HNRAO Observing Log
40.673181 N – 80.437885 W
EN90sq

Date: 12 February 2017

Object: Jupiter – Io-B

Observer: JB/Unattended

Start of pass:	**0545 UT**		
Jupiter Altitude:	**21.3 degrees**	**Jupiter Azimuth:**	**121.4 degrees**
Jupiter CML:	**120.14**	**Jupiter Io Phase:**	**089.37**
Jupiter RA:	**13:27**	**Jupiter Dec:**	**-07:32**
Hour Angle:	**-03:34**	**Polarization**	**RCP**
Sun Altitude:	**-63.3 degrees**	**Sun Azimuth:**	**008.9 degrees**
Sun RA:	**21:37**	**Sun Dec:**	**-14:15**

End of pass:	**0740 UT**		
Jupiter Altitude:	**36.8 degrees**	**Jupiter Azimuth:**	**149.1 degrees**
Jupiter CML:	**189.67**	**Jupiter Io Phase**	**105.50**
Hour Angle:	**-01:38**		
Sun Altitude:	**-51.0 degrees**	**Sun Azimuth:**	**056.8 degrees**

Observations made using:

1. FSX-8S fed by the TFD array
    a. 7.7 dB loss between TFD and Multicouplers.
    b. Connect to array through HNRAO Multicoupler #1 and #2, port 2
        i. HNRAO Multicoupler #1 – TFD/LCP
        ii. HNRAO Multicoupler #2 – TFD/RCP
            1. Port 1 having 10 dB of gain, all other ports have 3 dB gain.
2. FSX-2 fed by the LWA array directly
    a. LWA element configuration – 90 degrees
3. JOVE 2 receiver fed by phased JOVE dipoles @ 10’ – phased for 2016-17 season
    a. Calibrated 4 February 2017
    b. Connected to dipoles through HNRAO Multicoupler #3, port 1.
        i. 3.165 dB loss between Multicoupler and dipoles.
4. Icom R75 receiver fed by experimental DDRR antenna directly.
    a. Calibrated 4 February 2017

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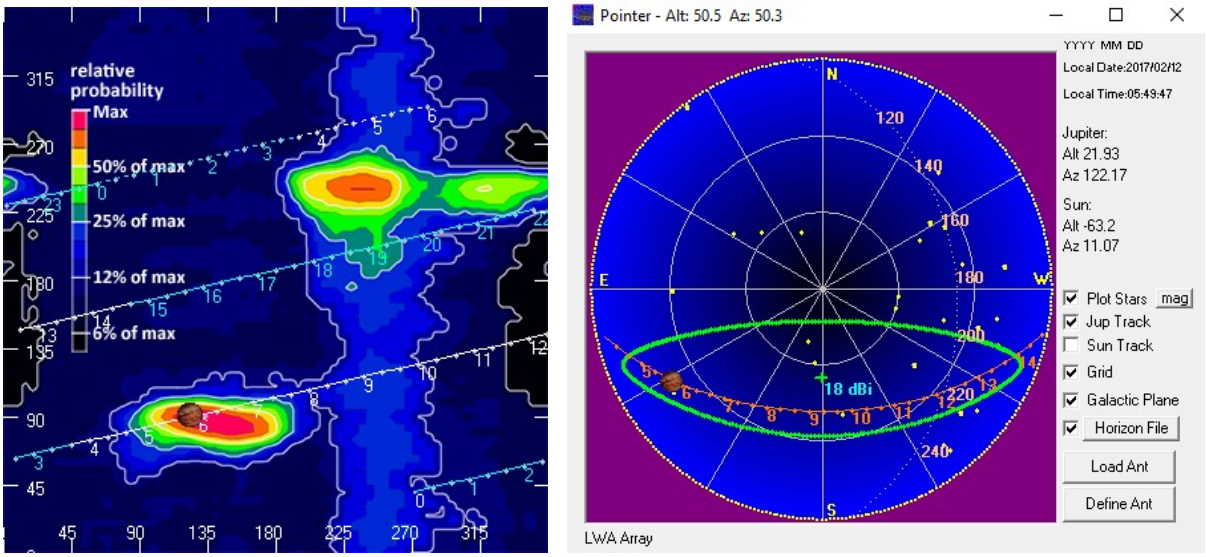
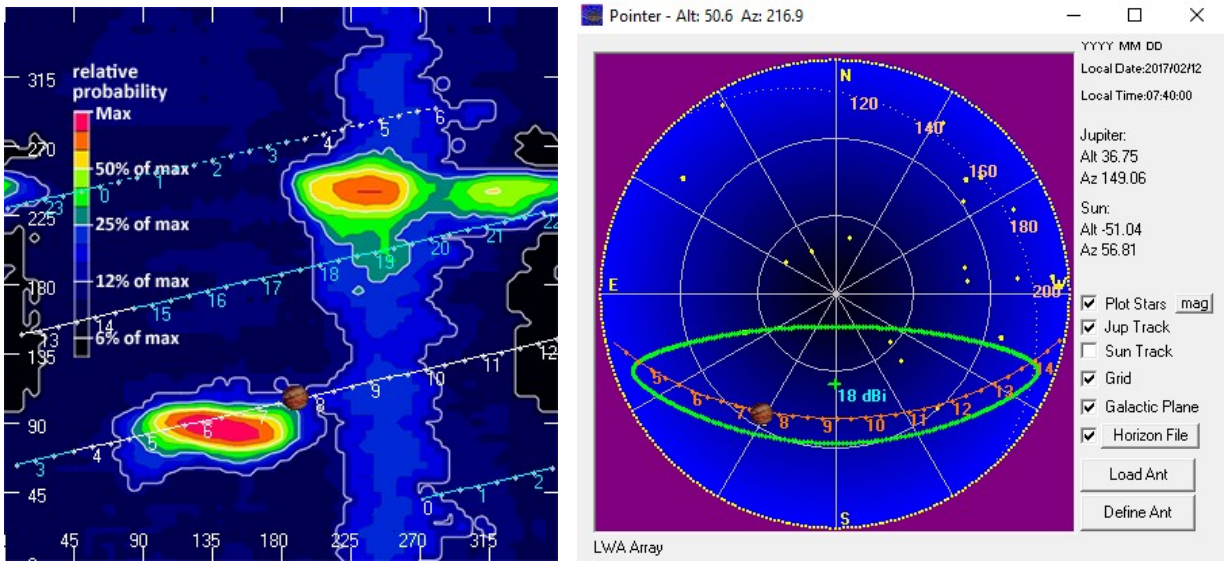


