**Deep Space Exploration Society Science Meeting Notes** **by Bill Miller**
**Oct 24, 2022 18:30**

Join Zoom Meeting
https://us02web.zoom.us/j/84508747185?pwd=TUd2enJjS2ZDeHEzNU9QWitQWVRFZz09

For meeting recording see Floyd's linked Zoom recording for 10-24-2022
Meeting ID: 845 0874 7185
Passcode: VTelescope

**Attendance:**

| | | |
|---|---|---|
| Ted Cline | Glenn Davis | Bill Miller |
| Rich Russel | Dan Layne | Floyd Glick |
| Myron Babcock | Mike Otte | Eddie Currie |
| Derick K0ATV | Jason Quilantan | Norman Black KF0PAM |
| Jim WB0GMR | Don Latham | Robert Sayers |
| Bruce Lamoreaux | Gary Agranat | Fred Brandeberry |
| Ray Uberecken | Rodger Oakey | Paul Sobon |
| Eli Reed | Mathew Shaham | |

**ADMINISTRATIVE ANNOUNCEMENTS - Myron Babcock**

Treasure's Report:

| | |
|---|---|
| CK | $4004.00 |
| SA | $5623.00 |
| Propane Fund | |
| Building Fund | |
| Expenses: | 16 bit web enables encoders ~$1900 |

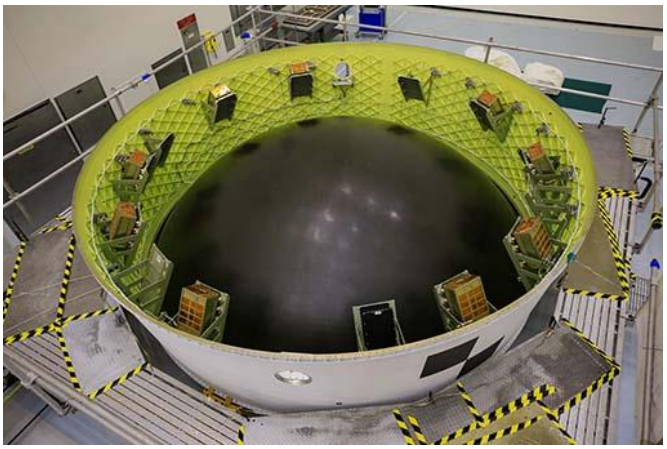
52 Voting and Nonvoting members
Elections for 2023 will start first of January
Will replace 3 or 4 board members

**Glenn Davis** picked up the encoders with the TCPIP Berkley Interface yesterday.

**Science Presentation Dan Layne - Fishing for Pulsars: Analyzing Open House Successes and Failures.**

We got skunked at the open house in our try for new pulsars. See link to Dan's Presentation Here

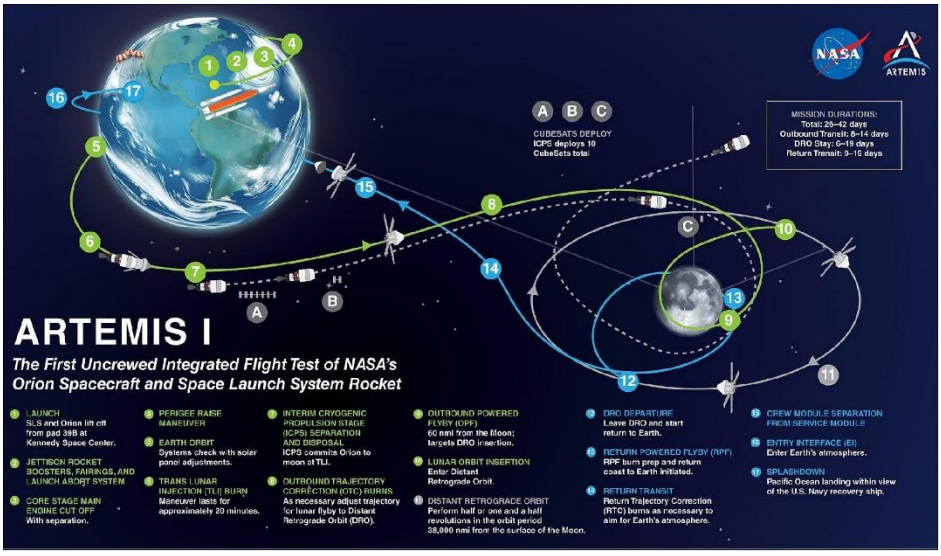
**Update JAPAN Omotenashi Moon Lander Update - Bill Miller**



