HNRAO Observing Log
40.673181 N – 80.437885 W
EN90sq

Date: June 9, 2018

Object: Jupiter – Io-A

Observer: Unattended

Start - Time UT:	**0254**	**Planetary K-index:**	
Jupiter Altitude (deg):	**34.2**	**Jupiter Azimuth (deg):**	**177.6**
Jupiter CML:	**195.21**	**Jupiter Io Phase:**	**205.36**
Jupiter RA (hr/min):	**14:50**	**Jupiter Dec (hr/min):**	**-15:06**
Hour Angle (hr/min):	**-00:08**	**Polarization**	**RCP**
Sun Altitude (deg):	**-18.8**	**Sun Azimuth (deg):**	**326.3**
Sun RA (hr/min):	**05:01**	**Sun Dec (hr/min):**	**22:45**

End – Time UT:	**0420**	**De:**	**-3.2**
Jupiter Altitude (deg):	**31.4**	**Jupiter Azimuth (deg):**	**202.2**
Jupiter CML:	**247.2**	**Jupiter Io Phase**	**217.60**
Hour Angle (hr/min):	**01:18**	**Duration (min):**	**166**
Sun Altitude (deg):	**-25.4**	**Sun Azimuth (deg):**	**346.5**
Max Frequency MHz	**26**	**Min Frequency MHz**	**15**

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	-3.12 dB	#3 Linear	Port 4 +3 dB	04/10/2018
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

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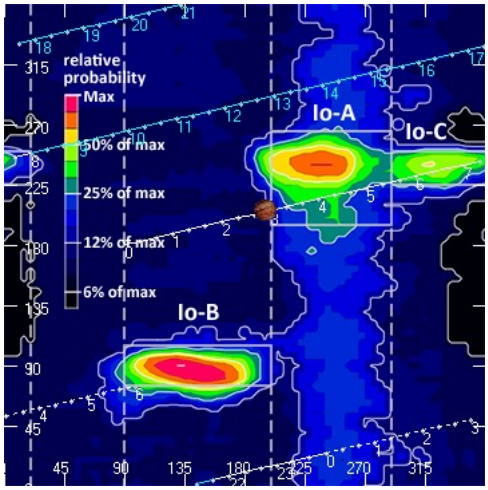
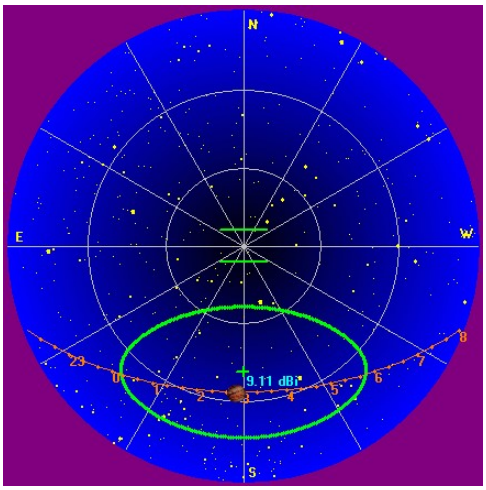
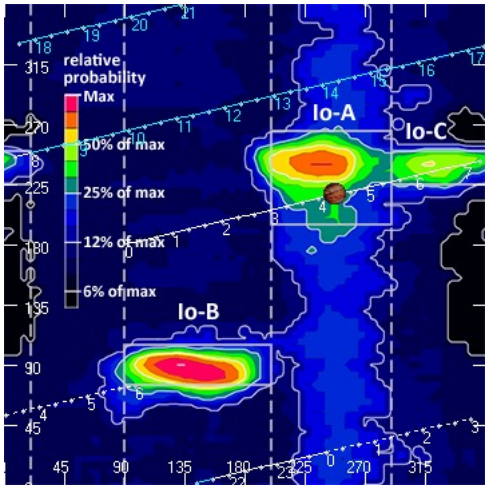
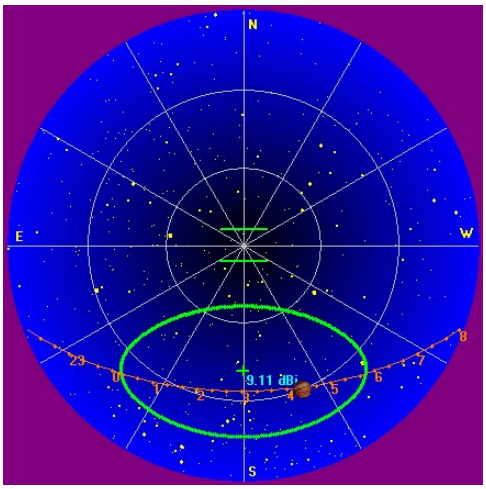


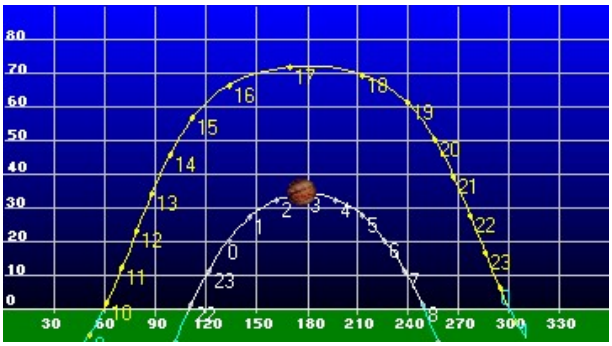


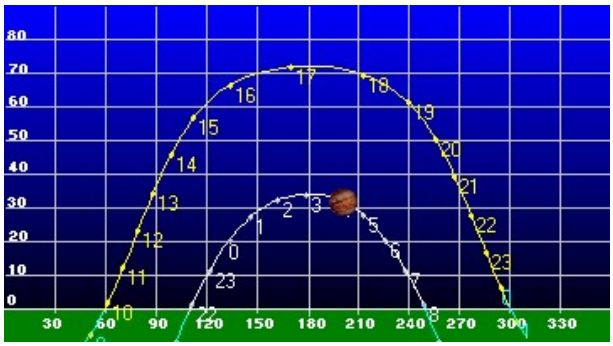
Beginning of Pass





End of Pass





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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Observed with the FSX-8S/TFD array, FSX-2/LWA array, SDRPlay2/TFD array and Jove II/Jove dual dipole array.

