

Deep Space Exploration Society

Science Meeting Presentations

Table of Contents

Event Horizon Telescope – determining resolution requirements for the M87* Black Hole	2
Fast Radio Burst Detection by Astropheiler Stockert Observatory	2
The use of the Sudden Ionospheric Disturbance Radio Telescope to predict the signal and observe the North American 2017 Total Solar Eclipse	2
Using EME to determine the Moon Range and Orbit, plus a tutorial on the use of the FITS Image Viewer (SAOImage ds9)	3
Neutral Hydrogen Measurements plus calculations of Galactic Rotation Rate and Galactic Mass.....	3
Getting Ready for Earth-Moon-Earth Transmissions with the DSES 60-ft Dish	3
HI Observations with 60 ft. Dish – includes plots and calculations for Galactic Rotation, Mass, and Velocity – Galactic Longitude Mapping.....	4
60 ft. Dish Pulsar Observing Trip Nets 2 More Pulsars; VELA (B0833-45) and B1946+35.....	4
DSES Pulsar Observing Team netted 5 new pulsars! B0740-28, B0531+22, B1642-03, B1929+10, B2016+28	5
Pulsar formulas and data analysis, plus Radio Jupiter Pro Tutorial	5
2020 Society of Amateur Radio Astronomers Eastern Conference Videos	5
Fast Radio Burst Science, pulsar simulator results, 60-ft dish auto-tracking system	6
Pulsar observation preparations using Ettus N210, pulsar simulator, GNU Radio and PRESTO software.....	6
DSES First Pulsar Detection B0329+54, 60-ft dish setup, PRESTO and MURMUR software tutorial	6
Gravitational Lenses (MG0414+0532), Betelgeuse update	6
Synchronized Multiple Radio Telescope Microwave SETI	7
Three-telescope synchronized narrowband pulse observations, Report of Observations, December 2019	7
Very Large Array (VLA) Imaging Results – 2nd Update & HI Drift Scan using 9-ft Dish at Russel Observatory September 2019	7
Very Large Array (VLA) Imaging Results – 2nd Update & HI Drift Scan using 9-ft Dish at Russel Observatory September 2019	8
Radio Search for Extraterrestrial Intelligence SETI is fun ! – August 2019 SARA Presentation by Skip Crilly	8
2019 Society of Amateur Radio Astronomers (SARA) Western Conference.....	8
Geographically-spaced Synchronized Signal Detection System by Skip Crilly, New Hampshire Astronomical Society, February 8, 2019	8
Neutral Hydrogen (HI) with 60 ft Dish - Results of December 2018 Observing Trip.....	9
Milky Way rotation rate calculations plus Dayton Jones', K6DJ, talked with the group about Small Antenna Calibration at JPL.	9

HI Observations using the 60-foot Dish during the Open House, August 11, 2018	9
Greenbank & Haswell plots of simultaneous observation of NRAO 5690 on August 15, 2018	10
DSES SuperSID Radio Telescope Detection of M and X Class Flares – September 2017	10
Phased Array and Interferometry Basics	10
Plishner Radio SuperSID Results – August 2016	11
Plishner Radio Jove Results – July 2016	11
Setting up Radio-Sky pipe for radio telescope data logging	11
Radio JOVE Observations at the Plishner Radio Astronomy Observatory – May 2016	11
Meteor Scatter Observations April 2016.....	11

Science Meeting Content and Links

Event Horizon Telescope – determining resolution requirements for the M87* Black Hole

DSES Science Meeting, May 24, 2021

<http://dses.science/wp-content/uploads/2021/05/DSES-Science-Meeting-5-24-2021-r2.pdf>

[2021-05-24 DSES Science Meeting.mp4 \(dropbox.com\)](https://www.dropbox.com/s/2021-05-24%20DSES%20Science%20Meeting.mp4)

Rich’s topic question for the evening was, *why did the Event Horizon radio telescope group, who succeeded in 2019 to image a black hole for the first time, chose to observe the supermassive black hole in the active galaxy M87?* To figure this out, we learned about what determines the physical size of a black hole, and its observable characteristics. And we learned about what determines the apparent angular resolution of an object in radio astronomy.

