Radio JOVE Transitions from Analog to Digital

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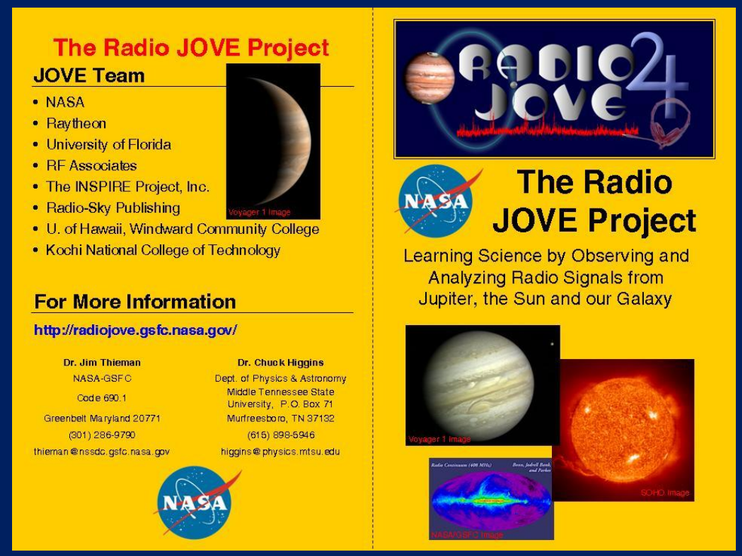
Outline:

- Radio JOVE Project
- Hardware, Software, Calibration
- SDR Radios
- Citizen Science Research
- Summary



radiojove.gsfc.nasa.gov

Radio JOVE History

Radio JOVE uses hands-on radio astronomy to get people interested in and doing science.

1999 - present

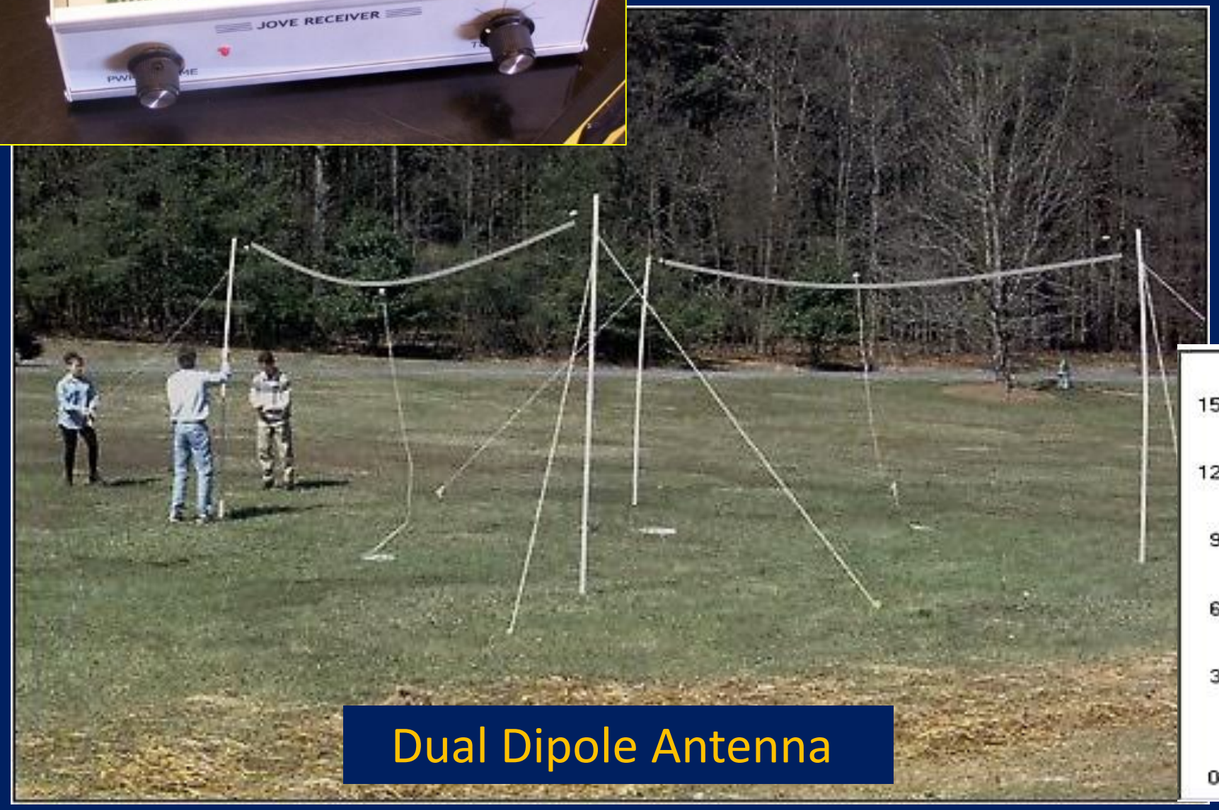
70 Countries have participated in Radio JOVE
Nearly 2500 kits sold

