

HNRAO Observing Log
40.673181 N – 80.437885 W
EN90sq



Date: July 23, 2019

Object: Jupiter – Io-A

Observer: JB

Start - Time UT:	0402	Planetary K-index:	2
Jupiter Altitude (deg):	22.4	Jupiter Azimuth (deg):	207.0
Jupiter CML:	215.29	Jupiter Io Phase:	251.83
Jupiter RA (hr/min):	16:55	Jupiter Dec (hr/min):	-22:08
Hour Angle (hr/min):	01:48	Polarization	RCP
Sun Altitude (deg):	-26.1	Sun Azimuth (deg):	339.5
Sun RA (hr/min):	08:01	Sun Dec (hr/min):	20:32

End – Time UT:	0434	De:	-2.7
Jupiter Altitude (deg):	19.3	Jupiter Azimuth (deg):	214.2
Jupiter CML:	234.64	Jupiter Io Phase	256.39
Hour Angle (hr/min):	02:20	Duration (min):	32
Sun Altitude (deg):	-27.8	Sun Azimuth (deg):	347.7
Max Frequency MHz	24	Min Frequency MHz	16

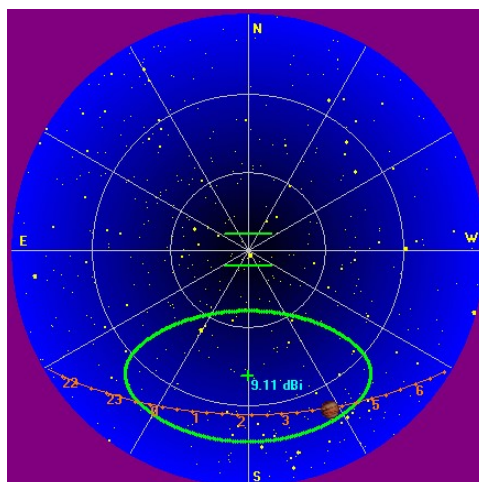
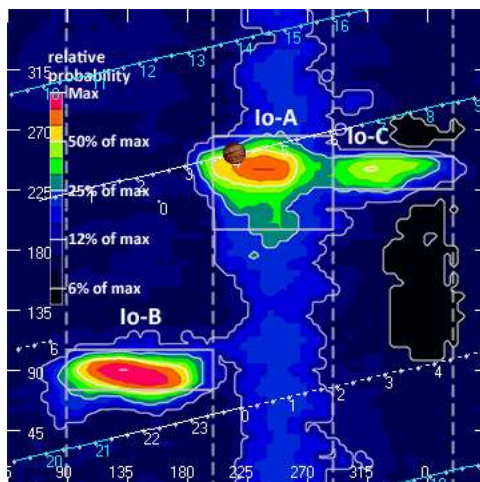
Observatory Configuration

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	7/19/2019

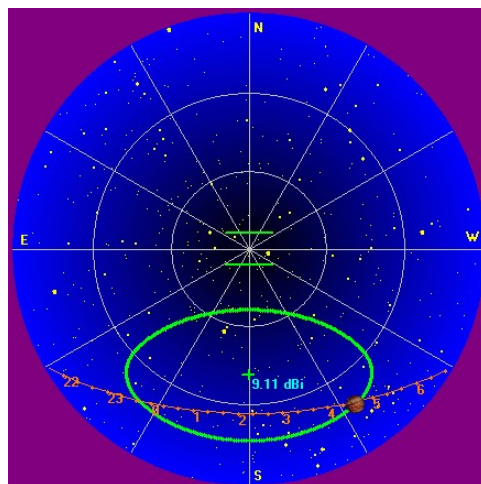
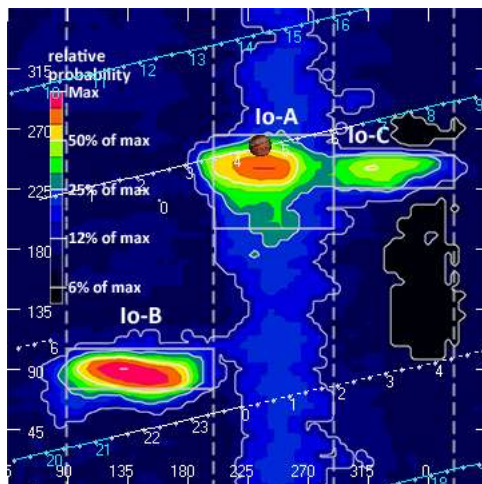
JOVE dipoles phased @ 32 degrees for 2018-2019 season
 TFD array phased @ 35 degrees for 2018-2019 season
 LWA antenna phased @ 35 degrees and orientation for observation: 45 degrees
 Radio Sky Spectrograph software version 2.9.25
 Radio-SkyPipe software version 2.7.33
 Radio-Jupiter Pro software version 3.8.2

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

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Beginning of Pass



End of Pass



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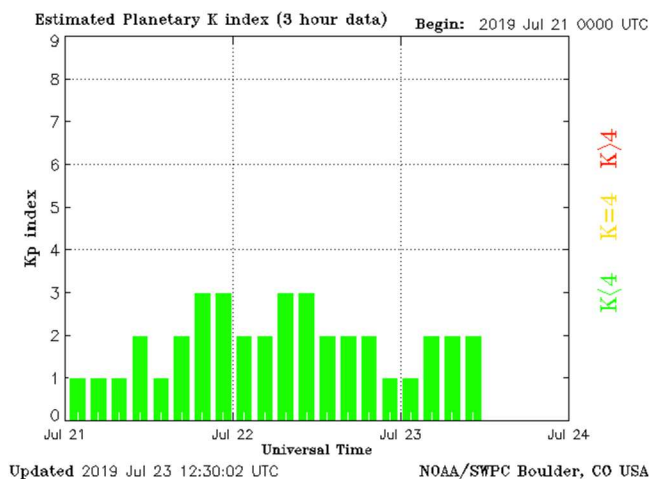


MODE	CML RANGE	Io RANGE	MAX F	POLAR	ARC	NOTES
Io-D	0-200	95-130	18	LH	Early	Also called "fourth source"
Io-B	(105 - 185)	(80-110)	39.5	RH	Early	Also called "early source"
non Io-B	80-200	0-360	38	RH	Early	Voyager info
Io-A	(200-270)	(205-260)	38	RH	Late	Also called "main source"
non-Io-A	(230-280)	0-360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



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Jupiter/Sun angular separation is 137.0 degrees.

