**HNRAO Observing Log**
**40.673181 N – 80.437885 W**
**EN90sq**


**Date: July 3, 2020**

**Object: Jupiter – Io-D**

**Observer: Unattended**

| | | | |
|---|---|---|---|
| **Start - Time UT:** | **0745** | **Planetary K-index:** | **1** |
| **Jupiter Altitude (deg):** | **24.4** | **Jupiter Azimuth (deg):** | **202.4** |
| **Jupiter CML:** | **198.68** | **Jupiter Io Phase:** | **092.90** |
| **Jupiter RA (hr/min):** | **19:43** | **Jupiter Dec (hr/min):** | **-21:39** |
| **Hour Angle (hr/min):** | **01:28** | **Polarization** | **LCP** |
| **Sun Altitude (deg):** | **-17.7** | **Sun Azimuth (deg):** | **035.3** |
| **Sun RA (hr/min):** | **06:43** | **Sun Dec (hr/min):** | **23:04** |

| | | | |
|---|---|---|---|
| **End – Time UT:** | **0852** | | |
| **Jupiter Altitude (deg):** | **18.0** | **Jupiter Azimuth (deg):** | **217.7** |
| **Jupiter CML:** | **239.34** | **Jupiter Io Phase** | **102.37** |
| **Hour Angle (hr/min):** | **02:35** | **Duration (min):** | **67** |
| **Sun Altitude (deg):** | **-09.1** | **Sun Azimuth (deg):** | **048.6** |
| **Max Frequency MHz** | **20** | **Min Frequency MHz** | **16** |
| **J/S Angular Separation** | **165.8** | **De:** | **-1.2** |

## Observatory Configuration

| Spectrograph Receiver | Antenna | Polarization | System Loss | Multicoupler | Multicoupler port | Calibrated |
|---|---|---|---|---|---|---|
| FSX-8S | TFD | RCP<br>LCP | -8.35 dB<br>-7.59 dB | #2 RCP<br>#1 LCP | Port 1 +10dB<br>Port 1 +10dB | Twice daily<br>Twice daily |
| FSX-2 | LWA | RCP/LCP manual select | | N/A | N/A | N/A |
| SDRPlay RSP2 #1 | TFD | RCP | -8.35 dB | #2 RCP | Port 2 +3dB | Twice daily |
| SDRPlay RSP2 #2 | TFD | LCP | -7.59 dB | #1 LCP | Port 2 +3dB | Twice daily |
| JOVE II HNRAO #2 | Jove dipoles | Linear | -3.66 dB | #3 Linear | Port 4 +3 dB | Offline |

Radio JOVE dipoles phased @ 32 degrees for 2020-2021 season
Typinski AN-TFD-24-4 array phased @ 35 degrees for 2020-2021 season
Four LWA antenna array phased @ 35 degrees and orientation for observation: 45 degrees
Radio Sky Spectrograph software version 2.9.30
Radio-SkyPipe software version 2.7.33 Radio-Jupiter Pro software version 3.8.2
Network Time Server GpsNtp-Pi, Reeve Engineering

