HNRAO Observing Log
40.673181 N – 80.437885 W
EN90sq

Date: March 12, 2019

Object: Jupiter – Io-C

Observer: Unattended

Start - Time UT:	**1234**	**Planetary K-index:**	
Jupiter Altitude (deg):	**25.0**	**Jupiter Azimuth (deg):**	**196.2**
Jupiter CML:	**291.82**	**Jupiter Io Phase:**	**251.01**
Jupiter RA (hr/min):	**17:28**	**Jupiter Dec (hr/min):**	**-22:37**
Hour Angle (hr/min):	**01:04**	**Polarization**	**LCP**
Sun Altitude (deg):	**10.4**	**Sun Azimuth (deg):**	**104.6**
Sun RA (hr/min):	**23:22**	**Sun Dec (hr/min):**	**-04:04**

End – Time UT:	**1331**	**De:**	**-2.8**
Jupiter Altitude (deg):	**20.8**	**Jupiter Azimuth (deg):**	**209.7**
Jupiter CML:	**326.28**	**Jupiter Io Phase**	**259.04**
Hour Angle (hr/min):	**02:01**	**Duration (min):**	**97**
Sun Altitude (deg):	**20.5**	**Sun Azimuth (deg):**	**114.9**
Max Frequency MHz	**22**	**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	08/21/2018
SDRPlay RSP1	Experimental*					

JOVE dipoles phased @ 32 degrees for 2017-2018 season
TFD array phased @ 35 degrees for 2017-2018 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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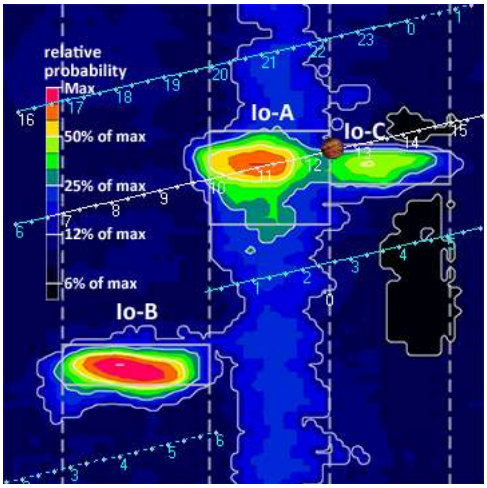
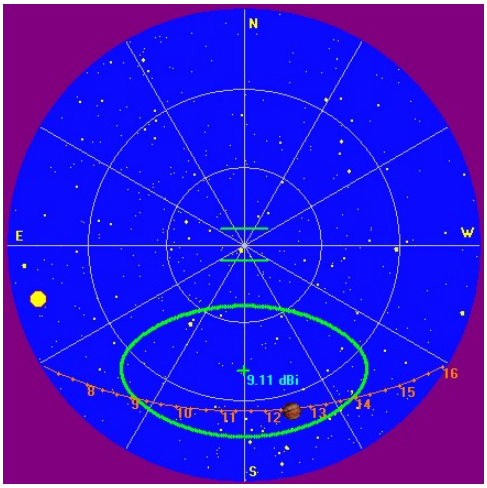
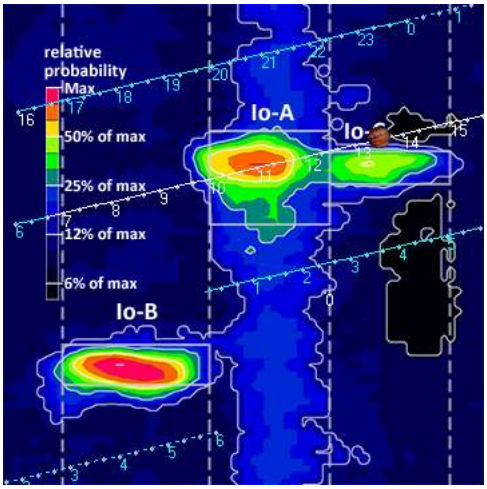
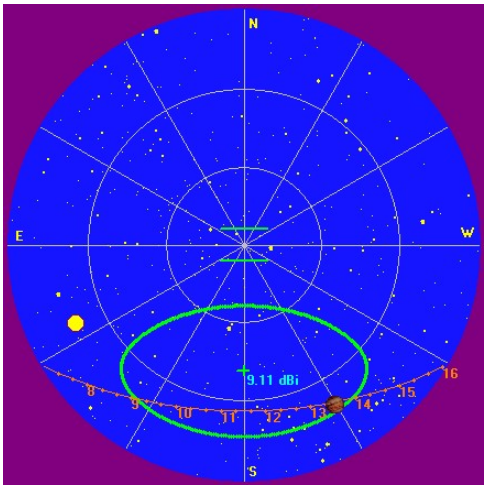




Beginning of Pass





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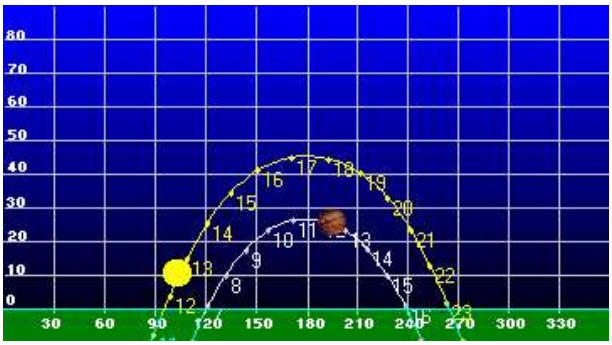

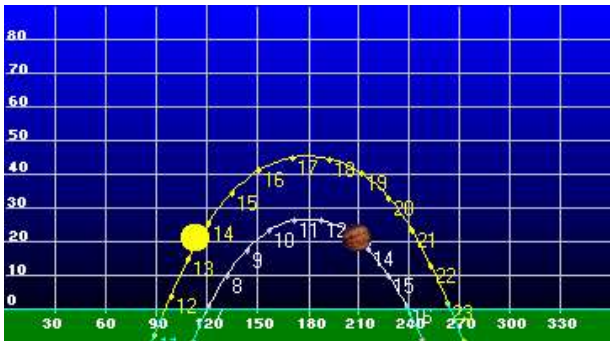

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MODE	CML RANGE	Io RANGE	MAX F	POLAR	ARC	NOTES
Io-D	0-200	95-130	18	LH	Early	Also called "fourth source"
Io-B	(105 - 185)	(80-110)	39.5	RH	Early	Also called "early source"
non Io-B	80-200	0-360	38	RH	Early	Voyager info
Io-A	(200-270)	(205-260)	38	RH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

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A 97-minute Io-C storm that was moderately stronger than any so far this Jupiter season. All spectrographs were running as well as the Radio Jove receiver/array. Both LCP spectrographs as well as the Radio Jove array were able to observe this storm. Scintillation was obvious in the emissions for the duration of the storm.

Storm consisted of negative drift L-bursts from 22-16 MHz with negative slope L4 modulation lanes. There were no observed emissions above 22 MHz, but at the end of the storm it appears that it continued below 16 MHz.

Most of the emissions were, perhaps, 2-3 dB above GB at this observatory, however, there were some emissions between 1255 UT and 1300 UT that were much stronger. The bursts at 1254:32 @ 20.344 MHz, 1258:27 @ 16.468 MHz, 1259:43 @ 19.183 MHz, 1259:44 @ 19.833 MHz, 1259:51 @ 19.695 MHz and 1259:56 @ 19.656 MHz were the strongest single bursts of this storm.

