

HNRAO Observing Log
40.673181 N – 80.437885 W
EN90sq



Date: September 3/4, 2018

Object: Jupiter – Io-A

Observer: Unattended

Start - Time UT:	2314	Planetary K-index:	2
Jupiter Altitude (deg):	28.2	Jupiter Azimuth (deg):	208.8
Jupiter CML:	190.1	Jupiter Io Phase:	234.33
Jupiter RA (hr/min):	14:59	Jupiter Dec (hr/min):	-16:08
Hour Angle (hr/min):	01:45	Polarization	RCP
Sun Altitude (deg):	05.2	Sun Azimuth (deg):	276.1
Sun RA (hr/min):	10:44	Sun Dec (hr/min):	08:00

End – Time UT:	0016	De:	-2.9
Jupiter Altitude (deg):	21.2	Jupiter Azimuth (deg):	223.4
Jupiter CML:	227.57	Jupiter Io Phase	243.12
Hour Angle (hr/min):	02:47	Duration (min):	102
Sun Altitude (deg):	-06.3	Sun Azimuth (deg):	286.3
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	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

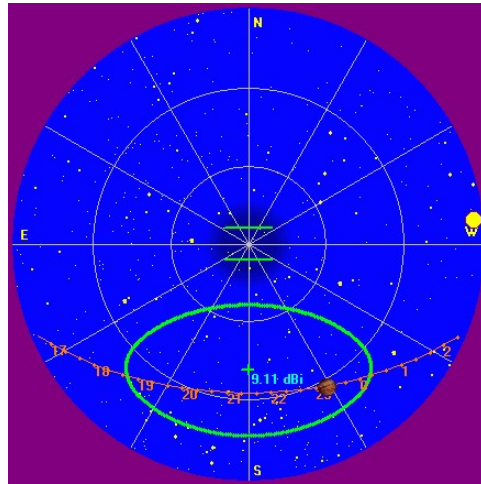
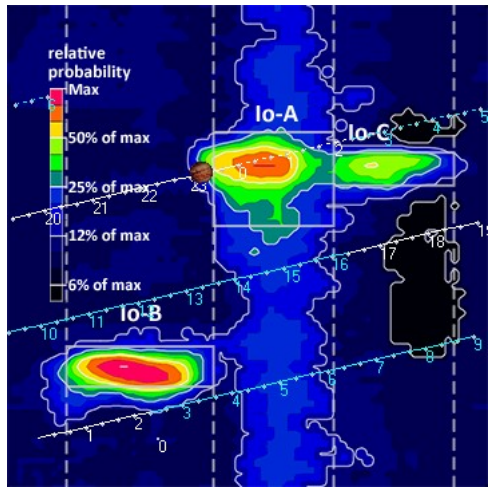
LWA antenna phased @ 35 degrees and orientation for observation: 45 degrees

* Used for testing and evaluating antenna systems

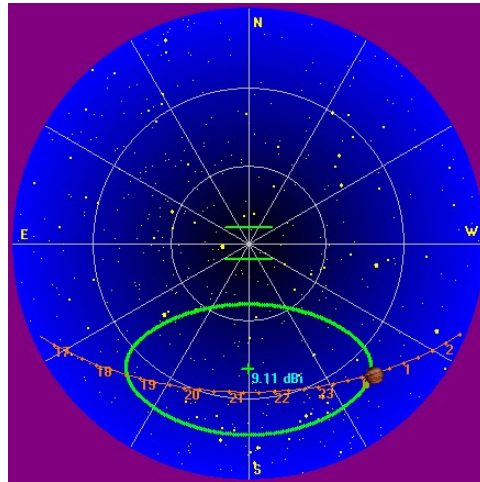
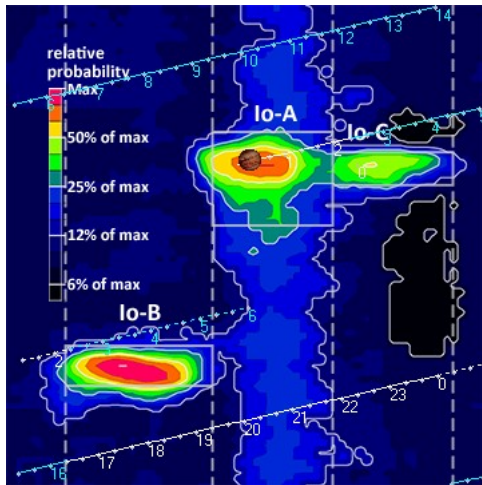
Software Radio Sky Spectrograph 2.8.50

Red = Offline

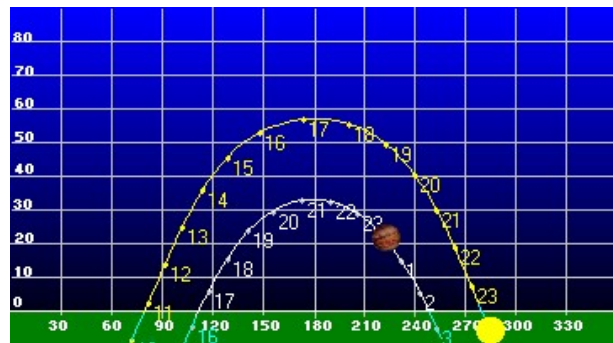
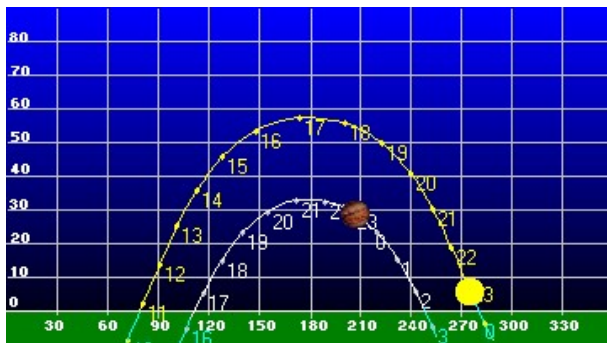
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Beginning of Pass



End of Pass



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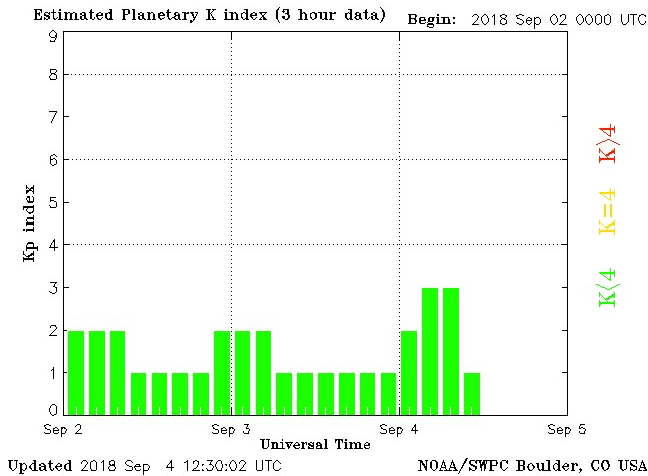


MODE	CML RANGE	Io RANGE	MAX F	POLAR	ARC	NOTES
Io-D	0-200	95-130	18	LH	Early	Also called "fourth source"
Io-B	(105 - 185)	(80-110)	39.5	RH	Early	Also called "early source"
non Io-B	80-200	0-360	38	RH	Early	Voyager info
Io-A	(200-270)	(205-260)	38	RH	Late	Also called "main source"
non-Io-A	(230-280)	0-360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



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All four spectrographs and the Jove II receiver were online during this observation. The only instrument able to resolve emissions was the SDRPlay RSP2 / TFD array combination. Weather conditions at the observatory were clear but the spectrograph showed lightning discharges somewhere relatively close. Hot and humid air at this time of the year produces pop up thunderstorm and this was the source of the lightning.

