Range Interface Unit

Pointing Data Selector

Ronald T. Peterson 2017-01-23 TRAX International, LLC

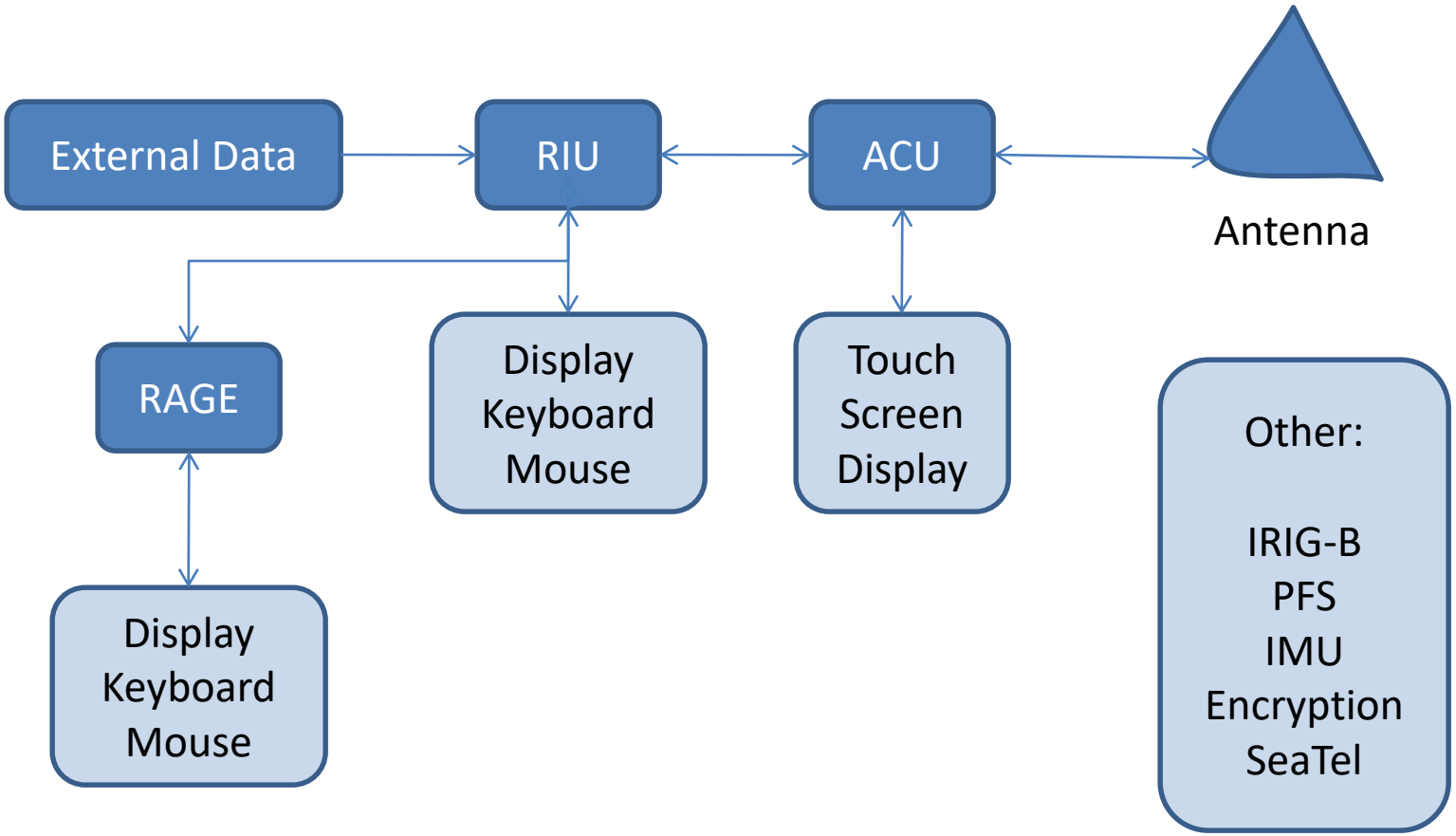
RIU Functions

- Receive Pointing Data in Various Formats
  - Convert to a Common Internal Format
  - Filter and Validate Data From Multiple Sources
- Send Pointing Command to Range Instrument
  - Select from Best of Pointing Sources
  - Predict Ahead as Required
  - Convert to The Required Format For Servos
- Receive Status from Range Instrument
  - Display and Publish Instrument Status

RIU Features

1. Multiple TSPI Input Sources
2. Output Formats to Various ACU's
3. Integral Data Logging
4. Situational Awareness Outputs
5. Data Playback Capability
6. Used at Several WSMR Locations
7. Used on Three MDA Ships for Seven Antennas