Observing conditions were good with little to no RFI present. There were occasional lightning discharges in the record, evident as brief vertical lines, some weak, some very strong. The record was not affected by foreign broadcast stations.

This was a very weak, 166 minute, RCP Io-A storm. L-bursts with type L4 modulation lanes throughout the storm. Scintillation was very apparent throughout the duration. Emissions, as observed with the FSX-8S/TFD array, spanned 15 MHz to 26 MHz.

The L-burst emissions came in small groups with long periods of no emission. Most emissions groups were, perhaps, a dB or less above the galactic background. Others may have risen +/- 2 dB above GB. The GB was measured with an average of 83.63 kK through the duration of storm This was measured with a calibrated, linear, radio JOVE receiver and dual dipole array. No L-burst rose above the measured galactic background at this observatory.

Nothing else of note.

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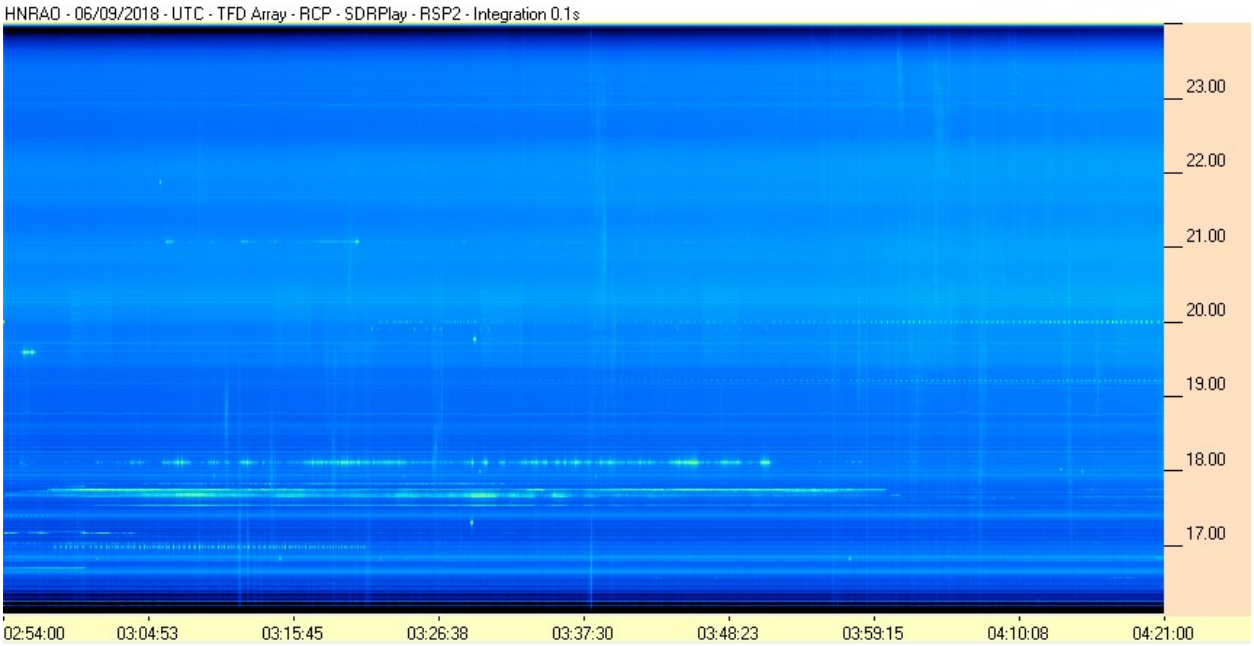
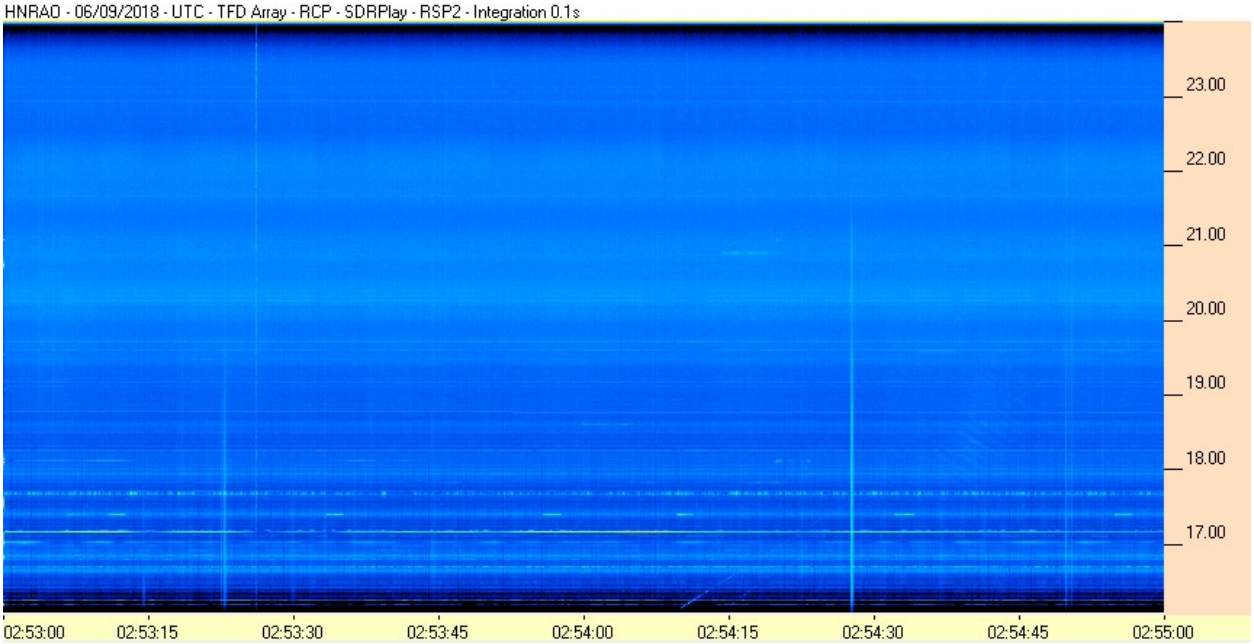
SDRPlay RSP2 / TFD Array