Worldwide Participants

- Citizen Scientists
- Interested amateurs
- Colleges & Universities
- High Schools

Hardware and Software

Radio JOVE RJ1.1
20 MHz Receiver

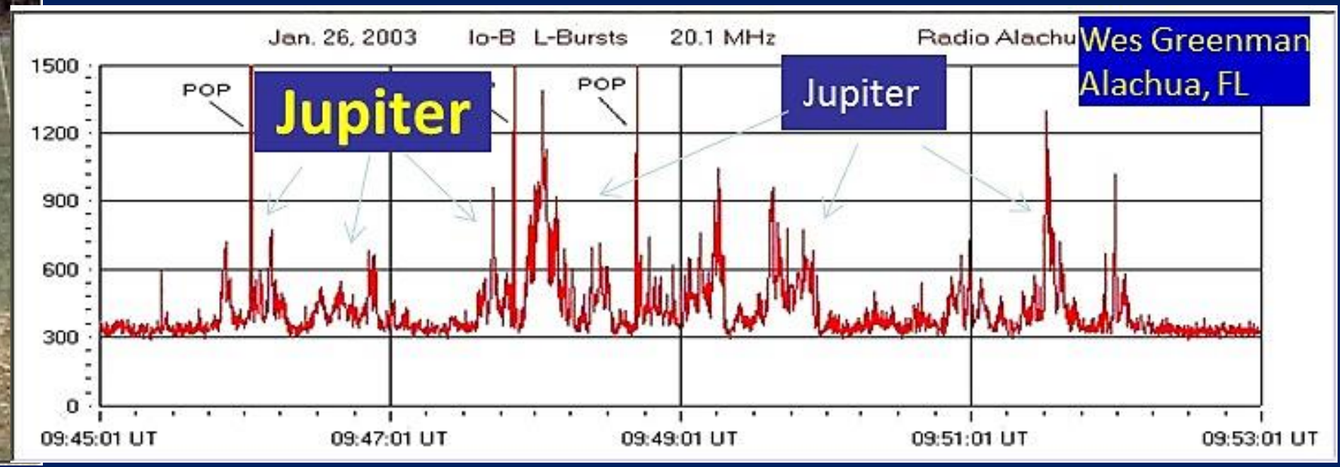


Dual Dipole Antenna

Basic System

- 20 MHz Receiver
- Dual Dipole Antenna
- Recording and Analysis Software
- $300 + computer

- You build it
- You operate it
- You collect data
- You analyze data
- You archive data
- You do science

