HNRAO Observing Log
40.673181 N – 80.437885 W
EN90sq

Date: May 4, 2019

Object: Jupiter – Io-A

Observer: Unattended

Start - Time UT:	**0815**	**Planetary K-index:**	**3**
Jupiter Altitude (deg):	**26.6**	**Jupiter Azimuth (deg):**	**182.5**
Jupiter CML:	**197.04**	**Jupiter Io Phase:**	**199.83**
Jupiter RA (hr/min):	**17:31**	**Jupiter Dec (hr/min):**	**-22:39**
Hour Angle (hr/min):	**00:10**	**Polarization**	**RCP**
Sun Altitude (deg):	**-19.6**	**Sun Azimuth (deg):**	**047.4**
Sun RA (hr/min):	**02:37**	**Sun Dec (hr/min):**	**15:21**

End – Time UT:	**0933**	**De:**	**-2.8**
Jupiter Altitude (deg):	**23.5**	**Jupiter Azimuth (deg):**	**202.1**
Jupiter CML:	**244.2**	**Jupiter Io Phase**	**210.81**
Hour Angle (hr/min):	**01:28**	**Duration (min):**	**78**
Sun Altitude (deg):	**-07.5**	**Sun Azimuth (deg):**	**062.2**
Max Frequency MHz	**24**	**Min Frequency MHz**	**15**

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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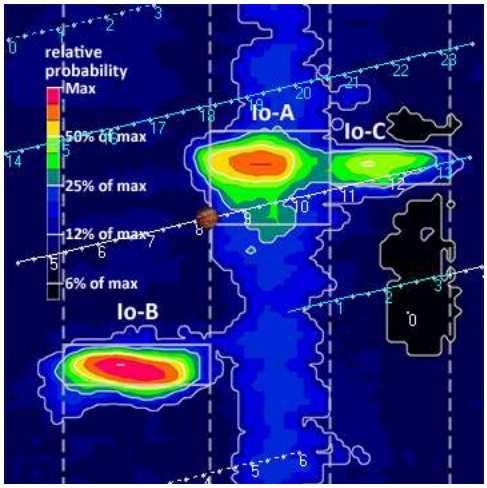
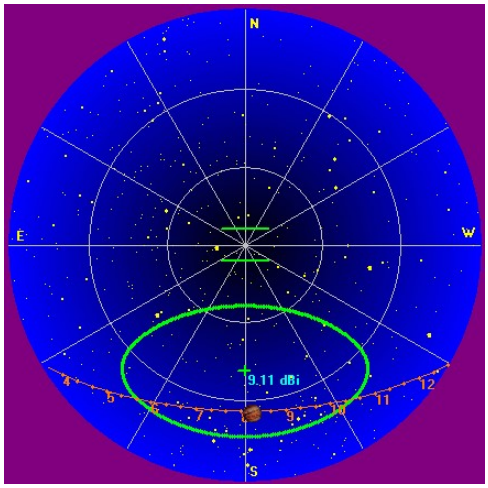
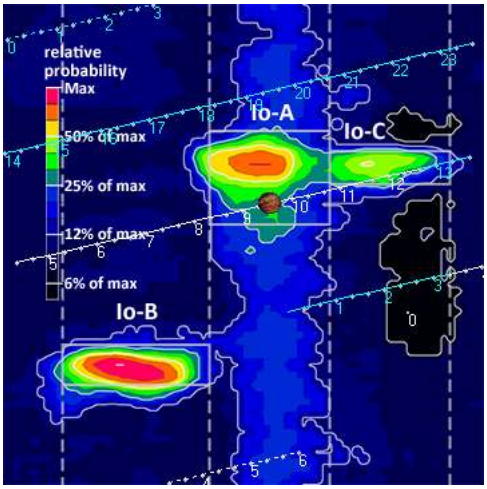
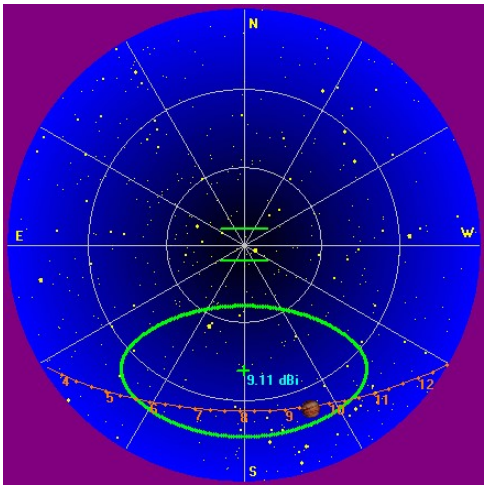


