HNRAO Observing Log
40.673181 N – 80.437885 W
EN90sq

Date: July 15, 2019

Object: Jupiter – Io-B

Observer: Unattended

Start - Time UT:	**0329**	**Planetary K-index:**	**3**
Jupiter Altitude (deg):	**26.2**	**Jupiter Azimuth (deg):**	**192.0**
Jupiter CML:	**74.52**	**Jupiter Io Phase:**	**060.07**
Jupiter RA (hr/min):	**16:57**	**Jupiter Dec (hr/min):**	**-22:10**
Hour Angle (hr/min):	**00:47**	**Polarization**	**RCP**
Sun Altitude (deg):	**-22.9**	**Sun Azimuth (deg):**	**333.6**
Sun RA (hr/min):	**07:29**	**Sun Dec (hr/min):**	**21:52**

End – Time UT:	**0605**	**De:**	**-2.7**
Jupiter Altitude (deg):	**12.3**	**Jupiter Azimuth (deg):**	**225.9**
Jupiter CML:	**165.21**	**Jupiter Io Phase**	**081.11**
Hour Angle (hr/min):	**03:17**	**Duration (min):**	**186**
Sun Altitude (deg):	**-26.6**	**Sun Azimuth (deg):**	**011.8**
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 1	TFD	RCP	-8.35 dB	#2 RCP	Port 3 +3 dB	04/20/2018
JOVE 1	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	4/19/2019
SDRPlay RSP1	Experimental*					

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
* 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.

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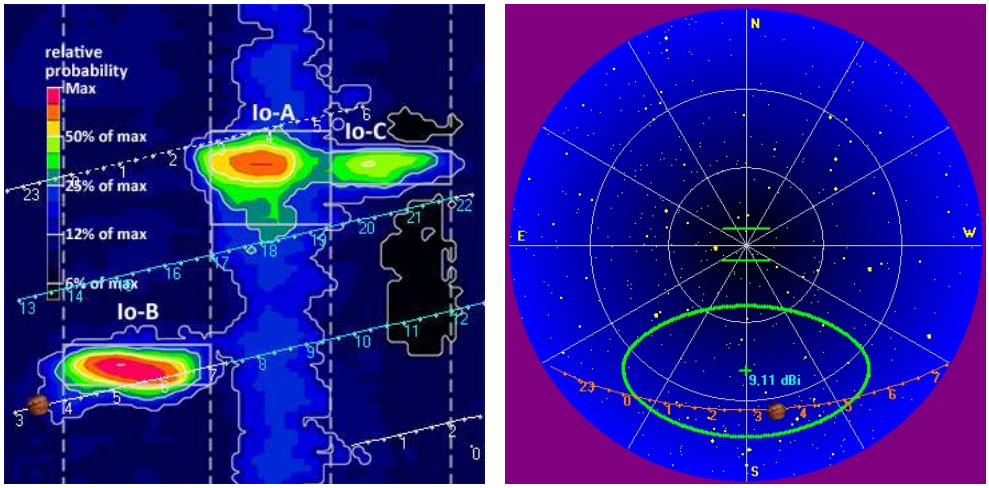

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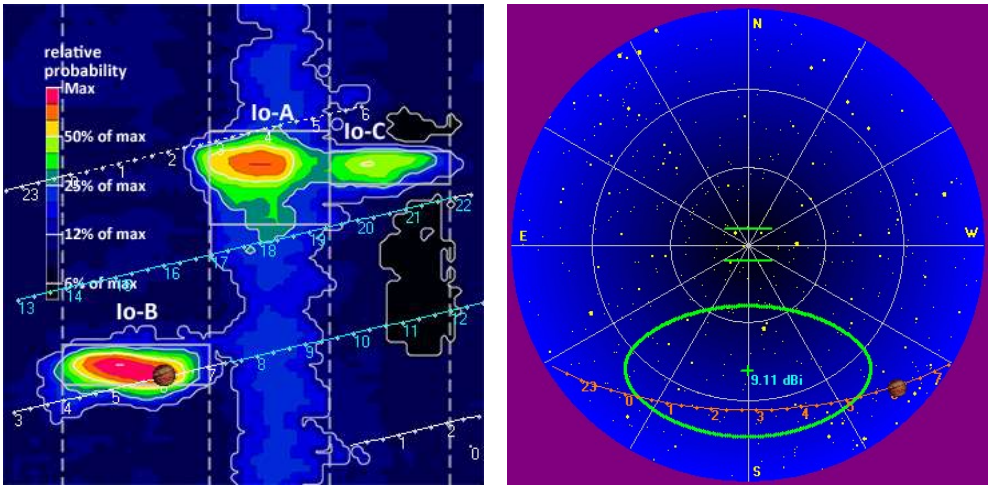

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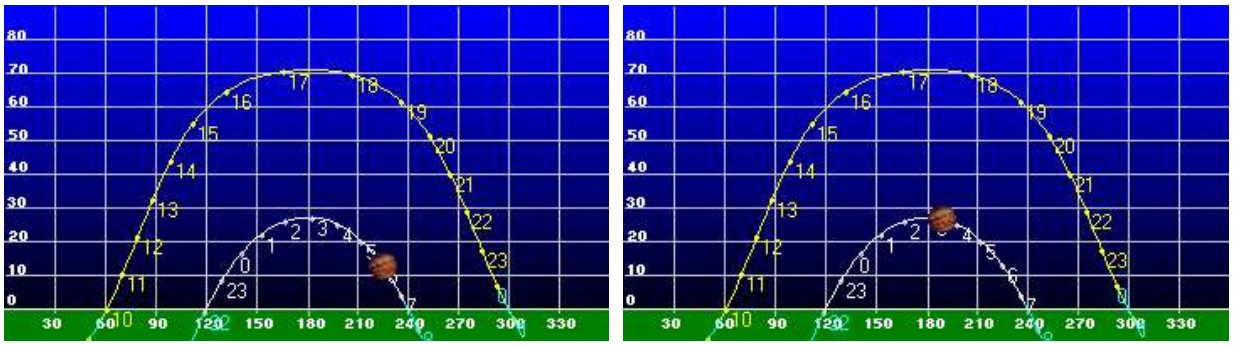
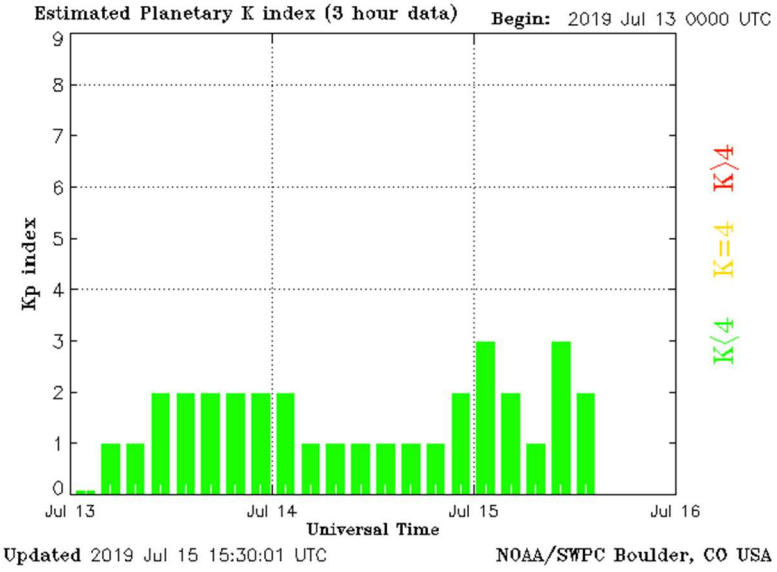


MODE	CML RANGE	Io RANGE	MAX F	POLAR	ARC	NOTES
Io-D	0-200	95-130	18	LH	Early	Also called "fourth source"
Io-B	(105 - 185)	(80-110)	39.5	RH	Early	Also called "early source"
non Io-B	80-200	0-360	38	RH	Early	Voyager info
Io-A	(200-270)	(205-260)	38	RH	Late	Also called "main source"
non-Io-A	(230-280)	0-360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



All observatory spectrographs, receivers and antennas were operating normally with no known issues. All spectrographs were, for the most part, free from RFI. The Radio JOVE II / JOVE Dipole array was subject to RFI beginning at about 0325 UT rendering it unable to collect useable data. On a positive note, the emissions that were strong enough to be observed with the JOVE II receiver were not present at 20 MHz, so no data was lost with that telescope.

