

Range Interface Unit

Pointing Data Selector

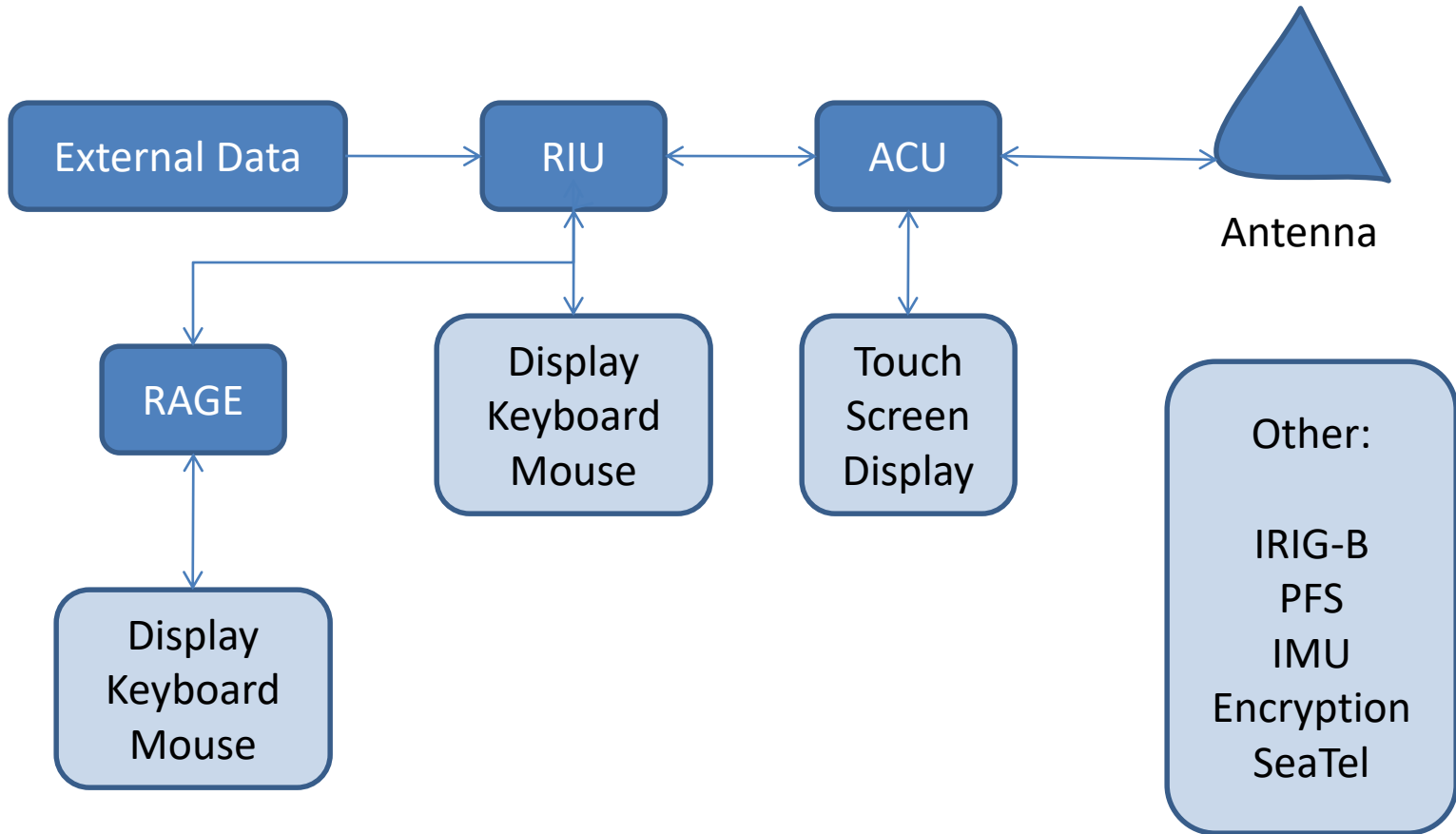
RIU Functions

- 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

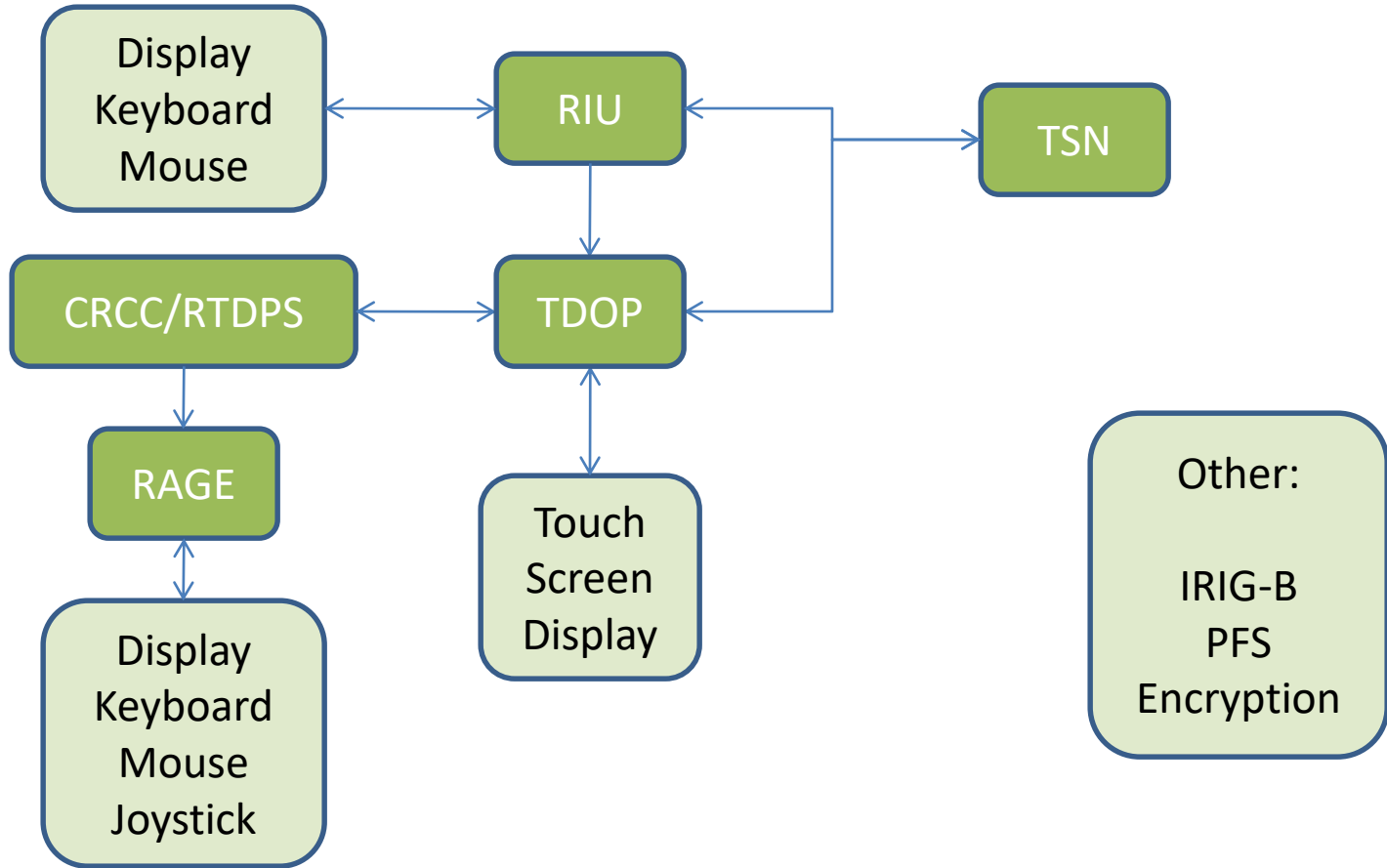
RIU Features

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

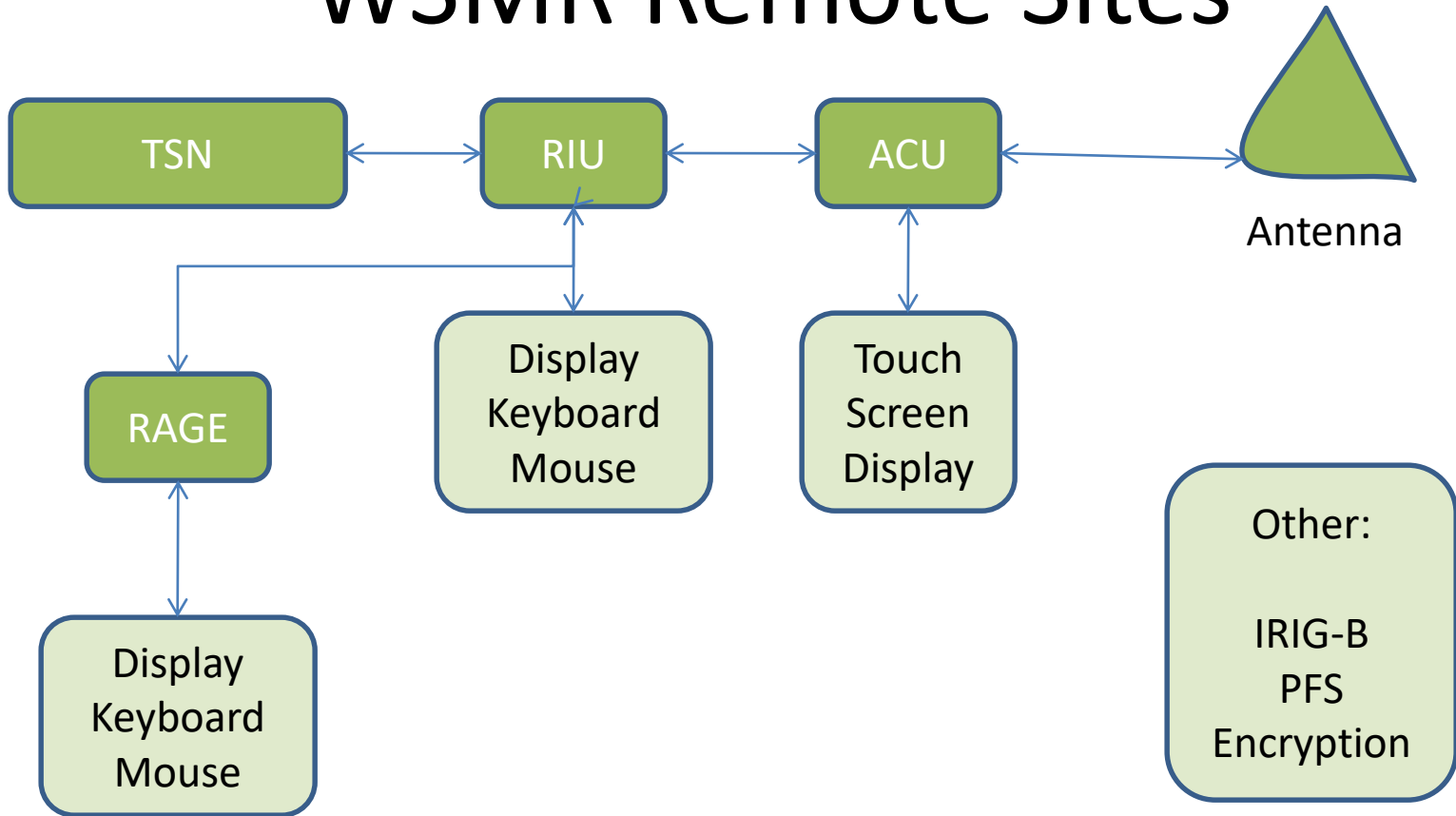
RIU MDA Setup



WSMR Master Location



WSMR Remote Sites



RIU-XVII 'Mission' Tab

RIU-Interface, 8-Aug-8 2015 12:27:08 (Setup) (V.1.2.15) PC: C:\RP\RS.W

External Date: Range Status: Mission Status: MSLU: Help

Antenna Location Lat Lon Ele. Deg Min Sec, meters WGS-84: H: 521 GB Free, 211 K lines logged

