HNRAO Observing Log
40.673181 N – 80.437885 W
EN90sq

Date: July 30, 2019

Object: Jupiter – Io-A

Observer: Unattended

Start - Time UT:	**0406:48**	**Planetary K-index:**	**0**
Jupiter Altitude (deg):	**19.1**	**Jupiter Azimuth (deg):**	**214.6**
Jupiter CML:	**191.18**	**Jupiter Io Phase:**	**237.10**
Jupiter RA (hr/min):	**16:53**	**Jupiter Dec (hr/min):**	**-22:07**
Hour Angle (hr/min):	**02:22**	**Polarization**	**RCP**
Sun Altitude (deg):	**-27.9**	**Sun Azimuth (deg):**	**340.2**
Sun RA (hr/min):	**08:29**	**Sun Dec (hr/min):**	**19:03**

End – Time UT:	**0452:57**	**De:**	**-2.6**
Jupiter Altitude (deg):	**13.5**	**Jupiter Azimuth (deg):**	**224.2**
Jupiter CML:	**219.79**	**Jupiter Io Phase**	**243.68**
Hour Angle (hr/min):	**03:08**	**Duration (min):**	**46**
Sun Altitude (deg):	**-29.9**	**Sun Azimuth (deg):**	**352.5**
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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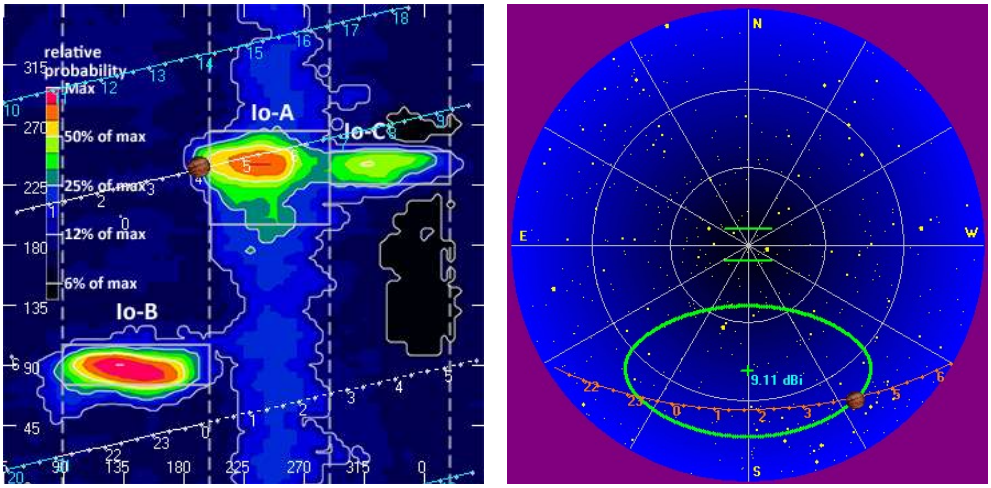
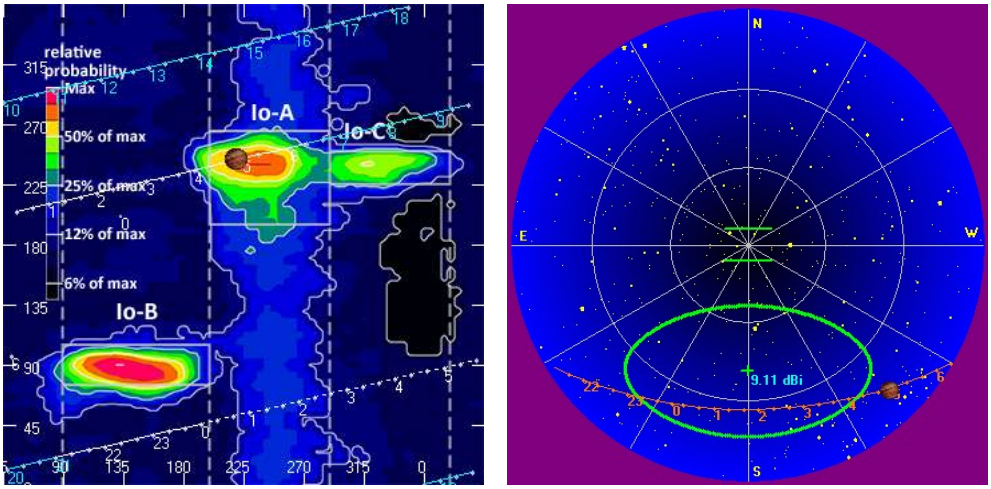


Beginning of Pass



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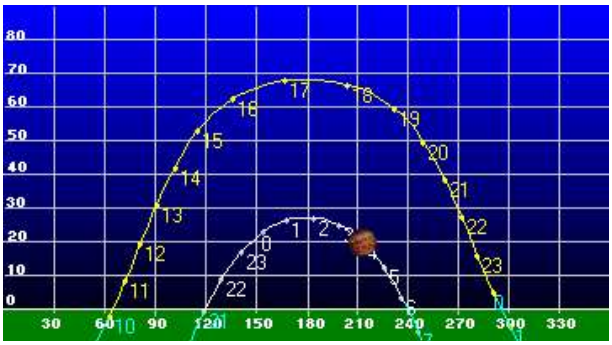
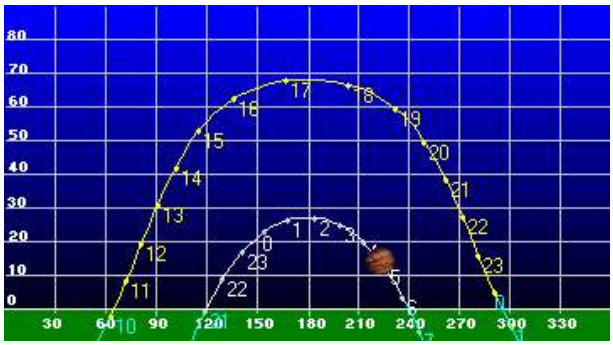
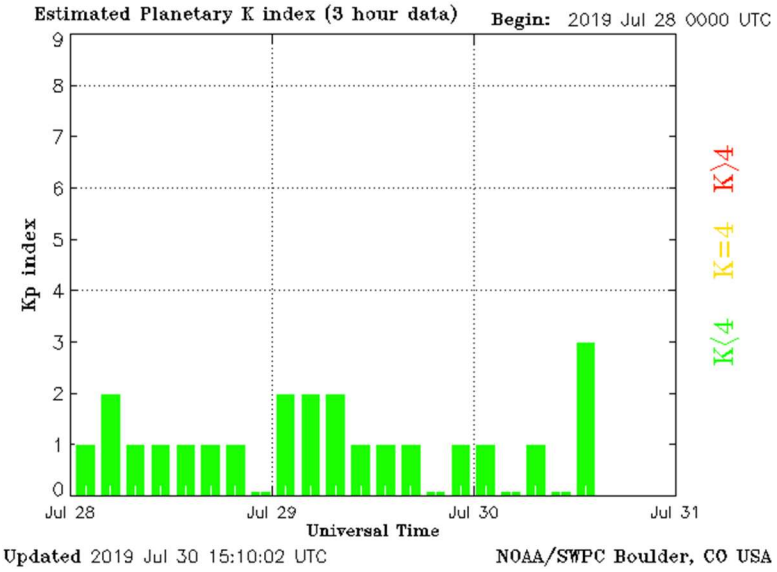