An unexpected and very weak RCP Io-A storm given the time of day and the location of the sun relative to Jupiter. All emissions were RCP L-bursts with no sign of S-burst emissions. L4 modulation lanes were present. The relative weakness of most emissions, 1 dB +/- GB made it difficult to determine if there were L3 modulation lanes, however, scintillation was clearly identifiable. There were a few clusters of emissions that were approximately 2 dB +/- GB.

Although 1 hr 45 min past transit, all emissions were observed within the beam of the array.

The spectrograph data showed emissions from 16 MHz to 24 MHz, but it's clear from the images that the emissions most certainly extended above 24 MHz.

Nothing else of significance was apparent.

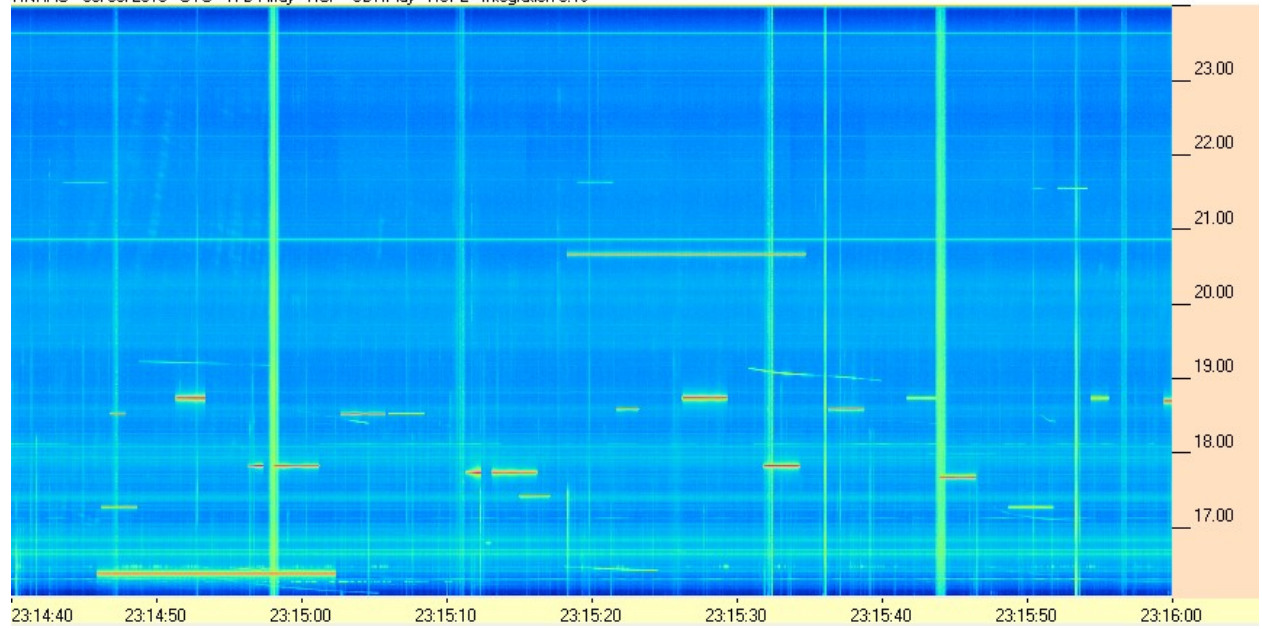
EOR

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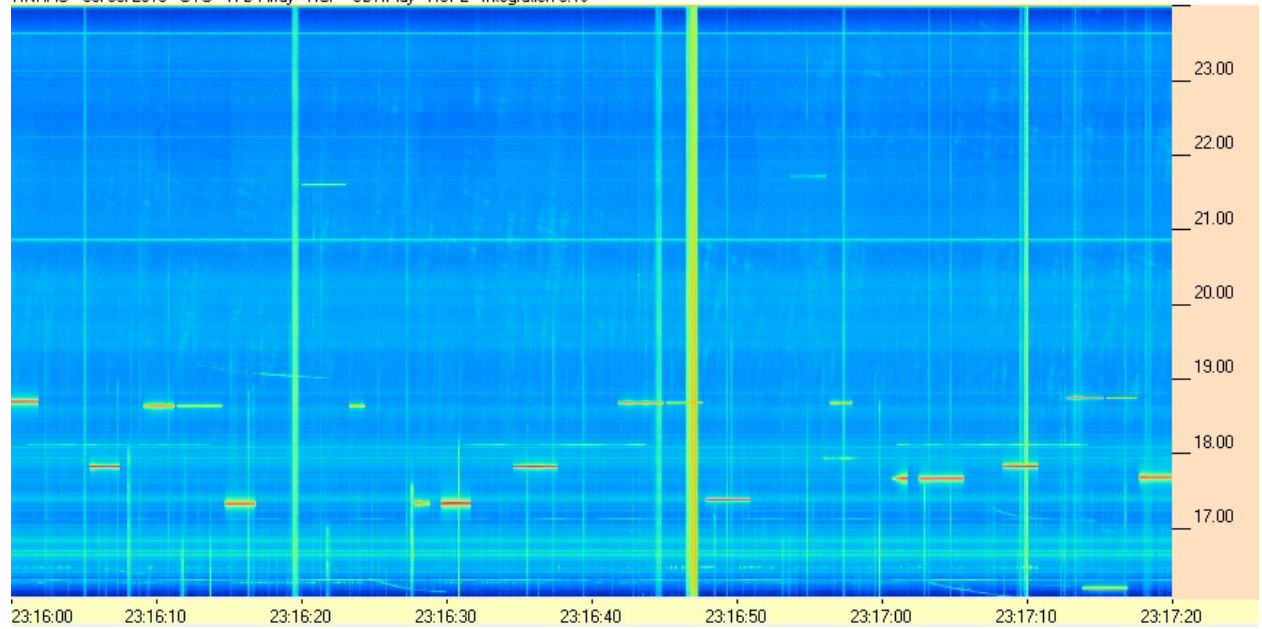