Weather at observatory was partly cloudy. All equipment operating normally with no known issues. Both the FSX-8S / TFD array and the FSX-2 / LWA array were observing. The FSX-8S / TFD array did see some emissions but the FSX-2 / LWA array did not show any emission. Vertical brighter lines in the spectrograph from 0400 UT to 0445 UT could possibly be Cass A scintillation. Horizontal brighter lines are RFI from unidentified source. RFI rendered the JOVE II / JOVE dipoles array ineffective in gathering data. While this RFI is unidentified, it appears to be more noticeable at night. It's also interesting that it doesn't seem to show up in any of the spectrograph data.

An Io-A storm with positive drift S-bursts and L-bursts. L4 modulation lanes over a substantial portion of the storm. Emissions were seen from 16 MHz to 24 MHz and appear to have started as S-bursts then transitioned into L-bursts about 8 minutes after the start. Since the emissions were very weak, the FSX spectrographs could not be used to determine maximum and minimum frequency range.

As seems to be typical for this iteration, there are large periods of no observed emission between bursts. Scintillation is present in all burst clusters. At first glance it seems that the scintillation gap is narrower at the lower frequencies and wider at the higher frequencies. This is an observation only and perhaps worth investigating at another time.

Most emissions were either at or slightly above GB as seen at this observatory. There were several periods of relatively stronger emissions. The strongest burst was observed at 16.37 MHz at 0428:44 UT in the relatively strong cluster from 0428 UT to 0429 UT.

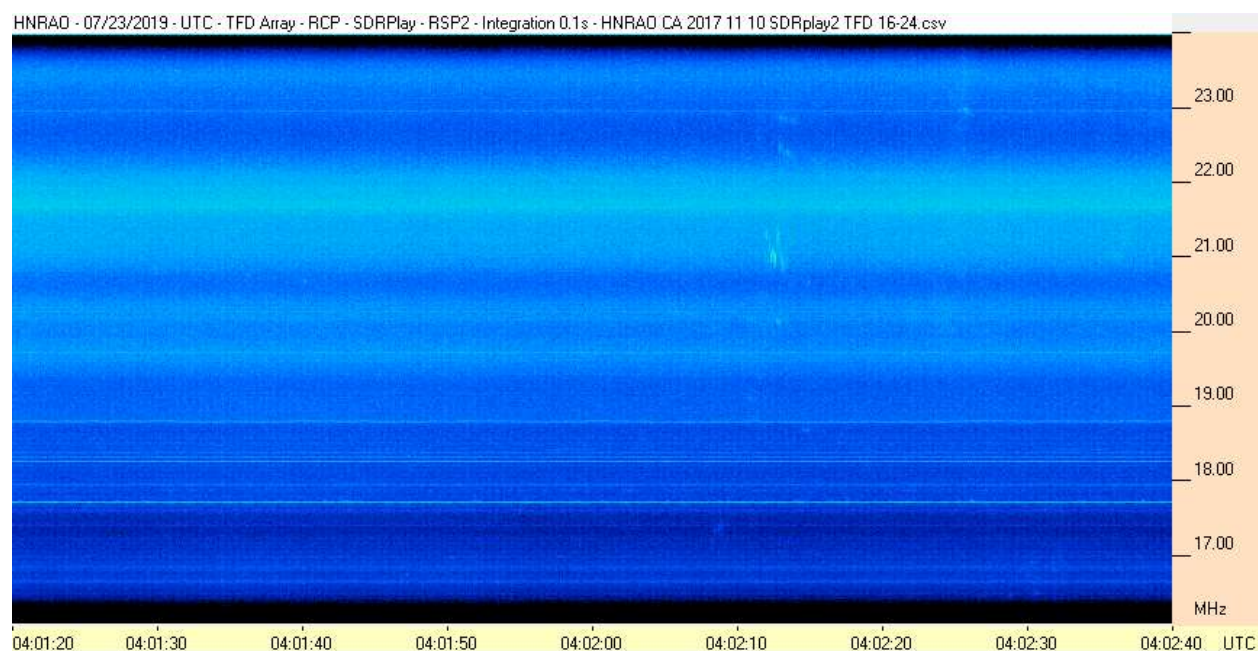
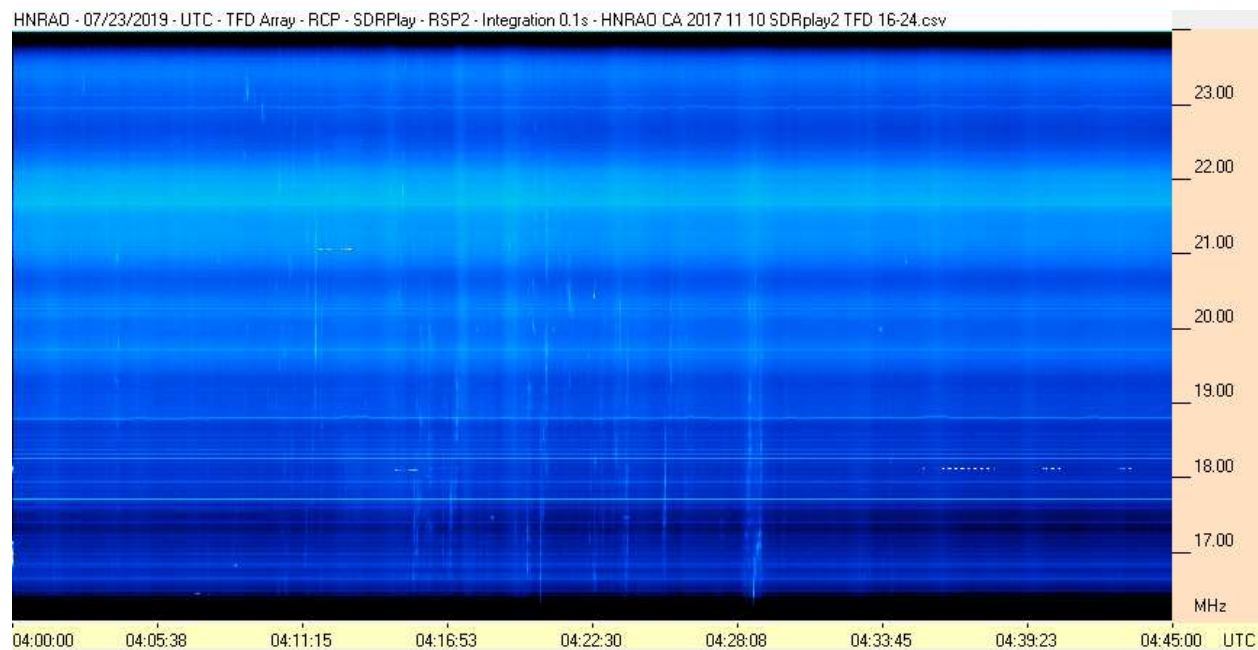
All things considered, for De at -2.7, this was not a bad storm.