**All times are synced with a local GPS locked NTP server.**

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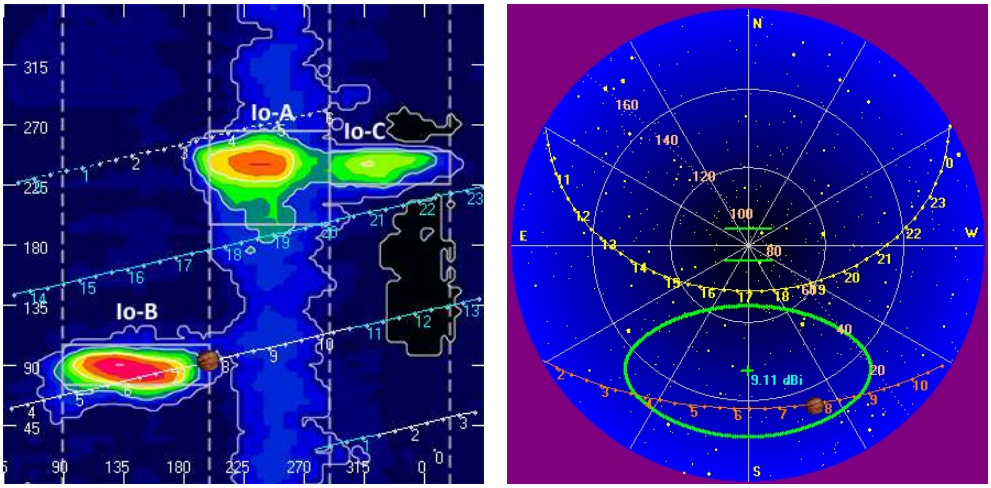
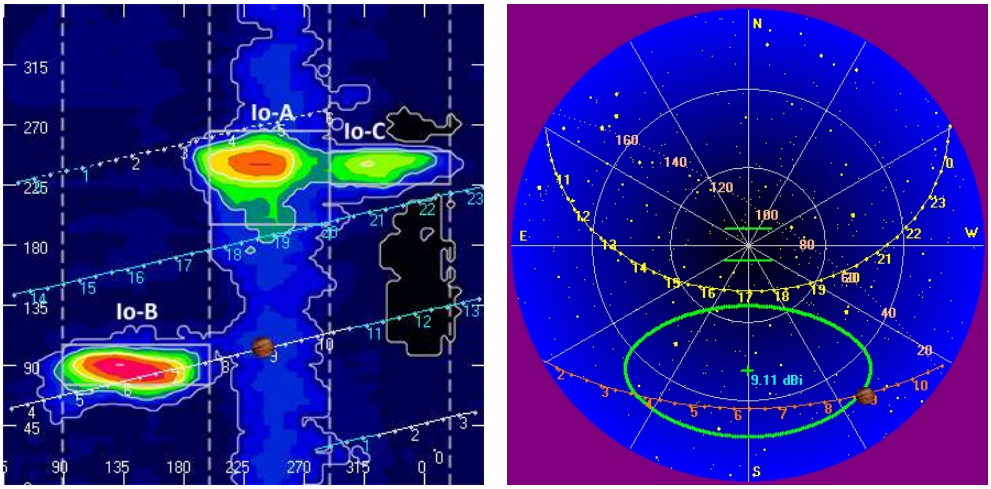
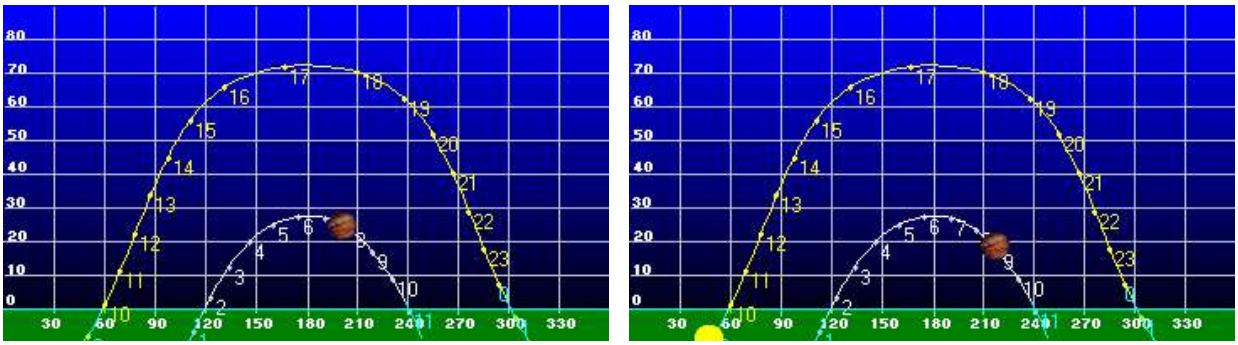



**Beginning of Pass**




**End of Pass**



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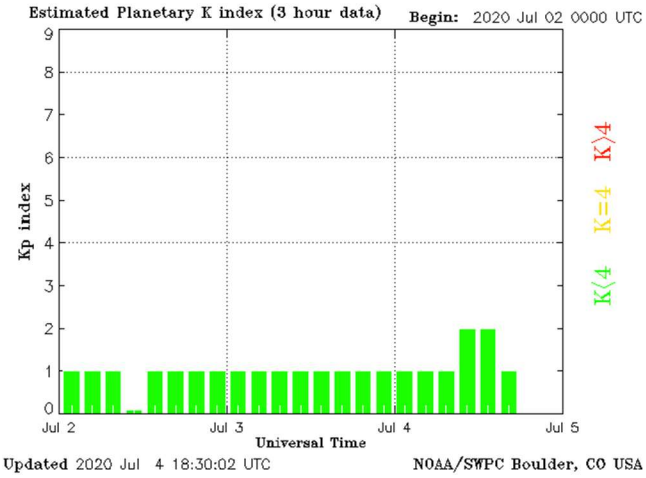



| MODE | CML RANGE | Io RANGE | MAX F | POLAR | ARC | NOTES |
|---|---|---|---|---|---|---|
| Io-D | 0-200 | 95-130 | 18 | LH | Early | Also called "fourth source" |
| Io-B | (105 - 185) | (80-110) | 39.5 | RH | Early | Also called "early source" |
| non Io-B | 80-200 | 0-360 | 38 | RH | Early | Voyager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

