

HNRAO Observing Log
40.673181 N – 80.437885 W
EN90sq



Date: April 14, 2019

Object: Jupiter – Io-B

Observer: Unattended

Start - Time UT:	0906	Planetary K-index:	2
Jupiter Altitude (deg):	26.4	Jupiter Azimuth (deg):	174.5
Jupiter CML:	95.06	Jupiter Io Phase:	096.92
Jupiter RA (hr/min):	17:34	Jupiter Dec (hr/min):	-22.41
Hour Angle (hr/min):	-00:21	Polarization	RCP
Sun Altitude (deg):	-17.6	Sun Azimuth (deg):	061.3
Sun RA (hr/min):	01:22	Sun Dec (hr/min):	08:39

End – Time UT:	1017	De:	-2.8
Jupiter Altitude (deg):	25.6	Jupiter Azimuth (deg):	192.8
Jupiter CML:	137.98	Jupiter Io Phase	106.91
Hour Angle (hr/min):	00:50	Duration (min):	111
Sun Altitude (deg):	-05.1	Sun Azimuth (deg):	073.9
Max Frequency MHz	24	Min Frequency MHz	16

Data from Radio-Jupiter Pro 3.8.2

Observatory Configuration

Spectrograph Receiver	Antenna	Polarization	System Loss	Multicoupler	Multicoupler port	Calibrated
FSX-8S	TFD	RCP LCP	-8.35 dB -7.59 dB	#2 RCP #1 LCP	Port 1 +10dB Port 1 +10dB	Twice daily Twice daily
FSX-2	LWA	RCP/LCP manual select		N/A	N/A	N/A
SDRPlay RSP2	TFD	RCP	-8.35 dB	#2 RCP	Port 2 +3dB	Twice daily
SDRPlay RSP2	TFD	LCP	-7.59 dB	#1 LCP	Port 2 +3dB	Twice daily
JOVE I	TFD	RCP	-8.35 dB	#2 RCP	Port 3 +3 dB	04/20/2018
JOVE I	TFD	LCP	-7.59 dB	#1 LCP	Port 3 +3 dB	04/20/2018
JOVE II	Jove dipoles	Linear	-3.66 dB	#3 Linear	Port 4 +3 dB	08/21/2018
SDRPlay RSP1	Experimental*					

JOVE dipoles phased @ 32 degrees for 2017-2018 season

TFD array phased @ 35 degrees for 2017-2018 season

LWA antenna phased @ 35 degrees and orientation for observation: 45 degrees

* Used for testing and evaluating antenna systems

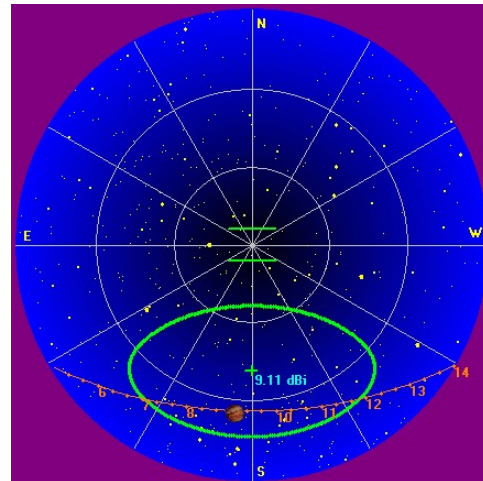
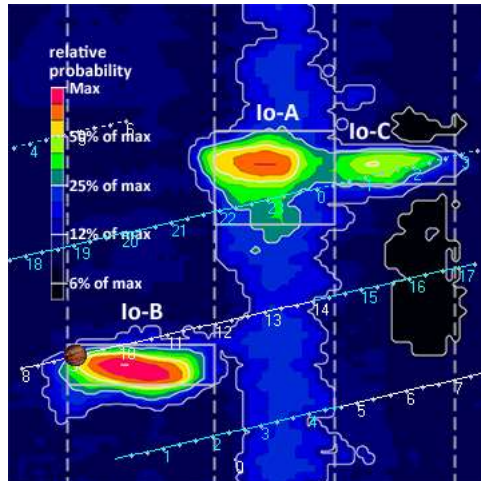
Software Radio Sky Spectrograph 2.8.50

Red = Offline

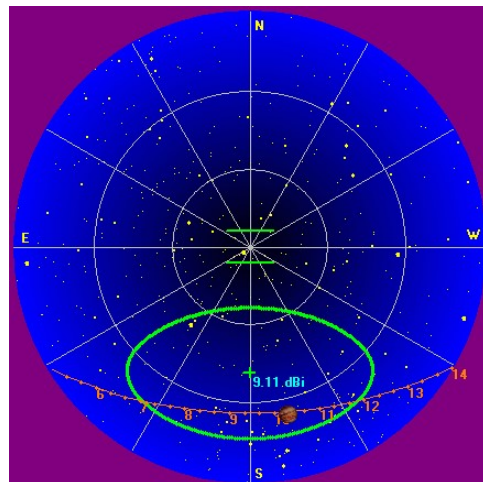
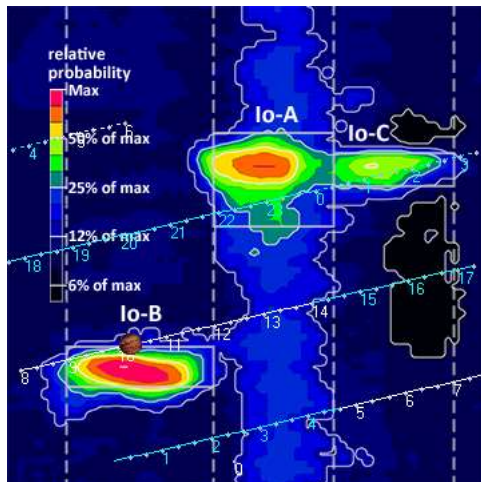
All times are synced with a local GPS locked NTP server.

HNRAO Observing Log

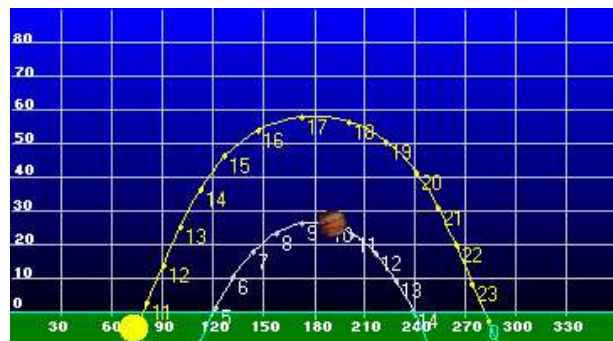
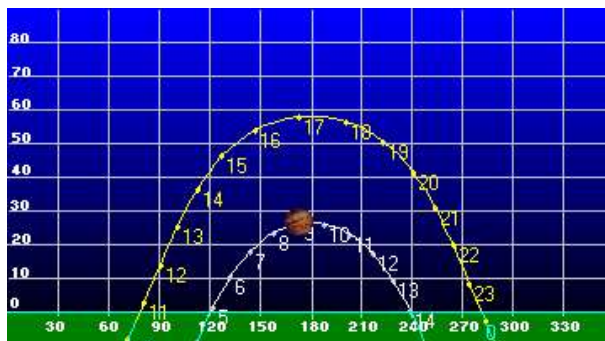
40.673181 N – 80.437885 W
EN90sq



Beginning of Pass

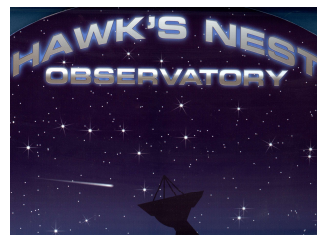


End of Pass



HNRAO Observing Log

40.673181 N – 80.437885 W
EN90sq

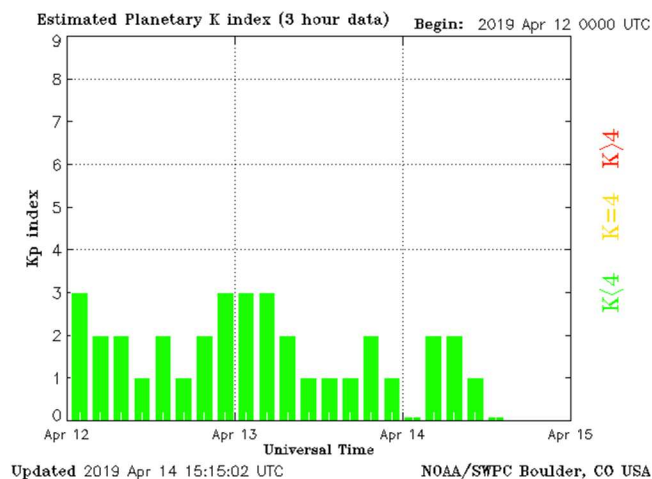


MODE	CML RANGE	Io RANGE	MAX F	POLAR	ARC	NOTES
Io-D	0-200	95-130	18	LH	Early	Also called "fourth source"
Io-B	(105 - 185)	(80-110)	39.5	RH	Early	Also called "early source"
non Io-B	80-200	0-360	38	RH	Early	Voyager info
Io-A	(200-270)	(205-260)	38	RH	Late	Also called "main source"
non-Io-A	(230-280)	0-360	38	RH	Late	
Io-C	(300-20)	(225-260)	36	RH&LH	Late	Also called "third source"
non-Io-C	300-360	0-360	32	RH&LH	Late	Voyager info