MODE	CML RANGE	Io RANGE	MAX F	POLAR	ARC	NOTES
Io-D	0-200	95-130	18	LH	Early	Also called "fourth source"
Io-B	(105 - 185)	(80-110)	39.5	RH	Early	Also called "early source"
non Io-B	80-200	0-360	38	RH	Early	Voyager info
Io-A	(200-270)	(205-260)	38	RH	Late	Also called "main source"
non-Io-A	(230-280)	0-360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



Jupiter / Sun angular separation = 129.9 degrees.

All spectrographs, receivers operating normally. No known issues. Horizontal brighter lines in spectrograph data is unknown RFI. Bright vertical lines are lightning discharges from distant thunderstorms. RFI in the JOVE II / JOVE dipole data was not as relatively bad at the start of the storm but increased at 0422 UT making the rest of the data unusable.

An Io-A storm consisting of negative drift L-bursts with negative slope, L4, modulation lanes. Frequency span was 16 MHz to 24 MHz, the range of the SDRPlay RSP2 spectrograph. This storm continues the pattern for this iteration, in that there were long periods of no emission activity between burst groups. Scintillation was also apparent throughout the duration of the storm. No S-bursts were apparent.

The SDRPlay RSP2 spectrograph was the primary spectrograph collecting data during this storm. The FSX-8S recorded the singularly strong burst at 0428:40 UT as slightly above galactic background (GB). The FSX-2 / LWA spectrograph did not show any emissions from this storm.

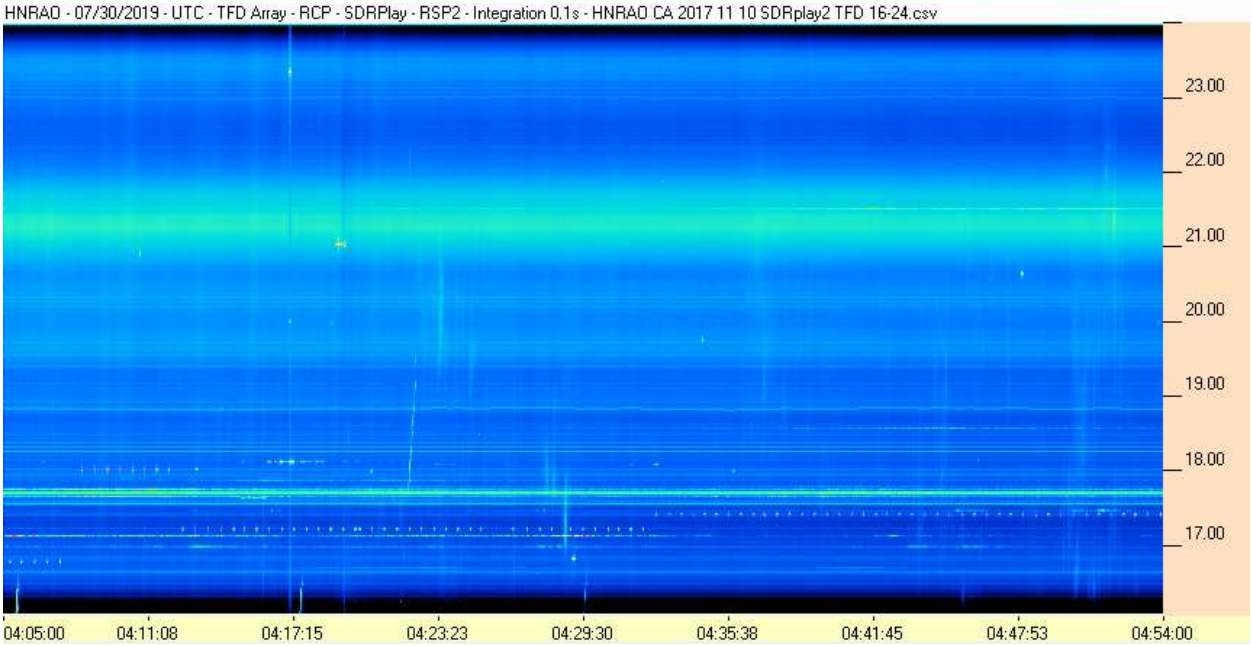
Between 0405 UT and 0417 UT, Cass A scintillation is very apparent as slightly brighter, on the order of 1-2 dB above GB, with positive drift vertical lines.

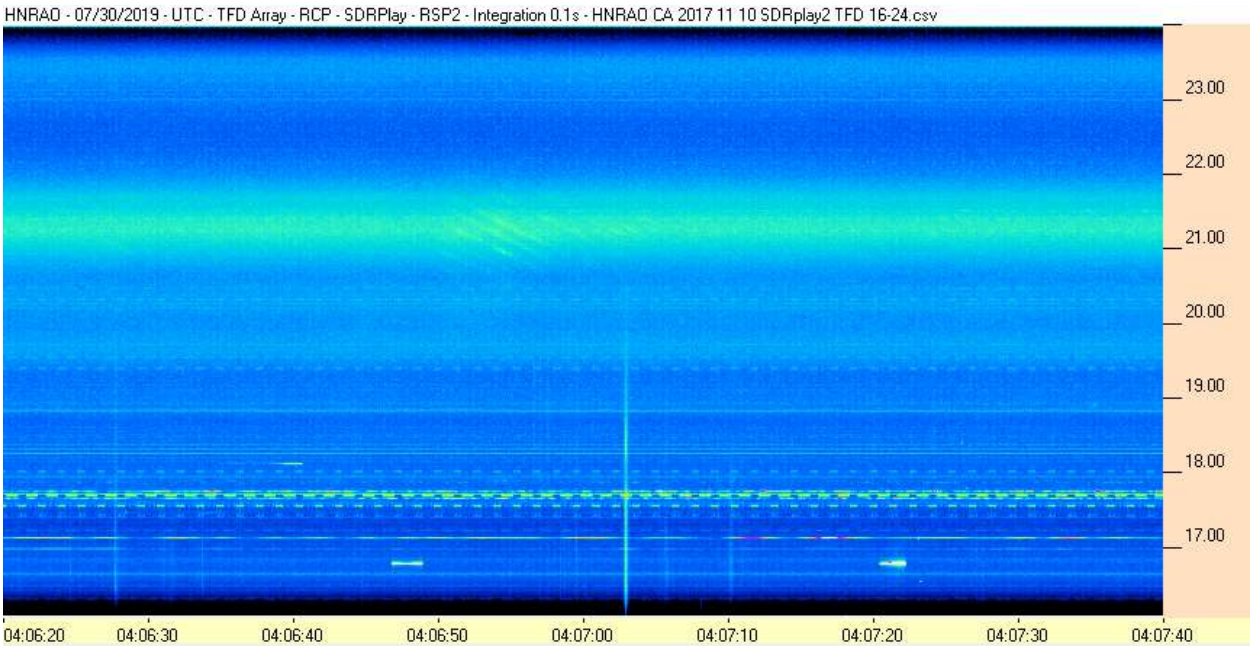
One L-burst measurement with the JOVE II / JOVE dipole array at 0423:22 UT indicated the burst peak at 217 kK. This corresponds to an L-burst group at the same time in the spectrograph data. At 0442 UT, the RFI jumped abruptly from 163 kK to 653 kK for the remainder of the observation period.

