

HNRAO Observing Log
40.673181 N – 80.437885 W
EN90sq



Date: December 5, 2019

Object: Jupiter – Io-B

Observer: Unattended

Start - Time UT:	1715	Planetary K-index:	1
Jupiter Altitude (deg):	24.0	Jupiter Azimuth (deg):	162.4
Jupiter CML:	113.14	Jupiter Io Phase:	097.13
Jupiter RA (hr/min):	18:00	Jupiter Dec (hr/min):	-23:19
Hour Angle (hr/min):	-01:10	Polarization	RCP
Sun Altitude (deg):	27.1	Sun Azimuth (deg):	182.9
Sun RA (hr/min):	16:39	Sun Dec (hr/min):	-22:08

End – Time UT:	1751	De:	-2.1
Jupiter Altitude (deg):	25.5	Jupiter Azimuth (deg):	171.3
Jupiter CML:	134.9	Jupiter Io Phase	102.24
Hour Angle (hr/min):	-00:34	Duration (min):	36
Sun Altitude (deg):	26.2	Sun Azimuth (deg):	192.2
Max Frequency MHz	30	Min Frequency MHz	18

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 #1	TFD	RCP	-8.35 dB	#2 RCP	Port 2 +3dB	Twice daily
SDRPlay RSP2 #2	TFD	LCP	-7.59 dB	#1 LCP	Port 2 +3dB	Twice daily
JOVE II HNRAO #2	Jove dipoles	Linear	-3.66 dB	#3 Linear	Port 4 +3 dB	9/21/2019

Radio JOVE dipoles phased @ 32 degrees for 2018-2019 season

Typinski AN-TFD-24-4 array phased @ 35 degrees for 2018-2019 season

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

Radio Sky Spectrograph software version 2.9.29

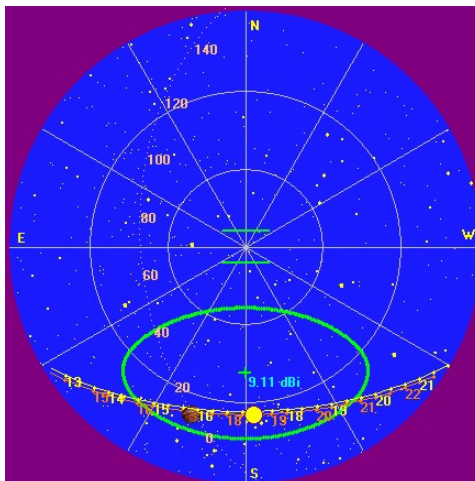
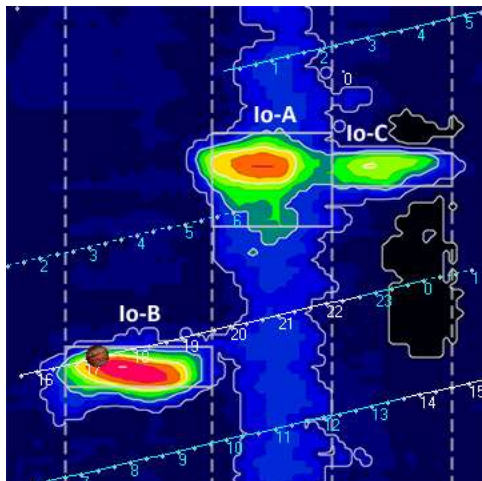
Radio-SkyPipe software version 2.7.33

Radio-Jupiter Pro software version 3.8.2

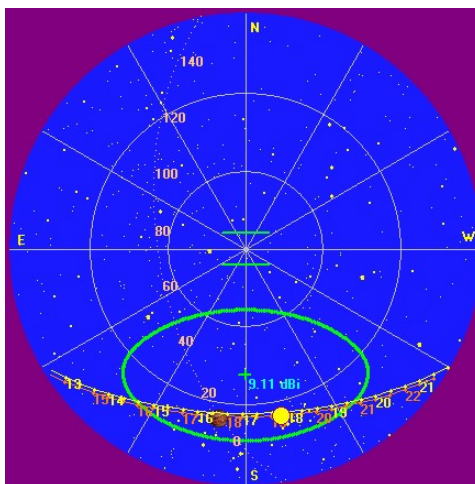
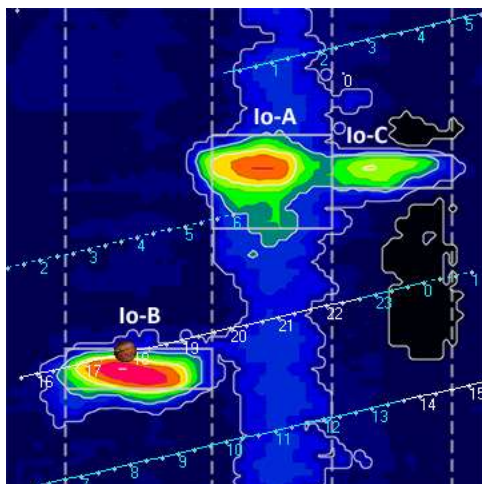
Network Time Server GpsNtp-Pi, Reeve Engineering

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

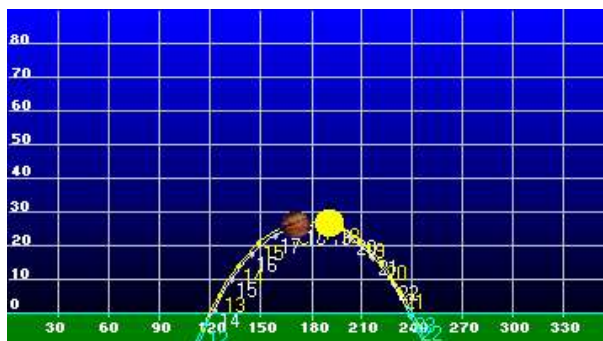
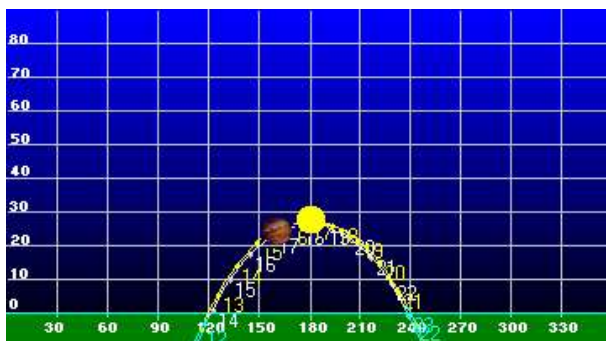
HNRAO Observing Log
 40.673181 N – 80.437885 W
 EN90sq