<https://www.radiosky.com/jupmodes.html>

Modulation Lanes Designations*	
L - Burst	S-Burst
L1 – No lanes	S1 – No lanes
L2 - Positive slope	S2 – Positive slope
L3 - Cross hatched	S3 – Cross hatched
L4 – Negative slope	S4 – Negative slope

*Modulation Lanes in the Dynamic Spectra of Jovian L-bursts, J.J. Riihimaa, Astron. & Astrophys. 4, 1970



HNRAO Observing Log
40.673181 N – 80.437885 W
EN90sq



Io-B storm starting at near transit. Very weak positive drift emissions with RCP S-bursts 1 - 3 dB above GB.

All RCP spectrographs and Radio JOVE / JOVE dipole array were online and recording. The LCP SDRPlay RSP2 / TFD array spectrograph was recording data in the 74 MHz range recording solar bursting at a higher frequency and did not capture any data.

There were also LCP L-burst emissions recorded by the FSX-8S / TFD array suggesting there was an Io-D component to this storm.

Weather was in the mid-60s (F) and cloudy with approaching rain as seen in weather radar. No lightning detected. Rain began falling at the end of emissions as indicated by the precipitation static visible in the spectrograph and SkyPipe record.

Emissions were recorded by the SDRPlay RSP2 / TFD array. The FSX-2 / LWA array did not record any data, even during the strongest portion of this storm.

The first indication of emissions were at 0906:30 UT between 19 MHz and 20 MHz. These appeared to be S-bursts with L4 modulation lanes.

This storm gives a good example of S-burst modulation lanes.

At 0938 UT, type L3 modulation lanes are present.

Relatively stronger emissions start in a positive drift band between 21 MHz and 24 MHz at 0947 UT. This is also composed of L3 modulation lanes.

There was data recorded by the Radio JOVE / JOVE dipole array on the SkyPipe record. This data was uploaded to the Radio JOVE data archive.

Nothing else of note during this storm.

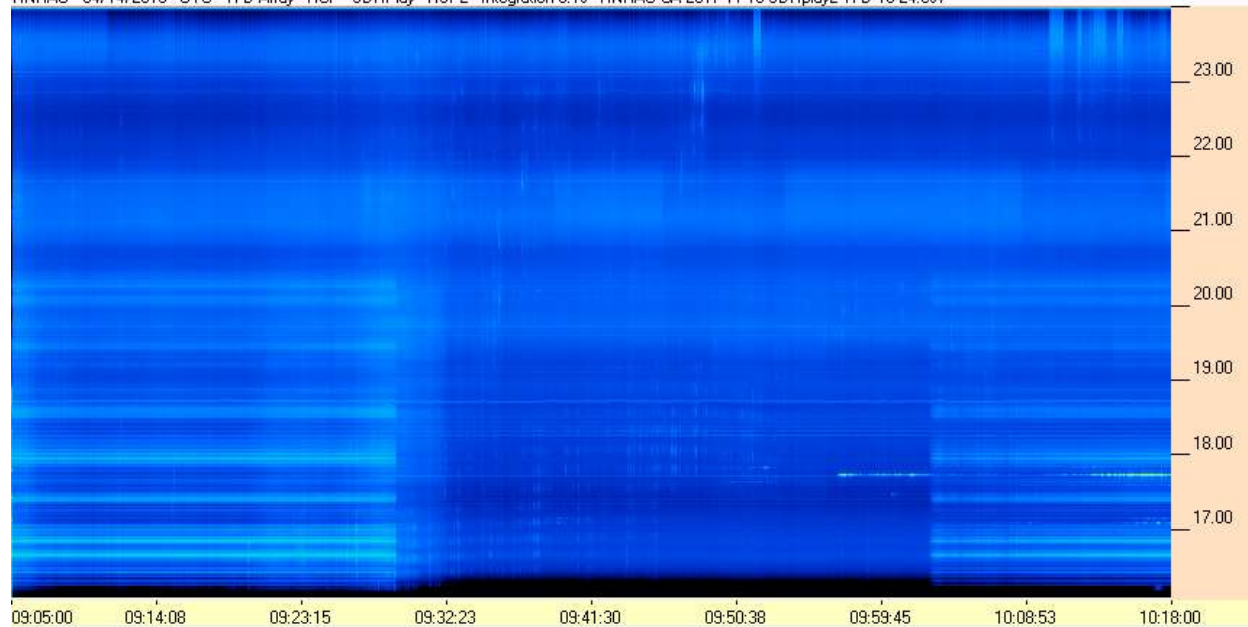
EOR

HNRAO Observing Log
40.673181 N – 80.437885 W
EN90sq

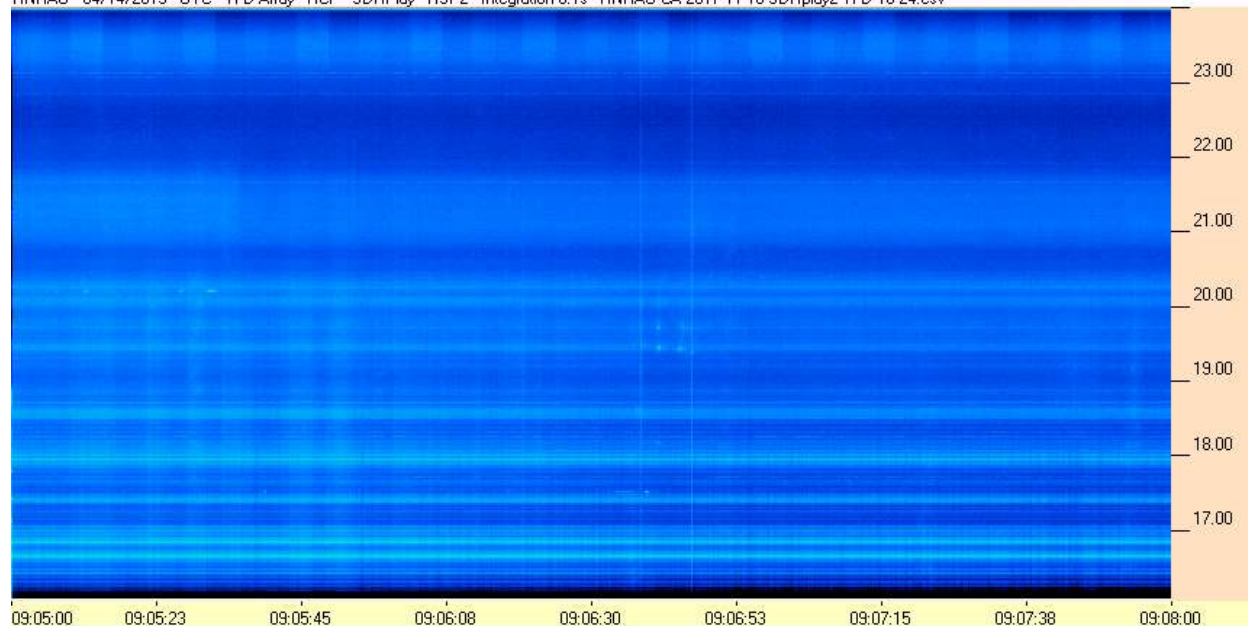


SDRPlay RSP2 / TFD Array

HNRAO - 04/14/2019 - UTC - TFD Array - RCP - SDRPlay - RSP2 - Integration 0.1s - HNRAO CA 2017 11 10 SDRplay2 TFD 16-24.csv