SkyPipe records from the calibrated, linearly polarized array showed L-bursts @ 20.1 MHz that approached 400 kK.

There were brief N-events during this storm, between 1240 UT and 1240:20, as an example.

Nothing else of note.

EOR

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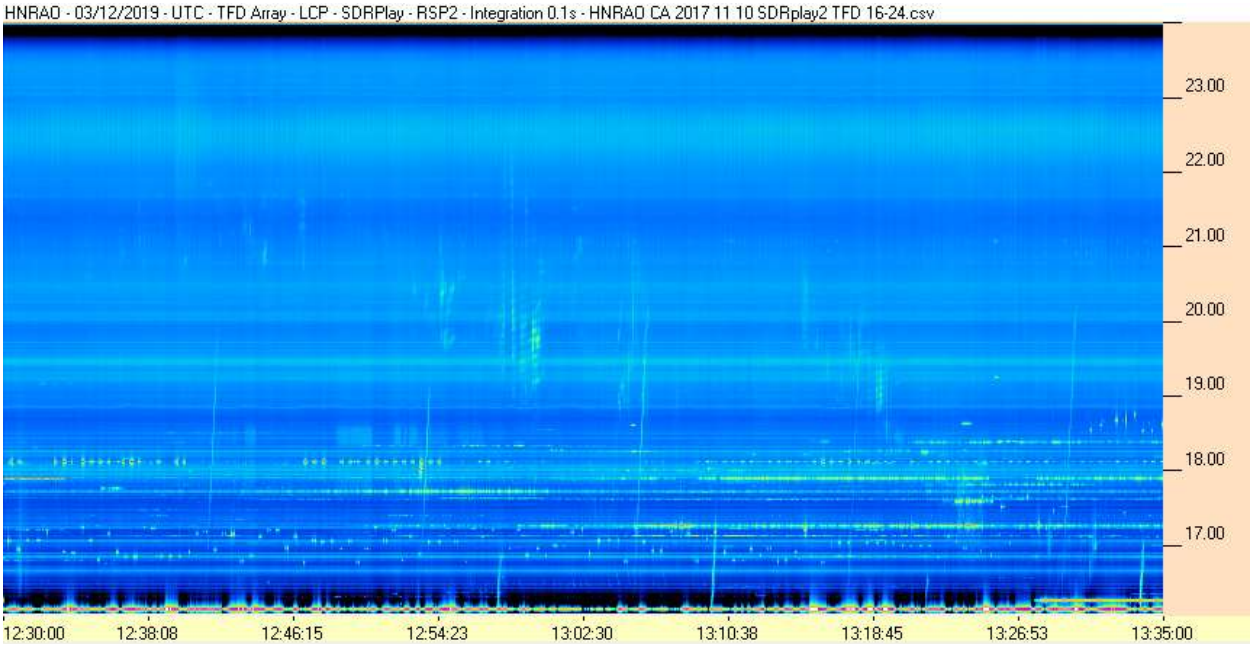
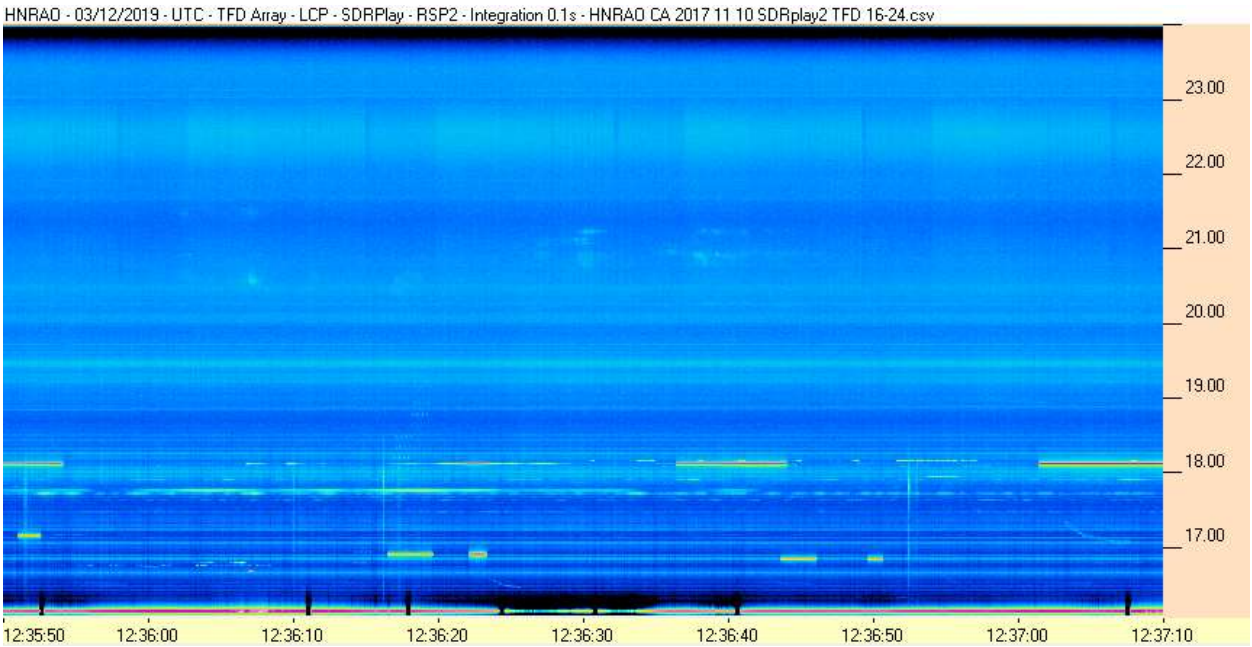
SDRPlay RSP2 / TFD Array