Beginning of Pass



End of Pass



HNRAO Observing Log
40.673181 N – 80.437885 W
EN90sq

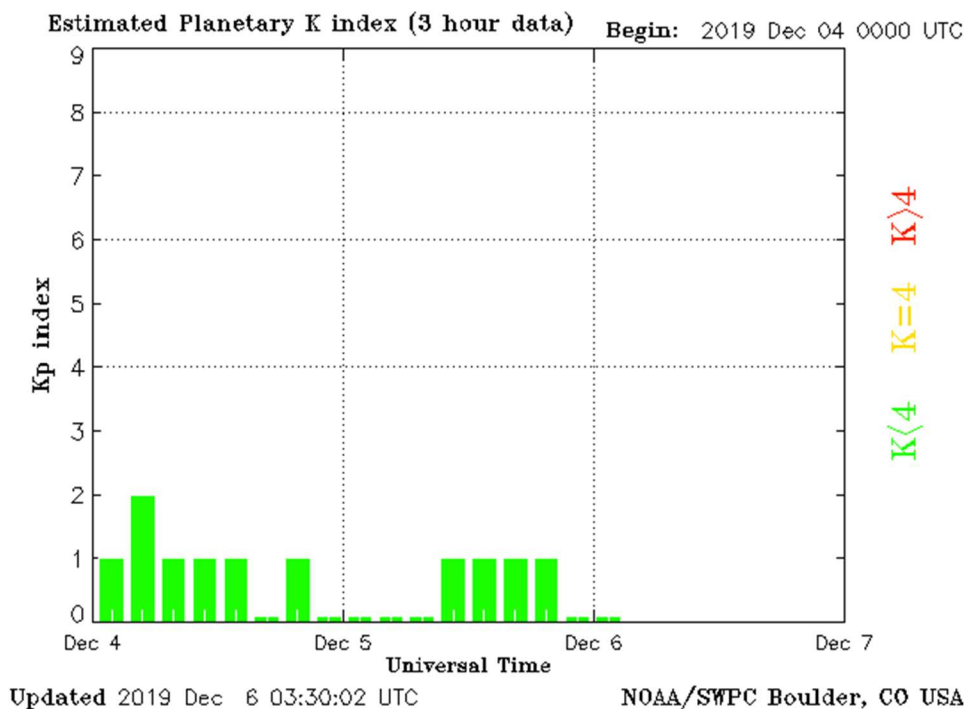


MODE	CML RANGE	Io RANGE	MAX F	POLAR	ARC	NOTES
Io-D	0-200	95-130	18	LH	Early	Also called "fourth source"
Io-B	(105 - 185)	(80-110)	39.5	RH	Early	Also called "early source"
non Io-B	80-200	0-360	38	RH	Early	Voyager info
Io-A	(200-270)	(205-260)	38	RH	Late	Also called "main source"
non-Io-A	(230-280)	0-360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



Sun/Jupiter angular separation = 019.3 degrees
Distance = 6.2 A.U.
De = -2.1 deg.

The weather at the observatory during this observation was partly sunny, high of 37 degrees F with 58% humidity. All observatory spectrographs and antenna arrays functioning normally. The FSX-8S produced good data as well as both the SDRPlay RSP2, RCP and LCP, spectrographs. FSX-2 data not available due to software issues. SkyPipe data not available due to local RFI issues.

Despite foreign broadcast RFI, time of day and the angular separation between Jupiter and the Sun, this storm, while not uncommon, was, under the circumstances, quite good in terms of intensity and clarity of emissions. It certainly ranks as having some of the strongest emissions seen from this observatory during this iteration.

The storm, lasting 36 minutes, consisted of positive drift L-bursts with positive slope, L2 modulation lanes as well as Faraday lanes. There were no S-bursts seen although S-bursts have been observed in this area of the Io-B zone from this observatory. Emissions spanned from 18 MHz to 30 MHz. Emissions first observed about 1715 UT with L-bursts drifting positive from about 21 MHz to 23 MHz. The storm produced emissions ranging from slightly above galactic background to several db above GB during the strongest period around 1746:30 UT.

LCP data was reviewed for this time period for possible Io-D emissions, but none were seen.

There was nothing else of note for this storm.

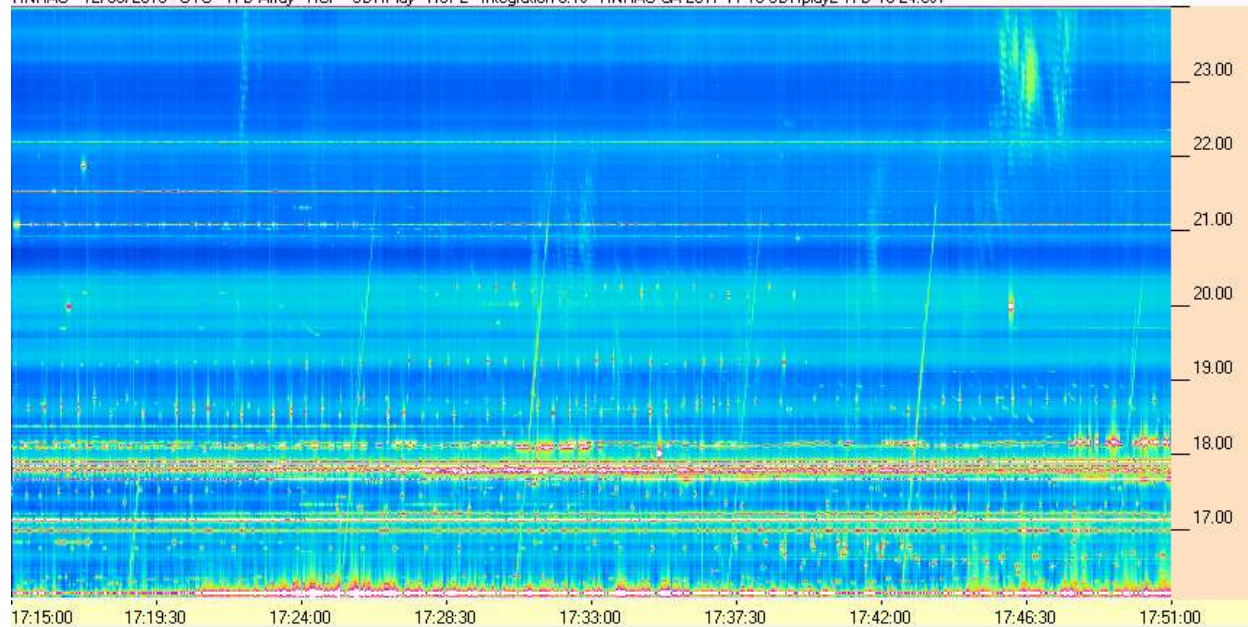
EOR

HNRAO Observing Log
40.673181 N – 80.437885 W
EN90sq

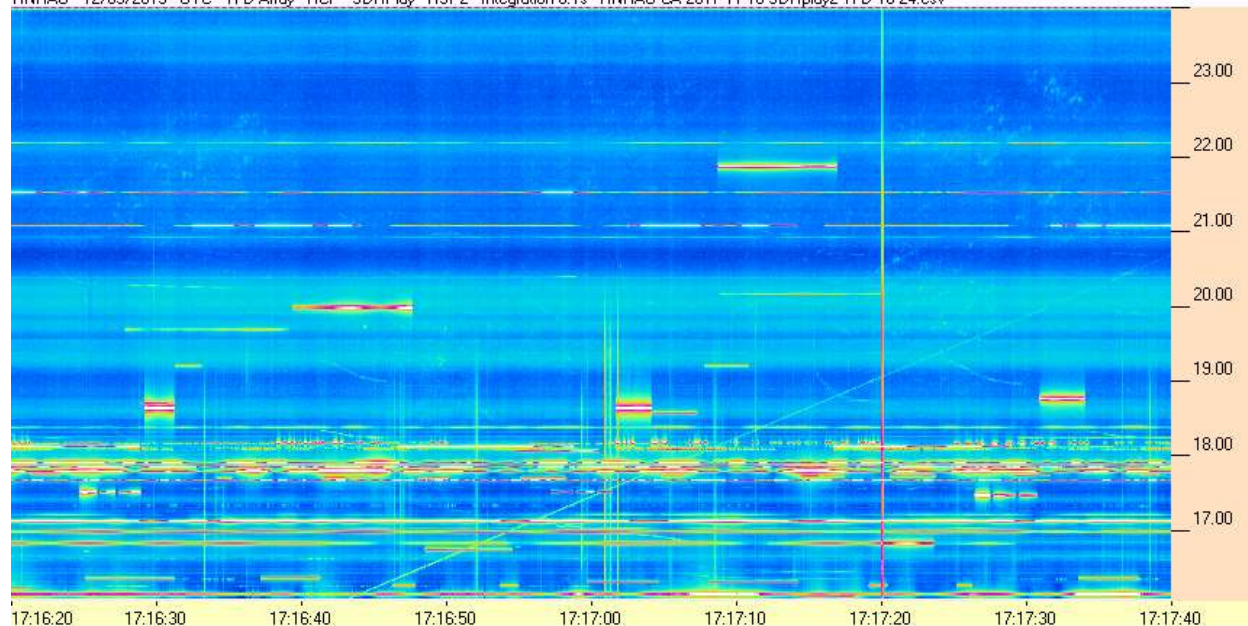


SDRPlay RSP2 / TFD Array

HNRAO - 12/05/2019 - UTC - TFD Array - RCP - SDRPlay - RSP2 - Integration 0.1s - HNRAO CA 2017 11 10 SDRplay2 TFD 16-24.csv



