



CHES
Commander's HandHeld Support System

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Defence Research and
Development Canada

Recherche et développement
pour la défense Canada

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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



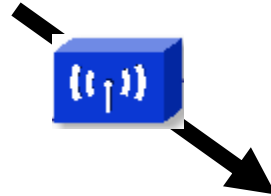


Interactions with Existing Information Systems

Command View

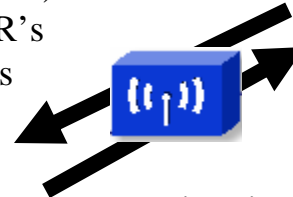


- Provides baseline information at strategic and operational level



- List of Campaign/Operation Plans
- Campaign/Operational Plans
- Battle Rhythm
- OPP stages information and outputs (Initiation, Orientation, COA Development)
- Plan CCIR's
- Plan Risks

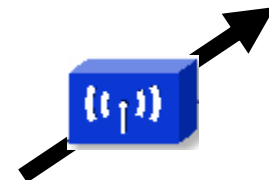
COPlanS



- Directives
- Approval

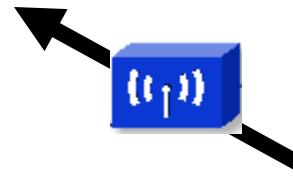


IMS



- 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



CHESSE Strategy

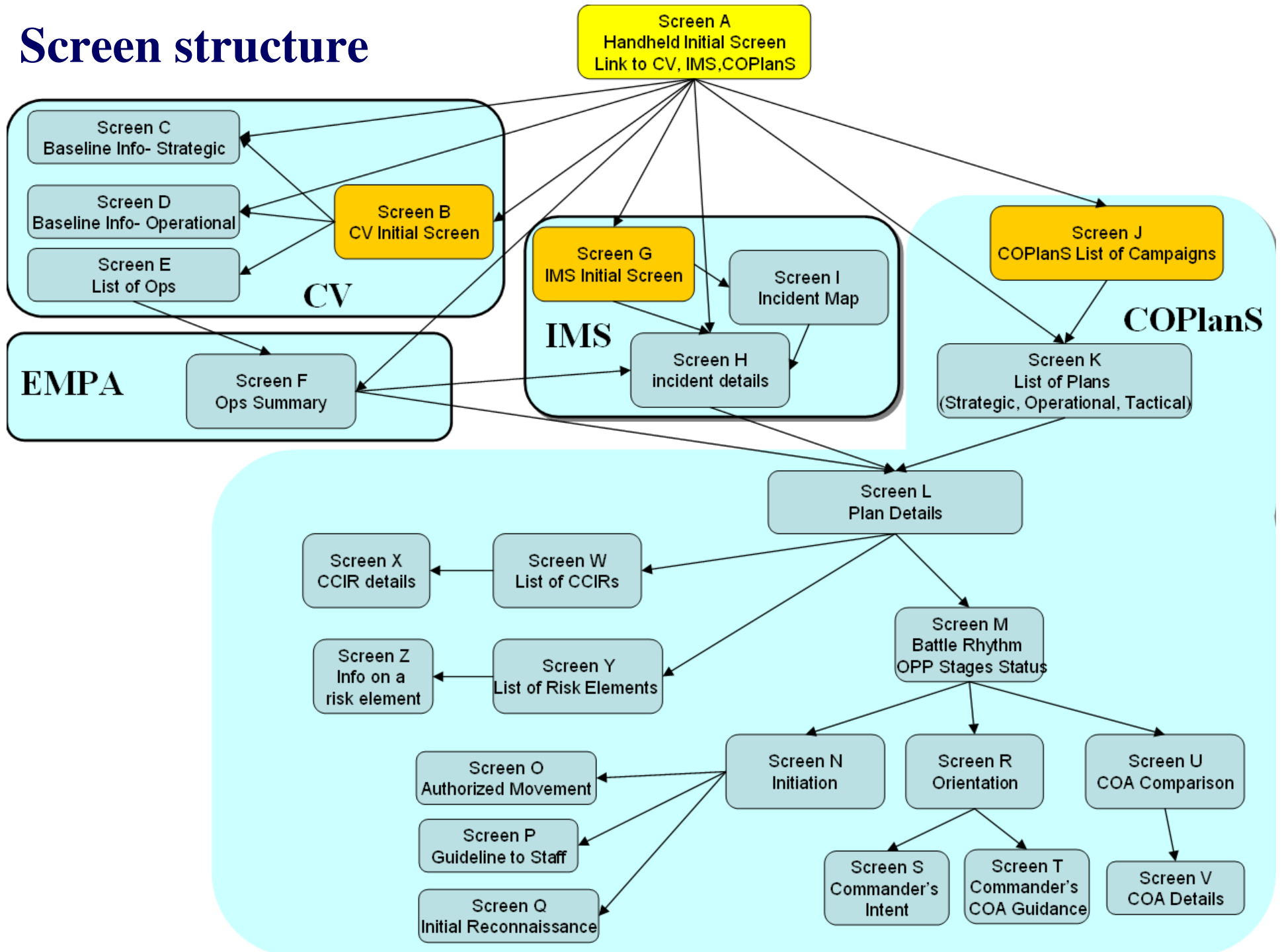
- Basic Design Guideline
 - Keep the URLs of site entry points short
 - Provide only minimal navigation at the top of the page
 - Ensure that content appears and behaves properly in landscape mode as well as portrait mode
- CHESSE Strategy
 - Give access primarily to information required by Commanders
 - 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	<ul style="list-style-type: none">• Provides baseline information at strategic and operational level (briefs, etc.)
IMS (Incident Management System)	<ul style="list-style-type: none">• Incidents list• Incidents details
Command View + EMPA	<ul style="list-style-type: none">• List of Current Operations
Command View + EMPA	<ul style="list-style-type: none">• Current Operations status
EMPA	<ul style="list-style-type: none">• Plan progression details
Command View + COPlanS + EMPA	<ul style="list-style-type: none">• Description of Campaign/Operational Plans
COPlanS	<ul style="list-style-type: none">• List of Campaign/Operational Plans• Battle Rhythm• OPP stages information and outputs (Initiation, Orientation, COA Development)• Plan CCIR's• Plan Risks

