H7700 & I2D Demonstration

Information Dissemination Over HF

HFIA

July 2007

SELEX Communications

Introduction

- SELEX's Information Dissemination HF Demonstration
  - What is being Demonstrated
  - Update on HF2000
  - H7700
  - SELEX participation at CWID2007
  - Information Dissemination over HF
  - Demonstration

Information Over HF

- Limitations of HF
- Need to use HF
- Networking enabling HF
- Need to develop applications for HF

HF2000 Update

- Customer: Sweden
- Developed in close co-operation with FMV
- Project Schedule
  - Supply of radio equipment and RSCUs completed
    - Last acceptance June 2007
  - First System Software Delivered October 2006
    - Delivered for initial tests
  - Second iteration of software accepted June 2007 subject to correction of some defects.
  - In Service Readiness Date of 2007 With Operations Expected From 2008
  - Progressive Software Deliveries Between 2007 and 2010

Combine Endeavor

- Sweden deployed HF2000 as part of their participation in CE07 in Baumholder, Germany
- Key objective for the Swedish Armed Forces was preparation for the deployment of the Nordic Battle Group. Testing was therefore of e-mail over STANAG 5066 in a fixed frequency configuration
- Testing allow HF2000 to be exercised against a range of different systems
  - Data gathered to allow improvements and corrections to be made
- Swedish Armed Forces planning further on-air test in the Autumn with other nations in readiness for Nordic Battle Group
  - Goes ‘live’ on January 1st 2008

H7700 Network Solution

- Integration to optimise technology
  - HF Radios
  - HF modems & waveforms
  - Automatic Link Establishment & Data Link Protocols
  - Frequency Performance Prediction
- Transparent subscriber-to-subscriber connectivity
- Range of user services
- Automatic, unattended operation
- Reduced operator workload, skill level & training costs
- Interoperability with legacy equipment
  - HF Radios
  - Subscriber Terminals

H7700 Capabilities

- Traffic User
  - The H7700 Architecture Allows the Users to Seamlessly Send and Receive Traffic of Various Types Across an HF Channel
- System Configuration and Monitoring Operator
  - The H7700 Provides the Operator With the Remote Capability to Configure the System, Enable Traffic to Be Sent and Received by Traffic Users, to Monitor the Status of Traffic in the System and the Status of System Equipment

H7700 Capabilities (1)

- User Traffic
  - IP (Main Traffic Type)
  - Text
  - Data
  - Voice (Analogue)
  - E-mail (SMTP & POP-3)

- Platforms
  - Fixed Site
  - Mobile Shelters
  - Surface Ships & Submarines
  - Helicopters
  - Transport Aeroplanes
  - Manpacks

H7700 Capabilities (2)

- H7700 System Solution Features …
  - Automated HF Radio System
  - Synchronous ALE (STANAG 4538)
  - Asynchronous ALE (Mil-std-188-141b)
  - Manual Mode
  - Data Link Protocol (STANAG 5066)
  - Automatic Frequency Selection
  - Standard IP, Text and Data Interfaces
  - Traffic Passed in All Link Establishment Modes
  - Interoperability

H7700 Capabilities (3)

- H7700 System Solution Features …
  - Split-site Architecture
  - Multi-channel Nodes
  - Unmanned Operation
  - Military Environment
  - Service Life of 25 Years
  - In-service Support