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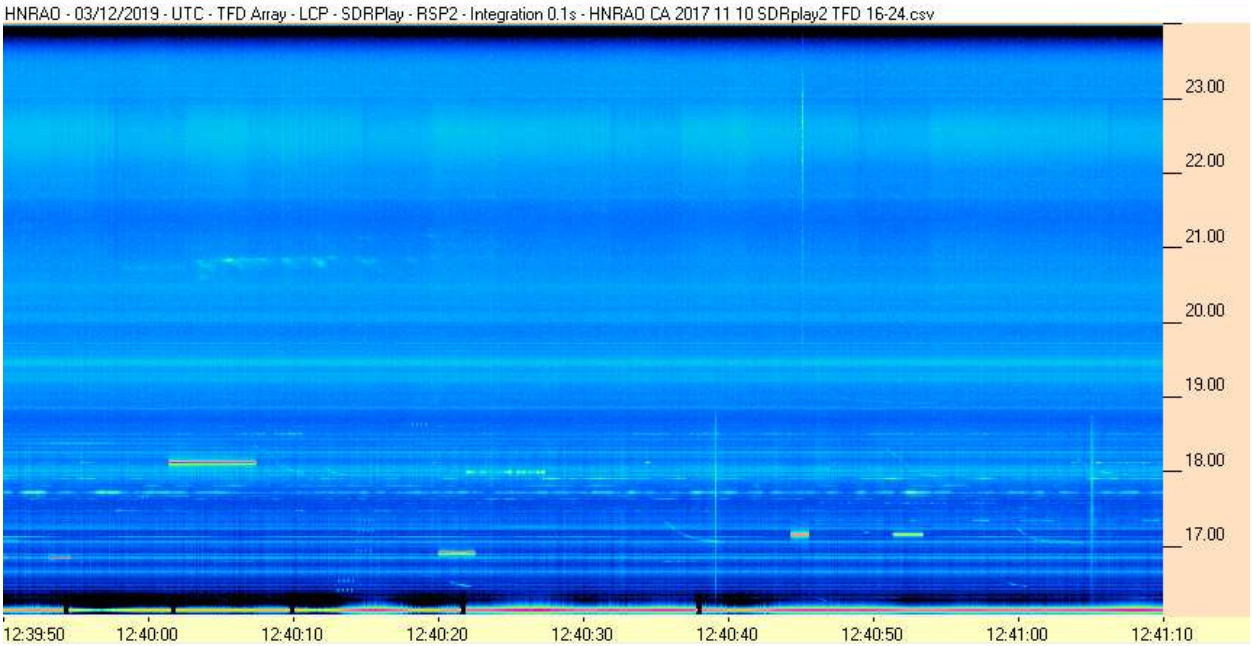
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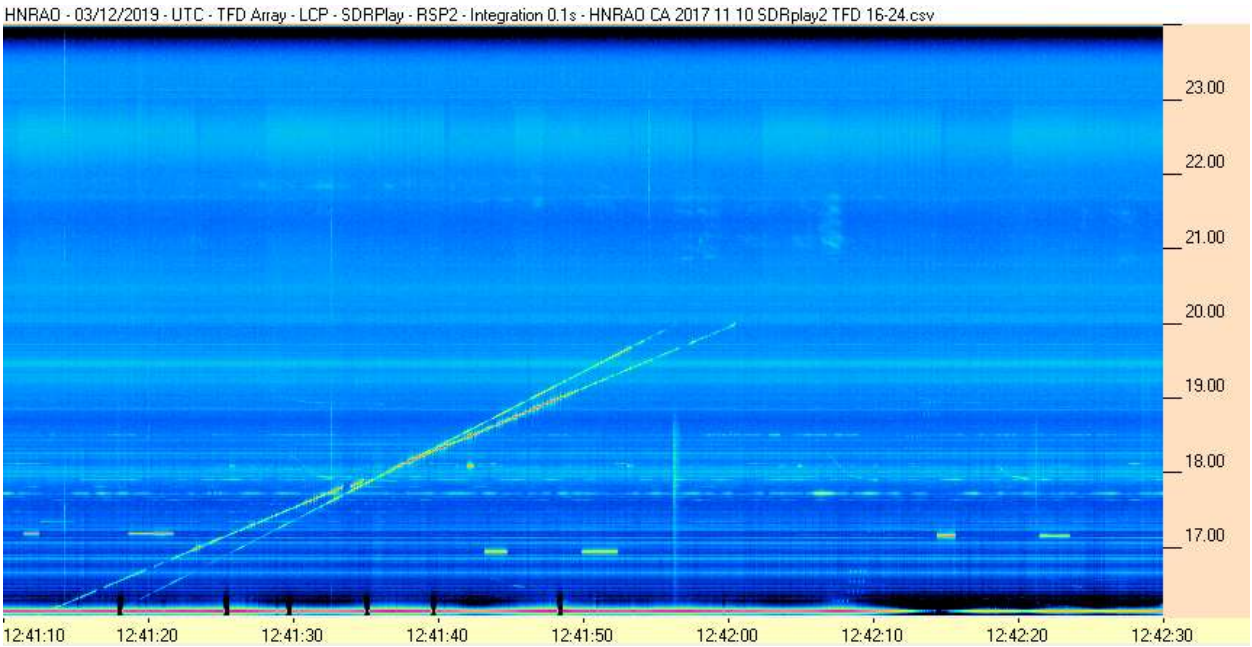
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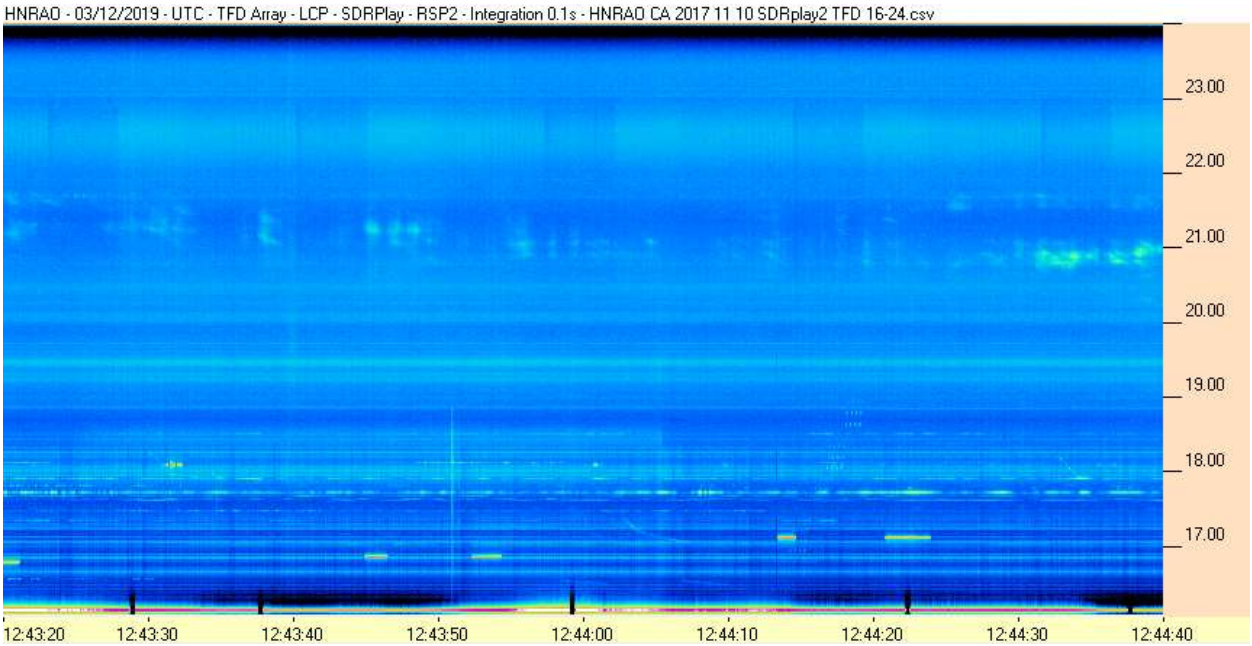