Fast Radio Burst Detection by Astropeiler Stockert Observatory

DSES Science Meeting March 22, 2021

<http://dses.science/wp-content/uploads/2021/03/DSES-Science-Meeting-3-22-2021.pdf>

<https://us02web.zoom.us/rec/share/WmQScWfaV2DH22cSW9CAnYJgjhMsYpHDCmyt39GC-BFhJoCtqjNfg2n1bxpNC-U.FJAeQcMiaKhBY2Bw>

The use of the Sudden Ionospheric Disturbance Radio Telescope to predict the signal and observe the North American 2017 Total Solar Eclipse

Rich Russel will have a poster presentation this coming Saturday, March 21, 2021 at HamSci – **Ham Radio Science Citizen Investigation** .

Rich will present his work about predicting the signal response of the 2017 total solar eclipse using the SID (Sudden Ionospheric Disturbance) radio telescope. The SID detects changes in ionospheric propagation of VLF signals due to solar activity. SID also measures changes at nominal sunrise and sunsets. Utilizing his historical data and geometry, Rich was able to predict what happened during the eclipse.

Please follow the links to read Rich's poster presentation and to learn more.

[The use of the Sudden Ionospheric Disturbance Radio Telescope to predict the signal and observe the North American 2017 Total Solar Eclipse | HamSCI](#)

Using EME to determine the Moon Range and Orbit, plus a tutorial on the use of the FITS Image Viewer (SAOImage ds9)

DSES Science meeting 2/22/2021

[Deep Space Exploration Society Science Meeting pdf](#)

Video:

https://us02web.zoom.us/rec/share/kUiVcAAiyqMexQTmUzZSq4Y4Xs3CrEv5gFOKUQxHZA8_Iymu5gkL78_f2qF2NCt3.YvX6G2M_ZqKk_g1K

Neutral Hydrogen Measurements plus calculations of Galactic Rotation Rate and Galactic Mass

DSES Science Meeting January 25, 2021

<http://dses.science/wp-content/uploads/2021/01/DSES-Science-Meeting-1-25-2021.pdf>

Also see the Zoom Video Recording for more detail:

<https://us02web.zoom.us/rec/share/4QX0KYVA-hEwRBuzXQOOWFATULWSDa1Om-BvlxFOdpIICmBVScbEnOn-f242PxYm.WmvPFXtfQNb75LwO?startTime=1611621114000>

Getting Ready for Earth-Moon-Earth Transmissions with the DSES 60-ft Dish

DSES Science Meeting Nov 23, 2020

<http://dses.science/wp-content/uploads/2020/11/DSES-Science-Meeting-11-23-20.pdf>

Also see the Zoom Video Recording for more detail:

https://us02web.zoom.us/rec/share/3mwT_OSBrUV6KMi8GTTrcFaiG77Jmuuke72Jk1zmmUDpSrO2nAY3jFx49_muRz5I.7GK8PFSy5Vs-kL4R?startTime=1606177717000

HI Observations with 60 ft. Dish – includes plots and calculations for Galactic Rotation, Mass, and Velocity – Galactic Longitude Mapping

DSES Science Meeting October 26, 2020

<http://dses.science/wp-content/uploads/2020/10/DSES-Science-Meeting-10-26-20.pdf>

Also see the Zoom Video Recording for more detail:

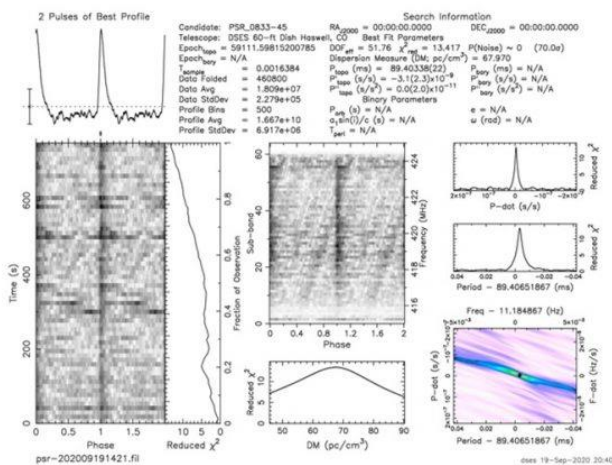
https://us02web.zoom.us/rec/share/VGBjHU_8SX1oUID9rfAETR6FDWU-AiO_jtXLBN5allYy37d8WWxX1-rcsEk_NwV.hIq6Lvmw397kui6R

