



# Network Enabled Operations in the Canadian Context

Briefing  
to  
9<sup>th</sup> Command and Control Research and  
Technology Symposium

By  
Sandy Babcock

15-17 Jun 04



# OUTLINE



- 1) Canadian Initiatives to date
- 2) Robust Ram
- 3) Pacific Littoral ISR Experiment
- 4) Atlantic Littoral ISR Experiment
- 5) The Way Forward



# CANADIAN NEOps INITIATIVES



- **C4ISR Campaign Plan**
- **Canadian Forces Experimentation Centre**
- **International Fora (NATO WGs – e.g. ET 049, TTCP – e.g. NCW AG)**
- **Bilateral Cooperation/Liaison (Australia, UK, USJFCOM) (e.g. MAR AG 1 and AG 10)**
- **Individual Contributions**



# CFEC INITIATIVES

- Concept Development (NEOps, EBO, ACAR, Alternative Futures)
- UAV-related Experiments
- Series of Workshops
- Gap Analysis
- PRICIE Assessment (DOTMILTP)
- Co-sponsorship of departmental NEOps symposium 30 Nov – 2 Dec 04

# CFEC Thrust Areas

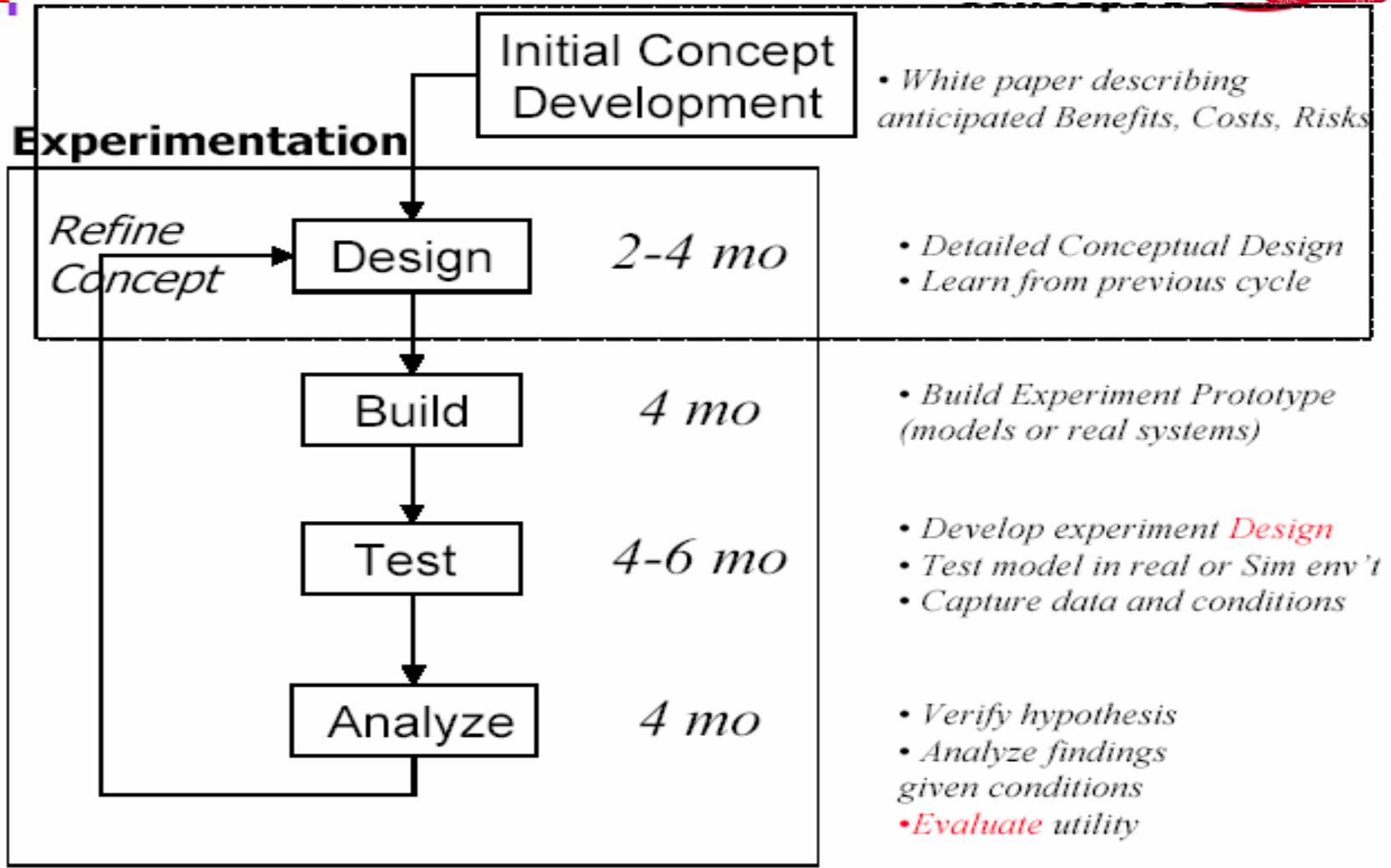


	INTEGRATING CONCEPT	FUNCTIONAL CONCEPT	EMPLOYMENT CONCEPT
C A P S T O N E  C O N C E P T  S T R A T  2 0 2 0	COMMAND & CONTROL	<u><b>EFFECTS BASED OPS</b></u>	POL-MIL
			<u><b>COLLABORATIVE PLNG</b></u>
			<u><b>JOINT TARGETTING</b></u>
		<u><b>COLLABROATIVE INFORMATION ENVIRONMENT</b></u>	<u><b>COP 21</b></u>
			<u><b>FUTURE CFCS</b></u>
			COMBAT ID
	INFO & INTEL	<u><b>INTEGRATED ISR ARCHITECTURE</b></u>	<u><b>UAVs</b></u>
			<u><b>IISRA</b></u>
		EFFECTS BASED ASSESSMENT	C2 ISR SYSTEMS
			RED TEAM
	<u><b>SUSTAIN</b></u>	LOGISTICS INFO FUSION	<u><b>COMMON LOGISTICS PICTURE</b></u>
			<u><b>LOGISTICS DECISION SUPPORT</b></u>
		LOGISTICS PLANNING AND EXECUTION	
		JOINT AND COMBINED LOGISTICS INTER-OPERABILITY	ALLIANCE/COALITION LOGISTICS
			<u><b>INTEROPERABILITY WITH OGDS/NGOS/ CONTRACTORS</b></u>
CF JOINT LOGISTICS			

**PLIX  
ALIX**



# Experimentation and Concept Maturation Process





# Exercise ROBUST RAM

- Experiment conducted in Apr 02 exploring employment of UAVs as an ISR platform within a network-centric environment.
- Used three UAV platforms (Guardian – Bombardier, I-Gnat – General Atomics-ASI, Pointer - AeroVironment) teamed with a Coyote Reconnaissance Vehicle.
- Experiment conducted in Suffield, Alberta.
- Subsequently used I-Gnat in support of Op Grizzly, support for G-8 Meeting in Kananaskis, Alberta, in Jun 02.



# ROBUST RAM RESULTS



- Canadian Forces occupational structure has all the necessary skill sets to operate and exploit the technological and information advantages offered by UAVs.
- A family of UAVs is required to provide seamless coverage of the battle space.
- UAVs cannot be considered in isolation; must be integrated into an integrated ISR architecture
- Recommend acquisition of proven and mature UAV system for integration into the Coyote Reconnaissance Vehicle.
- Need to further test concept, using medium altitude long endurance (MALE) UAV.





# Pacific Littoral Experiment (PLIX)



## Background

- The Canadian Forces have identified an Information and Intelligence (I2) capability deficiency
- Commercial off the shelf (COTS) technology using Integrated ISR Architecture hardware/software plus UAVs and sensor suite.
- Purpose of Experiment: to observe the I2 capability delivered by the **operation** of particular configuration of COTS technology as a rapid prototype.
- Conducted 8-13 Jul 03 at Tofino and Esquimalt, British Columbia.



