

HNRAO Observing Log
40.673181 N – 80.437885 W
EN90sq



Date: December 12, 2019

Object: Jupiter – Io-B

Observer: Unattended

Start - Time UT:	1829	Planetary K-index:	1
Jupiter Altitude (deg):	25.7	Jupiter Azimuth (deg):	186.5
Jupiter CML:	130.31	Jupiter Io Phase:	090.49
Jupiter RA (hr/min):	18:07	Jupiter Dec (hr/min):	-23:19
Hour Angle (hr/min):	00:25	Polarization	RCP
Sun Altitude (deg):	23.5	Sun Azimuth (deg):	200.8
Sun RA (hr/min):	17:10	Sun Dec (hr/min):	-22.56

End – Time UT:	1850		
Jupiter Altitude (deg):	25.1	Jupiter Azimuth (deg):	191.6
Jupiter CML:	142.6	Jupiter Io Phase	093.37
Hour Angle (hr/min):	00:46	Duration (min):	31
Sun Altitude (deg):	22.0	Sun Azimuth (deg):	205.6
Max Frequency MHz	24	Min Frequency MHz	16
J/S Degree Separation	013.8	De:	-2.1

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

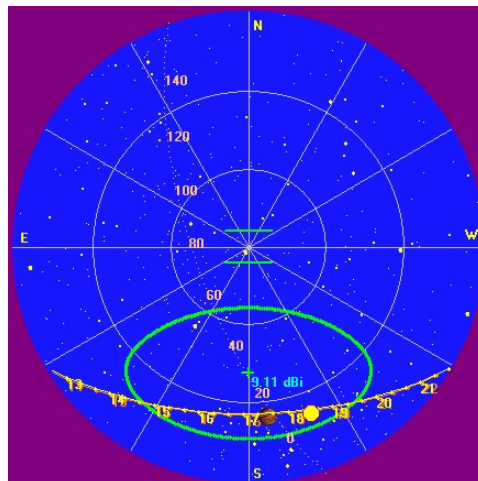
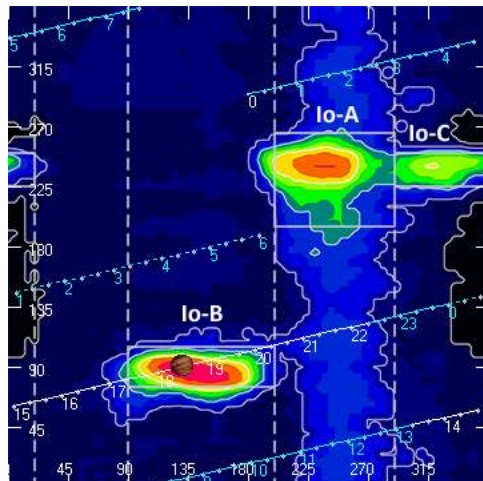
Radio Sky Spectrograph software version 2.9.30

Radio-SkyPipe software version 2.7.33 Radio-Jupiter Pro software version 3.8.2

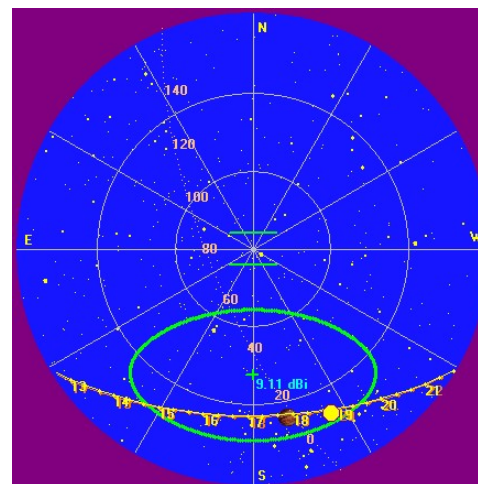
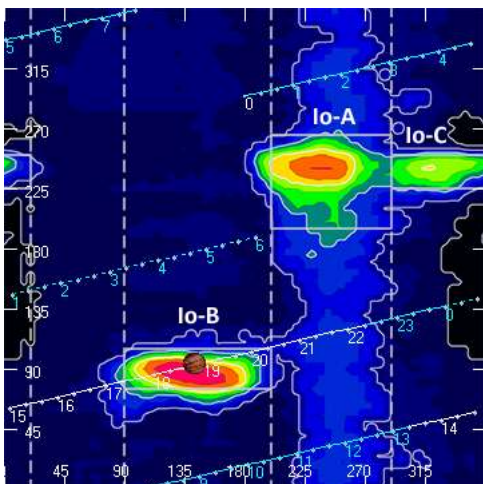
Network Time Server GpsNtp-Pi, Reeve Engineering