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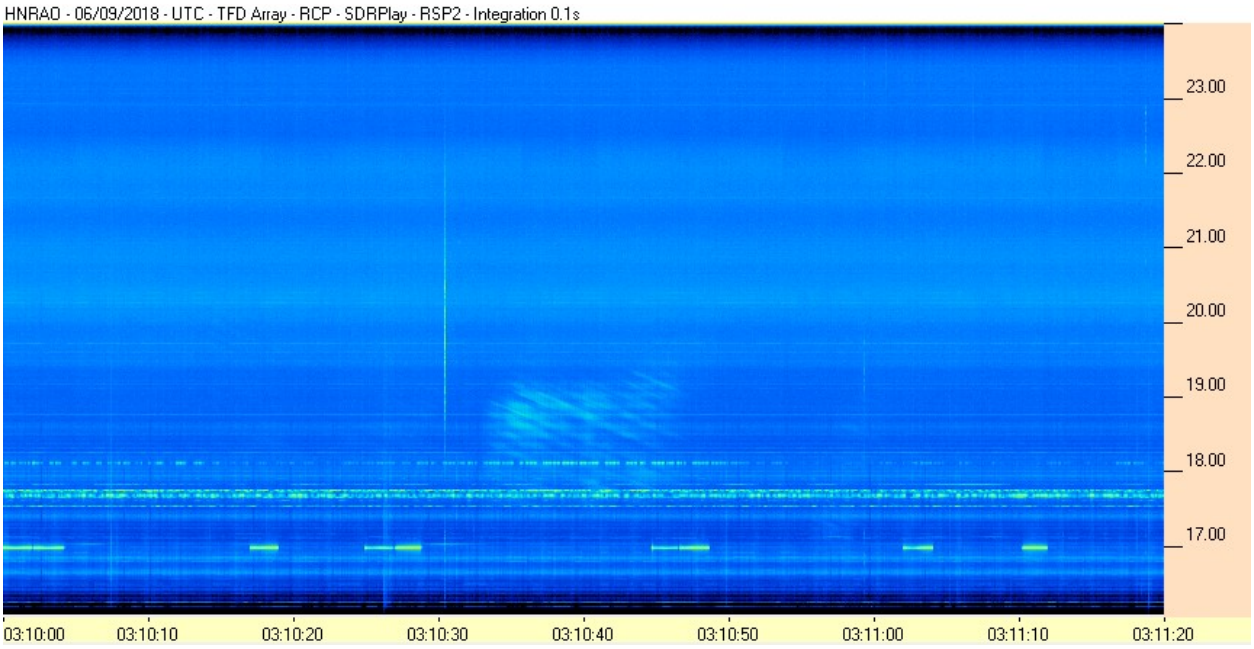

