Adaptive Multiple ALE Networking

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micom
Advanced HF radio solutions

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ALE Concepts

ALE for HF Communication

Automatic Link Establishment

Why ALE

- **HF link performance depends Frequencies that the best for link very according to:**
  - Time of day due to the sky layers reflection
  - Weather
  - Distance
  - Environmental and thermal noise

So, the ALE is to:

- **Selects the best frequency in the current conditions.**
- **Simplifies the operating and link set-up**

History 1980-1985

- **ALE Systems fielded early at the 80s**
  - Collins Selscan®
  - Tadiran AutoCall
  - Harris Autolink®
  - R&S ALIS
  - Sunair Scancall®
  - CCIR/GMDSS 493 (as a selcall protocol)

- **2nd Generation ALE standard- was published MIL-STD188-141**

Many products conforming to MIL-STD 188-141A/B 2G-ALE Fielded
All new professional radios have embedded 2G ALE

Basic ALE Protocol

NET1-20

F1
F2
F3
F4
F5
F6
F7

ALE Address	Freq.	LQA
BBB	F1-F7	30-90%
AAA	F1-F7	30-90%

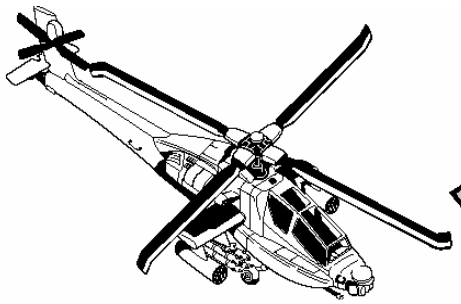
1-To reach a specific station, the radio operator simply enters an address

2-The radio consults its memory matrix and selects the best available assigned frequency

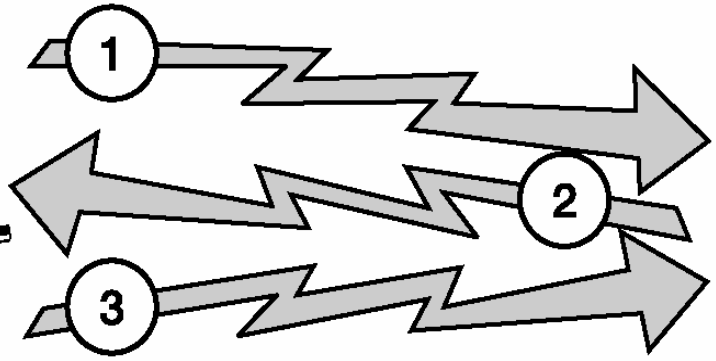
3-It then sends out a brief digital message containing the identification (ID) of the destination

4-The two stations automatically conduct a “handshake” to confirm that a link is established