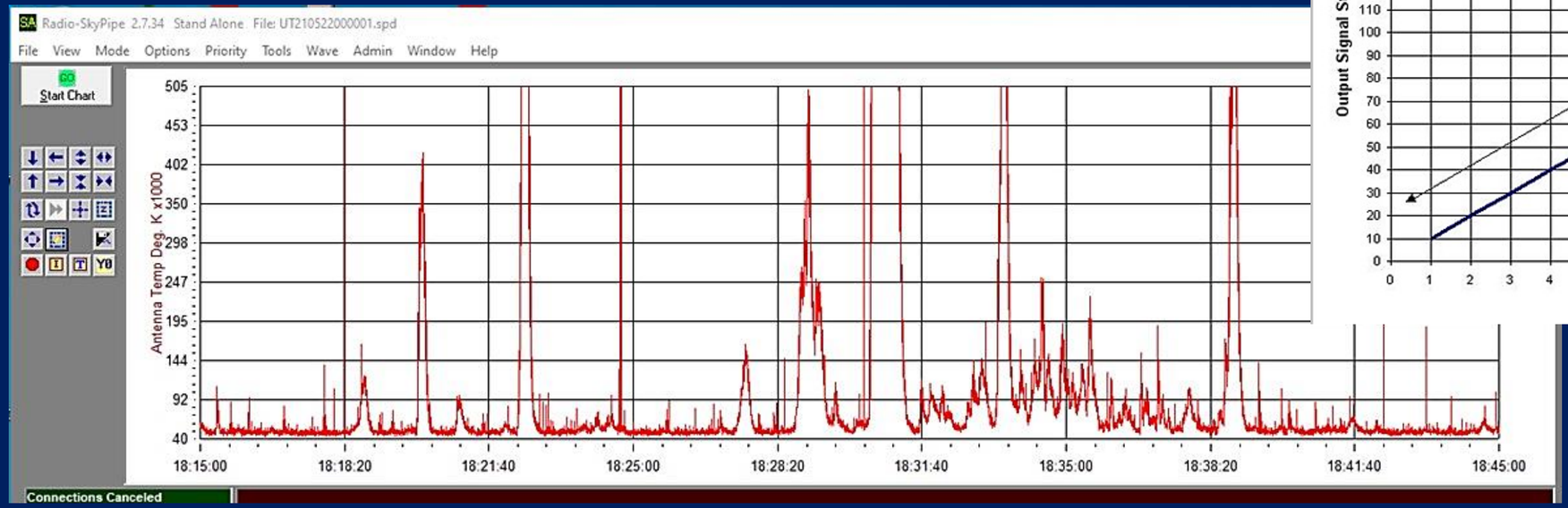


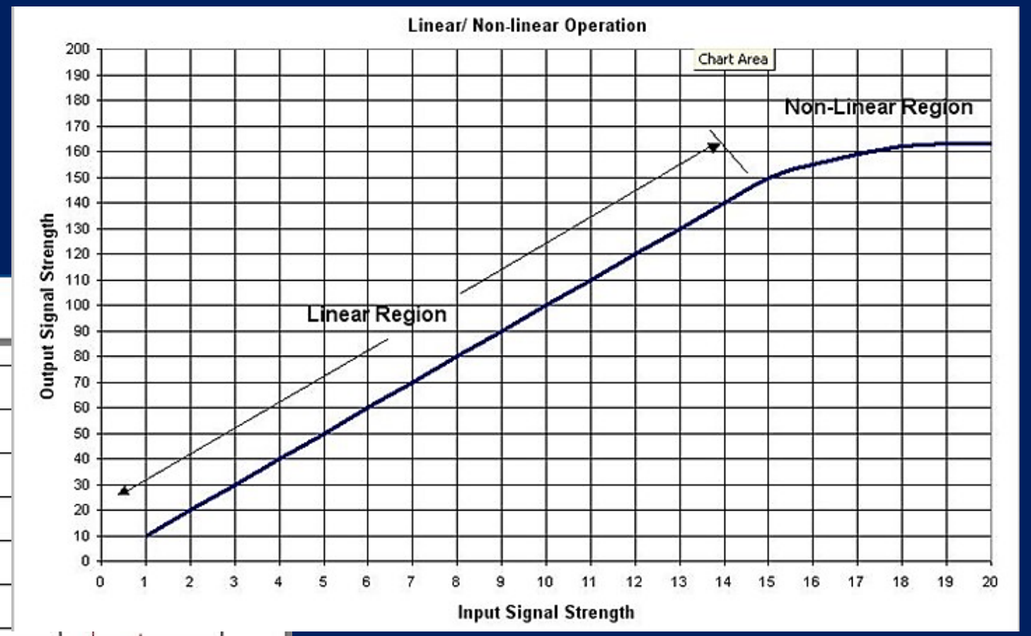
Radio-Skypipe Software from **Radiosky.com**

Radio JOVE Calibration

- Intermediate System = Basic system + Calibrator
- $400 + computer

RF 2080 Cal/Filter
Richard Flagg, RF Associates
[Units no longer available]

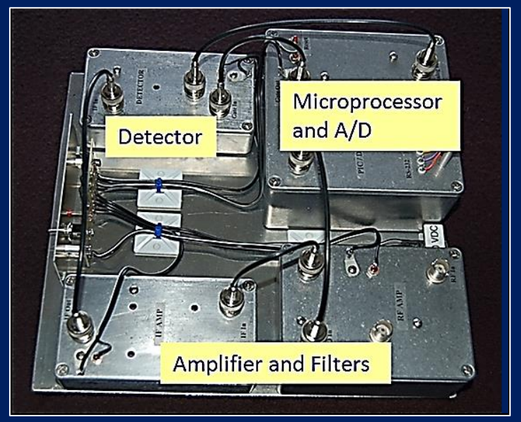




Sound card as the ADC --
Linear operation range of the receiver and sound card.
Credit: RF Associates

Radio-Skypipe Software from **Radiosky.com**

Advanced Hardware and Software



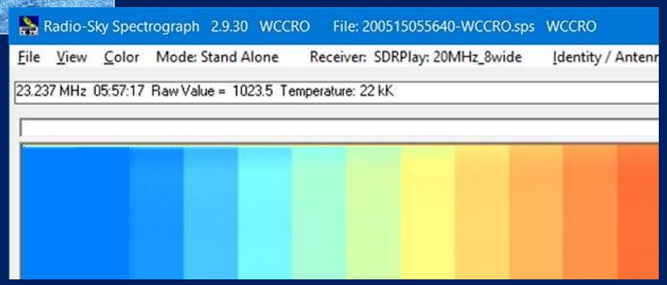
RF Associates Custom FSX Radio Spectrograph