32:22:03.492000N, 104:20:29.991000W, 1228.150, meters

UTC: 2015/08/11-14:52:25 IRIG (53645.080 S)

Mission | Setup Receivers | Setup Outputs | State Vector/Trajectory File | Test Mode | Ship Motion Sim | Modify Formats | Debug | Update Network List | Logged File Player

Record	SAS	(IO) Activity	Date	Enable	Quality	Port	Porting Source (TSFP)	Priority	EL, AZ, Range Km	Delta EL, AZ, Range Km
Enable	Xmit	Chan	Ok, Tgt ID	Process	OK Value	Num	Source Name	Active #	10/TALO	
1			16910		0x0	6555		3	5.0,20.0	
2			16911		0x0	3501		5	18.0	
3			16912		0x0	3502		4	15.0	
4			16913		0x0	3504	local guy	10		
5			16914		0x0	3505	V	9		
6			16915		0x0	3506		18		
7			16916		0x0	3507		11		
8			16917		0x0	3508		15		
9			16918		0x0	3509		14		
10			16919		0x0	3510		16		
11			6		0x0	3509	XI	1	1.204, 358.624, 67.92	1.009, -1.140, -15.27K
12			7		0x0	3510	XII	2	2.514, 9.513, 75.43	2.290, 9.557, -15.23K
13			5		0x0	3513	XIII	7	2.769, 358.842, 68.92	2.654, -2.930, -15.27K
14			11		0x0	3514		5	2.885, 6.094, 67.61	2.770, 6.204, -15.26K
15			3		0x0	3502		11	2.528, 350.753, 75.46	2.410, -4.123, -15.25K
16			16915		0x0	6555		13		

TSFP: NSV_LEGACY

Sea Tell: Ar 22:16,35:140, LOS (Chan:15)