Beginning of Pass



End of Pass

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Beginning conditions at observatory

46 degrees F. Cloudy. Light rain.
Rain will hinder observations with precipitation static.
Power line RFI, bad at start of pass.
Will make observations difficult for all but the most energetic bursts.
Affecting both spectrograph/antenna pairs.

Planetary K-index
Now: Kp= 1 quiet
24-hr max: Kp= 1 quiet

A stream of solar wind flowing from the indicated coronal hole will probably sail north of Earth this weekend, having little effect on our planet's magnetic field.

FSX-8S/TFD pair nearly useless due to RFI and precipitation static.
FSX-2/LWA pair useable

0545 UT
Weak L-burst
21 MHz
0554 UT
Weak L-burst
21 MHz – 19 MHz
Negative drift
0557 UT
Appears to be some L-burst activity at 15 MHz but RFI and precipitation static make it difficult to identify
0600 UT
Weak L-bursts with negative slope modulation
27-21 MHz
Rain quieted down the RFI on the FSX-2/LWA pair. Remains bad on FSX-8S/TFD pair.
0602 UT
Activity now between 29-26 MHz
Negative slope modulation lanes
0603 UT
Activity moving up to 30 MHz
0614 UT
Very weak L-bursts at 22 – 27 MHz.
0616 UT
A little stronger L-burst at 19 MHz
0620 UT
Very weak L-bursts between 24 MHz and 27 MHz

I can't tell if there are any S-bursts in this storm or not. RFI and S-bursts currently look alike.

Between the RFI and precipitation static, it's amazing I'm seeing anything at all. Remainder of Io-B pass will be unattended

Unattended portion of pass

L-burst emissions continued until end of pass at 0740 UT. The strongest single L-burst seen here was at 0654 UT.

From this observatory, first emissions began at 21 MHz. The range of this Io-B pass spanned 15 MHz, to a maximum of 30 MHz. It reached 30 MHz near the beginning. Positive drift L-bursts were the only emissions observed at this observatory. If there was any S-burst activity, the power line RFI and precipitation static prevented resolution. There were also negative slope modulation lanes present. At 0643 UT, these were measured to be approximately 67 kHz/s. Poor resolution prevented measurements during other portions of the pass.

From 0545 UT until 0625, the FSX-2/LWA shows precipitation static due to the rain fall at that point in the observation. That was immediately followed by a period of power line noise RFI centered around 0628 UT. During the same time, the FSX-8S/TFD was overwhelmed with precipitation static followed by the same power line noise RFI.

Beginning at 0642 UT, there were periods of activity at 20.1 MHz. The strongest bursts recorded here occurred at 0659 UT and 0718 UT reached a maximum of 270 kK and 240 kK respectively.

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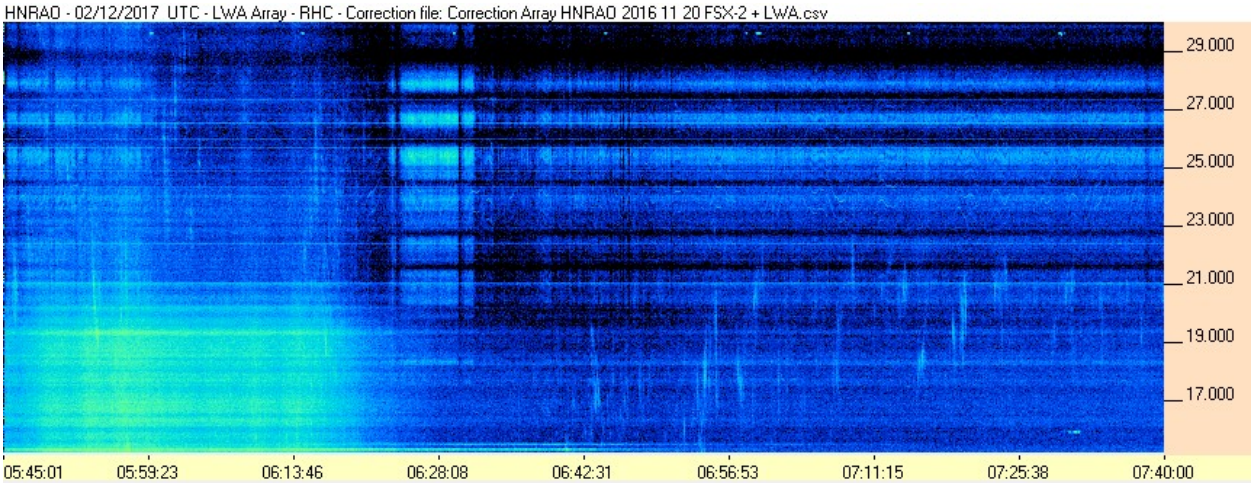
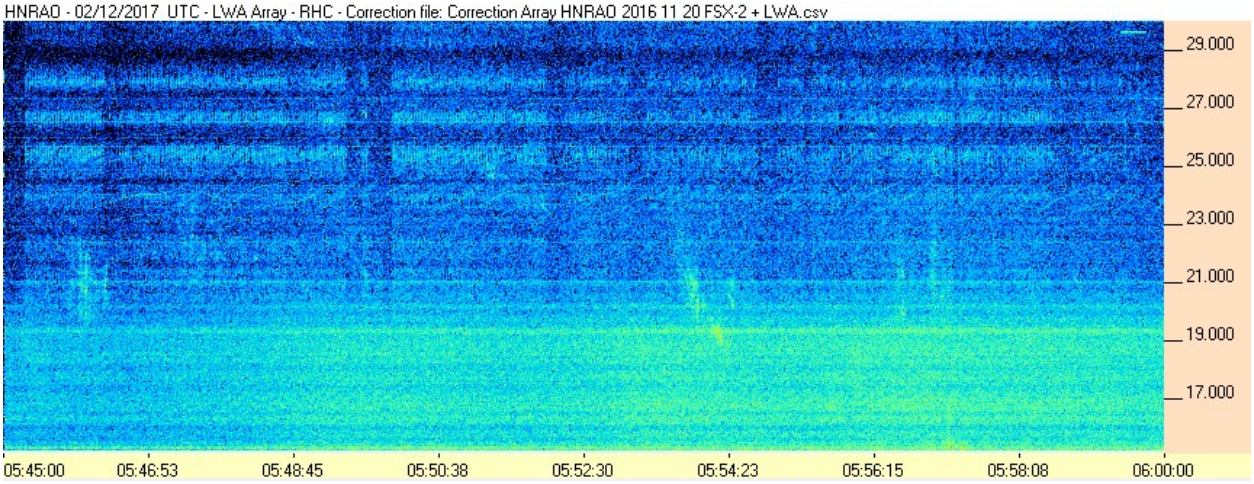
FSX-2/LWA Pair