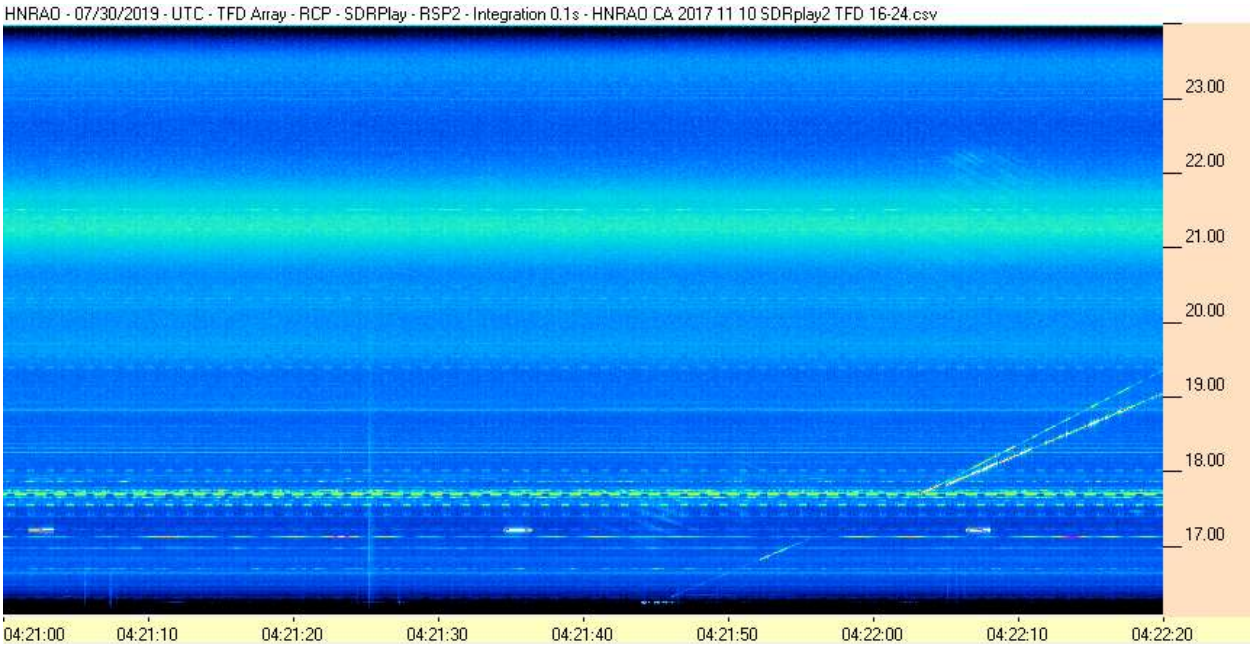
Nothing else of note.