SDRPlay RSP2

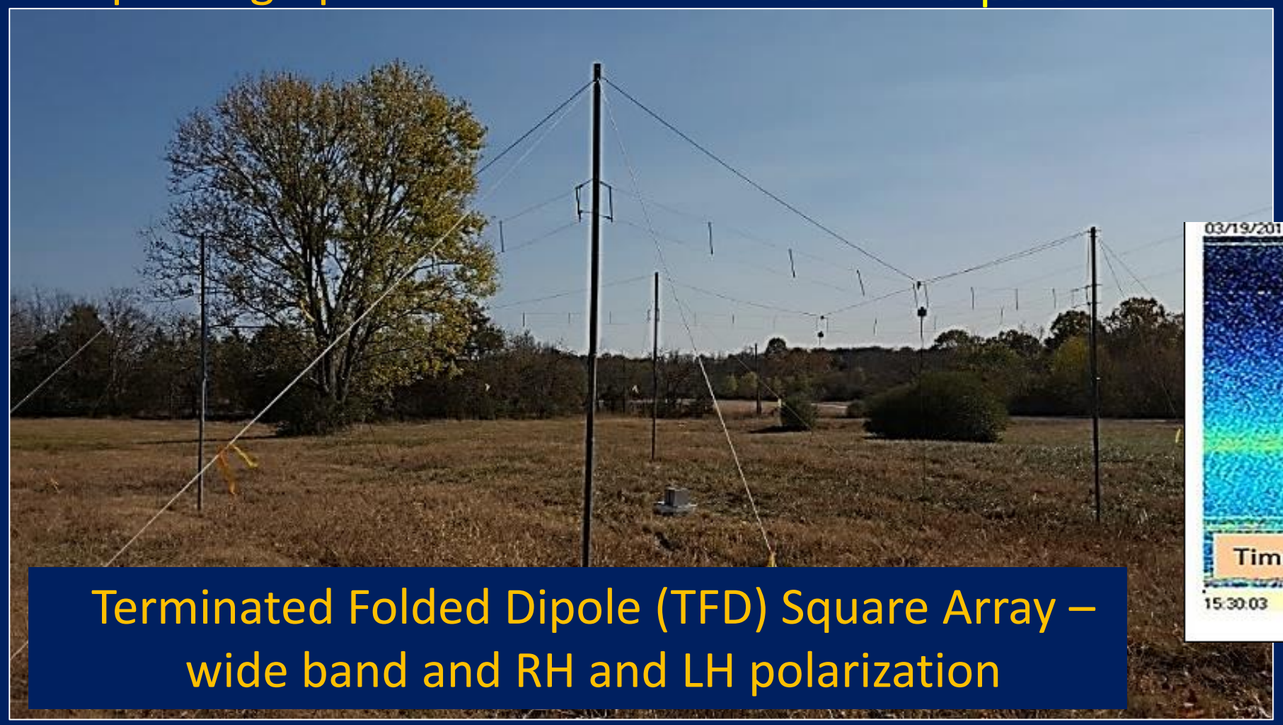
Advanced Systems

- 15-30 MHz Spectrograph
- Step Calibrator
- Wide band antenna
- Spectrograph Software
- $3000 + computer
- SDR + dipole antenna ~ $1000 + computer

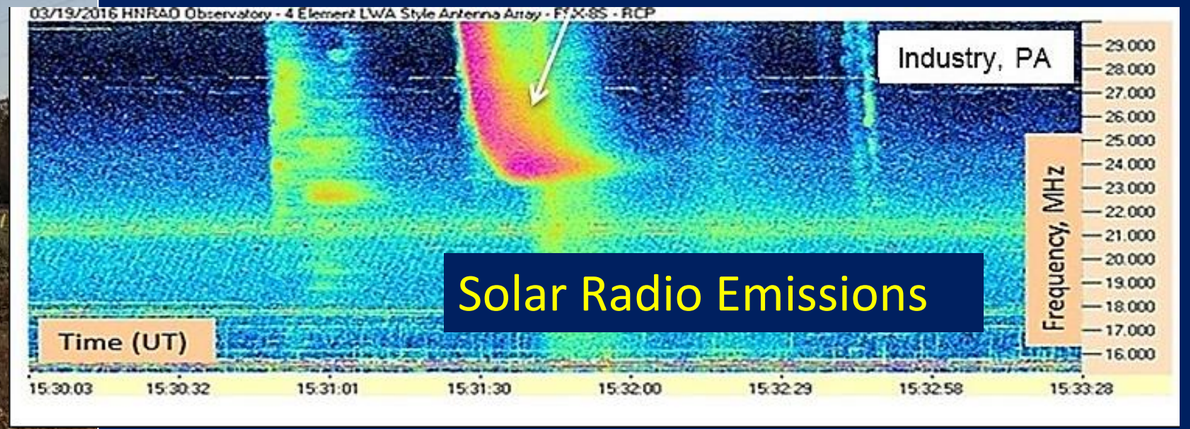
MK2 Programmable calibrator (Richard Flagg, RF Associates, and Jim Brown, HNRAO)