MIL-STD 188-141B 2G-ALE



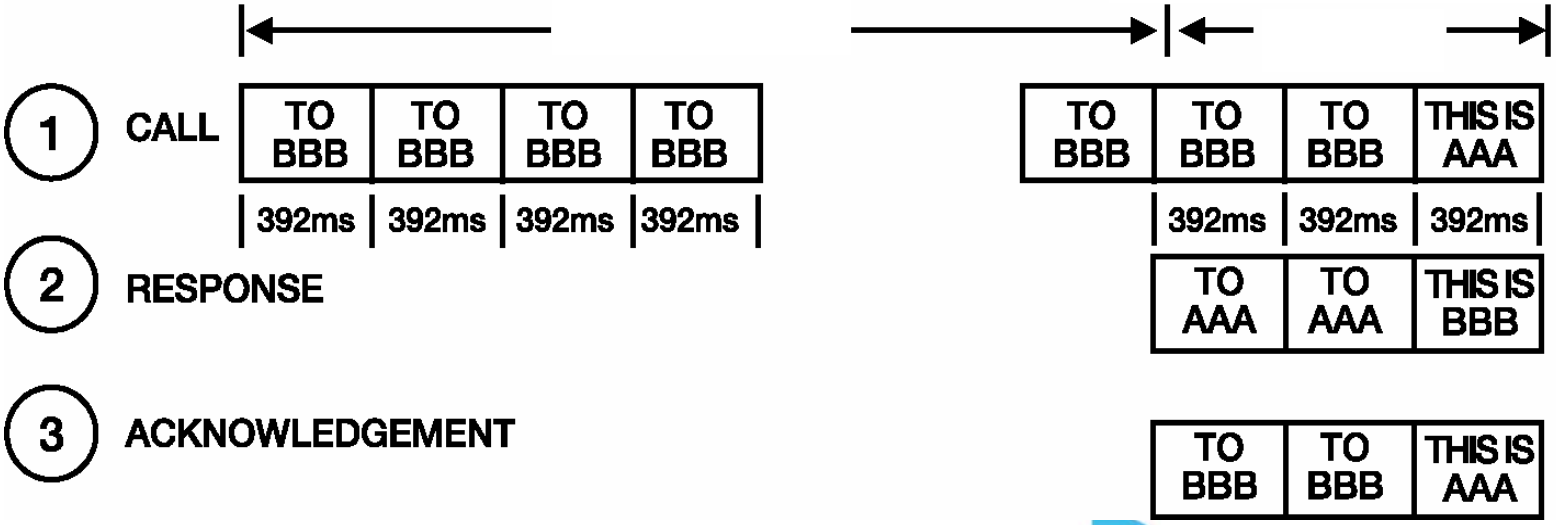
Aircraft AAA
Initiates Call



Ground Station

Ground BBB
Receiver
Scanning

Scanning Call



DATA OVER 2G, AMD – Automatic Message Display

Data- up to 90 Characters:

- Messages – Individual/All-Call
- Sending GPS information
- Polling GPS from clients
- Command and Control System
- Diagnostic information

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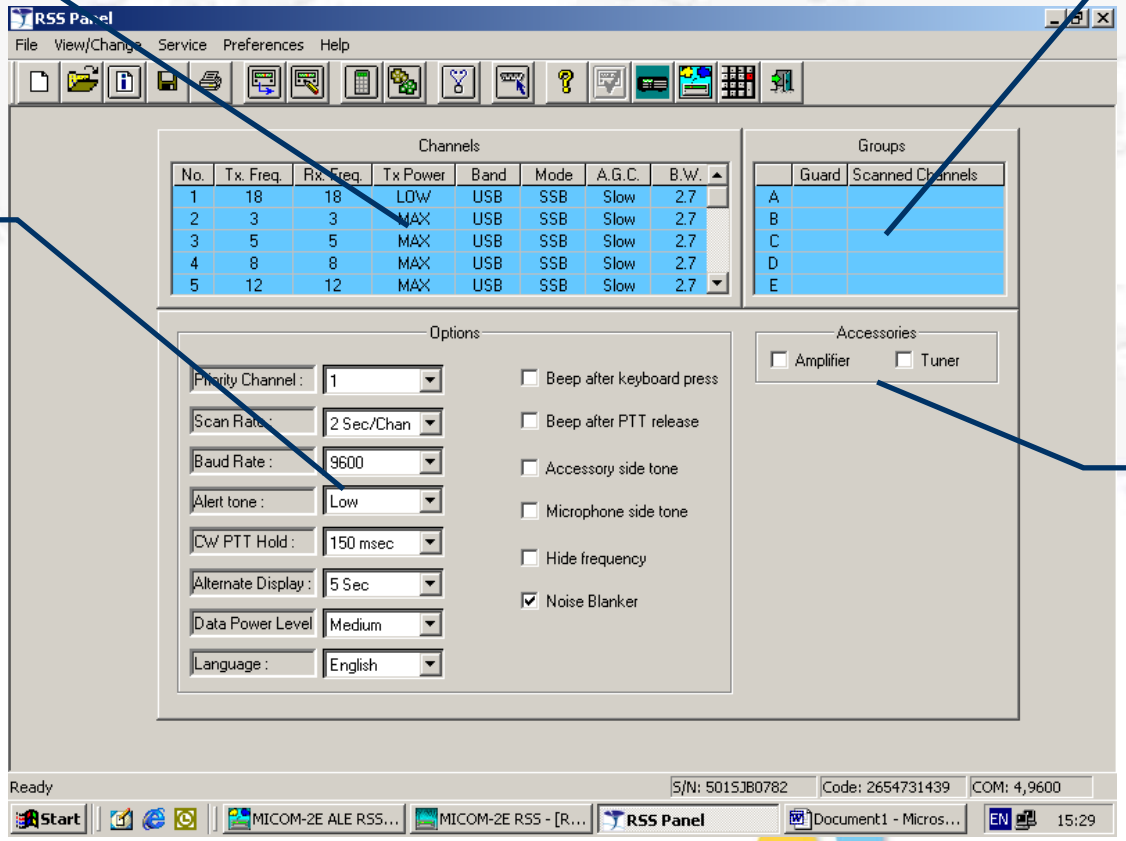
PC Control application Radio RSS menu