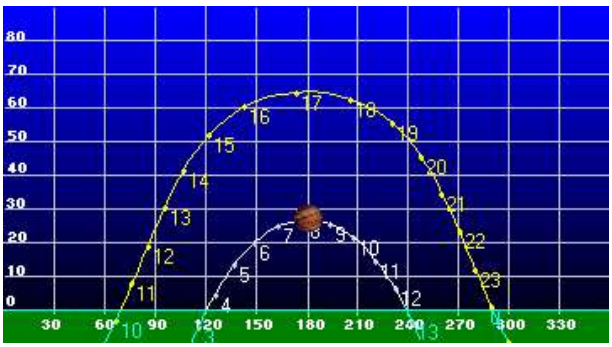


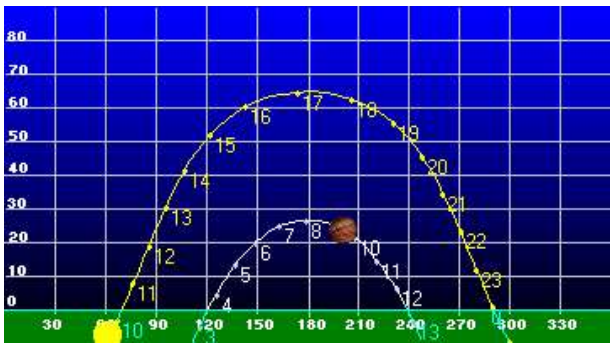
Beginning of Pass





End of Pass





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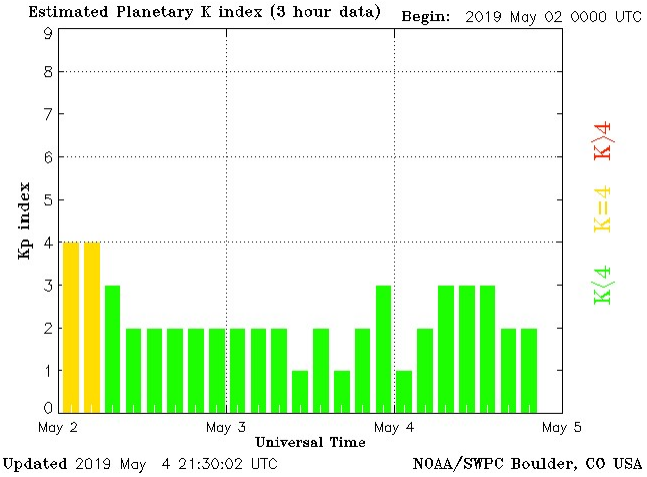
MODE	CML RANGE	Io RANGE	MAX F	POLAR	ARC	NOTES
Io-D	0-200	95-130	18	LH	Early	Also called "fourth source"
Io-B	(105 - 185)	(80-110)	39.5	RH	Early	Also called "early source"
non Io-B	80-200	0-360	38	RH	Early	Voyager info
Io-A	(200-270)	(205-260)	38	RH	Late	Also called "main source"
non-Io-A	(230-280)	0-360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



All telescopes were operational. The FSX-8S / TFD array, the FSX-2 / LWA array and the SDRPlay RSP2 / TFD array were able to see this storm. However, both the FSX spectrographs were only able to see the strongest emissions and nothing else (0840 UT to 0852 UT). Of the two FSX spectrographs, the FSX-2 / LWA array had a slight advantage in resolution.

RFI was present in all the spectrographs but not to the point where emissions were not visible. The Radio JOVE / JOVE dipole array was completely overwhelmed by powerline noise and yielded no data.

This storm was observed here beginning at transit +10 minutes. It was a very weak Io-A storm with most emissions perhaps at GB and 1 or 2 dB above GB. L4 modulation lanes with positive drift L-bursts. Storm beginning at 15 MHz, reached it's maximum at 24 MHz, then ending near 17 MHz.

There was a great deal of scintillation and the L-bursts came went with large time gaps where there were no emissions seen at all. This scintillation was both in the frequency domain and time domain.

There was little else of note in this storm.