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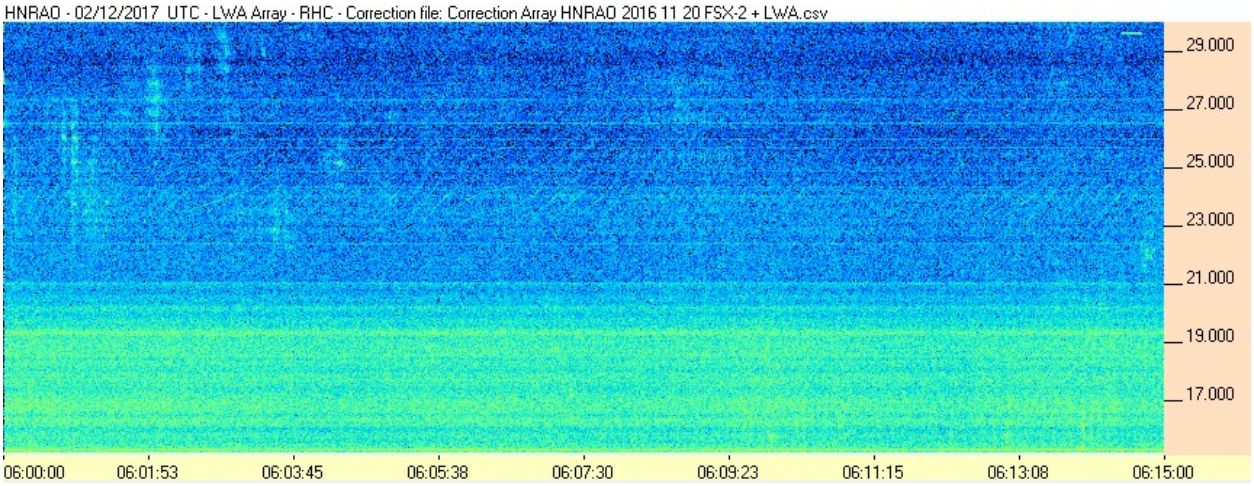