EOR

SDRPlay RSP2 / TFD Array



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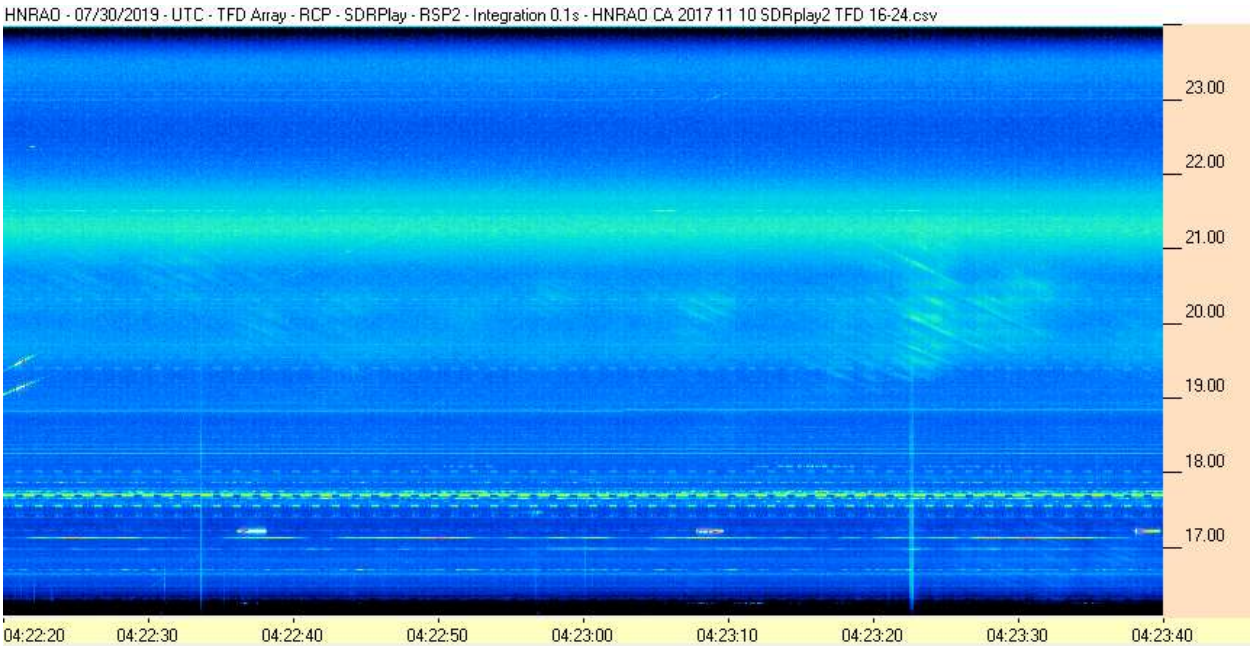
04:21:10
04:21:20
04:21:30
04:21:40
04:21:50
04:22:00
04:22:10
04:22:20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04:22:40
04:22:50
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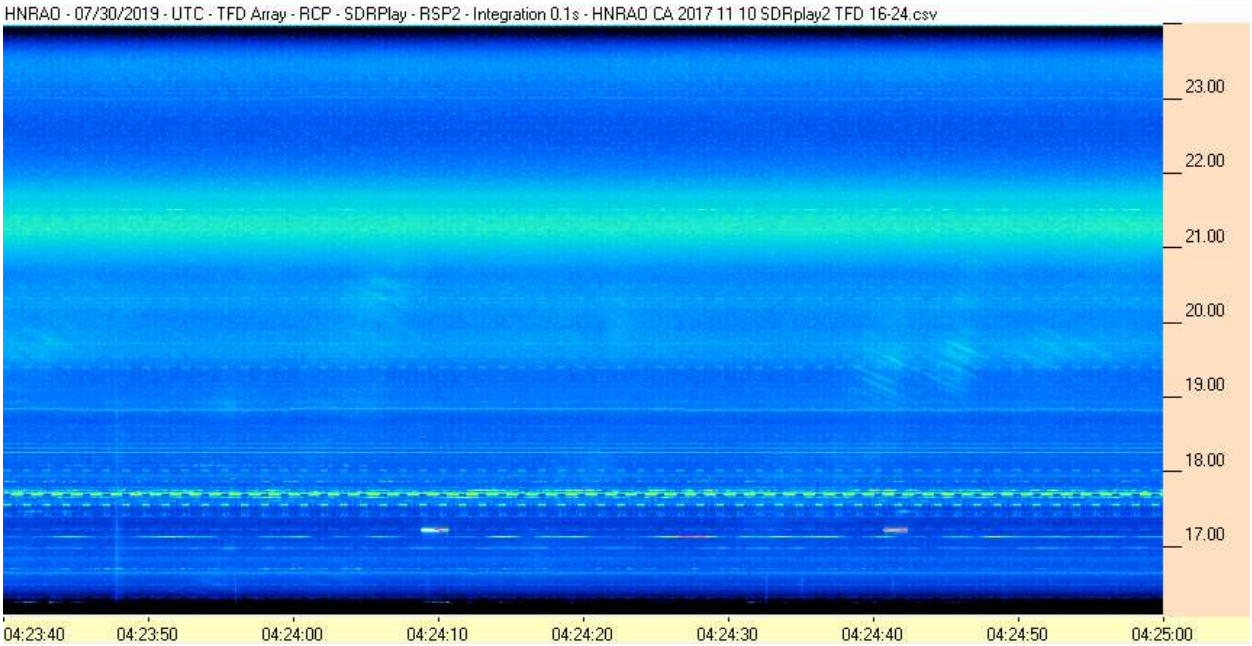
04:23:20
04:23:30