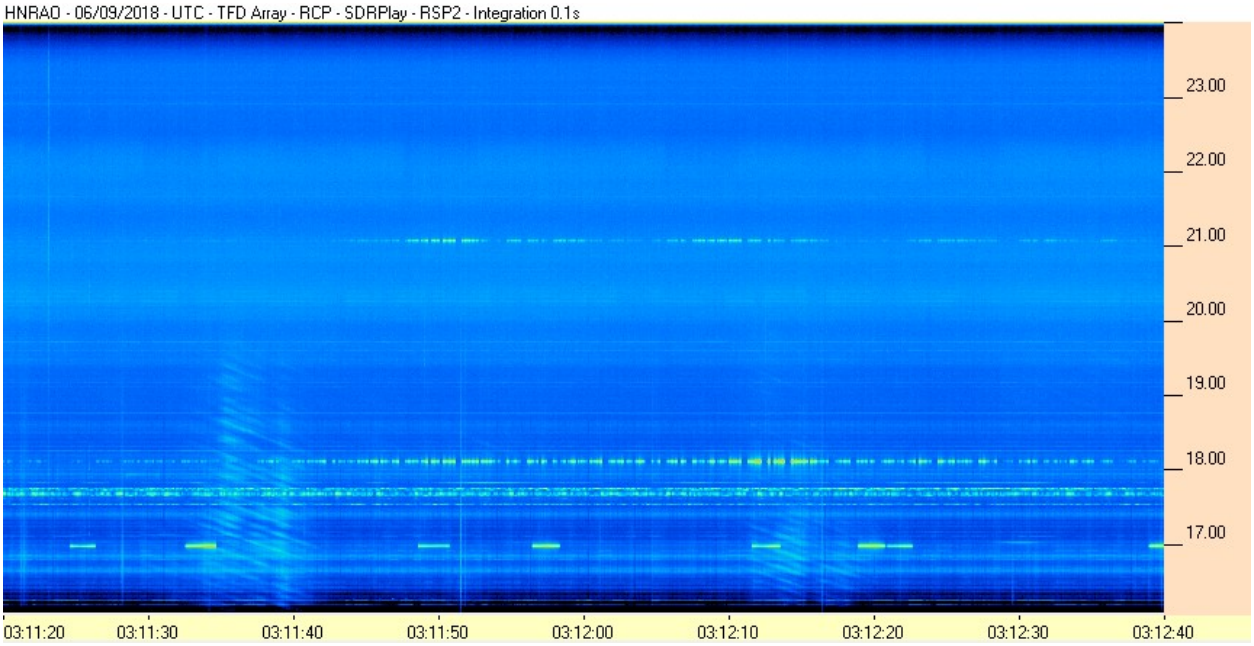

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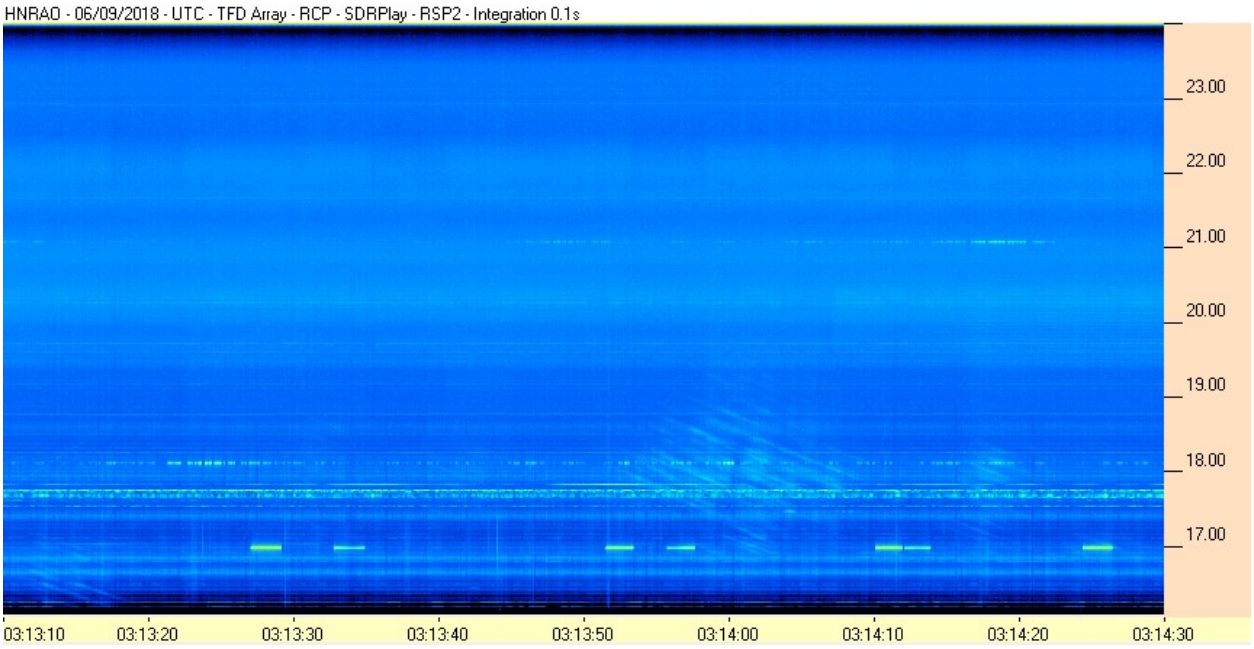