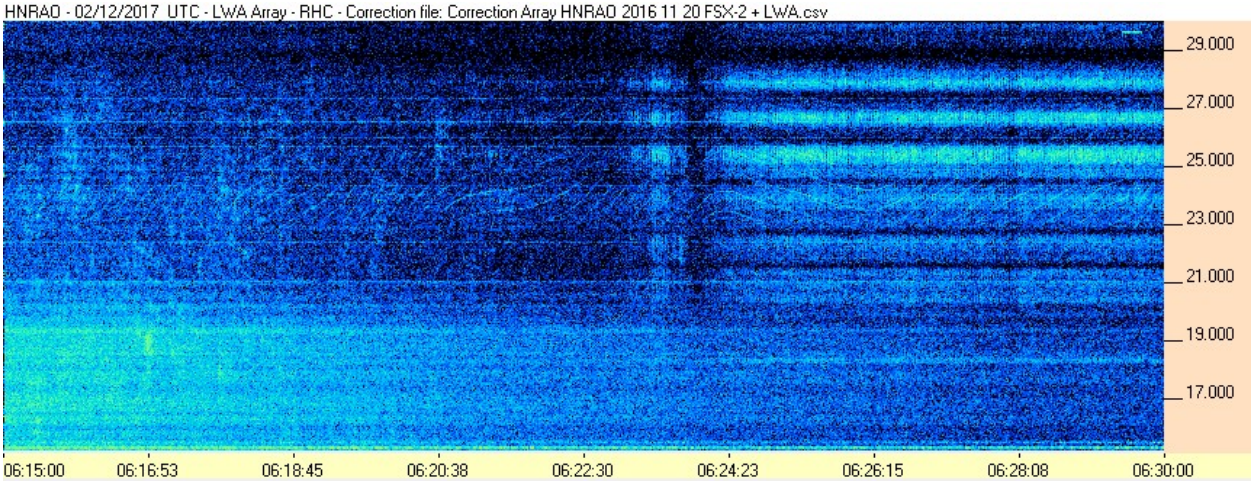

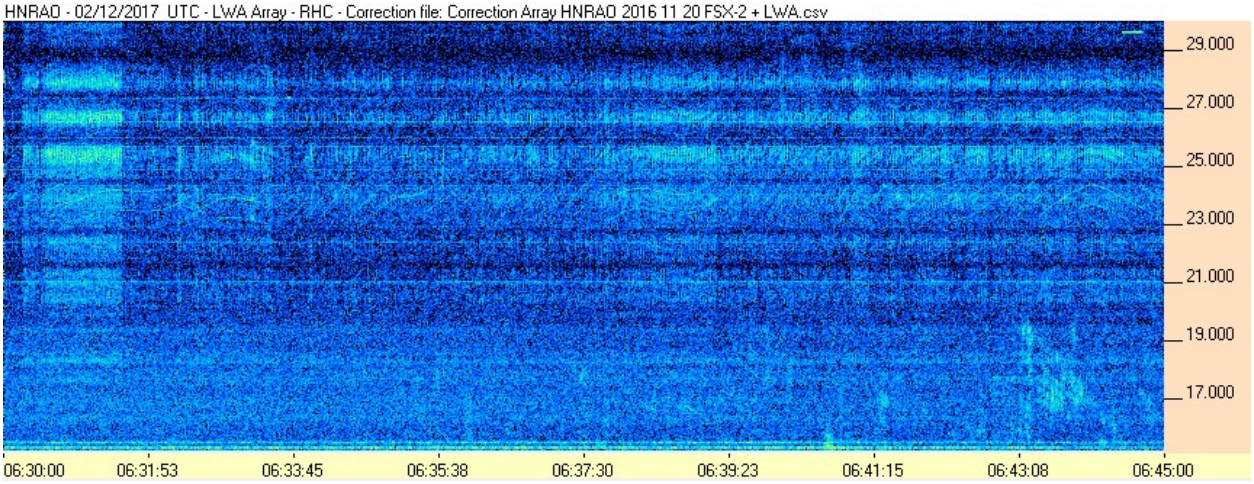

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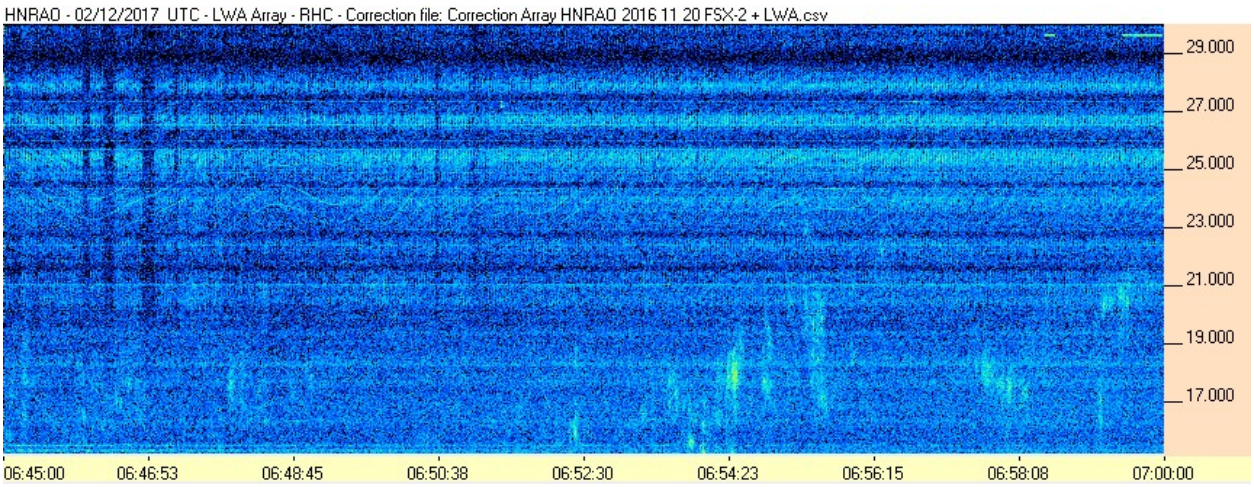