UTC Lock Time: NOT_SPECIFIED TALO: UNKNOWN

2138 PAS (w/AP1E2B_FFEC77_FF0688_03156F_004432 FPS-15 PAS Select) 13 2.769, 358.842, 68.92 2.654, -2.930, -15.27K

2207 RADS (w/AC003D_FF9F86_FFCAE8_000CCF_004432) 1.204, 358.624, 67.92 1.009, -1.140, -15.27K

0086 PAS (w/07BF98B_53571E2D_03FFEC77_53FFD680_4300156F_03310796_03310828_52324443_X) 0.115, 358.772, 15336.513

Expn ACU Cmd: Publish Current: 0x0; Export to CRCC: 0x0; Date to RAGE: 0x0; ACU Data to: 0x0; Print RAGE: 0x0; Date to SMDX5: 0x0; Position to PMRF: 0x0

Ship Mode: Lck; Date valid time: 53544.550, 1452.24.99200; siteID: 011, trackMode: 3, bandwidth: 7, AGC: 8, Q: 1; Range: 16772215 yards; Az(Acu): 359.77 deg; El(Acu): 0.12 deg

RIU-XVII 'Setup Receivers' Tab

RIU-Interface, P-Aug. 8, 2015 12:27:08 (Setup) (V.1.2.15) (CGE-COSP) (RS) (W)

External Date: Range Status: Mission Status: MSU: Help

Antenna Location Lat Lon Ele. Deg Min Sec, meters WGS-84: H: 521 GB Free, 211 K lines logged

32:22:03.492000N, 104:20:29.991000W, 1228 150, meters

UTC: 2015/08/11-14:52:25 (IRIG [53645.000 S])

IRIG Time: ■

Mission: Setup Receivers | Setup Outputs | State Vector/Trajectory File | Test Mode | Ship Motion Sm | Modify Formats | Debug | Update Network List | Logged File Player

IP Address		Data Format		Chan	Filter / Prediction Options			
Multicast IP Address	Network				Smoothing Seconds	Prediction Method	Timeout Seconds	Latency Seconds
127.0.0.1	195.148.53.197		NETACQUIRE TSP V3	1	1.00	Inertial Model filtered data	19999999	0.3
225.1.2.3	195.148.53.197		NETACQUIRE TSP V3	2	1.00	Inertial Model filtered data	2.0	0.3
0.0.0.0	0.0.0.0		NETACQUIRE TSP V3	3	1.00	Inertial Model filtered data	2.0	0.3
0.0.0.0	0.0.0.0		NETACQUIRE TSP V3	4	1.00	Inertial Model filtered data	2.0	0.3
0.0.0.0	0.0.0.0		NETACQUIRE TSP V3	5	1.00	Inertial Model filtered data	2.0	0.3
0.0.0.0	0.0.0.0		NETACQUIRE TSP V3	6	1.00	Inertial Model filtered data	2.0	0.3
0.0.0.0	0.0.0.0		NETACQUIRE TSP V3	7	1.00	Inertial Model filtered data	2.0	0.3
0.0.0.0	0.0.0.0		NETACQUIRE TSP V3	8	1.00	Inertial Model filtered data	2.0	0.3
0.0.0.0	0.0.0.0		NETACQUIRE TSP V3	9	1.00	Inertial Model filtered data	2.0	0.3
0.0.0.0	0.0.0.0		NETACQUIRE TSP V3	10	1.00	Inertial Model filtered data	2.0	0.3
0.0.0.0	0.0.0.0		NETACQUIRE TSP V3	11	1.00	Inertial Model filtered data	2.0	0.3
0.0.0.0	0.0.0.0		NETACQUIRE TSP V3	12	1.00	Inertial Model filtered data	2.0	0.3
0.0.0.0	0.0.0.0		NETACQUIRE TSP V3	13	1.00	Inertial Model filtered data	2.0	0.3
0.0.0.0	0.0.0.0		NETACQUIRE TSP V3	14	1.00	Inertial Model filtered data	2.0	0.3
0.0.0.0	0.0.0.0		NETACQUIRE TSP V3	15	1.00	Inertial Model filtered data	2.0	0.3
0.0.0.0	0.0.0.0		NETACQUIRE RADAR GATEWAY OUTPUT XYZ	16	1.00	Inertial Model filtered data	2.0	0.3

Refresh Network List Make All Receive Formats The Same

Linkoff Time and Mission Status from FFS at IRIG CS-524:

Multicast IP Address	Network	Port Number	Latency	Mission Name
0.0.0.0	0.0.0.0	50921	0.00	

Update Linkoff Time from External Timing Source
 Linkoff Time Integer Minutes

See Tel(s):

Multicast IP Address	Network	Port Number	Heading Offset	Beam Width
#1 0.0.0.0	0.0.0.0	50922	0.00 Degs	1.5 Degs
#2 0.0.0.0	0.0.0.0	50922	0.00 Degs	1.5 Degs

Ship's 4-DOF (Lat Lon Elevation Heading) via Wireless CSI:

Multicast IP Address	Network	Port Number	Heading Offset
0.0.0.0	0.0.0.0	50923	0.00 Degs

Filter / Prediction Options (continued):

Smoothing Seconds	Prediction Method	Timeout Seconds	Latency Seconds
1.00	Inertial Model filtered data	2.0	0.3
		2.0	
		10.0	

Filter Radius (meters): 100000 | Filter Count: 10 Make All Prediction Methods The Same

RIU-XVII 'Setup Outputs' Tab

RIU-Interface, P-Aug. 8, 2015 12:27:08 (Setup) (V.1.2.15) PC: C:\RP\RS - 64

External Date: Range Status: Mission Status: MSU: Help

Antenna Location Lat Lon Ele. Deg Min Sec, meters WGS-84: H: 521 GB Free, 211 K lines logged

32 22 03.492000N, 106 20 29.991000W, 1228 150, meters

UTC: 2015/08/11-14:52:25 (IRIG [53645.000 S])

IRIG Time: ■

Mission: Setup Receivers: Setup Outputs | State Vector/Trajectory File | Test Mode | Ship Motion Sim | Modify Formats | Debug

Update Network List | Logged File Player

ACU Settings

Port Number	IP Address	Network	Output Path	Output Format	Relative Location	
Status from ACU	6400	0 . 0 . 0 . 0	0.0.0.0	UDP	RAOS-PAS WSCS FPS-16 240 BPS	Fixed A
Creds to ACU	6500	192 . 168 . 105 . 90	0.0.0.0			

Show angles as rads (640/360deg)
 Show geodetics as decimal degrees
 Send Data to ACU at 20 Hz

Output Argument: Value: Predict Ahead Milliseconds: 50

Subtract Heading from AZ Creds
 Heading Offset 180 Degs
 Update position from INS/LH-100

Log Data

Filename: H:\RIU_Log_Hier\2015_08_10_22_20_49.csv Browse

Click To Log Operator Message Create New Log Filename

Operator Message: Filename Prefix:

Situational Awareness System (SAS)

Port Number	IP Address	Network	SIMDIS SID Argument (16 bits)	Value
Creds to RAGE	0010	127 . 0 . 0 . 1	0.0.0.0	
NTSPI to RAGE	0001		SHPS_SID	99
ACU Creds to Remote RAGE	0001	155 . 148 . 53 . 94	155.148.53.197	
Creds to SIMDIS	6111	155 . 148 . 53 . 94	155.148.53.197	SHPS_VID
Position to PMRF	6111	155 . 148 . 53 . 94	155.148.53.197	SIMDIS System ID (16 bits)

Site Name: Value: 45

Export ACU Pointing Command

Port Number	IP Address	Network	Unique ID	Site ID	Mission ID	Range Km	Output Format	Track Mode	
Export ACU Cmd	58210	155 . 148 . 53 . 94	155.148.53.197	10	9	8	1.6	NTSPI V3	6

Export ACU Actual Pointing Angles

Port Number	IP Address	Network	Target ID	Site ID	Source ID	Range Km	Output Format	
Publish Current	58995	127 . 0 . 0 . 1	155.148.53.197	77	16010	355	1.6	RADAR-PAE Message
Export to CRCC	58995	127 . 0 . 0 . 1	155.148.53.197					NTSPI V3