04:23:40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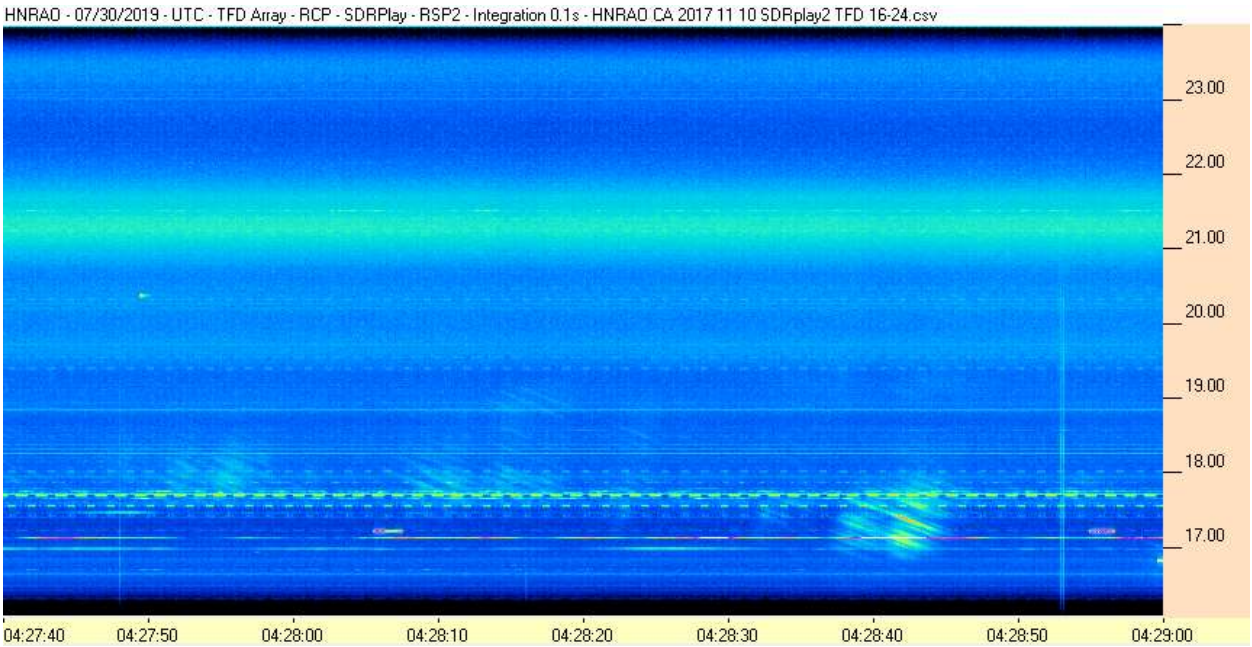
04:25:00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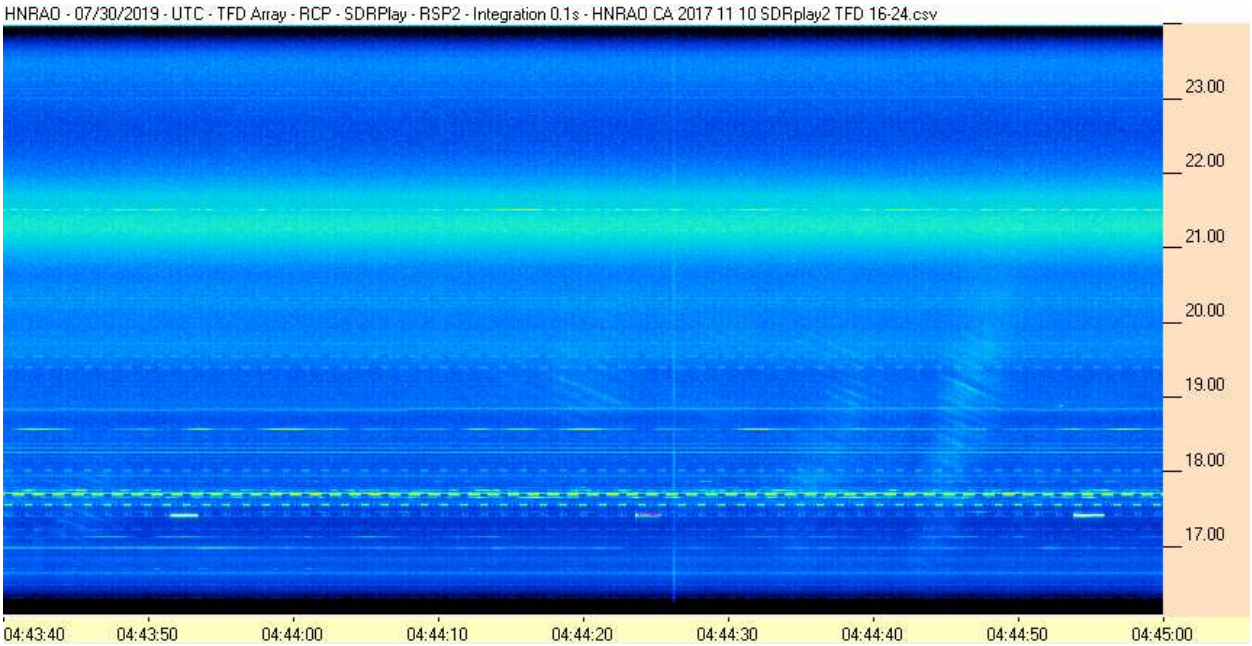
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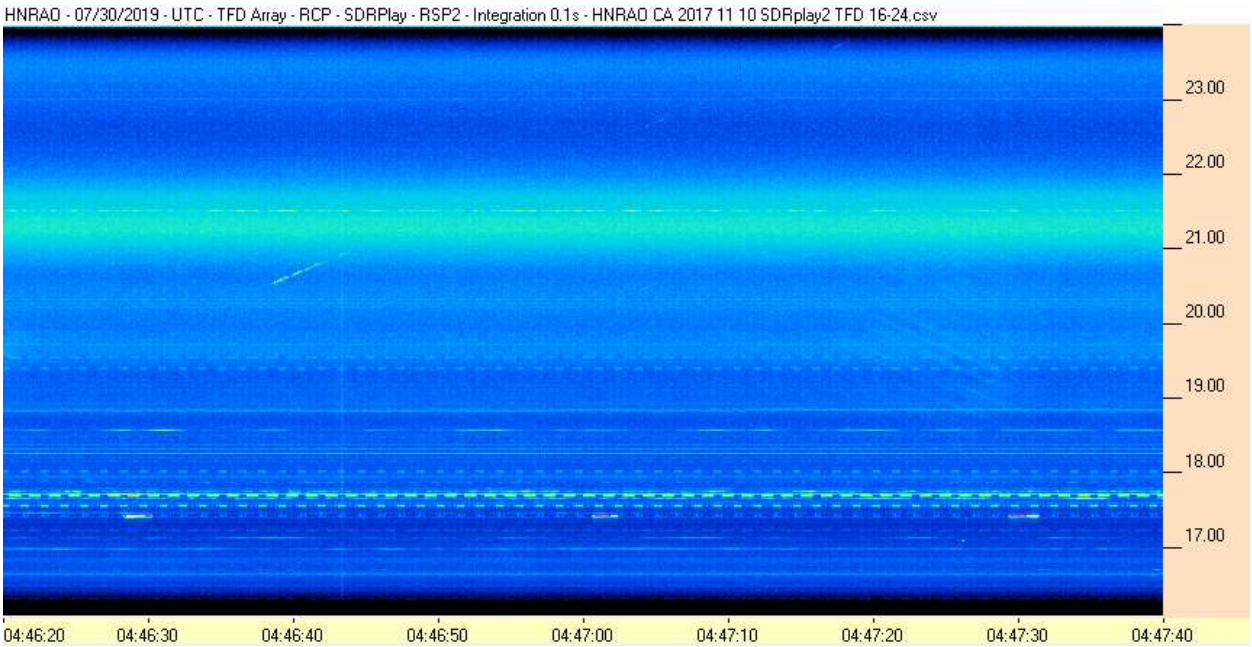
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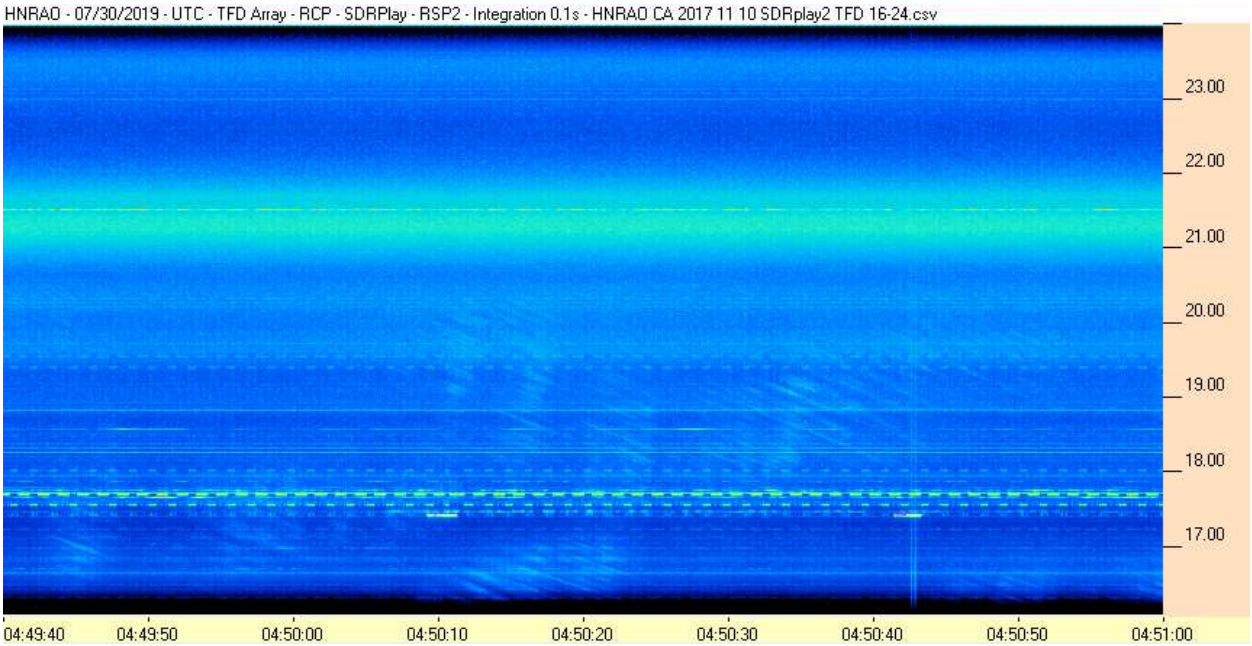