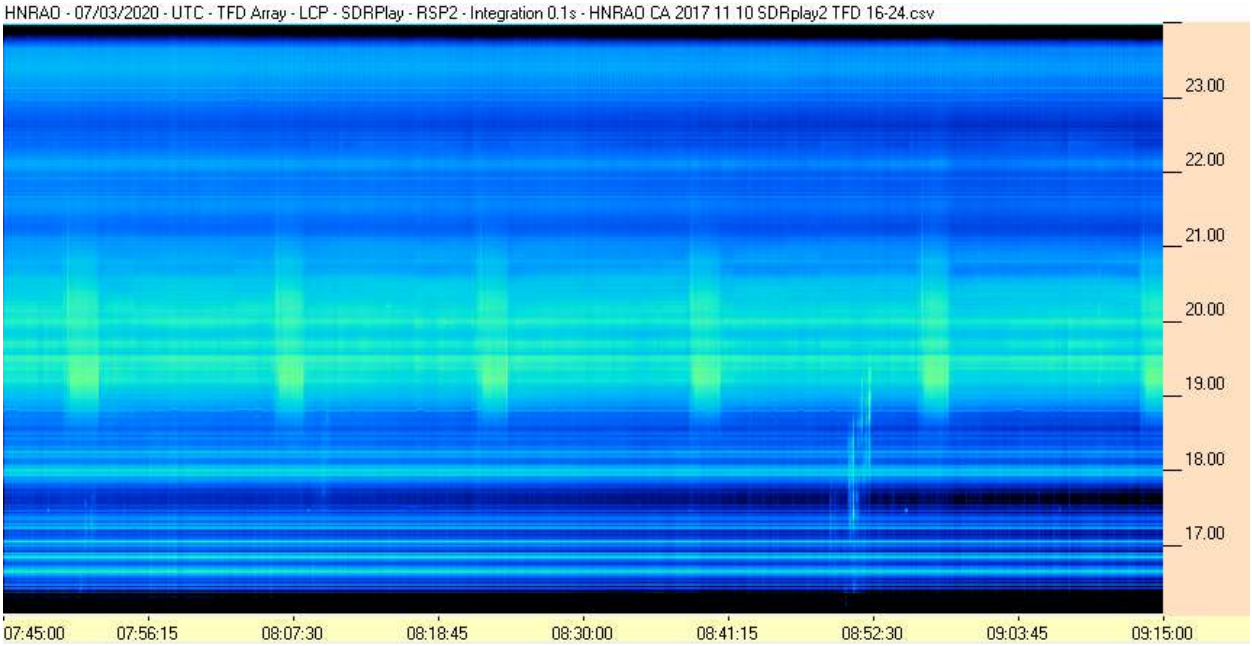
| Modulation Lanes Designations* | |
|---|---|
| L - Burst | S-Burst |
| L1 – No lanes | S1 – No lanes |
| L2 - Positive slope | S2 – Positive slope |
| L3 - Cross hatched | S3 – Cross hatched |
| L4 – Negative slope | S4 – Negative slope |
| *Modulation Lanes in the Dynamic Spectra of Jovian L-bursts, J.J. Riihimaa, Astron. & Astrophys. 4, 1970 | |