An Io-B storm composed of weak L-bursts with L2 modulation lanes and S-bursts. There were two N-events observed, one between 0501:50 UT and 0502:20 UT. The second N-event was weaker and was observed between 0602:48 UT and 0604:55 UT, almost an hour apart.

Most of the L-bursts were 1-2 dB above GB as observed here. There were several exceptions that were 3-4 dB above GB, most notably the N-event at 0501:50 UT.

There was a brief flurry of S-bursts between 0550 UT and 0556 UT. These were weak S-bursts but were clearly identifiable.

It was an unremarkable storm demonstrating scintillation as fading was observed throughout the entire storm.

An examination of the LCP data from this same time period did not show any Io-D emissions.

EOR

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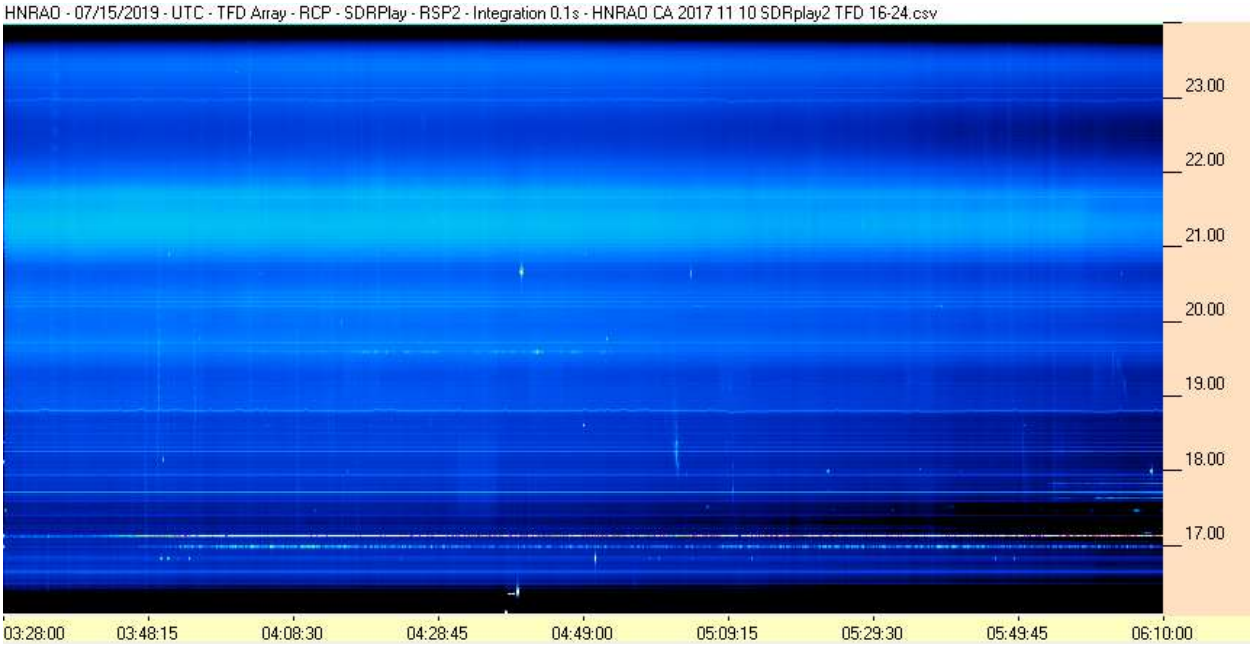
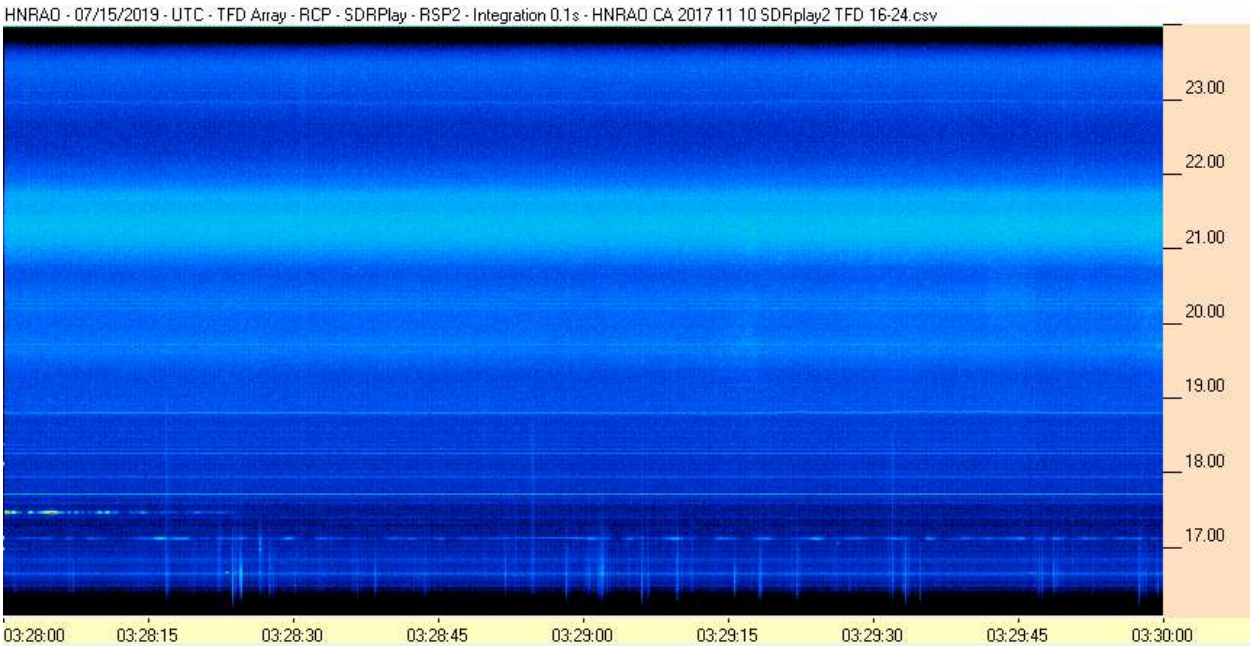
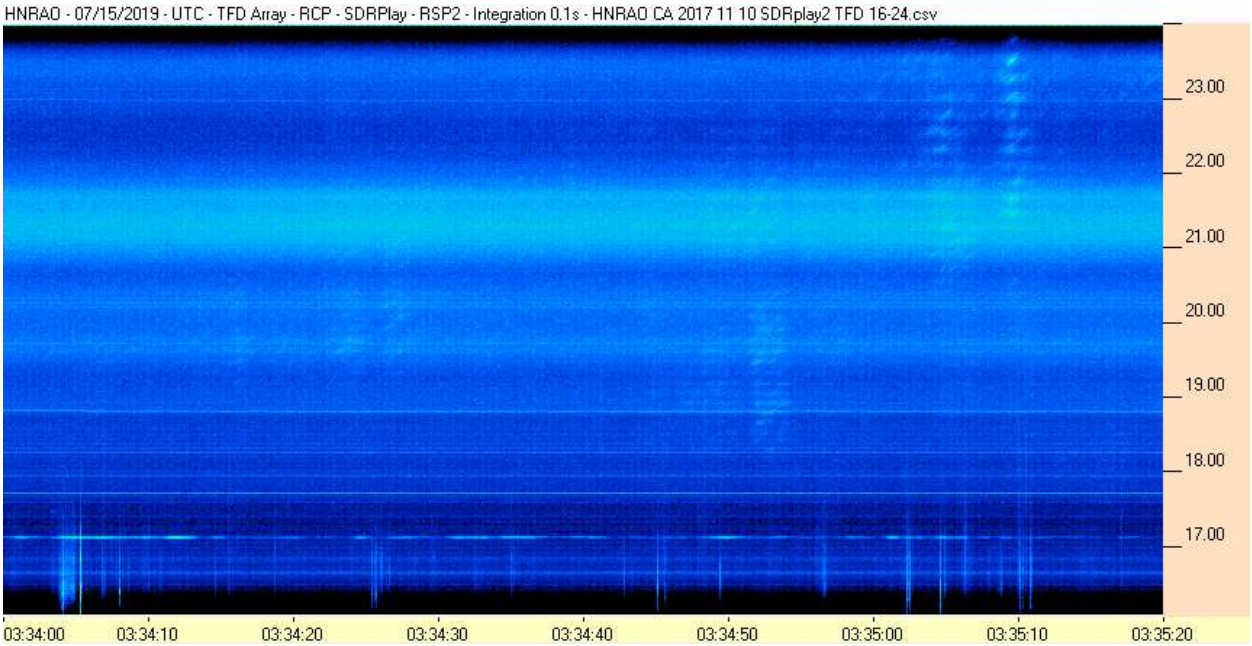
SDRPlay RSP2 / TFD Array