SDRPlay RSP2 / TFD Array

HNRAO - 09/03/2018 - UTC - TFD Array - RCP - SDRPlay - RSP2 - Integration 0.1s



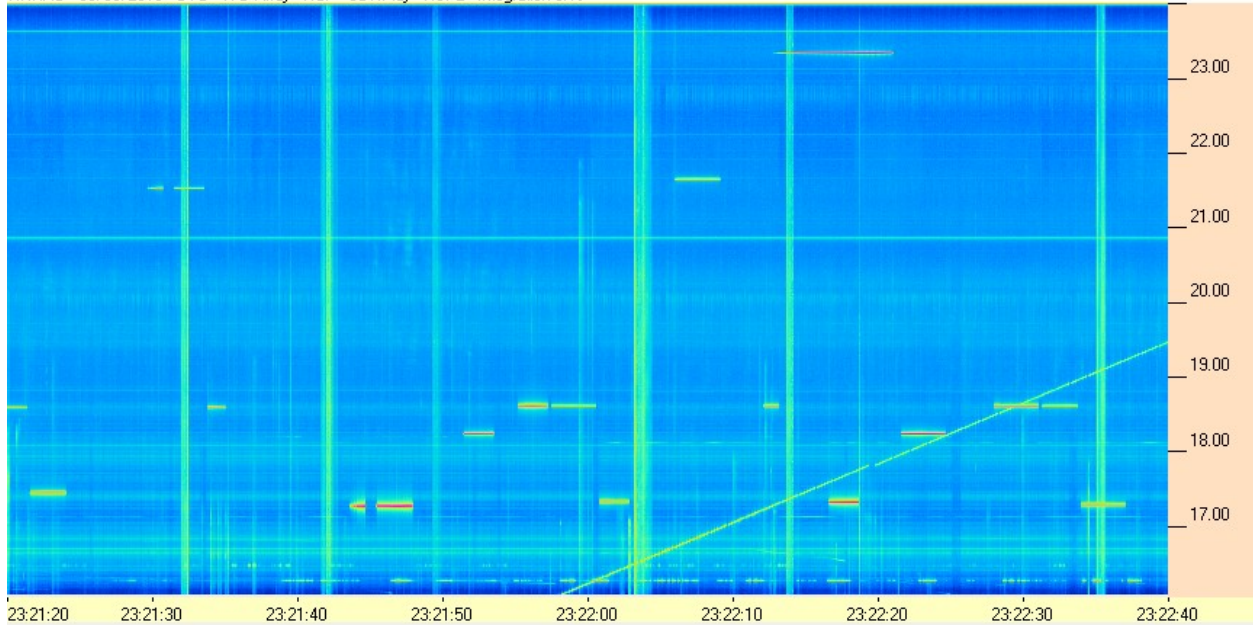
HNRAO - 09/03/2018 - UTC - TFD Array - RCP - SDRPlay - RSP2 - Integration 0.1s



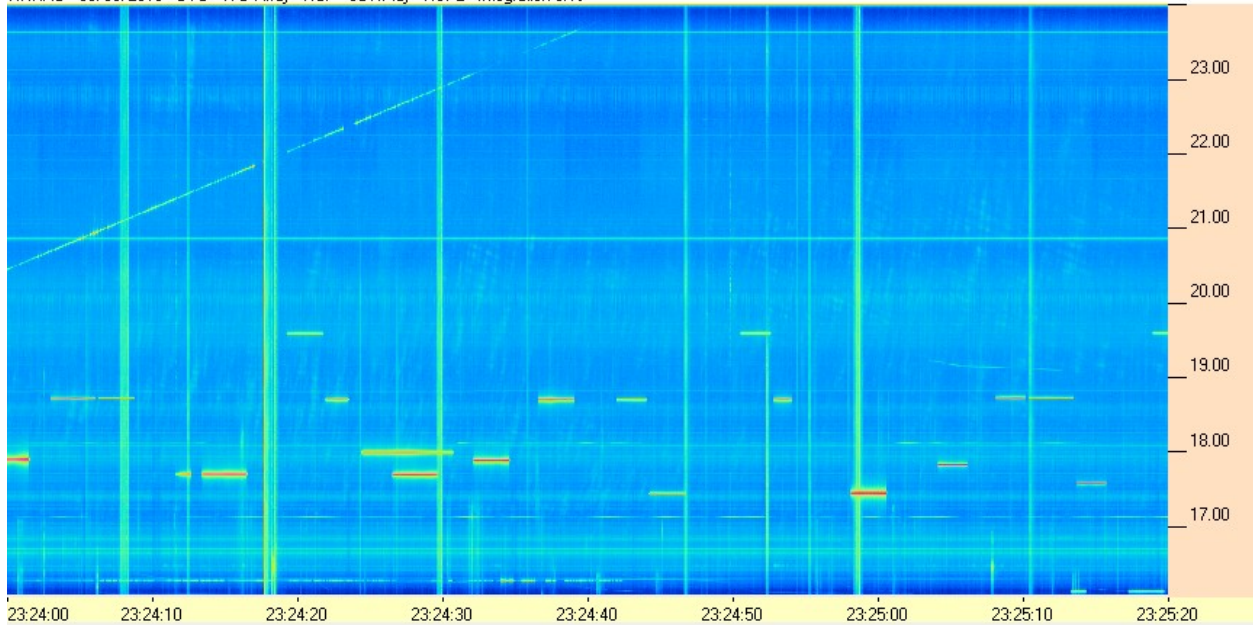
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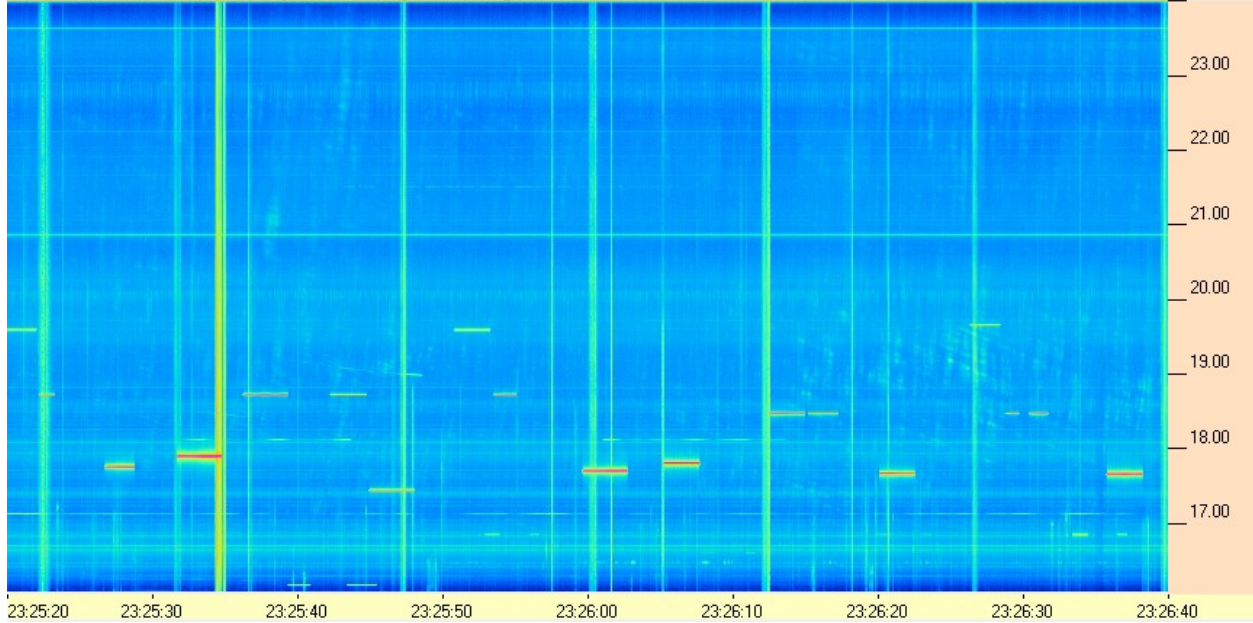
HNRAO - 09/03/2018 - UTC - TFD Array - RCP - SDRPlay - RSP2 - Integration 0.1s