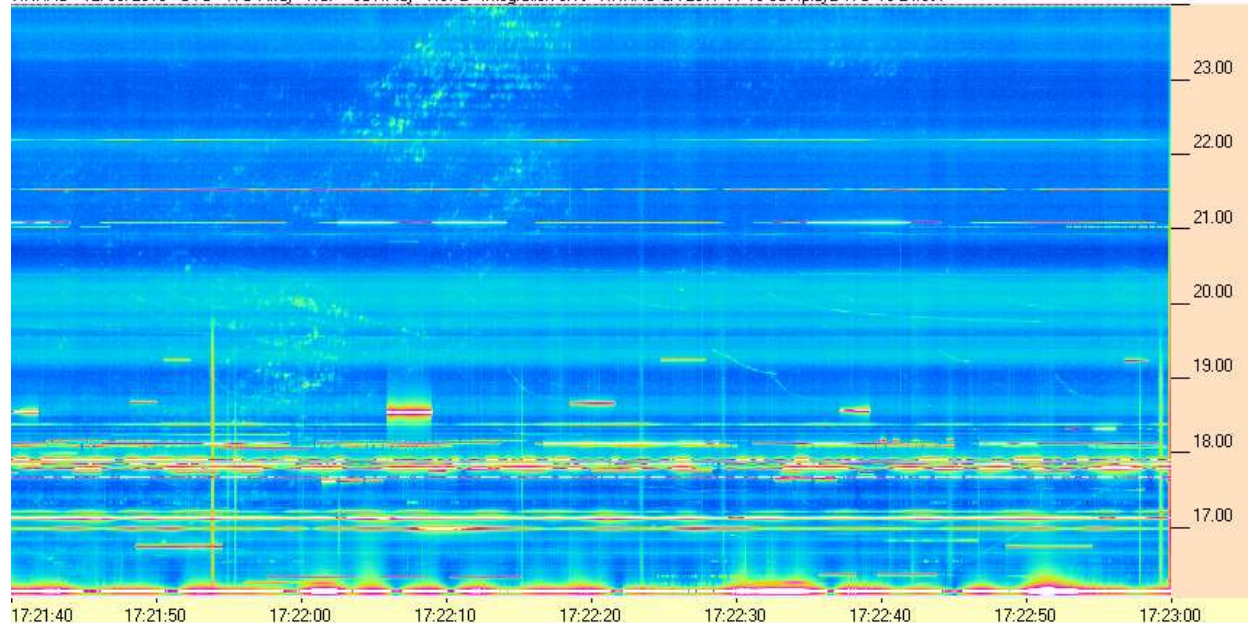
HNRAO - 12/05/2019 - UTC - TFD Array - RCP - SDRPlay - RSP2 - Integration 0.1s - HNRAO CA 2017 11 10 SDRplay2 TFD 16-24.csv



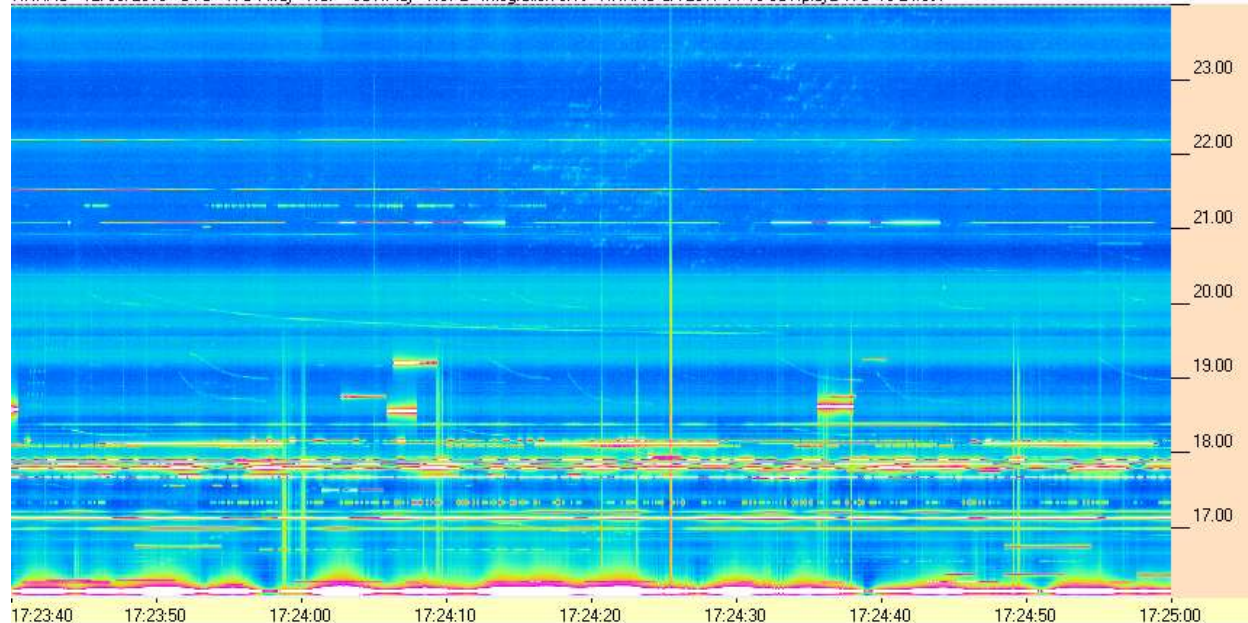
HNRAO Observing Log
40.673181 N – 80.437885 W
EN90sq



HNRAO - 12/05/2019 - UTC - TFD Array - RCP - SDRPlay - RSP2 - Integration 0.1s - HNRAO CA 2017 11 10 SDRplay2 TFD 16-24.csv



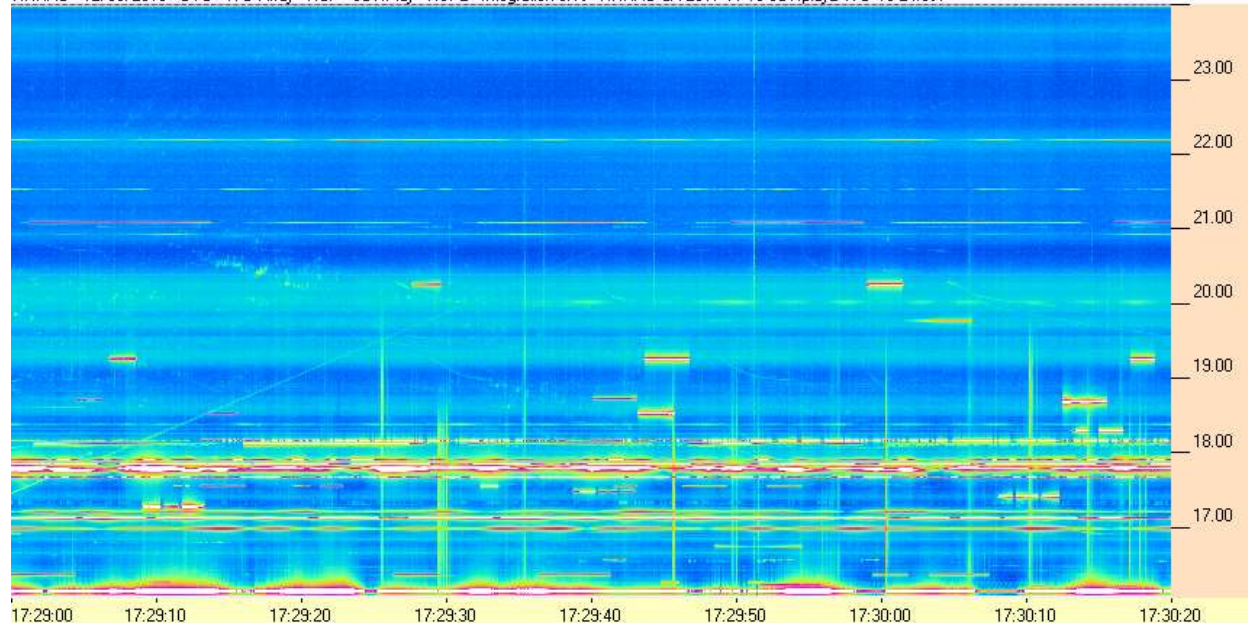
HNRAO - 12/05/2019 - UTC - TFD Array - RCP - SDRPlay - RSP2 - Integration 0.1s - HNRAO CA 2017 11 10 SDRplay2 TFD 16-24.csv