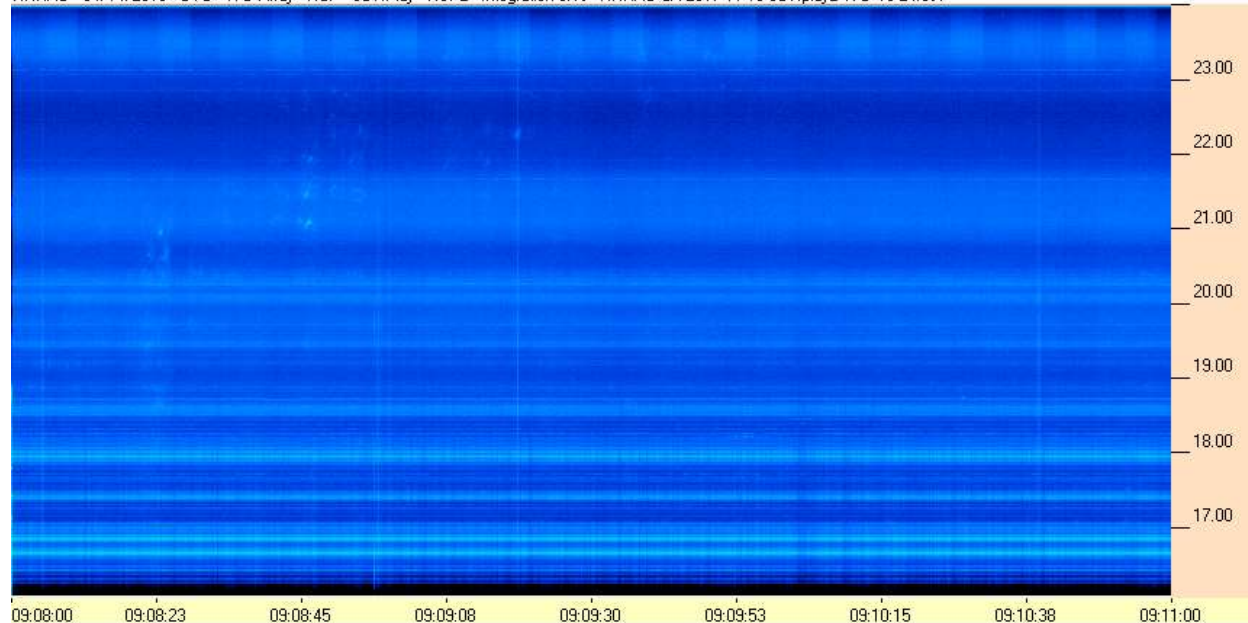
HNRAO - 04/14/2019 - UTC - TFD Array - RCP - SDRPlay - RSP2 - Integration 0.1s - HNRAO CA 2017 11 10 SDRplay2 TFD 16-24.csv



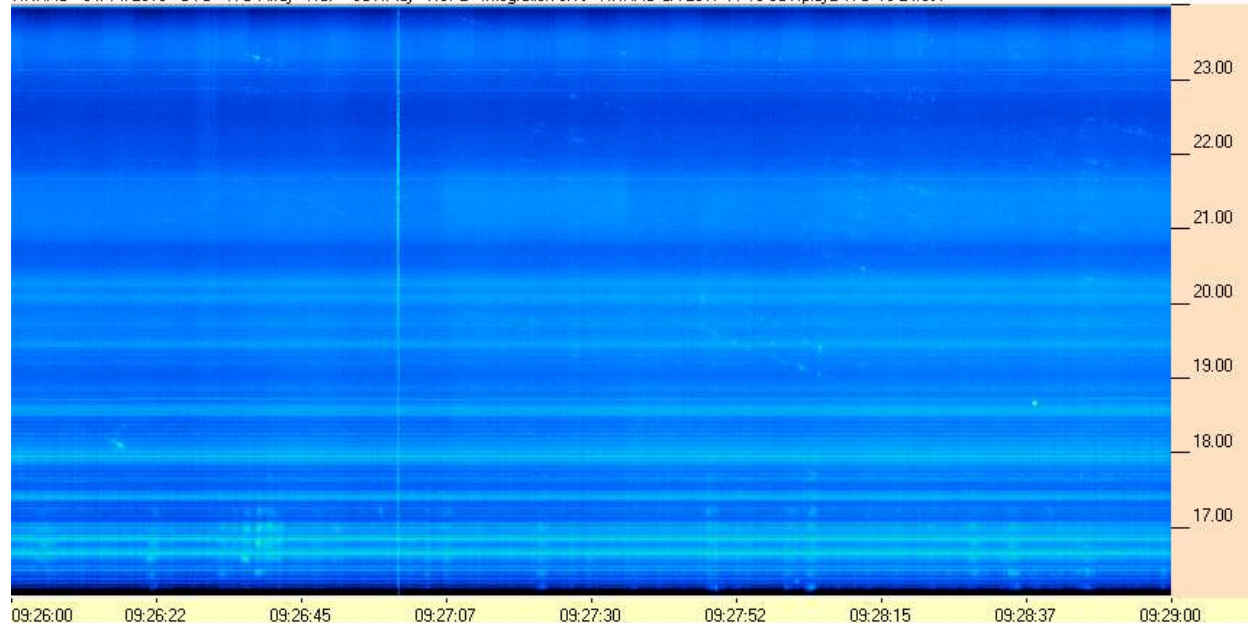
HNRAO Observing Log
40.673181 N – 80.437885 W
EN90sq



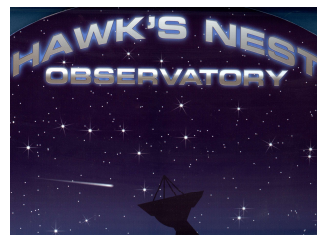
HNRAO - 04/14/2019 - UTC - TFD Array - RCP - SDRPlay - RSP2 - Integration 0.1s - HNRAO CA 2017 11 10 SDRplay2 TFD 16-24.csv



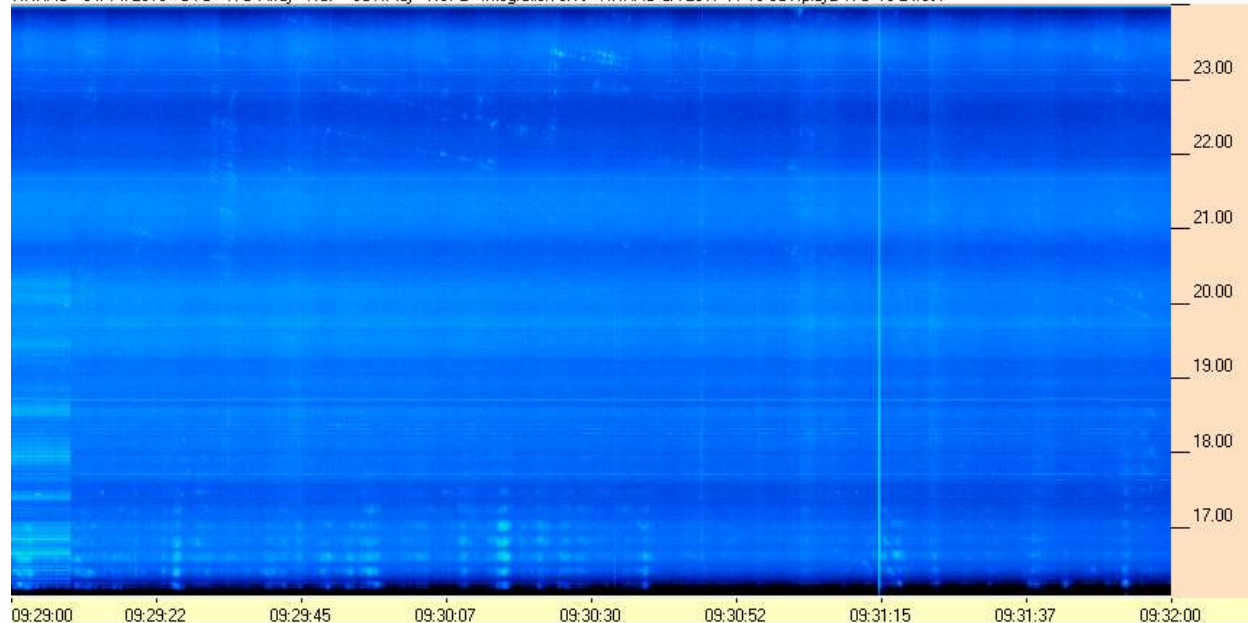
HNRAO - 04/14/2019 - UTC - TFD Array - RCP - SDRPlay - RSP2 - Integration 0.1s - HNRAO CA 2017 11 10 SDRplay2 TFD 16-24.csv