60 ft. Dish Pulsar Observing Trip Nets 2 More Pulsars; VELA (B0833-45) and B1946+35

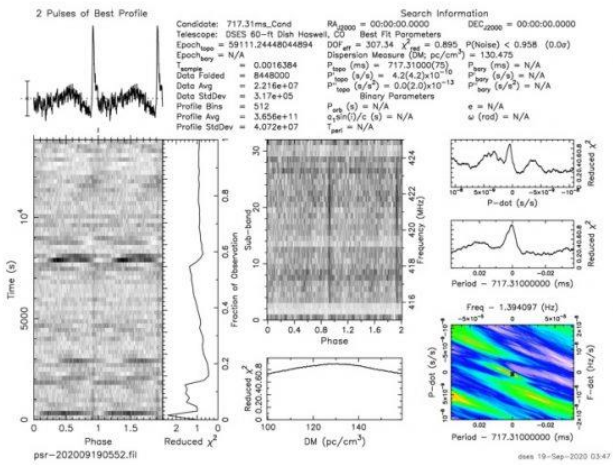
DSES Science Meeting Sept 19, 2020

DSES Pulsars Observed on 9-19-20

Observers: Rich Russel, Bob Haggart



B0833-45 (VELA)



B1946+35

Bob Haggart and Rich Russel did an observation all nighter on Friday/Saturday (September 19, 2020, GMT) and observed 2 pulsars.

VELA (Bo833-45) is one of the strongest pulsars at 5 JY while **B1946+35** is at 0.145 JY.

DSES is one of the most northern amateur stations to detect VELA. We detected it in 15 minutes at 5 to 6 degrees elevation.

This make 13 pulsars and puts us 5th on the international amateur pulsar hunter list. <http://www.neutronstar.joataman.net/>

DSES Pulsar Observing Team netted 5 new pulsars! B0740-28, B0531+22, B1642-03, B1929+10, B2016+28

DSES Science Meeting September 9, 2020

<http://dses.science/wp-content/uploads/2020/09/8-Pulsars-Observed-so-Far-9-5-20-r3.pdf>

Pulsar formulas and data analysis, plus Radio Jupiter Pro Tutorial

DSES Science Meeting, August 24, 2020

<http://dses.science/wp-content/uploads/2020/08/DSES-Science-Meeting-8-24-20.pdf>

You can watch the video of our meeting:

https://us02web.zoom.us/rec/share/x_1UIpbw2DNLQ8_q4xvyY4MhD4f1T6a81igfrqAPmk86FwFaBdR2MHJzIJSeeaTR?startTime=1598312047000

2020 Society of Amateur Radio Astronomers Eastern Conference Videos

Videos of all of the presentations at the **2020 Society of Amateur Radio Astronomers Eastern Conference** are now available online at the SARA website. The conference was held on August 1 & 2, 2020.

The SARA page is organized so that you can reach each presentation individually. The videos are carried on YouTube.

<https://www.radio-astronomy.org/node/331>

Fast Radio Burst Science, pulsar simulator results, 60-ft dish auto-tracking system

DSES Science Meeting Notes July 27, 2020

<http://dses.science/wp-content/uploads/2020/07/DSES-Science-Meeting-7-27-20.pdf>

See the Zoom recording for more detail.

<https://us02web.zoom.us/rec/share/u50vfrXt12hJbKf341OCGbJmA8fIaaa80yL-aUKzx2QbQXjO1w8ndJvEt-SL86->

Pulsar observation preparations using Ettus N210, pulsar simulator, GNU Radio and PRESTO software

DSES Science Meeting June 22, 2020

<http://dses.science/wp-content/uploads/2020/06/DSES-Science-Meeting-6-22-20.pdf>

Zoom Meeting Recording

https://us02web.zoom.us/rec/share/5MIUEJfO0F5LXbPd2WvWeP4fRb-__eaa80SgYq6JYnhmJ9zhQ6vhRNDmHd4LZkX0-

DSES First Pulsar Detection B0329+54, 60-ft dish setup, PRESTO and MURMUR software tutorial

DSES Science Meeting: May 25, 2020

<http://dses.science/wp-content/uploads/2020/05/DSES-Science-Meeting-5-25-2020-r2.pdf>

Zoom recording:

<https://www.dropbox.com/sh/1949mj9o2084nhs/AACnrJNys-jzNa-mwzSfG4eka?dl=0&preview=2020-05-25+Science+Meeting.mp4>

Gravitational Lenses (MG0414+0532), Betelgeuse update

DSES Science Meeting, April 27, 2020

<http://dses.science/wp-content/uploads/2020/04/DSES-Science-Meeting-4-27-2020.pdf>

Here is a drop box link to the meeting recording missing the first 10 minutes before I logged in.

