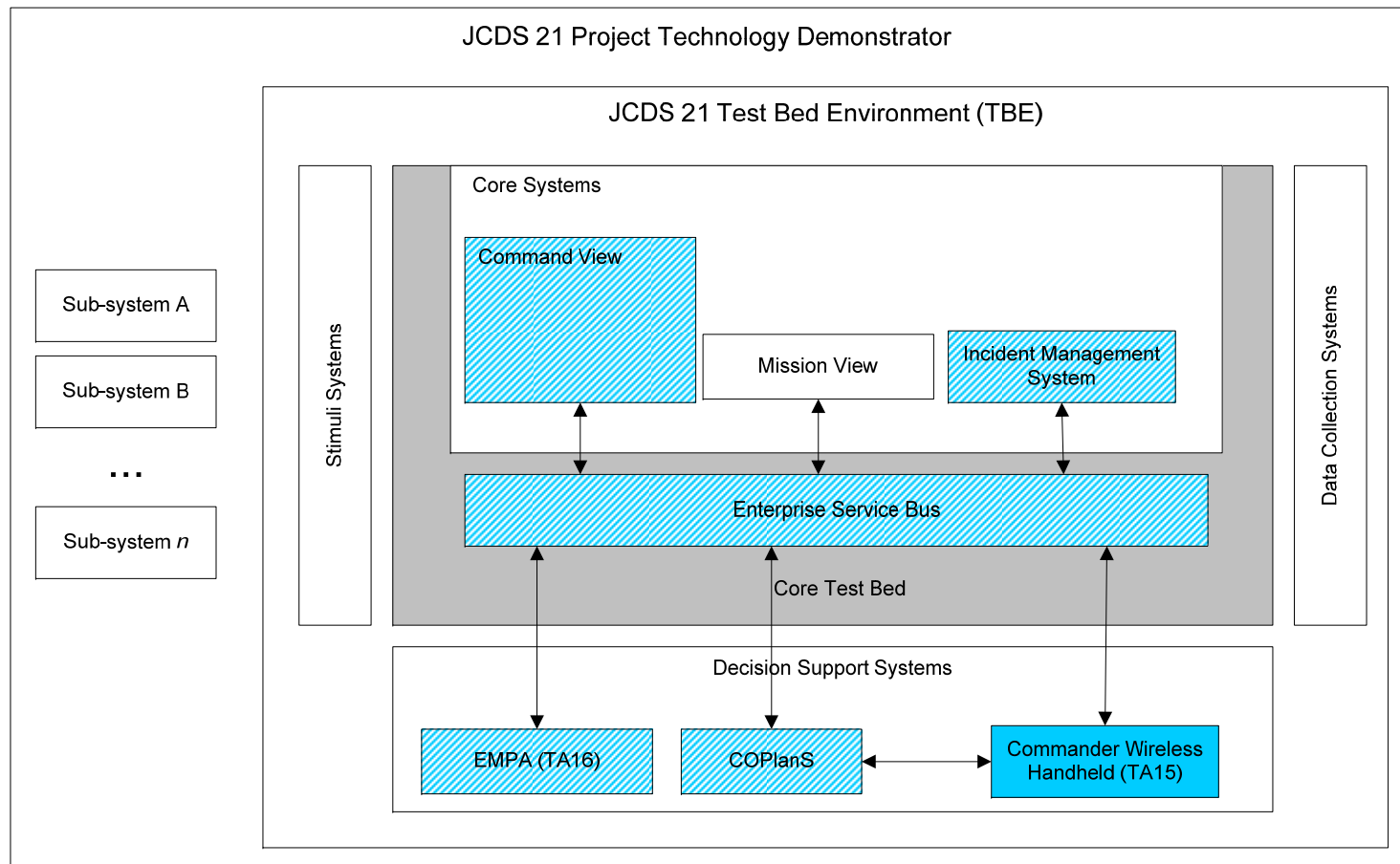# Plan Information / Threats and Risk Assessment