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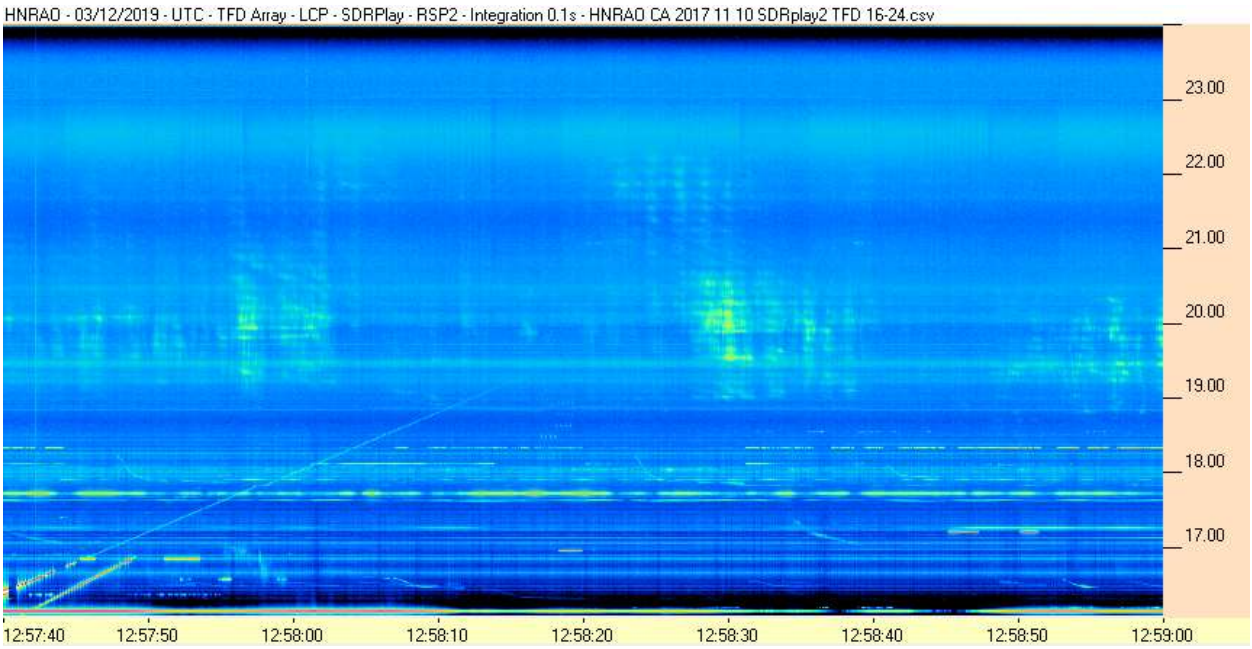
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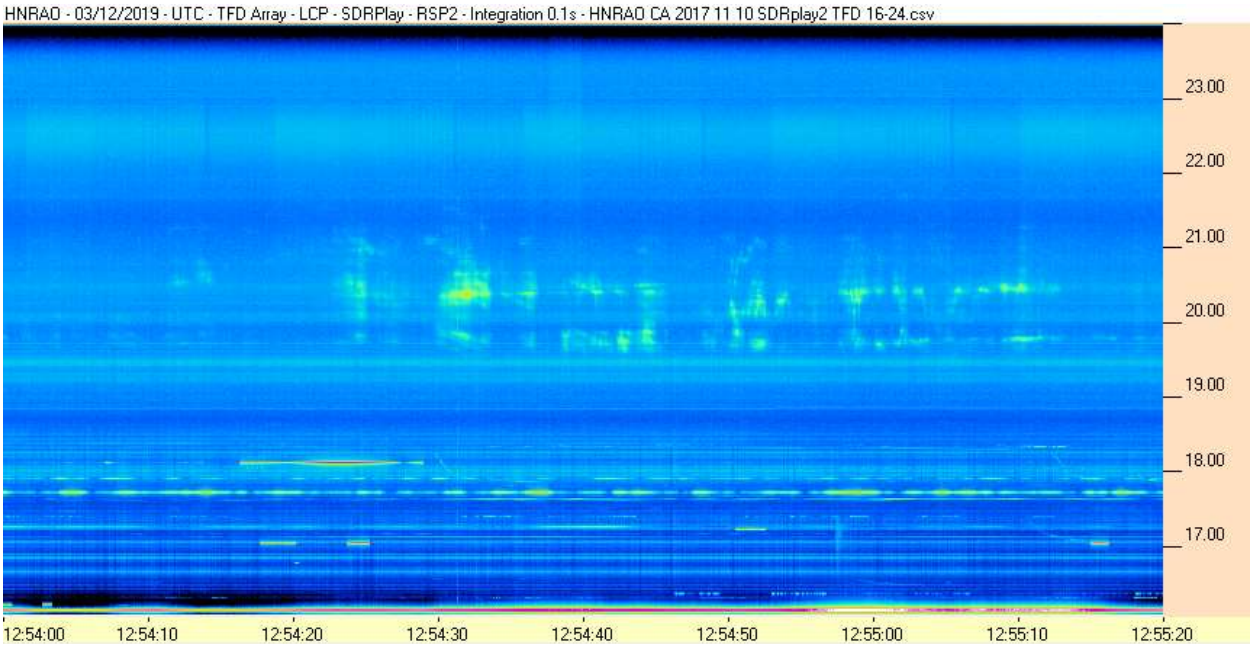
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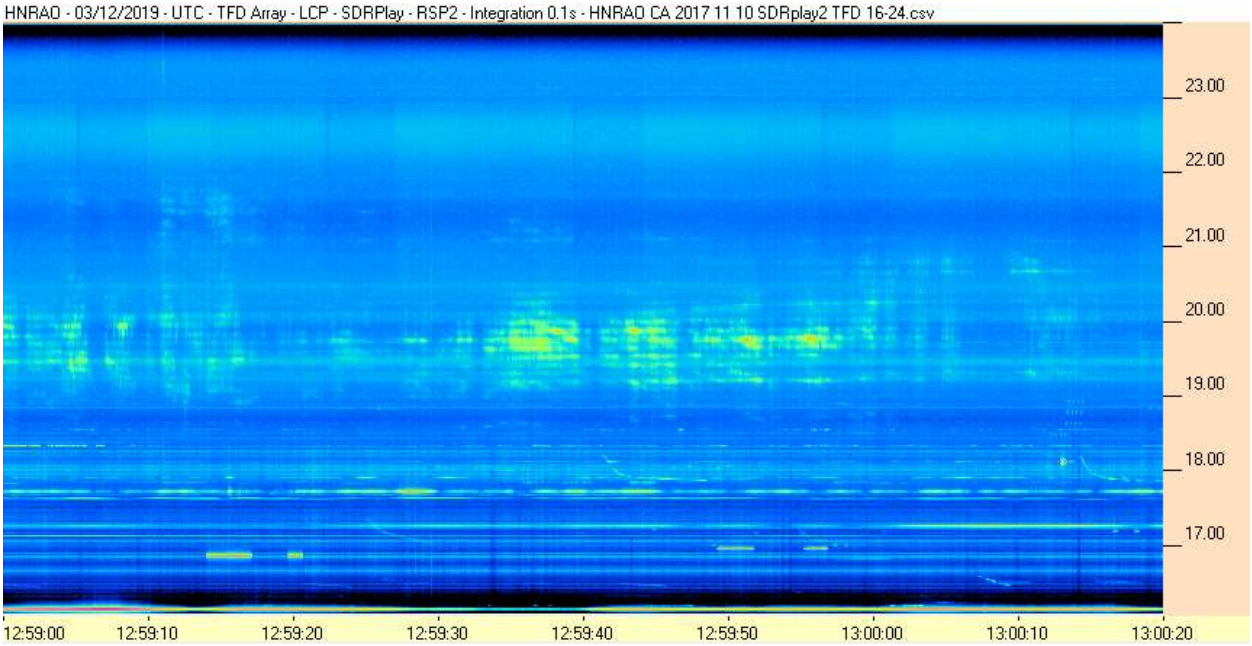