RIU MDA Setup



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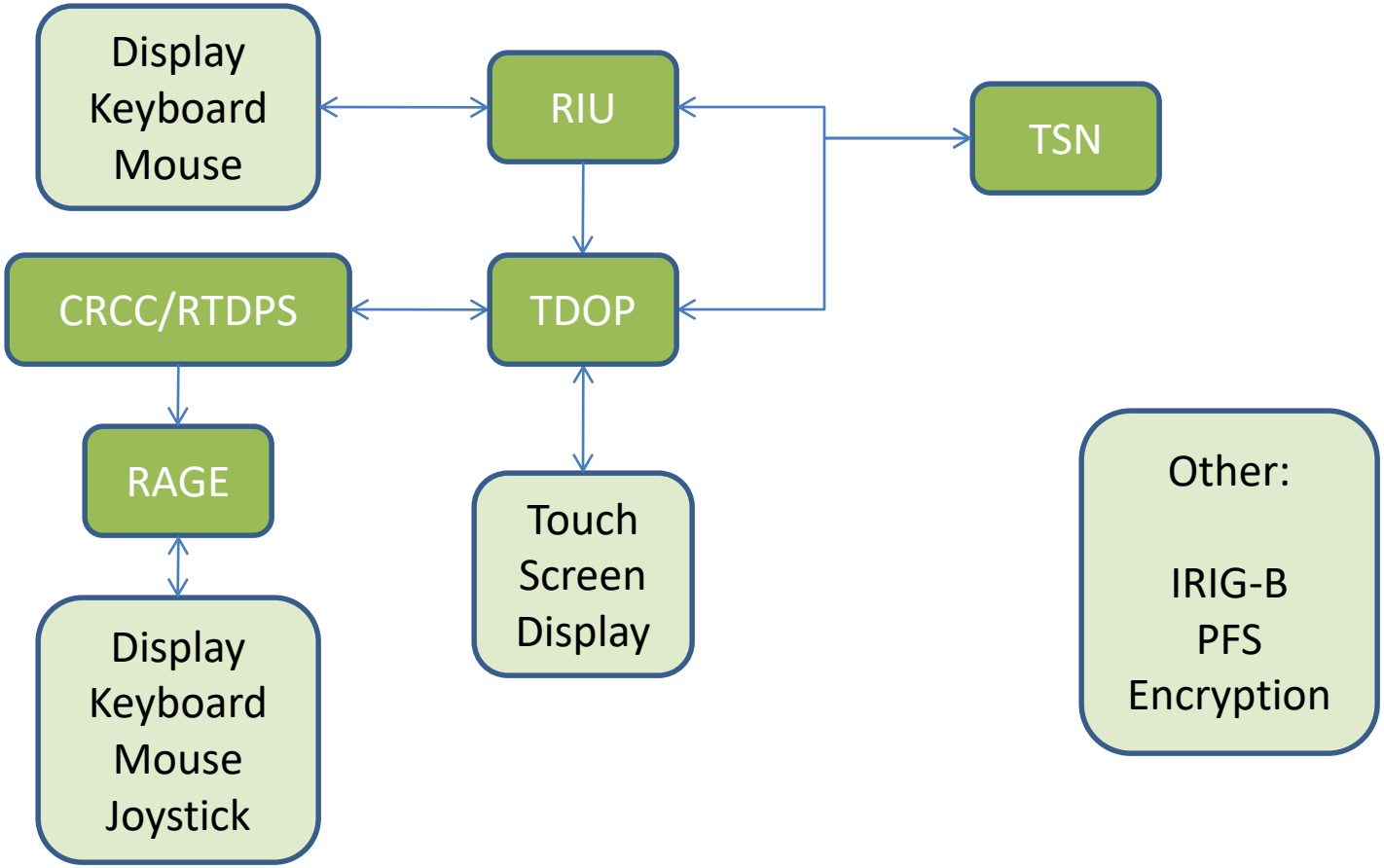