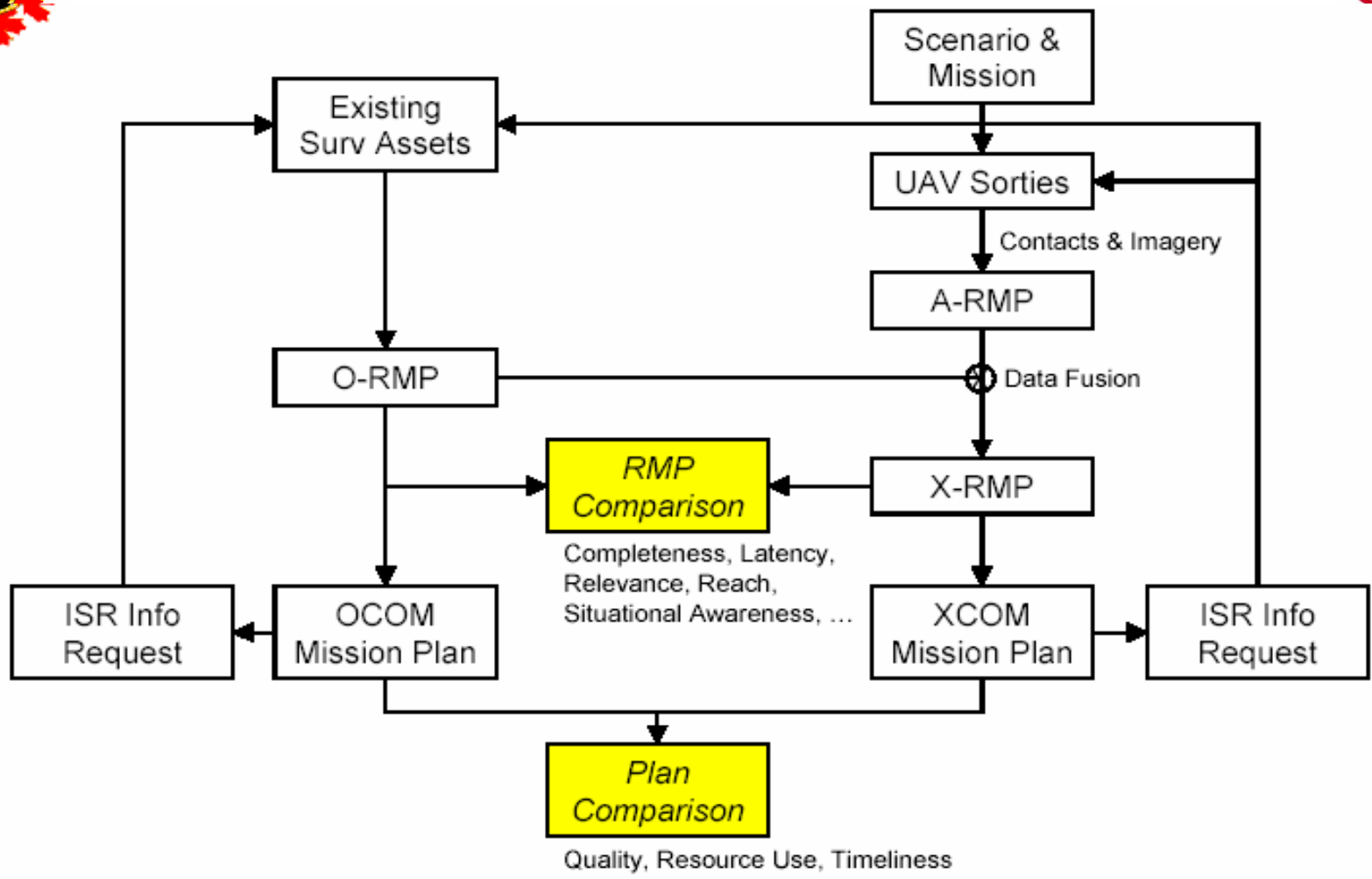
# PLIX Hypothesis



- If PLIX UAV patrols a designated littoral operations area, then all surface contacts are detected, continuously tracked, and positively identified in the experimentation recognized maritime picture (XRMP).
  - NOTE: This was the proposition to test, not a promise to keep – it was clearly falsifiable and was framed in consultation with the sponsor

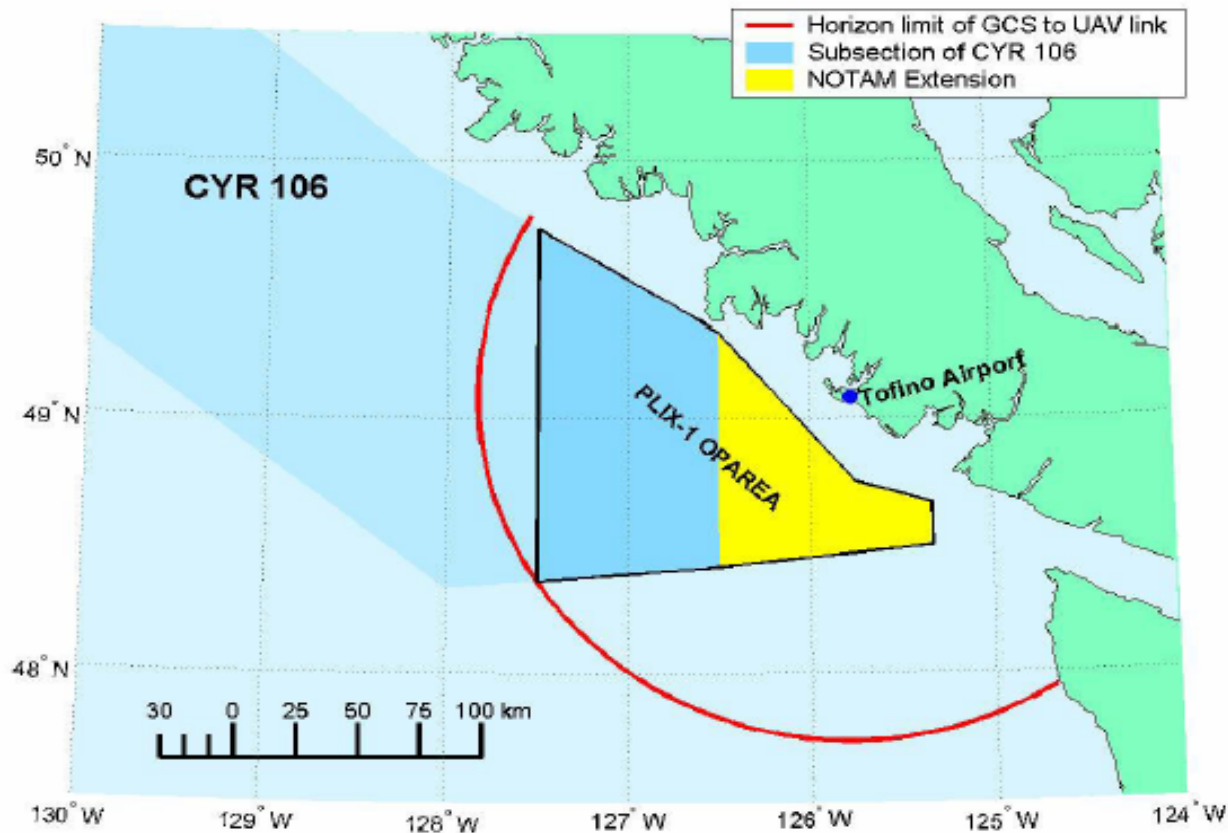


# Design Schematic





# Operations Area





# PLIX UAV – IAI Eagle I

- Operational Altitude (OA): 20,000 ft
- Max. air speed: 120 Knots
- Cruise speed at OA: 80 to 110 Knots
- Mission Time: 30 hours
- Sensors: EO/IR, MPR
- Manufacturer's MPR Specified Detection Ranges
  - Dinghy 11 nm
  - Fast Patrol Boat 27 nm
  - Tanker/Corvette 65 nm









# Participating Naval Units



 CCGS BARTLETT




 CCGS GORDON REID



 CCGS SIR WILFRID LAURIEF



 CCGS TANU



Position recording every 6 minutes during experiment period.



Position recording every 6 minutes  
Following scripted event profiles.