<https://www.dropbox.com/sh/2pqsewj7txr7d5p/AADq0yNIG2KI3ZZDE8lqfxEta?dl=0>

Synchronized Multiple Radio Telescope Microwave SETI

This paper is an updated presentation by **Skip Crilly K7ETI** about the continuing SETI observation results we're doing together. The DSES 60-foot dish antenna in Haswell and the 40-foot dish antenna at the Greenbank Observatory in West Virginia have been making simultaneous observations for SETI (Search for Extraterrestrial Intelligence) since November 2017. A third antenna in New Hampshire was added for taking data in December 2019. Simultaneous observing by sites distant from each other helps filter out local radio frequency interference (RFI). Signals observed at each site can then more confidently be identified as non-Earth in origin. This presentation summarizes the results, with additional data from February and March 2020.

The paper is available as a PDF file. Please click to read. [Synchronized Multiple Radio Telescope Microwave SETI, by Skip Crilly \[HamSCI 2020, March 2020\]](#)

Three-telescope synchronized narrowband pulse observations, Report of Observations, December 2019

This is a presentation about our the latest SETI observation results. The DSES 60-foot dish antenna in Haswell and the 40-foot dish antenna at the Greenbank Observatory in West Virginia have been making simultaneous observations for SETI (Search for Extraterrestrial Intelligence) since November 2017. Now a third antenna in New Hampshire has been added. Simultaneous observing by sites distant from each other helps filter out local radio frequency interference (RFI). Signals observed at each site can then more confidently be identified as non-Earth in origin. This presentation summarizes the results with the addition of the third New Hampshire antenna in December 2019. The presentation is written by Skip Crilly. It was revised February 2, 2020.

.Please click the link to read the presentation in PDF format: [Three-telescope synchronized narrowband pulse observations – Report of Observations, December 2019](#) by Skip Crilly, Education and Public Outreach Volunteer Science Ambassador, Green Bank Observatory, 1/22/2020, revised 2/2/2020

Skip Crilly's earlier version is still available [here](#).

Very Large Array (VLA) Imaging Results – 2nd Update & HI Drift Scan using 9-ft Dish at Russel Observatory September 2019

Please click the link to view the illustrated pdf file:

<http://dses.science/wp-content/uploads/2019/11/DSES-Science-Meeting-11-25-19-Imaging-Results.pdf>
Very Large Array (VLA) Imaging Results – 2nd Update & HI Drift Scan using 9-ft Dish at Russel Observatory September 2019

<http://dses.science/wp-content/uploads/2019/11/DSES-Science-Meeting-11-25-19-Imaging-Results.pdf>

Radio Search for Extraterrestrial Intelligence SETI is fun ! – August 2019 SARA Presentation by Skip Crilly

This is **Skip Crilly**'s updated paper/presentation, "*Radio Search for Extraterrestrial Intelligence SETI is fun ! Geographically-spaced Synchronized Signal Detection System*", updated July 2019. Skip presented it at the Society of Amateur Radio Astronomers conference at Greenbank, WV on August 4, 2019. The link will open as a pdf file.

[Radio Search for Extraterrestrial Intelligence SETI is fun ! Geographically-spaced Synchronized Signal Detection System](#)

These two wave files are part of the presentation: [Figure 9 Simultaneous Tones Slow wave file](#) and [Figure 9 Simultaneous SETI Tones wave file](#).

2019 Society of Amateur Radio Astronomers (SARA) Western Conference

The 2019 [Society of Amateur Radio Astronomers Western Conference](#) this year was held in Boulder, Colorado, from March 22nd to 25th. The Deep Space Exploration Society co-hosted the conference this year, with a field trip to the Plishner radio telescope site in Haswell. DSES members presented 5 of the talks at the conference. The venue location was the Boulder campus of the National Center for Atmospheric Research (NCAR).