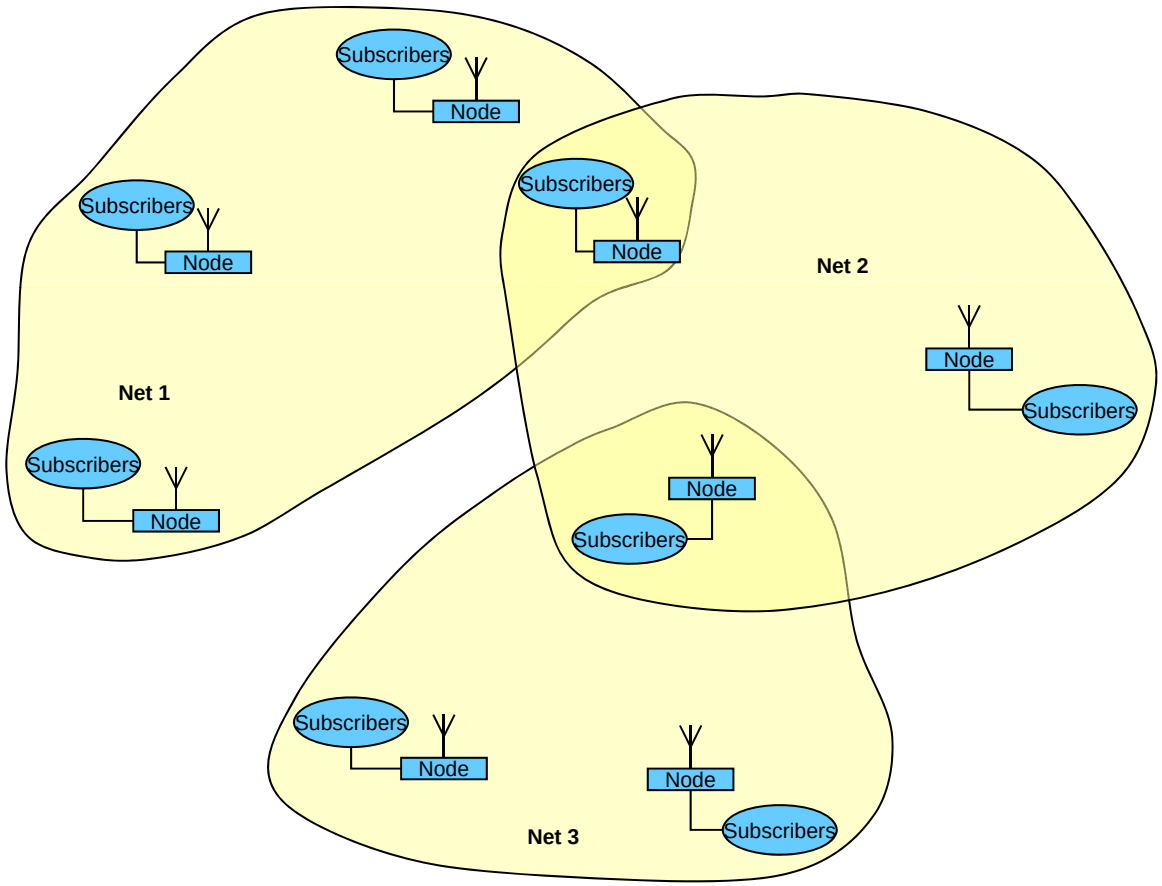
Benefits H7700 Delivers (1)

- System Based on User Needs
- Common Resource Across defence
- Rapidly Deployable
- Once Configured, Nodes Run Un-attended
- Reduced Training and Skill Level Required
- Optimises Use of the HF Spectrum Automatically
- Lower Cost of Ownership Than SATCOM Systems
- National Ownership of Whole System

Benefits H7700 Delivers (2)