04:47:40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17.00
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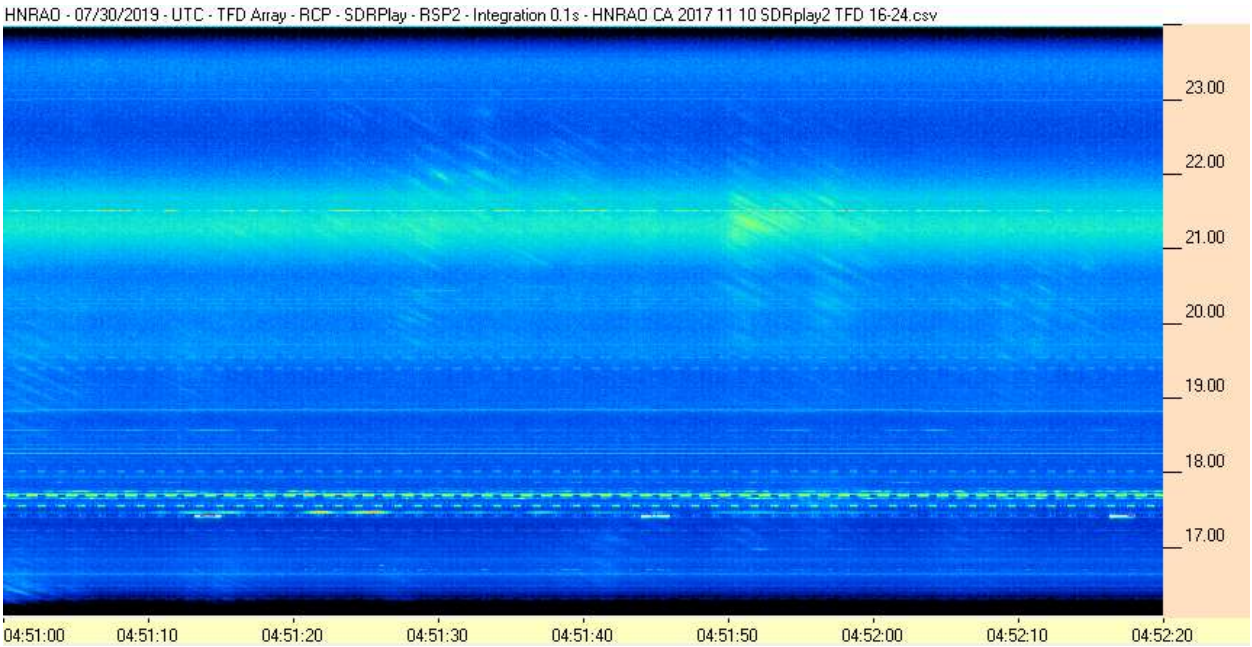
HNRAO - 07/30/2019 - UTC - TFD Array - RCP - SDRPlay - RSP2 - Integration 0.1s - HNRAO CA 2017 11 10 SDRplay2 TFD 16-24.csv
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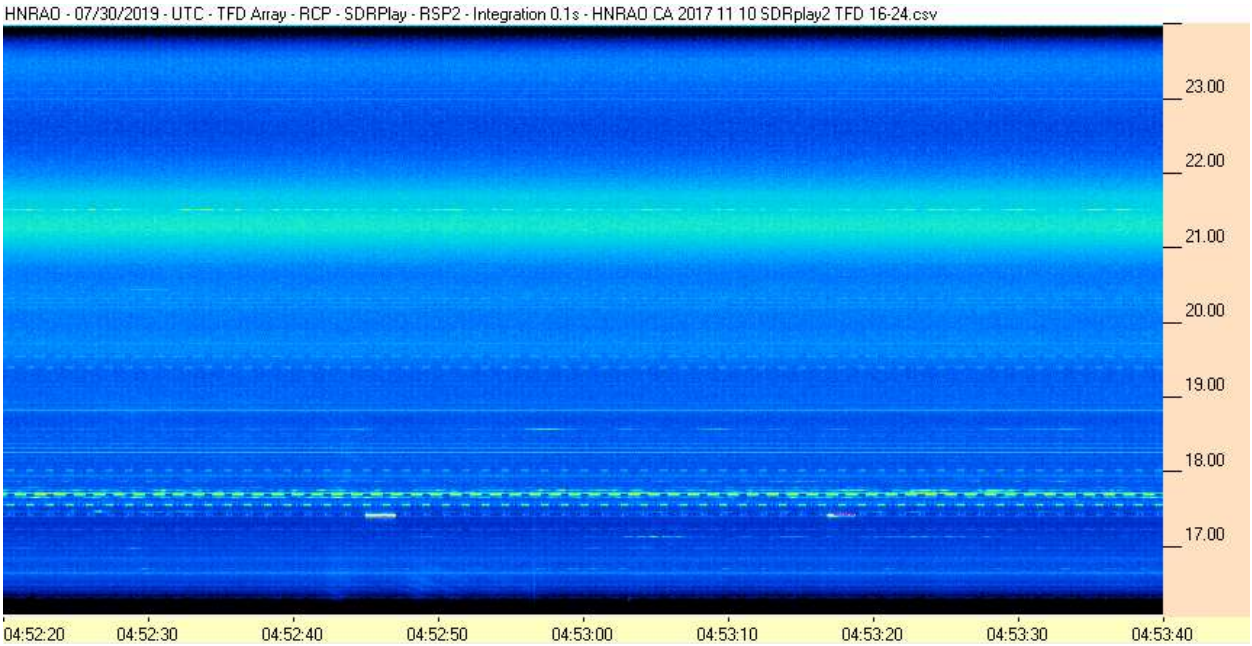
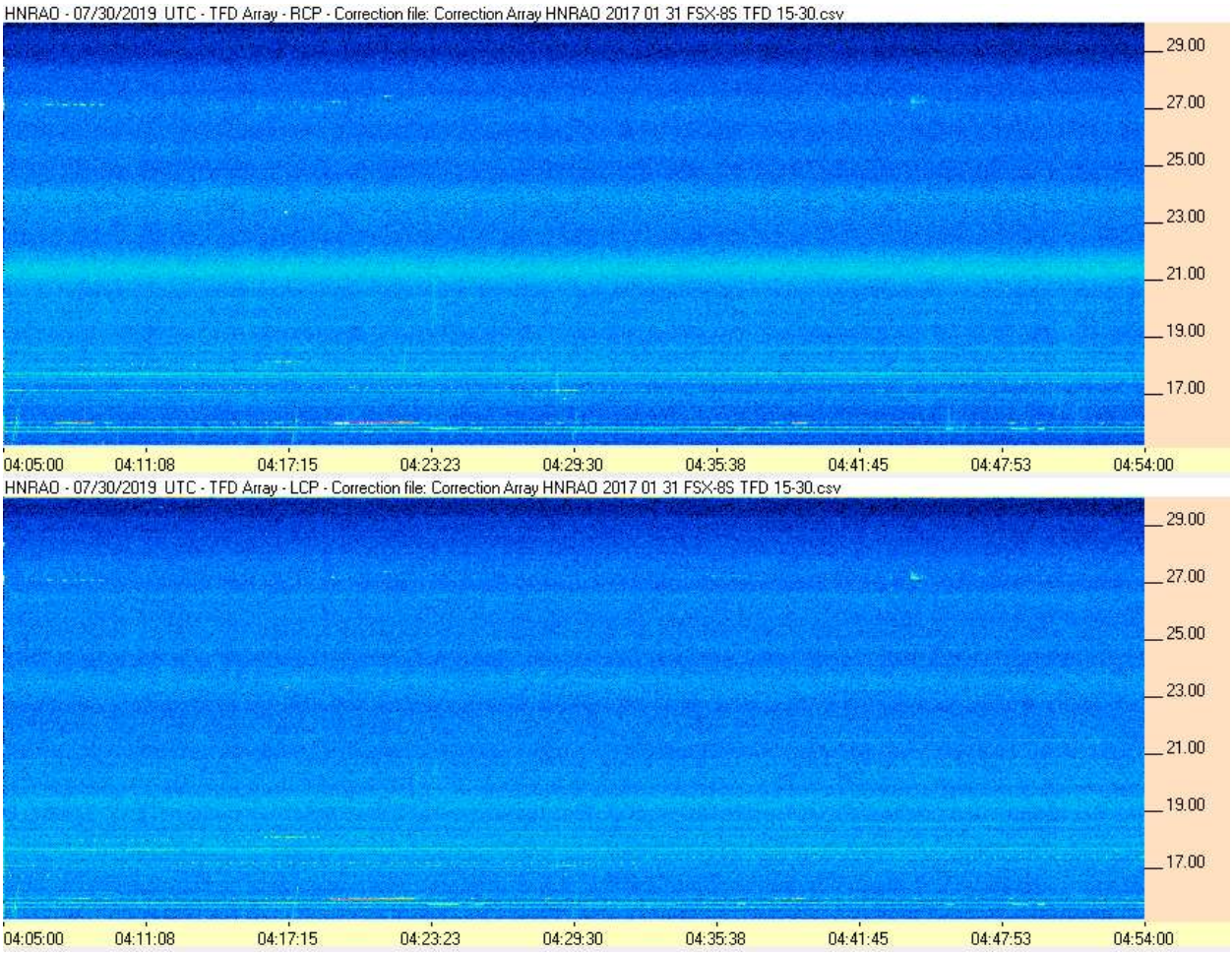