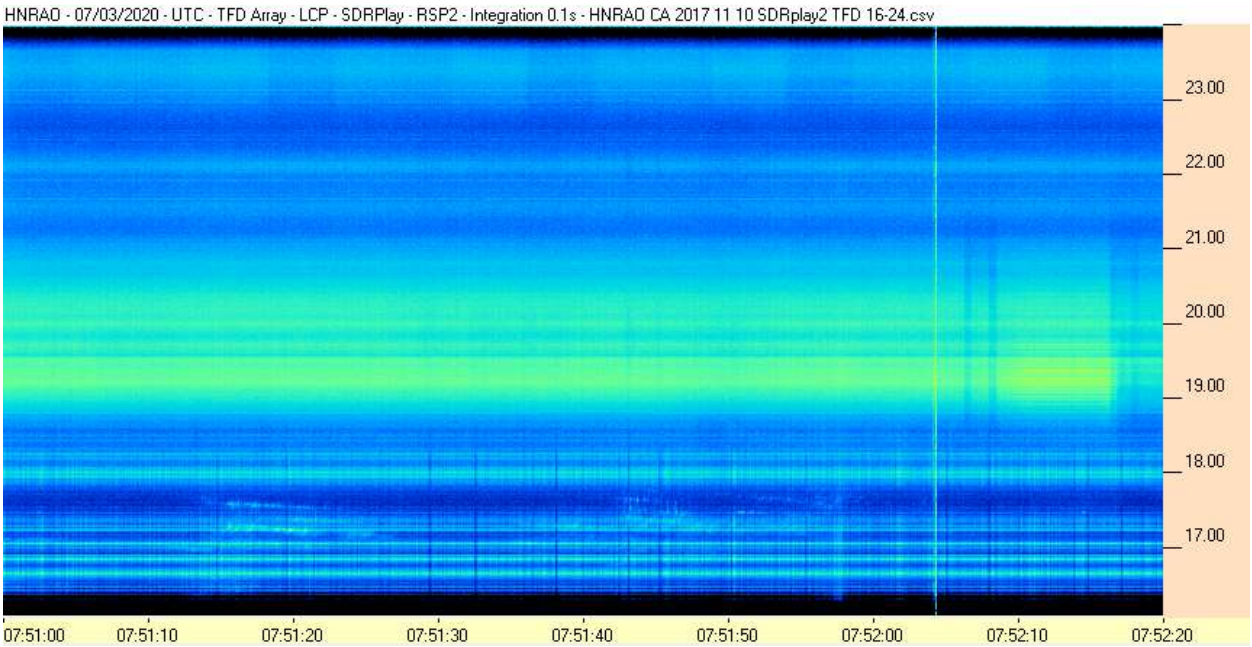

This was a very brief Io-D storm with emissions throughout slightly above GB. Emissions consisted primarily of L-bursts with L4 modulation lanes. The only significant emissions were between 0850:10 UT and 0852:20 UT. In this grouping there appear to be S-bursts at 0850:52 UT at 17.4 MHz which reached near saturation point. There are more S-bursts in the cluster at 0852:08 UT.

Nothing else of significance.