Screen structure





Starting with

Commander Mobility Portal

USERNAME

PASSWORD

Ending with

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Help Logout CANADACOM JTFG

Command View

Baseline Info

- [Strategic Level](#)
- [Operational Level](#)

Ops Info

- Ops 1
- Ops 2

IMS

- [EQ at GM Place](#)
- [Incident 4 planned protest at Victory Square](#)
- [Cypress Mountain Explosion](#)
- [Suspicious Vessel - Hyundai National](#)
- [Van Rail Yard](#)

COPlans

- [Contingency Plans](#)
- [EMPA Campaign Campaign Test 1](#)
- [Tyro](#)

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Command View

- [Strategic Info](#)
- [Operational Info](#)
- [IMS](#)
- [Current Ops](#)

COPlans

- [OP PODIUM](#)
- [Contingency Plans](#)
- [OP TRAINING](#)
- [Operation TuringTest](#)
- [JCDS 21 Server Rebuild](#)
- [JCDS21 Server Rebuild](#)



Baseline SA Information

Command View

- [Strategic Info](#)
- [Operational Info](#)
- [IMS](#)
- [Current Ops](#)

COPlans

- [OP PODIUM](#)
- [Contingency Plans](#)
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- [Operation TuringTest](#)
- [JCDS 21 Server Rebuild](#)
- [JCDS21 Server Rebuild](#)

Home

Baseline Info

- [CDS Morning Brief](#)
- [CDS Wkly Ops Brief](#)
- [Key Personnel Locator](#)
- [Continental Highlights](#)
- [International Highlights](#)
- [SOF Highlights](#)
- [Key Issues](#)
- [CF Personnel Summary](#)
- [Upcoming Events](#)
- [Weather](#)
- [News Clips](#)
- [Early Bird](#)
- [Afghan Daily](#)

RiD Incidents

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Command View
 • Strategic Info
 • Operational Info
 • **IMS**
 • Current Ops

COPlans
[OP PODIUM](#)
[Contingency Plans](#)
[OP TRAINING](#)
[Operation TuringTest](#)
[JCDS 21 Server Rebuild](#)
[JCDS21 Server Rebuild](#)

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IMS

Name	Status	Type
Hot Air Balloon Explosion at BC Place Stadium:	Opened	Incident
Ex Ex Ex Water Tower Breakage	Opened	Incident
Test Incident 5 (2008-09-23)	Opened	Incident
Theft of a massive Olympic flag at City Hall	Opened	Incident
Avalanche in Whistler - Lost skiers	Opened	Incident
Murder on Elm's Street	Opened	Incident

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Home

CV

Incidents

1 - [Hot Air Balloon Explosion at BC Place Stadium:](#)

2 - [Ex Ex Ex Water Tower Breakage](#)

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UC_TRAININGIMS_00053
 - Hot Air Balloon
 Explosion at BC Place Stadium: [Map](#)

Background :
 251440Z mars 09 - (Administrator)

Three members of the Voice of the Homeless are confirmed dead after a hot air balloon exploded into a ball of fire and crashed Friday evening 1 kilometer from BC Place Stadium, in Vancouver, the Opening Ceremony site, injuring 11 and destroying three homes. Voice of the Homeless was trying to disrupt the Opening Ceremony and embarrass Canada through international media coverage.