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

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Beginning of Pass

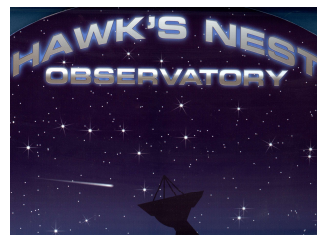


End of Pass



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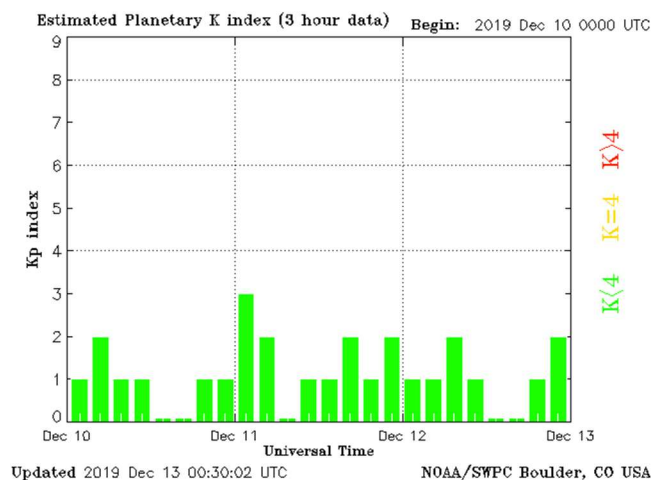


MODE	CML RANGE	Io RANGE	MAX F	POLAR	ARC	NOTES
Io-D	0-200	95-130	18	LH	Early	Also called "fourth source"
Io-B	(105 - 185)	(80-110)	39.5	RH	Early	Also called "early source"
non Io-B	80-200	0-360	38	RH	Early	Voyager info
Io-A	(200-270)	(205-260)	38	RH	Late	Also called "main source"
non-Io-A	(230-280)	0-360	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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Weather at the observatory was 36 deg F, and clear.

All antennas functioning nominally. All spectrographs functioning nominally. No known issues. Radio JOVE telescope offline due to local RFI. There was RFI in the spectra data from foreign broadcast and various other unknown transmitters, radar, etc. but didn't obscure the Jupiter activity.

FSX-8S, FSX2 and SDRPlay RSP2/RCP telescopes all recorded data.

This RCP Io-B storm started with a long string of S-bursts. They were sudden and continuous from 1829:40 UT until 1832:30 when they dropped below 16 MHz. They began centered at 19 MHz and had a bandwidth of about 2 MHz.

No more activity until 1839:40 UT when another weak group of S-bursts were observed, centered around 18.5 MHz. These were just above the GB.

At 1842:10 UT, another group of S-bursts with S2 modulation lanes. Emissions jumped from the S-bursts at 19 MHz to negative drift emissions starting at 24 MHz and drifting down to 21.5 MHz at 1846 UT. These emissions were slightly above GB as observed here.

Activity became more pronounced at 1847:10 where S-burst emissions spanned nearly 8 MHz in bandwidth. A strong emission group at 1848:10 UT were several dB above GB. There was some scintillation fading between 1848:50 UT and 1849:20 UT.

At 1849:20, another S-burst emission group, starting at 24 MHz, drifted down to 20 MHz at a rate of -146 kHz/sec.

This grouping faded at 1850 UT and there was no more observable emission past this point.

This was an unremarkable Io-B storm composed of S-bursts. The most interesting event was the sudden onset of S-burst emission at the beginning, almost as if a switch had been turned on.