EOR

## SDRPlay RSP2/RCP / TFD Array



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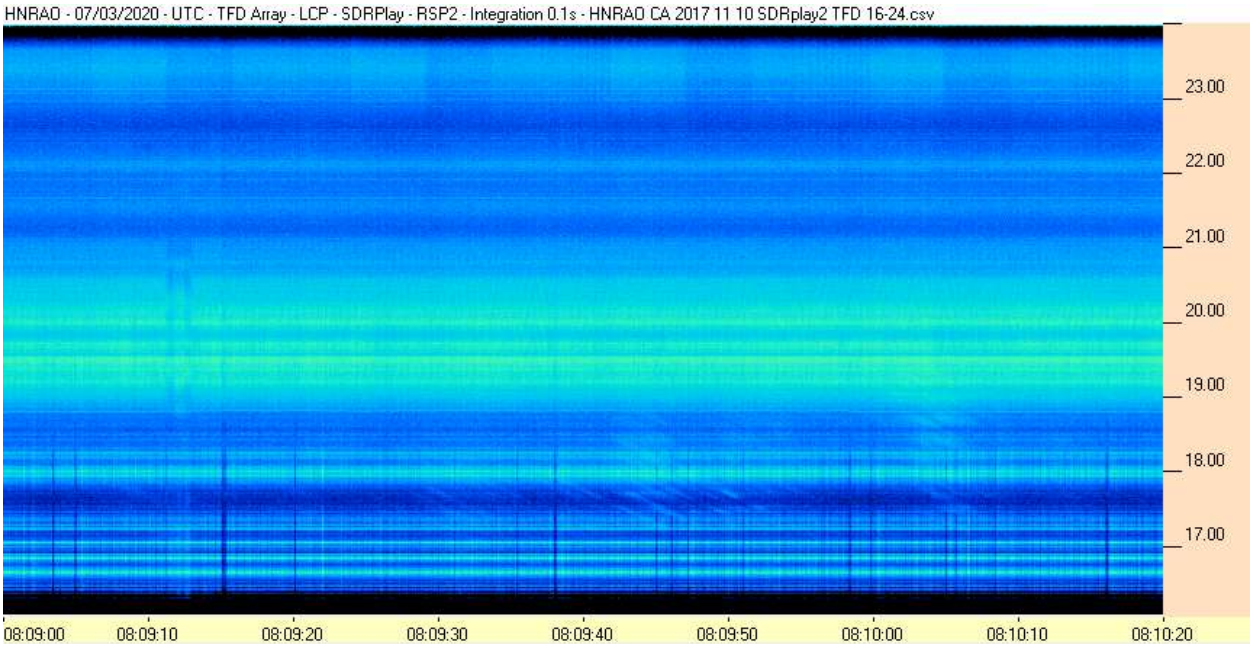
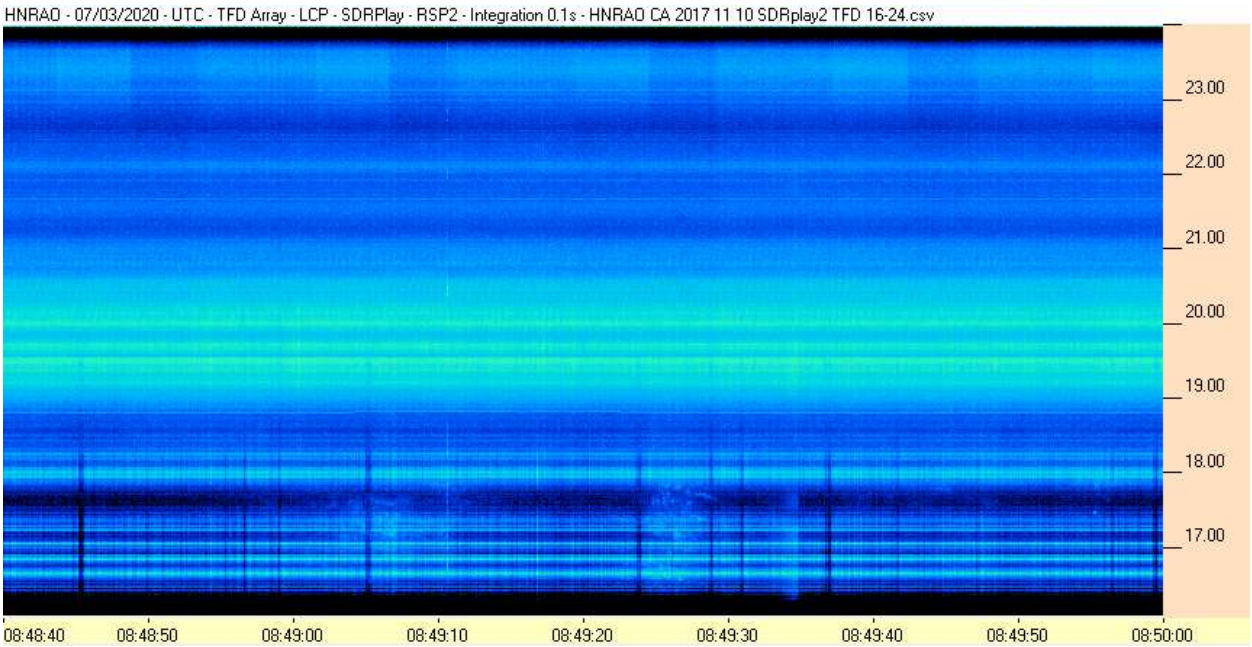
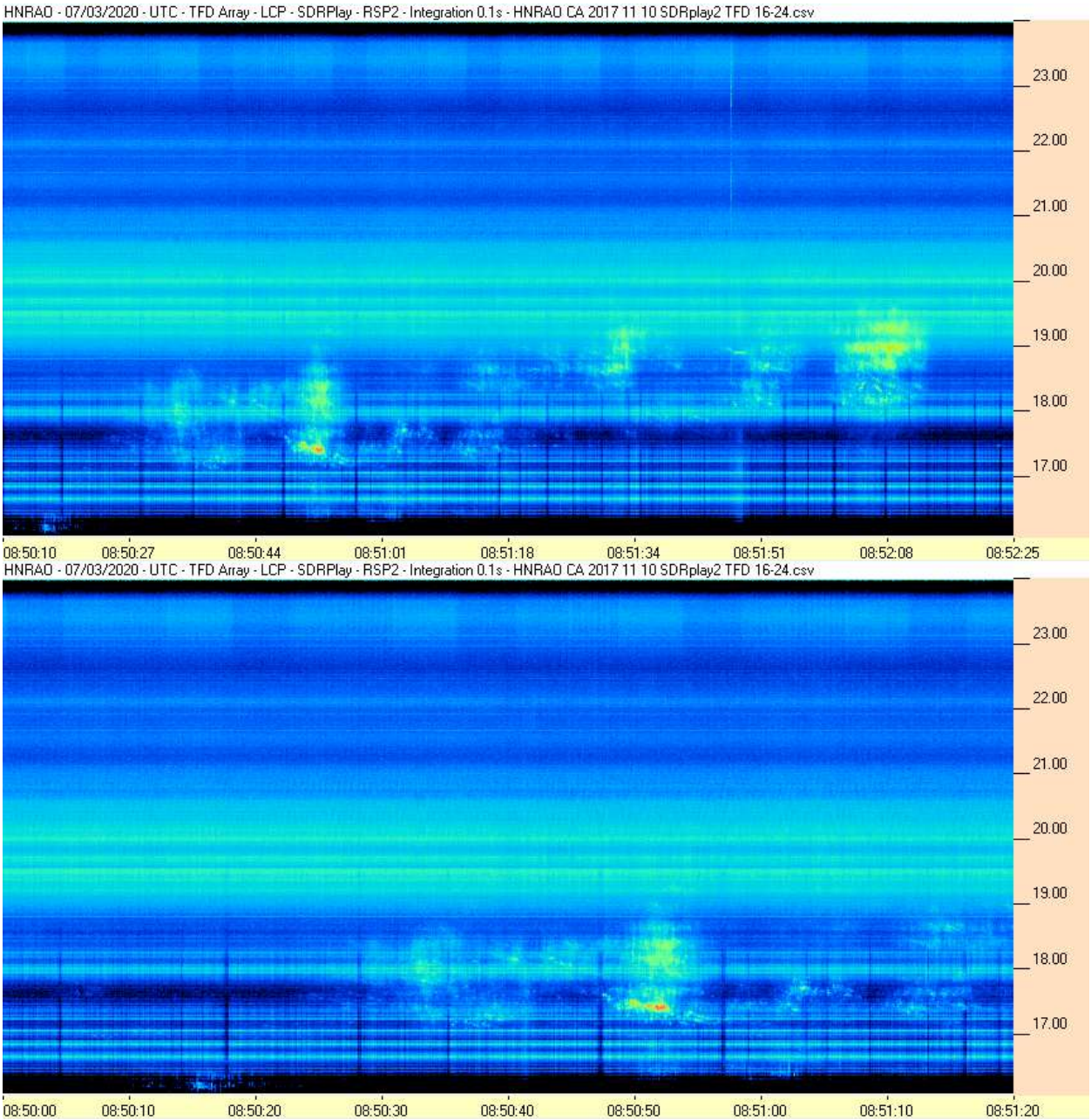