The Deep Space Exploration Society will support the Japanese **OMOTENASHI (Outstanding MOon exploration TEchnologies demonstrated by NAno Semi-Hard Impactor) mission is a JAXA (Japan space agency Amateur Radio Club) and University of Tokyo technology demonstration mission Cube Sat Moon Lander**. We will be attempting to receive and record its UHF downlink signals enroute to the Moon, during and after landing. OMOTENASHI is one of ten Cube Sat satellites on the NASA Artemis 1 lunar mission carried in the Orion Stage Adapter pictured here.

NASA is targeting the next launch attempt of the Artemis I mission for Monday, Nov. 14 with liftoff of the Space Launch System (SLS) rocket carrying the Orion spacecraft planned during a 69-minute launch window that opens at 12:07 a.m. EST. Additional Launch Windows can be found on the NASA schedule
https://www.nasa.gov/sites/default/files/atoms/files/091522_missionavailability_pao.pdf

Several hours after Artemis 1 launches, the Interim Cryogenic Propulsion Stage boosts the Orion Spacecraft from an Earth parking orbit to a transfer orbit to the Moon in the Trans Lunar Injection Profile. The Trans Stage Adapter will deploy several CubeSats at the (A) designation point on the attached Artemis 1 orbital profile diagram shown here. The Omotenashi CubeSat, having already been boosted with the Orion Spacecraft, will independently coast toward the moon making some small corrections with its very small rocket motors and reaction wheels. Once near the Moon it will fire a retro rocket and separate into an orbiter and a surface probe. The surface probe will slow down with this rocket firing and will impact the moon at around 30 Meters per second. It has a crushable end and an airbag to cushion its impact.