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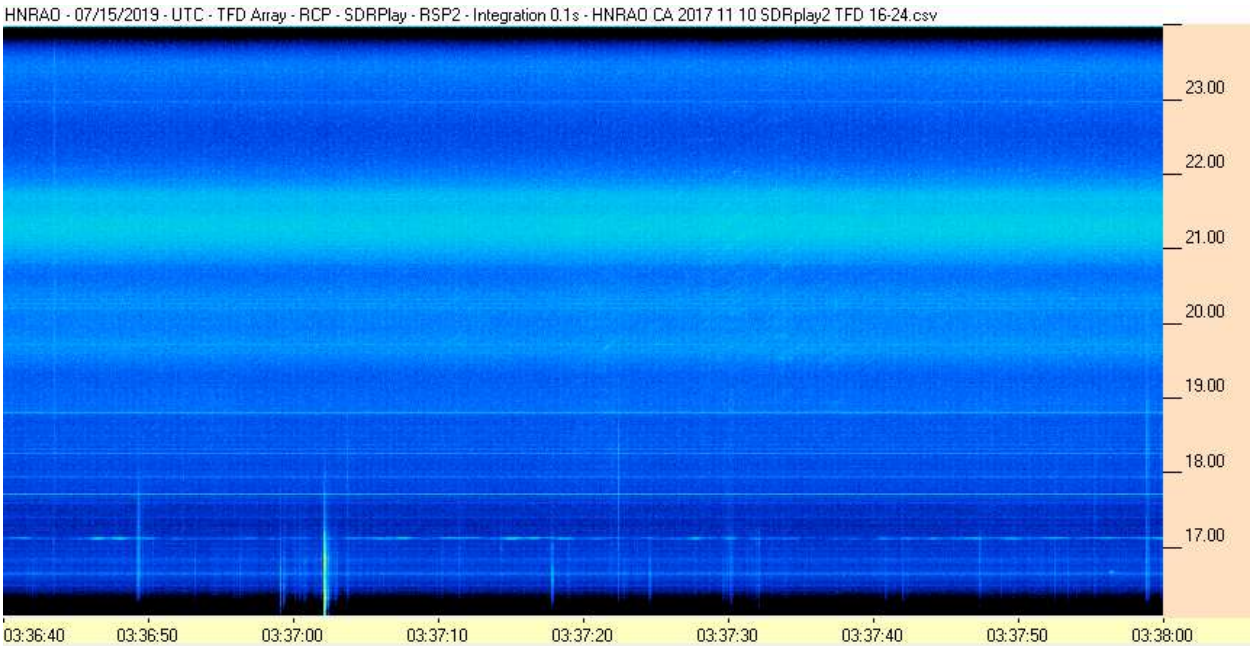
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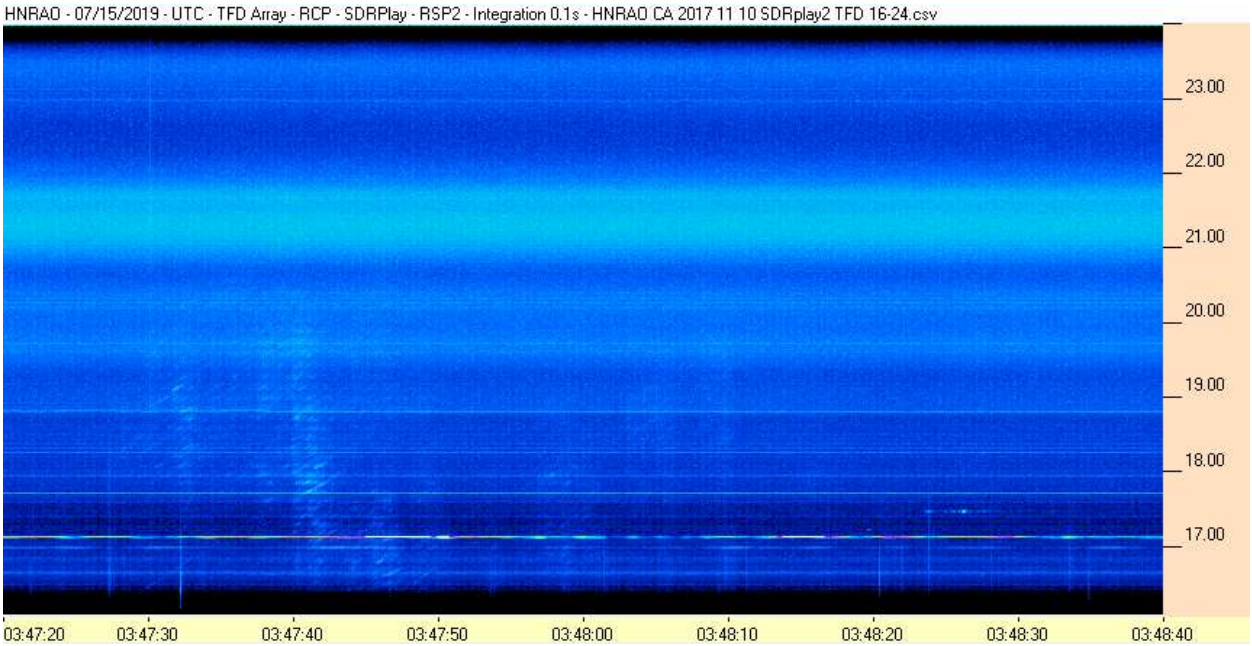
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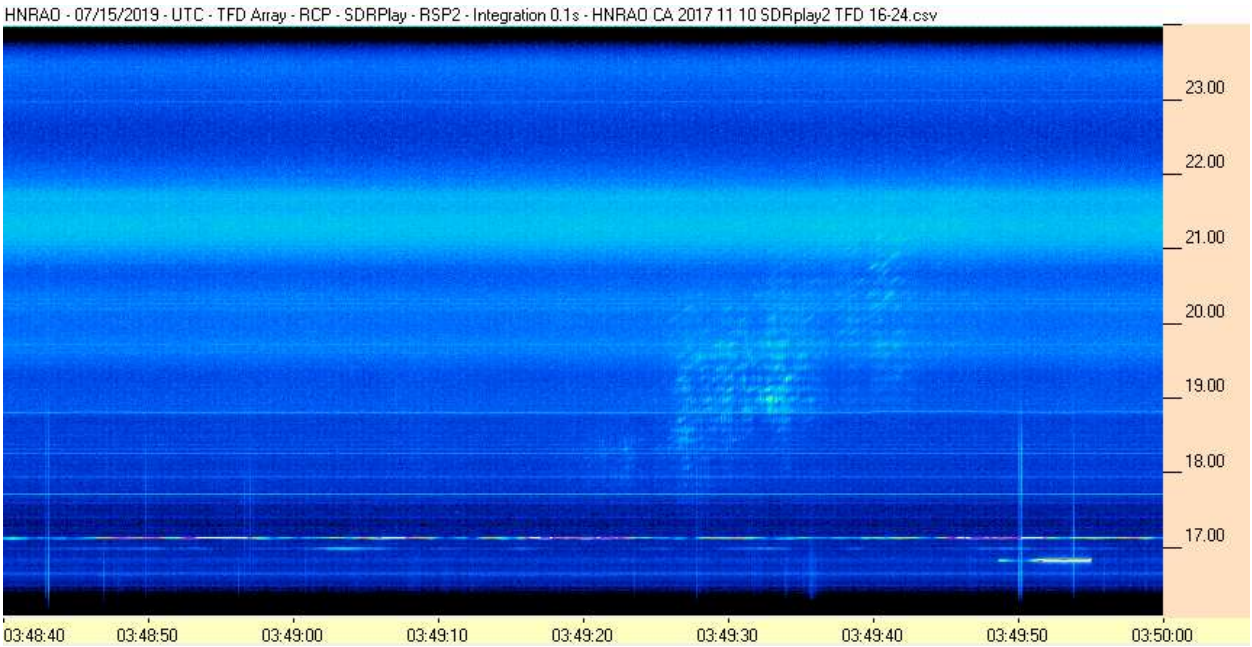