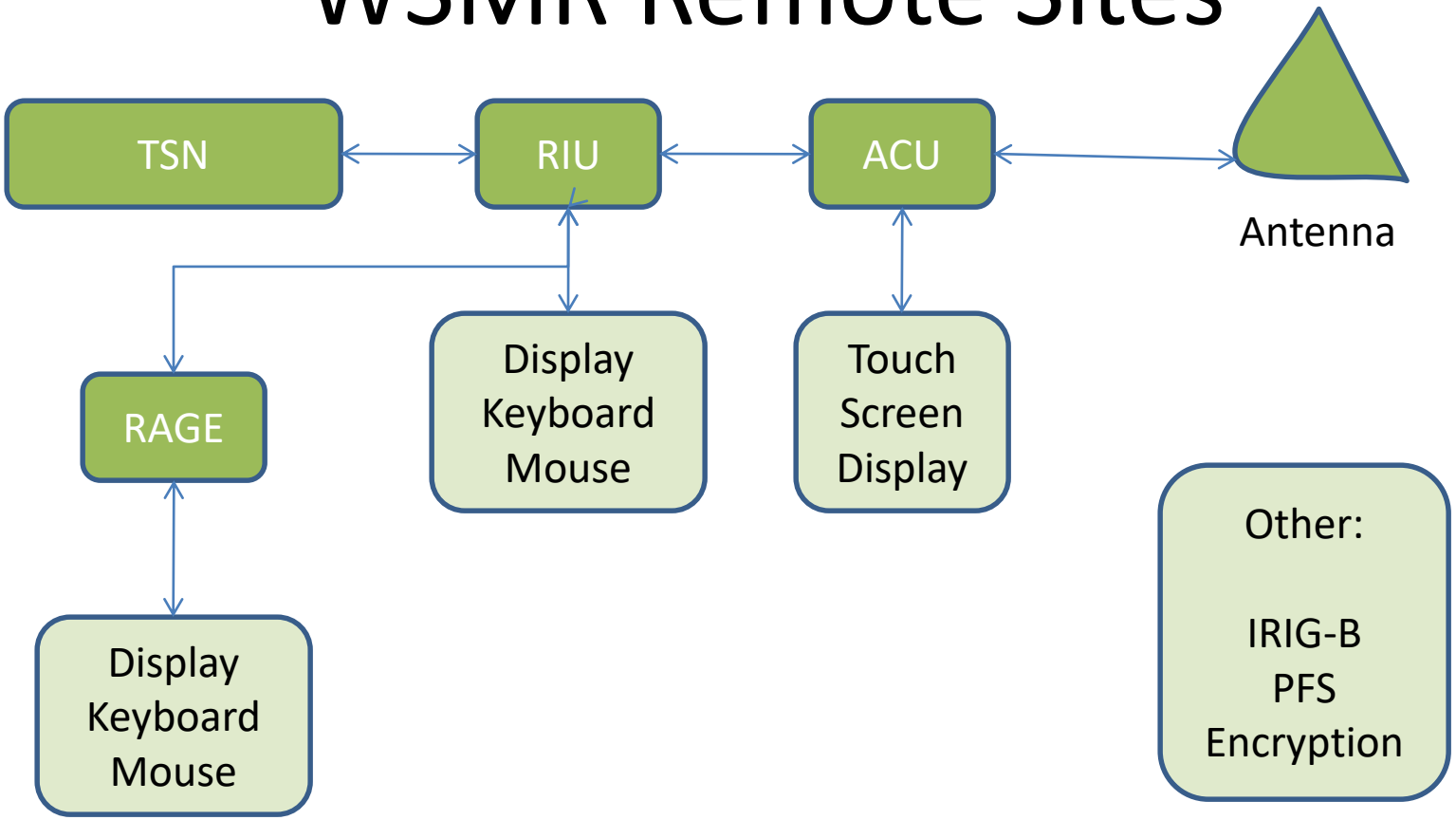
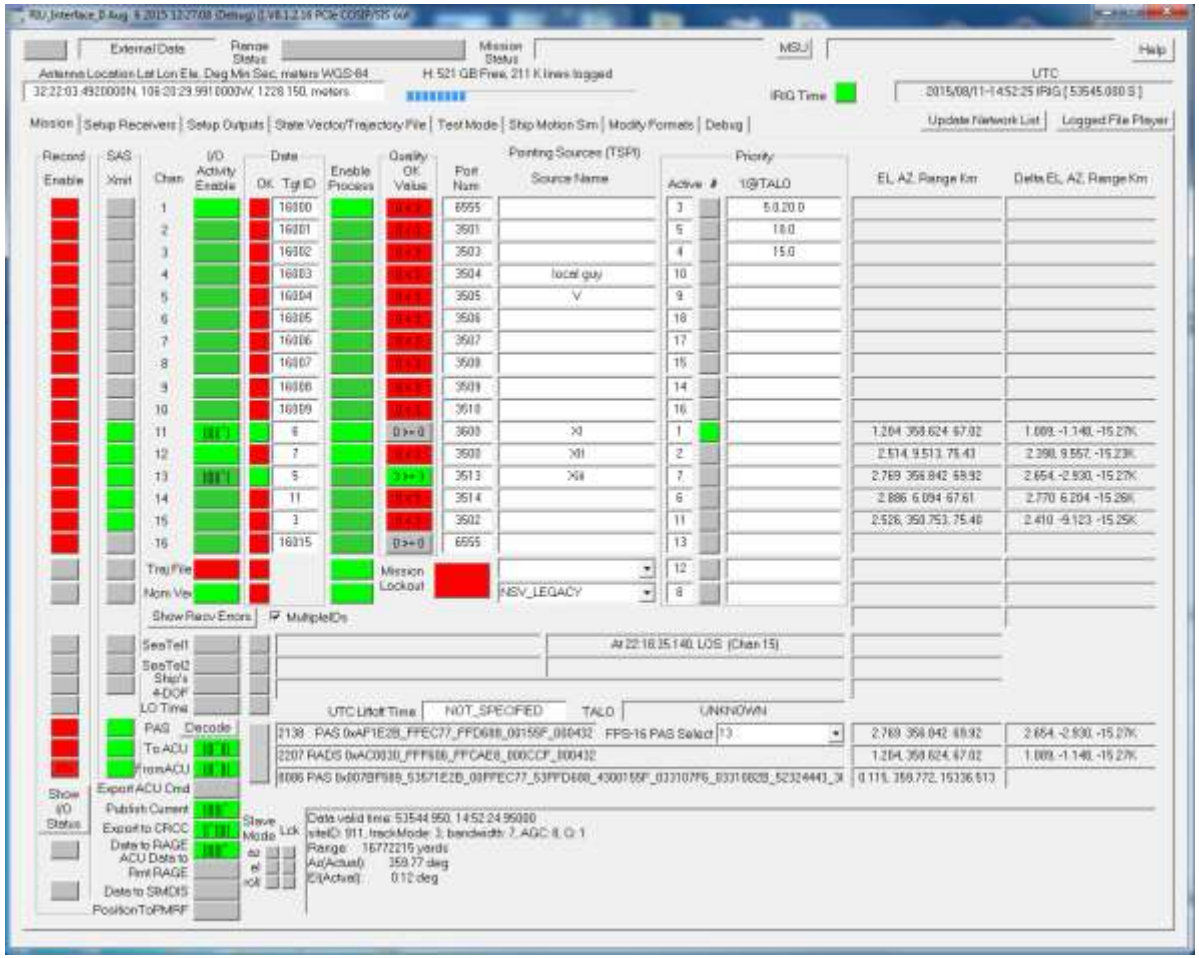
WSMR Master Location