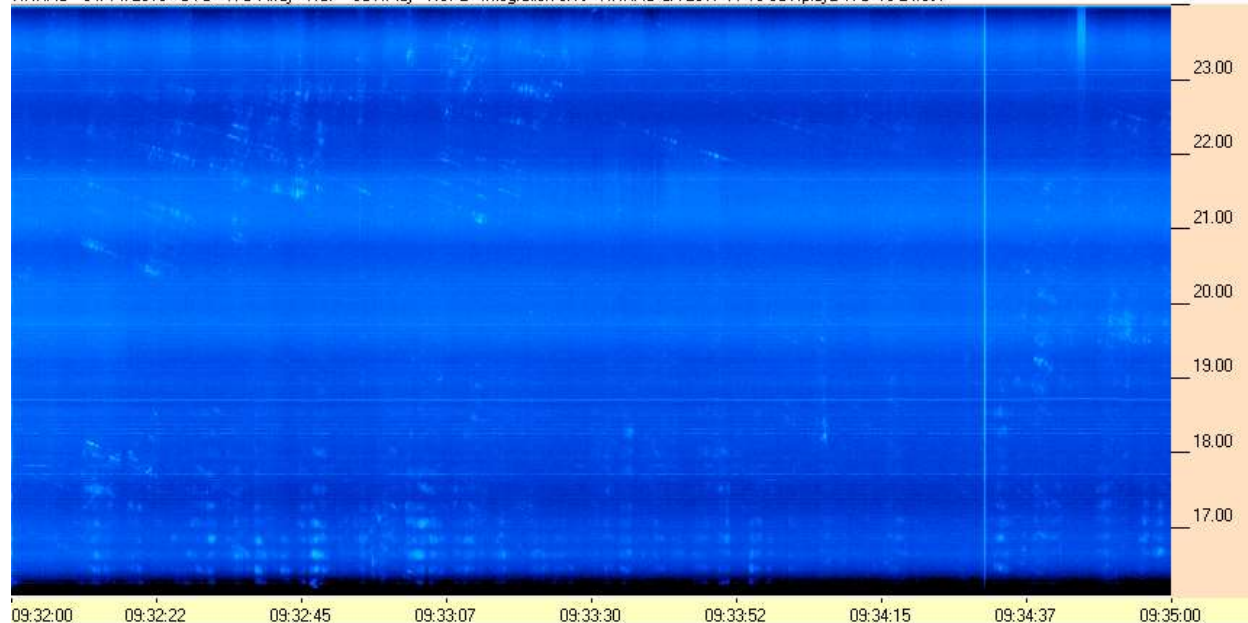
HNRAO Observing Log
40.673181 N – 80.437885 W
EN90sq



HNRAO - 04/14/2019 - UTC - TFD Array - RCP - SDRPlay - RSP2 - Integration 0.1s - HNRAO CA 2017 11 10 SDRplay2 TFD 16-24.csv



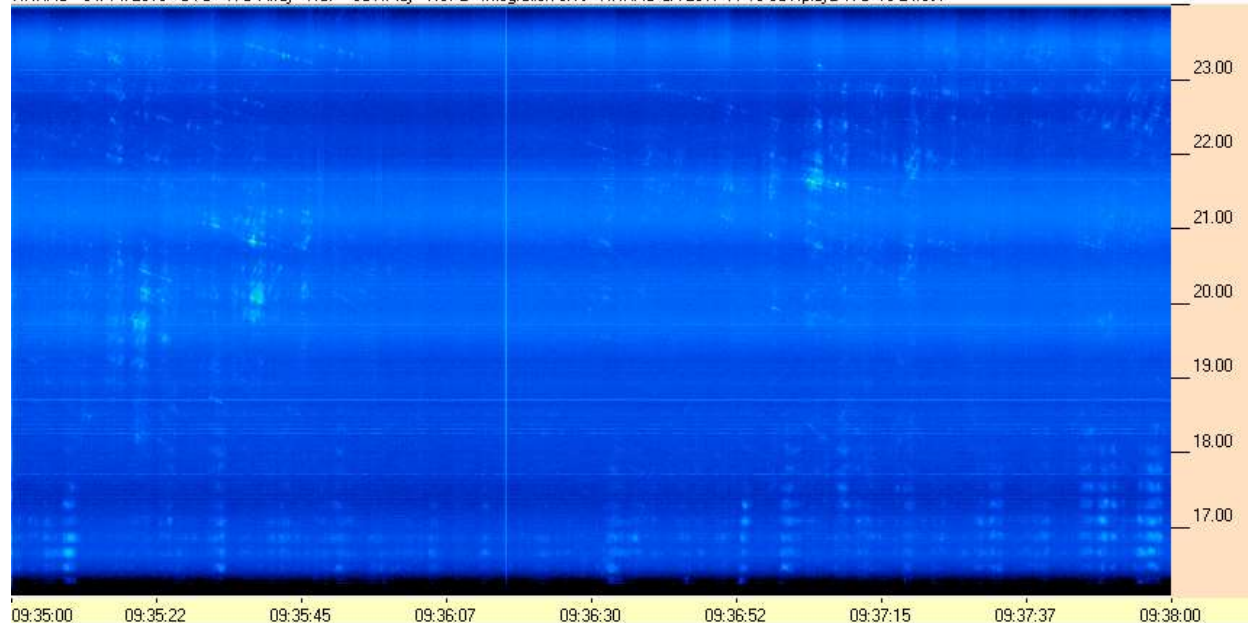
HNRAO - 04/14/2019 - UTC - TFD Array - RCP - SDRPlay - RSP2 - Integration 0.1s - HNRAO CA 2017 11 10 SDRplay2 TFD 16-24.csv



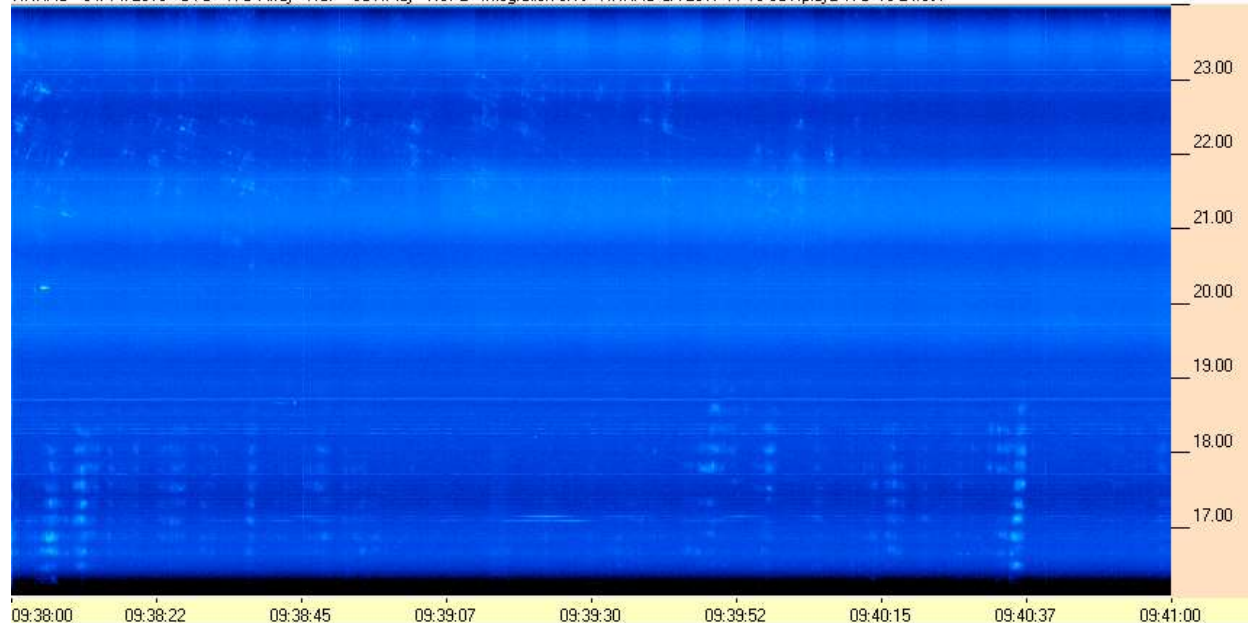
HNRAO Observing Log
40.673181 N – 80.437885 W
EN90sq



HNRAO - 04/14/2019 - UTC - TFD Array - RCP - SDRPlay - RSP2 - Integration 0.1s - HNRAO CA 2017 11 10 SDRplay2 TFD 16-24.csv