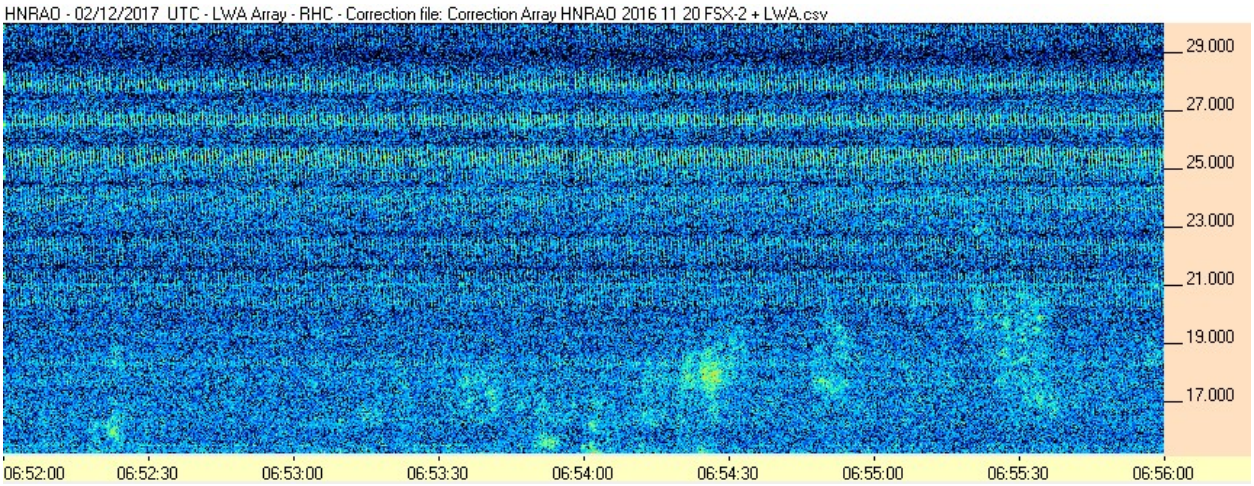

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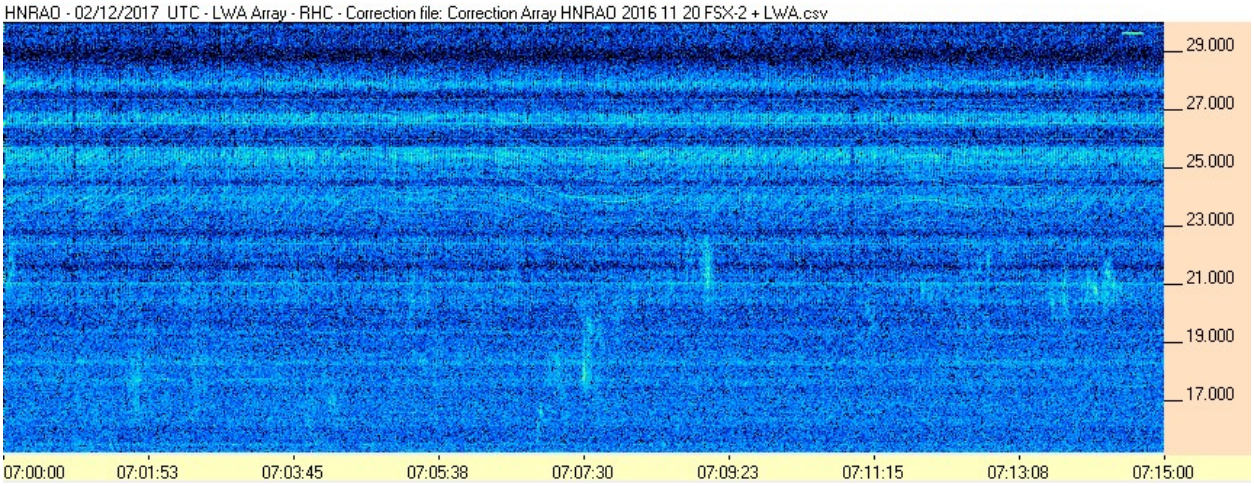

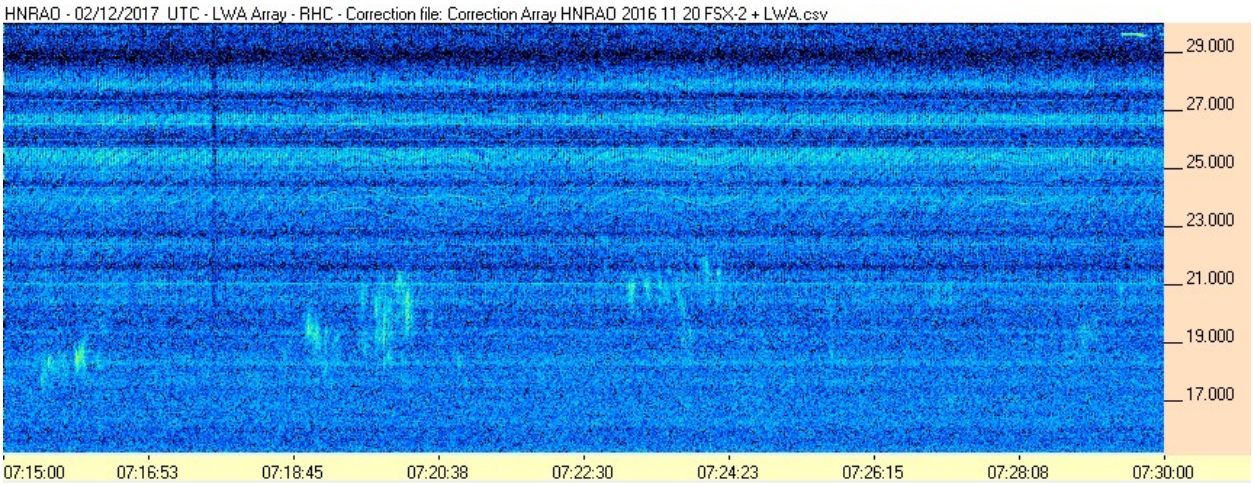

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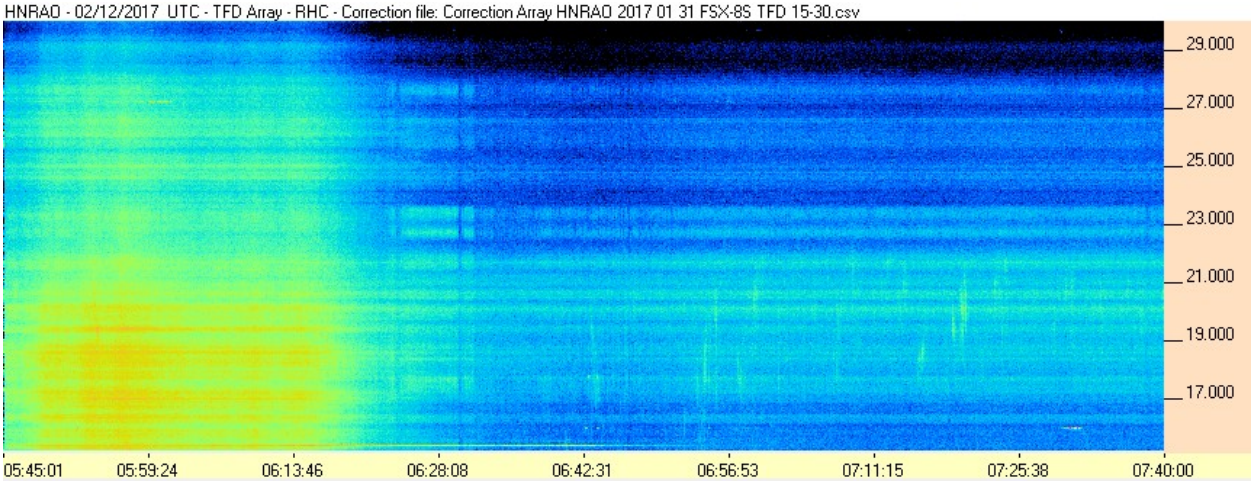
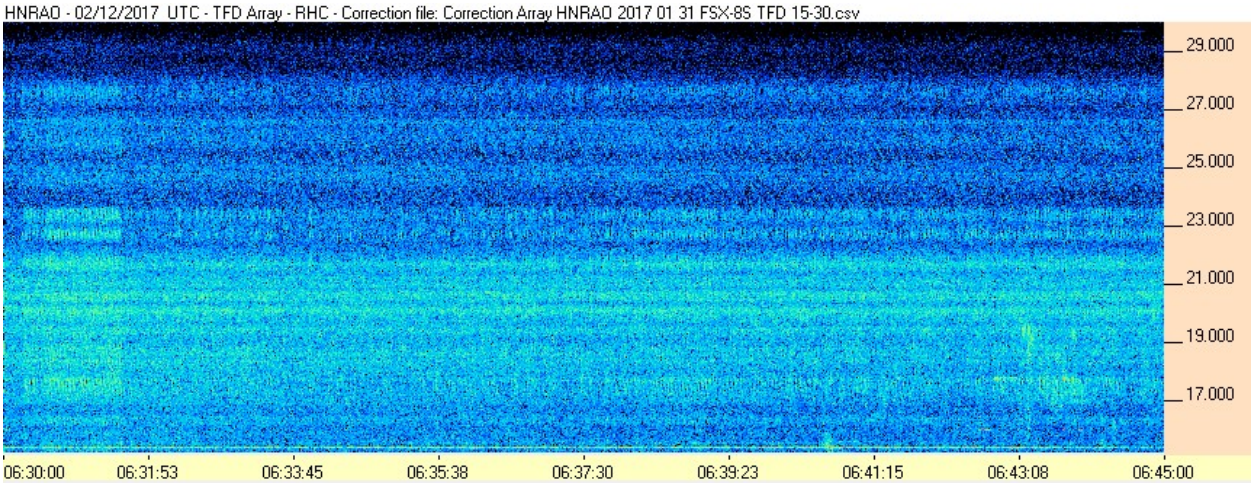
FSX-8S/TFD Pair