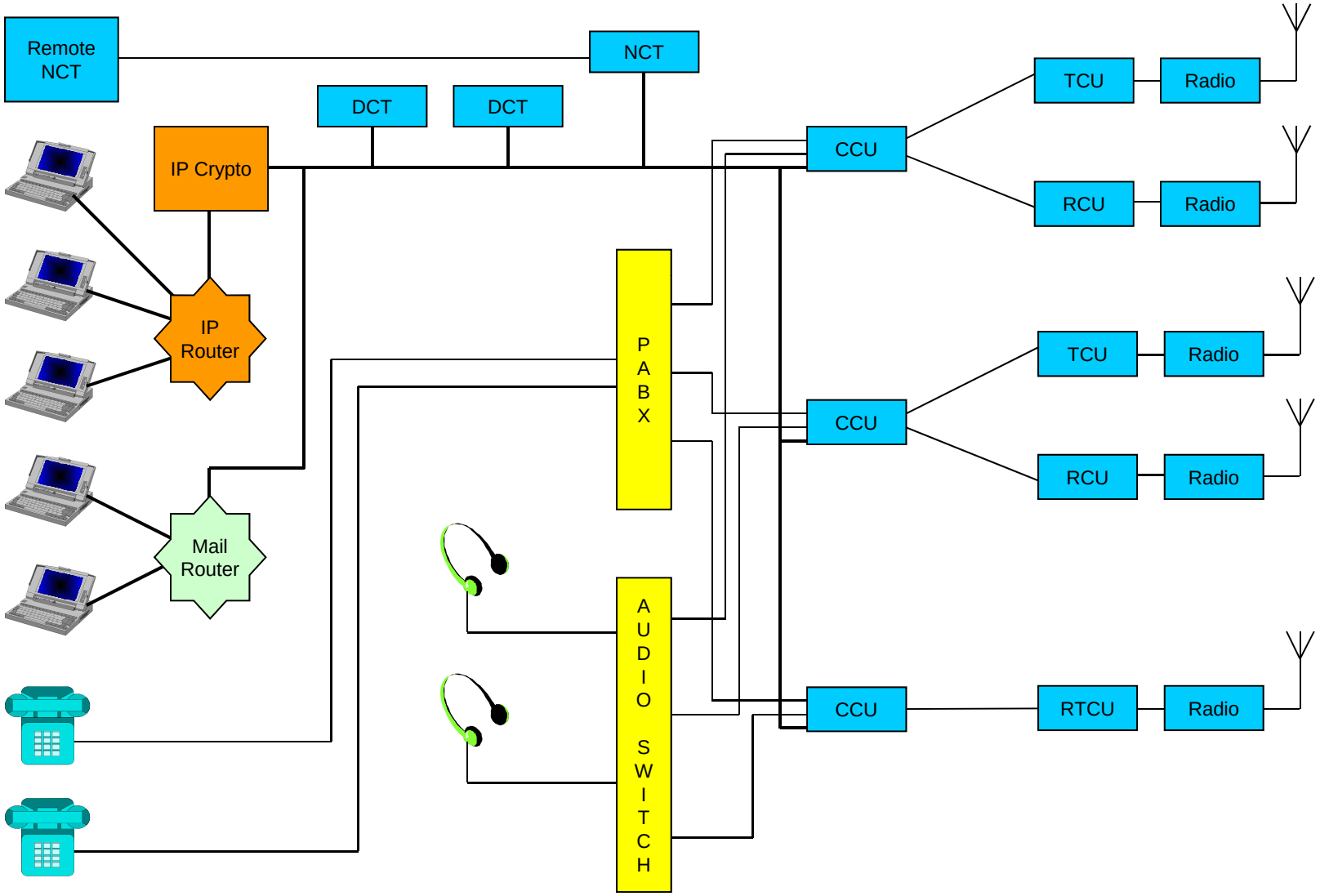
- Flexible network enabler
  - From strategic to tactical
  - As primary or secondary means
- Use of IP supports a vast range of user needs
- Uses NATO and US Military standards
- Interoperable with other military HF systems
- Flexible
  - Can scale to operational need
  - Expand to cater for new systems as they are deployed
- Operates with legacy subscriber and radio equipment