EOR

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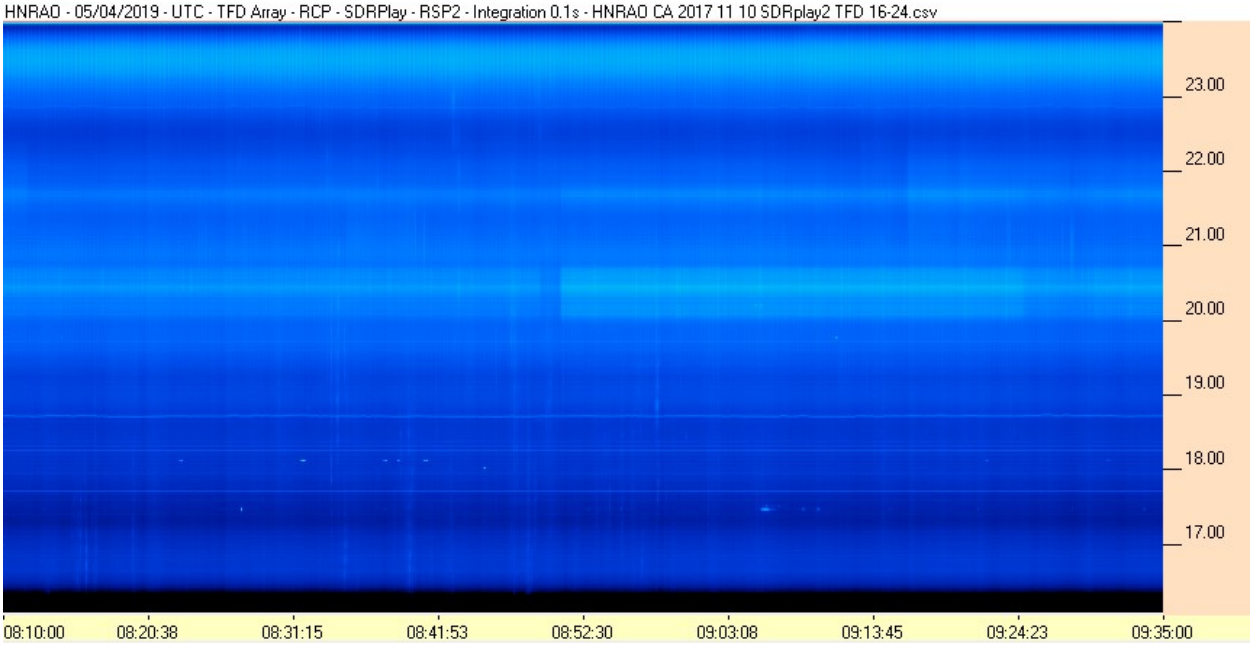
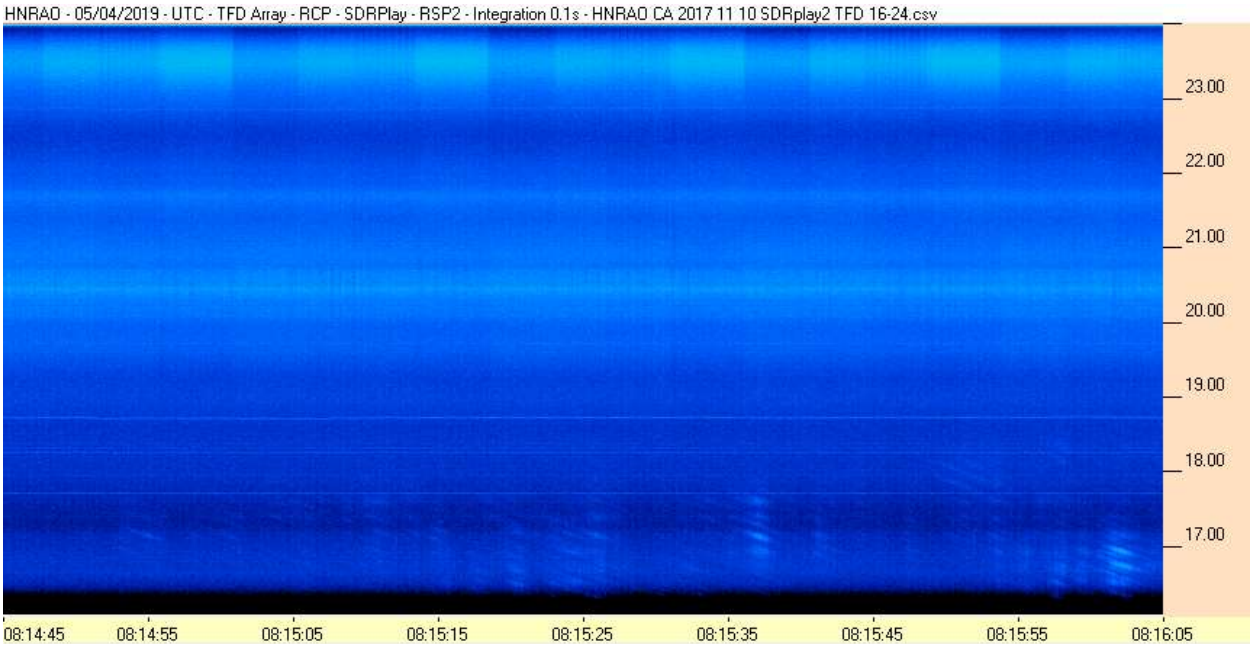
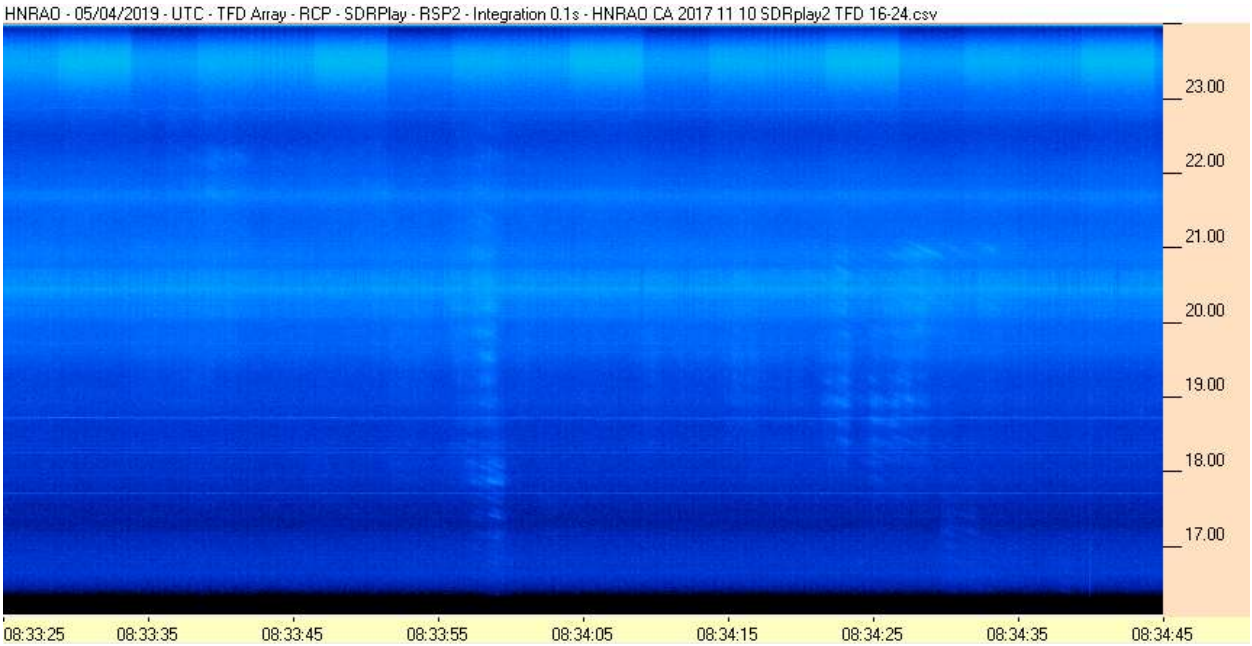
SDRPlay RSP2 / TFD Array