EOB

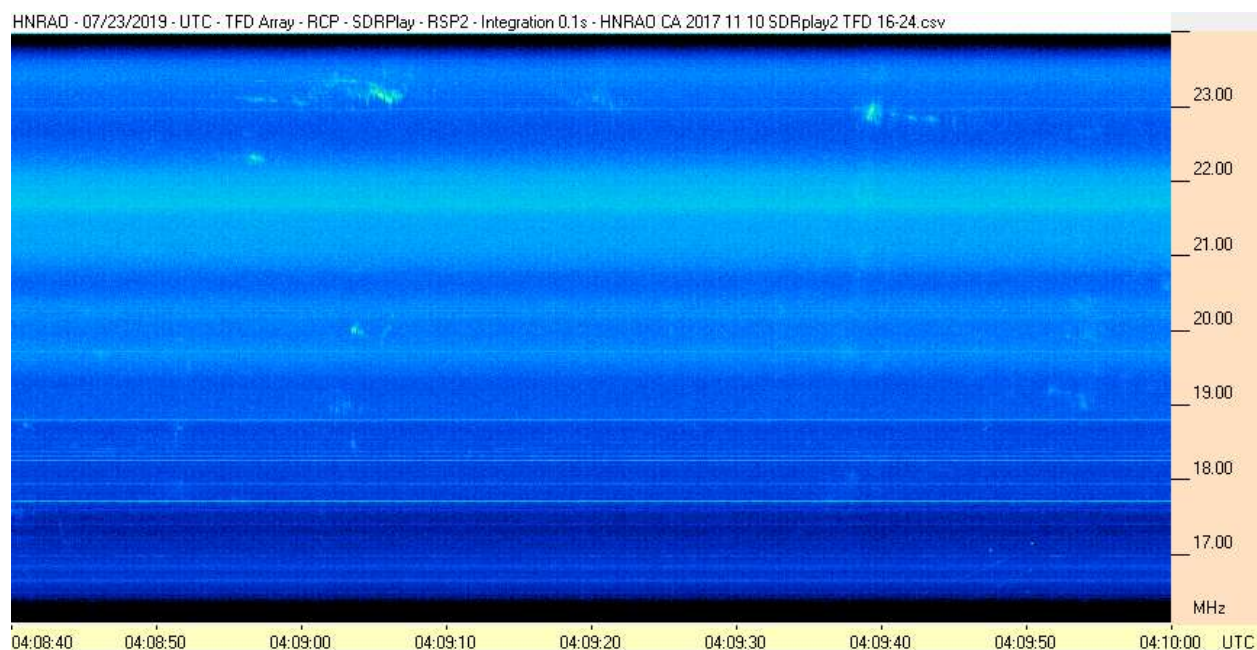
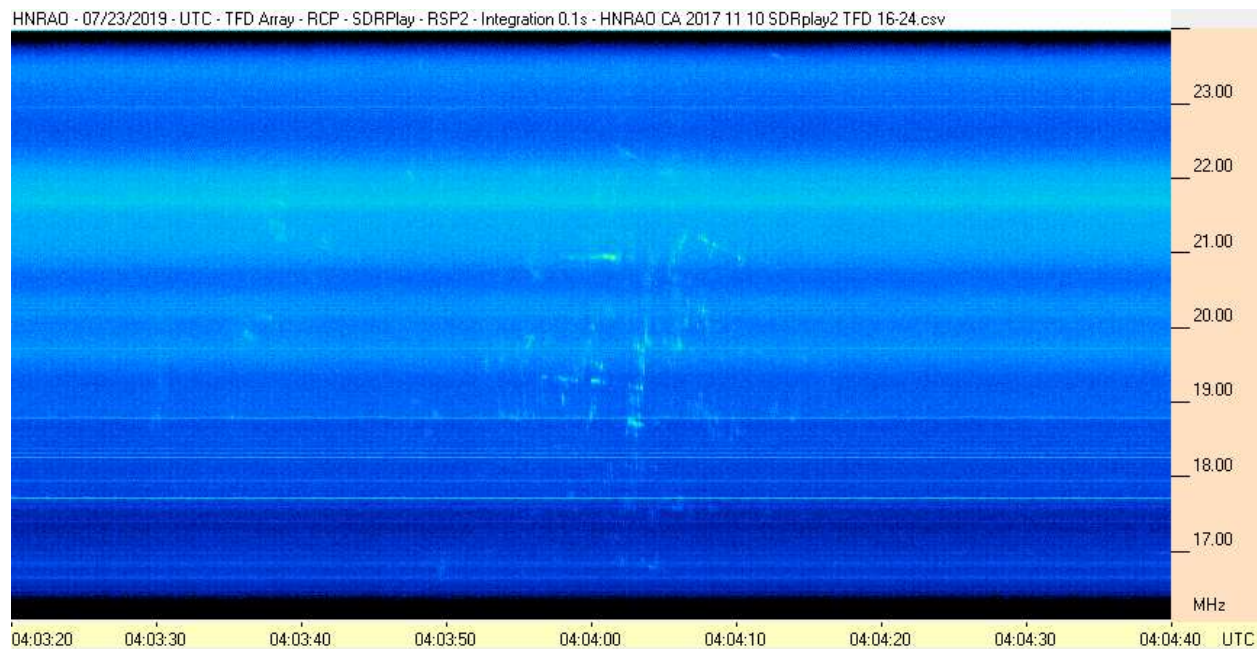
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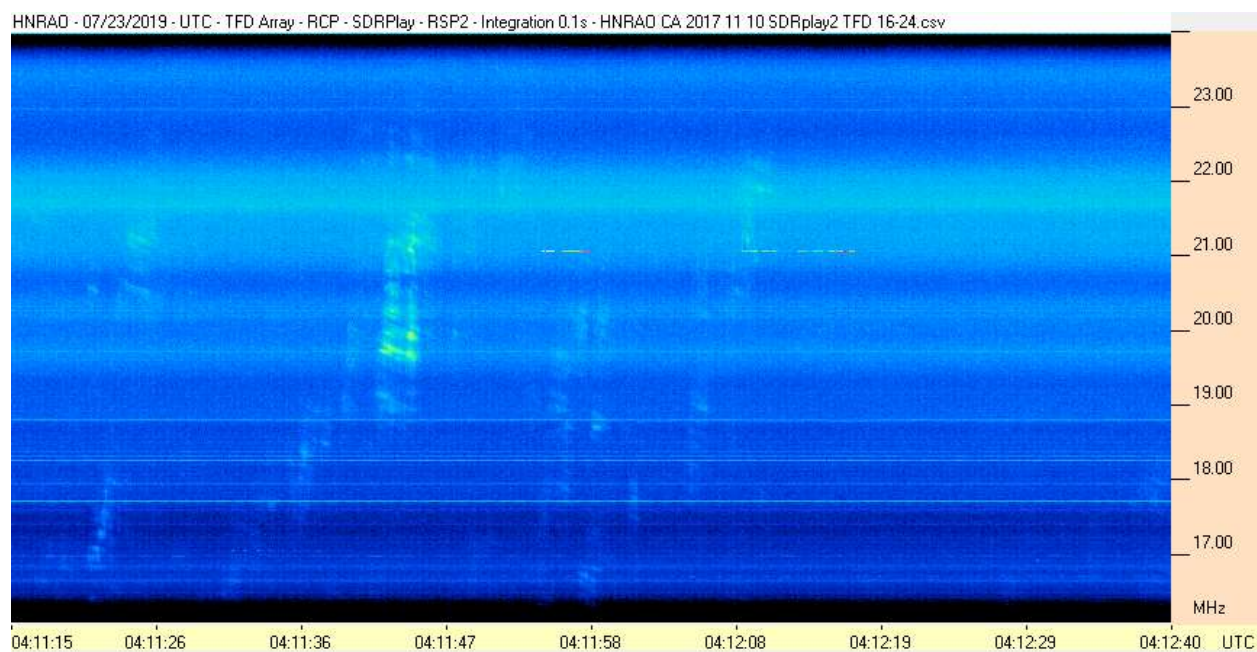
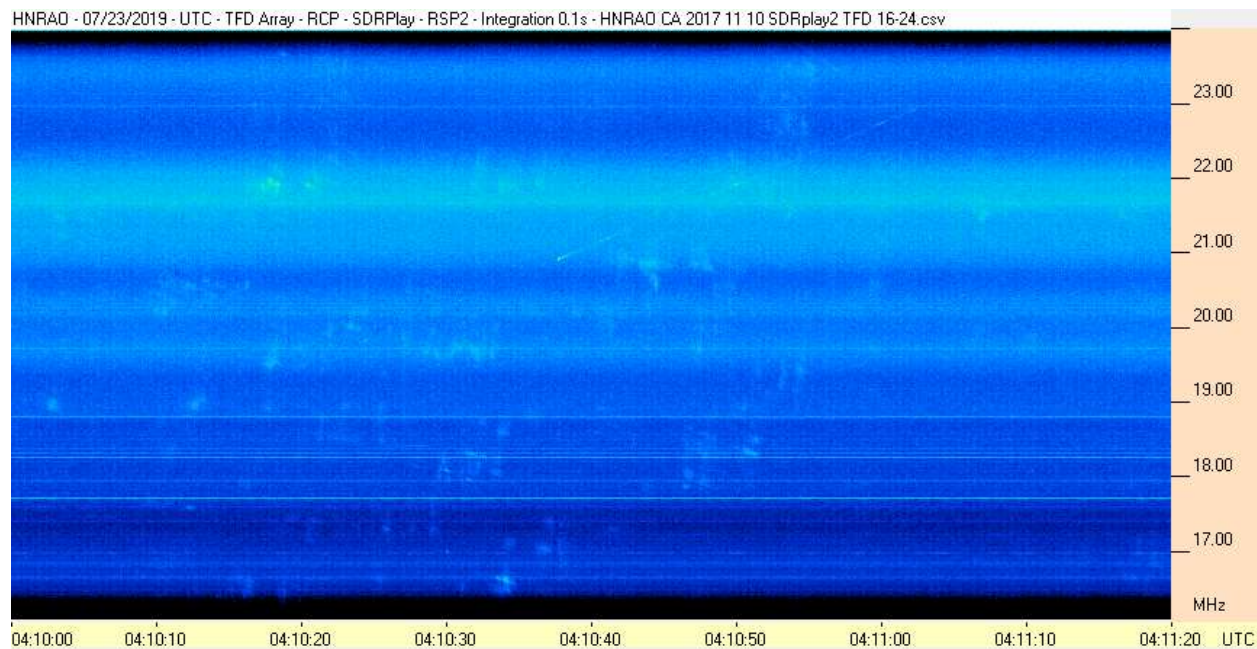
SDRPlay RSP2 / TFD Array