Channels parameters

General parameters

Scanning setting

Amplifier and tuner enable menu



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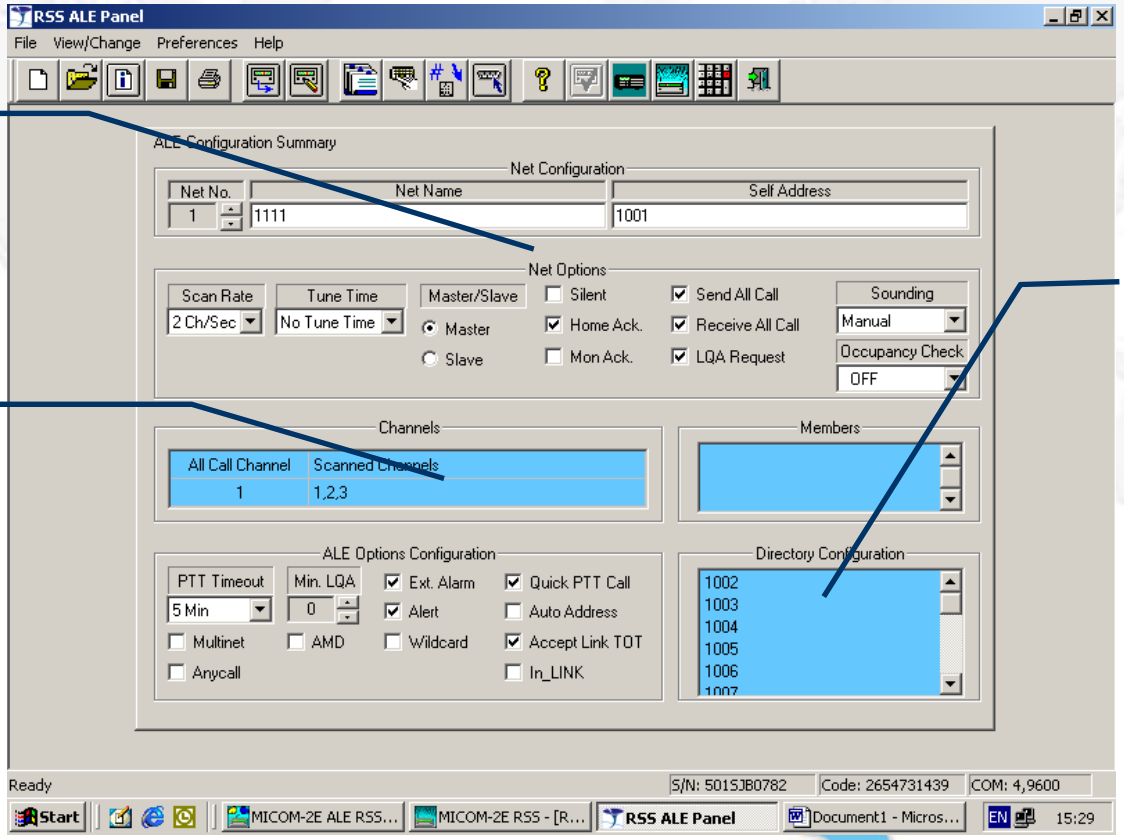
ALE DB