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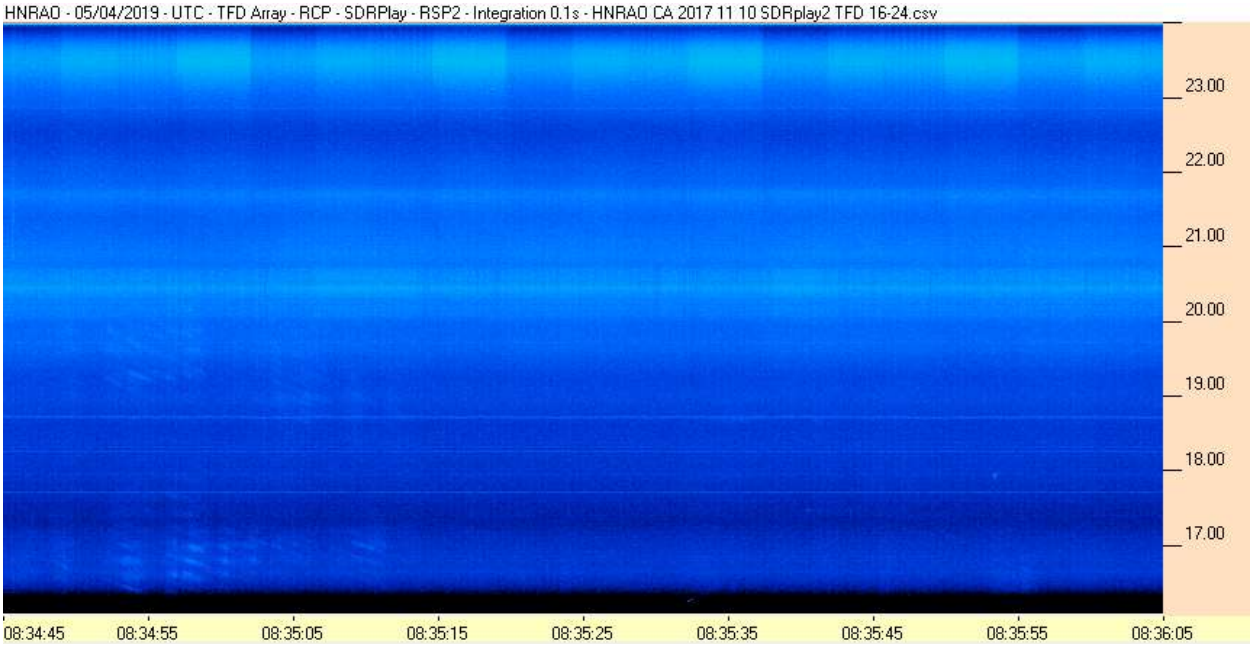
08:34:45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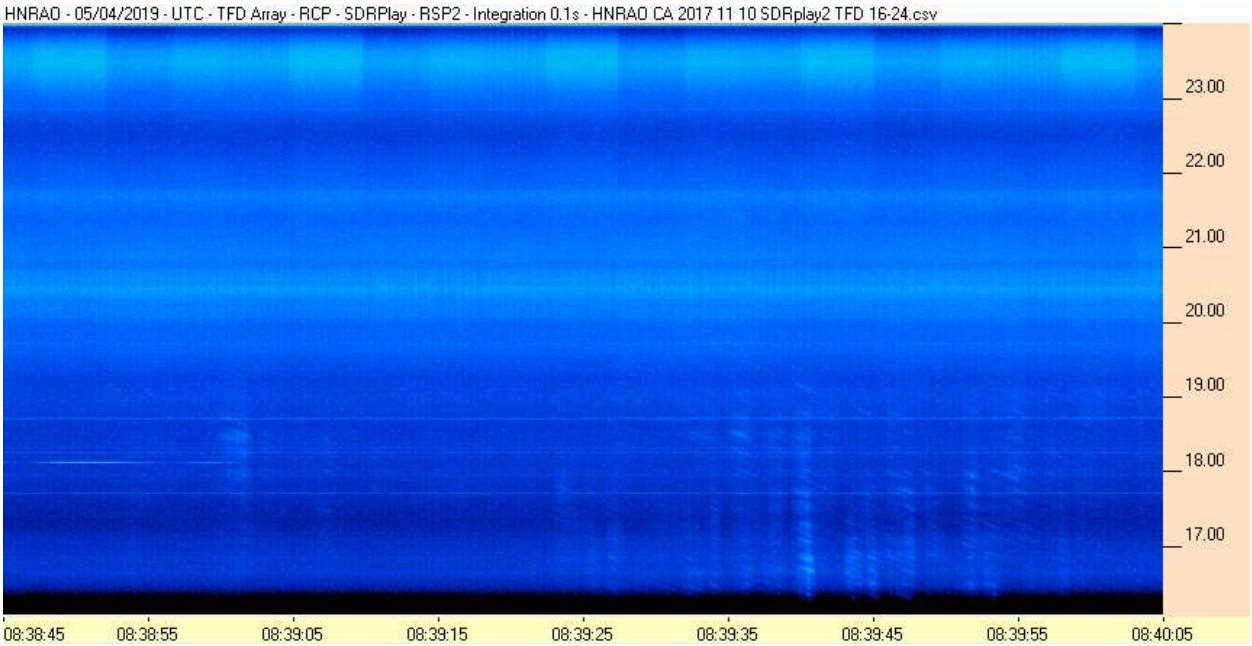