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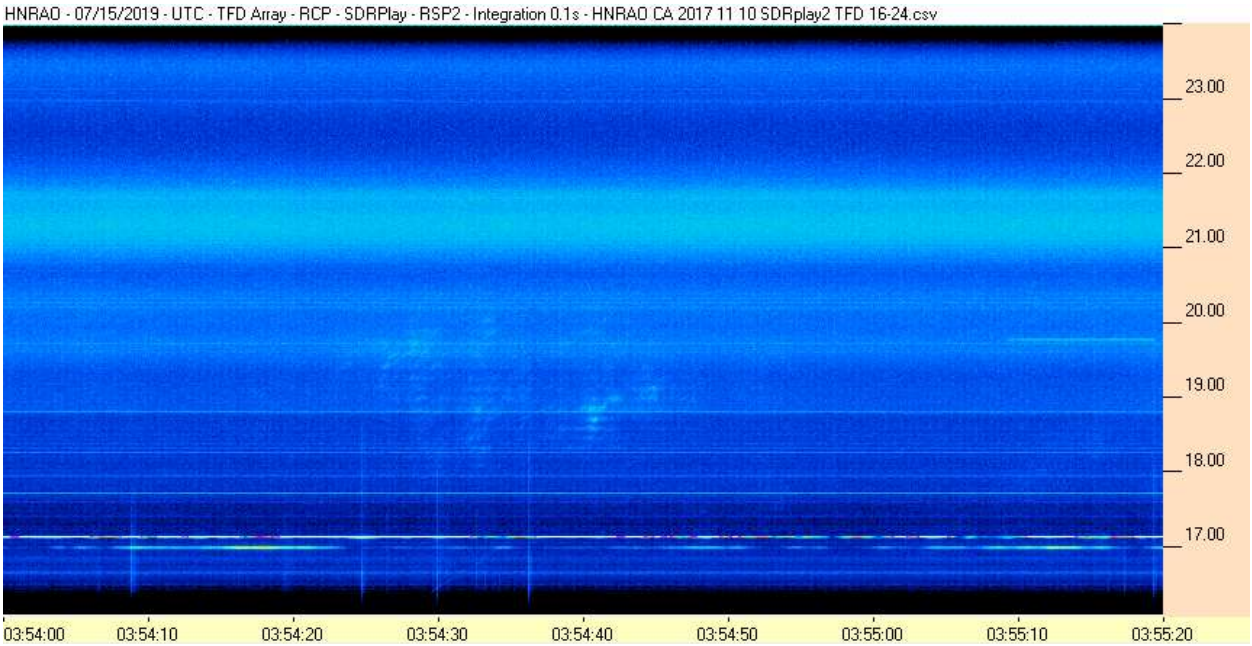
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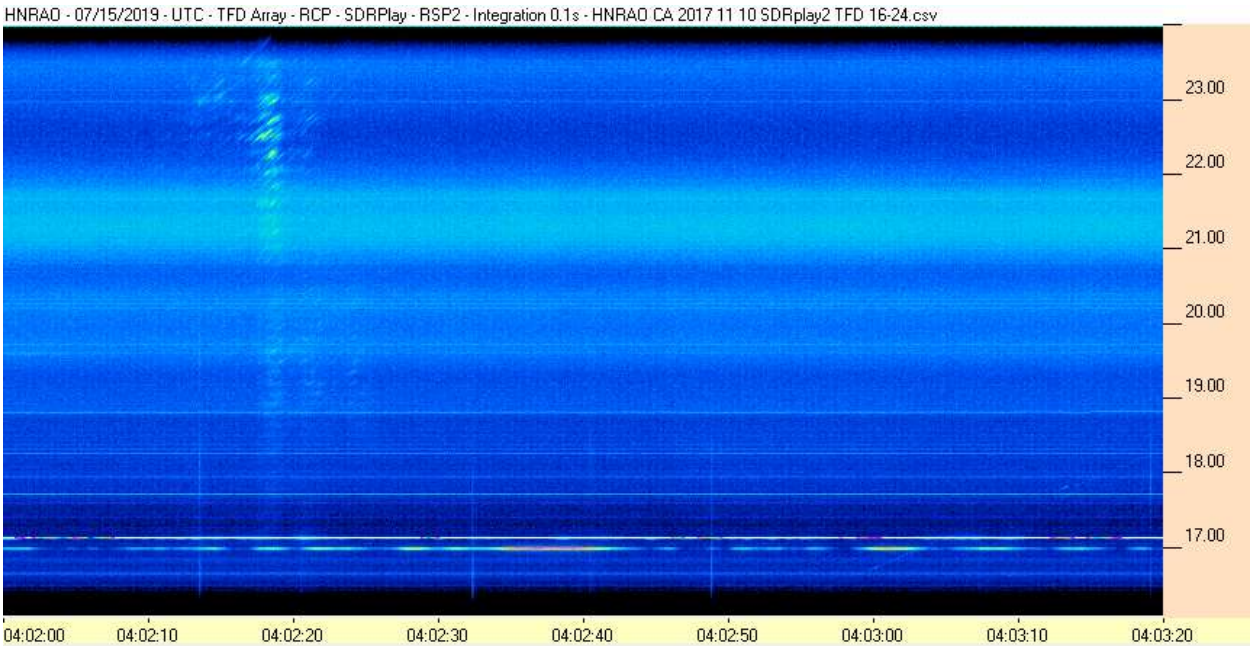
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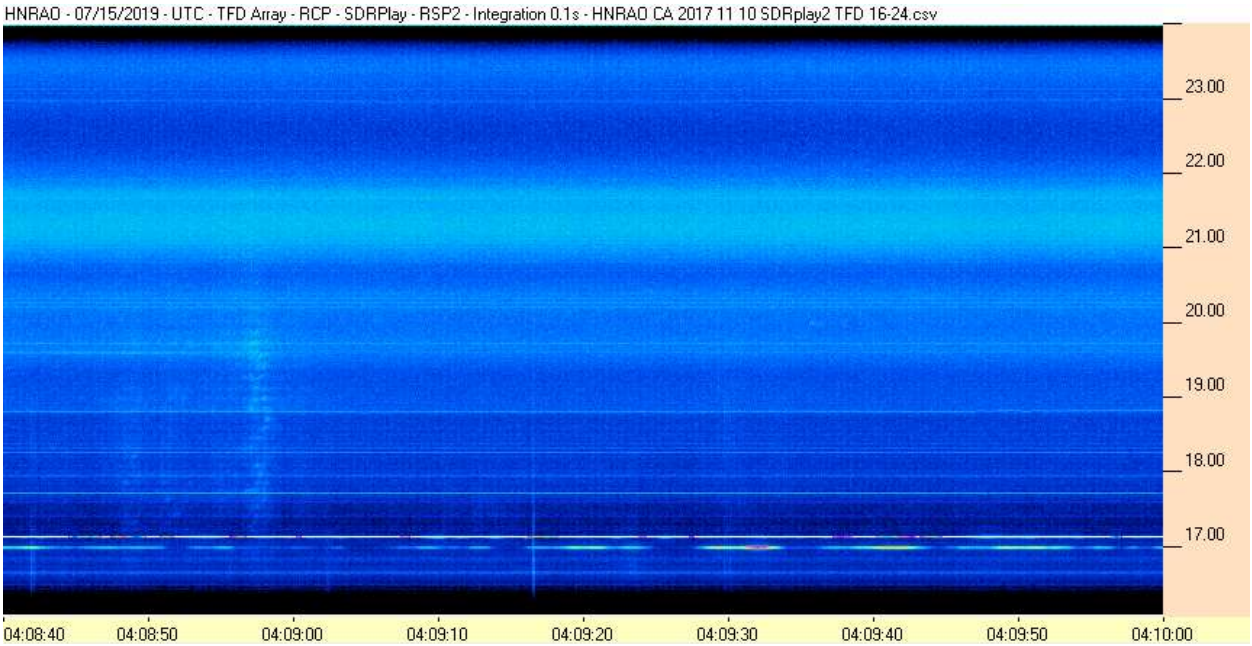
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