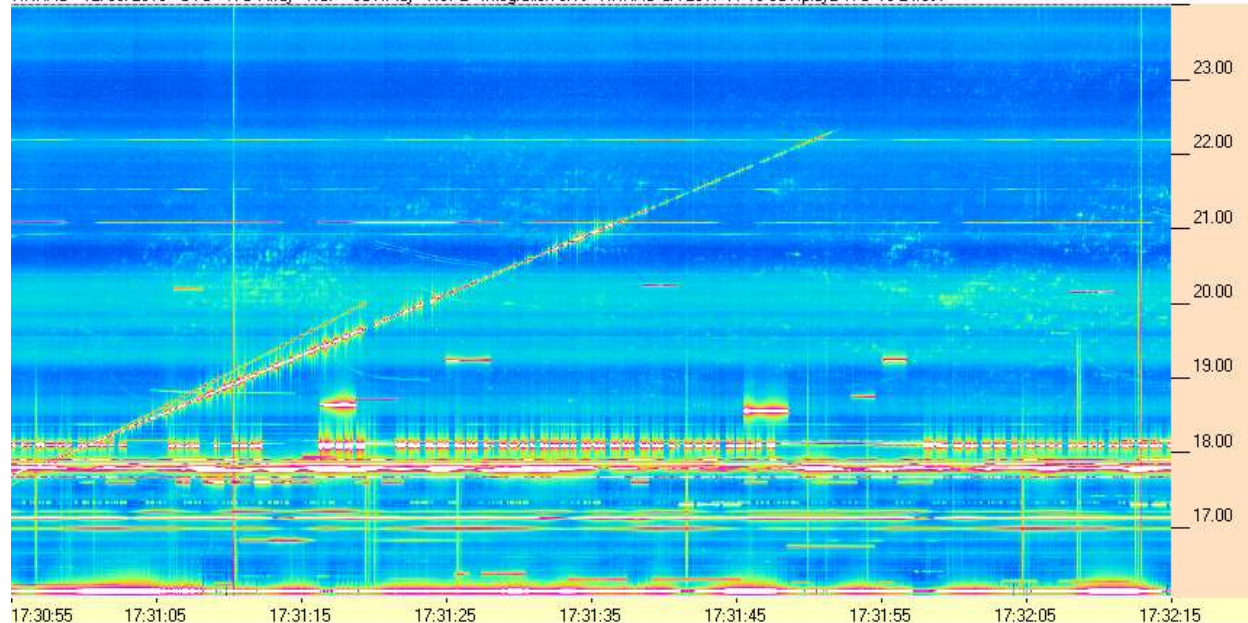
HNRAO Observing Log
40.673181 N – 80.437885 W
EN90sq



HNRAO - 12/05/2019 - UTC - TFD Array - RCP - SDRPlay - RSP2 - Integration 0.1s - HNRAO CA 2017 11 10 SDRplay2 TFD 16-24.csv



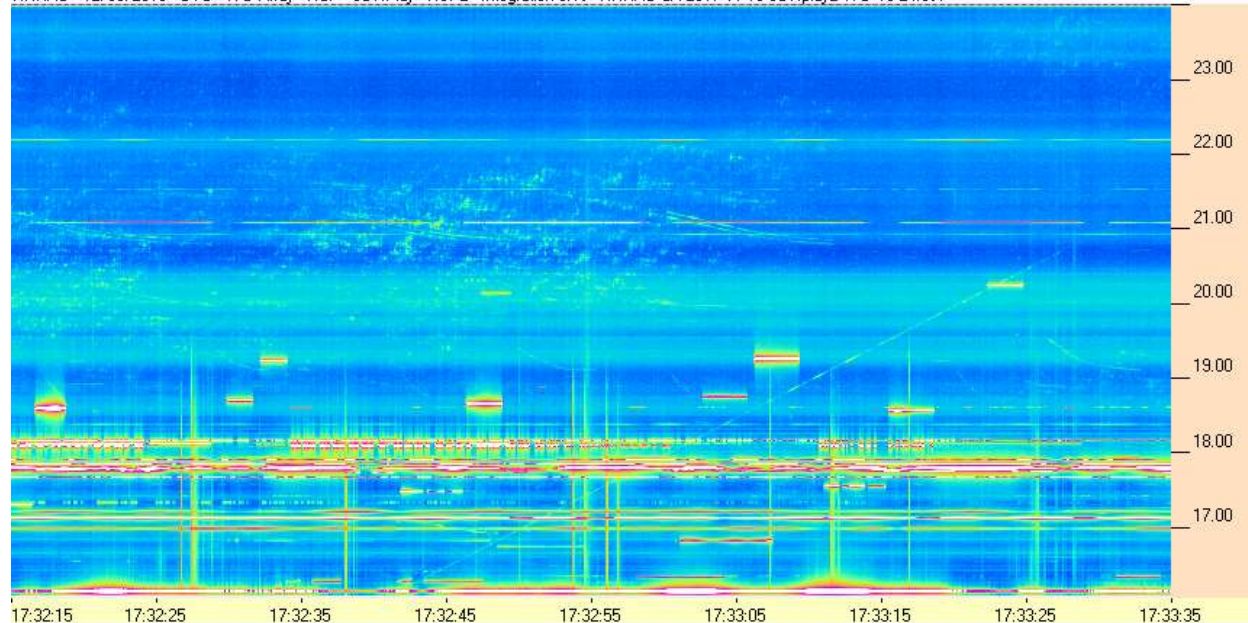
HNRAO - 12/05/2019 - UTC - TFD Array - RCP - SDRPlay - RSP2 - Integration 0.1s - HNRAO CA 2017 11 10 SDRplay2 TFD 16-24.csv