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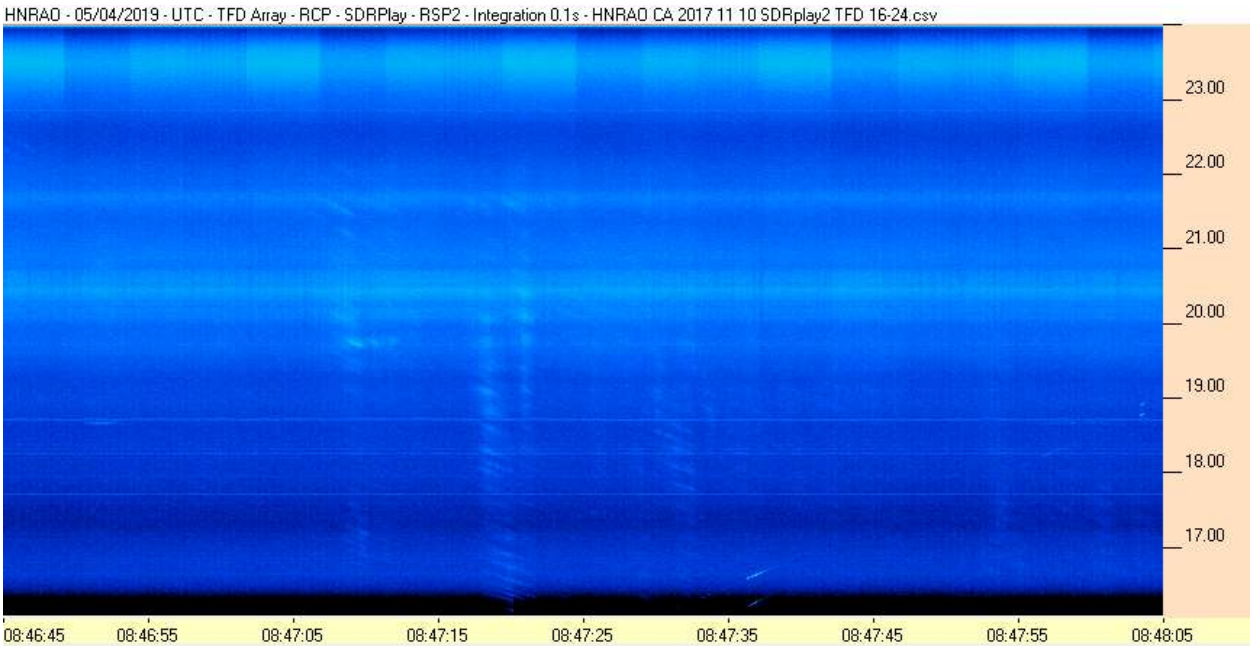
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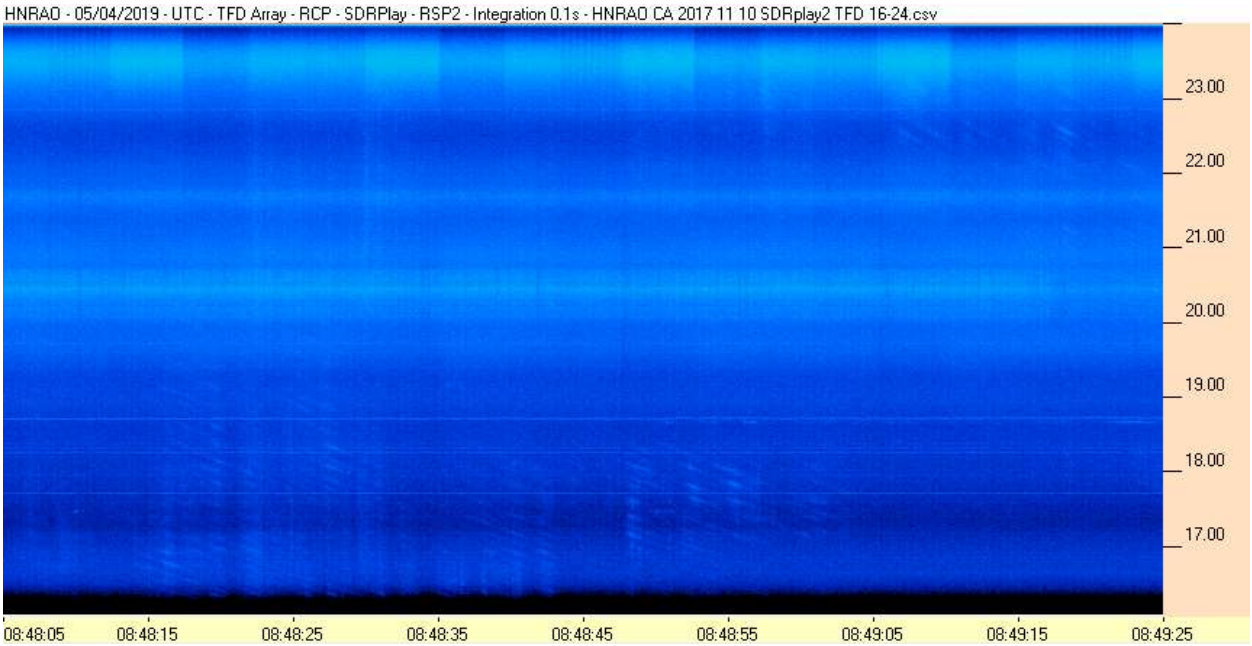