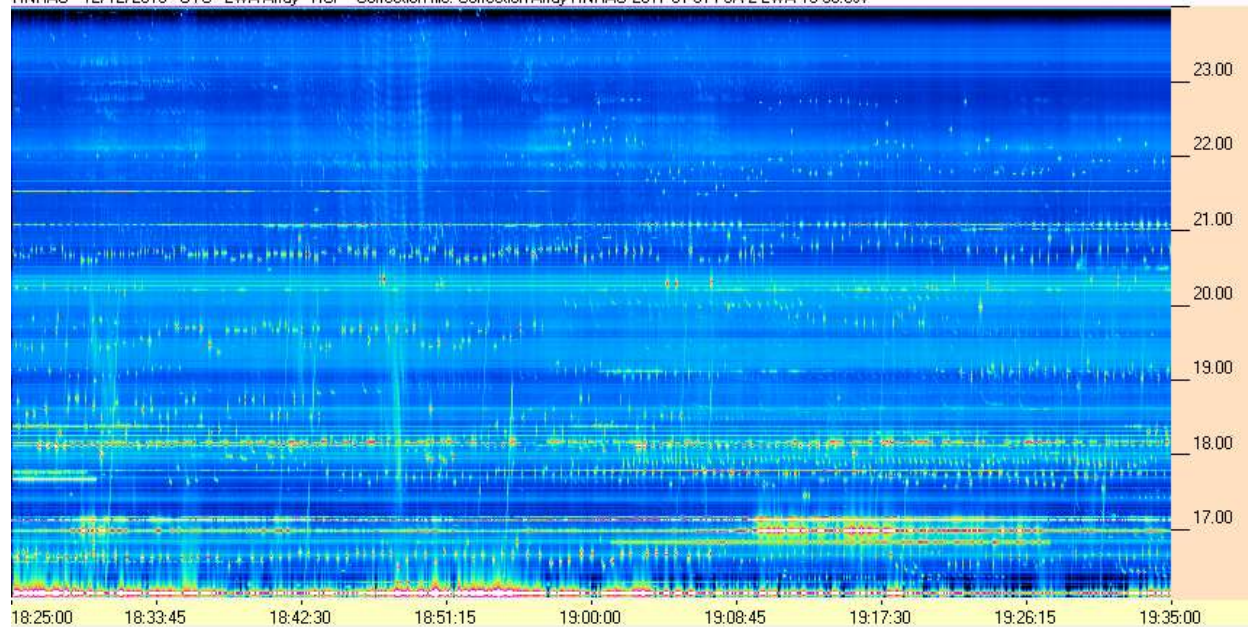
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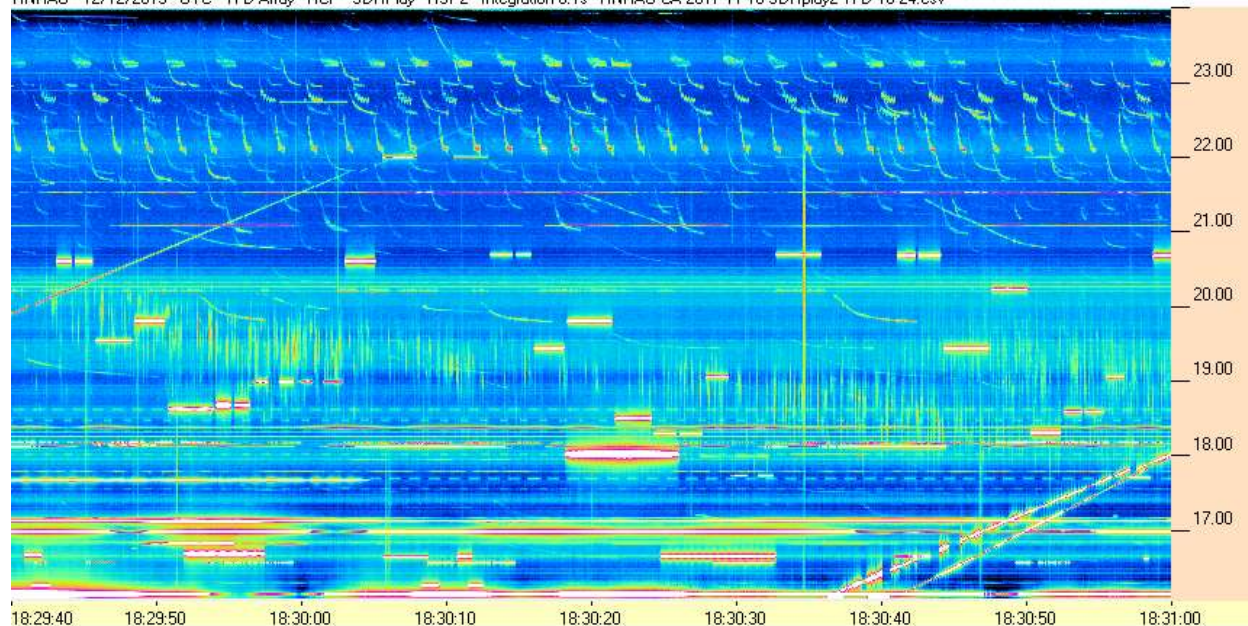


SDRPlay RSP2 / TFD Array

HNRAO - 12/12/2019 - UTC - LWA Array - RCP - Correction file: CorrectionArray HNRAO 2017 01 31 FSX-2 LWA 15-30.csv