DSES Contributions to the 2019 SARA Western Conference – with abstracts: <http://dses.science/wp-content/uploads/2019/04/DSES-Contribution-to-the-2019-Western-Conference.pdf>

Geographically-spaced Synchronized Signal Detection System by Skip Crilly, New Hampshire Astronomical Society, February 8, 2019.

Skip Crilly gave this presentation to the New Hampshire Astronomical Society, February 8, 2019.

[Geographically-spaced Synchronized Signal Detection System](#) (Please click to read pdf presentation.)

Neutral Hydrogen (HI) with 60 ft Dish - Results of December 2018 Observing Trip

Dr. Richard Russel put together this slide set about the latest results from this month's observing. Contents:

- Galactic Rotation Rate Results
- Earth's Position in Solar System
- Complete HI spectrum Measurements from all observing trips

Dr. Russel is now utilizing Doppler shift measurements, and hence velocity, to also estimate the Earth's position in the Solar System.

[DSES Observation Trip December 2018](#) [Click to open the pptx slide show file.]

Milky Way rotation rate calculations plus Dayton Jones', K6DJ, talked with the group about Small Antenna Calibration at JPL.

DSES Science Meeting – November 26, 2018

These are the presentations from our DSES Science Meeting on November 26, 2018.

Dr. Richard Russel reported on the latest results from the Milky Way galactic rotation rate observations of November 16. Also, he compiled all of the observations of individual radio sources done with the 60-foot antenna with the Spectracyber 1420 MHz receiver. He includes descriptions of the objects and photos, as well frequency plot observations.

[DSES Science Meeting Dr Russel 11-26-18](#)

Dayton Jones K6DJ talked with the group about Small Antenna Calibration at JPL.

[Dayton Jones Science Meeting Presentation 11-26-18 DSES_ant_cal_v2](#)

HI Observations using the 60-foot Dish during the Open House, August 11, 2018

Editor's note: During the DSES Open House on the weekend of August 11, 2018, three receiver systems were tested on the 60-foot dish antenna. Dr. Richard Russel reports on their successful results, and he shows what we see in our data plots. Some highlights to point out:

1. *The Spectracyber definitively observed the neutral hydrogen of the Milky Way as the beam width completely crossed the galactic plane.*
2. *The RASDR4 observed a known neutral hydrogen radio source, which has a closer cloud along the line of sight that absorbs some of the hydrogen signal. The distinctive signal feature is known from published data by the Parkes Radio Observatory in Australia.*
3. *The RASDR2 detected a 1296 MHz beacon set up at the home of a member about 80 miles away. This is our first definitive detection of a beacon at 1296 MHz.*

-Gary Agranat, website editor.

[Observations using the 60-foot Dish during the Open House, August 11, 2018 – Deep Space Exploration Society \(dses.science\)](#)

Greenbank & Haswell plots of simultaneous observation of NRAO 5690 on August 15, 2018

The following is a comparison of simultaneous observations made on August 15, 2018 of the astronomical radio source, NRAO 5690.

[Greenbank & Haswell plots of simultaneous observation of NRAO 5690 on August 15, 2018 – Deep Space Exploration Society \(dses.science\)](#)

DSES SuperSID Radio Telescope Detection of M and X Class Flares – September 2017

[DSES SuperSID Radio Telescope — September 2017 Significant Solar Events Observed – Deep Space Exploration Society](#)

Phased Array and Interferometry Basics

DSES Science Meeting, September 26, 2016

Download this title as PDF: [Phased Array and Interferometry Basics](#)

Plishner Radio SuperSID Results – August 2016

DSES Science Meeting August 1, 2016

PDF Presentation: [DSES SuperSID Results July 2016](#)

Plishner Radio Jove Results – July 2016

DSES Science Meeting, July 2016

PDF Presentation: [DSES Plishner Radio Jove Results July 2016](#)

Setting up Radio-Sky pipe for radio telescope data logging

PDF Presentation: [DSES Science Update 6-6-16](#)

Radio JOVE Observations at the Plishner Radio Astronomy Observatory – May 2016

DSES Science Update 5-1-16

<http://dses.science/radio-jove-observations-at-the-plishner-radio-astronomy-observatory>

Meteor Scatter Observations April 2016

DSES Science Update 4-6-16

[Science Update 4-6-16 – Deep Space Exploration Society \(dses.science\)](#)