Wireless Handheld PC Selected

- ## Device Model: HTC Mogul (P4000)
  - Touch screen and display size and resolution (320x240 pixels, 65k colours)
  - QWERTY slide-in keyboard for easier typing
  - WIFI (802.11 b/g)
  - Bluetooth
  - Expandable memory: MicroSD cards
  - Operating System (OS): Windows Mobile 6 (latest available version at that time)

CHESS in JCDS 21 Test Bed Environment

JCDS 21 Project Technology Demonstrator

JCDS 21 Test Bed Environment (TBE)

Core Systems

Command View

Mission View

Incident Management System

Stimuli Systems

Data Collection Systems

Enterprise Service Bus

Core Test Bed

Sub-system A

Sub-system B

...

Sub-system n

Decision Support Systems

EMPA (TA16)

COPlanS

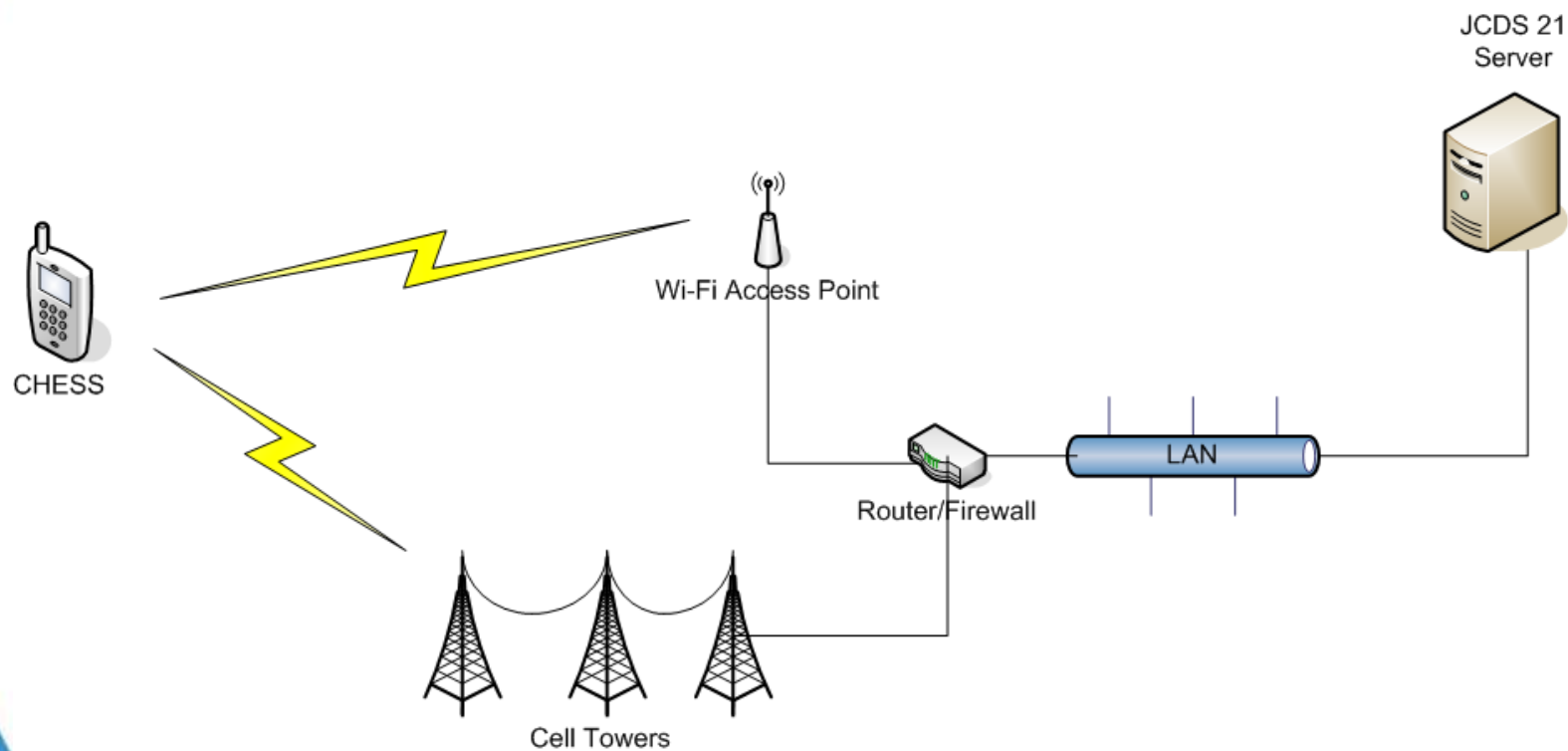Commander Wireless Handheld (TA15)