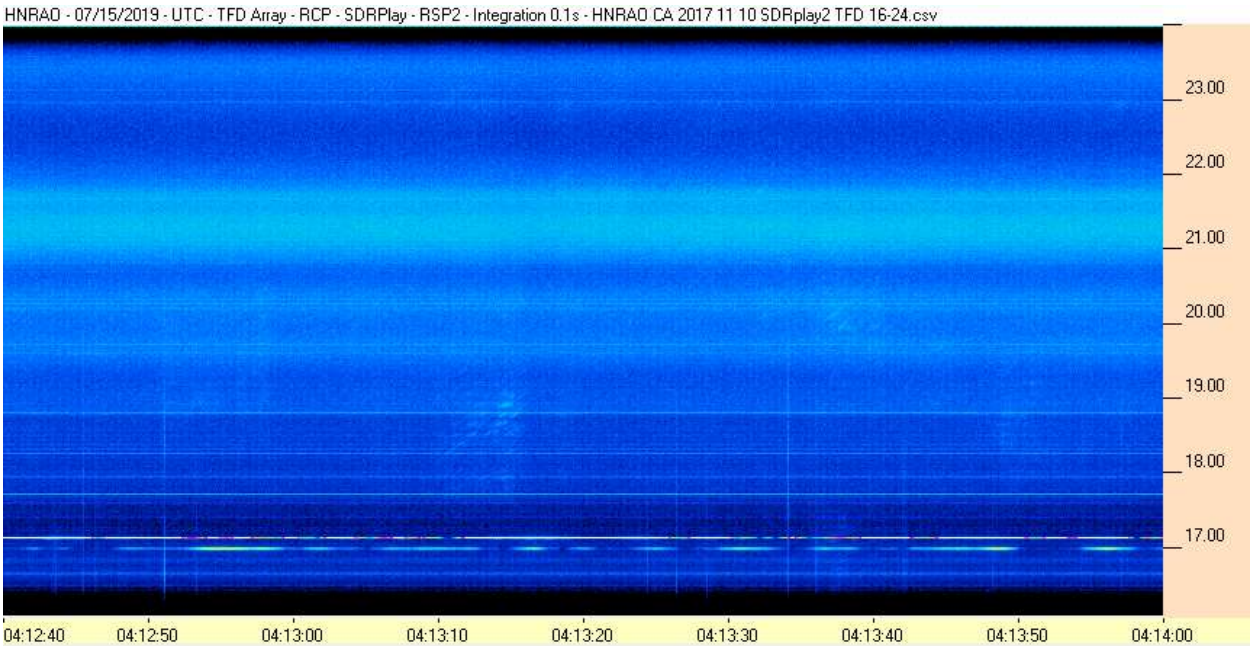
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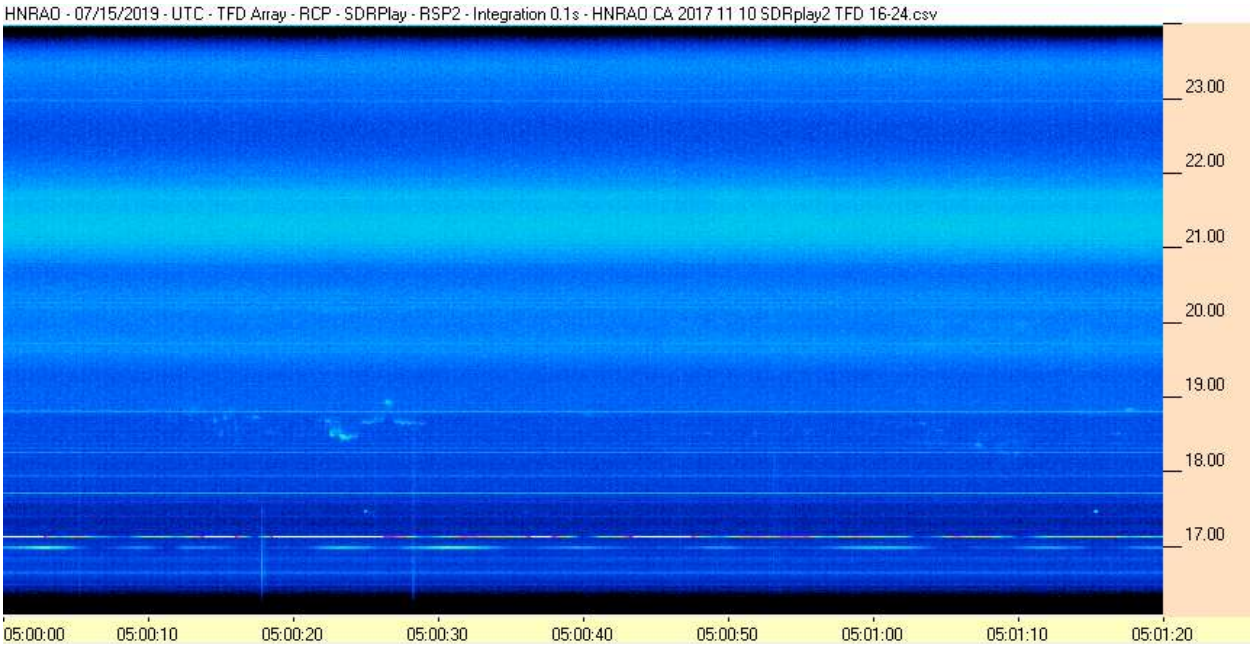
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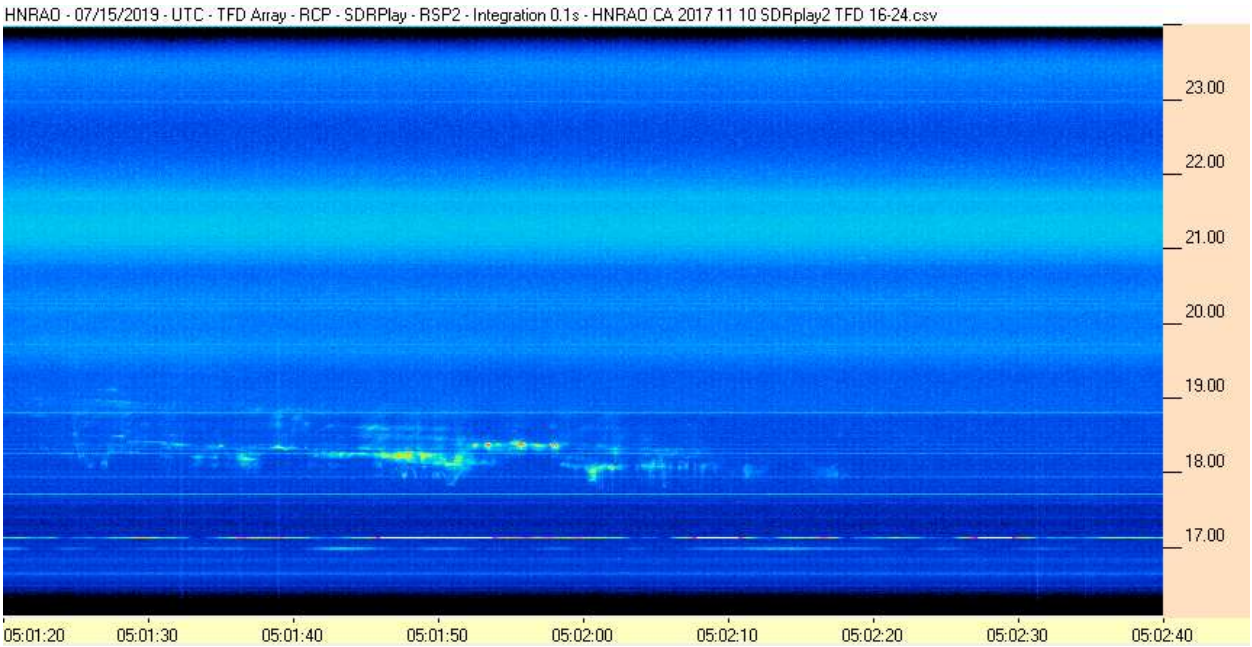
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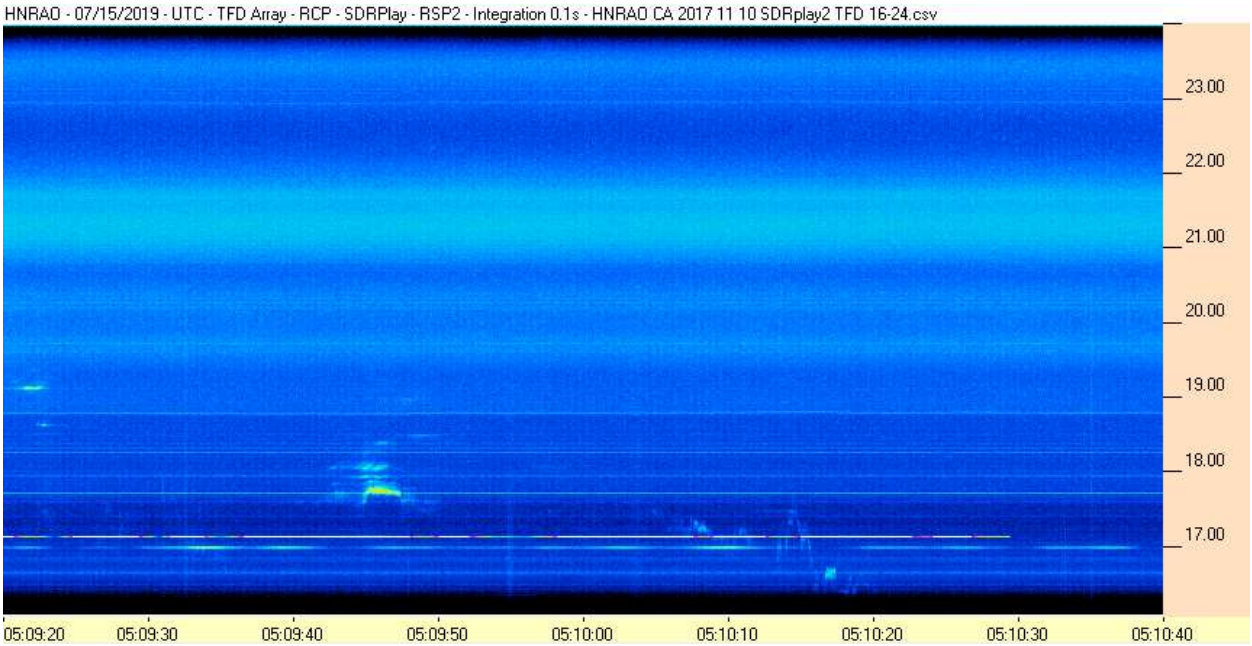