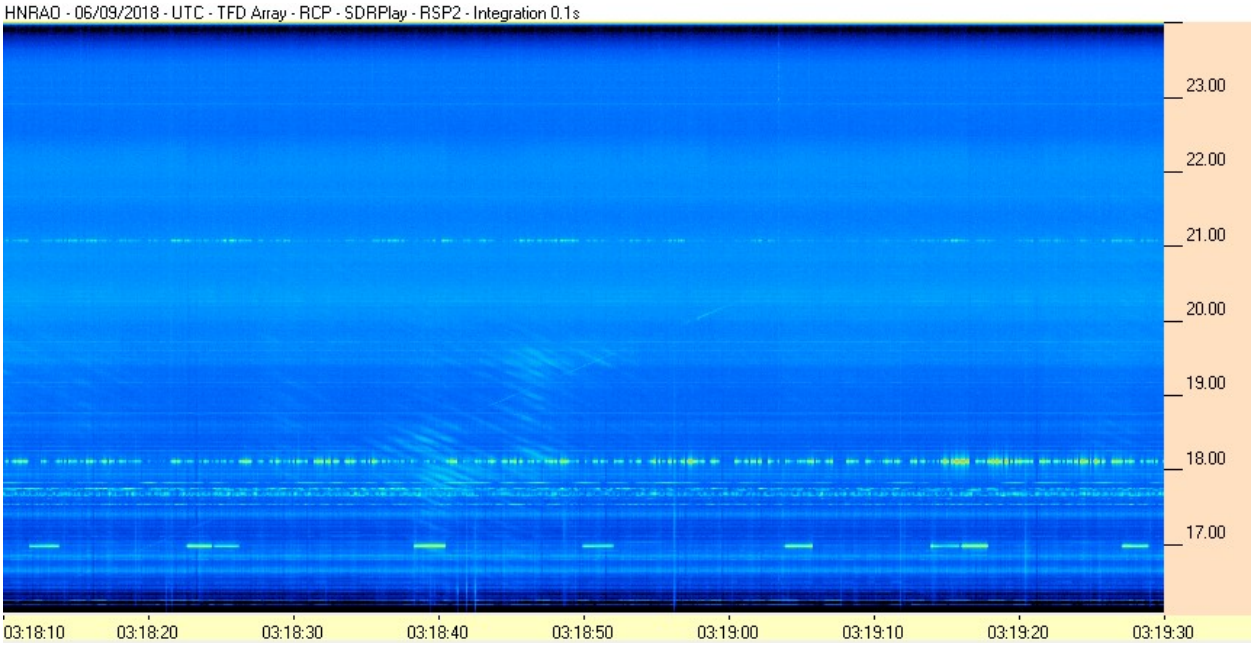

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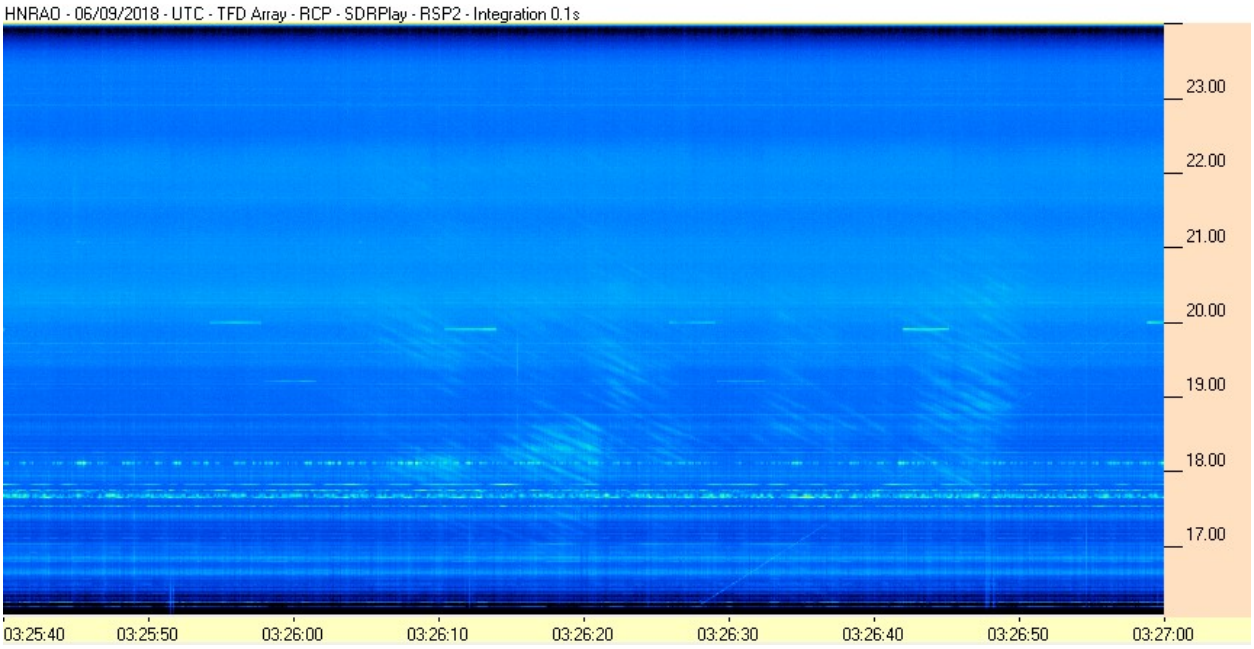