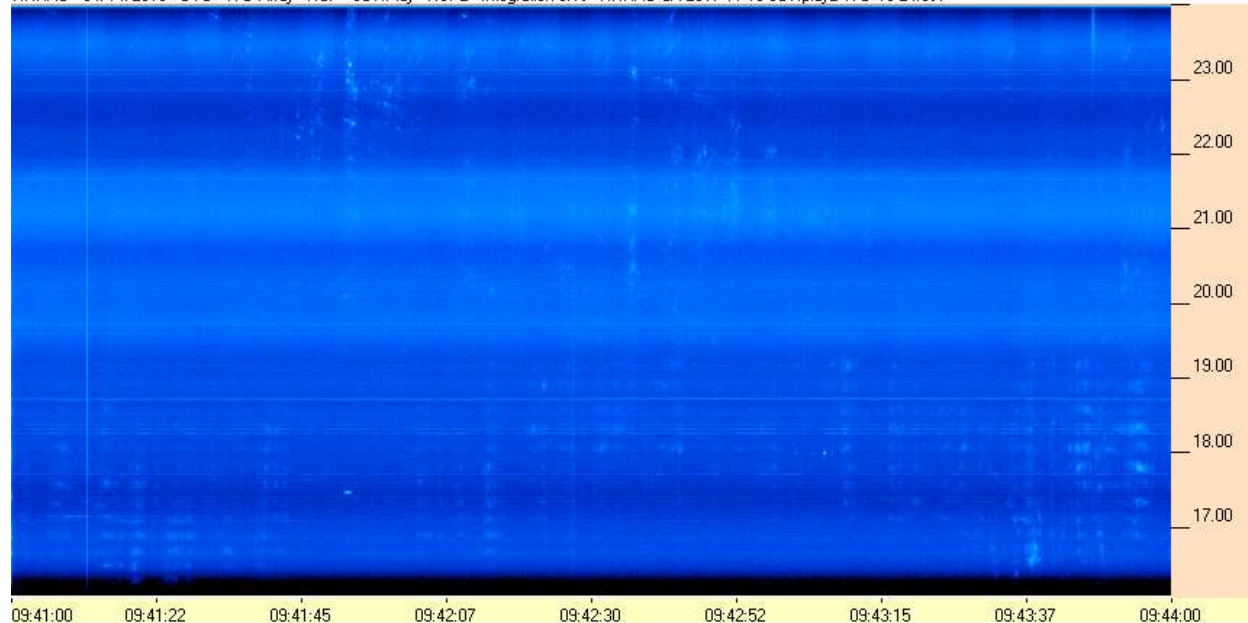
HNRAO - 04/14/2019 - UTC - TFD Array - RCP - SDRPlay - RSP2 - Integration 0.1s - HNRAO CA 2017 11 10 SDRplay2 TFD 16-24.csv



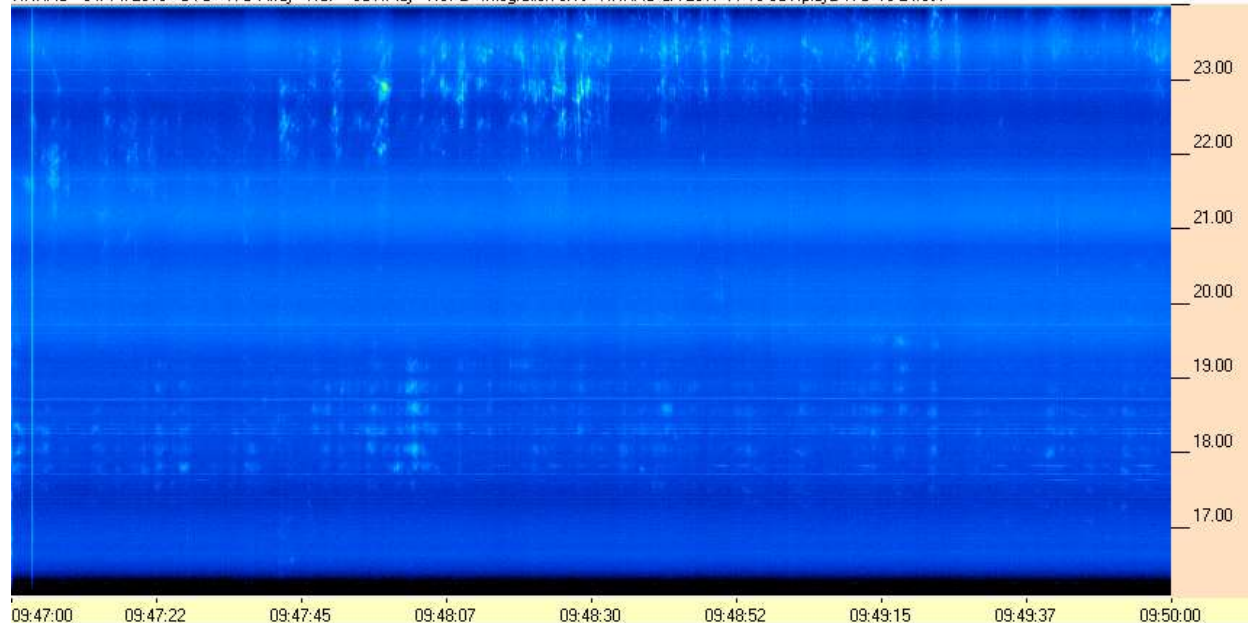
HNRAO Observing Log
40.673181 N – 80.437885 W
EN90sq



HNRAO - 04/14/2019 - UTC - TFD Array - RCP - SDRPlay - RSP2 - Integration 0.1s - HNRAO CA 2017 11 10 SDRplay2 TFD 16-24.csv



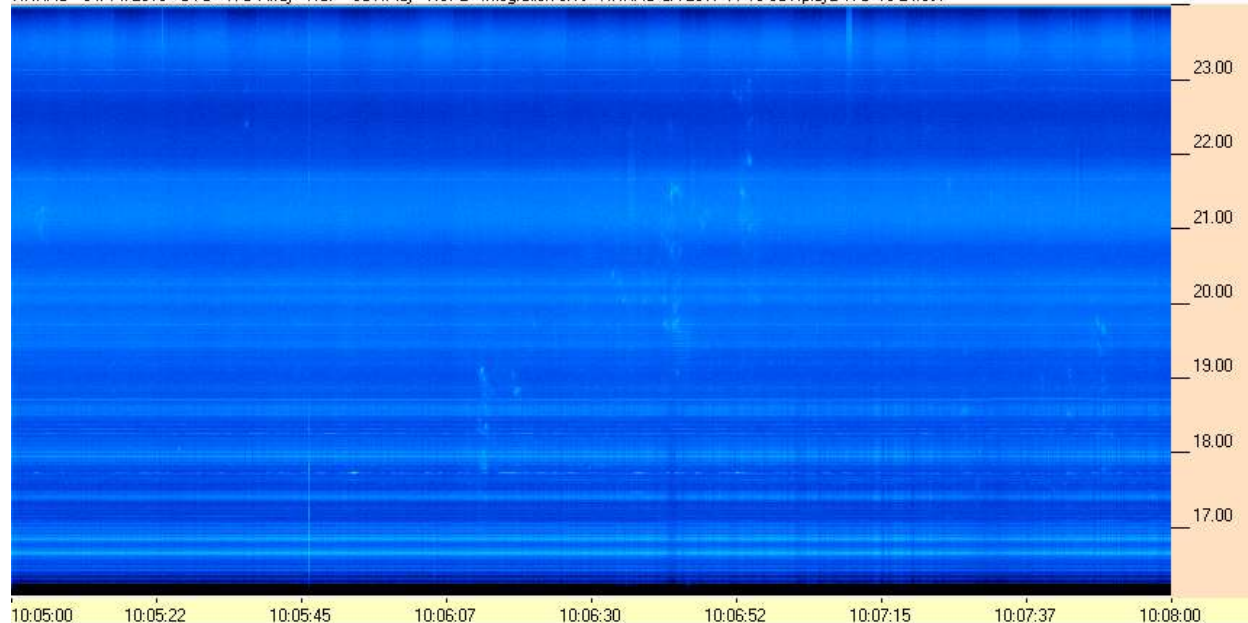
HNRAO - 04/14/2019 - UTC - TFD Array - RCP - SDRPlay - RSP2 - Integration 0.1s - HNRAO CA 2017 11 10 SDRplay2 TFD 16-24.csv