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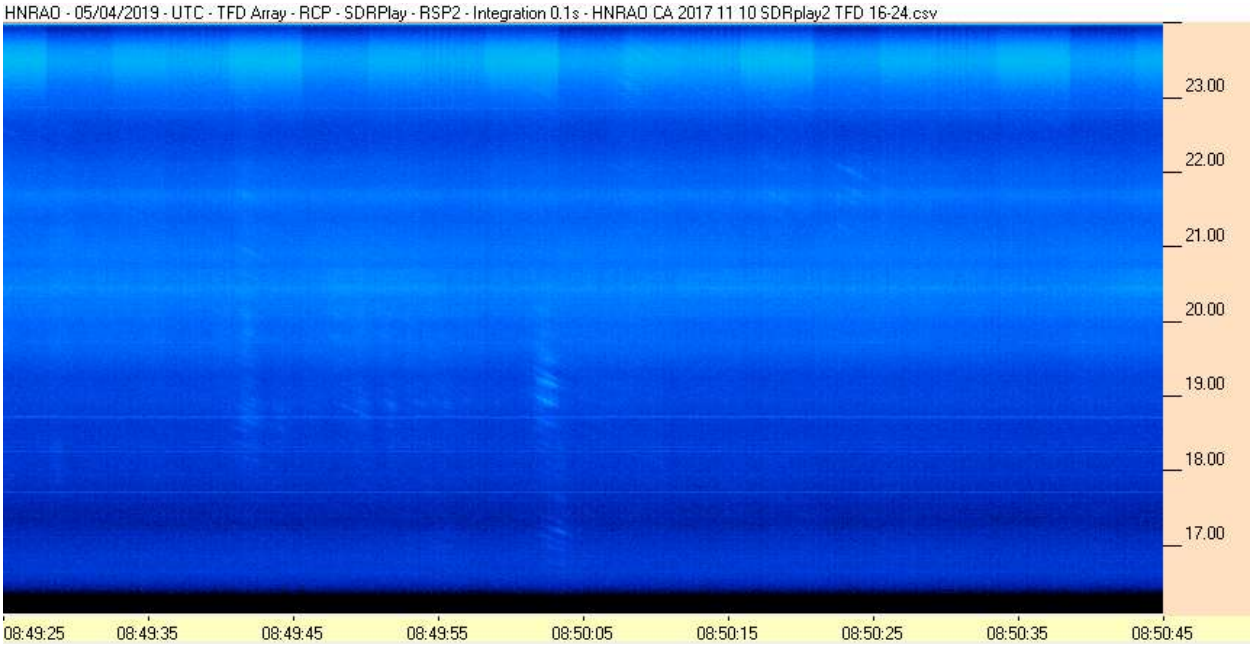
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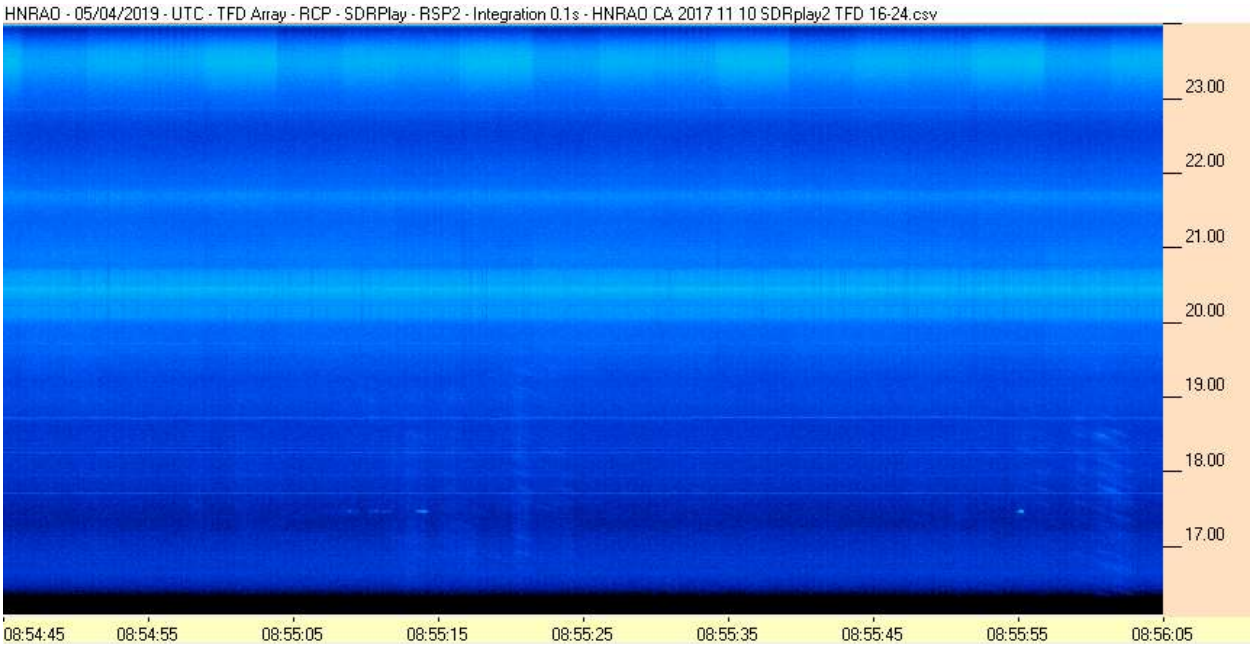