FSX-8S / TFD Array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19.00
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04:23:23
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04:35:38
04:41:45
04:47:53
04:54:00
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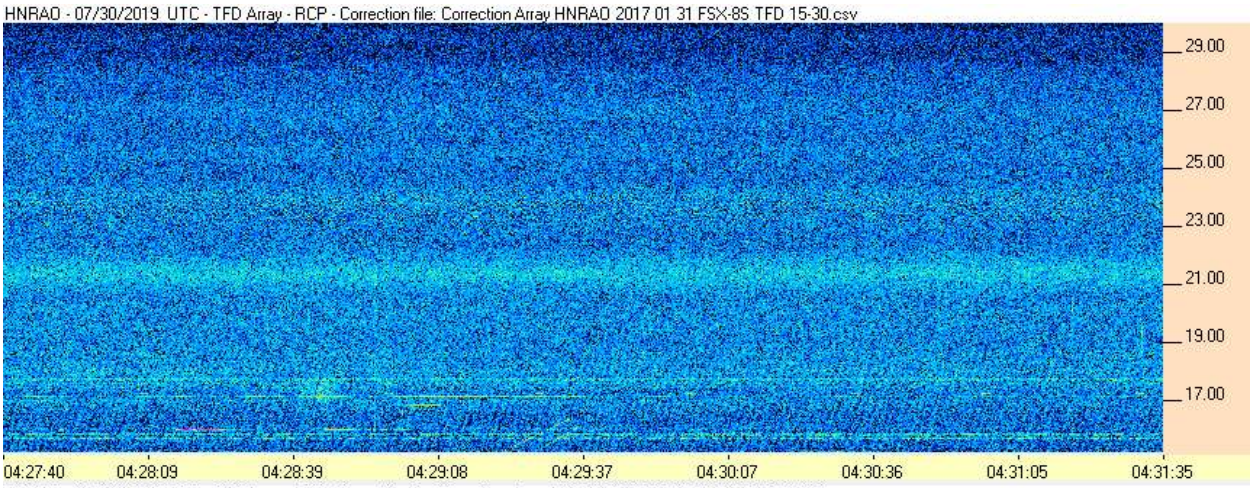