Keywords: Hot air balloon, Voice of the Homeless, BC Place Stadium, Vancouver.

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Home > [IMS](#) > [Hot Air Balloon Explosion at Place Stadium:](#)



Current Ops

Navigation menu for CANADACOM JTFG. The 'Current Ops' link is circled in red.

Command View	COPlans
<ul style="list-style-type: none">Strategic InfoOperational InfoJMSCurrent Ops	<ul style="list-style-type: none">OP PODIUMContingency PlansOP TRAININGOperation TuringTestJCDS 21 Server RebuildJCDS21 Server Rebuild

Navigation menu for CANADACOM FOI(E). The 'Ops 2' link is circled in red.

Home > CV

- Current Ops

- Current Operations
 - Ops 1
 - Ops 2**
- Future Operations
- Past Operations
- Under Planning

Navigation menu for CANADACOM FOI(E). The 'Command View' link is circled in red.

Home > Command View

JTFG - Current Ops	
Name :	Ops 2 Plan Details
Start Time :	
Area :	Vancouver
State :	In progress
Status :	■
Progress :	On Schedule
Key Incidents :	Incident1 ▾
Critical Issues :	Issue ▾



Plans

Command View

- [Strategic Info](#)
- [Operational Info](#)
- [IMS](#)
- [Current Ops](#)

COPlans

- [OP PODIUM](#)
- [Contingency Plans](#)
- [OP TRAINING](#)
- [Operation TuringTest](#)
- [JCDS 21 Server Rebuild](#)
- [JCDS21 Server Rebuild](#)

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Campaigns

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- [Contingency Plans](#)
- [OP TRAINING](#)
- [Operation TuringTest](#)
- [JCDS 21 Server Rebuild](#)
- [JCDS21 Server Rebuild](#)

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Campaign	OP PODIUM
Strategic Plans :	<ul style="list-style-type: none"> • OP PODIUM (Strat Lvl)
Operational Plans :	<ul style="list-style-type: none"> • 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.



Plans

Home > Campaigns

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Campaign	OP PODIUM
Strategic Plans :	<ul style="list-style-type: none">OP PODIUM (Strat Lvl)
Operational Plans :	<ul style="list-style-type: none">OP PODIUM (Op Lvl)OP BOISFLOTANT (VOI CONPLAN)CONPLAN DRIFTWOODTEST CONPLAN DRIFTWOOD (Dated 23 Oct 08)CONPLAN DRIFTWOOD (JCDS21 Rebuild Demo)CONPLAN DRIFTWOOD (Dated 23 Oct 08)CONPLAN DRIFTWOOD (27 March 09)
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Home > Campaigns > OP PODIUM

CFNOC Canada

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

Canada

Home > Campaigns > OP PODIUM

CCIRs Battle Rhythm TRA

Plan	OP PODIUM (Strat Lvl)
Higher Headquarter Plan :	
Campaign :	OP PODIUM
Planning Level :	Strategic Military
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D-Day :	10/16/08 8:00 PM
Description :	Strategic Plan for CF assistance to law enforcement agencies during 2010 Vancouver Olympic Games.

Canada

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

CCIRs [New](#)

Name	Importance	Closed
Test	Normal	<input type="checkbox"/>
Security Involvement of the Int'l Entities and Delegations	High	<input type="checkbox"/>
Major CF Vulnerabilities	Normal	<input type="checkbox"/>
Security threats to V2010 Games	Low	<input checked="" type="checkbox"/>

Canada

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

CCIR

Item : Security Involvement of the Int'l E

Sequence : 1

Importance : High

Category : Priority Intelligence Requiremer

Done :

Checked By :

Checked At :

Analysis :

Deduction



Plan Information / Battle Rhythm

CFNOC Canada

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[CCIFs](#) [Battle Rhythm](#) [TRA](#)