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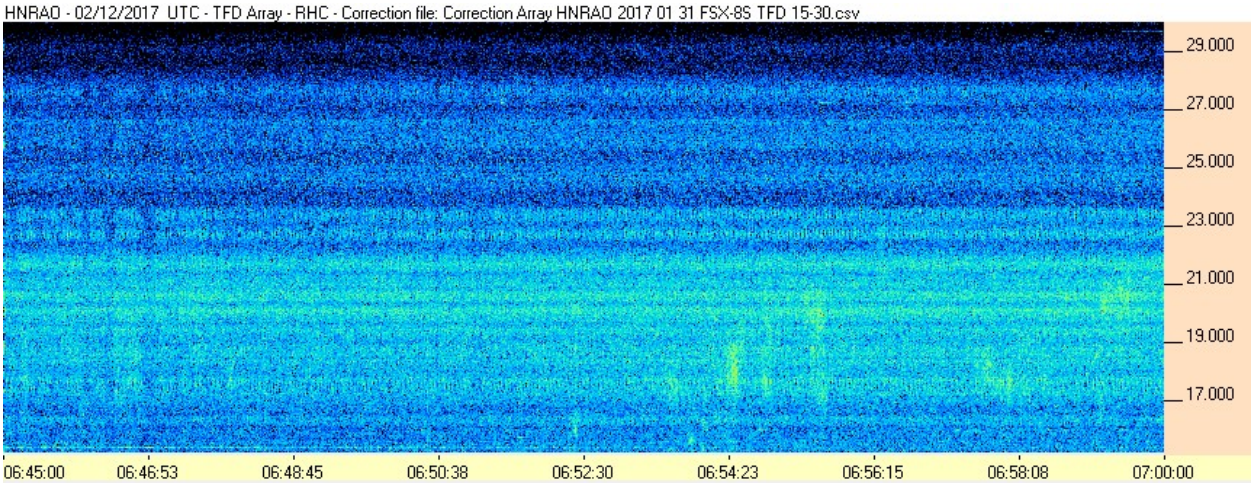
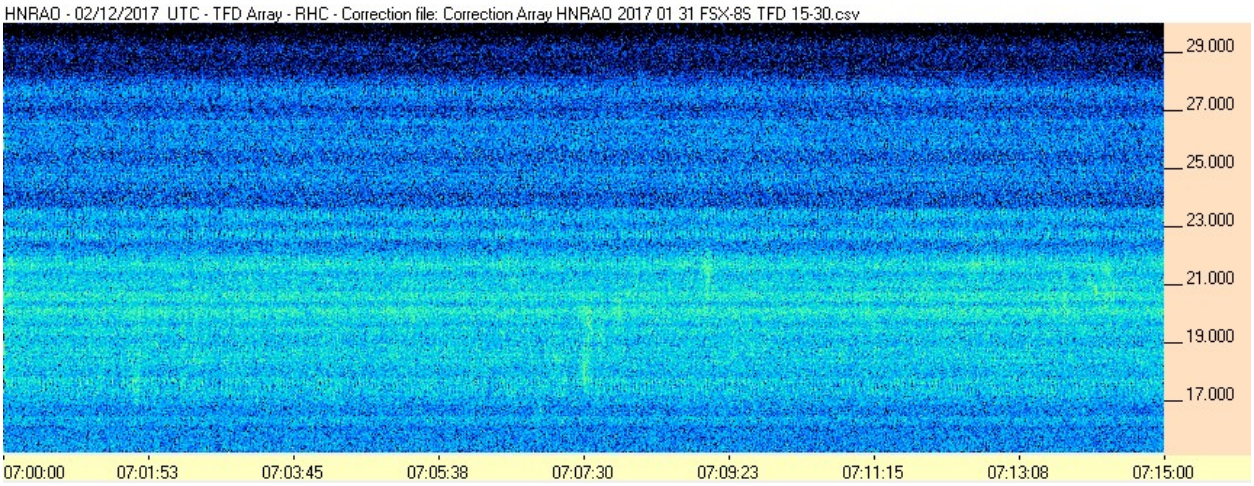