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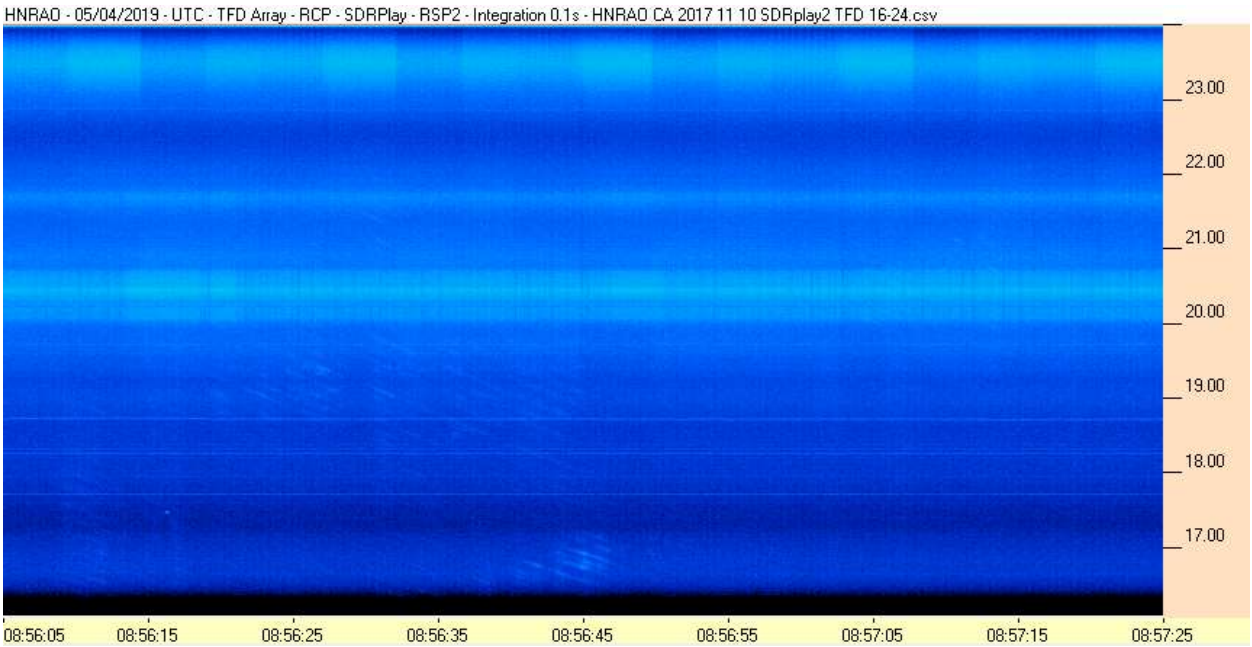
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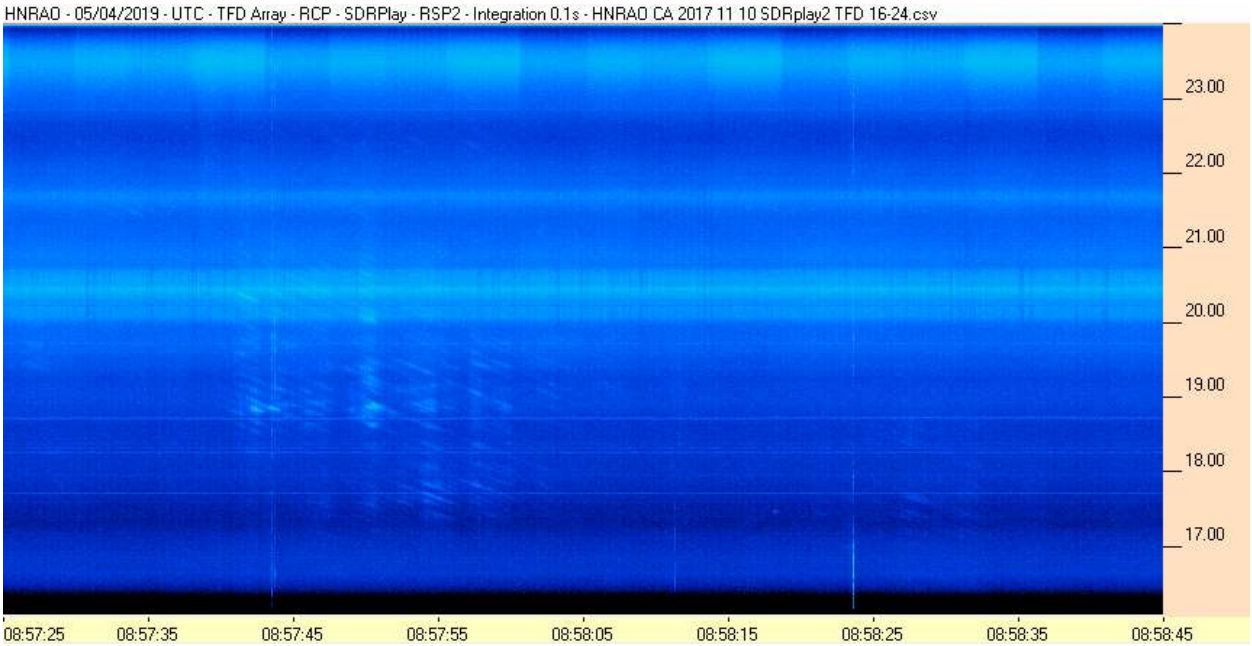