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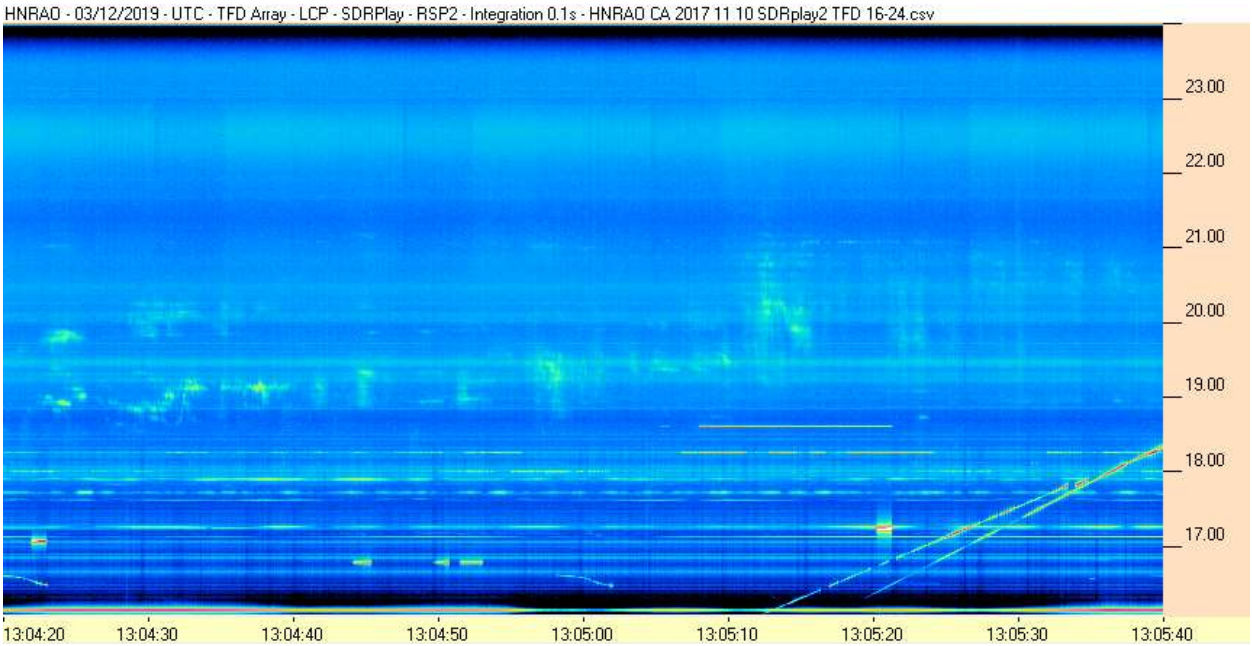
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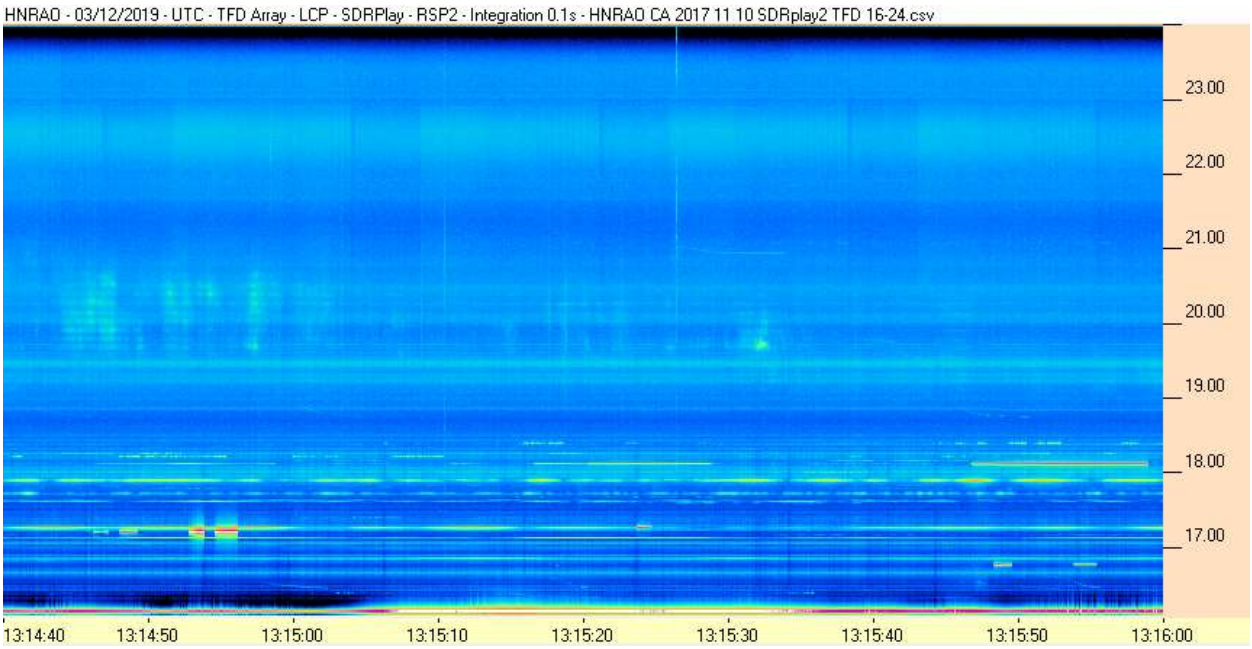
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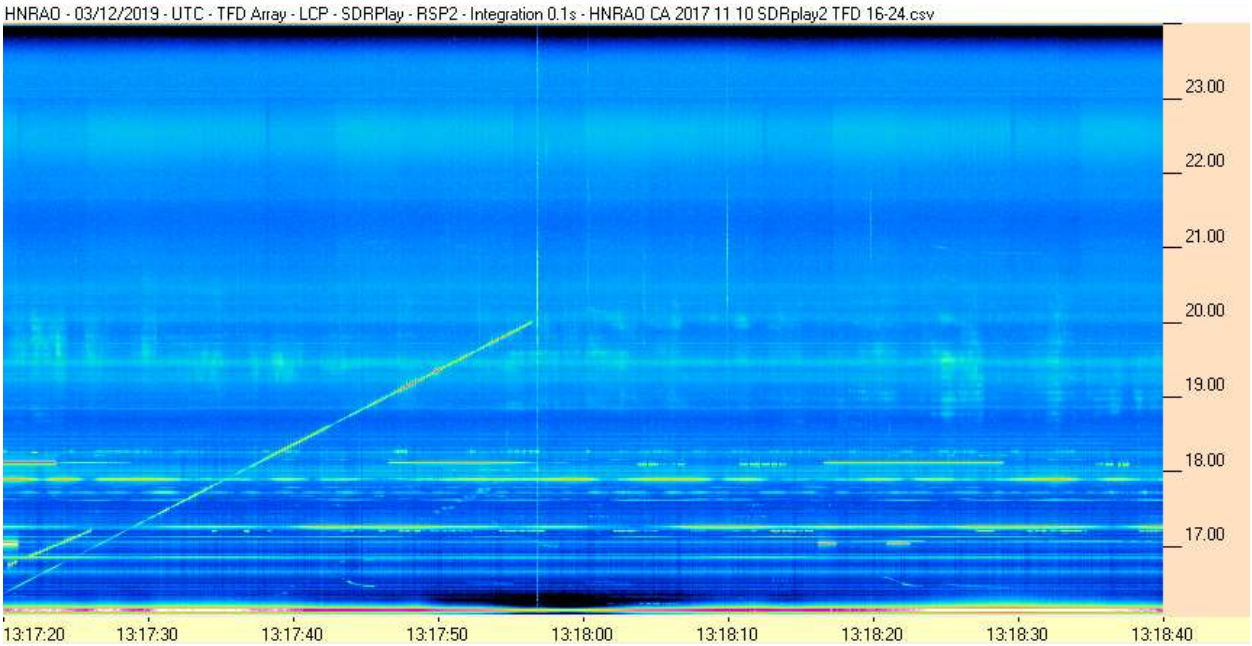
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