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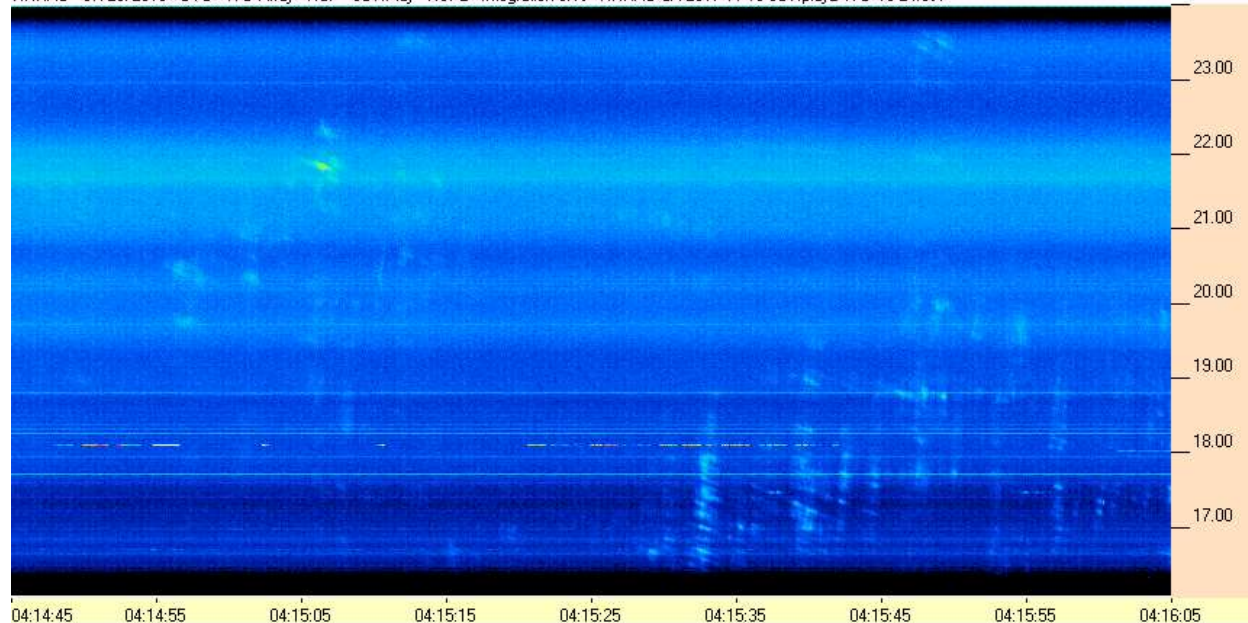
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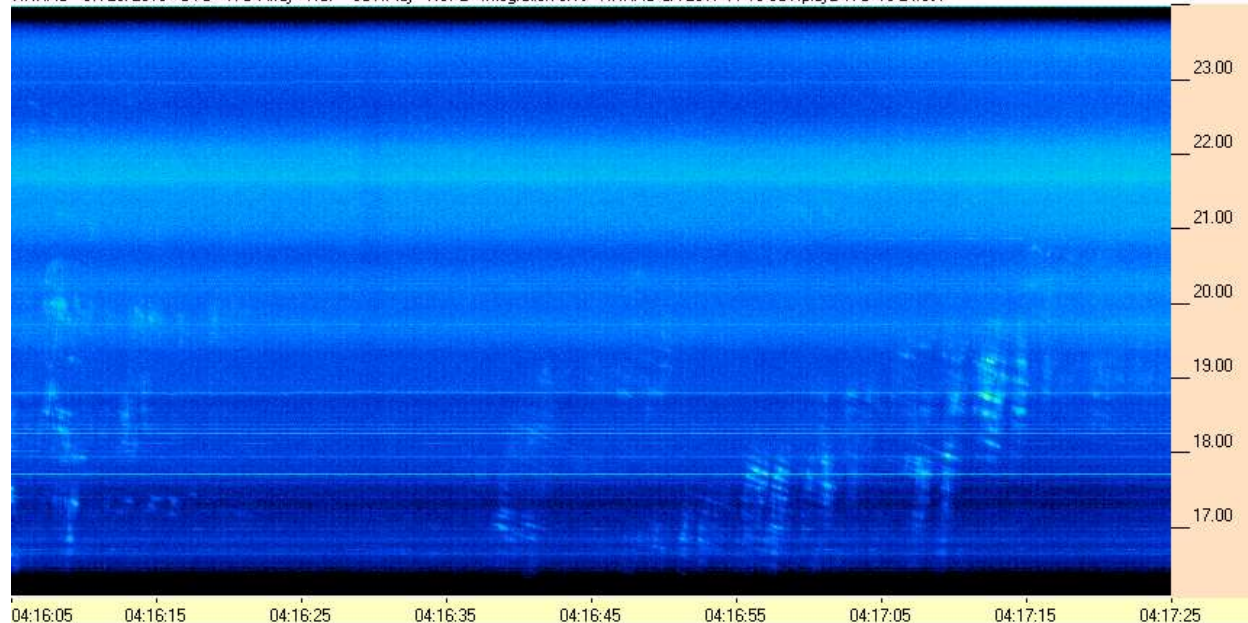
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HNRAO - 07/23/2019 - UTC - TFD Array - RCP - SDRPlay - RSP2 - Integration 0.1s - HNRAO CA 2017 11 10 SDRplay2 TFD 16-24.csv