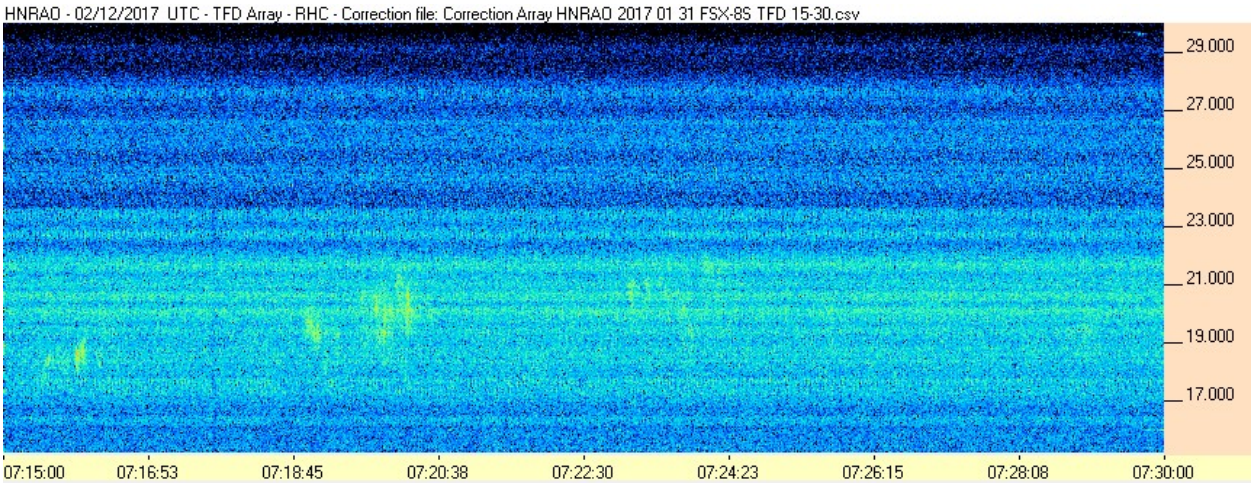
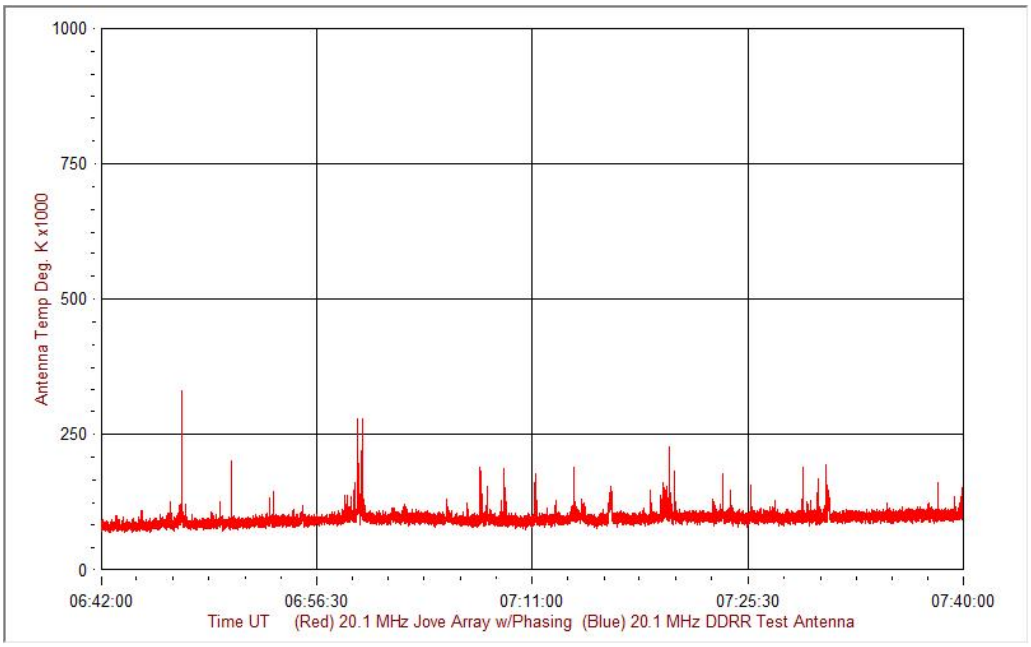
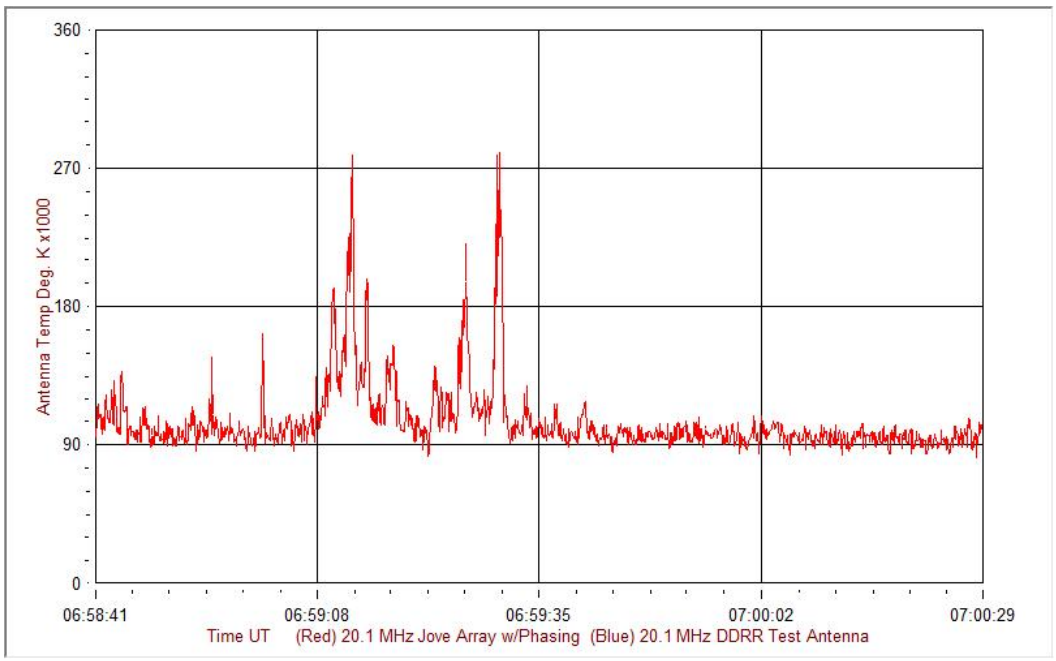