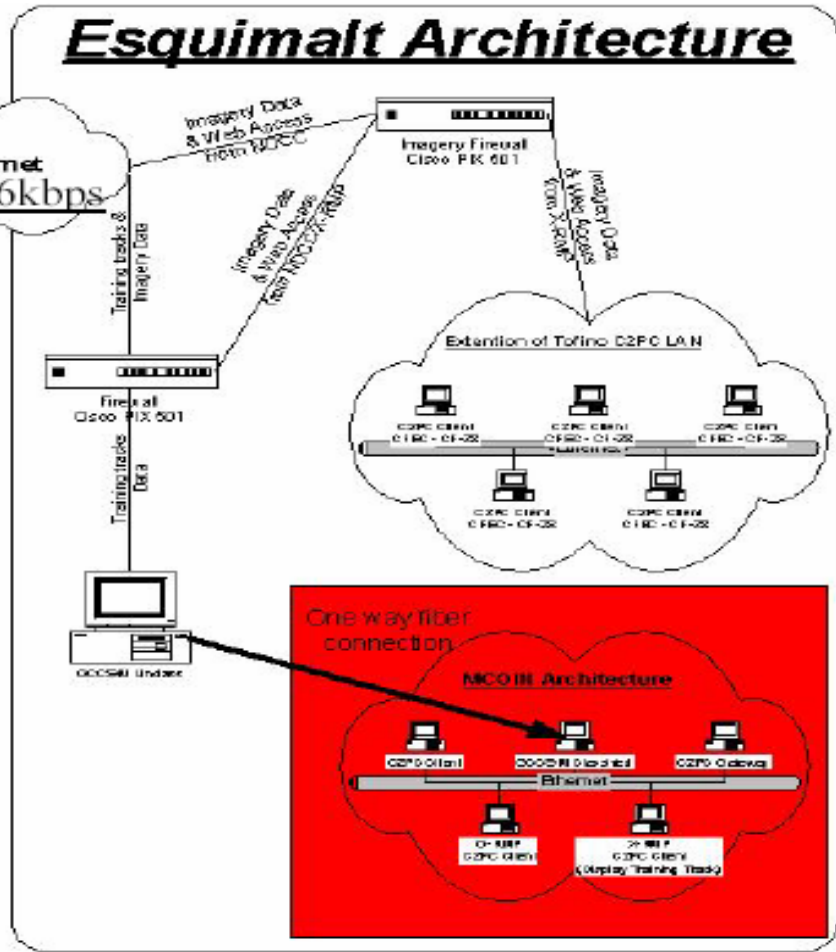
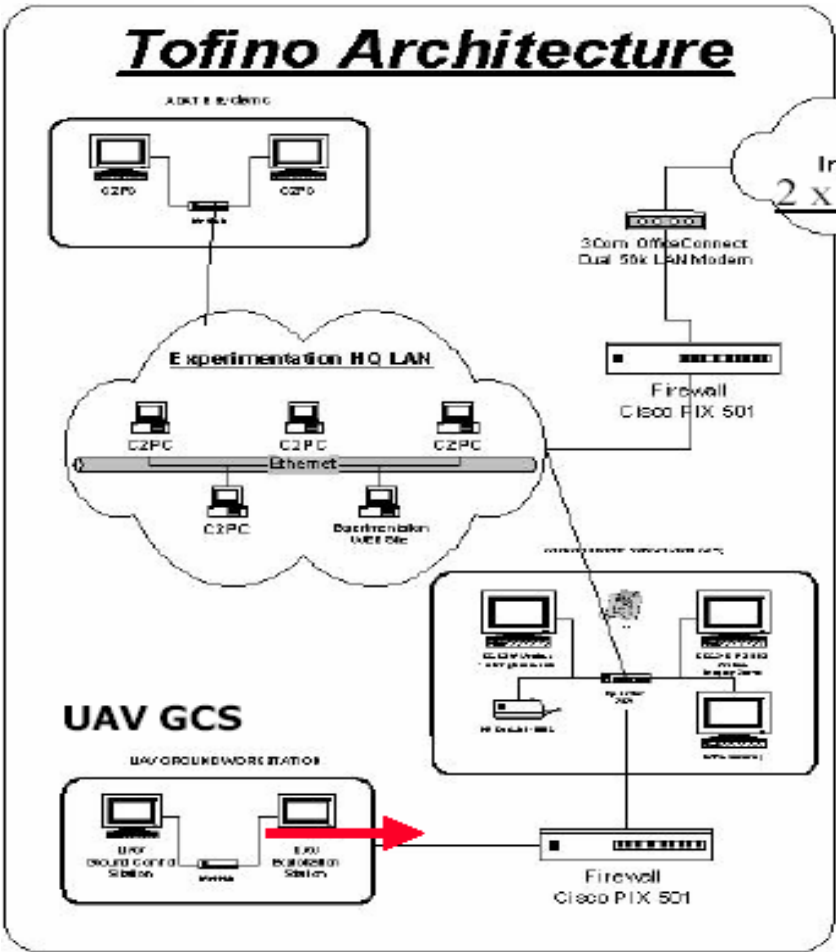


YP 697 Agate Passage  
Coastal Oiler  
Ship in Distress  
Immigrant Smuggler  
Terrorist Vessel

YARD PATROL CRAFT AGATE PASSAGE YP 697



# PLIX Network Architecture





## Issues (Preliminary)



- Intrusion of “real world” incident.
- Bandwidth available between Tofino and Esquimalt introduced latency issues, resulting in false Postings (TPPU). Latency also influenced by personnel factors, hardware and software limitations, and inadequate procedures for NCO environment.
- UAV icing.
- UAV radar had mixed success detecting and tracking targets.