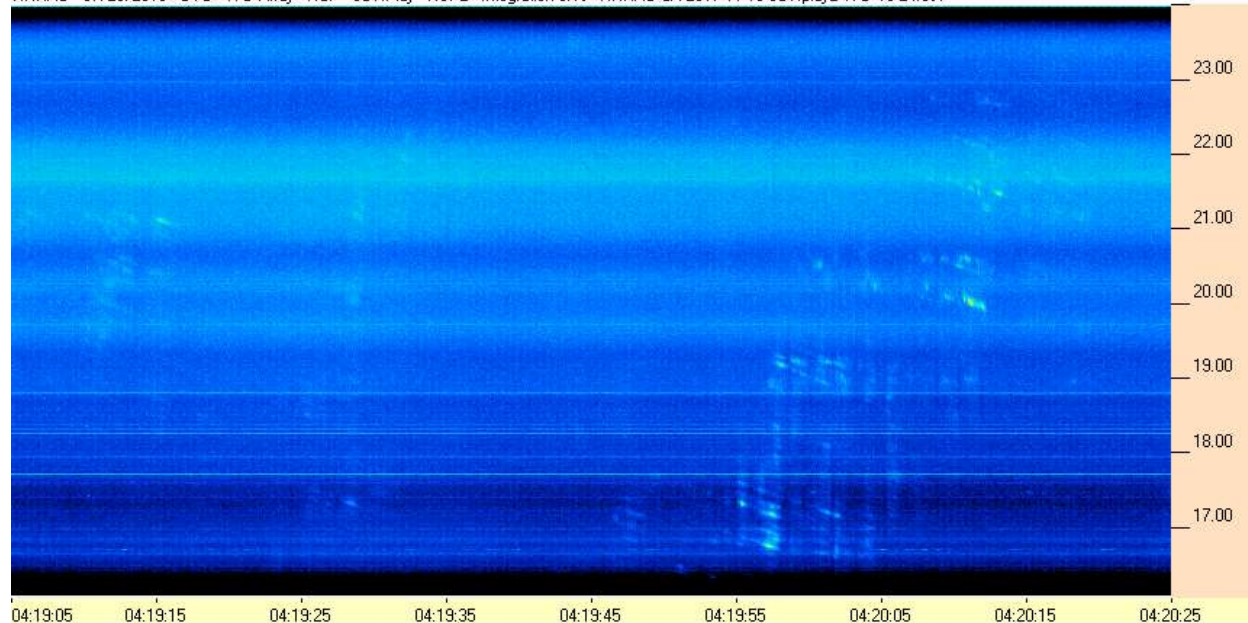
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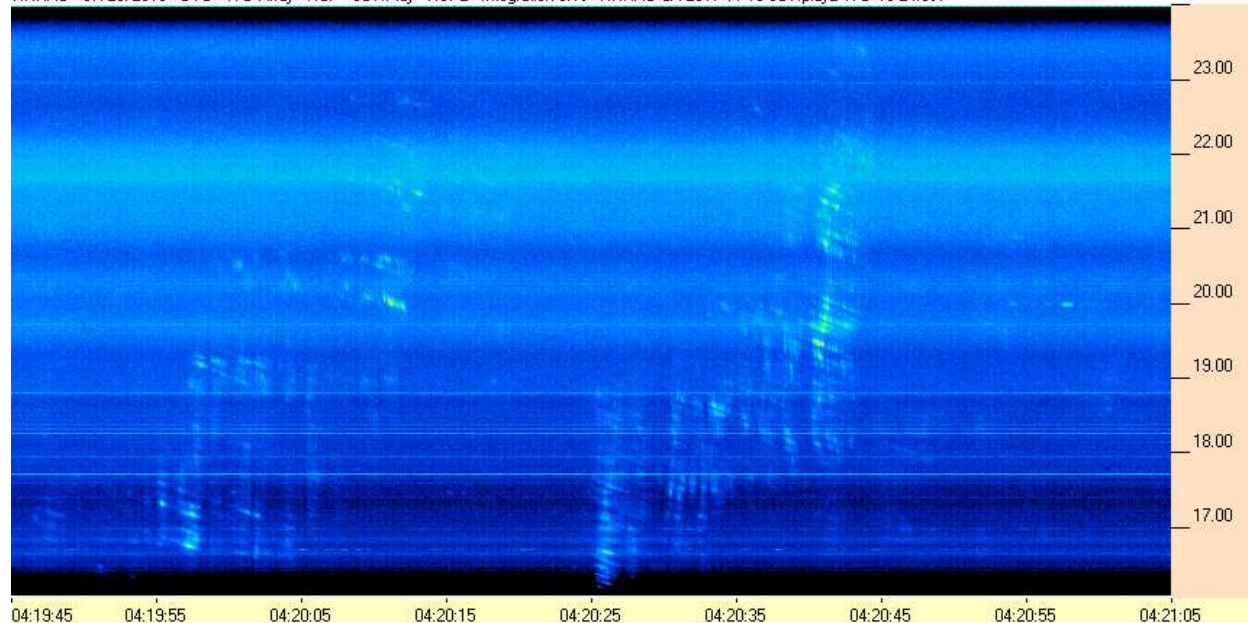
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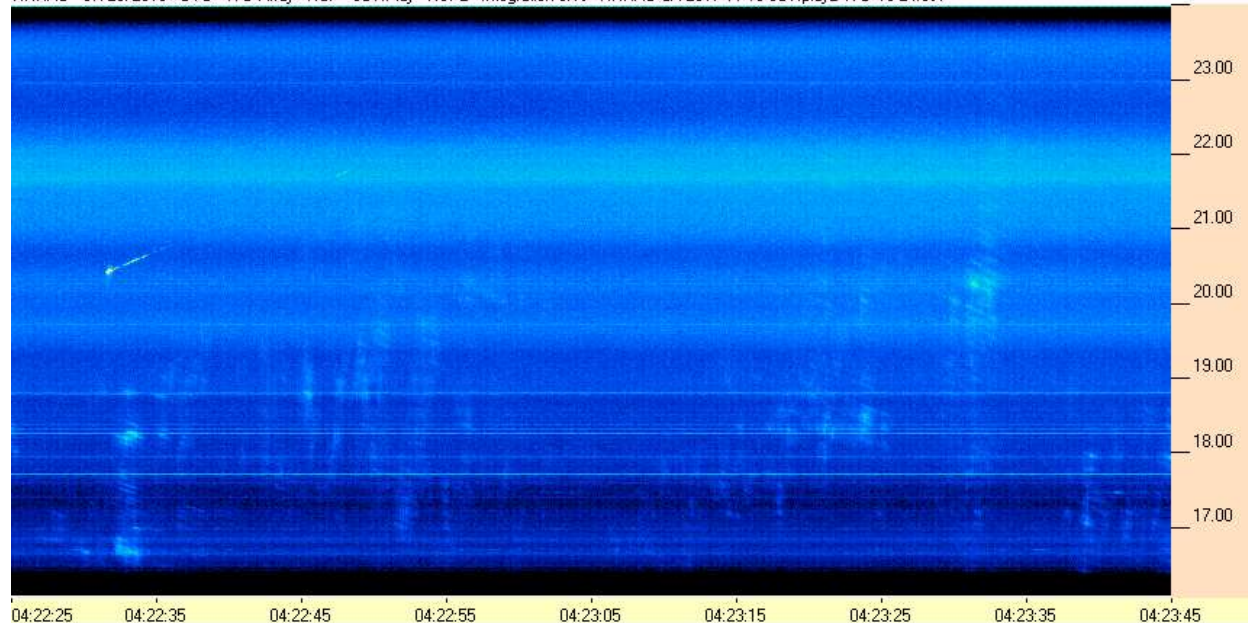
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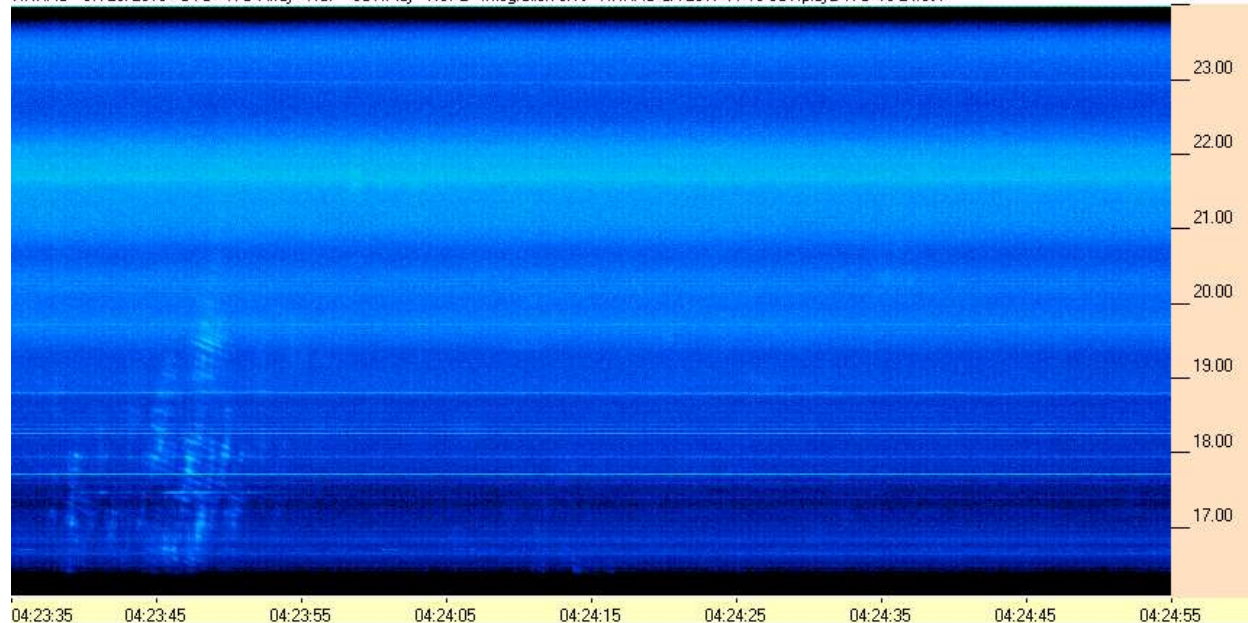