Spectrograph Software showing Antenna Temperature, Credit: Jim Sky, Radiosky.com, and Richard Flagg, RF Associates



Terminated Folded Dipole (TFD) Square Array – wide band and RH and LH polarization

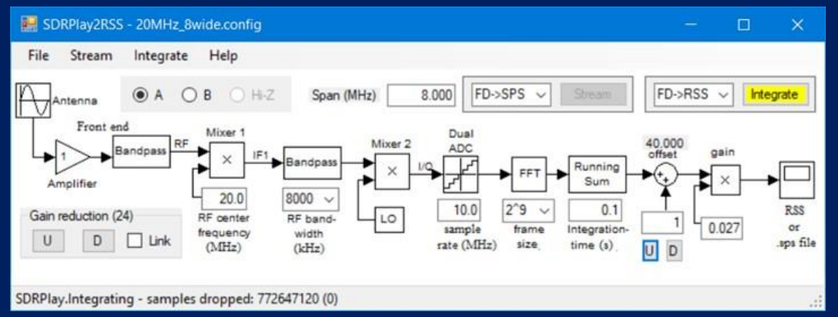


Radio Spectrograph Software (RSS) from **Radiosky.com**

Radio JOVE System with SDR Radios

SDRPlay RSP1A
8 MHz bandwidth