Plan	OP PODIUM (Strat Lvl)
Higher Headquarter Plan :	
Campaign :	OP PODIUM
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Commander :	j5_usr
Key Informations :	Notional
D-Day :	10/16/08 8:00 PM
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CFNOC Canada

[Home](#) > [Campaigns](#) > [OP PODIUM](#) > [OP PODIUM \(Strat Lvl\)](#)

Plan	Status	Start Date	End Date
<u>Initiation</u>	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
<u>Orientation</u>	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
<u>COA Development</u>	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



Canada

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

Plan	Status	Start Date	End Date
		10/6/08 3:33	10/6/08 3:33

Initiation

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

Initiation

Authorized Movement *Freedom of movement in conjunction with the Coast Guard, RCMP*

Guidelines To Staff *1. SITUATION, a. General, This*

Initial Reconnaissance *See OP PODIUM Op Plan*

Deliverables

Orientation

COA Development

Plan Development

		10/8/08 3:33 PM	10/9/08 3:33 PM
		10/10/08 11:35 AM	10/10/08 11:36 AM
Plan Review	Completed	planned : 10/9/08 3:33 PM	planned : 10/10/08 3:33 PM

CANADACOM JTFG Canada

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Authorized Movement

Freedom of movement in conjunction with the Coast Guard, RCMP

Save

CANADACOM JTFG Canada

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

Guidelines To Staff

CDS Direction and Guidance (Extract from "Van2010.pdf")

Save

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

Initial Reconnaissance

The Threat Level for V21010 Olympics and Para Olympics is considered as MEDIUM. (Extract

Save



Battle Rhythm / Orientation

CFNOC

Canada

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Plan	Status	Start Date	End Date
Initiation	Complete		
Orientation	Complete		
COA Development	Complete		
Plan Development	Complete		
Plan Review	Completed		

Initiation

Complete

Canada Com will plan, direct and coordinate all activities related to the CF security

Save

Orientation

Complete

Canada Com will plan, direct and coordinate all activities related to the CF security

Save

COA Development

Complete

Plan Development

Complete

Plan Review

Completed

planned :	planned :
10/8/08 3:33 PM	10/9/08 3:33 PM
10/10/08 11:35 AM	10/10/08 11:36 AM
planned : 10/9/08 3:33 PM	planned : 10/10/08 3:33 PM

CANADACOM JTFG Canada

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

Commander's Intent

Canada Com will plan, direct and coordinate all activities related to the CF security

Save

CANADACOM JTFG Canada

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

Commander's Intent

Canada Com will plan, direct and coordinate all activities related to the CF security

Save



Battle Rhythm / COA Development

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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

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COAs	Selected COA - JTFG Supported RCMP Interdiction	COA 1 - JTFG supports RCMP Interdiction	COA 2 - JTFG Supported RCMP Interdiction
Ranking	1	1	1
Selected	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Criteria	Weight		
Operations Complexity	7.0		
Command and Control Complexity	9.0		
Sustainability	5.0	-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

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[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.

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Threats Risk Assessment

- [Poor International and Domeestic Public Opinion](#)
- [Assymeric \(VOI\) Threat](#)
- [Ineffective or latent C2 Infrastructure](#)

CANADACOM Canada
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Threat	Poor International and Domeestic Public Opinion	
Threat Initial Risk :	<input type="checkbox"/> Moderate	
Analysis :		
Causes		
Cause	Probability	Category
Residual Risks		
Coa	Global Residual Risk	
Selected COA - JTFG Supported RCMP Interdiction		
Selected COA - JTFG Supported RCMP Interdiction		
COA 1 - JTFP supports RCMP Interdiction		
COA 2 -JTFG Supported RCMP Interdiction		



