

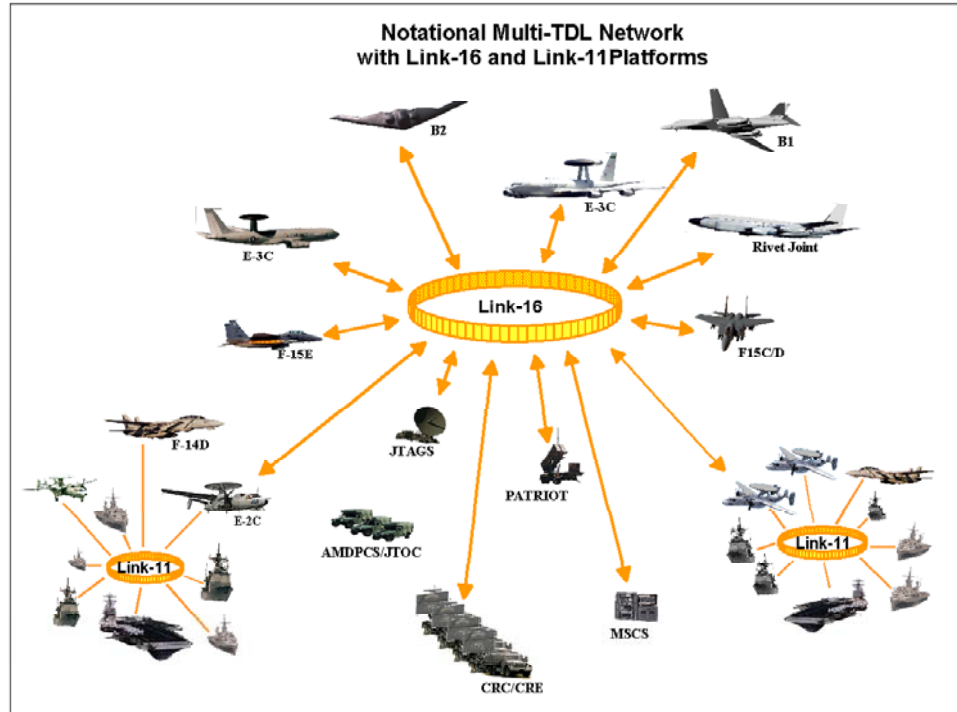


# Link-11 HF/Terminal Slides

The following slides are from the JSS Final Presentation. They are the slides concerning the work I did for the Link-11 HF/Terminal.