Legend

Components developed by the TA15 Team

Existing components that will be slightly modified or to which we connect

CHESS Network Connectivity Overview

Commander HandhEld Support System (CHESS)

Command View

IMS

COPlanS

JCDS21 Applications
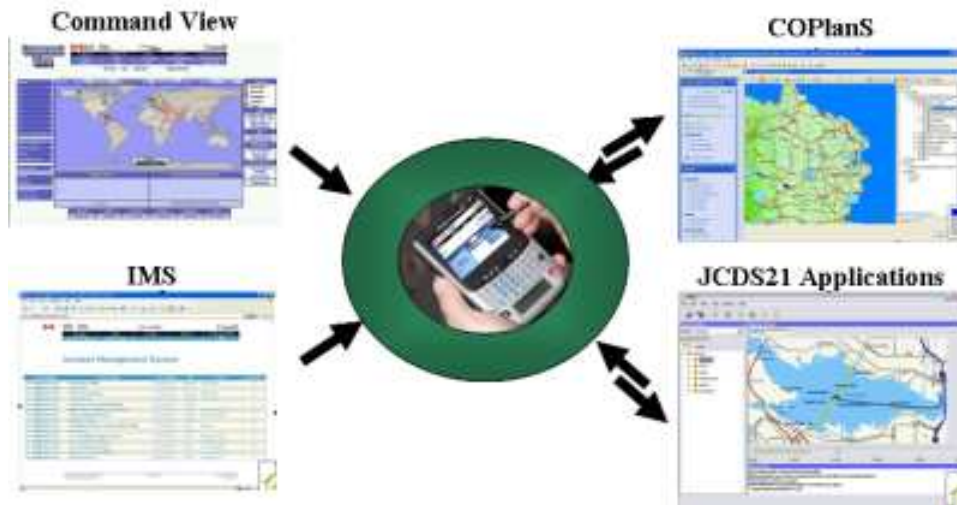
- A tool for real-time exchange of information with key DND systems through a wireless handheld device.
  - Multi-networks communication
  - Limited bandwidth connectivity information delivery services
  - Notification and alerts
  - Electronic documents management services

Concepts Demonstrated

✓ Access to situational awareness provided by existing baseline systems, ex. CommandView;

✓ Reception of notifications events/ alerts through emails;

✓ Access to plans and consult planning status provided by COPlanS;

✓ Collaboration with planning staff to activate planning stages via COPlanS;

✓ Contribution to the planning by giving guidance or by inserting information or concerns about strategic aspects (e.g. CCIR, Risk Management, Commander's Guidance);

✓ Approbation of documents remotely;

✓ Reception of briefings remotely;

✓ Capacity to store and retrieve e-mail, manage contacts and appointments;

✓ Text-based online chat communication over Internet (direct one-on-one or to a group);

✓ Capacity of audio intervention during a remote briefing.

Future Work

- Refinement of Information Requirements

  – Considering different situations

- Identification of Information Requirements for staff

- Improvement of User Interface

  – interaction and visualisation possibilities

  – automatic adaptation of mobile interfaces to user learned preferences [Smyth et al. 2008]

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