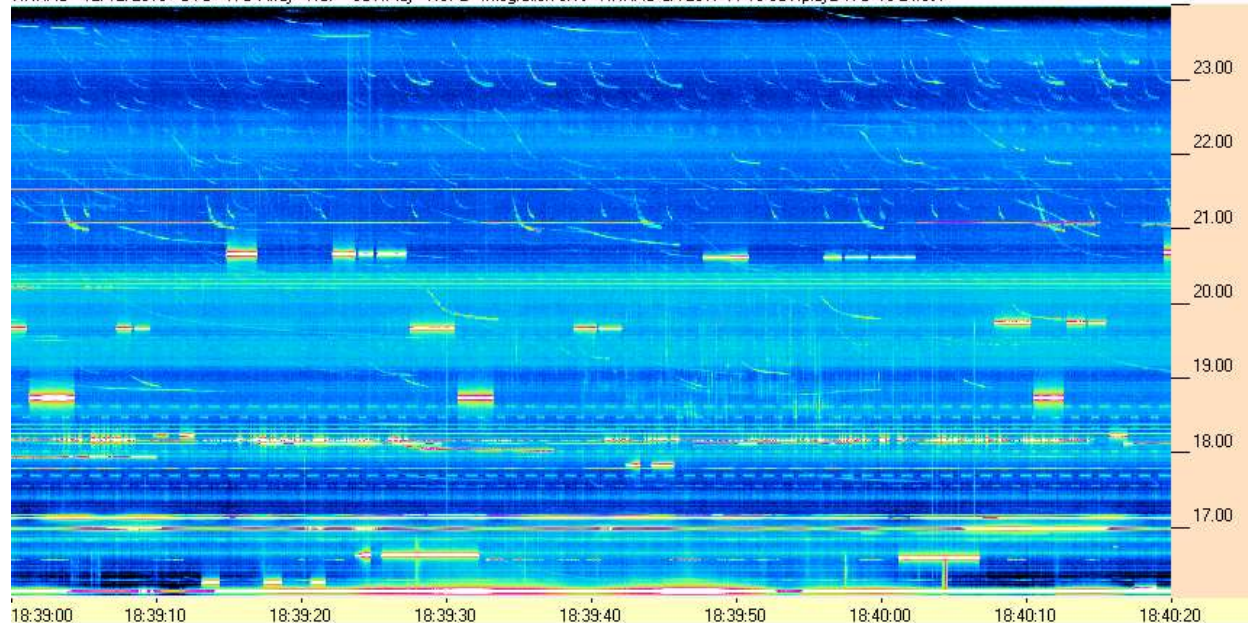
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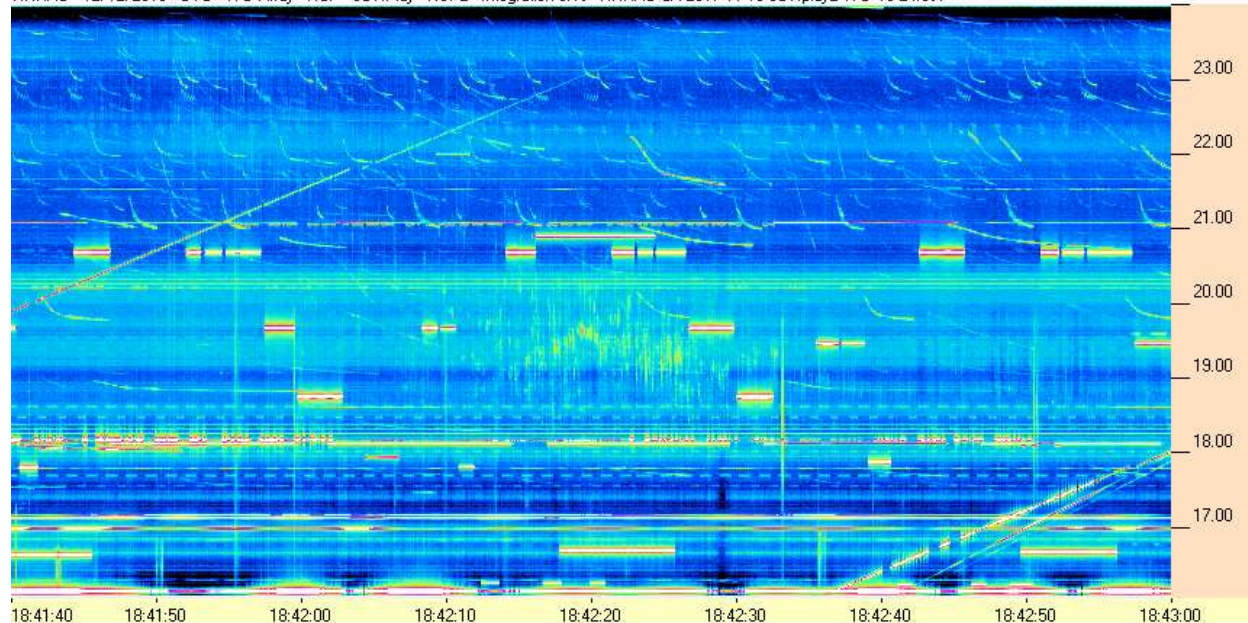
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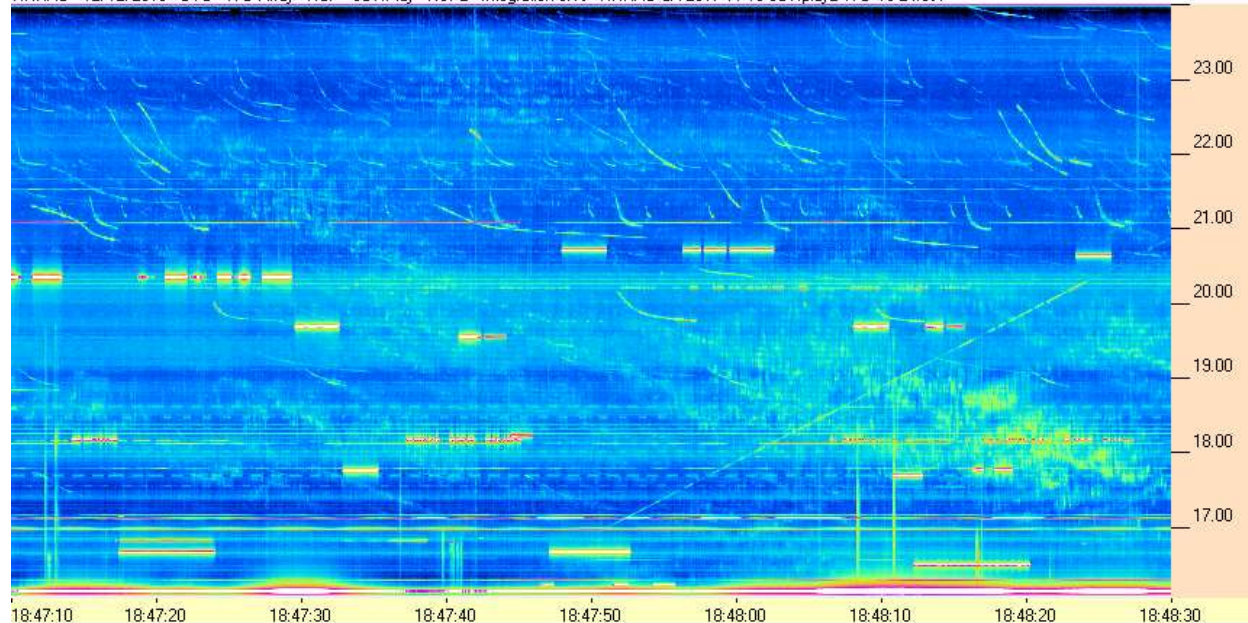
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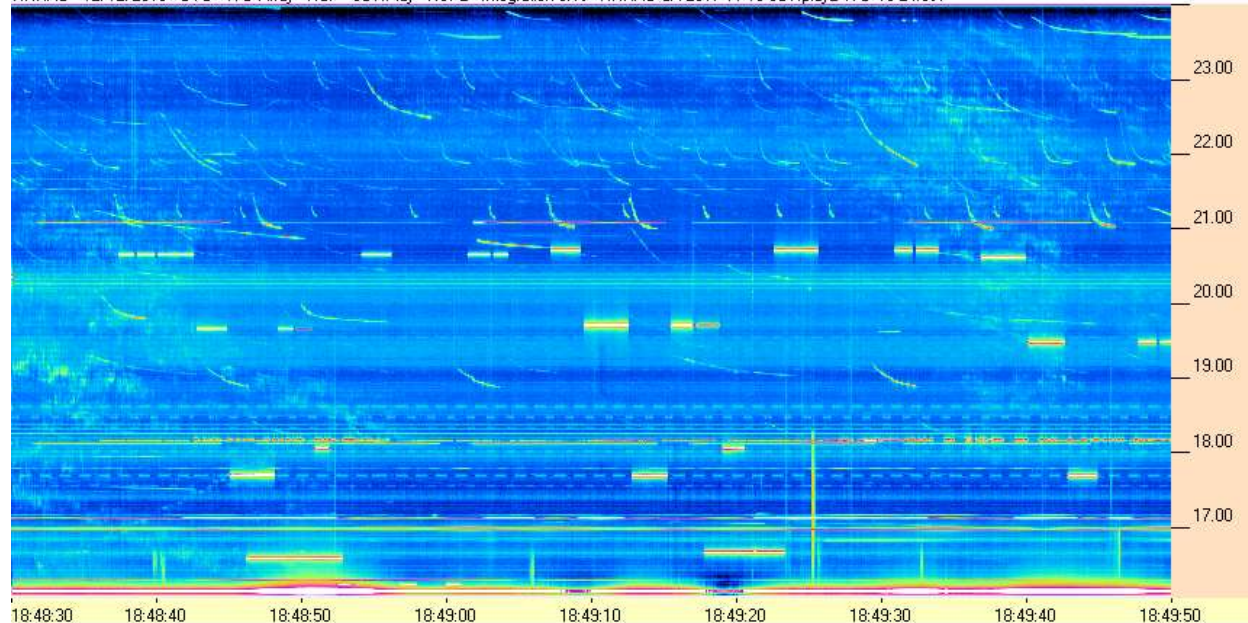
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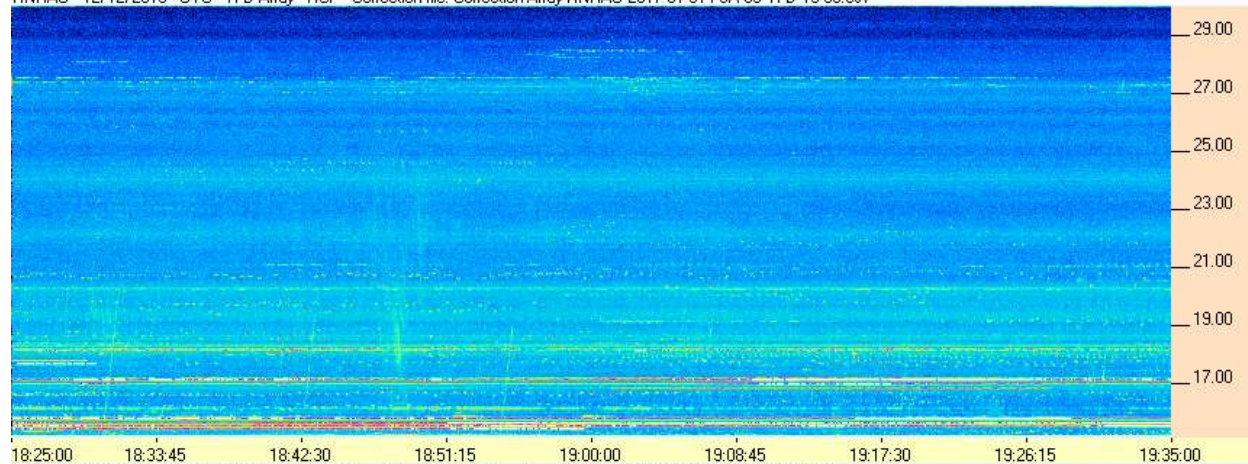