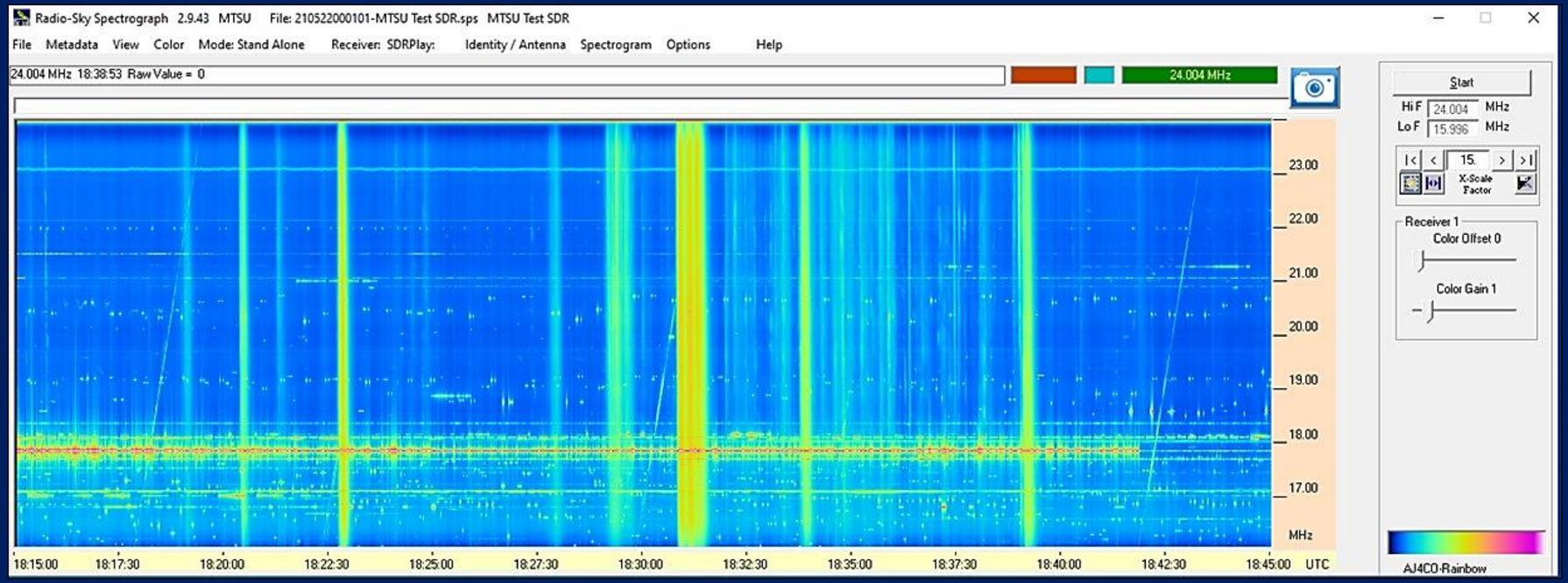
Dual Dipole Antenna



SDR Control Software, SDRUno to RSS.
Credit: Nathan Towne

Digital System

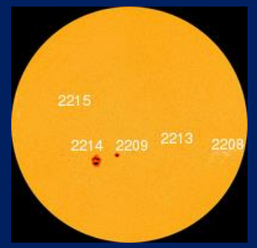
- SDR Receiver
- Dual Dipole Antenna
- Software
- < $300 + computer



Radio Spectrograph Software (RSS) from **Radiosky.com**

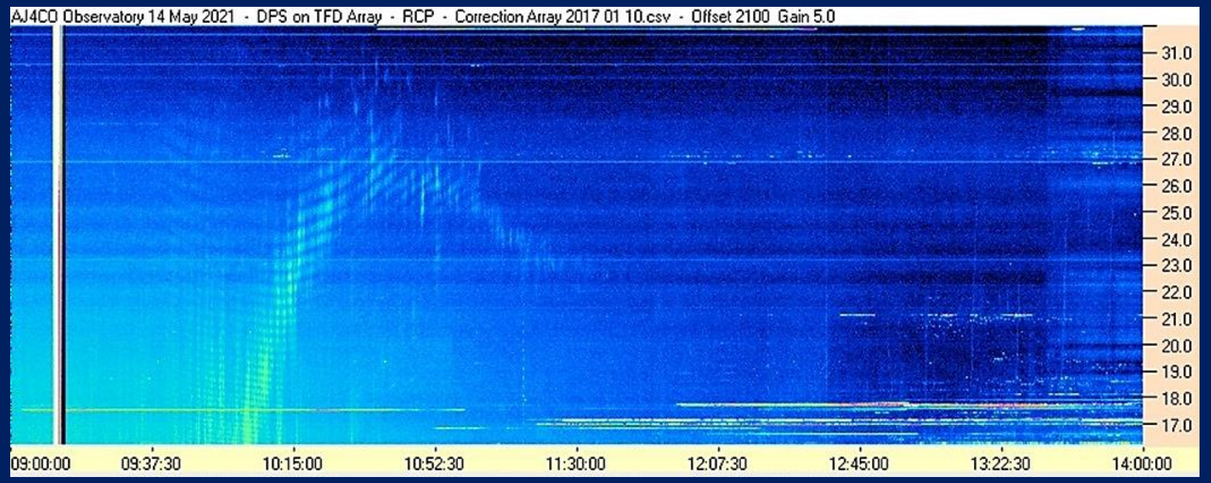
Solar Bursts 05/22/21
MTSU Dairy Farm,
Murfreesboro, TN