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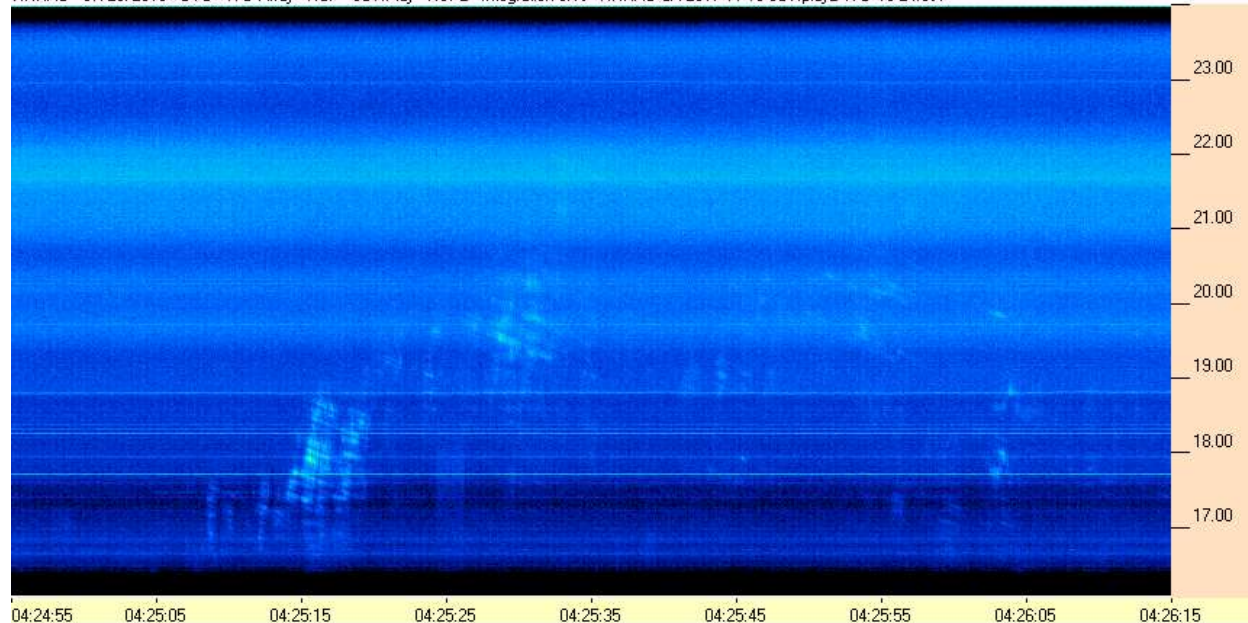
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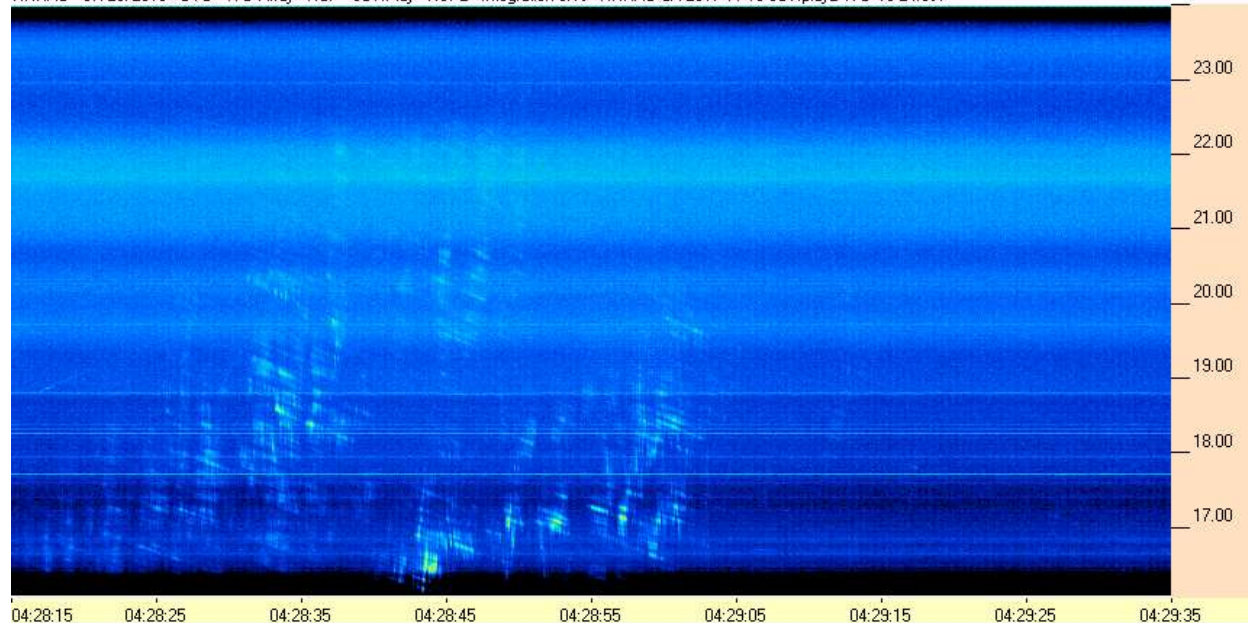
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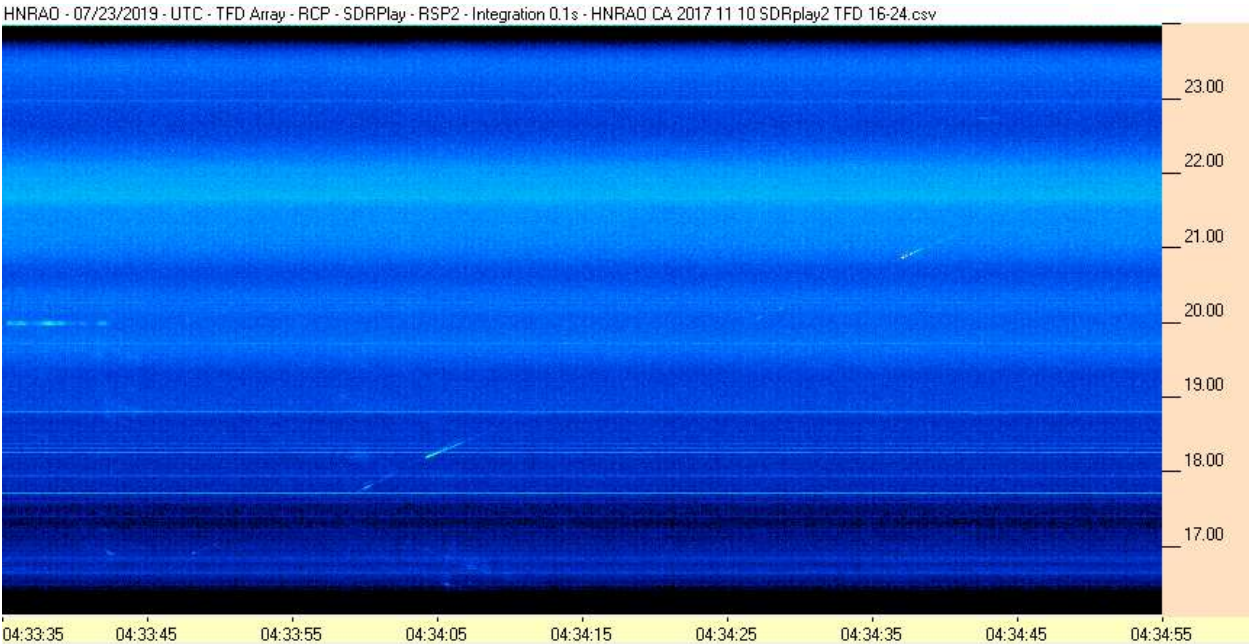
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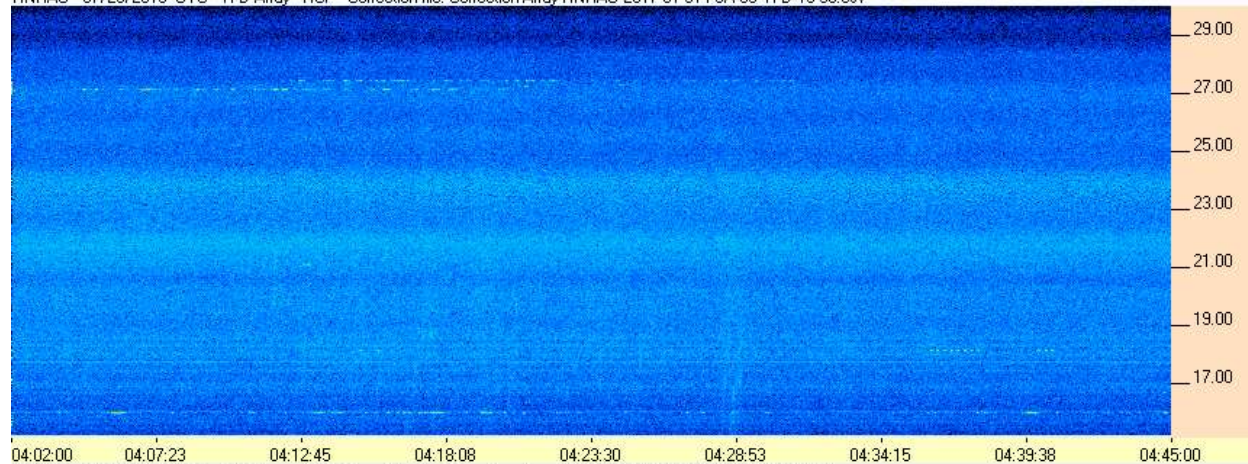