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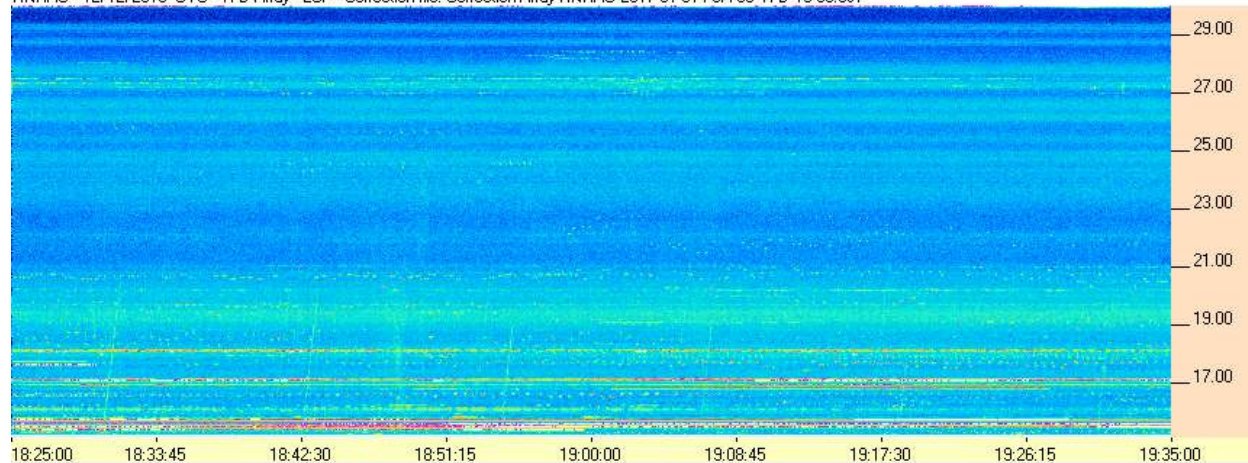