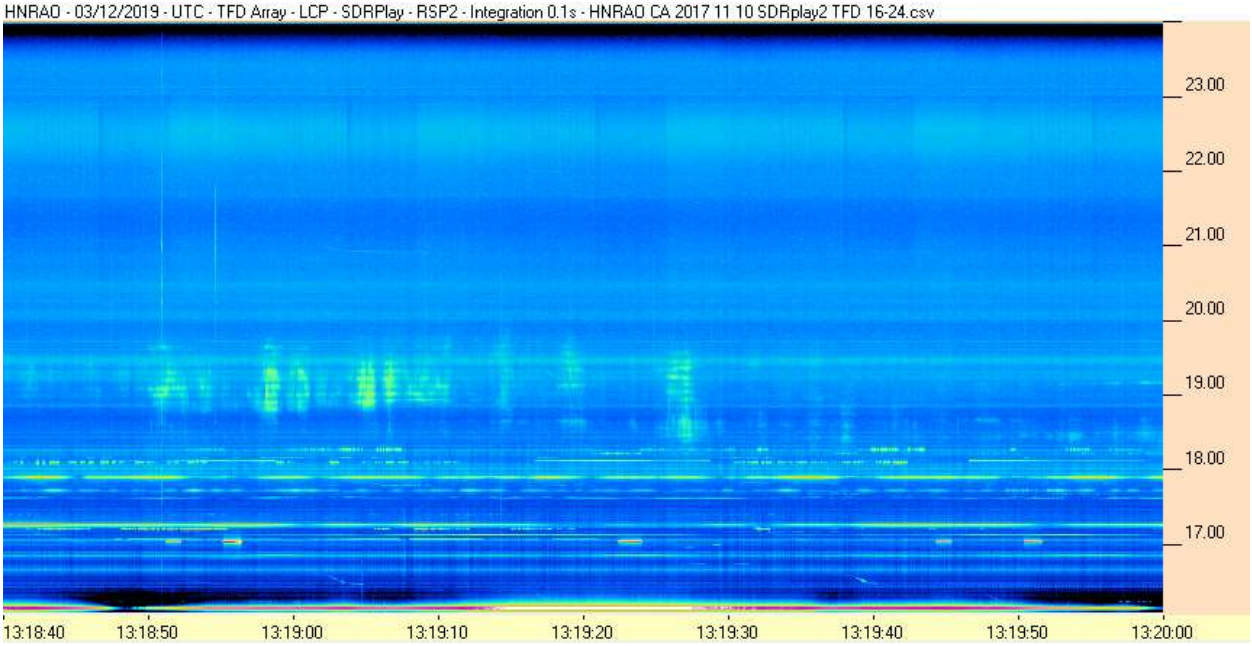
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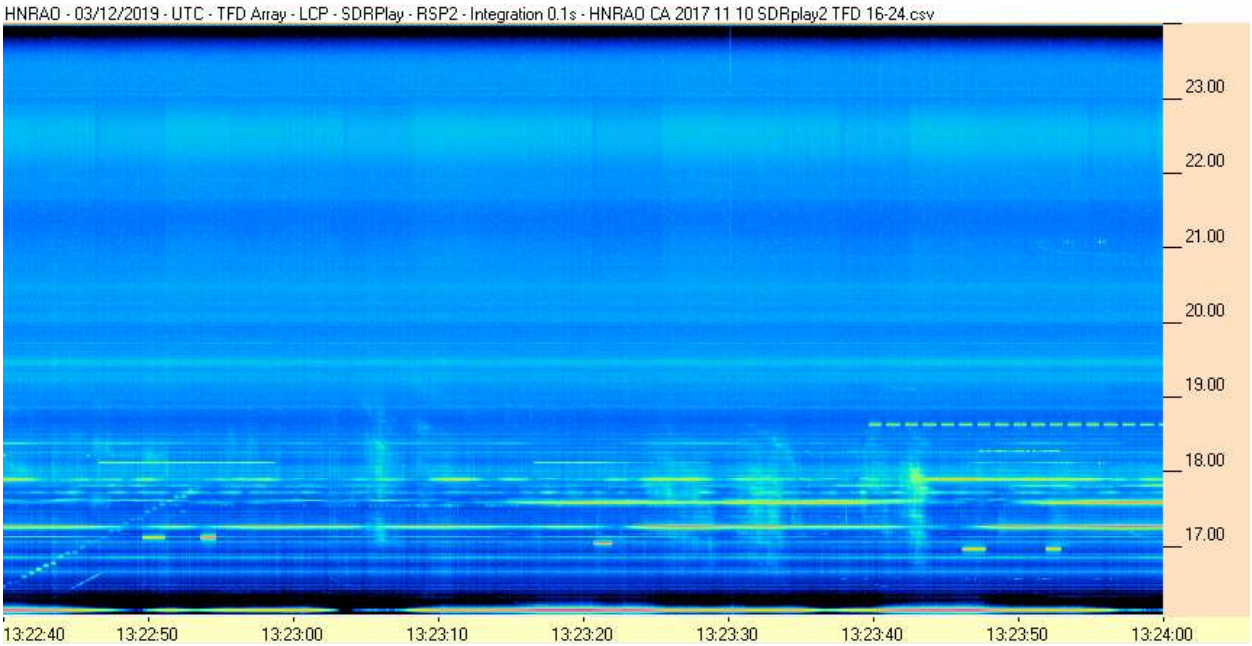
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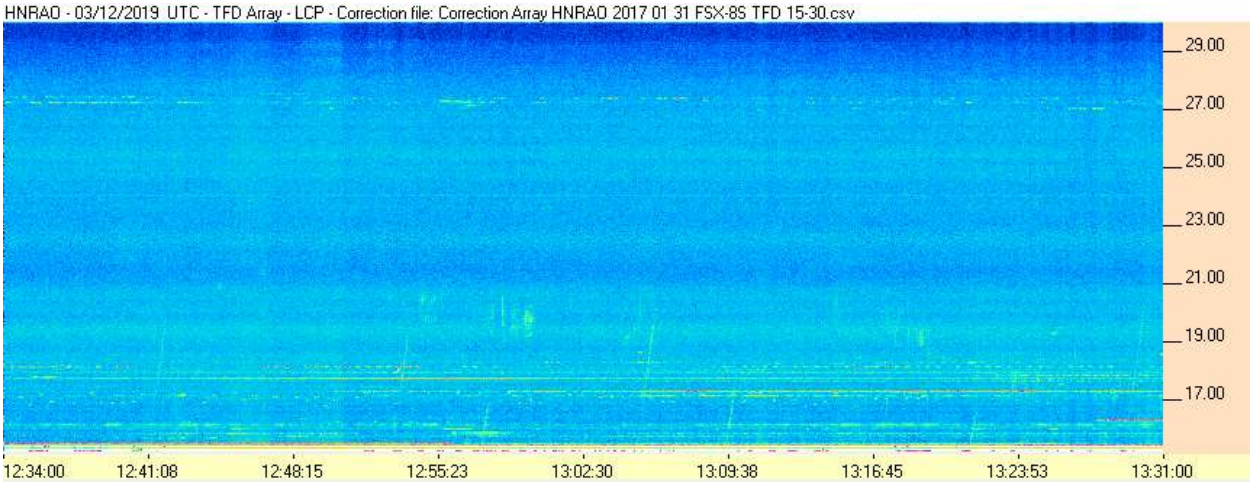
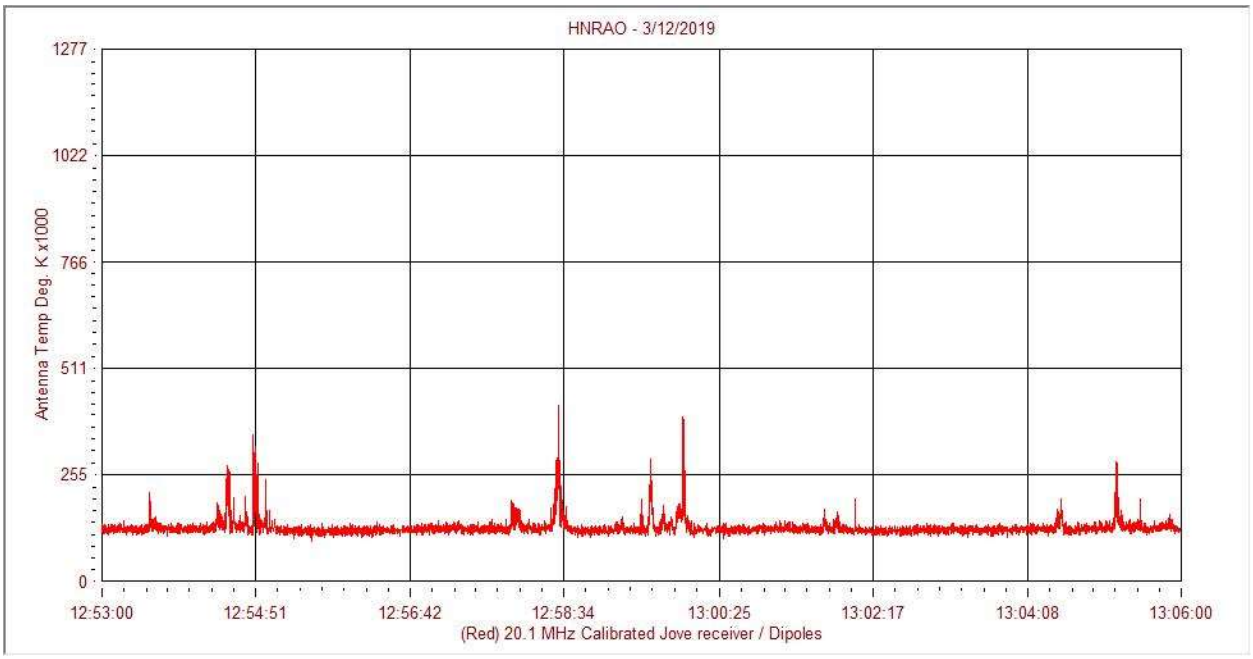
FSX-8S /TFD Array