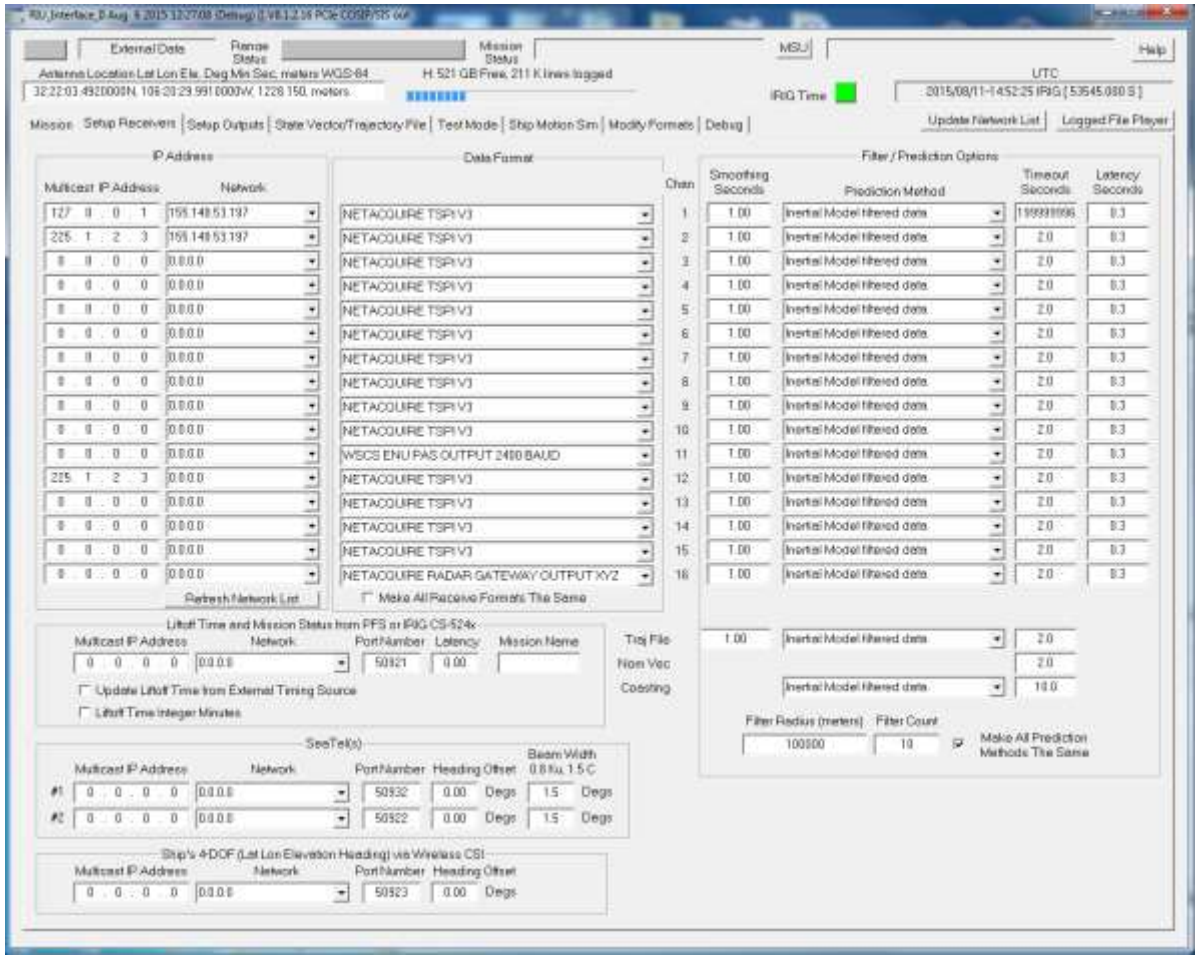
WSMR Remote Sites



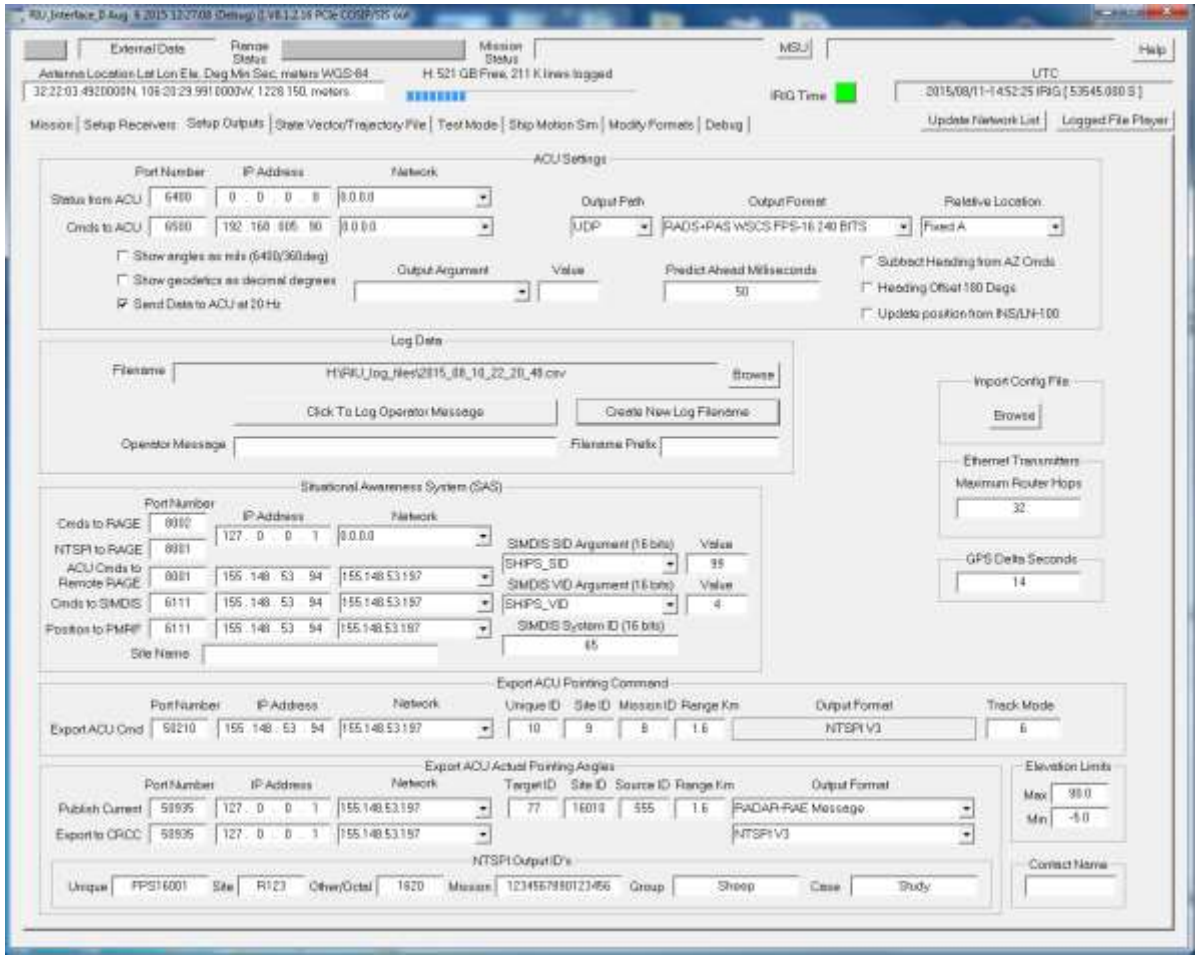
RIU-XVII ‘Mission’ Tab



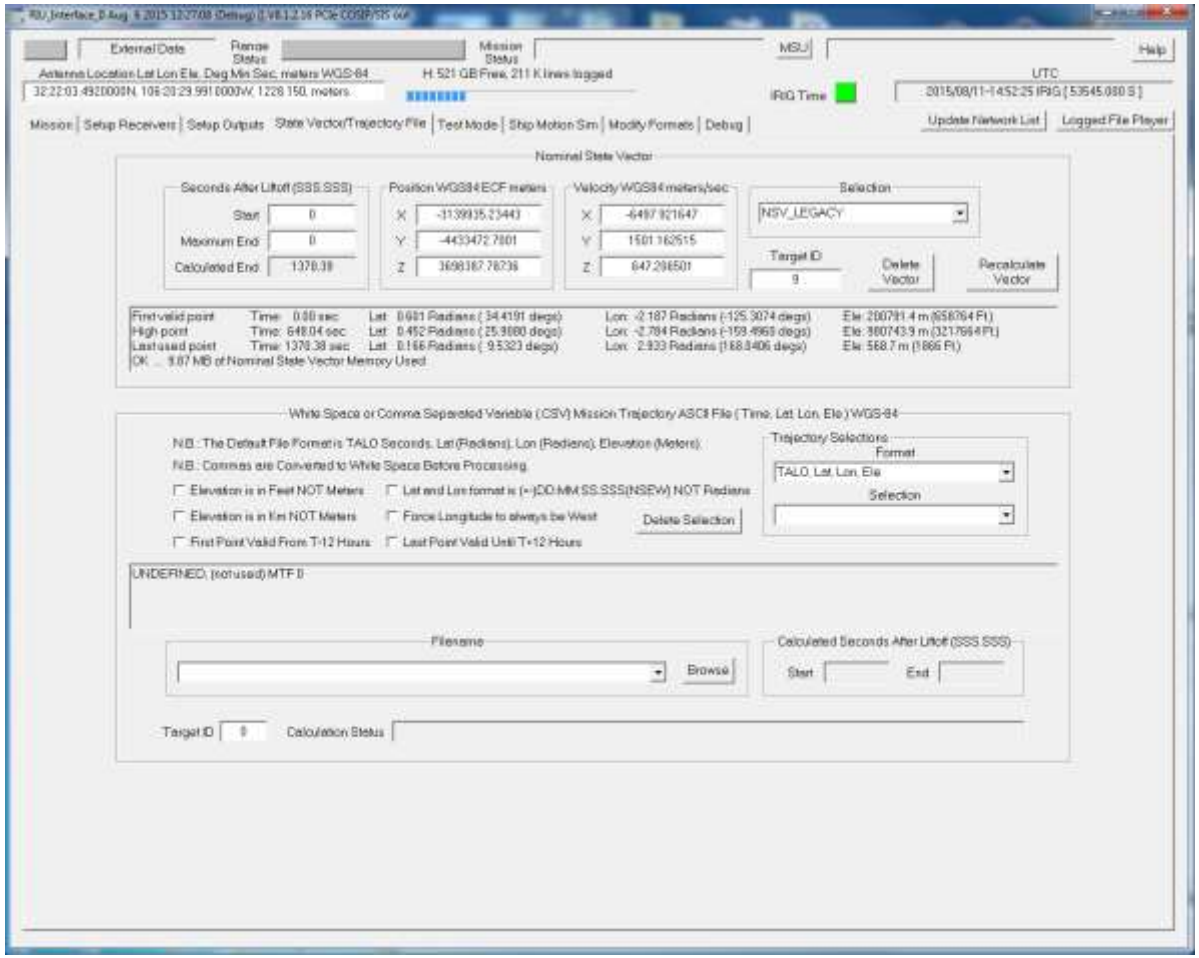
RIU-XVII ‘Setup Receivers’ Tab



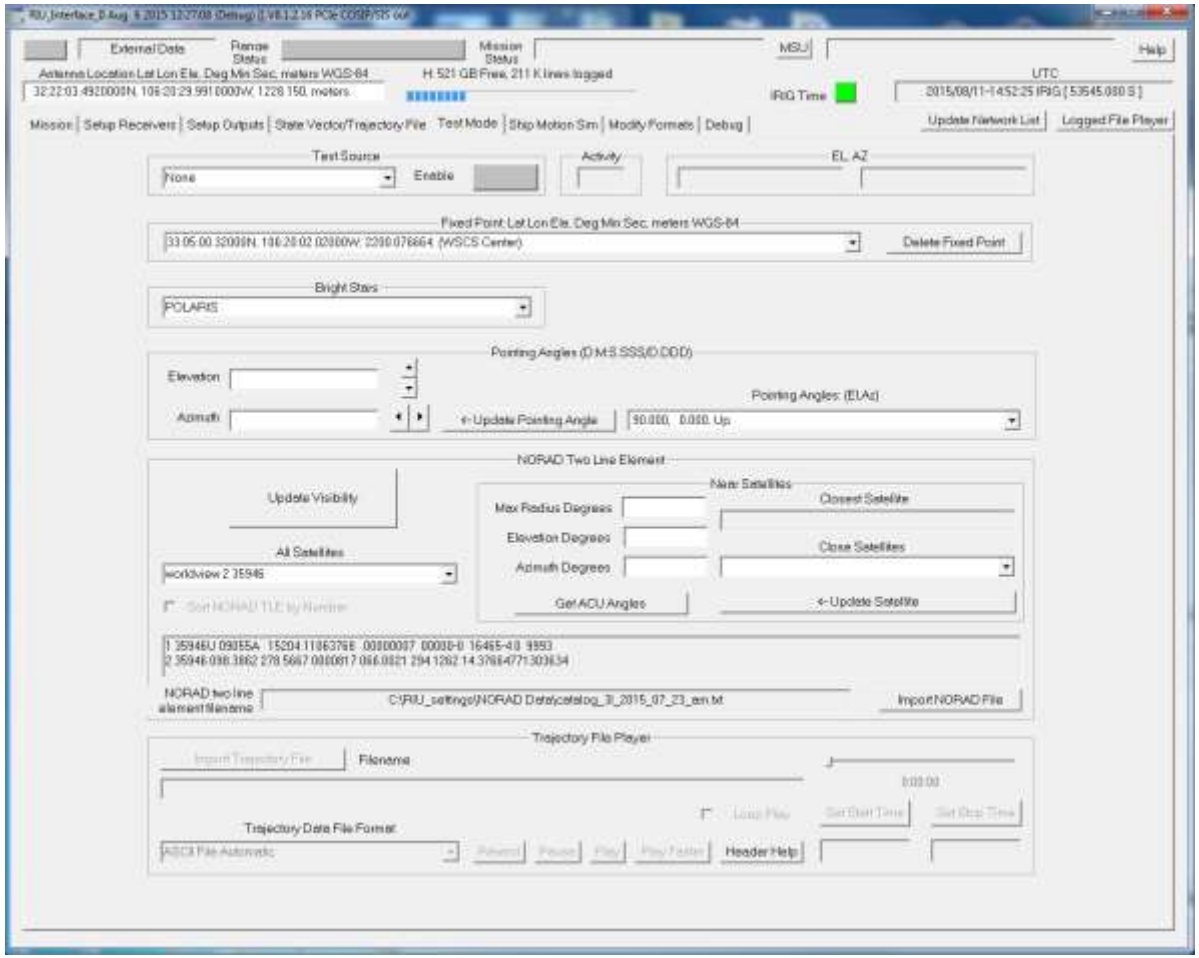
RIU-XVII ‘Setup Outputs’ Tab



RIU-XVII ‘State Vector/Trajectory File’ Tab



RIU-XVII ‘Test Mode’ Tab