FSX-8S / TFD Array

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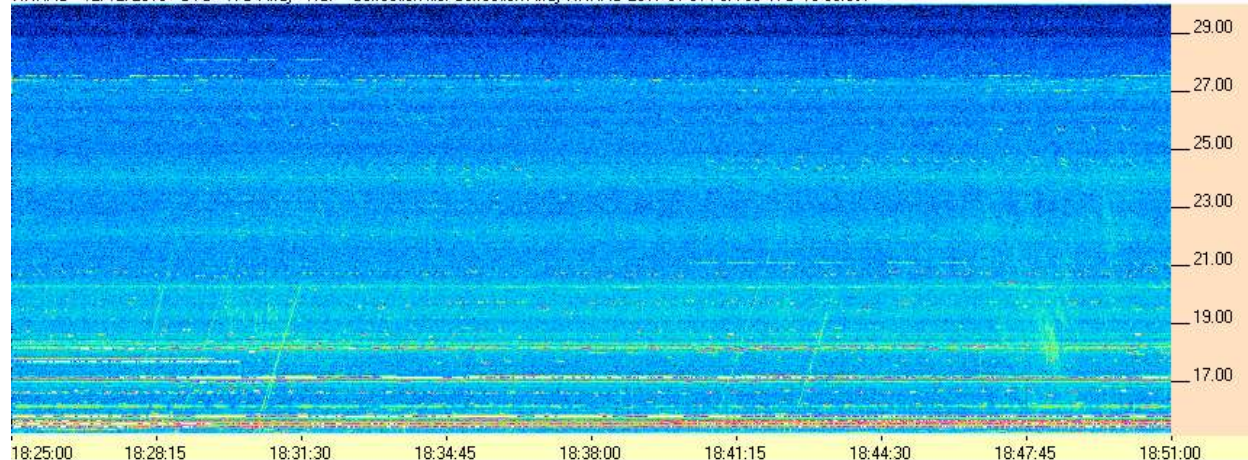
HNRAO - 12/12/2019 - UTC - TFD Array - LCP - Correction file: Correction Array HNRAO 2017 01 31 FSX-8S TFD 15-30.csv