Roger Grayson

# Link-11 HF/Terminal Models

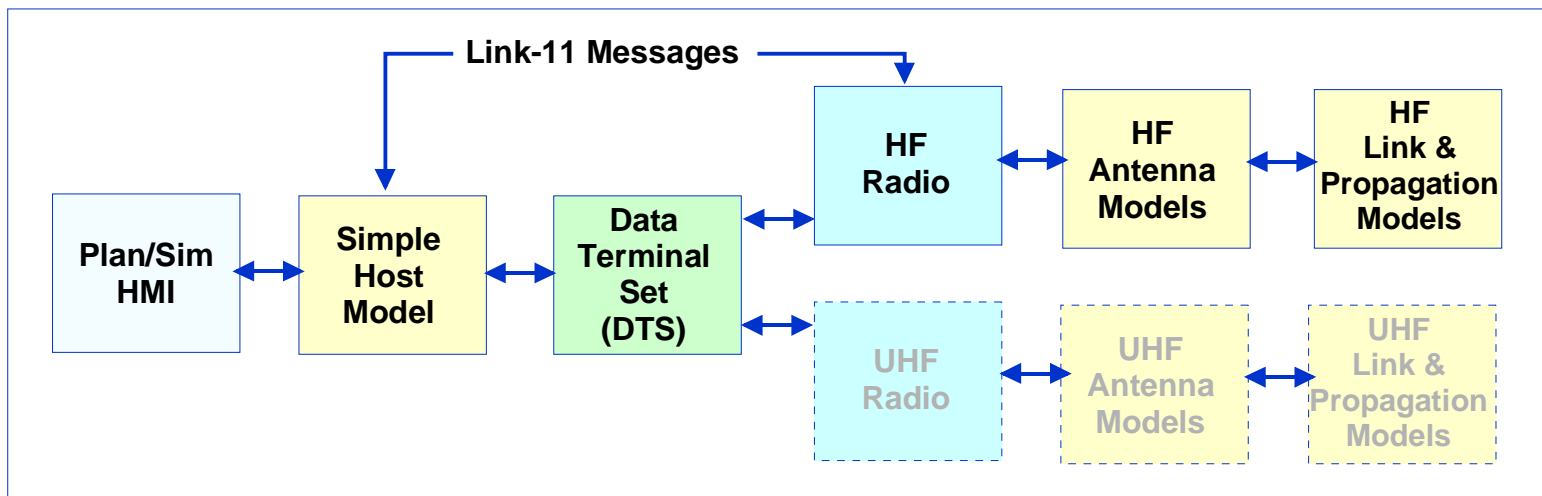


Link-11  
Net 1

Link-11  
Net 2

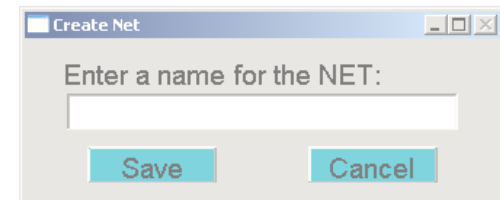
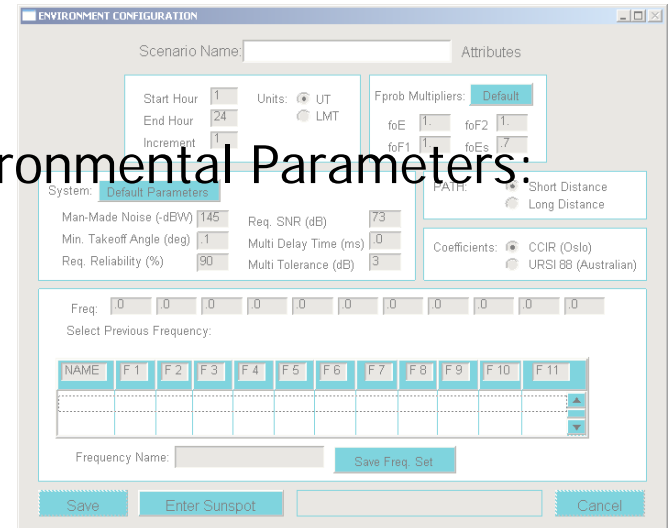
# Link-11 HF/Terminal Modeling

- Requirements Analysis
- Model Architecture and Design for Link-11 HF and Terminal Models with IO File examples.
- Functional Planning Tool with Release Notes and User Guide.
- Future Plans



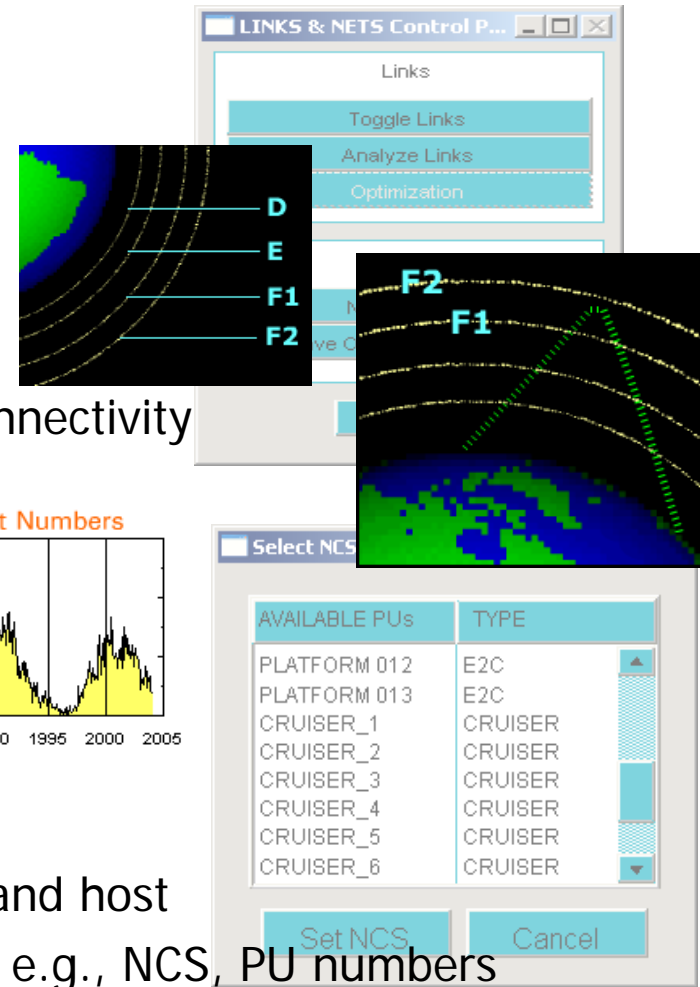
# L-11 HF/Terminal Requirements

- Ability to interactively build, save and read-in a Link-11 HF Scenario:
  - Link-11 Platform deployments
  - Movement paths
  - Link-11 PU radio parameters
  - Link-11 PU antenna parameters
- Ability to create, save and read-in Environmental Parameters:
  - Man-made noise
  - Minimum takeoff angle
  - Required reliability
  - Required SNR
  - Multi-path settings
  - Sunspots
- Ability to interactively build, save and read-in Link-11 Nets:
  - Link-11 PU parameters, e.g., NCS, etc.
  - Net characteristics, e.g., audio signaling, etc.