**Net Result:** Hypothesis was falsified.





## Lessons Learned

- **P**ersonnel
- **R**esearch and Development / OR
- **I**nfrastructure and organization
- **C**oncepts, doctrine and collective training
- **I**nformation management
- **E**quipment, supplies and services



# Questions



## PRICIE

- Sensor Ops: air sense and 3D awareness required
- Wide variability in GCCS knowledge

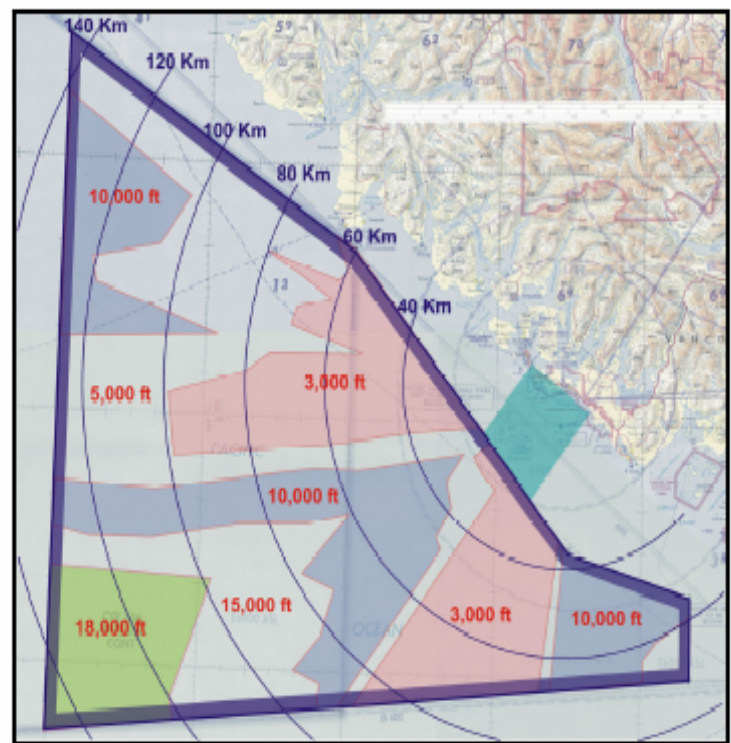
## PRICIE

- Baseline surveillance assessment required to understand RMP quality and accuracy of inputs
- Req't for all weather classification/identification capability
- Req't for Beyond Line of Sight Capability



# UAV Line of Sight

- MALE UAV operations limited by line of sight datalink impacting on contact classification and identification



Minimum UAV LOS Operating Altitude (feet)



# Lessons Learned (Cont'd)

## PR**I**CIE

- Ground Data Terminal (GDT) location drives infrastructure layout
- Flt Ops support needs include mission planning, meteo, intel, C4 systems

## PR**I**CIE

- UAV contributed significantly to RMP
- need for all weather sensor performance
- UAV airspace integration completed with Transport Canada procedures and NOTAMS



# Lessons Learned (Cont'd)

## PRICIE (Cont'd)

- Require Multiplexed sensor suite
- Reference contact database needed for info exploitation
- UAVs provide persistent surveillance capability
- line of sight datalink impaired classification and identification

## PRICIE

- Require bandwidth for distributed collaborative planning
- Adopt NATO STANAG formats for imagery
- Need effective 2-way data exchange in IISRA
- Fully test IISRA and procedures in ALIX



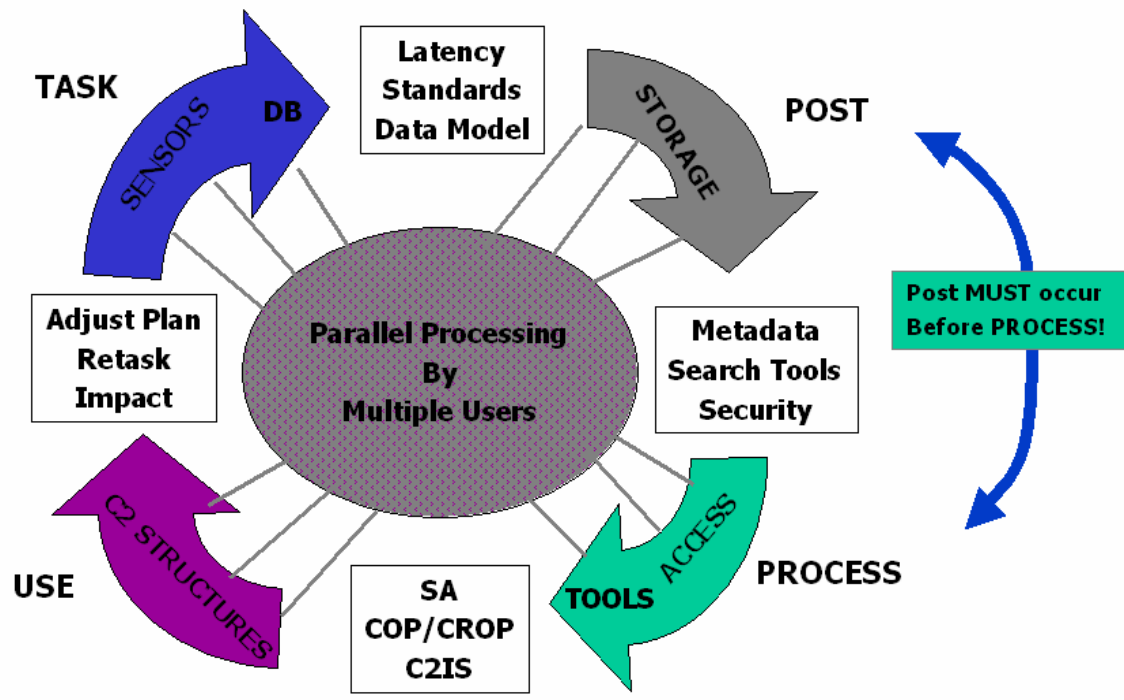
# Atlantic Littoral Experiment (ALIX)