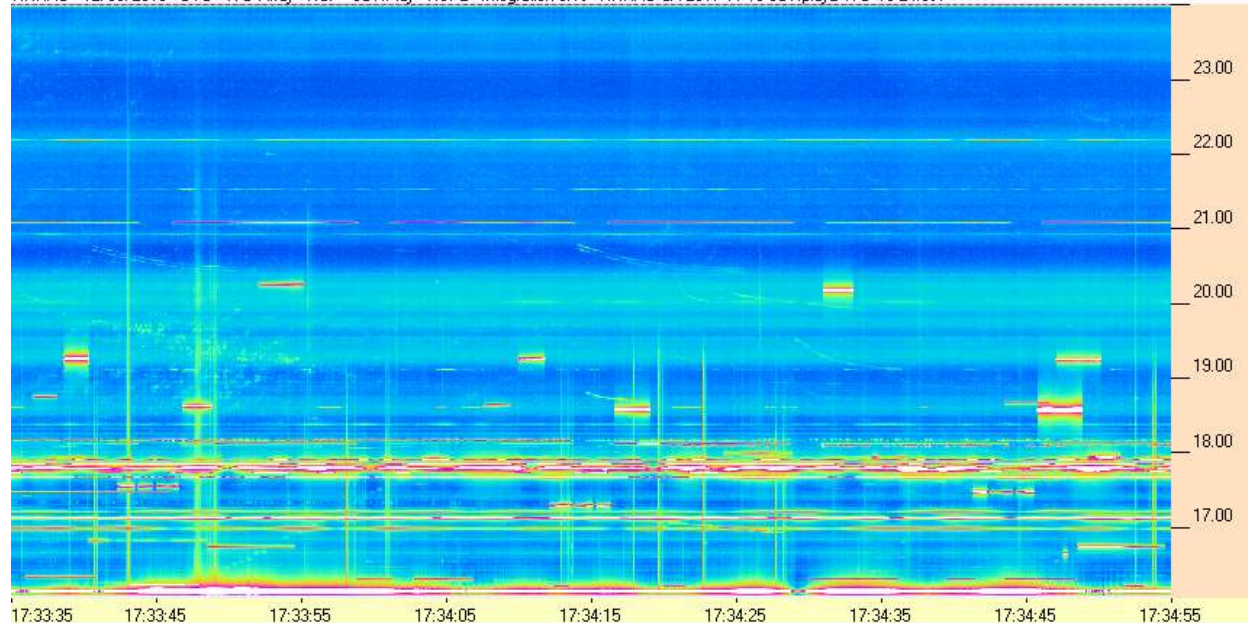
HNRAO Observing Log
40.673181 N – 80.437885 W
EN90sq



HNRAO - 12/05/2019 - UTC - TFD Array - RCP - SDRPlay - RSP2 - Integration 0.1s - HNRAO CA 2017 11 10 SDRplay2 TFD 16-24.csv



HNRAO - 12/05/2019 - UTC - TFD Array - RCP - SDRPlay - RSP2 - Integration 0.1s - HNRAO CA 2017 11 10 SDRplay2 TFD 16-24.csv

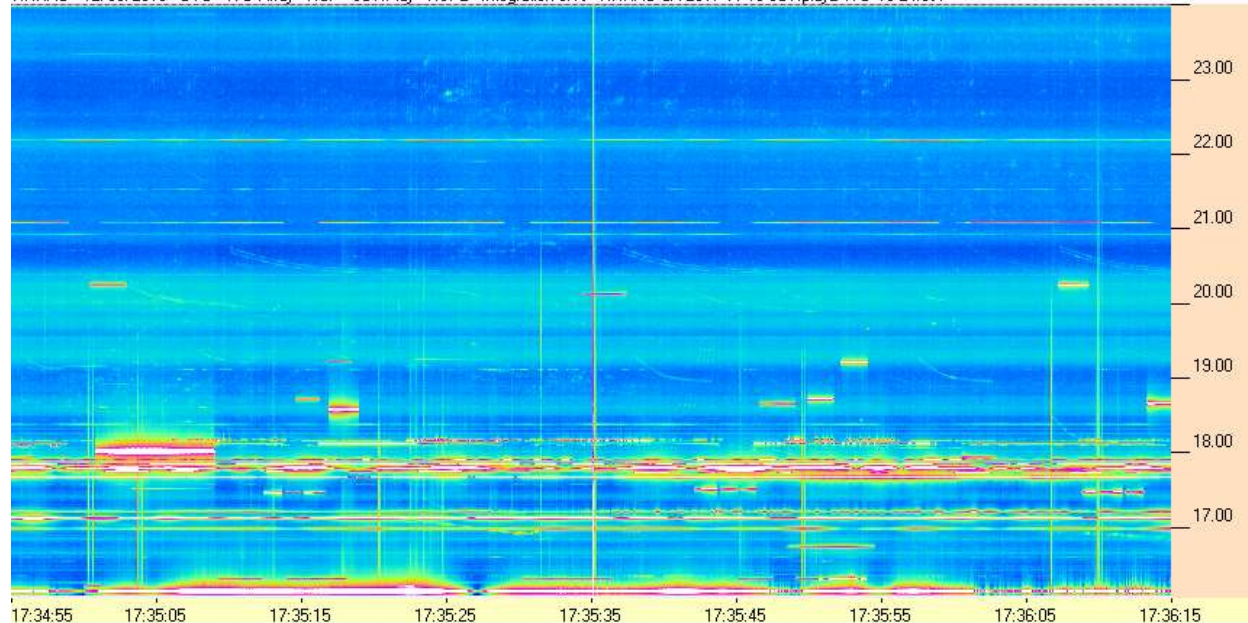


HNRAO Observing Log

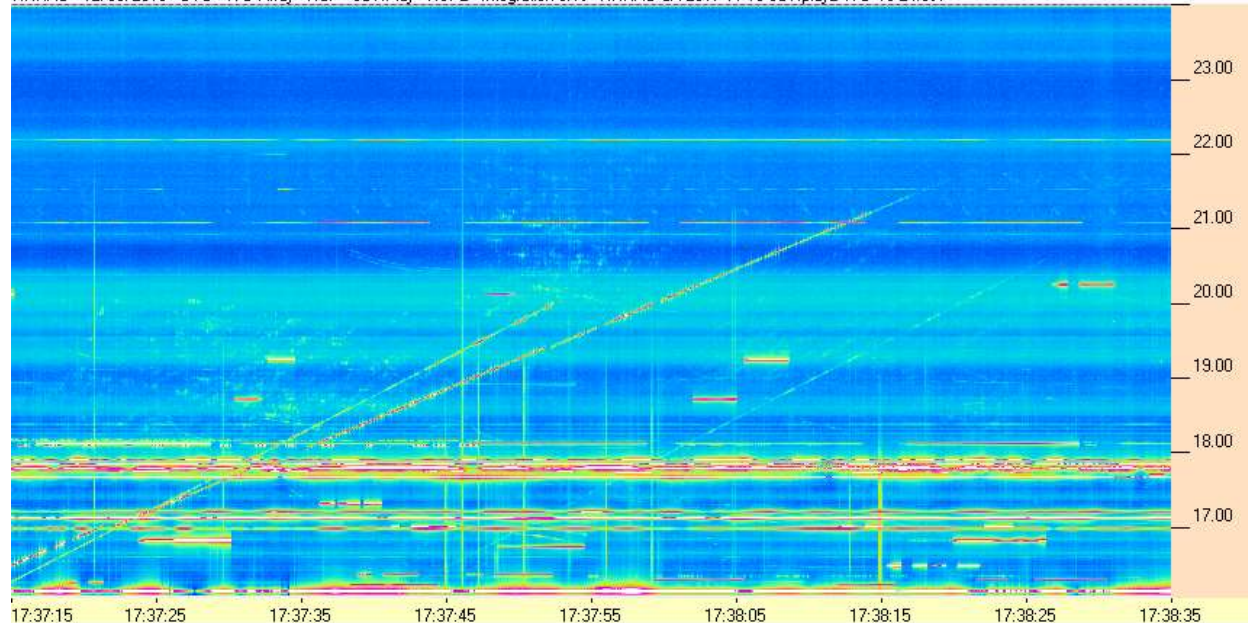
40.673181 N – 80.437885 W
EN90sq



HNRAO - 12/05/2019 - UTC - TFD Array - RCP - SDRPlay - RSP2 - Integration 0.1s - HNRAO CA 2017 11 10 SDRplay2 TFD 16-24.csv