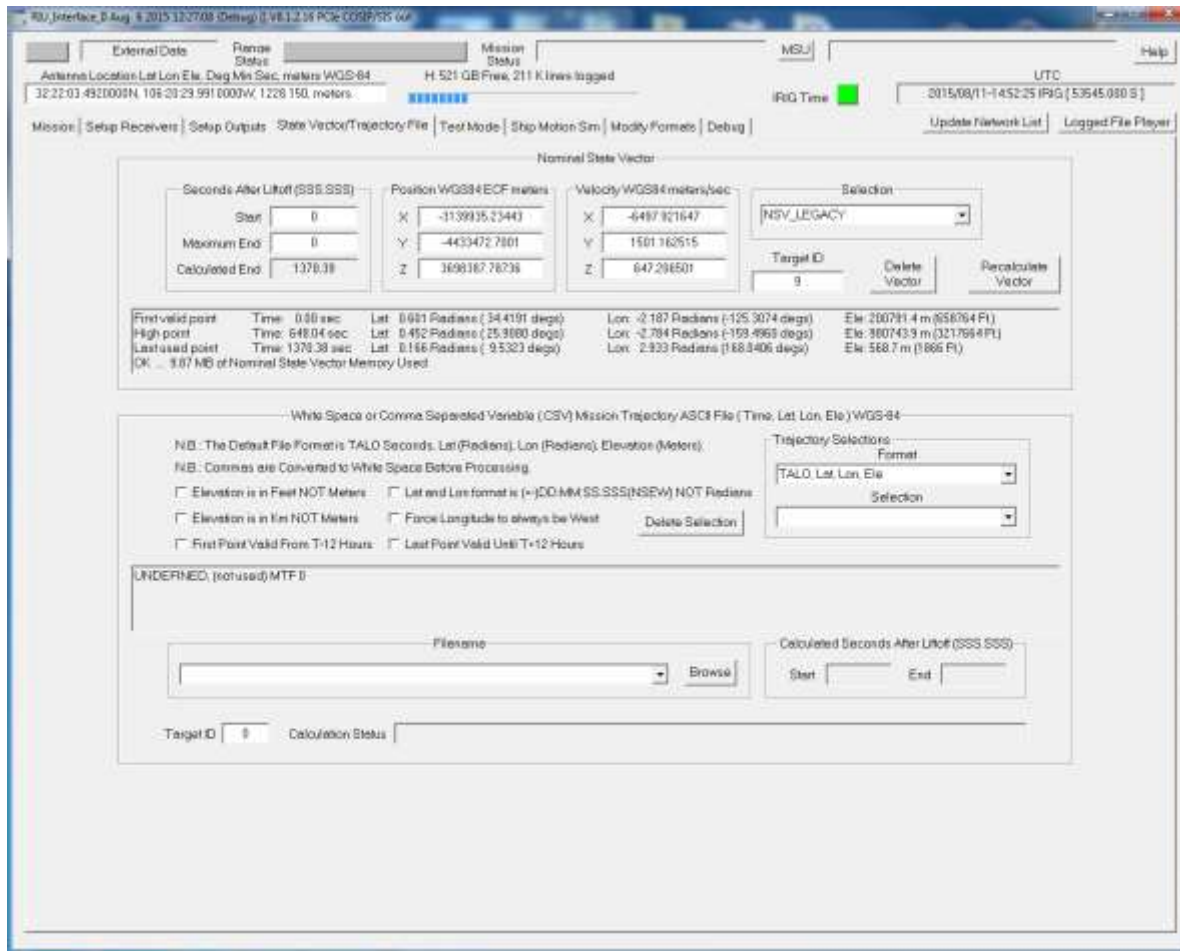
Elevation Limits: Max: 99.0, Min: -9.0

Contact Name:

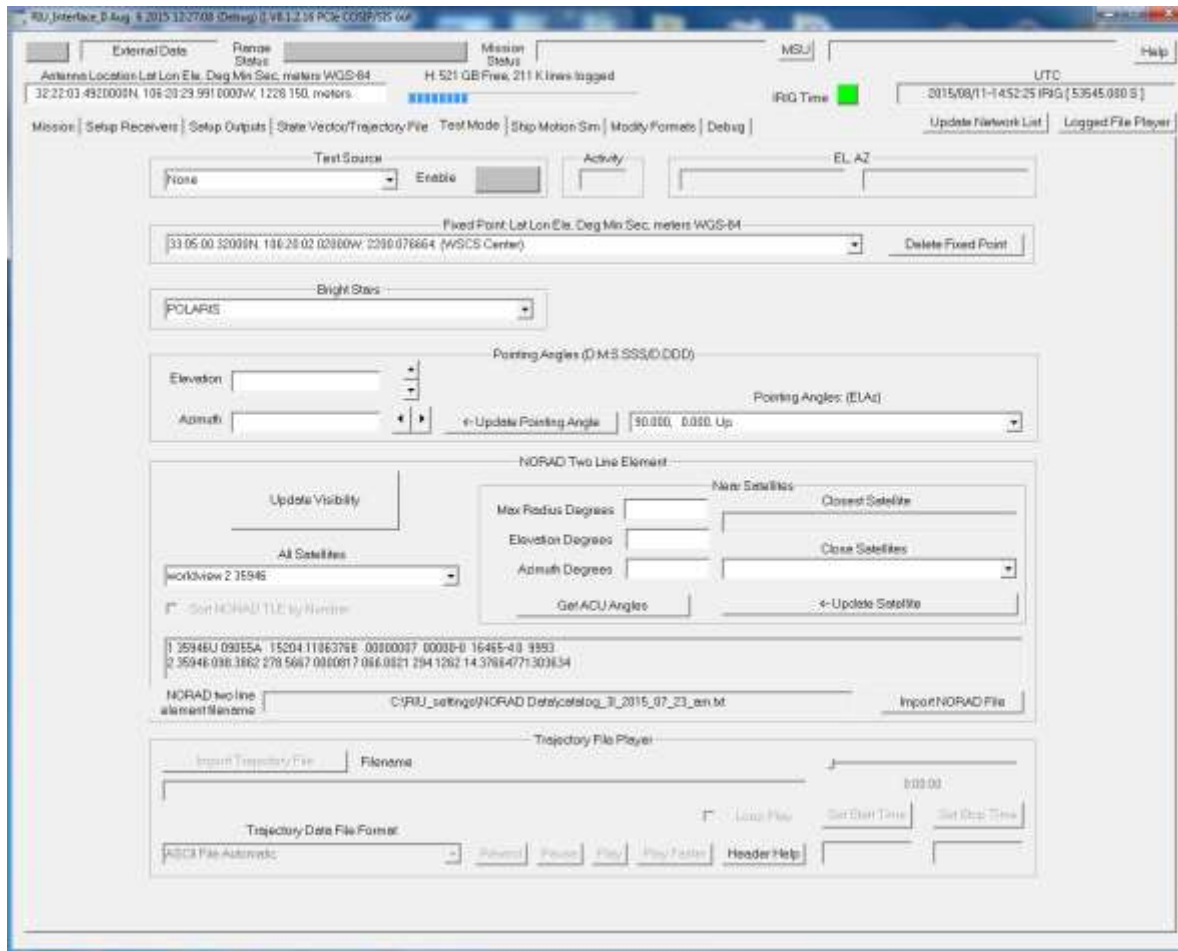
NTSPI Output ID's

Unique	FPSI/6001	Site	R123	Other/Octal	1620	Mission	1234567890123456	Group	Sheep	Case	Study

RIU-XVII 'State Vector/Trajectory File' Tab



RIU-XVII 'Test Mode' Tab



RIU Questions

- POC:

- Ronald.T.Peterson.ctr@mail.mil

- 1-575-678-4272

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

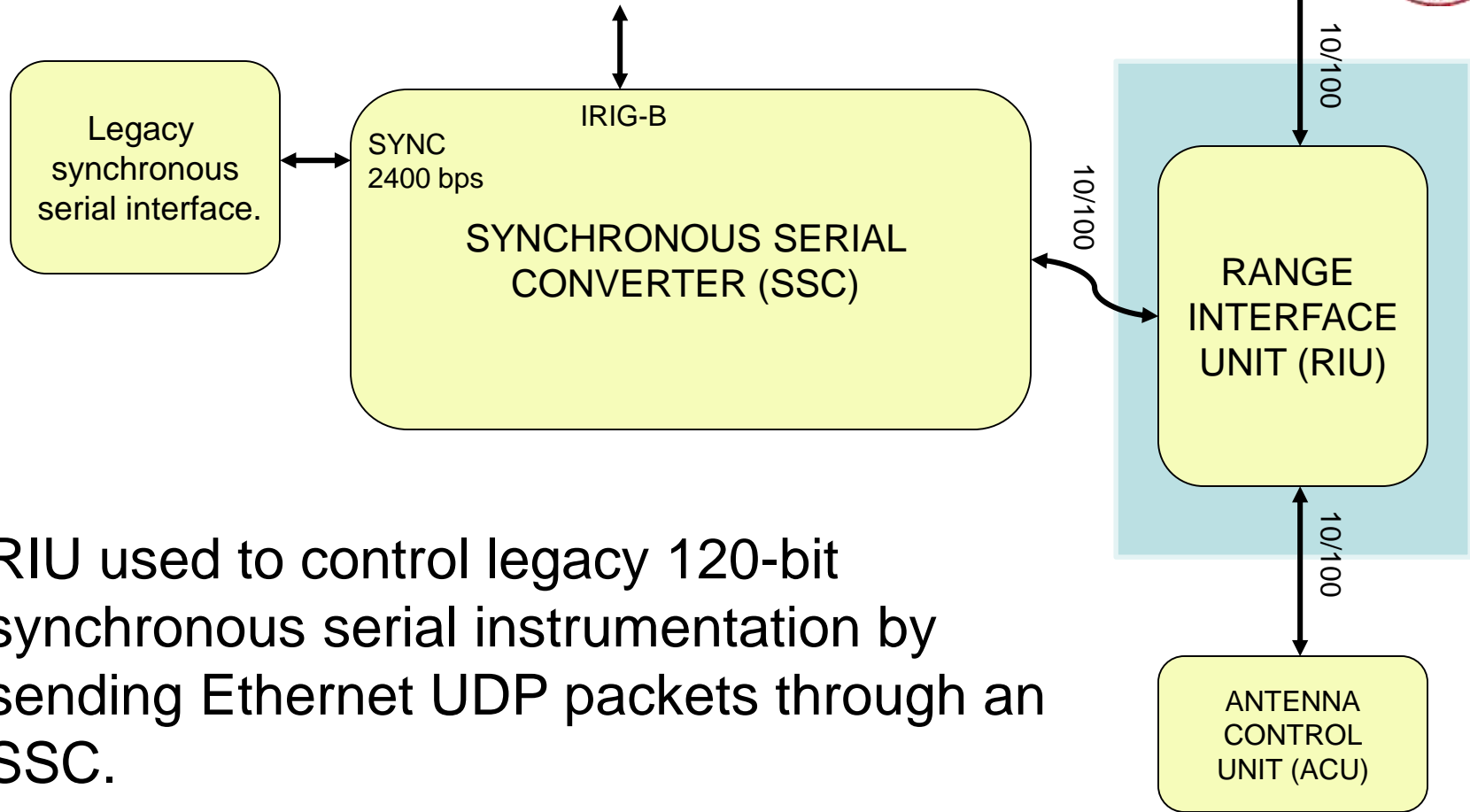
Replacement Hardware For The Lenkurt Modem