HF Network

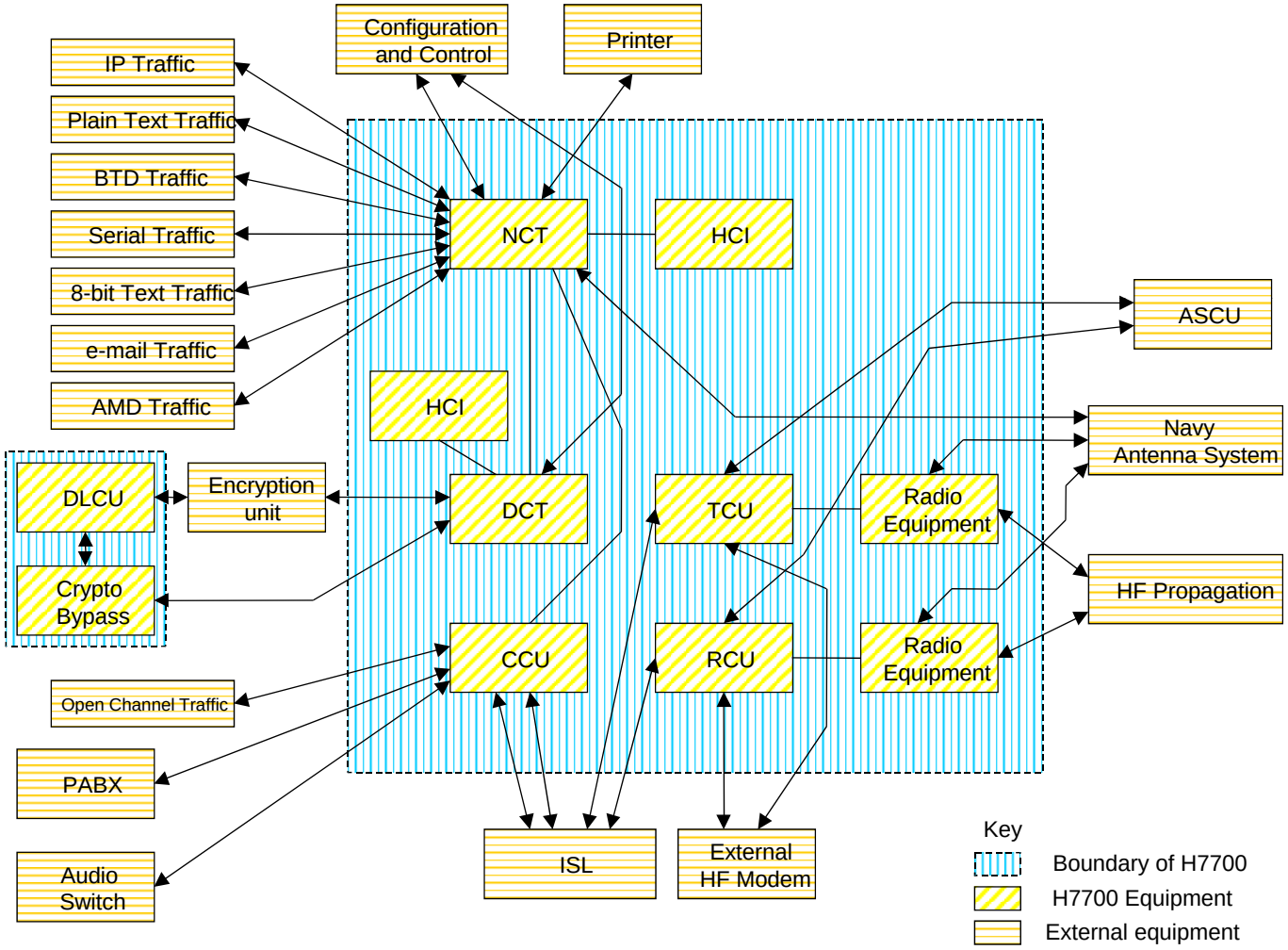


- Subscribers communicate within a net.
- Nets have their own frequency allocations
- Separation into different Nets allows frequency-re-use
- ALE supports increased traffic flow in a Net through concurrent channels

H7700 Multi-Station Node



H7700 Architecture



Equipment (1)