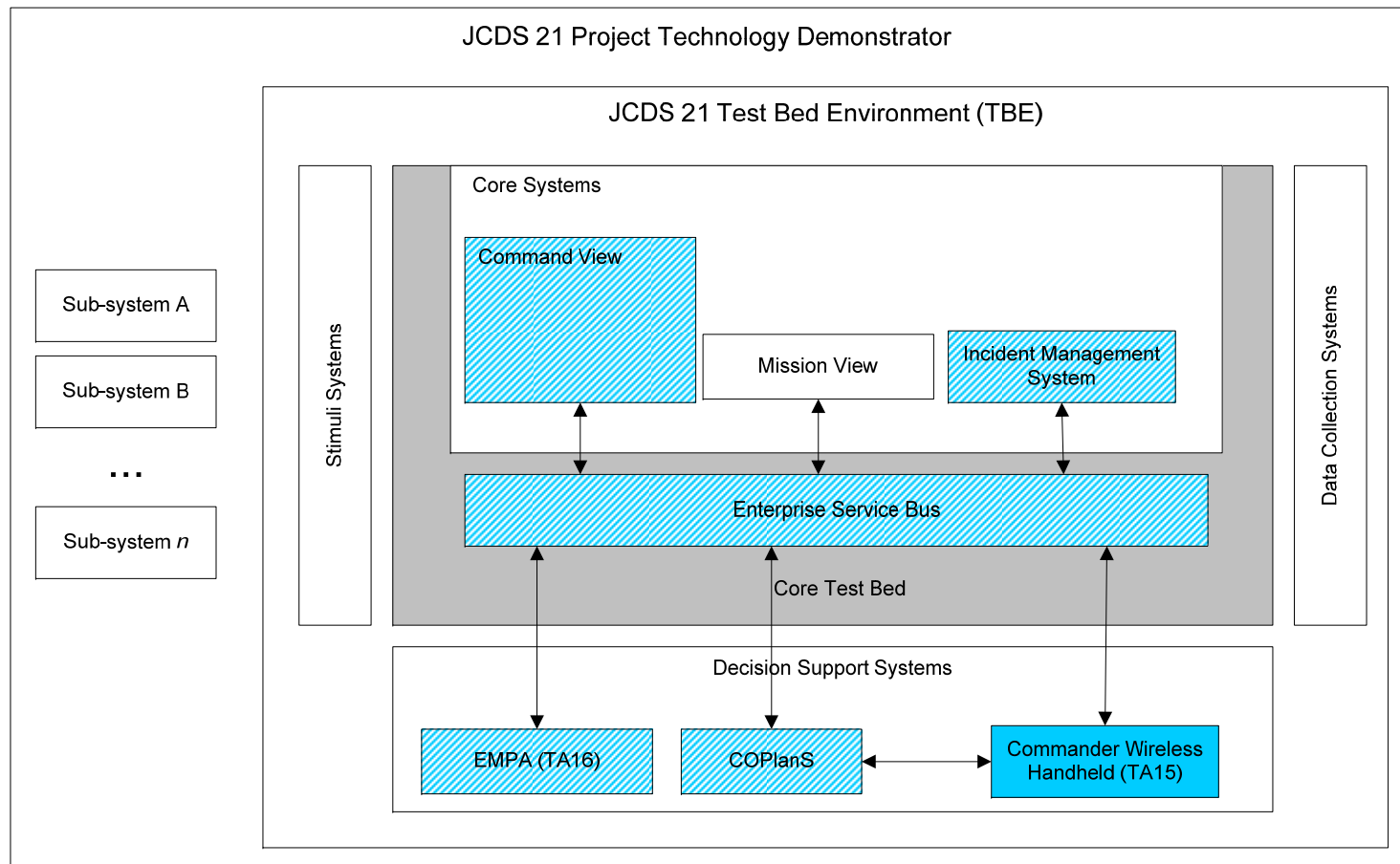
Wireless Handheld PC Selected

- 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)