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

Note: 120-bit synchronous serial packets may be time tagged with IRIG-B millisecond time.



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

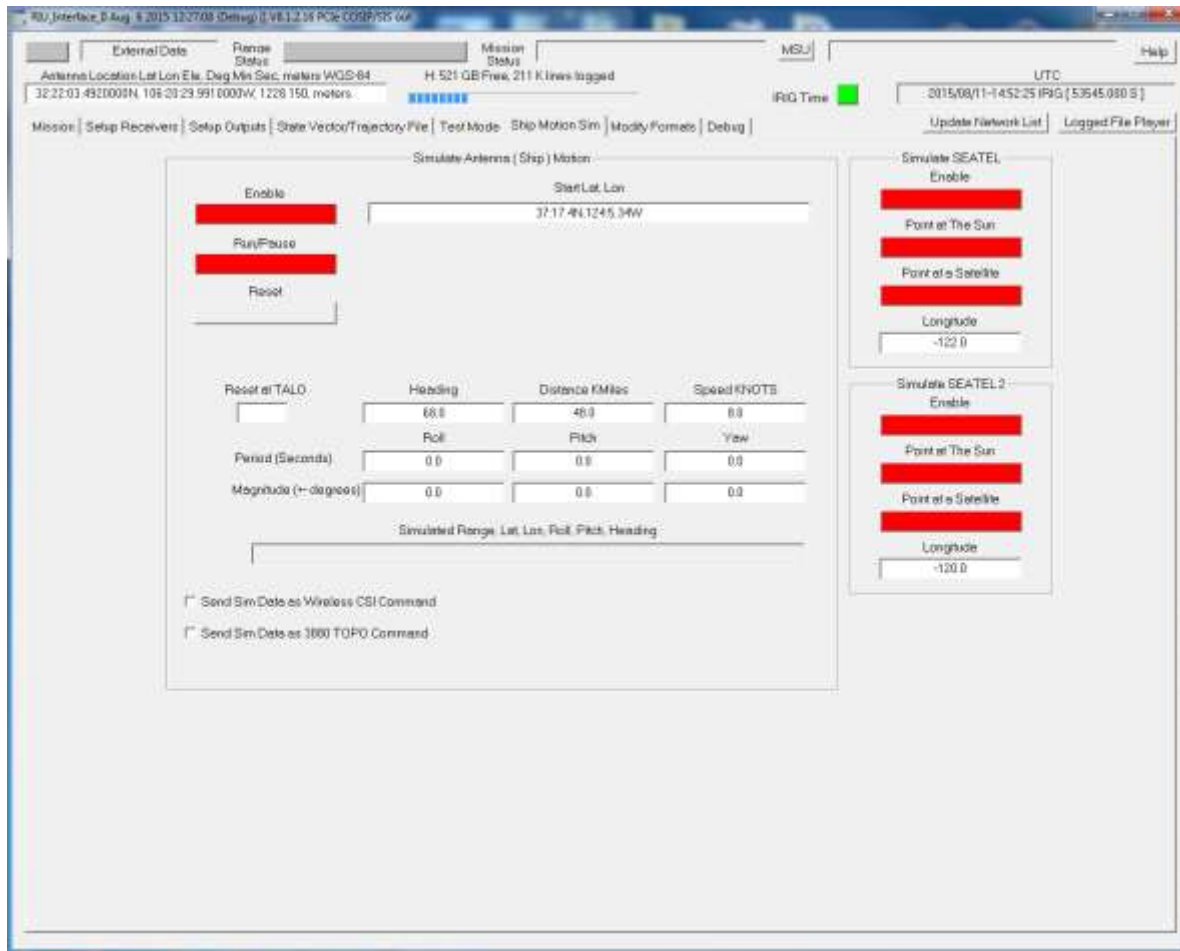
RIU & SSC Answers

- POC:

- Ronald.T.Peterson.ctr@mail.mil

- 1-575-678-4272

RIU-XVII 'Ship Motion Sim' Tab



RIU-XVII 'Modify Formats' Tab