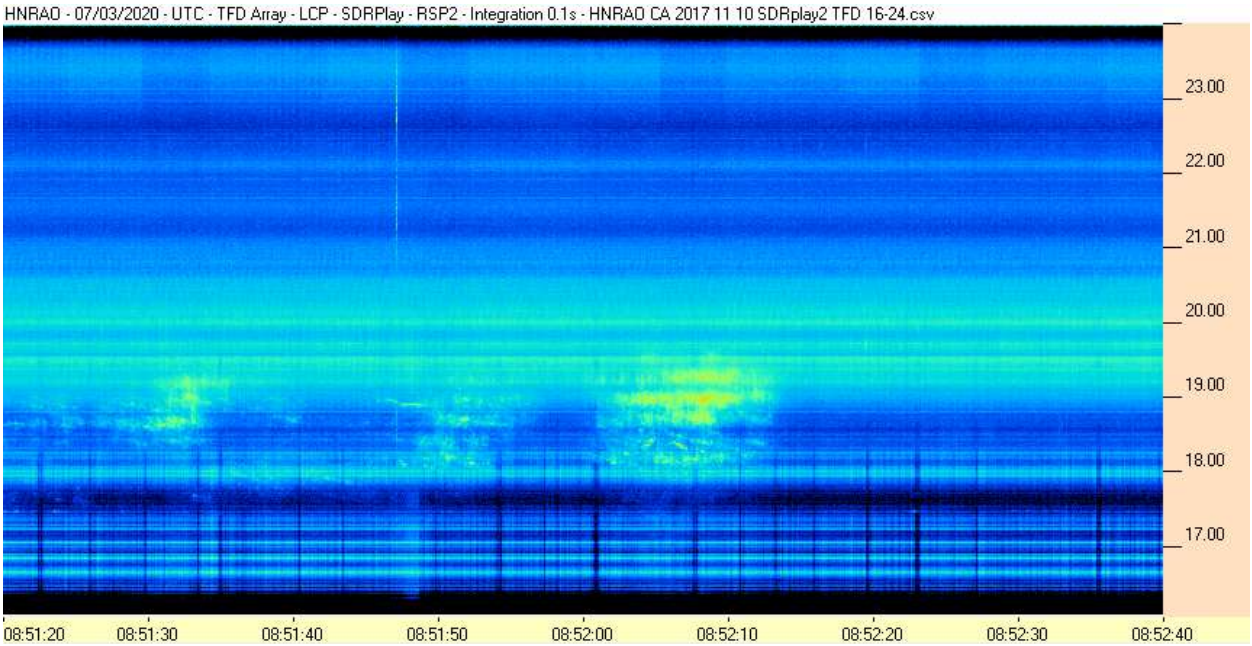
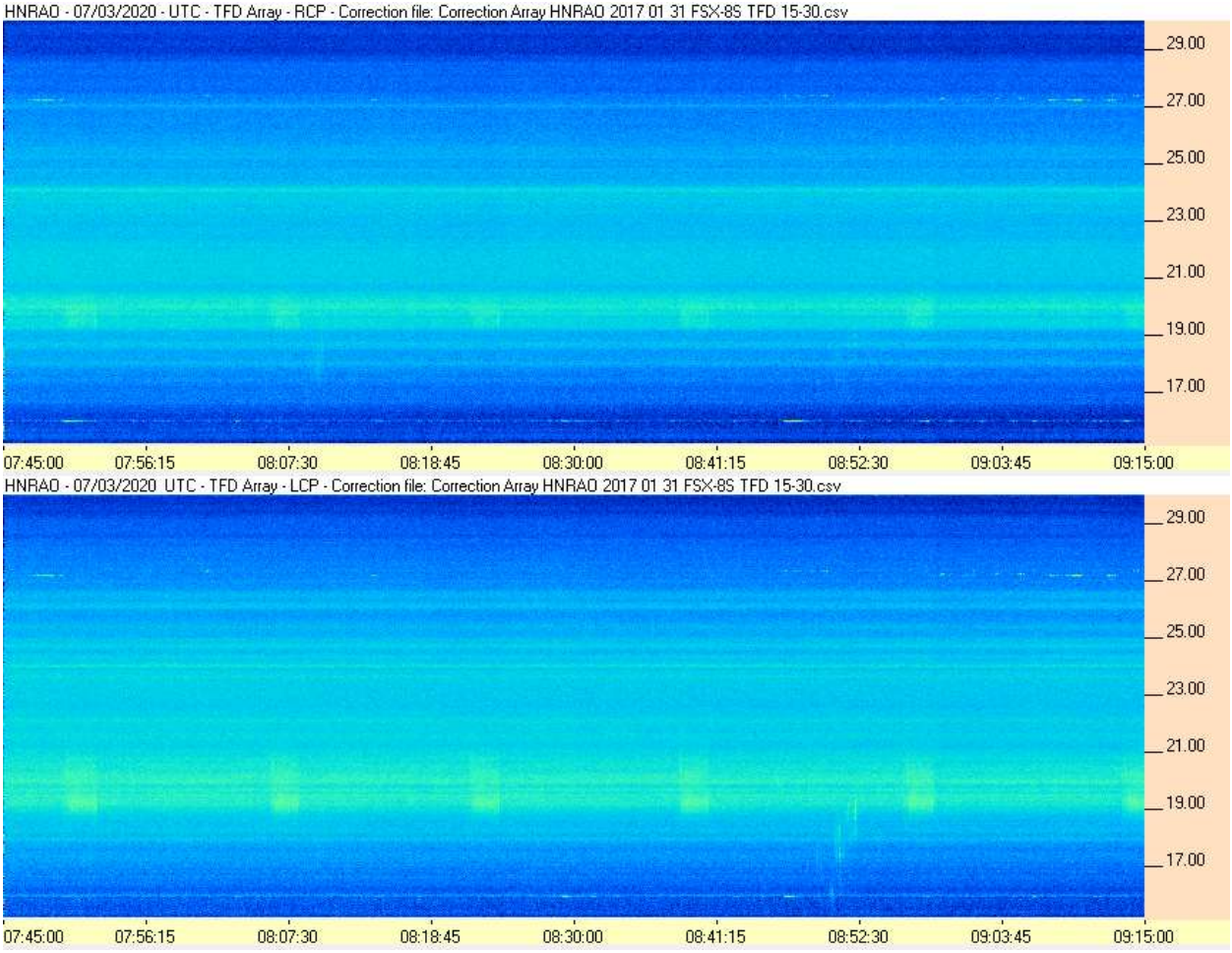