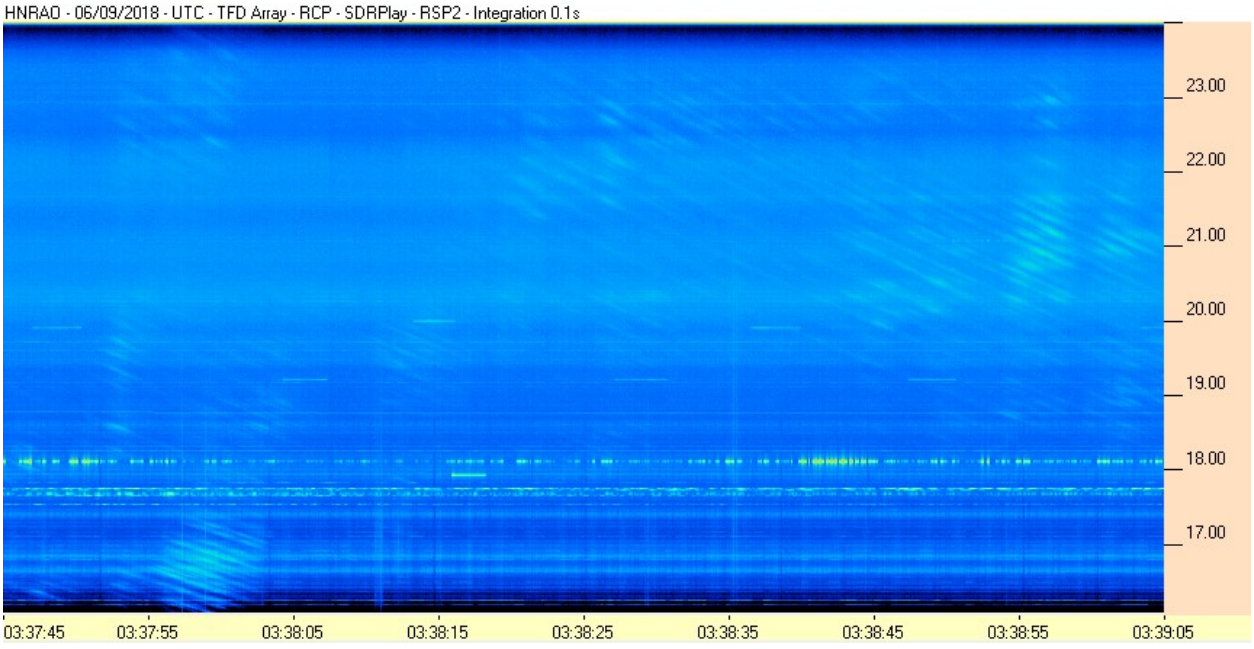
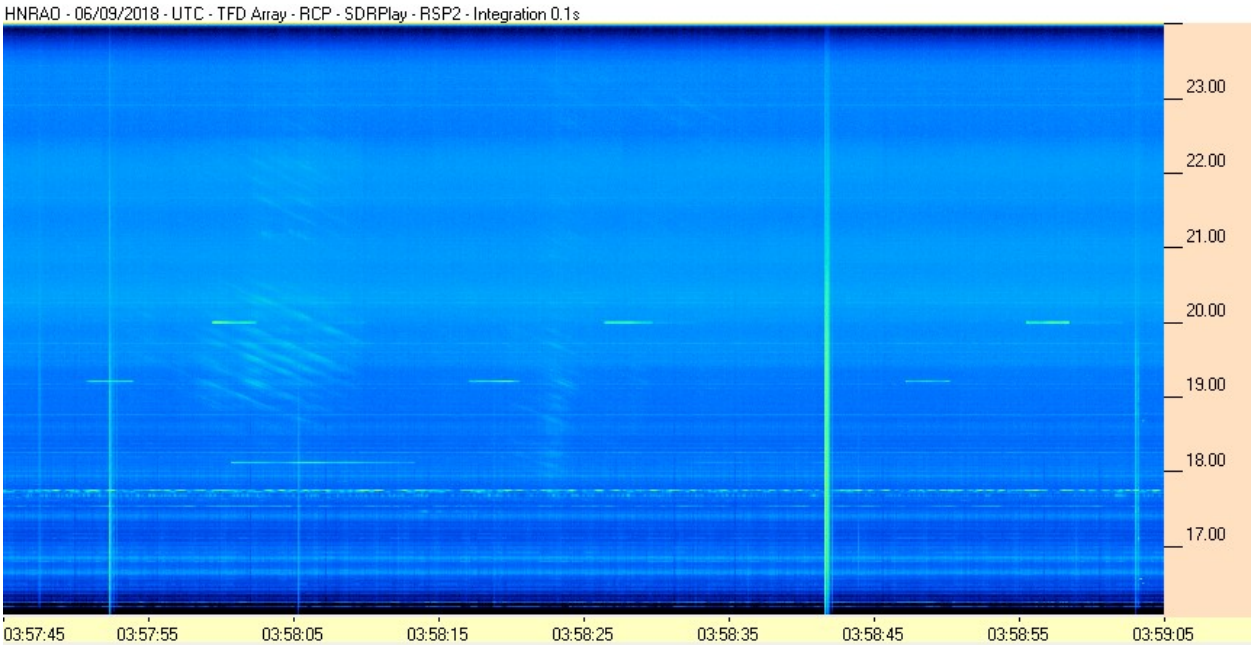
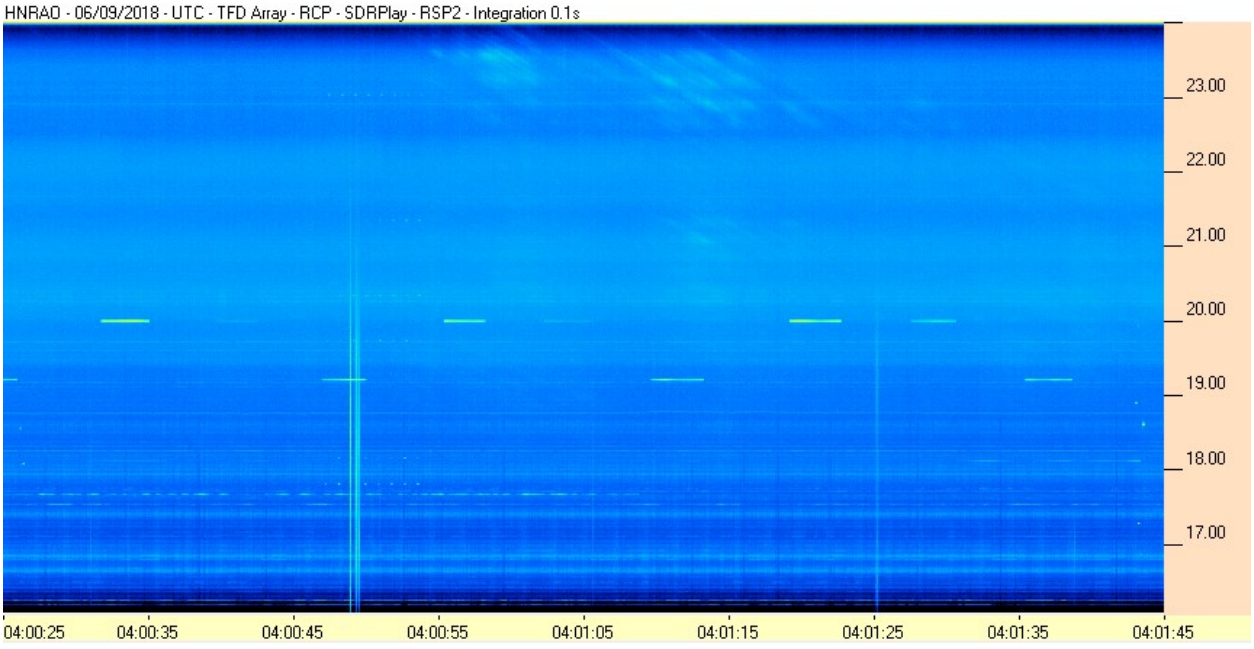