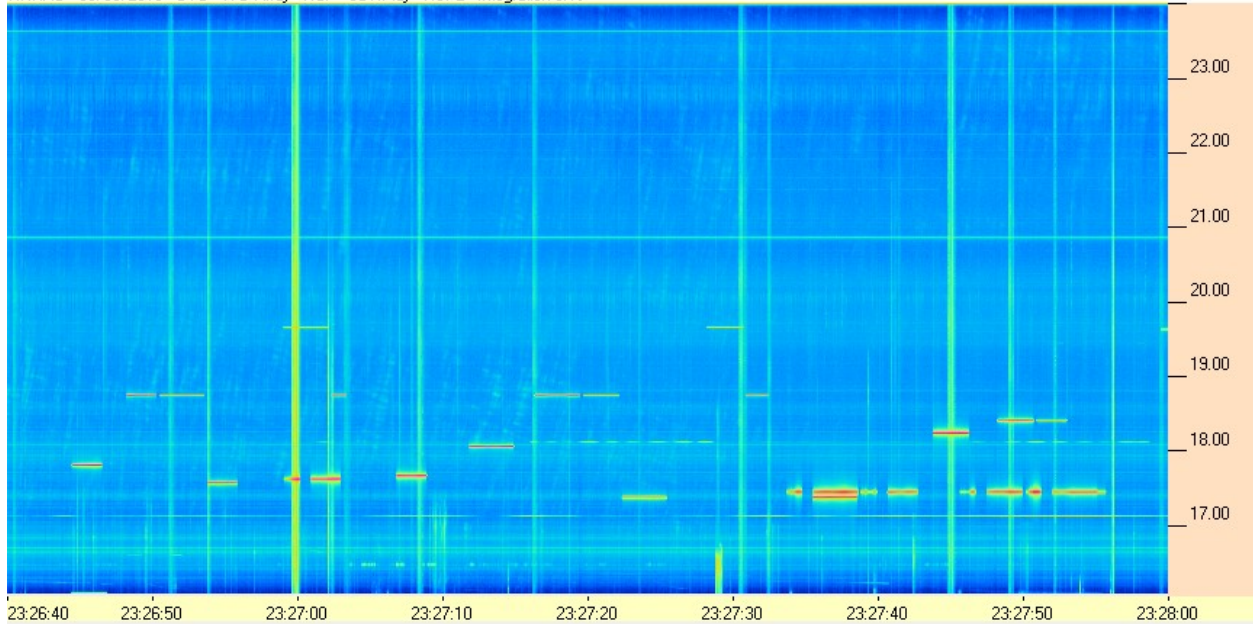
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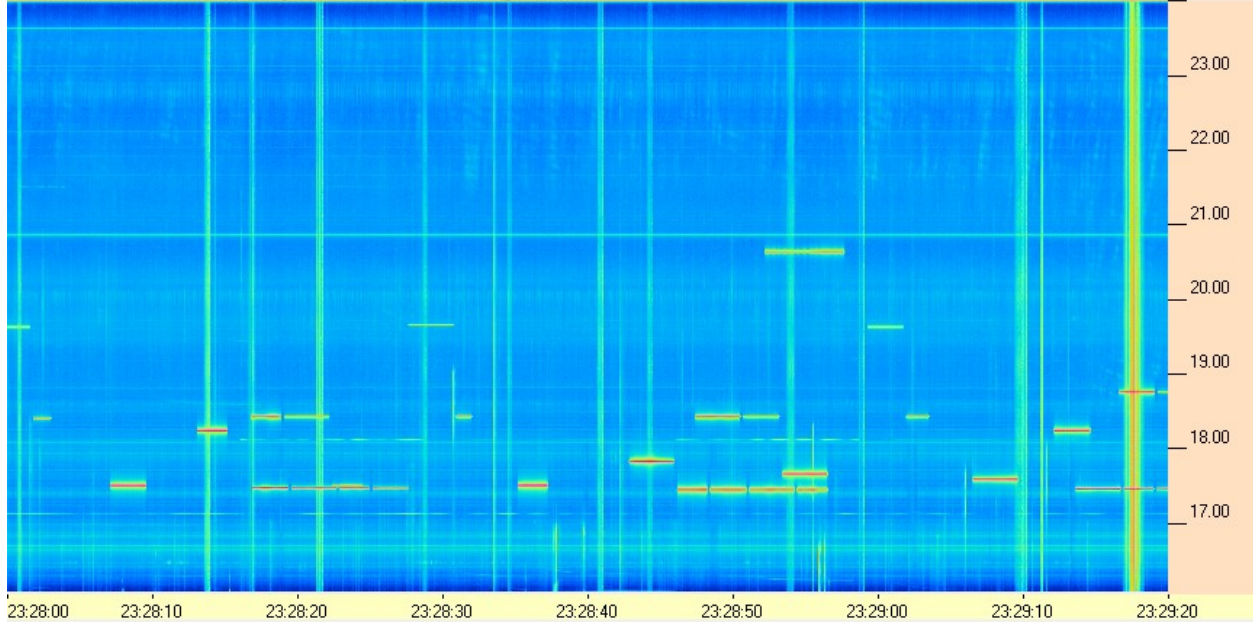
HNRAO - 09/03/2018 - UTC - TFD Array - RCP - SDRPlay - RSP2 - Integration 0.1s