- Scheduled 16-31 Aug 04
- Intended to examine ISR Critical Operational Issues, including:
  - Effectiveness of multi-source, multi-sensor data fusion practice using IISRA
  - Timeliness of information flow (latency)
  - Exploitation (sequential and parallel TPPU)
  - Information Reach/Sharing
  - Relevance, completeness and responsiveness to decision-making

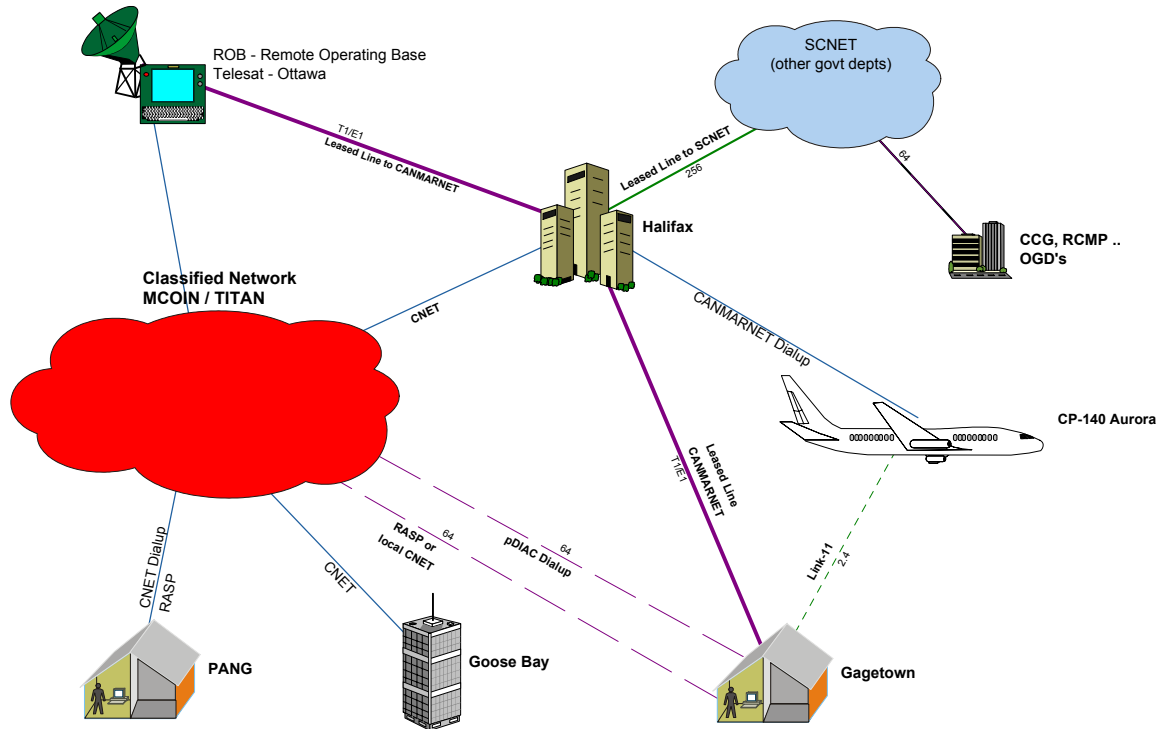


# TPPU





# ALIX Network Architecture

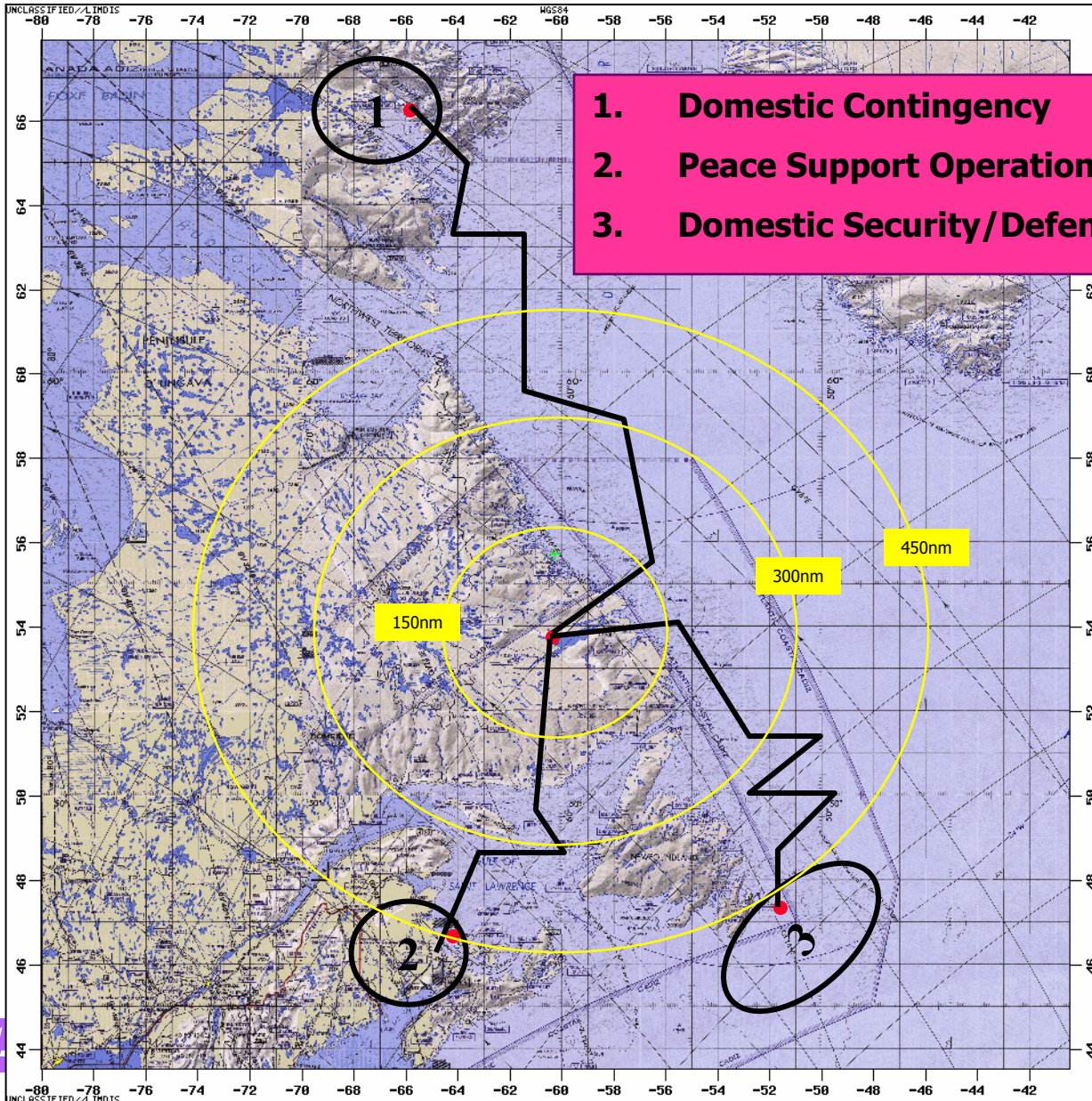


ALIX Trial - Top Level





# ALIX Area of Operations

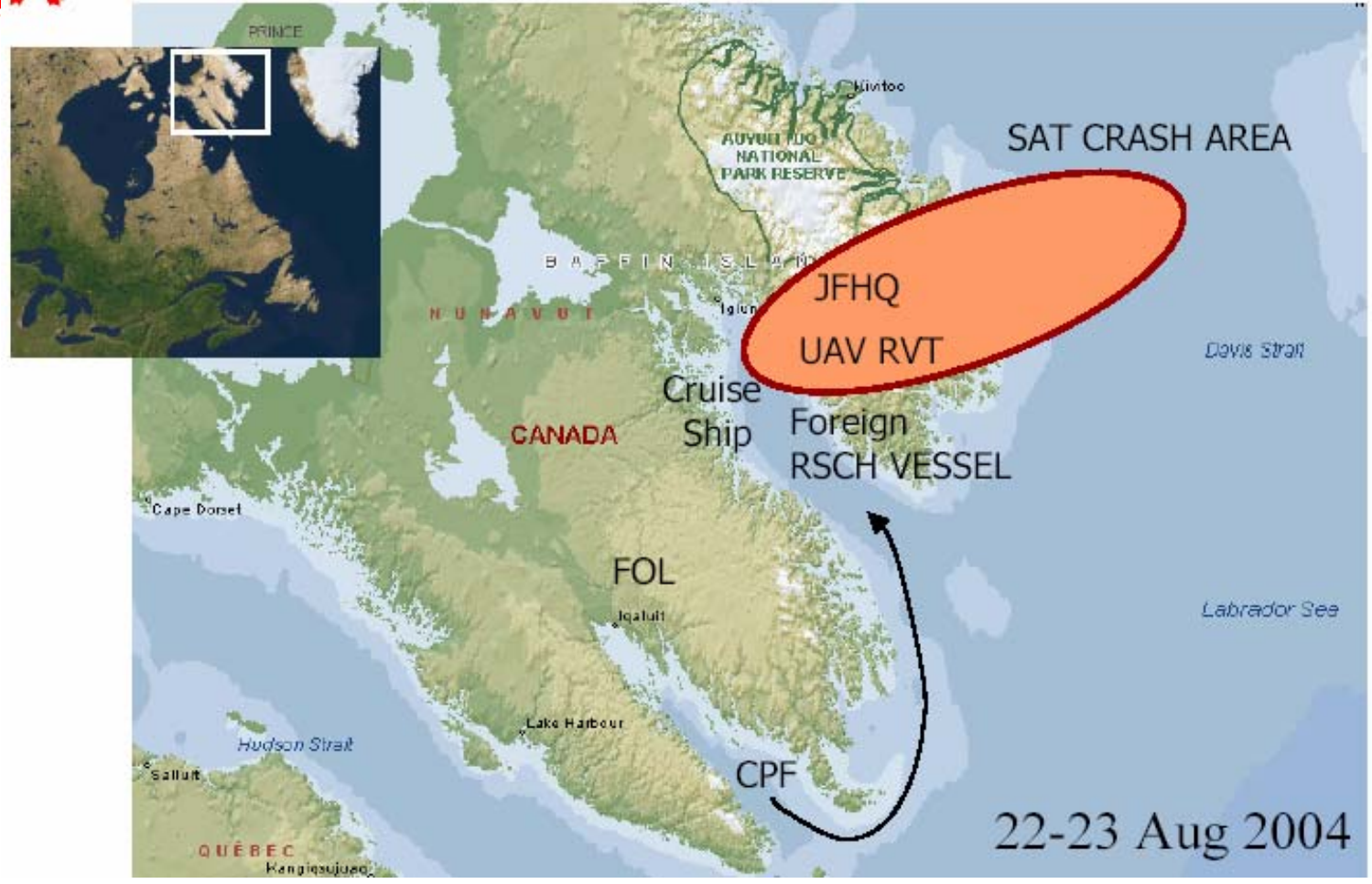


- 1. Domestic Contingency**
- 2. Peace Support Operations**
- 3. Domestic Security/Defence of Canada**