HNRAO - 06/09/2018 - UTC - TFD Array - RCP - SDRPlay - RSP2 - Integration 0.1s
23.00
22.00
21.00
20.00
19.00
18.00
17.00
03:57:45
03:57:55
03:58:05
03:58:15
03:58:25
03:58:35
03:58:45
03:58:55
03:59:05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23.00
22.00
21.00
20.00
19.00
18.00
17.00
04:00:25
04:00:35
04:00:45
04:00:55
04:01:05
04:01:15
04:01:25
04:01:35
04:01:45

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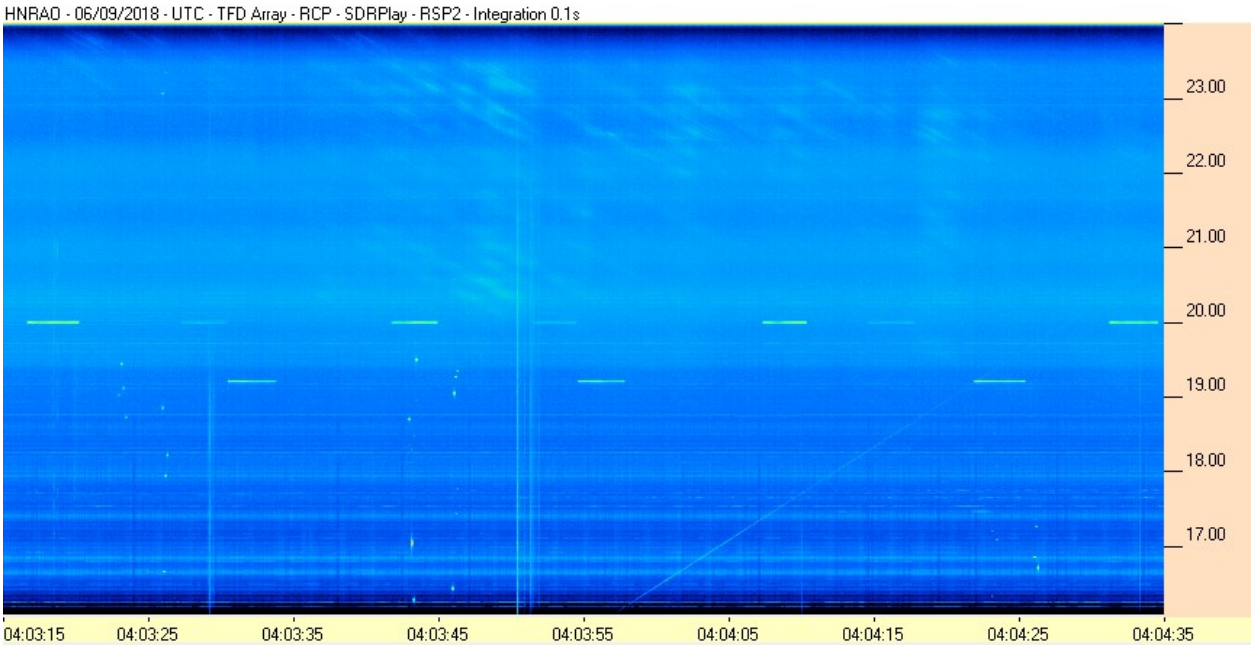