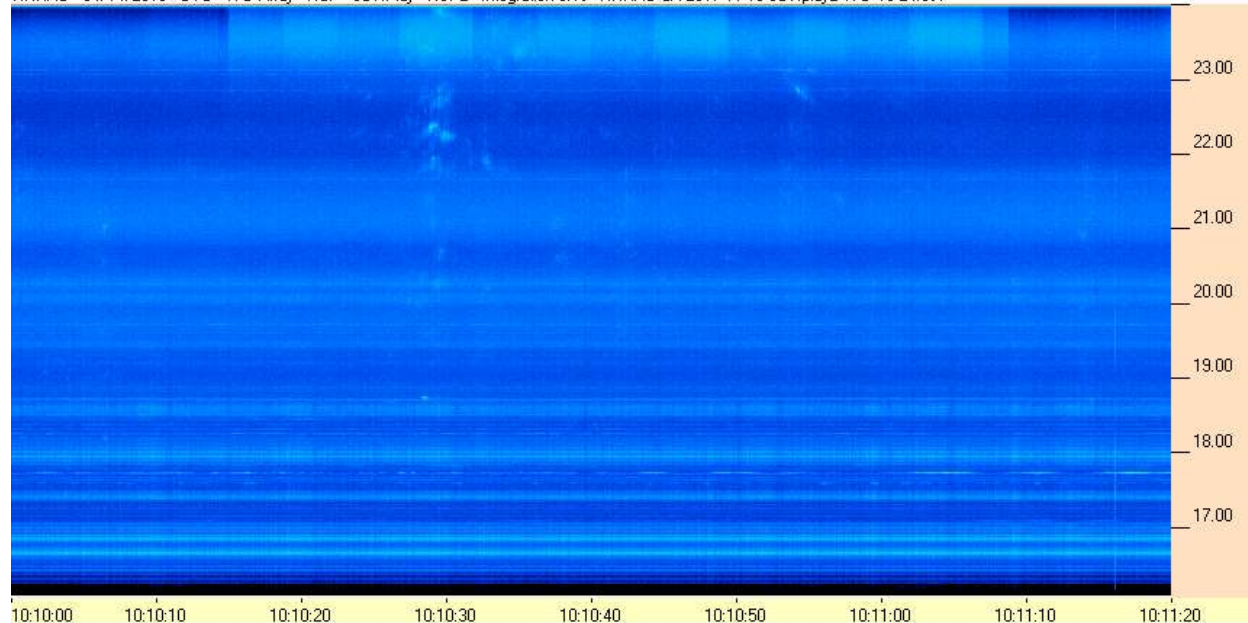
HNRAO Observing Log
40.673181 N – 80.437885 W
EN90sq



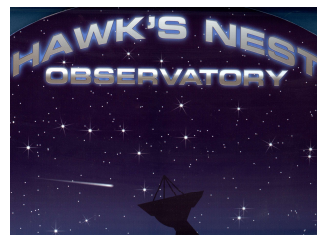
HNRAO - 04/14/2019 - UTC - TFD Array - RCP - SDRPlay - RSP2 - Integration 0.1s - HNRAO CA 2017 11 10 SDRplay2 TFD 16-24.csv



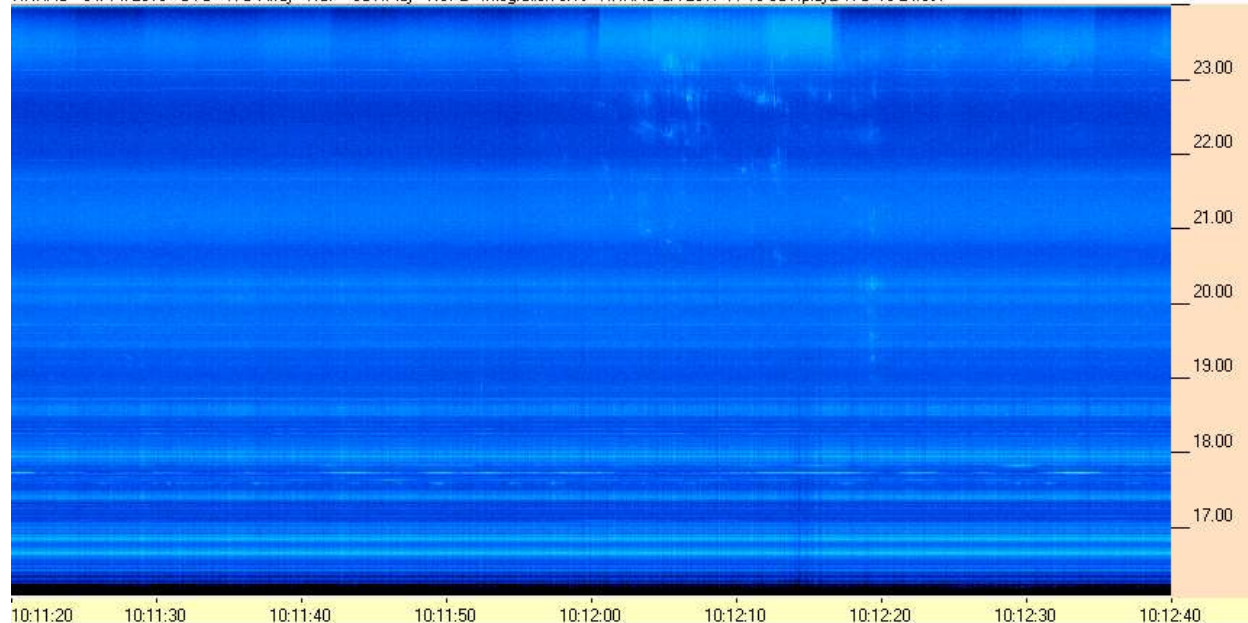
HNRAO - 04/14/2019 - UTC - TFD Array - RCP - SDRPlay - RSP2 - Integration 0.1s - HNRAO CA 2017 11 10 SDRplay2 TFD 16-24.csv



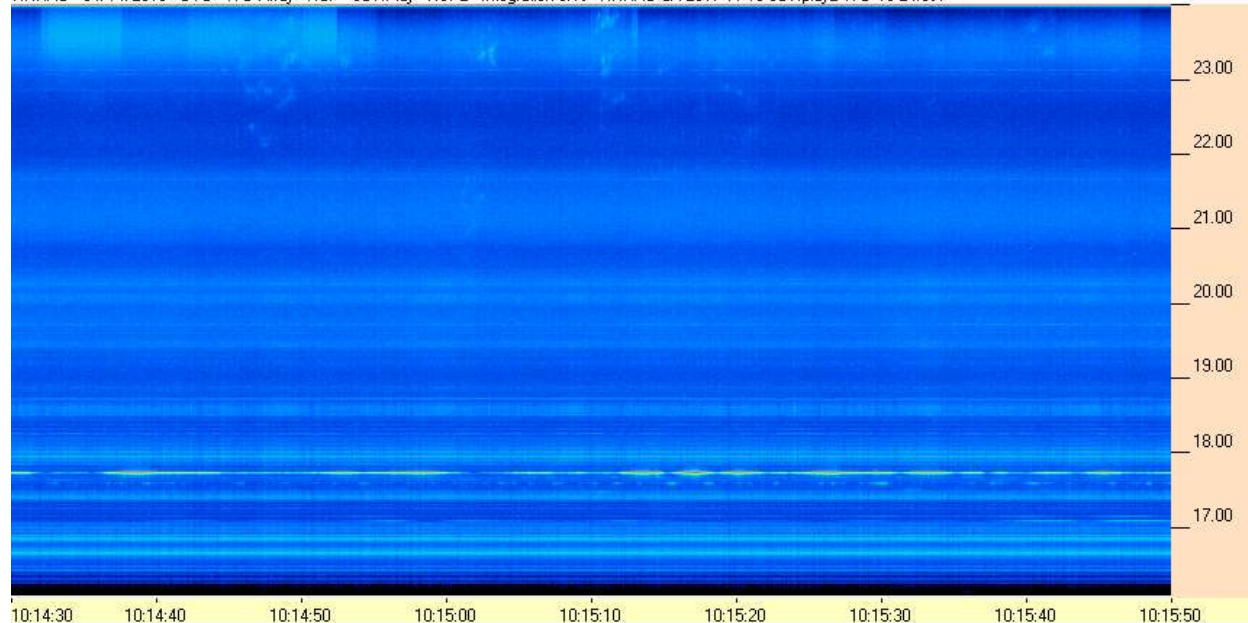
HNRAO Observing Log
40.673181 N – 80.437885 W
EN90sq