# Scenario 1:





# ALIX Scenario 1

## SOVOP within CFNA (Narwhal '04)



- Situation: SAT Crash near Pangnirtung, Environment concerns, Foreign Nation Interest, Sensitive Payload
- Mission: Conduct focused surveillance of arctic area  
Support to civil authorities
- Success  
Criteria: Locate debris, timely ISR Support
- Tasks: Map & secure debris field, track intruders  
ISR Support to CFNA for recovery
- Forces: CFNA/JTFHQ, Infantry Coy, 1 CRPG, CPF, UAV, CH-146, Radarsat, Solicitor General, Coast Guard
- C4I: JTFHQ/CFNA, Maritime Operations Centre, ROC, NDCC



# Scenario 2





# ALIX Scenario 2

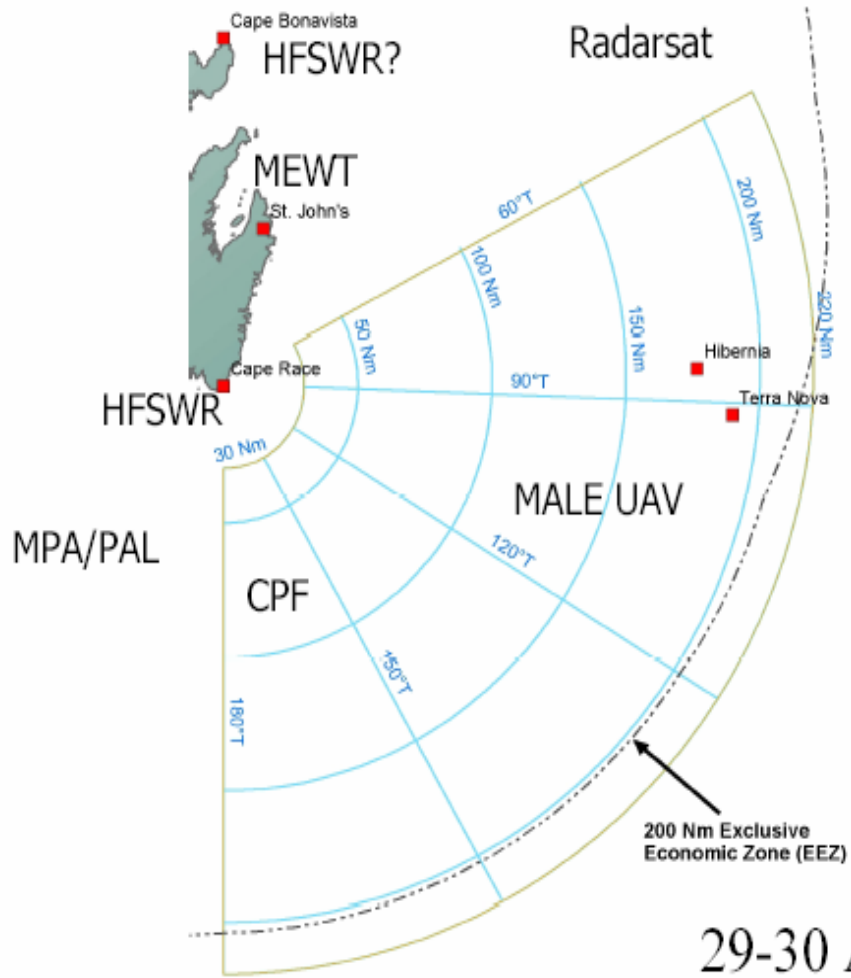
## Peace Support Op (ARCON '04)

- Situation: UN Peace Support Operation (Chap 6)  
at Isle Gagetown
- Mission: Surveillance of Approaches,  
Support Ground forces, COP, BDA, TST
- Success  
Criteria: Timely identification/tracking of forces
- Tasks: Locate OPFOR, Classify & Identify Ground/air targets,  
Live fire targeting, BDA
- Forces: LFISTAR Tactical ASC, MALE/Mini UAVs, Coyote,  
ADATS, MEWT, MPA, DDH
- C4I: ARCON, JFHQ/MARLANT, LCC/LFAA, NDCC





# Questions





# ALIX Scenario 3

## Marine Security



- Situation: Terrorist organization suspected of targeting Int'l Environmental Congress in St John's Nfld
- Mission: Timely threat warning,  
Surveillance of air and maritime approaches  
Support to civil authorities
- Success Criteria: Timely Detection of suspect activity,  
Track/ID vessels, Intercept VOI
- Tasks: Area Surveillance, Fish Patrol,  
Protection of vital points
- Forces: ROC, HFSWR, AIS, CP140, PAL, UAV,  
CBRN Team, ISTAR ASC, MEWT, Radarsat, OGDs
- C4I: ROC, NDCC, GoC PSEP/OCIPEP



# Estimate of Distance Covered







# Questions?



## Contact Info:

[BABCOCK.AA@FORCES.GC.CA](mailto:BABCOCK.AA@FORCES.GC.CA)

Phone: (613) 990-7455

Fax: (613) 991-5819