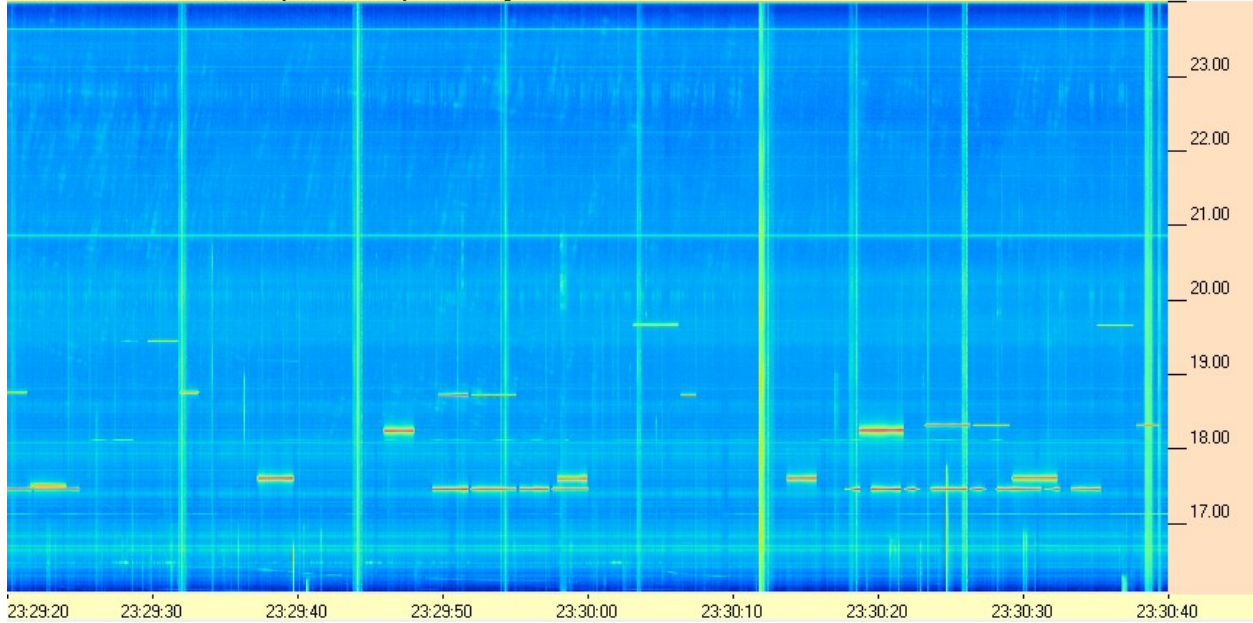
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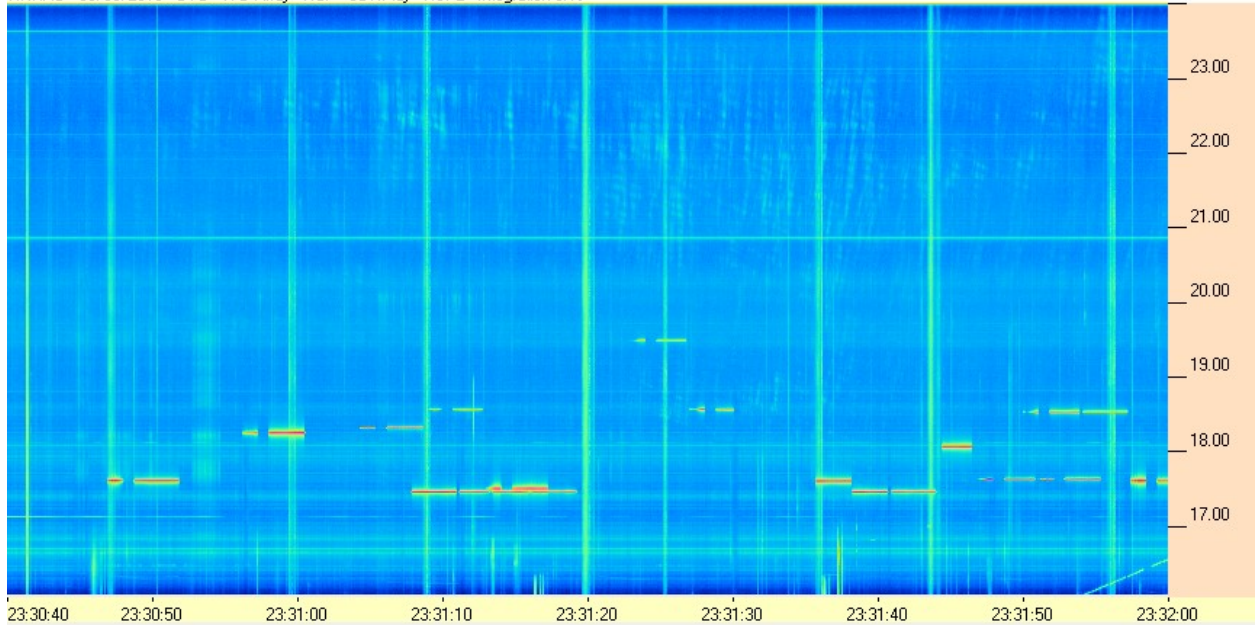
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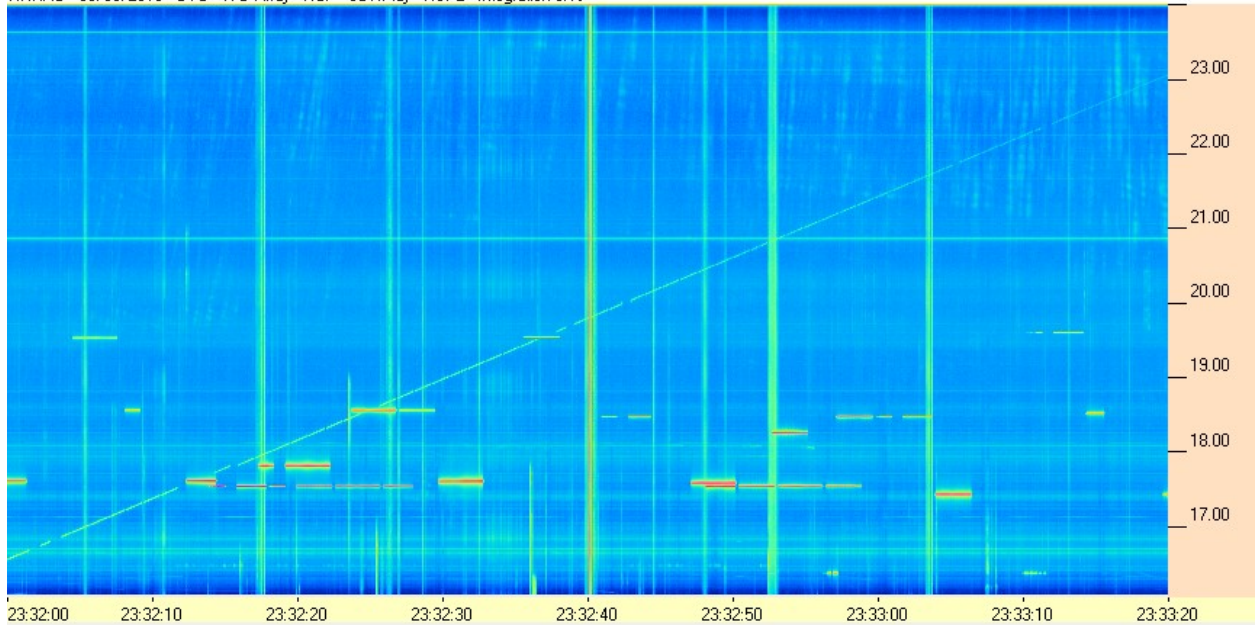
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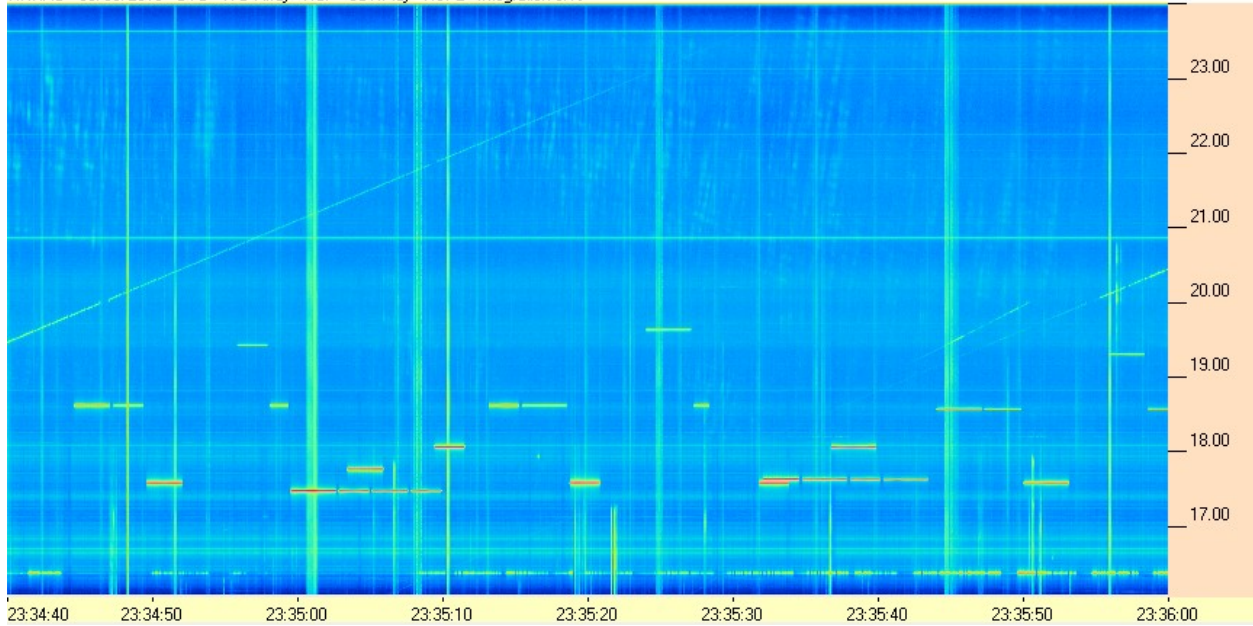