RIU Questions

- POC:
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Serial Data Synchronous vs Asynchronous

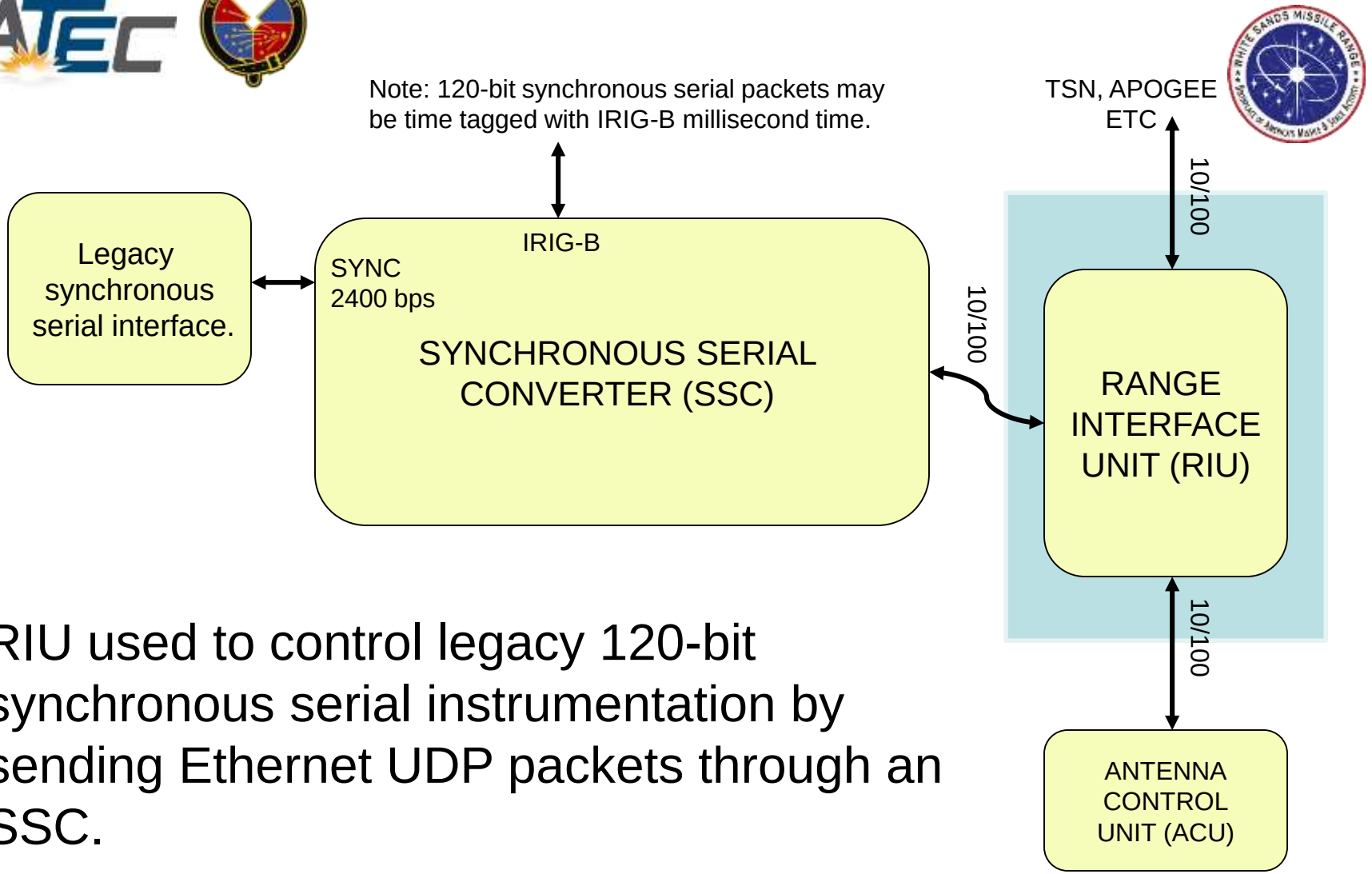
- Serial Data Port on PC is Asynchronous
  - One Start bit, Eight Data bits(a Byte), One Stop bit
  - Stop bit Level Until Ready to Send Next Byte
- Synchronous Data
  - Never Stops, Has NO START bit, NO STOP bit
  - Start of Message Is Encoded in the data
- Ethernet is Synchronous Data
  - Sync Pattern is 64 bits
  - Data Length is Variable

Synchronous Serial Converter (SSC) Summary

Replacement Hardware For The Lenkurt Modem

Synchronous Serial Converter (SSC)

- Government off-the-shelf (GOTS) product from WSMR.
- Designed as a drop-in replacement for the Lenkurt modem.
- Uses existing 120-bit message protocol.
- Additional features
  - IRIG-B decoder
  - Expanded formats with IRIG time tag
  - HDLC data formatting
  - 240-bit UTTR messages



RIU used to control legacy 120-bit synchronous serial instrumentation by sending Ethernet UDP packets through an SSC.