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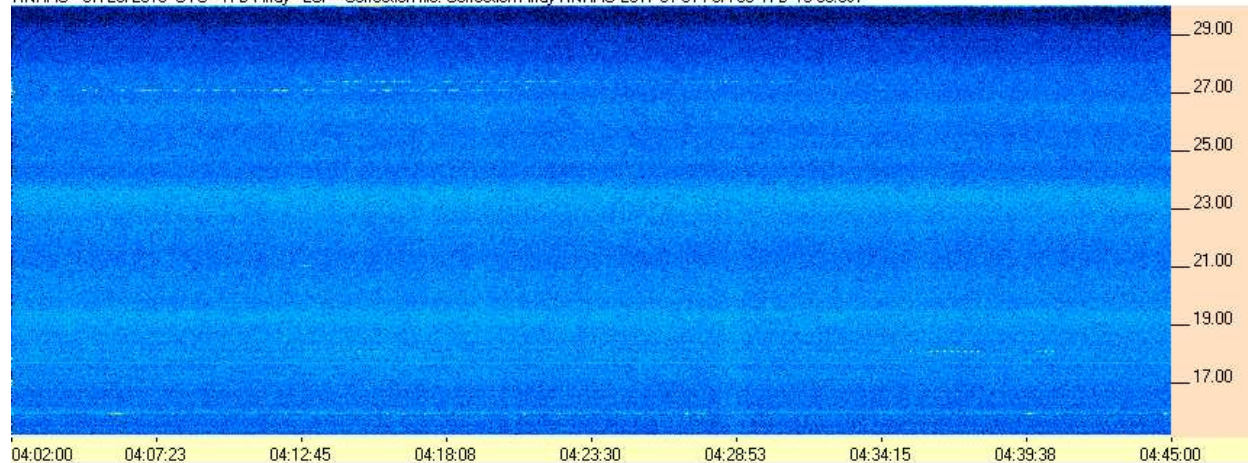