- RSCU - Radio System Control Unit
  - Multi-role: CCU, TCU, RCU, CCU&RCU, CCU&TCU, CCU&RTCU
  - Two Physical Configurations, Land/sea and Airborne

- PC controller
- 19.2kbps modem
- Interfaces to
  - Ethernet
  - Traffic interface
  - Inter-Site Links
  - Radios

Equipment (2)

- Operates With a Range of Equipment
  - Receiver
  - 100w TCVR
  - 400w TCVR
  - 1kw TCVR
  - 5/10kw TCVR
  - 100W and 1kw ATUs

SELEX @ CWID 2007

- SELEX participated in the UK MOD Coalition Warrior Interoperability Demonstration (CWID) in June 2007
- Partnership between MOD and industry run as part of a wider US lead Coalition event.
- CWID is focussed towards filling defence capability gaps.
- CWID uses real data sat on real in-service or planned communications bearers with real infrastructure and security.
- All the demonstrations at CWID UK must connect to and be part of the UK's secure network in order to prove their interoperability

CWID Deployment

- Provided the HF connectivity between the Maritime Command Component back to the UK Strategic infrastructure.

- The actual physical link was a 140km NVIS link between the CWID location in Portsmouth and our HF transmitter facilities in Chelmsford.

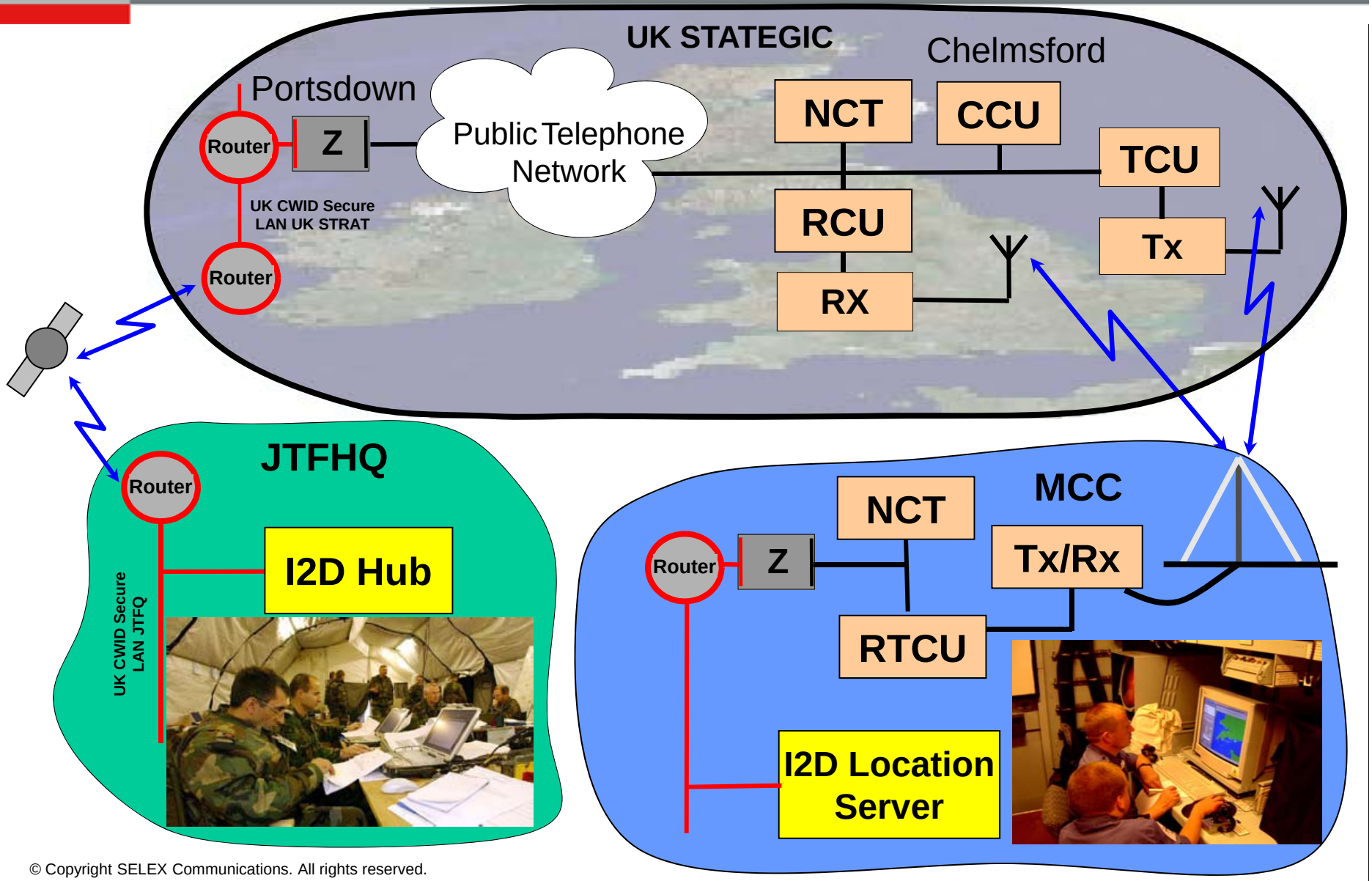
Demonstration Role

- The HF link was used to provide meteorology reports and recognisance imagery to the Maritime Platforms from a central depository located at the JTFHQ.
- This depository was provided by a SELEX product called I2D.
- I2D products were available to a wide range of users located on the network but importantly these products were also available to the maritime component regardless of the availability of satellite connectivity.
- A typical imagery that would be provided to the Maritime Platforms would be recognisance photos with the latest intelligent info.

Issues

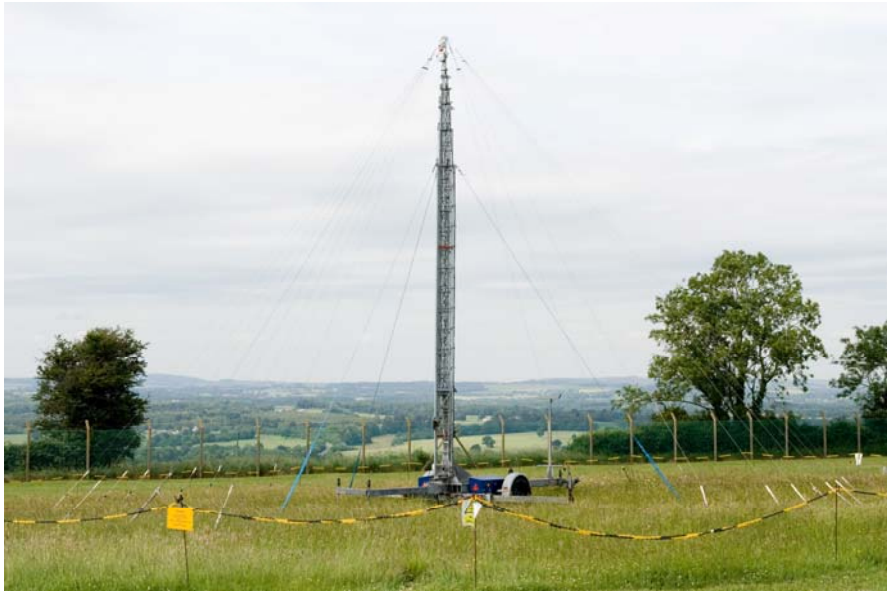
- 1kW into 10 meter whip
- 400W into SELEX broadband Conifan.
- Normal problem of limited HF frequency available from the Army
- Problems with local interference at Chelmsford, not a very quite site!!!