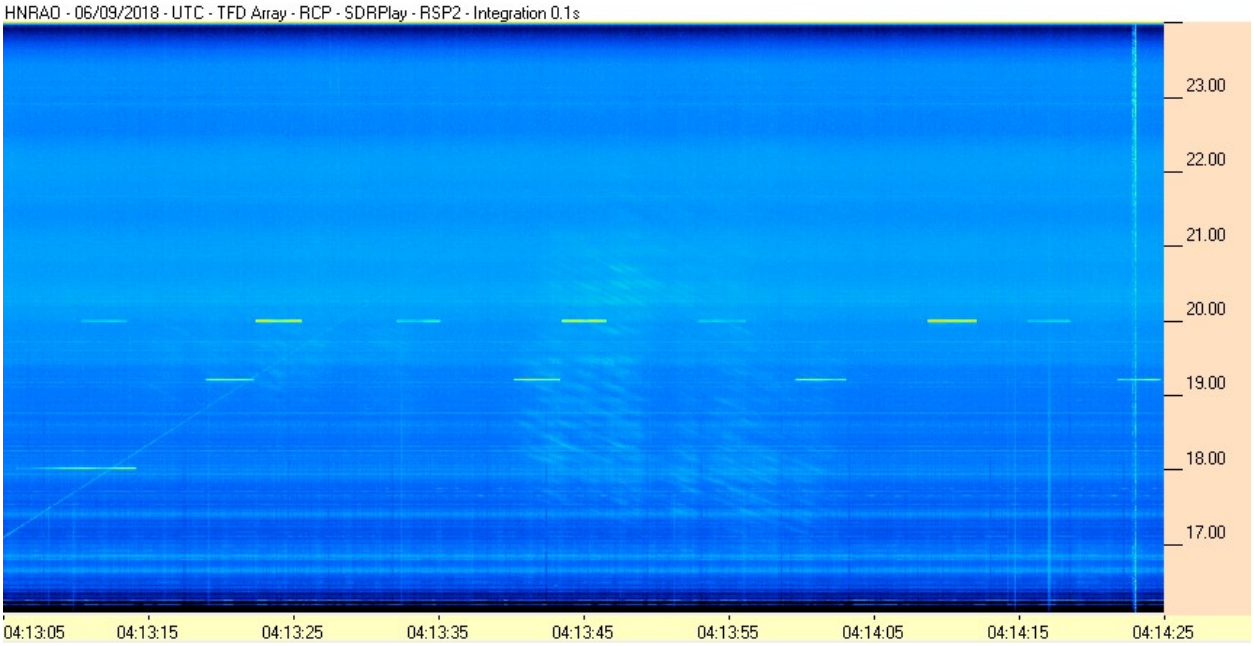

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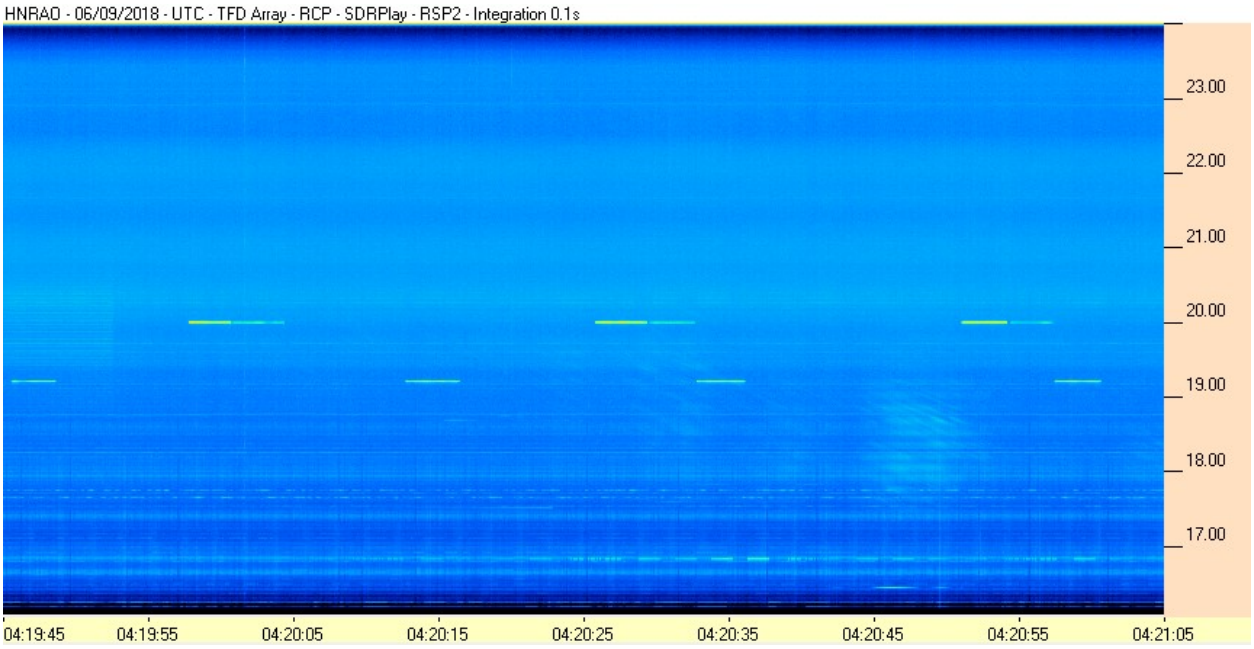
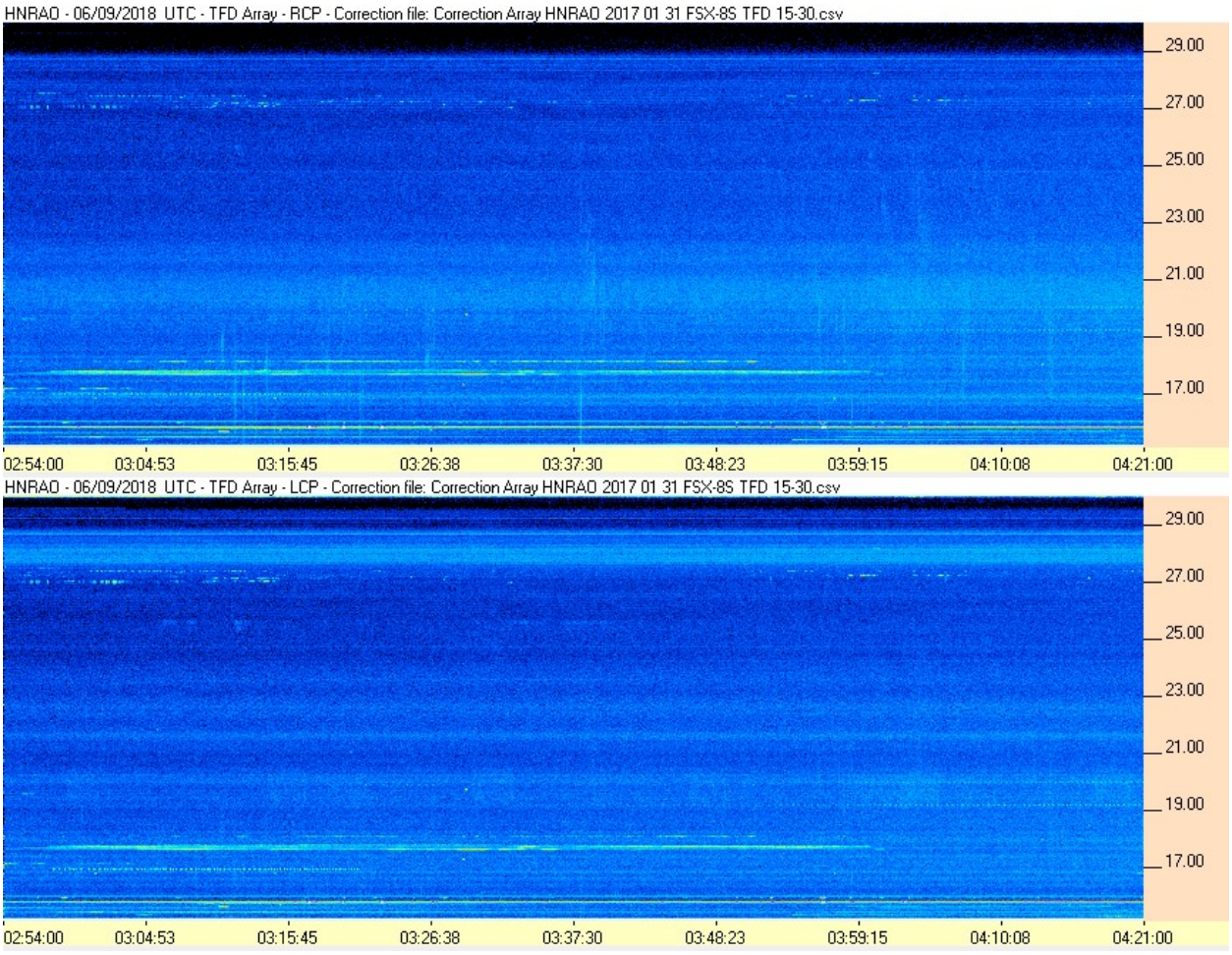


FSX-8S / TFD Array



FSX-2 / LWA Array

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