Net parameters Up to 20

Channels setting Up to 200

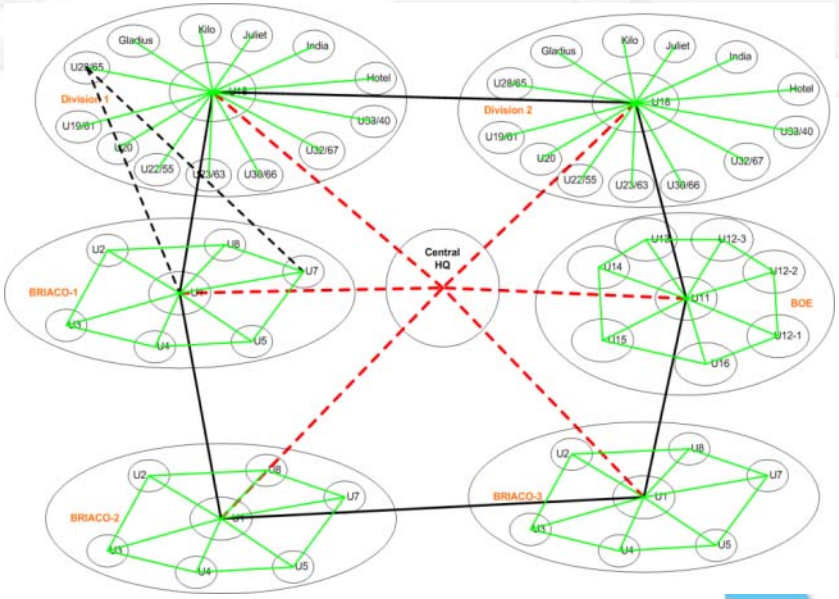


Directory Up to 100

Up to15 characters address

ALE biggest limitation

Linking between nets/groups/organization
Specially in emergency



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ALE Data Base improvements for large networks

- Data Base management
  - Frequency Management
    - Increasing the frequencies table to thousands
  - Addressing Directory Management
    - Increasing the Directory table to thousands
  - Address book:
    - Linking between address and frequency table; each address will carry its own frequencies and use real time channel selection before use or by setting the minimum LQA.
  - Fast/Speed dialing HMI algorithm (similar to phone number)