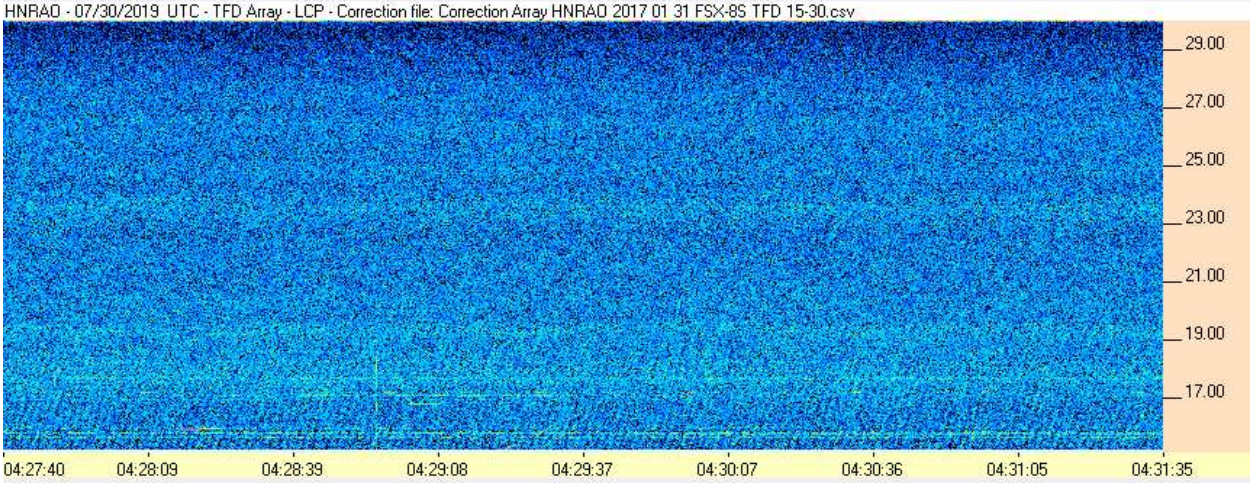

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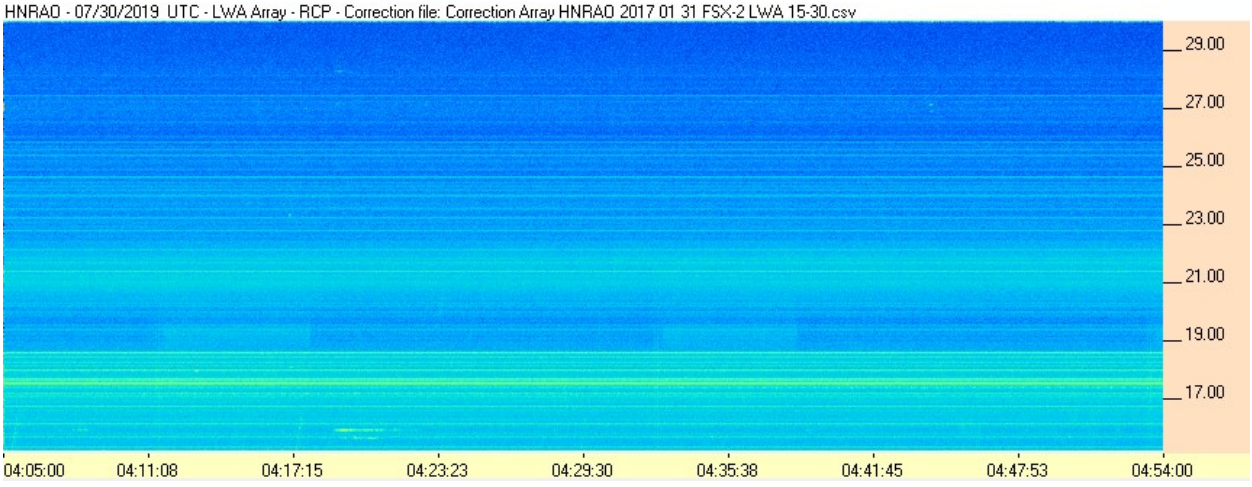

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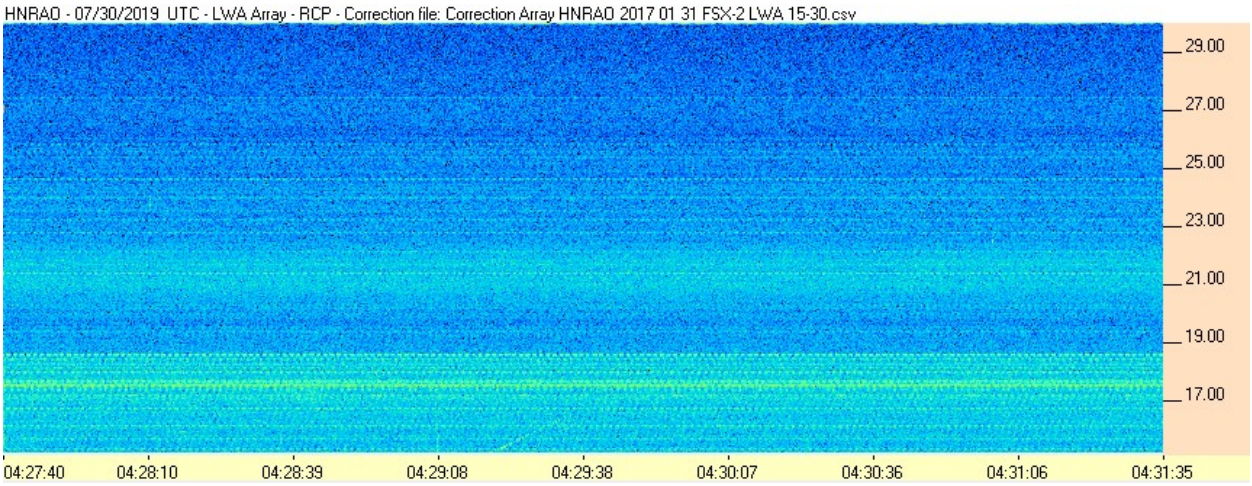
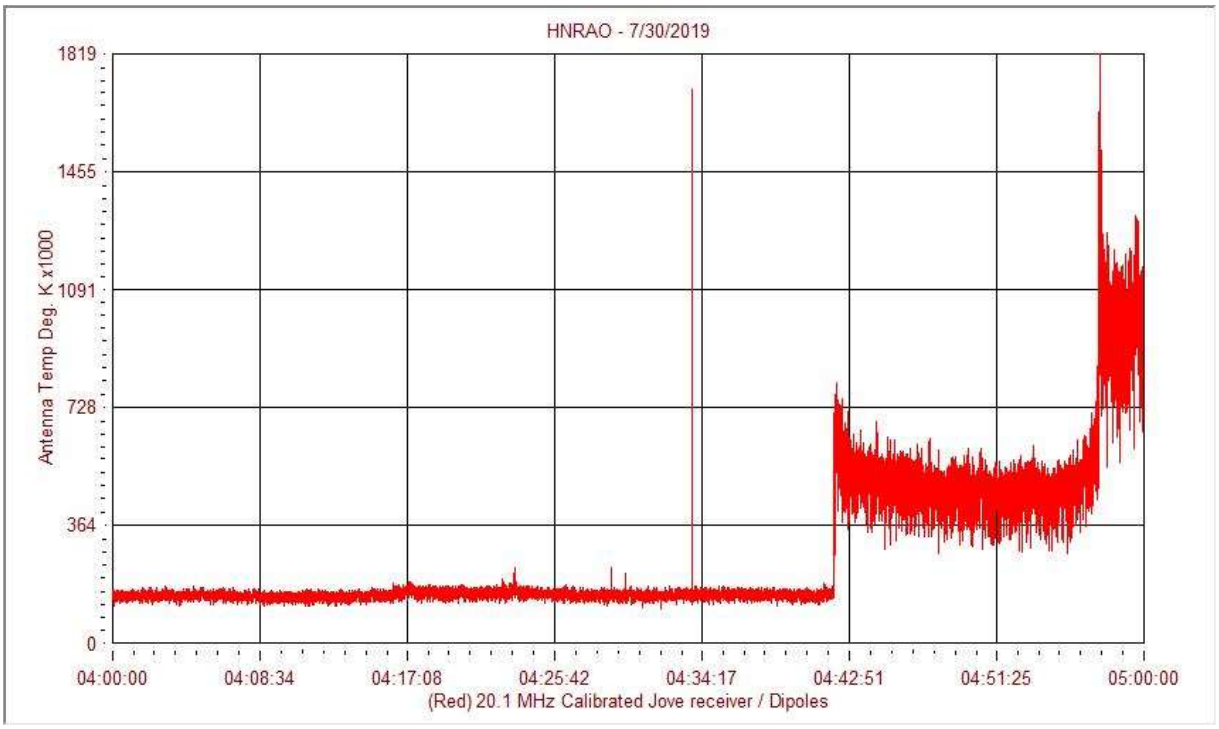


JOVE II Receiver / JOVE Dipole Array



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