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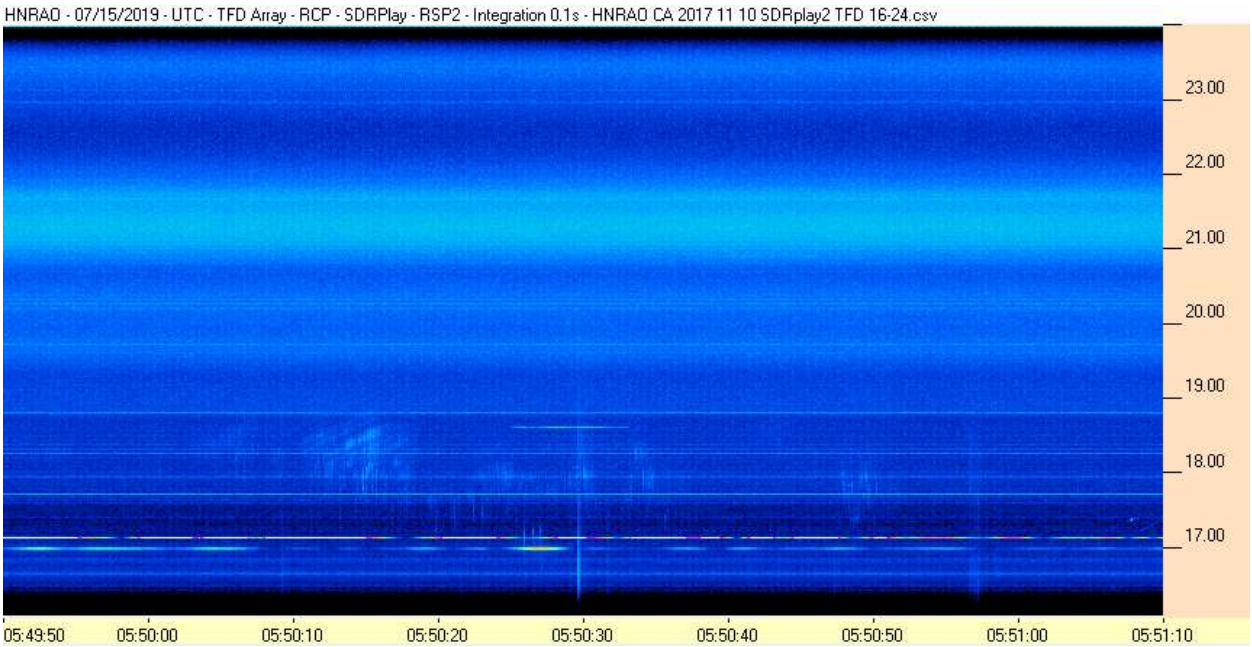
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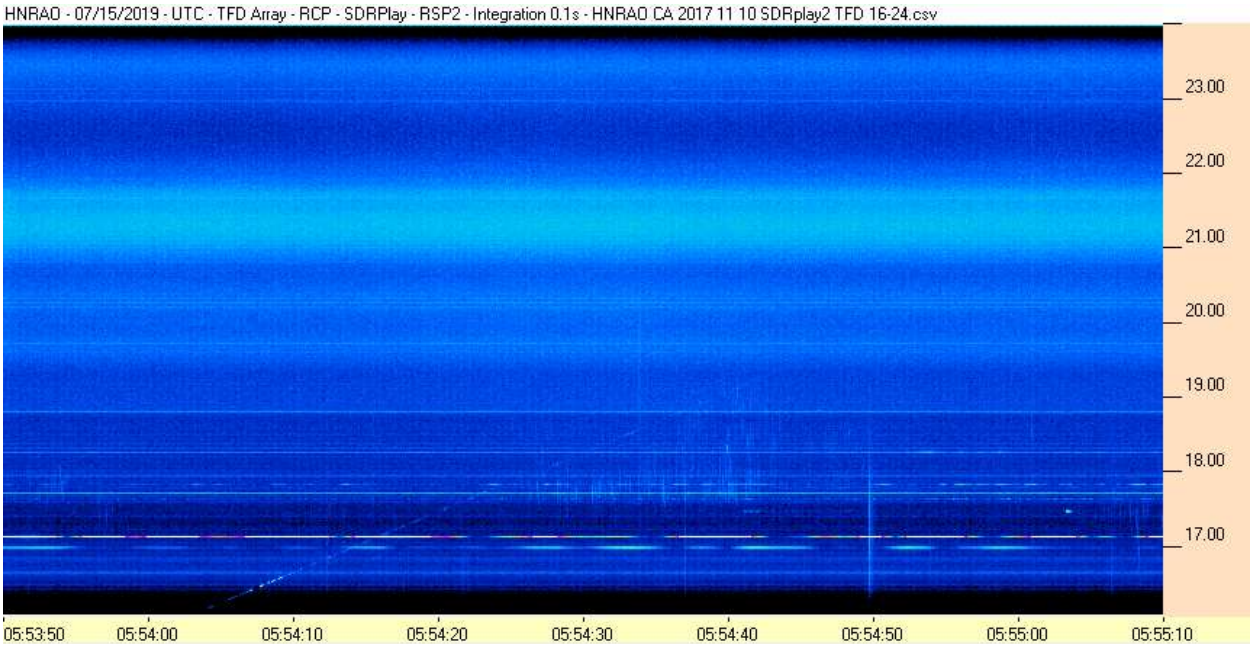
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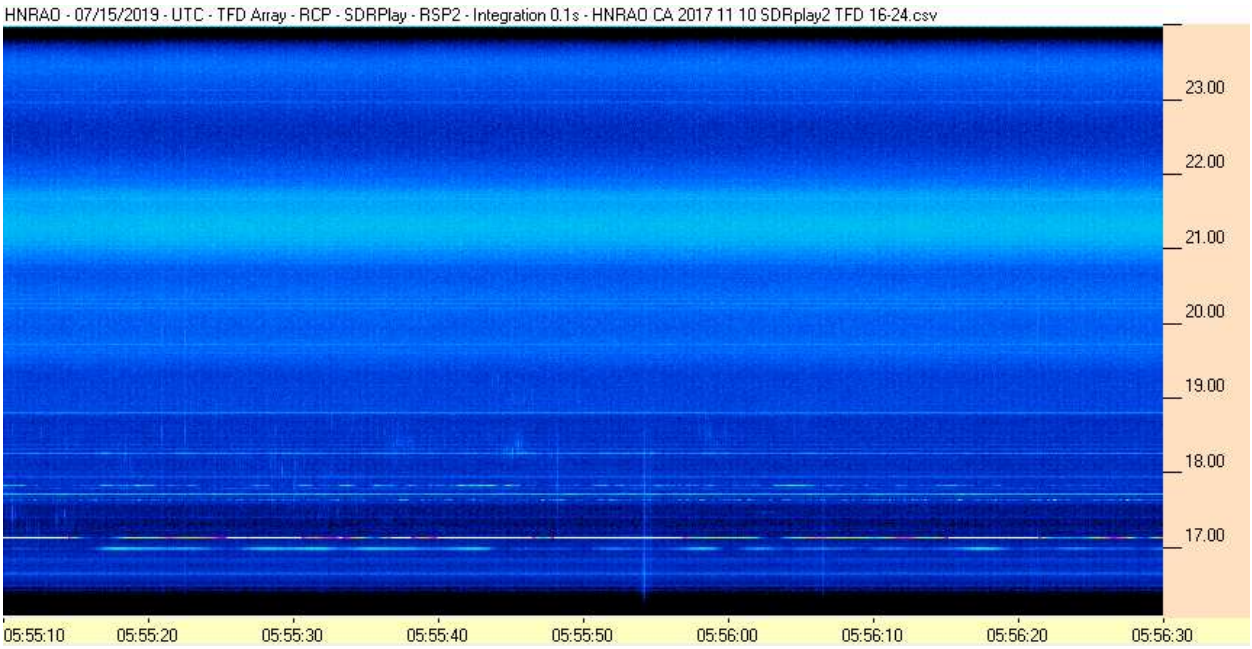