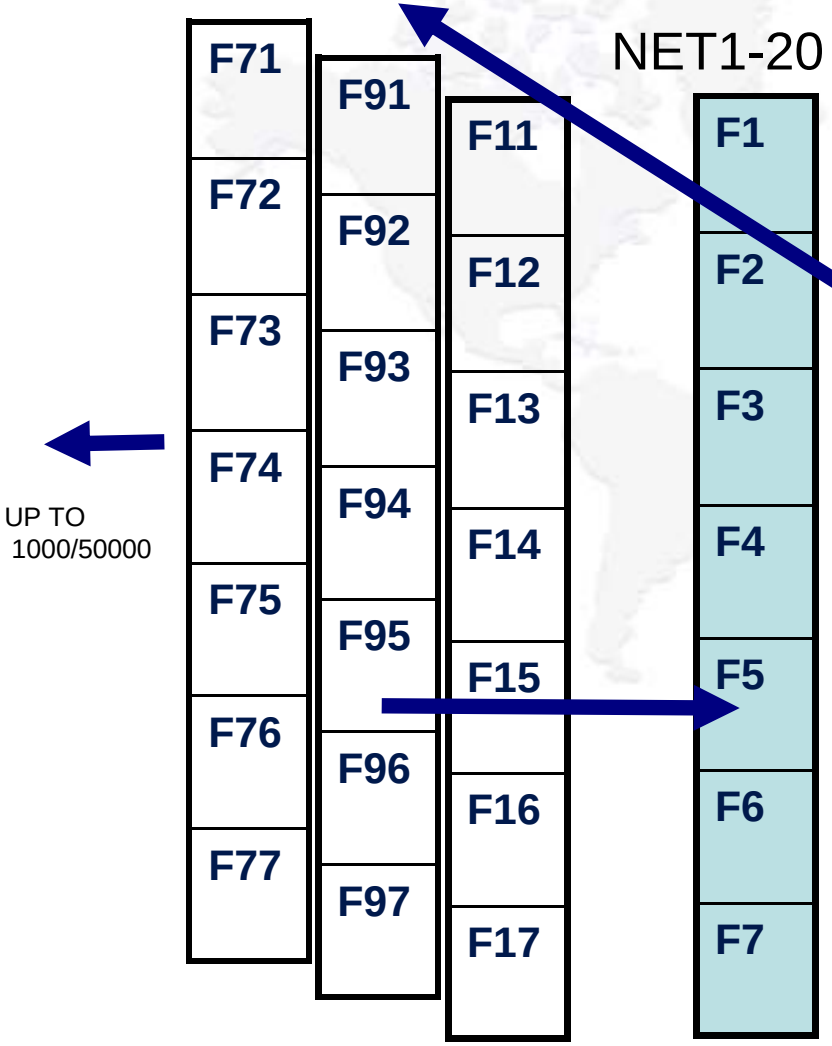
Enhanced ALE Adaptive Protocol

Address related to NET

LQA – mini LQA/Bidirectional

Common Federal DB

ALE Address	Freq.	LQA
BBB	F1-F7	30-90%
AAA	F1-F7	30-90%



Designed for the Federal

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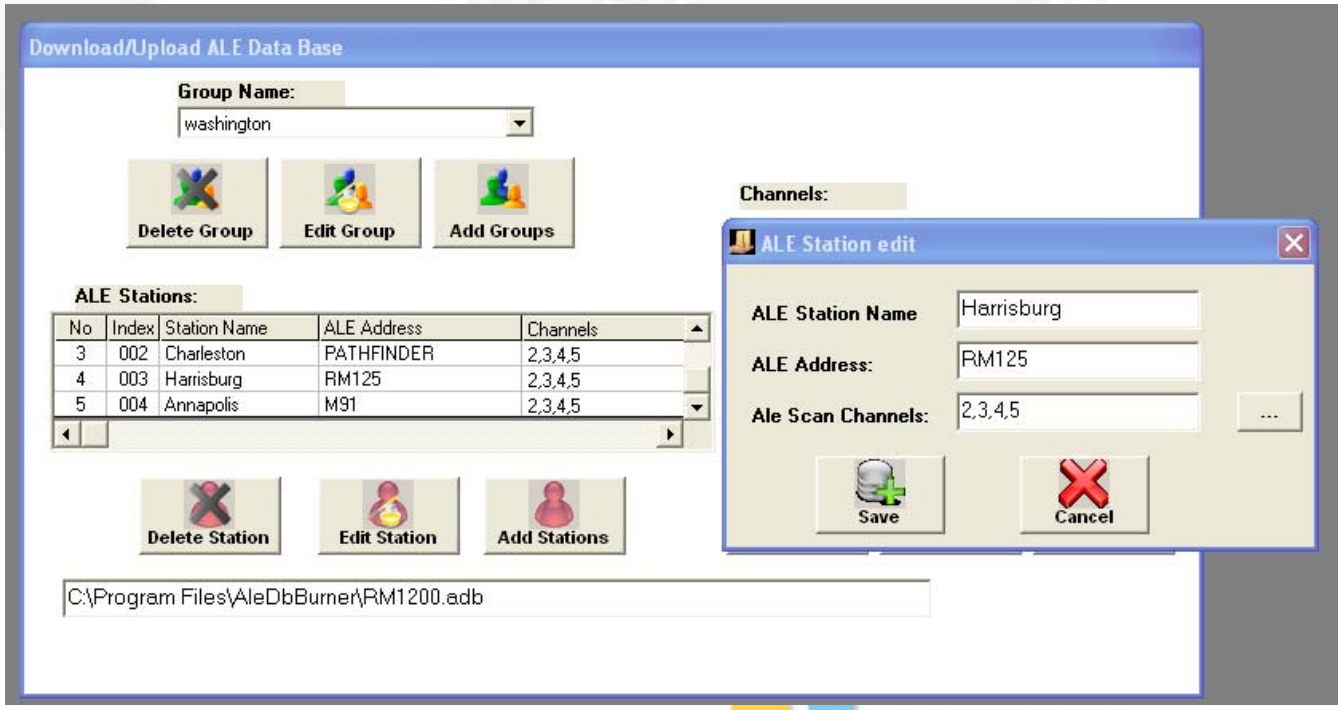
Adaptive Multiple Networking