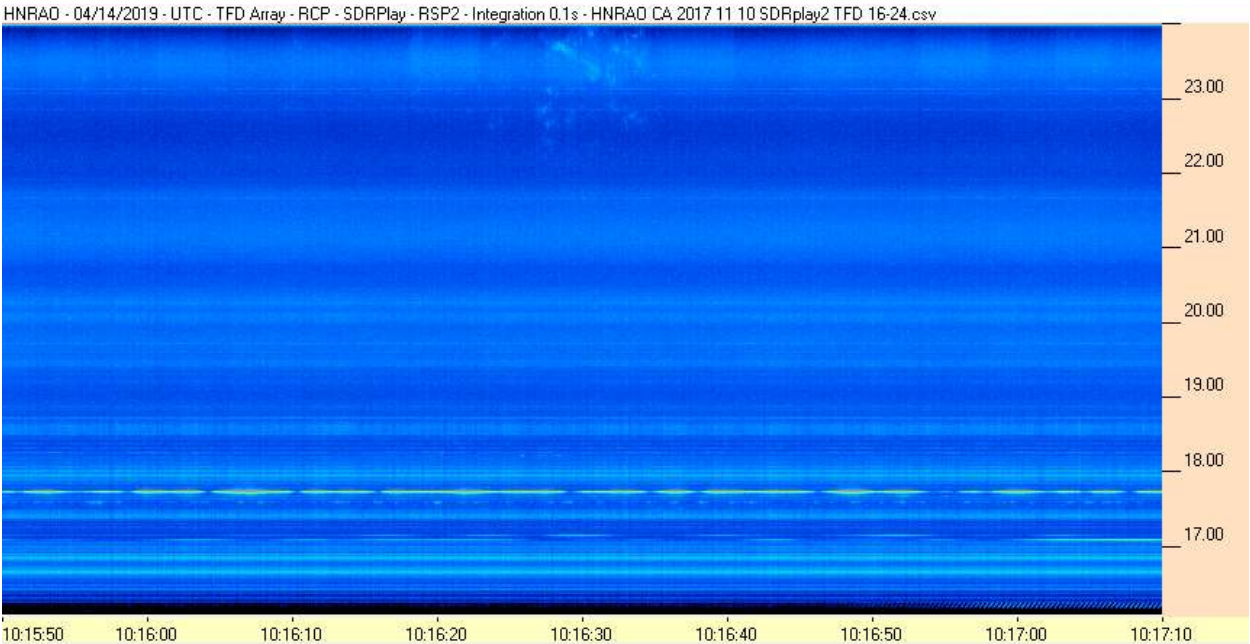
HNRAO - 04/14/2019 - UTC - TFD Array - RCP - SDRPlay - RSP2 - Integration 0.1s - HNRAO CA 2017 11 10 SDRplay2 TFD 16-24.csv



HNRAO - 04/14/2019 - UTC - TFD Array - RCP - SDRPlay - RSP2 - Integration 0.1s - HNRAO CA 2017 11 10 SDRplay2 TFD 16-24.csv



HNRAO Observing Log
40.673181 N – 80.437885 W
EN90sq

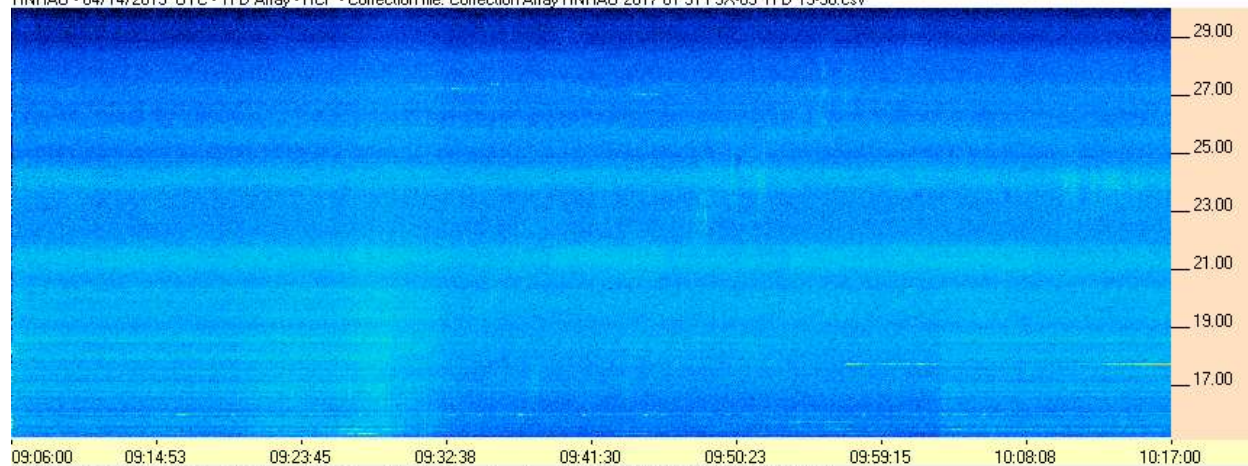


HNRAO Observing Log
40.673181 N – 80.437885 W
EN90sq

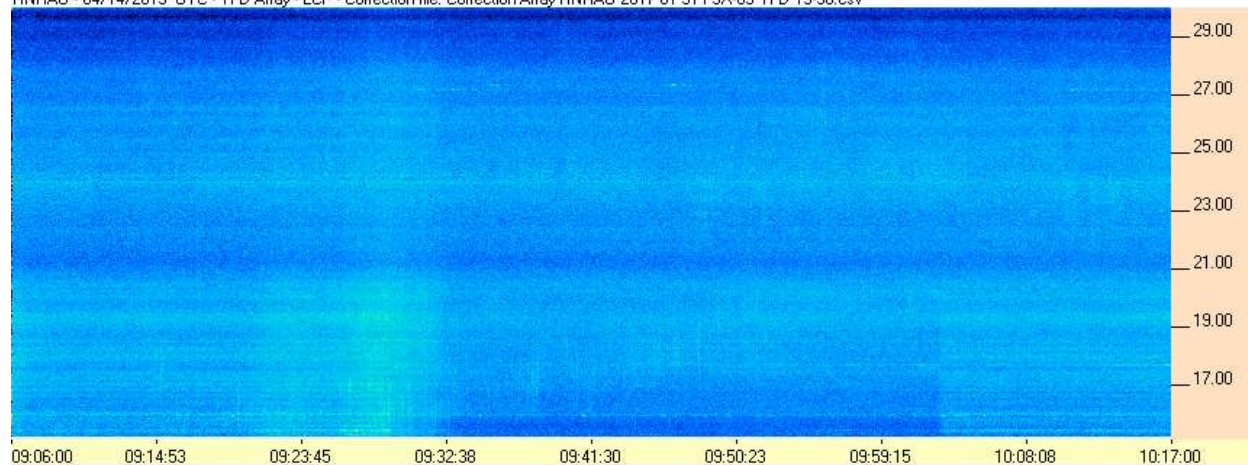


FSX-8S / TFD Array

HNRAO - 04/14/2019 UTC - TFD Array - RCP - Correction file: Correction Array HNRAO 2017 01 31 FSX-8S TFD 15-30.csv



HNRAO - 04/14/2019 UTC - TFD Array - LCP - Correction file: Correction Array HNRAO 2017 01 31 FSX-8S TFD 15-30.csv