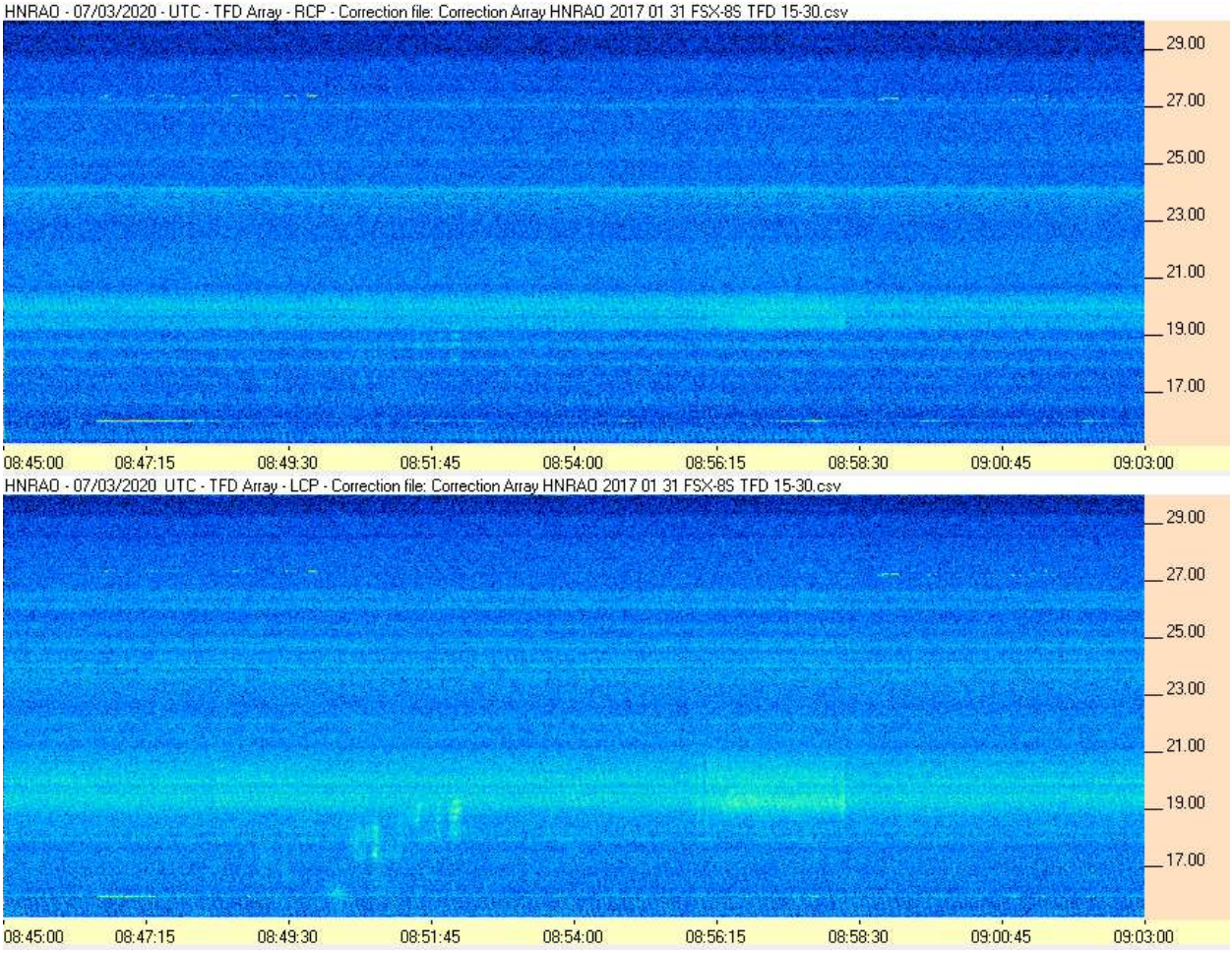




HNRAO - 07/03/2020 - UTC - TFD Array - LCP - SDRPlay - RSP2 - Integration 0.1s - HNRAO CA 2017 11 10 SDRplay2 TFD 16-24.csv
23.00
22.00
21.00
20.00
19.00
18.00
17.00
08:50:10
08:50:27
08:50:44
08:51:01
08:51:18
08:51:34
08:51:51
08:52:08
08:52:25
HNRAO - 07/03/2020 - UTC - TFD Array - LCP - SDRPlay - RSP2 - Integration 0.1s - HNRAO CA 2017 11 10 SDRplay2 TFD 16-24.csv
23.00
22.00
21.00
20.00
19.00
18.00
17.00
08:50:00
08:50:10
08:50:20
08:50:30
08:50:40
08:50:50
08:51:00
08:51:10
08:51:20




**FSX-8S / TFD Array**


HNRAO - 07/03/2020 - UTC - TFD Array - RCP - Correction file: Correction Array HNRAO 2017 01 31 FSX-8S TFD 15-30.csv
29.00
27.00
25.00
23.00
21.00
19.00
17.00
07:45:00
07:56:15
08:07:30
08:18:45
08:30:00
08:41:15
08:52:30
09:03:45
09:15:00
HNRAO - 07/03/2020 UTC - TFD Array - LCP - Correction file: Correction Array HNRAO 2017 01 31 FSX-8S TFD 15-30.csv
29.00
27.00
25.00
23.00
21.00
19.00
17.00
07:45:00
07:56:15
08:07:30
08:18:45
08:30:00
08:41:15
08:52:30
09:03:45
09:15:00


HNRAO - 07/03/2020 - UTC - TFD Array - RCP - Correction file: Correction Array HNRAO 2017 01 31 FSX-8S TFD 15-30.csv
29.00
27.00
25.00
23.00
21.00
19.00
17.00
08:45:00
08:47:15
08:49:30
08:51:45
08:54:00
08:56:15
08:58:30
09:00:45
09:03:00
HNRAO - 07/03/2020 UTC - TFD Array - LCP - Correction file: Correction Array HNRAO 2017 01 31 FSX-8S TFD 15-30.csv
29.00
27.00
25.00
23.00
21.00
19.00
17.00
08:45:00
08:47:15
08:49:30
08:51:45
08:54:00
08:56:15
08:58:30
09:00:45
09:03:00