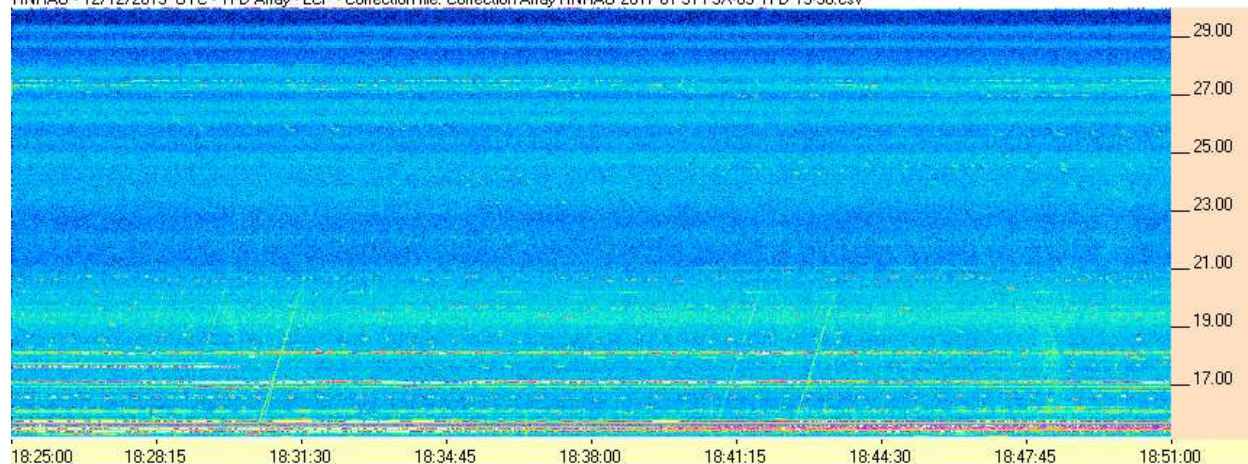
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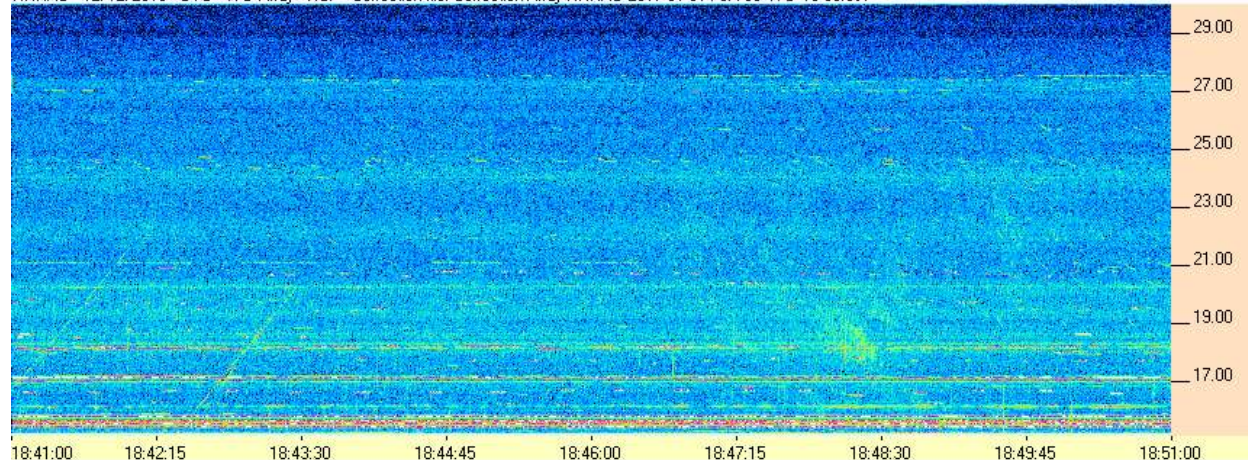
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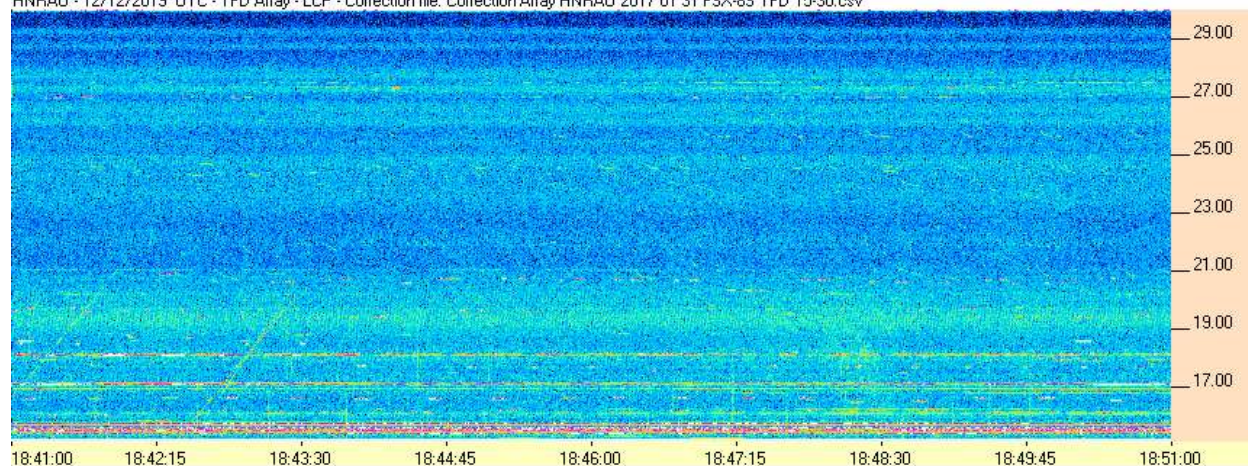
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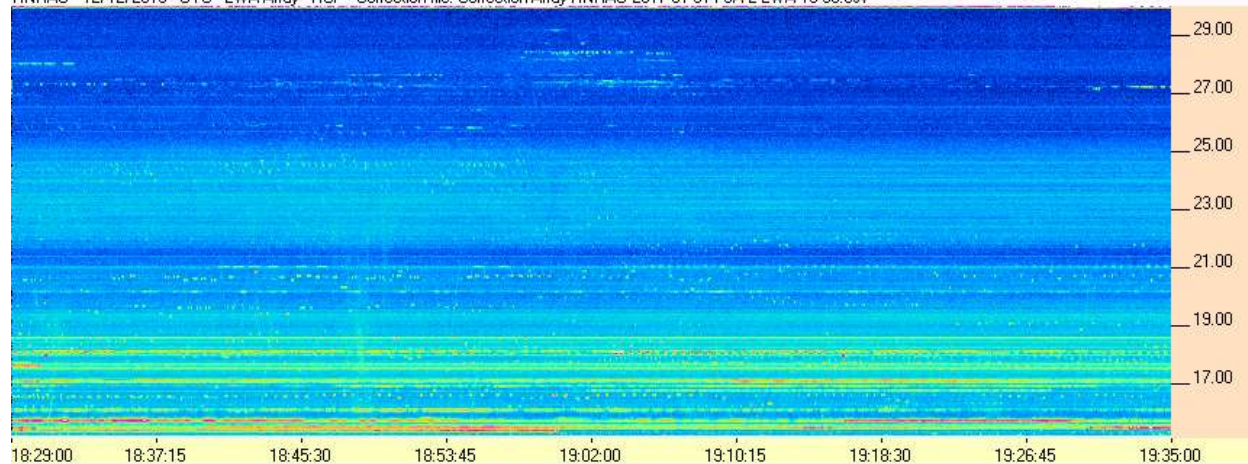