CWID Deployment



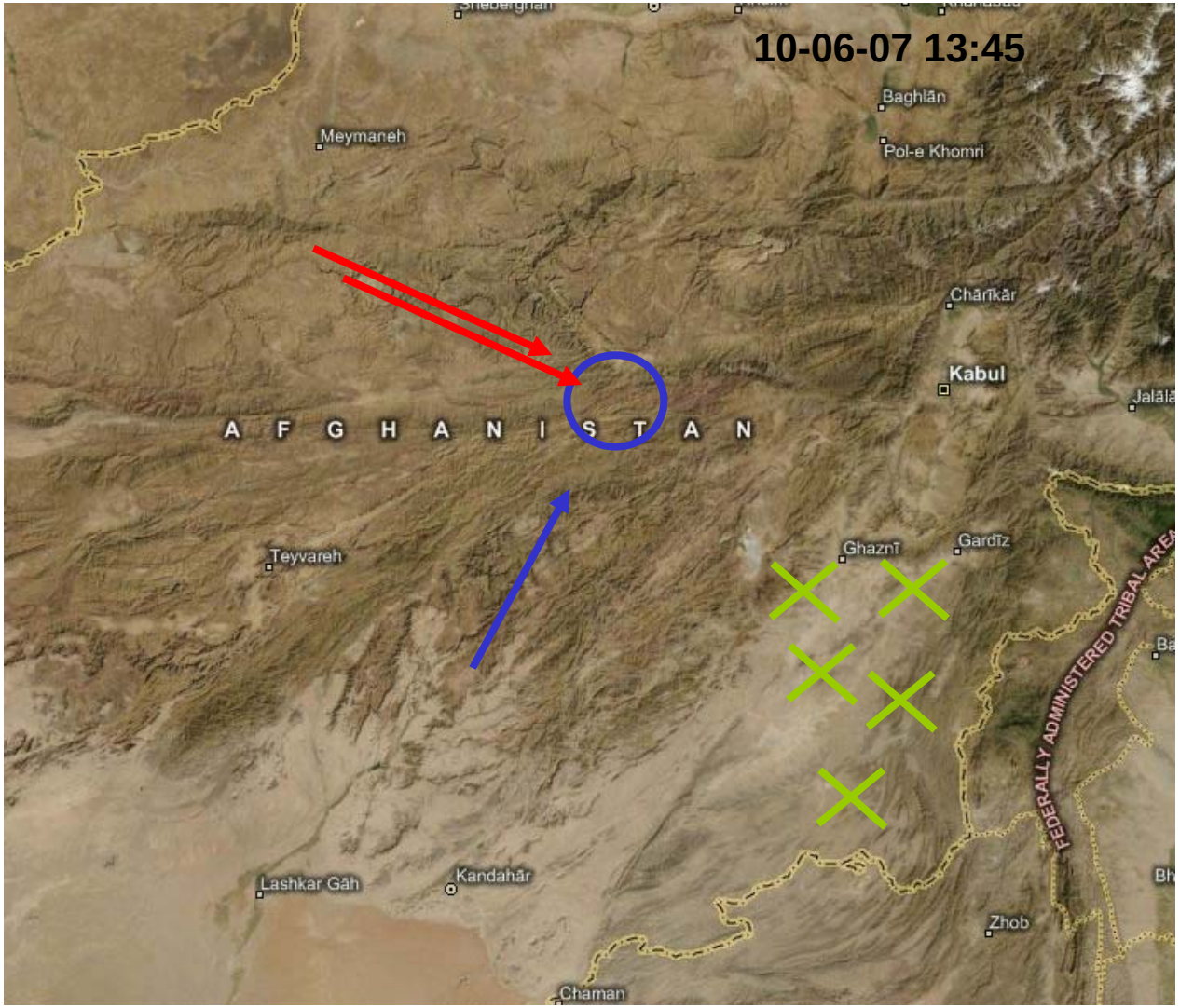
Antennas Used

10m Naval Whip at Chelmsford



SELEX Conifan Antenna at CWID

A Typical Image



The Solution

- So how was it done?