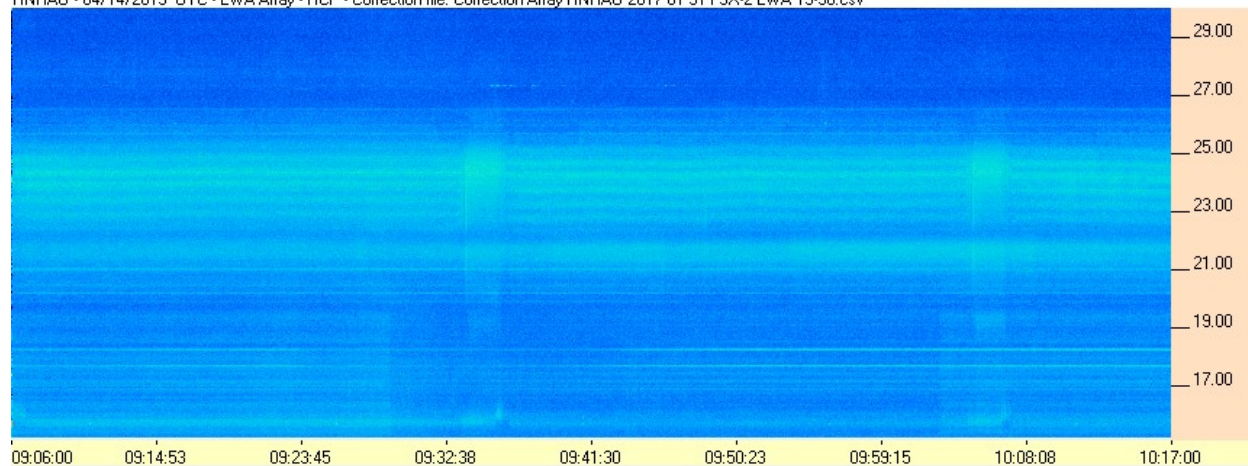


HNRAO Observing Log
40.673181 N – 80.437885 W
EN90sq

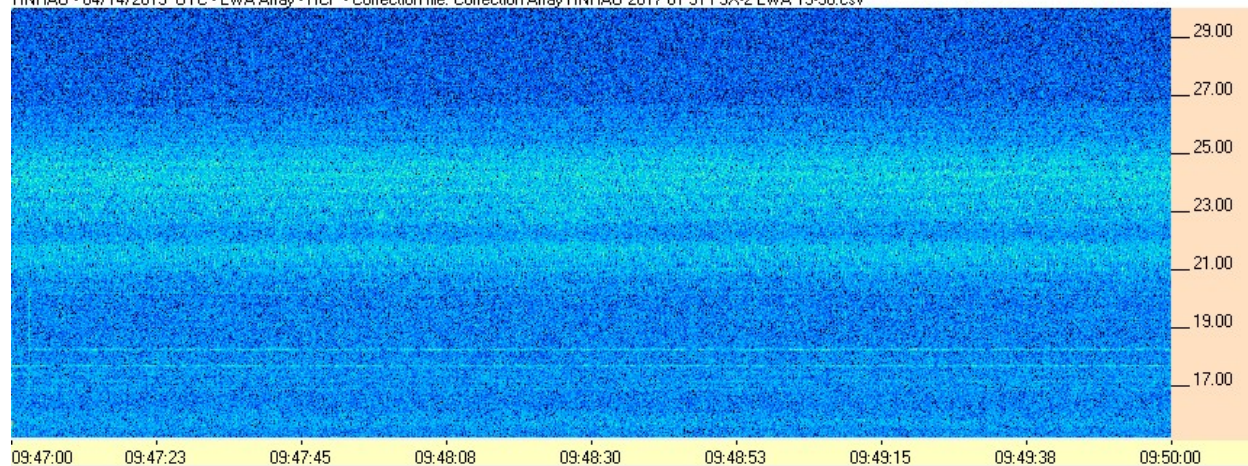


FSX-2 / LWA Array

HNRAO - 04/14/2019 UTC - LWA Array - RCP - Correction file: Correction Array HNRAO 2017 01 31 FSX-2 LWA 15-30.csv



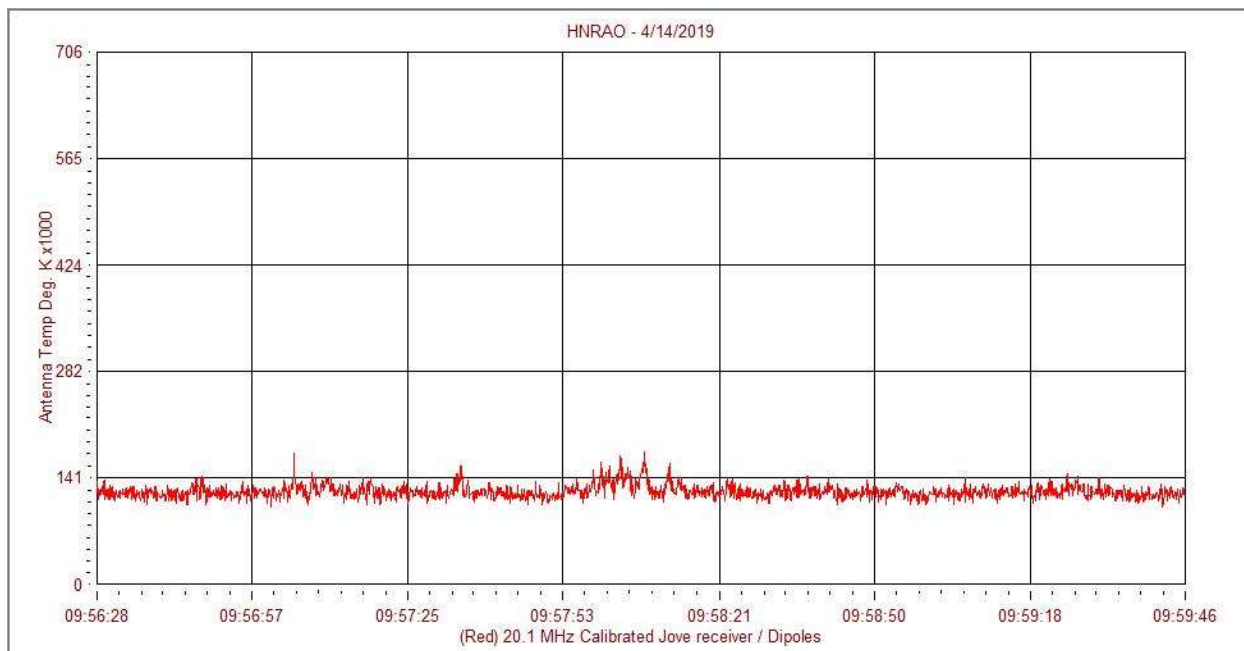
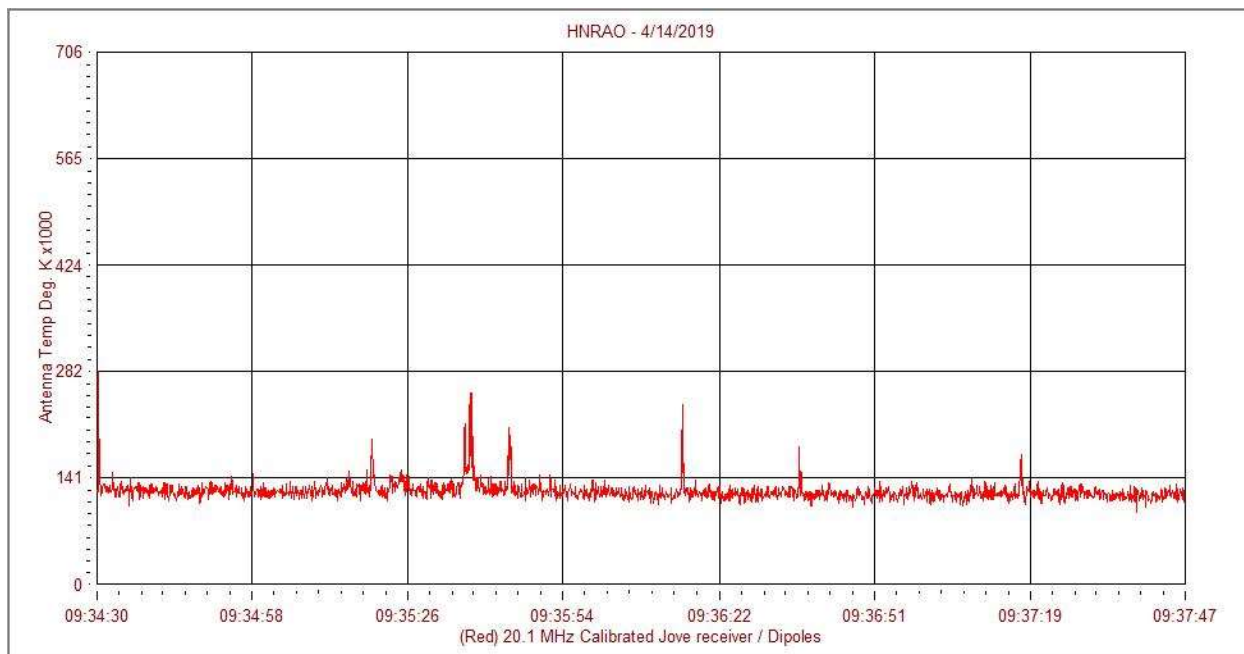
HNRAO - 04/14/2019 UTC - LWA Array - RCP - Correction file: Correction Array HNRAO 2017 01 31 FSX-2 LWA 15-30.csv



HNRAO Observing Log
40.673181 N – 80.437885 W
EN90sq



Radio JOVE / JOVE Dipole array



HNRAO Observing Log
40.673181 N – 80.437885 W
EN90sq