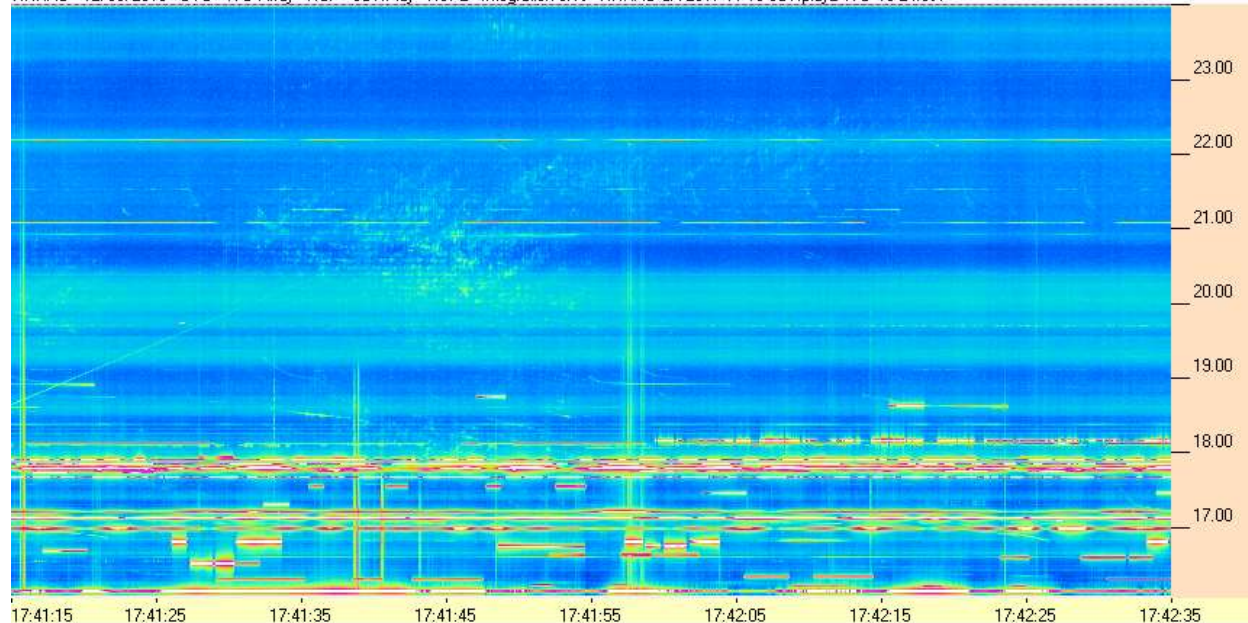
HNRAO - 12/05/2019 - UTC - TFD Array - RCP - SDRPlay - RSP2 - Integration 0.1s - HNRAO CA 2017 11 10 SDRplay2 TFD 16-24.csv



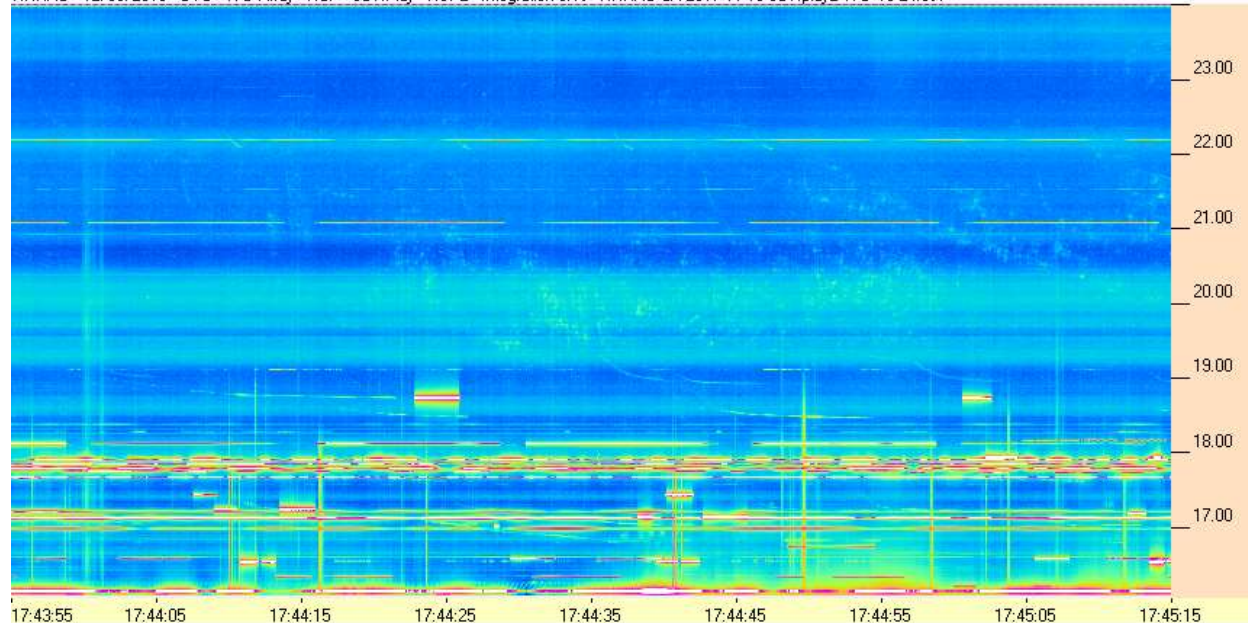
HNRAO Observing Log
40.673181 N – 80.437885 W
EN90sq



HNRAO - 12/05/2019 - UTC - TFD Array - RCP - SDRPlay - RSP2 - Integration 0.1s - HNRAO CA 2017 11 10 SDRplay2 TFD 16-24.csv



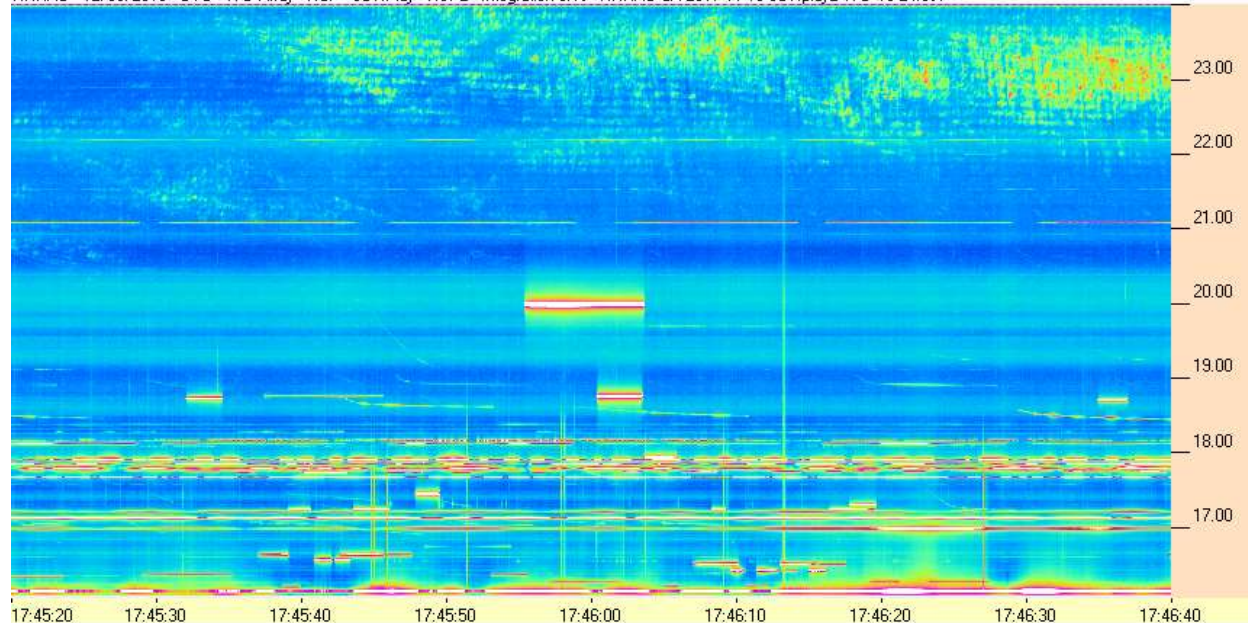
HNRAO - 12/05/2019 - UTC - TFD Array - RCP - SDRPlay - RSP2 - Integration 0.1s - HNRAO CA 2017 11 10 SDRplay2 TFD 16-24.csv