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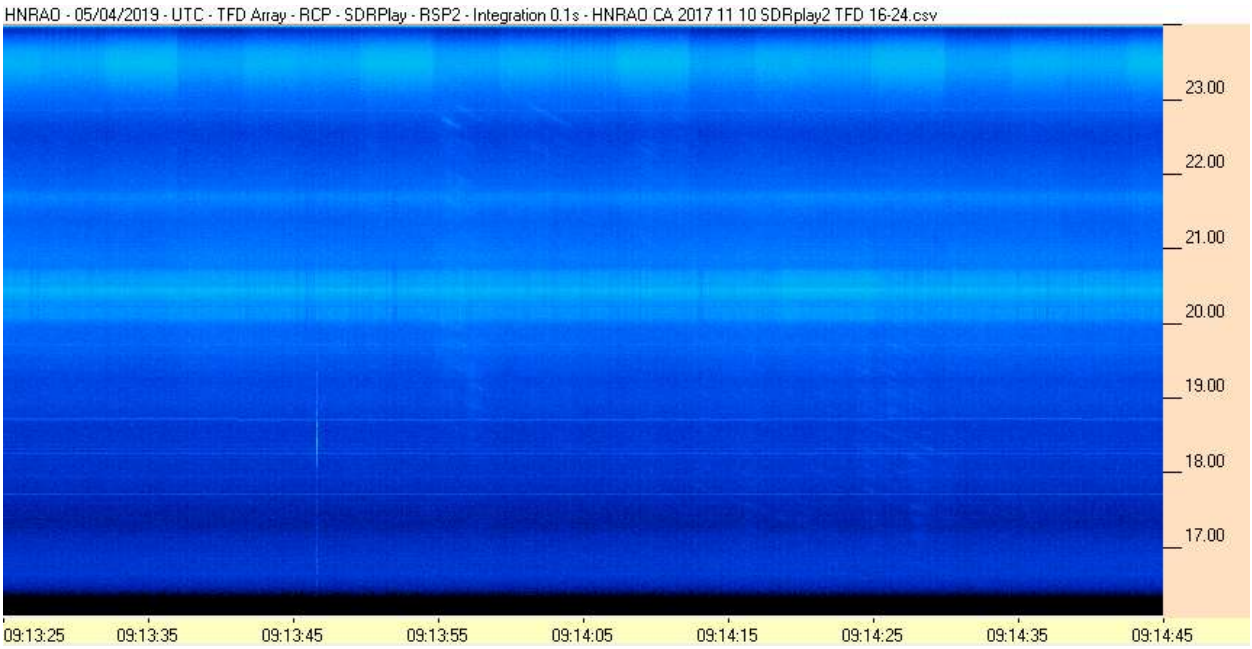
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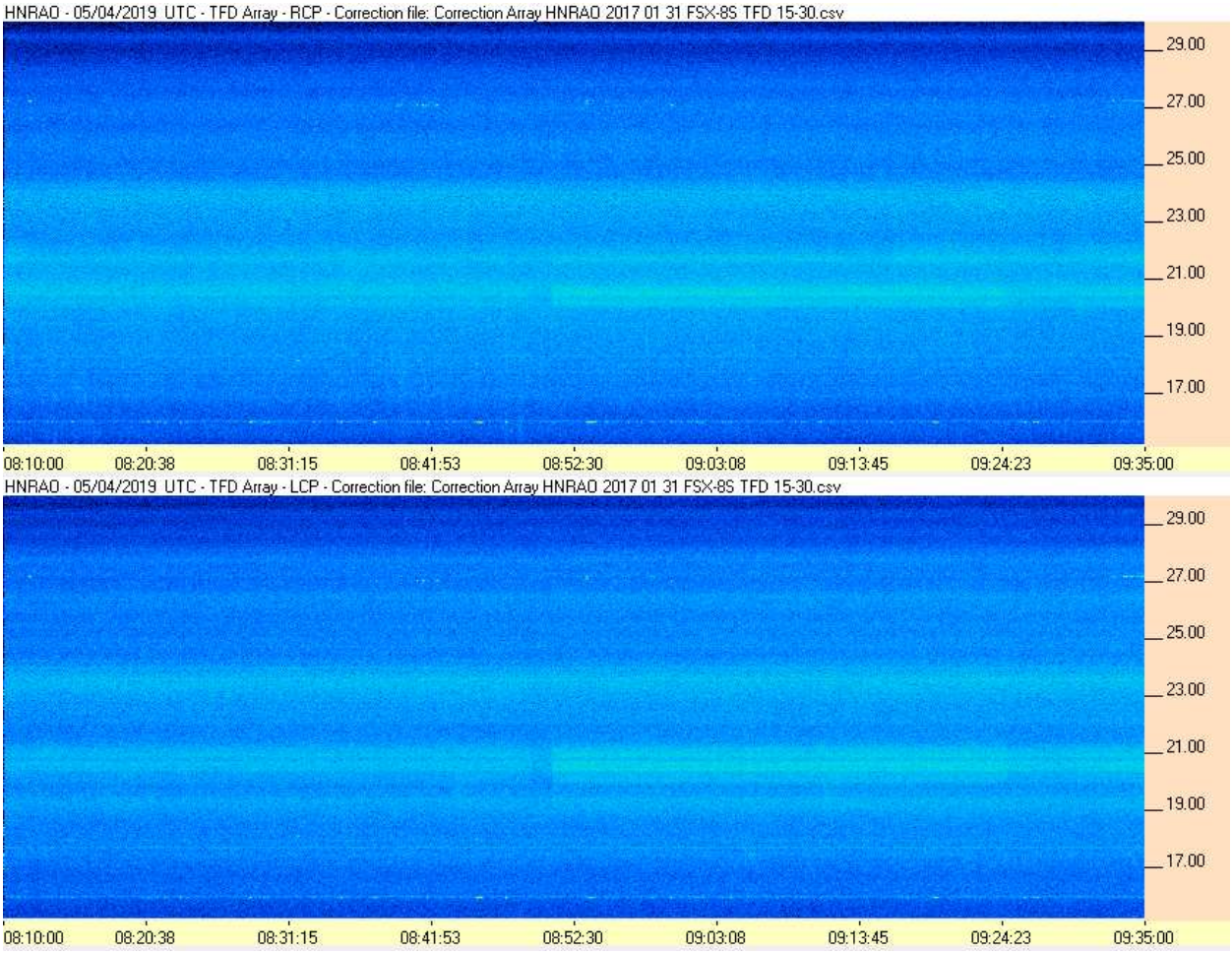
FSX-8S / TFD Array



FSX-2 / LWA Array