# L-11 HF/Terminal Requirements

- Ability to visualize:
  - o HF RF connectivity
  - o Link-11 network connectivity
  - o Dynamic platform movements
- HF Radio Propagation Model:
  - o Dynamic computation of HF radio connectivity
    - ❖ Against 3D terrain (future)
  - o Input and operation with:
    - ❖ Solar events
    - ❖ Time of day and year
    - ❖ Antenna characteristics
- Link-11 Terminal Model:
  - o Basic simulation of Link-11 terminal and host
  - o Specification of terminal parameters, e.g., NCS, PU numbers



# L-11 HF/Terminal HMI

**Scenario Selection**

Scenario List

BOSNIA SCN  
KOREA SCN

SELECT SCENARIO FROM LIST  
CREATE NEW SCENARIO

**Equipment Panel**

Platform: E2C\_1\_8  
Platform Type: E2C

Radio Selection      Antenna Data

HF Radio      TX RX  
 UHF Radio         
 None

Radio Power (kW): 1.

ISOTROPIC GAIN (dB): 4.  
MIN FREQUENCY (MHz): 2.  
MAX FREQUENCY (MHz): 6.

Save

**NCS Panel**

AVAILABLE PUs	TYPE
PLATFORM 012	E2C
PLATFORM 013	E2C
CRUISER_1	CRUISER
CRUISER_2	CRUISER
CRUISER_3	CRUISER
CRUISER_4	CRUISER
CRUISER_5	CRUISER
CRUISER_6	CRUISER

Set NCS      Cancel

**Net Characteristics**

Audio Signaling: CLEW  
Transmission Rate: 2250  
Mode of Operation: ROLL CALL  
NCS Label: CRUISER\_1\_2

Save      Cancel

## Environment Selection

**Environment Selection**

Environmental Parameters Files

BOSNIA ENV  
KOREA\_LINK11.ENV  
SAHARA.ENV

Load Selected Environment File  
Create New Environmental Parameters

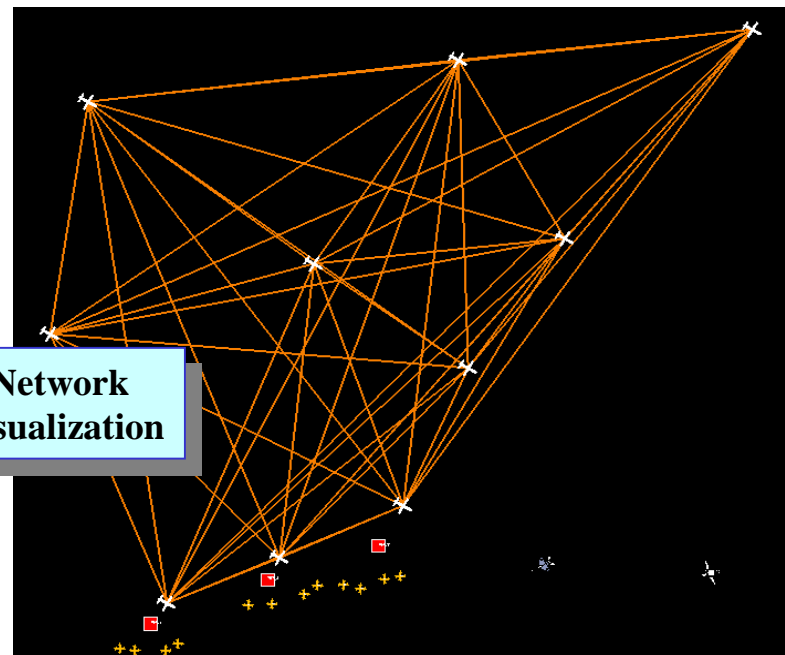
## Network Selection

**Network Selection**

BOSNIA.NET  
KORONA\_LINK11.NET  
TEST.NET  
TEST2.NET  
TESTING.NET

Load Selected NET File  
Create New NETS

## Network Visualization





# Link-11 Future Direction

- Enhancements:
  - HF terrain masking
  - Additional modulation types, e.g., MFL
  - TADIL-A message handling
- New Models for:
  - Link-11 UHF
  - Link-11B (Point to Point)
- Complete Link-11 Planning and Validation Toolset
- Migration to Link-22
- MTN Integration:
  - Data Forwarding through Link-16
  - Link-11 Monitor Feedback