CHES in JCDS 21 Test Bed Environment

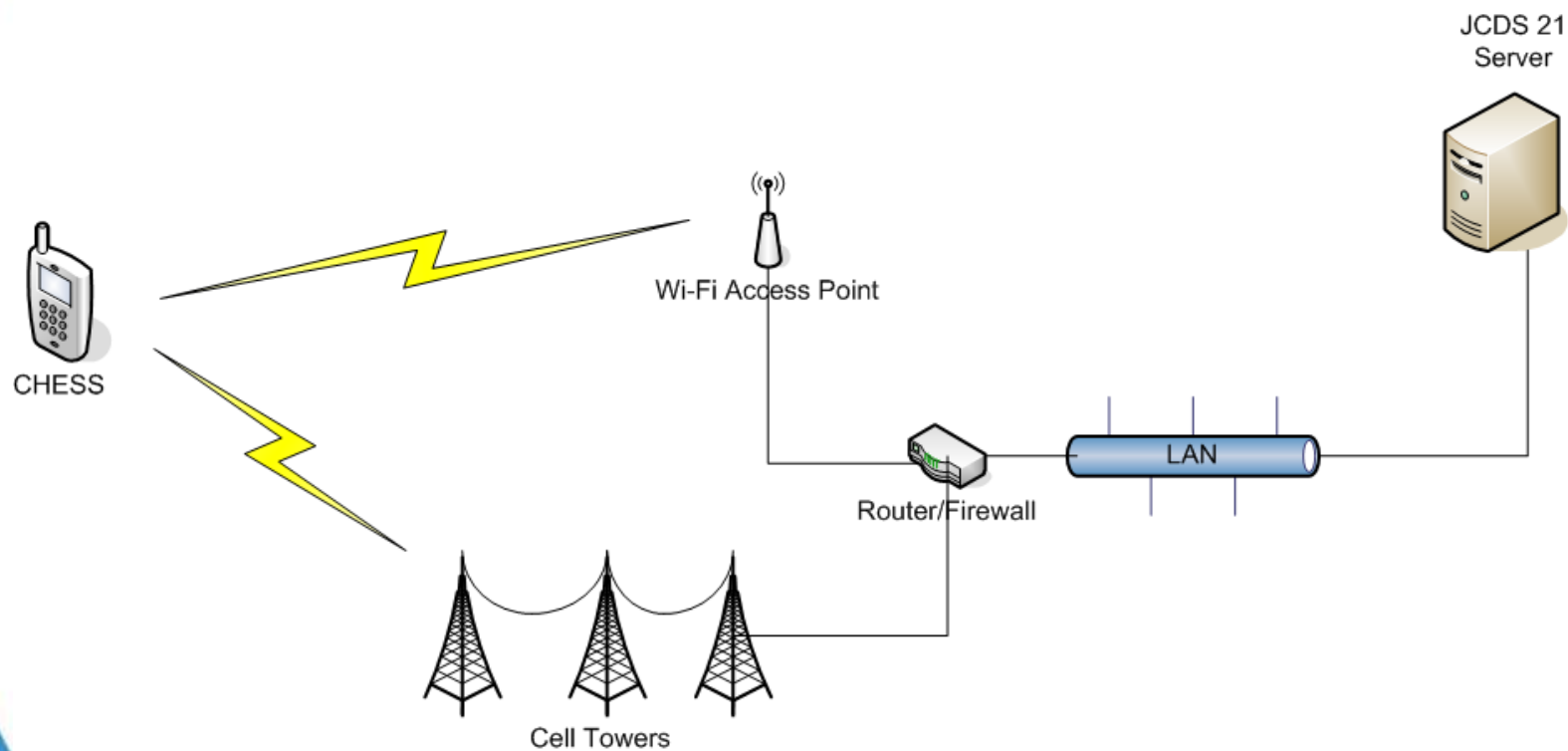


Legend

-  Components developed by the TA15 Team
-  Existing components that will be slightly modified or to which we connect

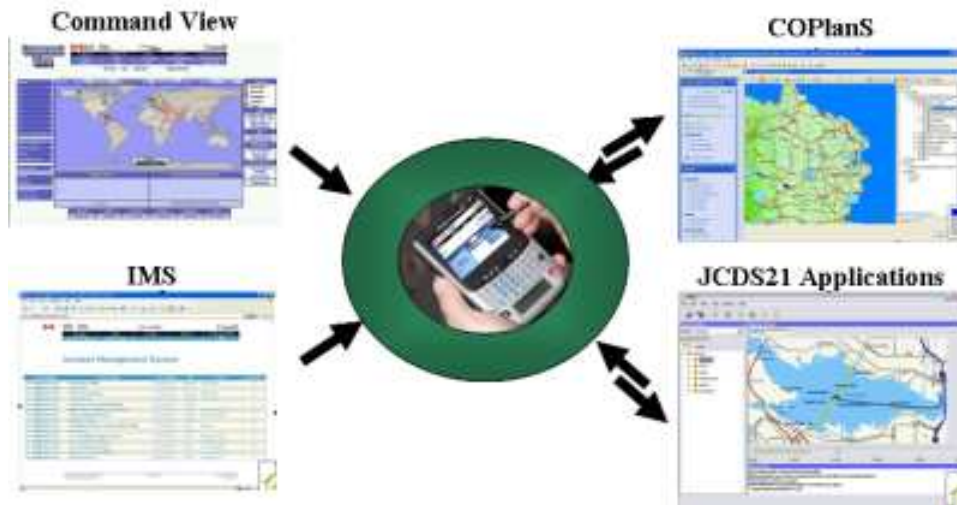


CHES Network Connectivity Overview





Commander HandhEld Support System (CHESS)



- 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]

DEFENCE



DÉFENSE