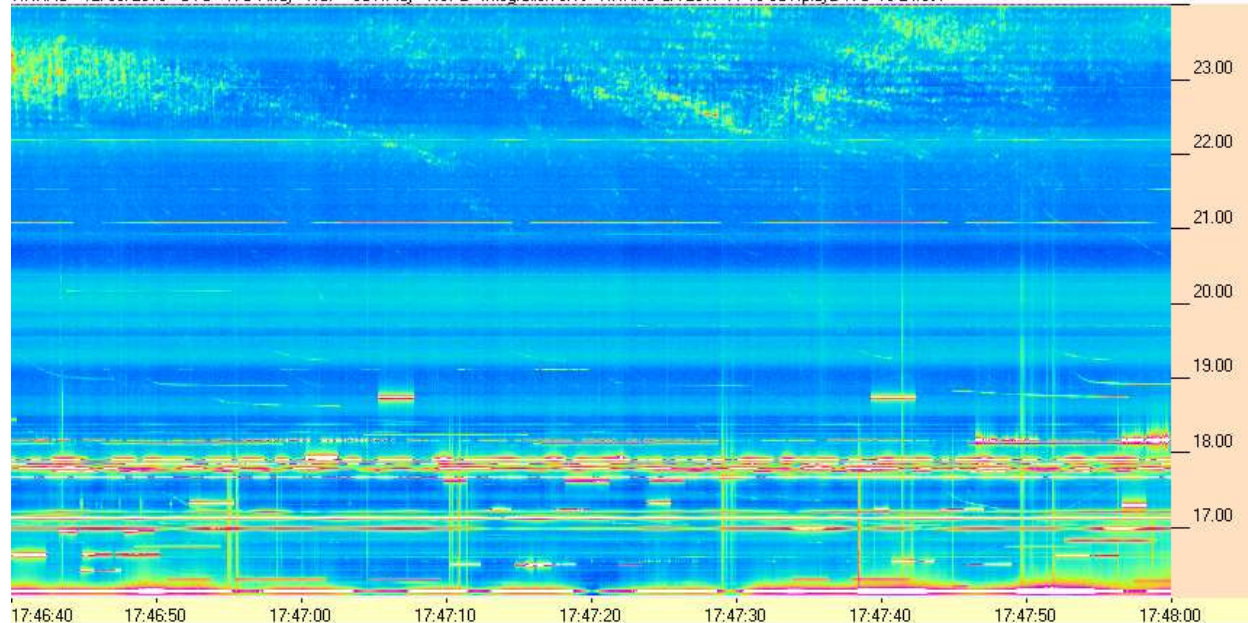
HNRAO Observing Log
40.673181 N – 80.437885 W
EN90sq



HNRAO - 12/05/2019 - UTC - TFD Array - RCP - SDRPlay - RSP2 - Integration 0.1s - HNRAO CA 2017 11 10 SDRplay2 TFD 16-24.csv



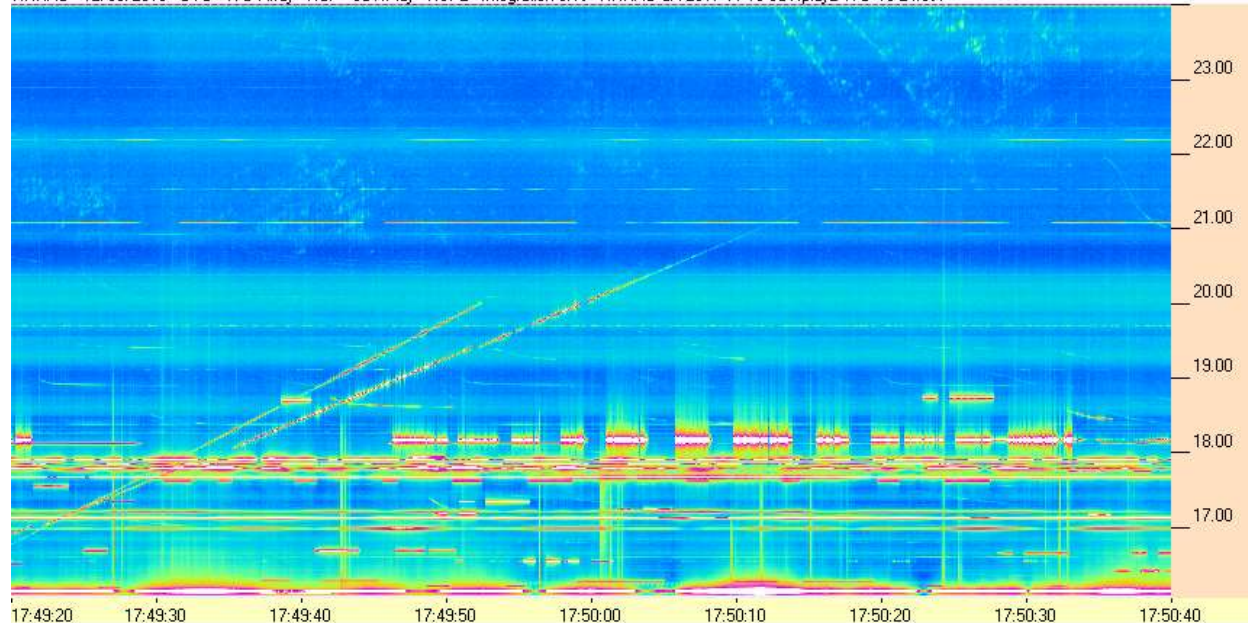
HNRAO - 12/05/2019 - UTC - TFD Array - RCP - SDRPlay - RSP2 - Integration 0.1s - HNRAO CA 2017 11 10 SDRplay2 TFD 16-24.csv



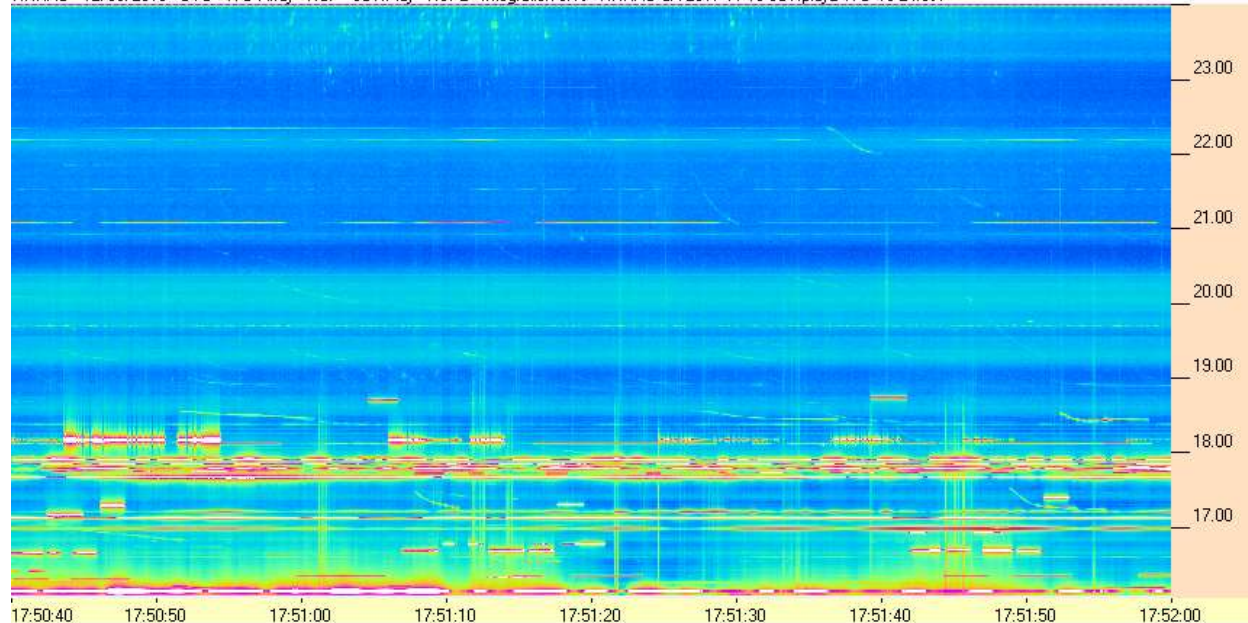
HNRAO Observing Log
40.673181 N – 80.437885 W
EN90sq