- Extended ALE Data Base Management
- Keeping - JITC Certification per MIL-STD188-141B **interoperability**
- Interoperable with all ALE - MIL-STD188-141B networking system
- Fast Dialing



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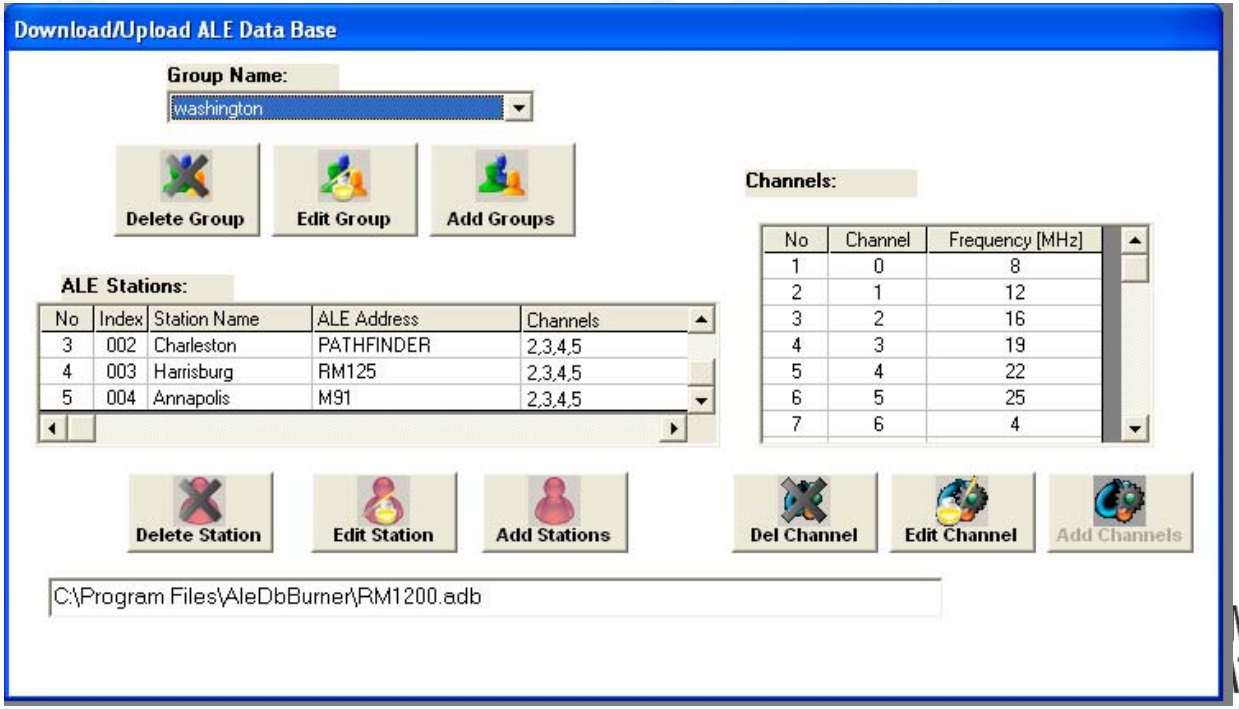
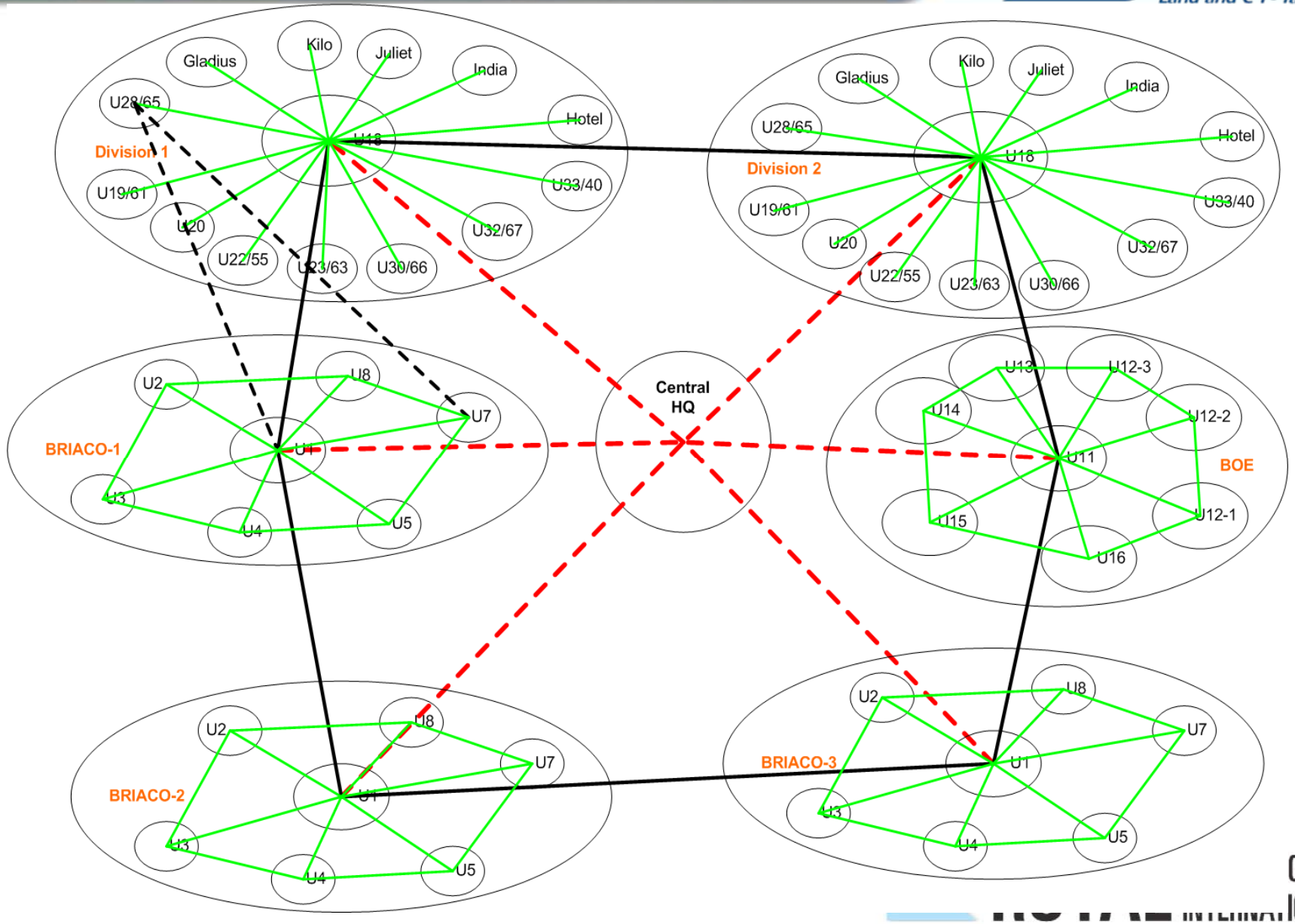
Adaptive Multiple Networking

- Common Global Federal Data Base
- ALE Index (1000 stations and 1000 channels – that can be increased)
- Linking in minimum LQA
- Linking on best CH with Bidirectional LQA update
- Dialing (index) feature
- Concept: Loading ALE NET according to destination address



Results of Adaptive ALE Networking



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Thanks

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