Radio JOVE Receiver / JOVE Dipole Array



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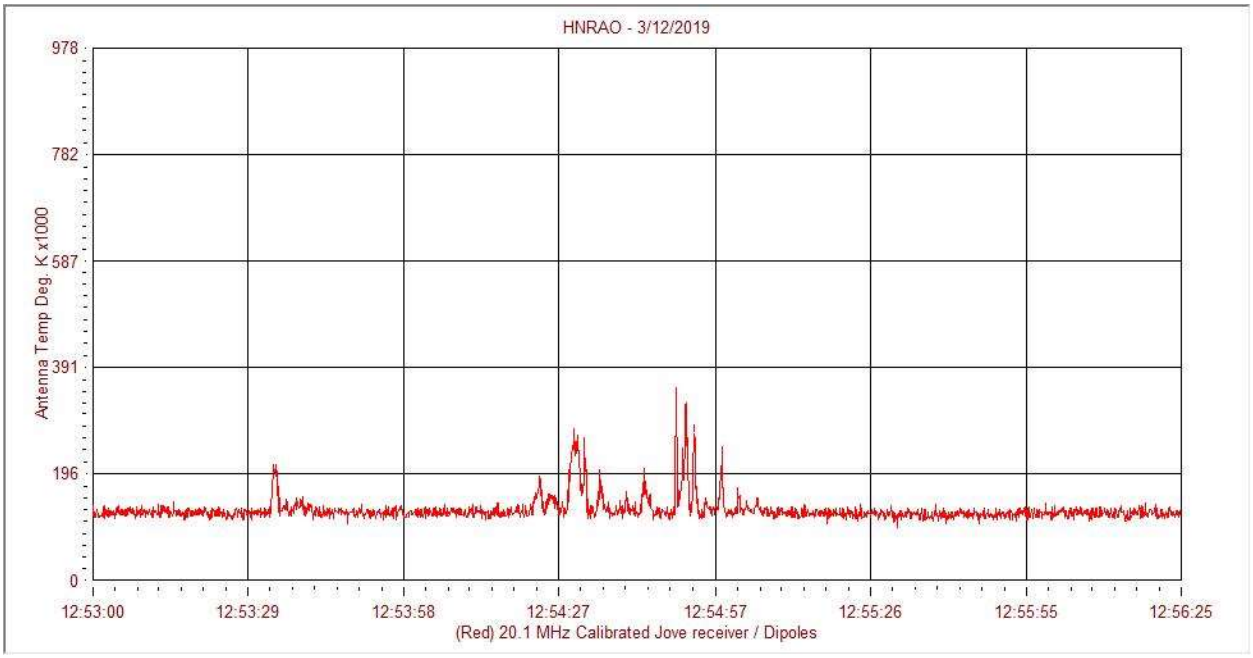