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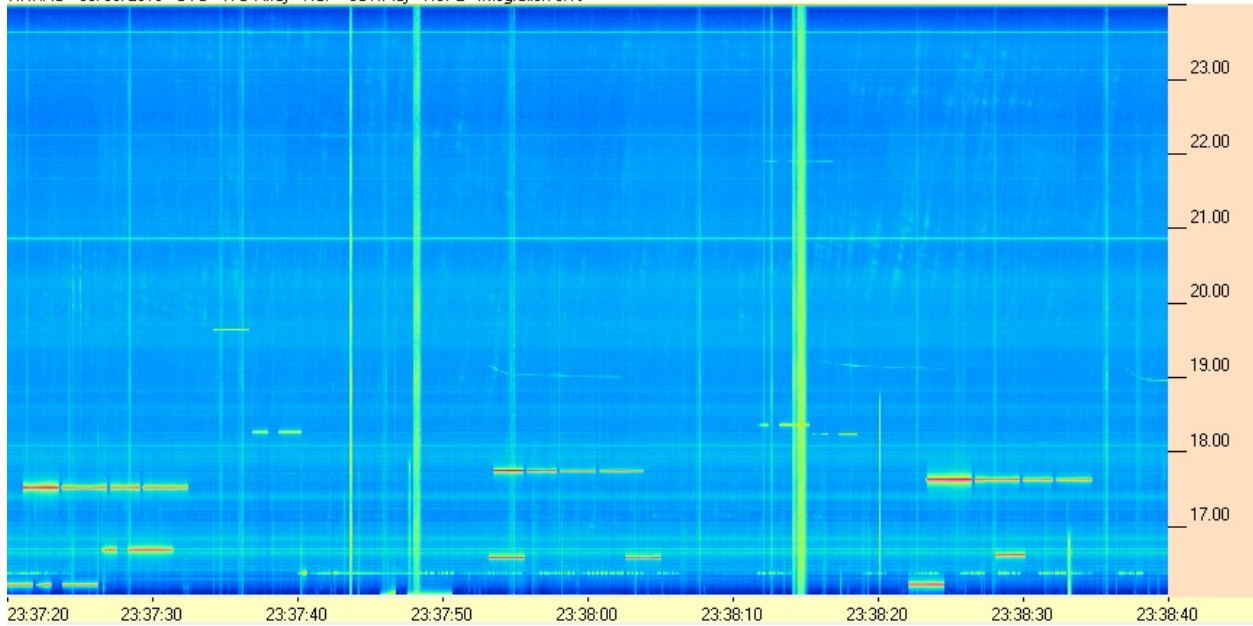
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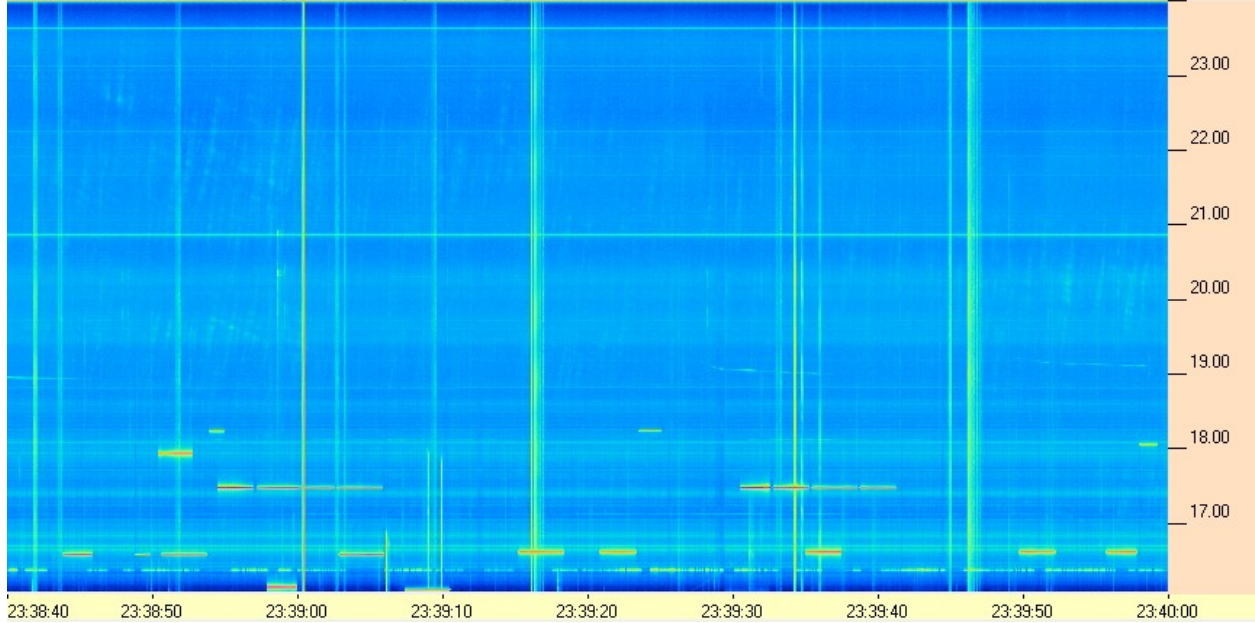
HNRAO - 09/03/2018 - UTC - TFD Array - RCP - SDRPlay - RSP2 - Integration 0.1s