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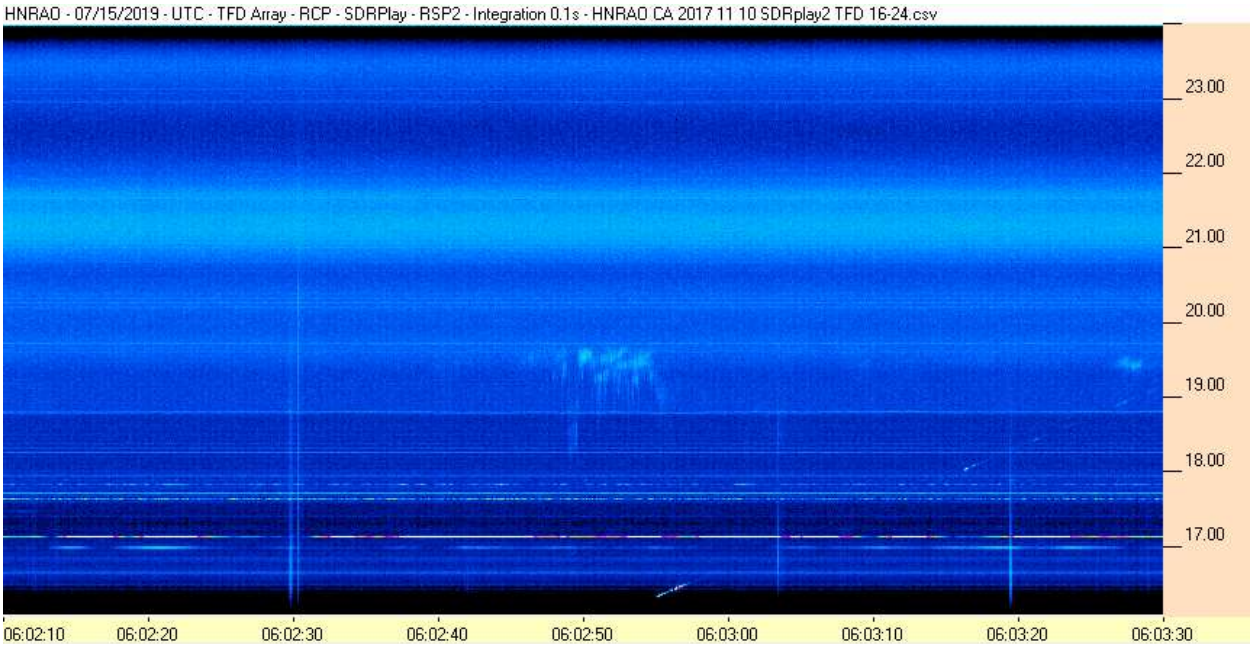
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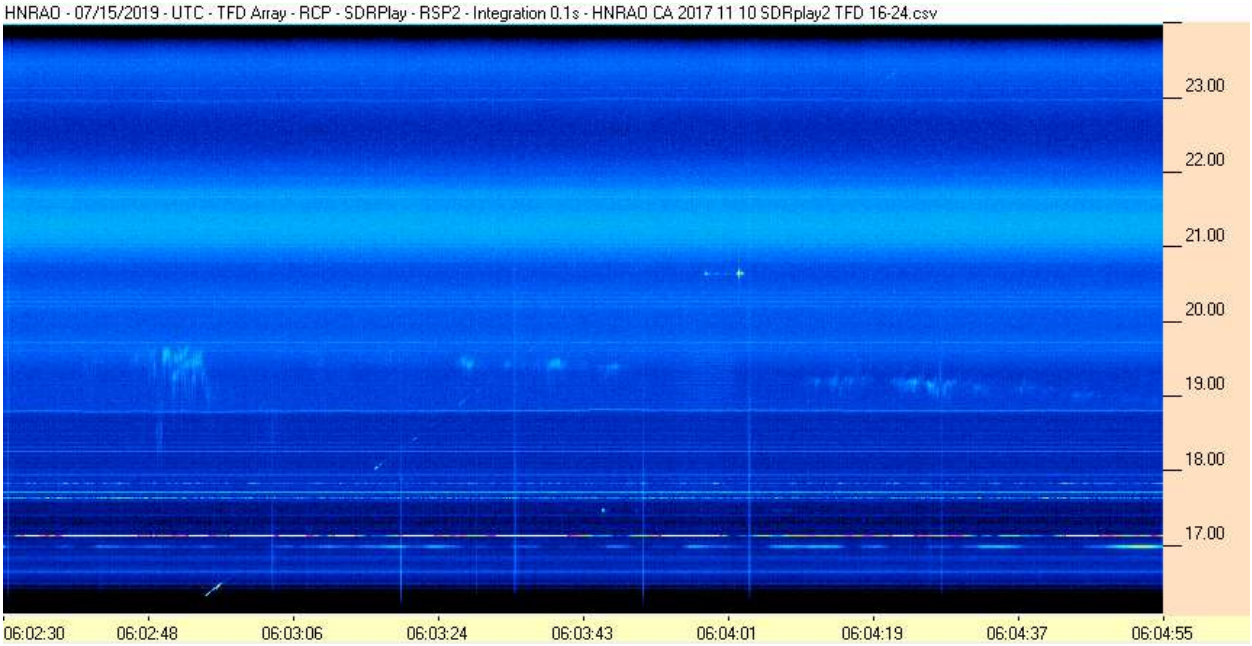
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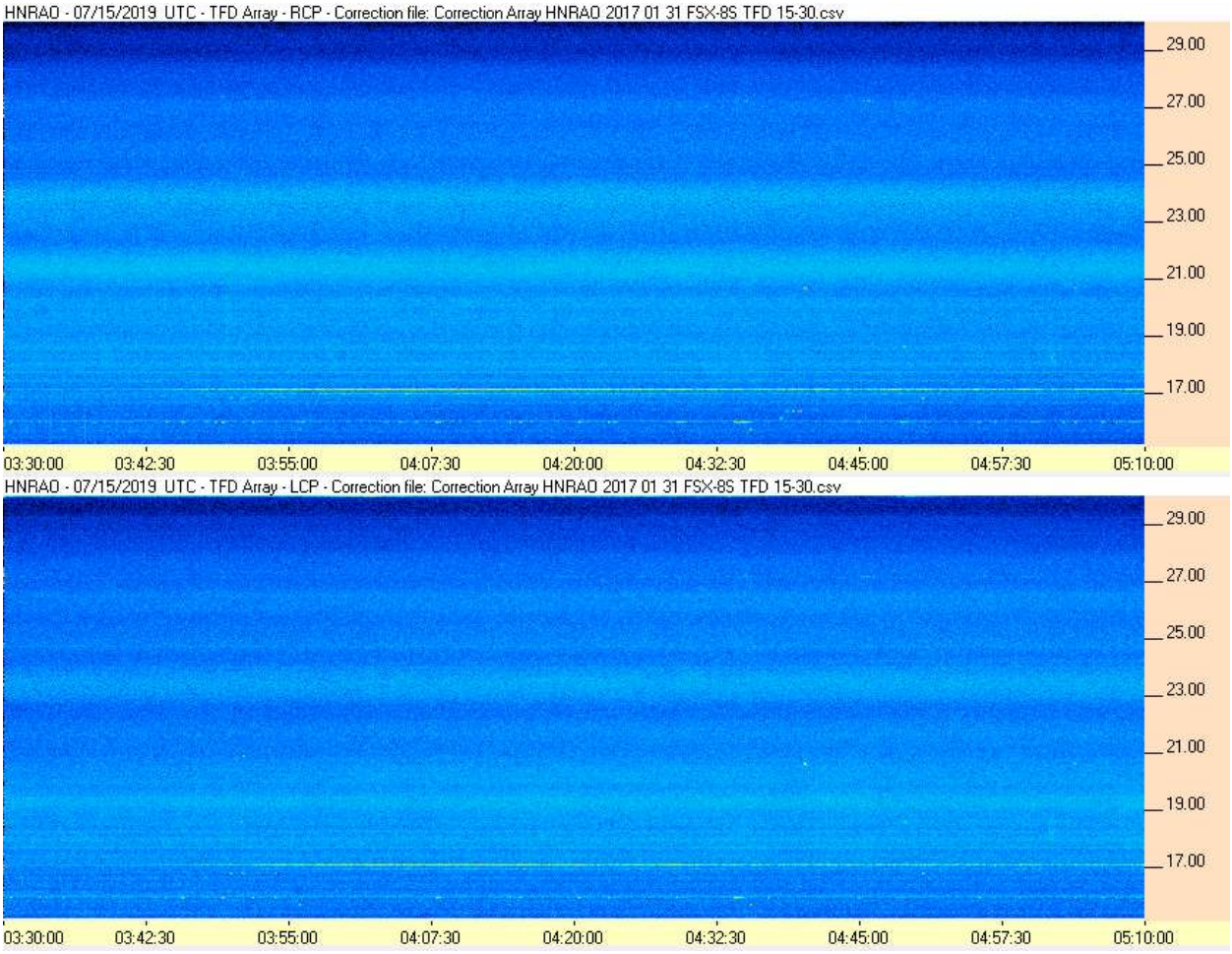
FSX-8S / TFD Array