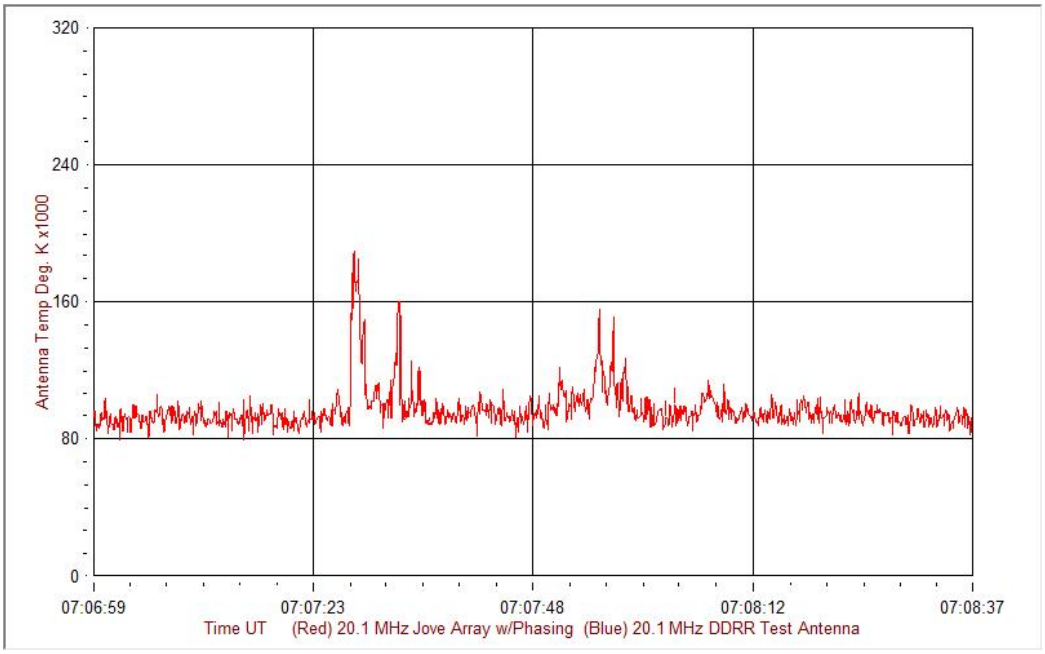


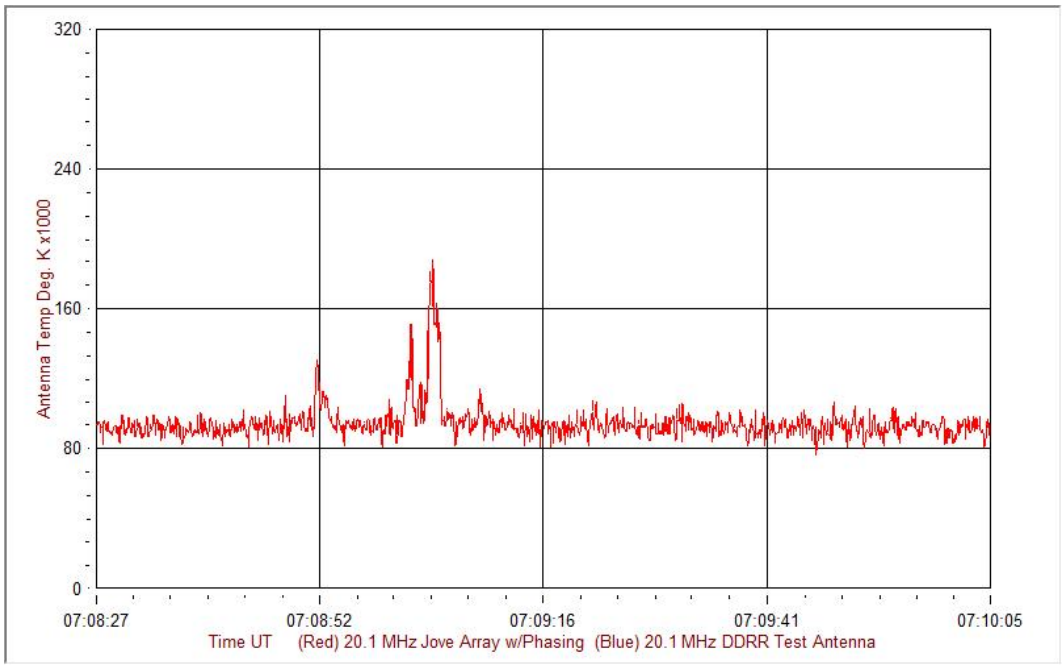


Radio JOVE Receiver/JOVE dipoles






320
240
160
80
0
Antenna Temp Deg. K x1000
07:06:59
07:07:23
07:07:48
07:08:12
07:08:37
Time UT (Red) 20.1 MHz Jove Array w/Phasing (Blue) 20.1 MHz DDRR Test Antenna


320
240
160
80
0
Antenna Temp Deg. K x1000
07:08:27
07:08:52
07:09:16
07:09:41
07:10:05
Time UT (Red) 20.1 MHz Jove Array w/Phasing (Blue) 20.1 MHz DDRR Test Antenna

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