RANGE INTERFACE UNIT (RIU) & Synchronous Serial Converter (SSC)

Synchronous Serial Converter (SSC)

Front Panel

Rear Panel

Synchronous Serial Converter

- Interface's Between 2400 baud Synchronous Data and Ethernet UDP Packets
- RS-232 Defines Voltage Levels +12, -12 Volts
- RS-232 Transmit & Receive Has Data and Clock
  - Not Asynchronous (no start bit) alternating sync
  - Find the Start of Data Packet
  - Publish Data as a UDP Ethernet Packet
- Receive UDP Ethernet Packet
  - Send RS-232 Data and Clock at 2400 baud

RIU & SSC Answers

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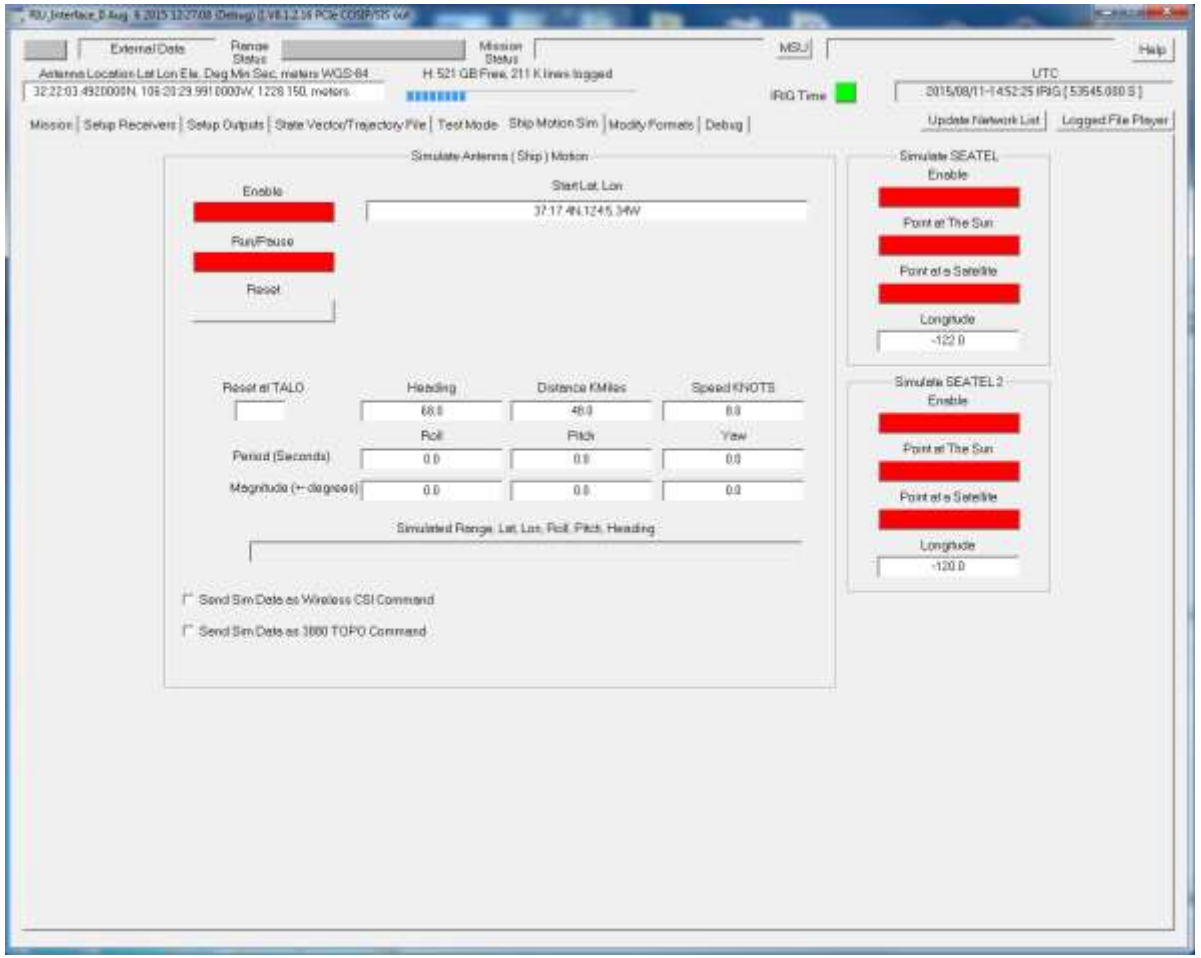
RIU-XVII ‘Ship Motion Sim’ Tab



RIU-XVII ‘Modify Formats’ Tab