Citizen Science Research and Projects

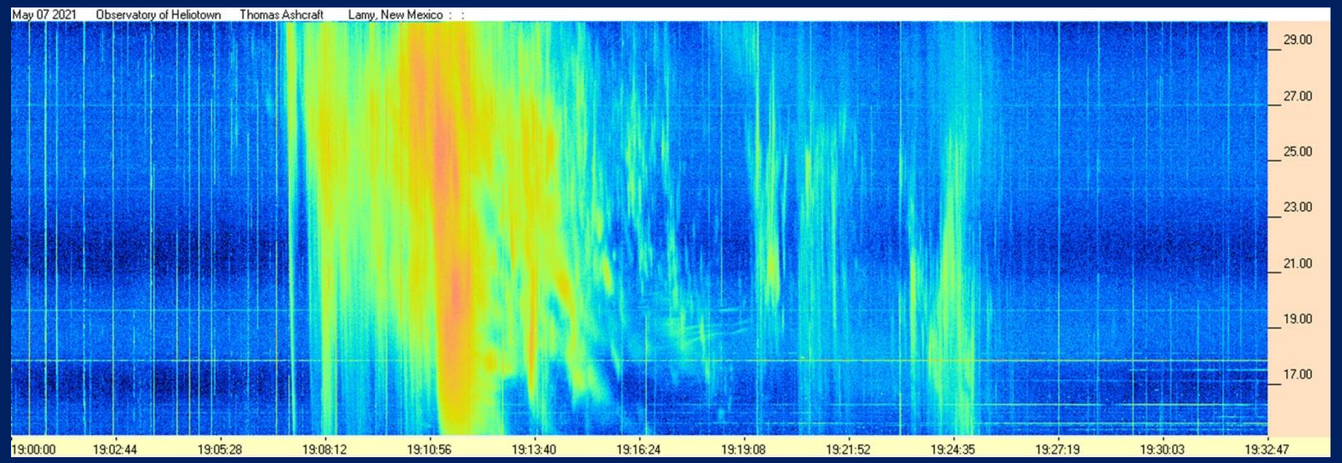


Research Interests

- Jupiter Radio Emission Structure
- Solar Radio Emissions
- Ionosphere Radio Wave Propagation
- Milky Way Galaxy



Jupiter Io-B event, May 14, 2021, D. Typinski, AJ4CO



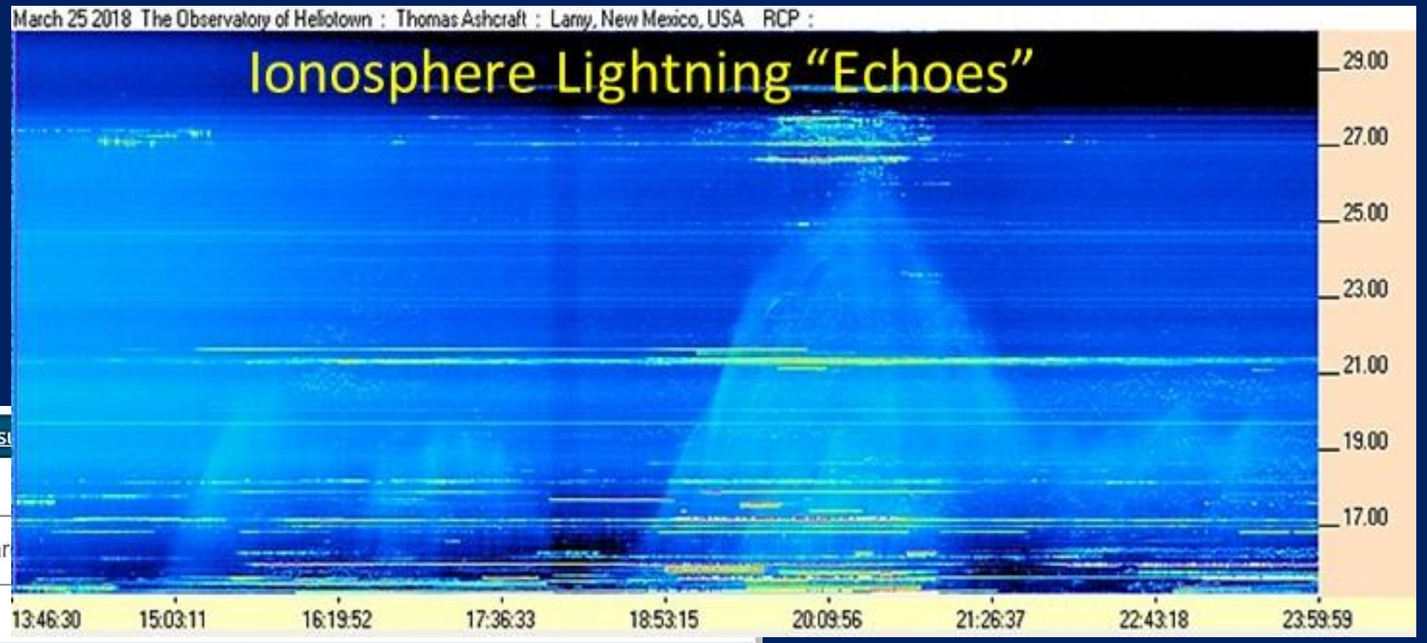
Solar event, May 7, 2021, T. Ashcraft, Heliotown Obs.

Ionosphere Citizen Science

Partner

Research Interests

- Jupiter Radio Emission Structure
- Solar Radio Emissions
- Ionosphere Radio Wave Propagation
- Milky Way Galaxy



COVID-19 Impact: Information for print s

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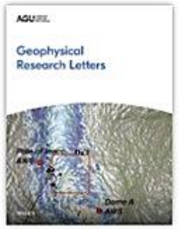
Geophysical Research Letters

Research Letter

Propagation Teepee: A Possible High-Frequency (15–30 MHz) Remote Lightning Signature Identified by Citizen Scientists

Shing F. Fung, David Typinski, Richard Flagg, Thomas Ashcraft, Wes Greenman, Charles Higgins, James Brown, Larry Dodd, Francisco Reyes, Jim Sky, James Thieman, Leonard Garcia