HNRAO - 12/05/2019 - UTC - TFD Array - RCP - SDRPlay - RSP2 - Integration 0.1s - HNRAO CA 2017 11 10 SDRplay2 TFD 16-24.csv



HNRAO - 12/05/2019 - UTC - TFD Array - RCP - SDRPlay - RSP2 - Integration 0.1s - HNRAO CA 2017 11 10 SDRplay2 TFD 16-24.csv

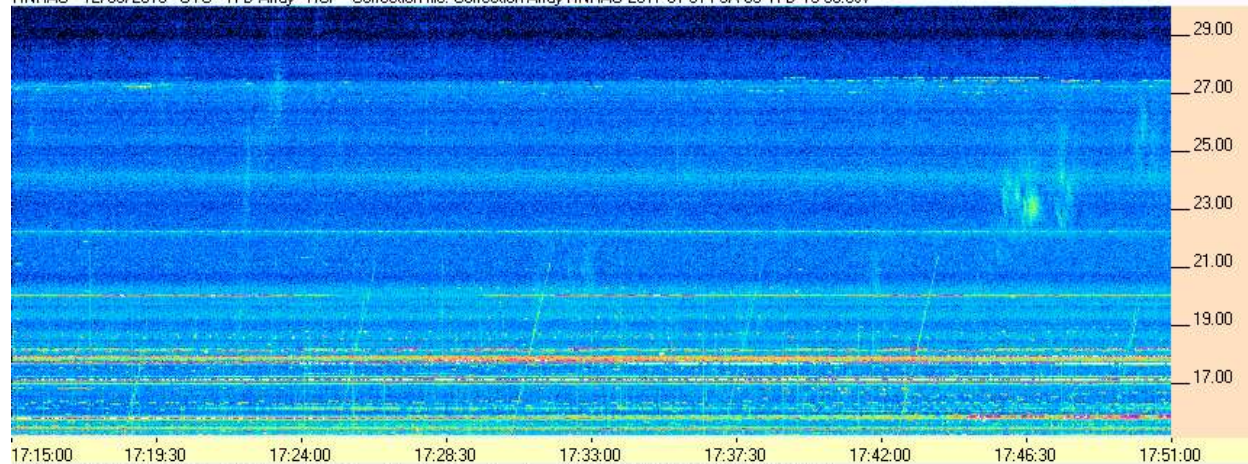


HNRAO Observing Log
40.673181 N – 80.437885 W
EN90sq

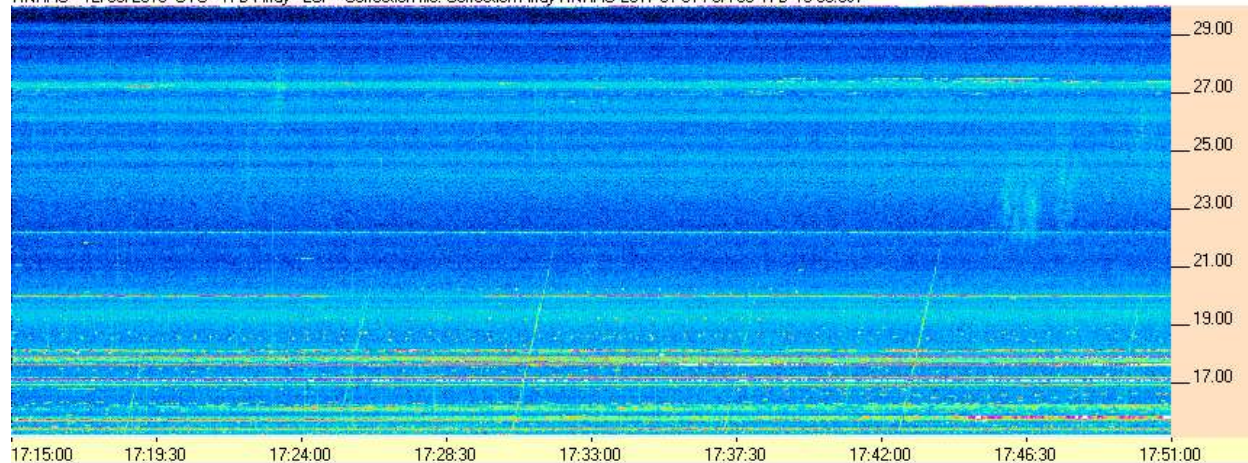


FSX-8S / TFD Array

HNRAO - 12/05/2019 - UTC - TFD Array - RCP - Correction file: Correction Array HNRAO 2017 01 31 FSX-8S TFD 15-30.csv



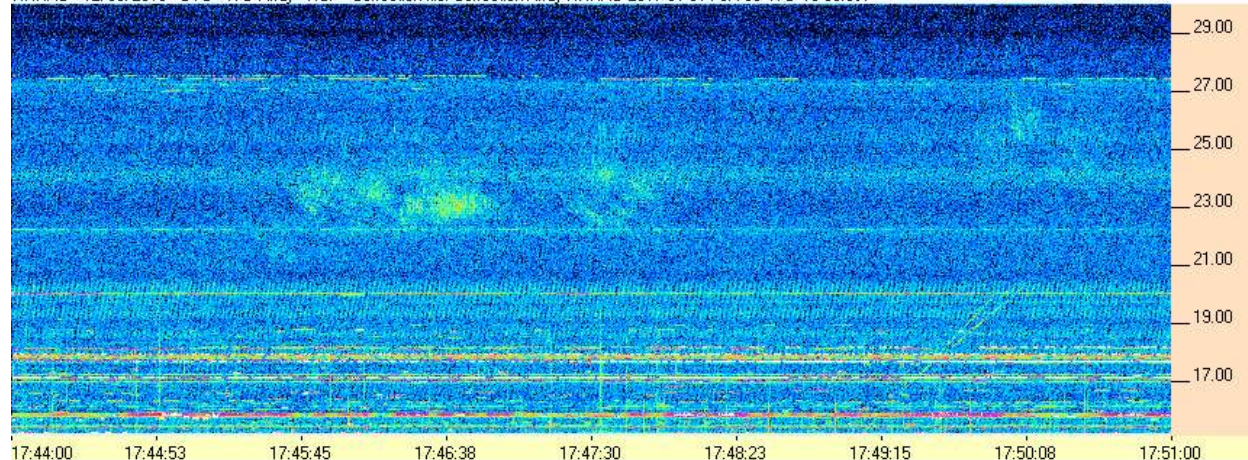
HNRAO - 12/05/2019 - UTC - TFD Array - LCP - Correction file: Correction Array HNRAO 2017 01 31 FSX-8S TFD 15-30.csv



HNRAO Observing Log
40.673181 N – 80.437885 W
EN90sq



HNRAO - 12/05/2019 - UTC - TFD Array - RCP - Correction file: Correction Array HNRAO 2017 01 31 FSX-8S TFD 15-30.csv



HNRAO - 12/05/2019 - UTC - TFD Array - LCP - Correction file: Correction Array HNRAO 2017 01 31 FSX-8S TFD 15-30.csv