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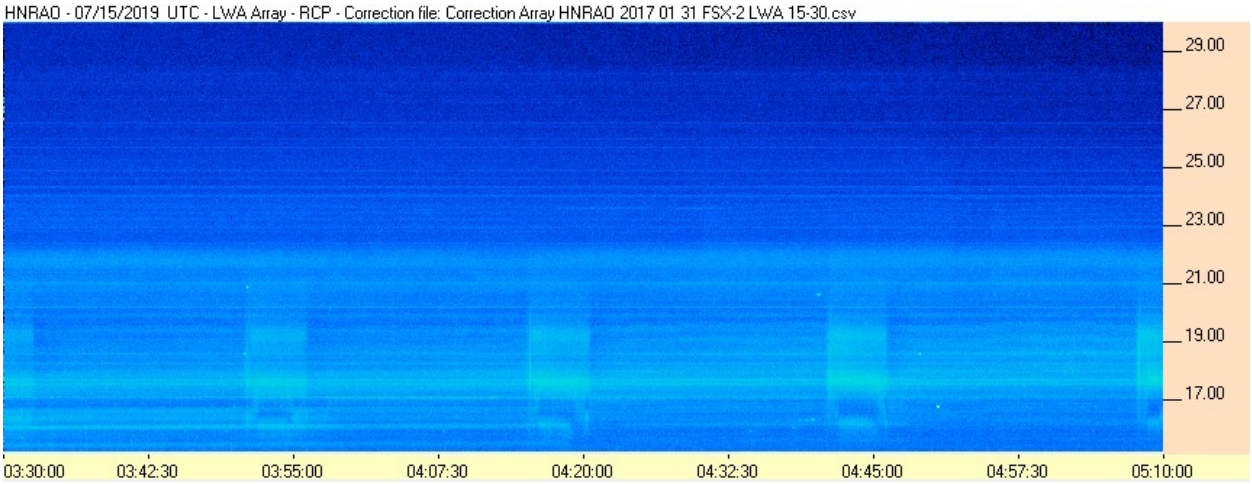
FSX-2 / LWA Array



Radio JOVE II / JOVE Dipole Array