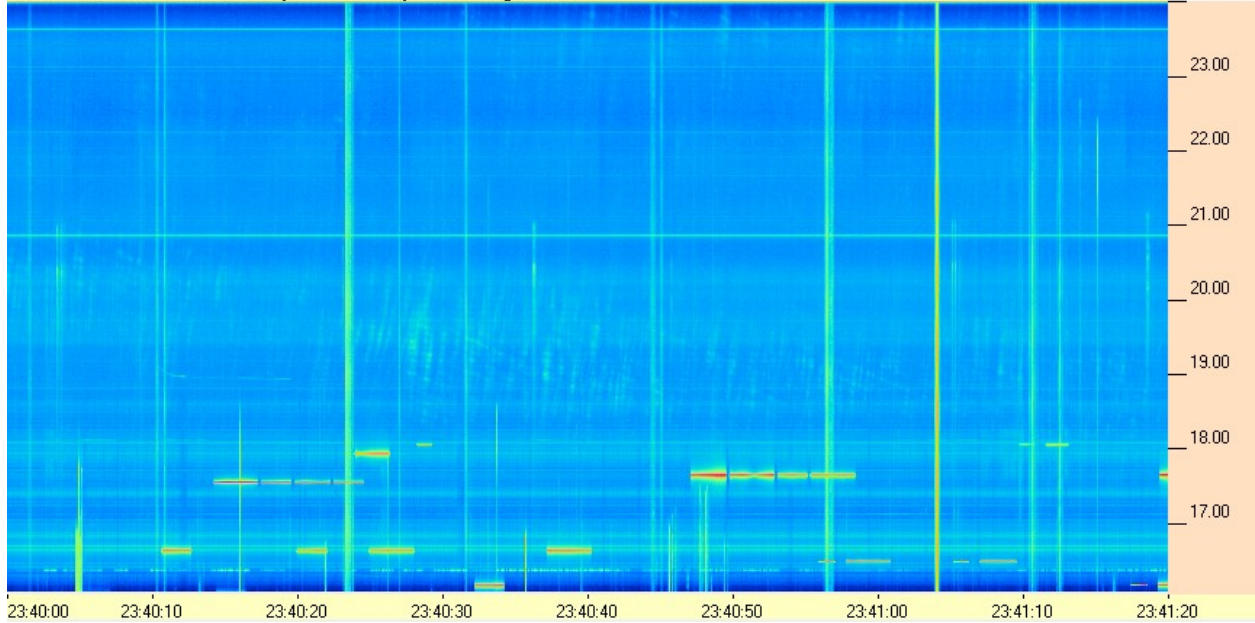
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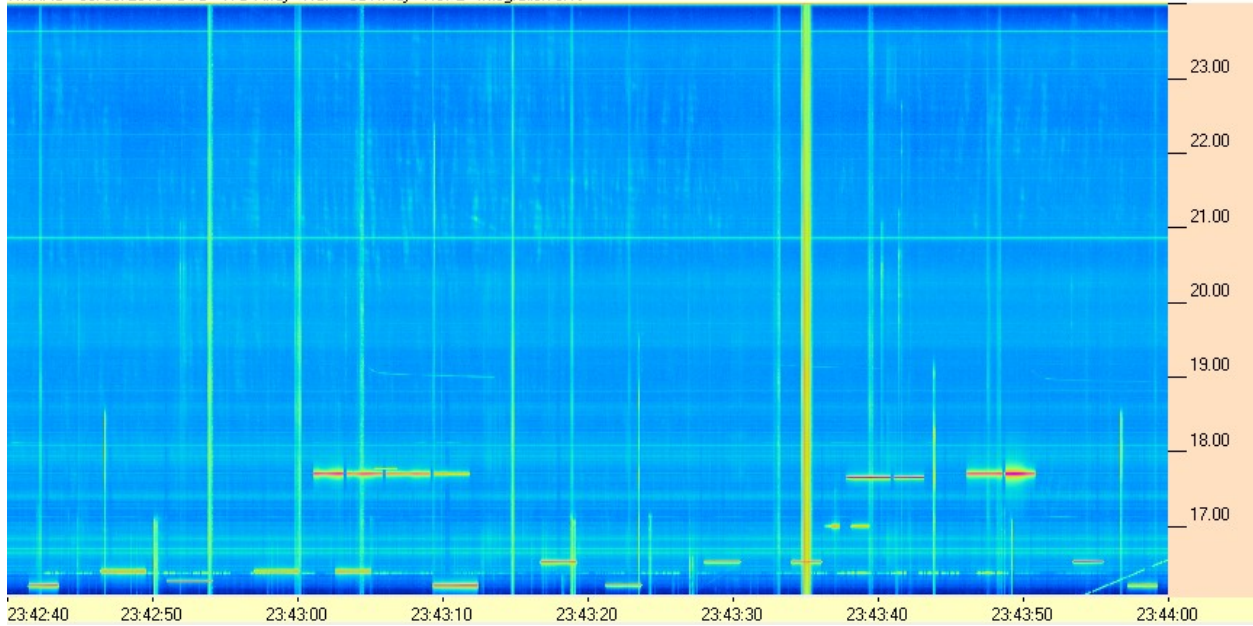
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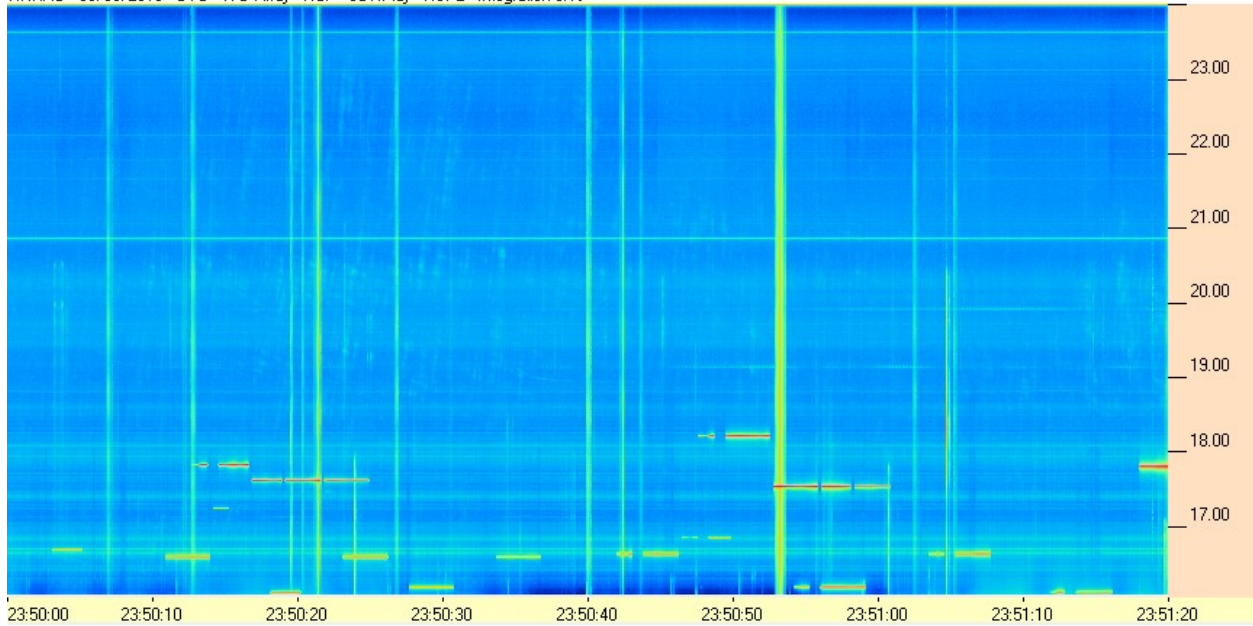
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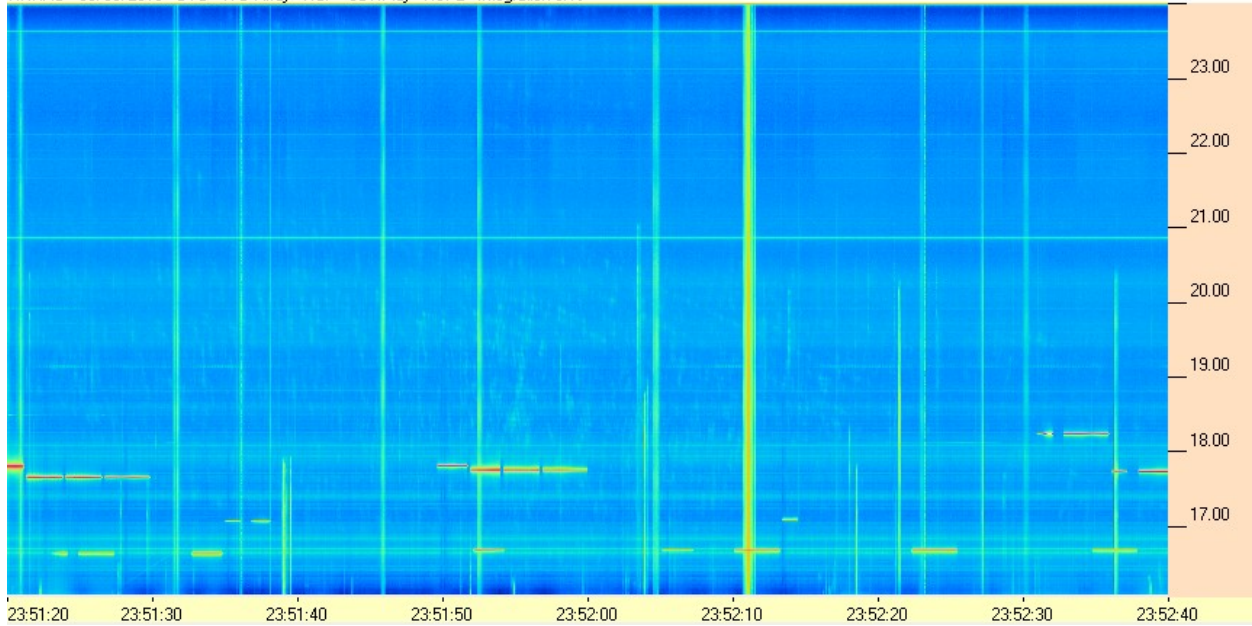
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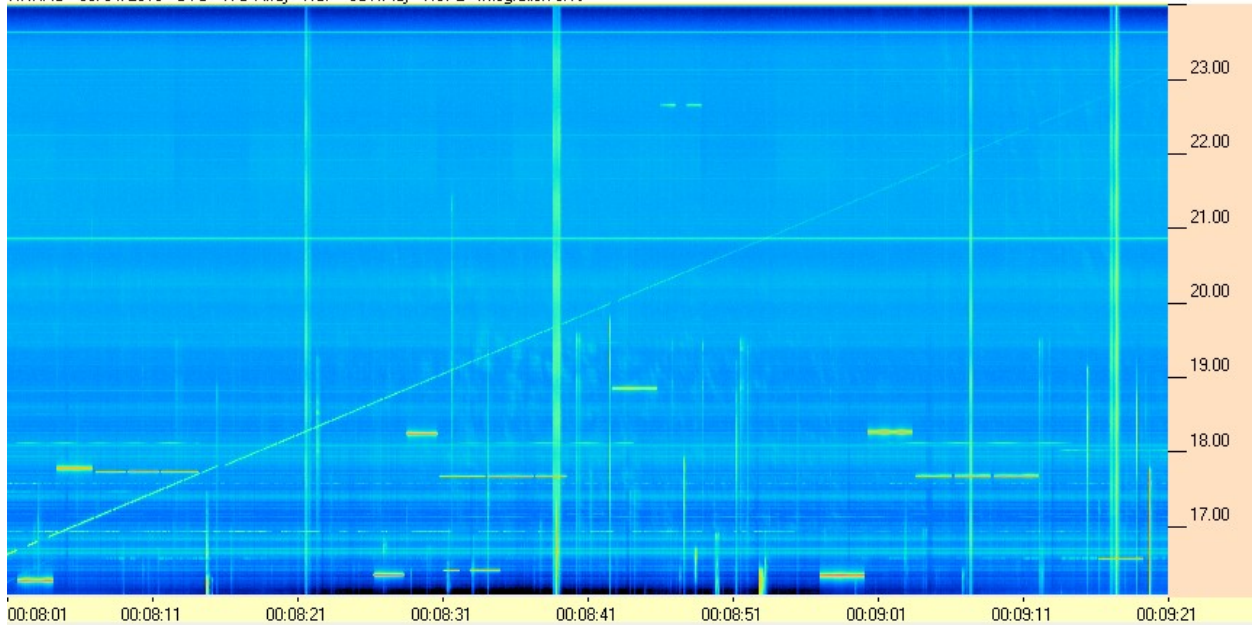
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HNRAO - 09/03/2018 - UTC - TFD Array - RCP - SDRPlay - RSP2 - Integration 0.1s



HNRAO - 09/04/2018 - UTC - TFD Array - RCP - SDRPlay - RSP2 - Integration 0.1s



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HNRAO - 09/04/2018 - UTC - TFD Array - RCP - SDRPlay - RSP2 - Integration 0.1s