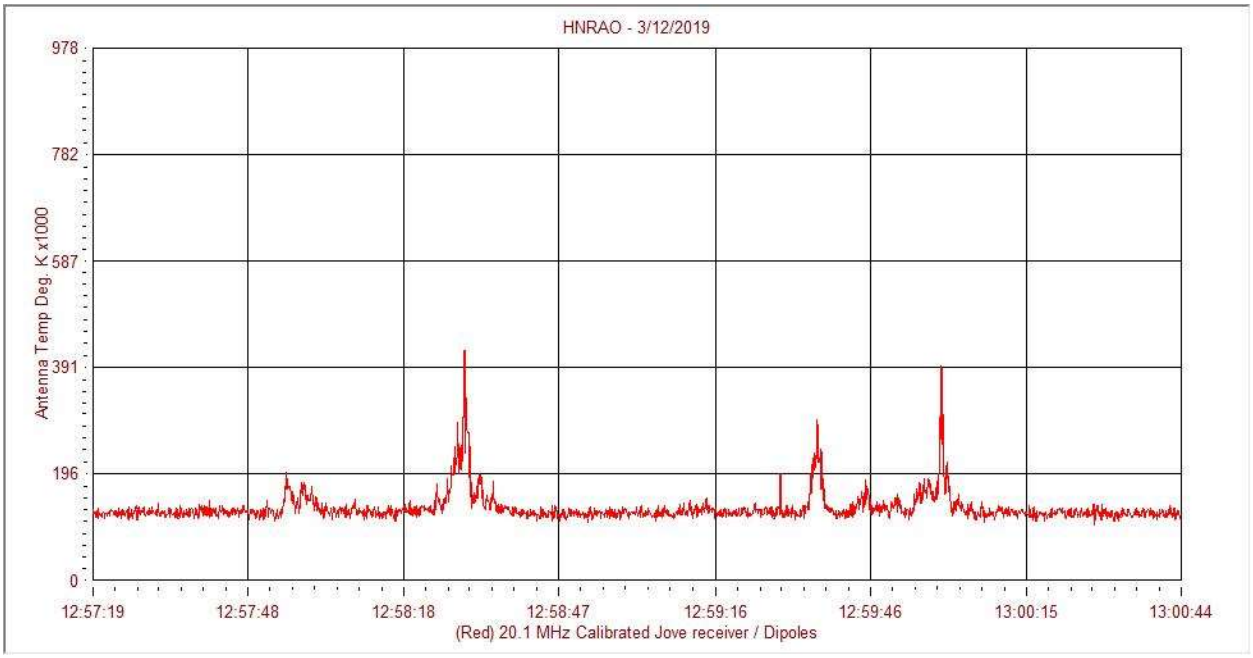

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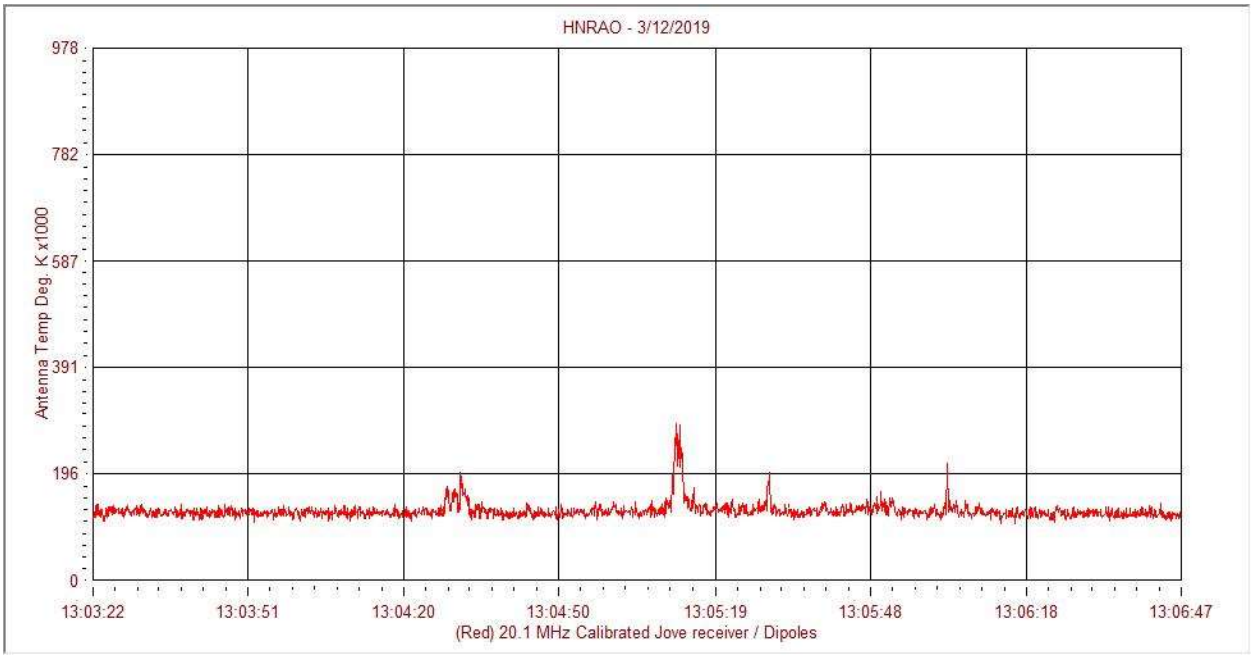

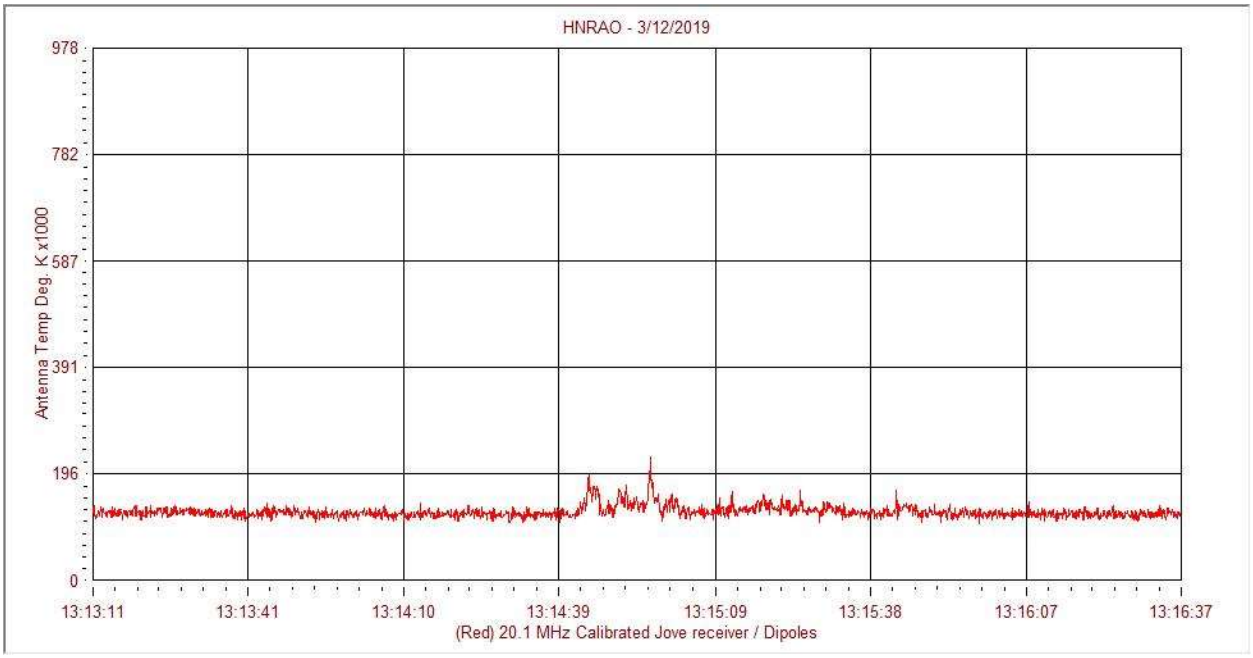

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Measurable Modulation Lanes

Polarization	Date/Time	Freq Start	Freq End	Slope	CML	Io Phase	Center Freq
LCP	3/12/2019 12:42	21053	21289	-90.8	296.7	252.2	21.2
LCP	3/12/2019 12:43	21013	21348	-92.9	297.8	252.4	21.2
LCP	3/12/2019 12:44	20738	21013	-98.4	298.2	252.5	20.9
LCP	3/12/2019 12:54	19557	19833	-88.9	304.3	253.9	19.7
LCP	3/12/2019 12:54	20128	20403	-106	304.3	253.9	20.3
LCP	3/12/2019 12:54	20659	21092	-120.3	304.2	253.9	20.9
LCP	3/12/2019 12:58	20502	20876	-89	306.4	254.4	20.7
LCP	3/12/2019 12:58	21564	21899	-101.4	306.6	254.5	21.7
LCP	3/12/2019 12:58	20758	21151	-98.4	306.6	254.5	21.0
LCP	3/12/2019 12:59	19597	19931	-83.6	307.3	254.6	19.8
LCP	3/12/2019 12:59	19124	19498	-77.9	307.5	254.7	19.3
LCP	3/12/2019 13:04	18593	18829	-54.9	310.3	255.3	18.7

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