FSX-8S / TFD Array

HNRAO - 07/23/2019 UTC - TFD Array - RCP - Correction file: Correction Array HNRAO 2017 01 31 FSX-8S TFD 15-30.csv



HNRAO - 07/23/2019 UTC - TFD Array - LCP - Correction file: Correction Array HNRAO 2017 01 31 FSX-8S TFD 15-30.csv



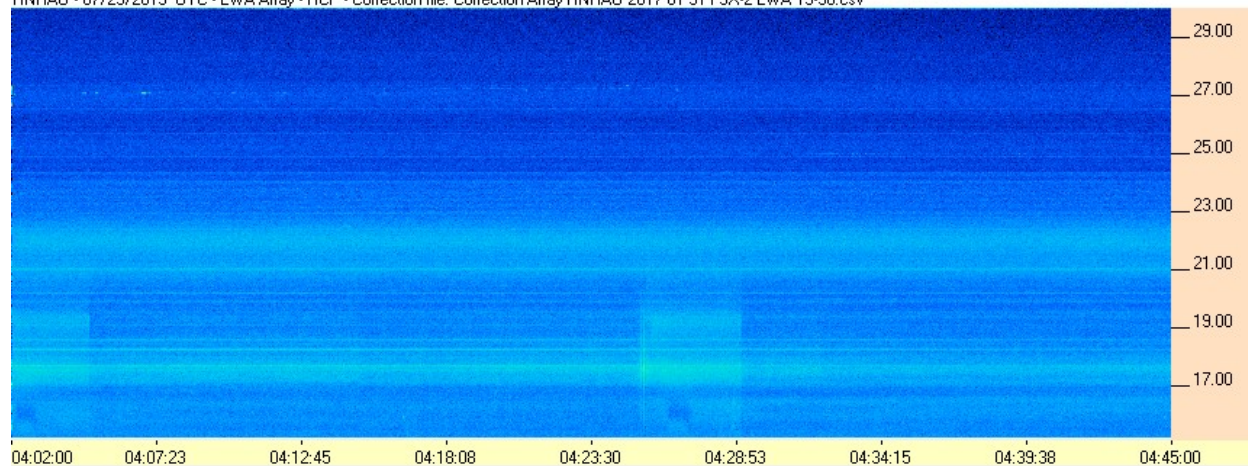
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FSX-2 / LWA Array

HNRAO - 07/23/2019 UTC - LWA Array - RCP - Correction file: Correction Array HNRAO 2017 01 31 FSX-2 LWA 15-30.csv



JOVE II / JOVE Dipole array