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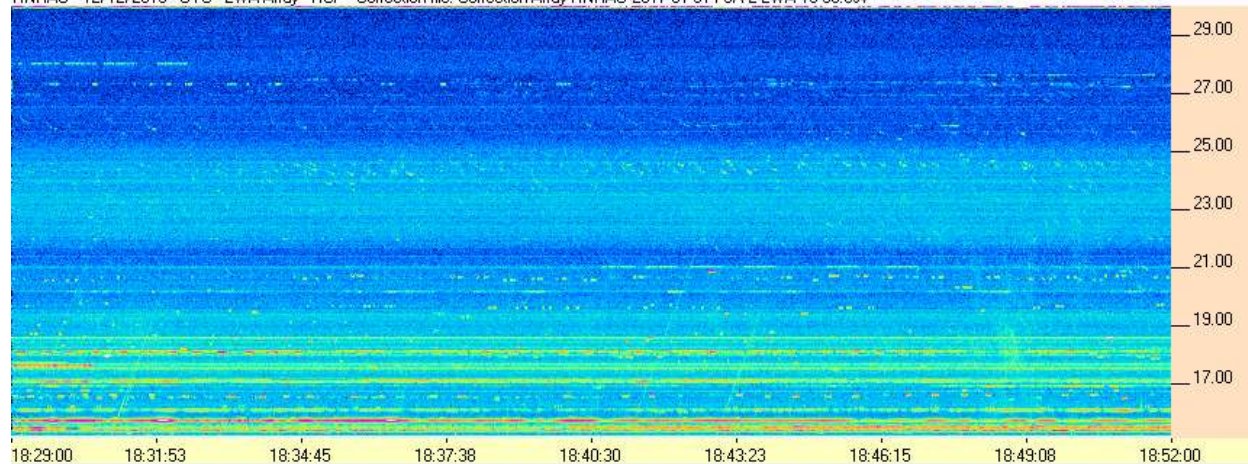


FSX-2 / LWA Array

HNRAO - 12/12/2019 - UTC - LWA Array - RCP - Correction file: Correction Array HNRAO 2017 01 31 FSX-2 LWA 15-30.csv



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