First published:23 April 2020 | https://doi.org/10.1029/2020GL087307



Volume 47, Issue 11
16 June 2020
e2020GL087307

Related Information

Propagation Teepee [T. Ashcraft, Heliotown Observatory]

Testing other SDRs

Software Chain:

SDR Console

- Get latest version at:
- SDR-RADIO.com

SDRc2RSS Interface

- Download latest version at:
- 101science.com/SDRc2RSS.exe

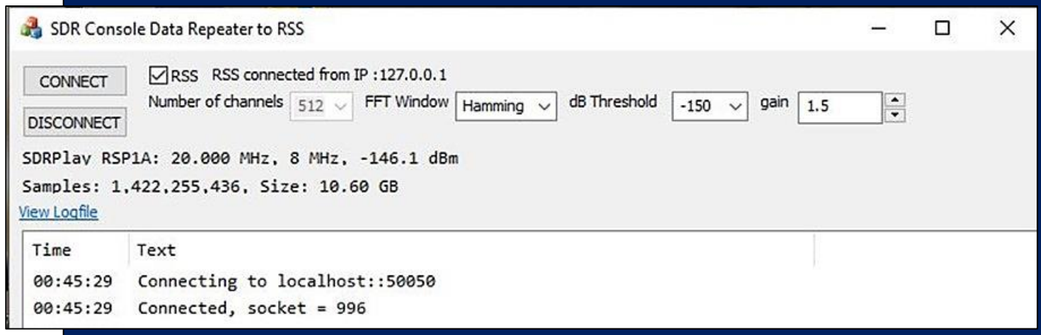
RSS

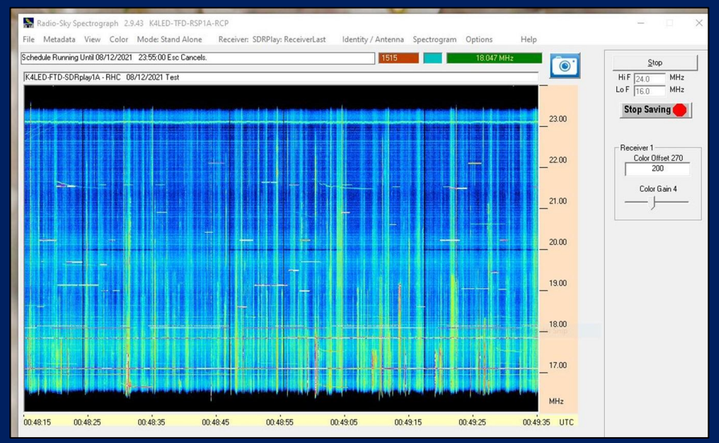
- Download: http://jupiter.wcc.hawaii.edu/spectrograph_software.htm

Credit: Larry Dodd, K4LED, 101science.com

SDR Console

Credit: Simon Brown, sdr-radio.com



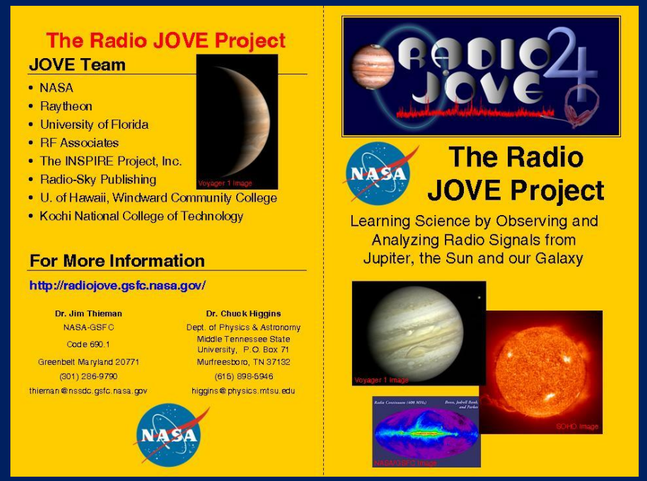


Radio Spectrograph Software (RSS) from **Radiosky.com**

SDR Console opens the door to many SDRs for beginner radio astronomy

Radio JOVE Summary

radiojove.gsfc.nasa.gov



- Radio JOVE is active and innovating
- Developing and transitioning into SDR Radios
- Partnership with NASA Heliophysics Education Activation Team (HEAT)
- We do Citizen Science, Education, and Public Outreach – developing training modules to help participants do science
- We have 12 Active Citizen Scientists – looking to expand the network
    - NASA Citizen Science highlight of Tom Ashcraft (https://solarsystem.nasa.gov/people/488/thomas-ashcraft/)