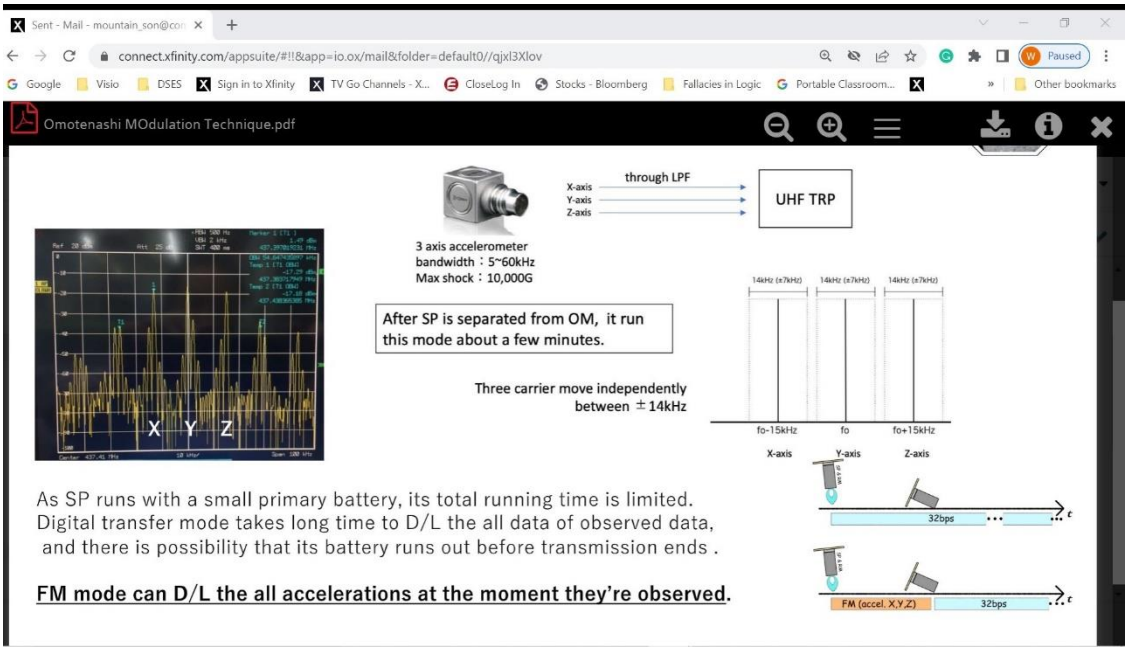



We will attempt to receive and record this impact with the output of its 3 axis accelerometer transmitted on 437.41 MHz as it lands (impacts) the surface and send that data to the Japanese team if successful.

See this link for details on the Cube Sat Specifications
https://www.isas.jaxa.jp/home/omotenashi/JHRCweb/jhrc.html

See this spreadsheet for an example of the Omotenashi operational schedule

UHF-SOE.xlsx




Here is the 437.410 MHz signal we expect to receive from the Surface Probe on Landing.


Here I synthesized the signal by modulating the 437.410 signal in steps of +/- 1500Hz with 3kHz audio modulation and received it on an SDRPlay1 software defined radio running SDR UNO.

- In flight to the moon the orbiter will send short 1 to 3 minute PSK31 signals occasionally on 437.310 MHz and the surface probe will send FM modulation from the accelerometers and revert to PSK31 on 437.410 MHz once landed, continuing to transmit until it runs out of battery power. This will be with LHC or RHC Polarization depending on how it orients after landing (crashing). We can switch the polarization with our dish feed antenna but can't receive both simultaneously.
- We will attempt to record these signals and send the recording to the Japanese .Amateur radio group.

**ARRL EME Contest** - Ray Uberecken, Paul Sobon, Gary Agranat DSES are participating in the annual ARRL EME Earth-Moon-Earth Moon Bounce communications contest. We operated on the weekend of *October 15 & 16* at 1296 MHZ. The second session will be on the weekend of *November 11 thru 13, 2022.* We operate using our 60-foot dish antenna at the Plishner site in Kiowa County. Members and guests are welcome to visit and operate with us. We plan to use Morse Code CW, Q65 digital, and SSB voice communications modes. We will start operation on Friday evening November 11 when the Moon rises. For information contact us at *information@DSES.Science*

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**Dish Preparation for EME and Haswell Bazaar** October 14, 2022-
On Friday afternoon October 14, 2022, we prepared the 60-foot dish antenna for the weekend's Moon bounce communications operations in the ARRL EME contest.
Glen Davis updated the tracking software, checked the calibration of the mount, and helped as ground crew and photographer. Meanwhile Ray Uberecken and Bill Miller climbed the scaffold and changed the feed from the 437 MHz antenna to the 1296 MHz antenna. They also installed Ray's 180 watt amplifier at the antenna feed point and checked the system reception from Ray's Calhan residence beacon.


Once the feed and amplifier were set up, Ray and Glenn worked to see if the complete system could receive and transmit signals on 1296 MHz The Icom Transceiver worked well but there were problems getting the Flex Radio to work.

On Saturday morning Bill got up and relieved Paul in the Comm. at about 8. Chas Rooney came out from Colorado Springs and Bill set up the system for SSB to allow him to bounce his voice off the moon. Gary came in and we got that working, thrilling Chas with the unique opportunity to hear his echo 2 1/3 seconds after transmitting and making the nearly half million mile trip.

Bill left the site and went to the Haswell community center which is the old school. Gary had made arrangements for us to have a table at the Bazaar there. Bill setup the display boards and a laptop and monitor showing some of our videos.

The Bazaar was lightly attended but we made some new friends and contacts. Of particular note, were Cindy McLoud of the Kiowa County Economic Development Foundation (KCEDF) and past Kiowa County Commissioner trying to get a Darks Skies designation for the county. Also Michelle Nelson, Mayor of Haswell, and organizer of the bazaar. Bill invited both out to the site to see what we were doing.

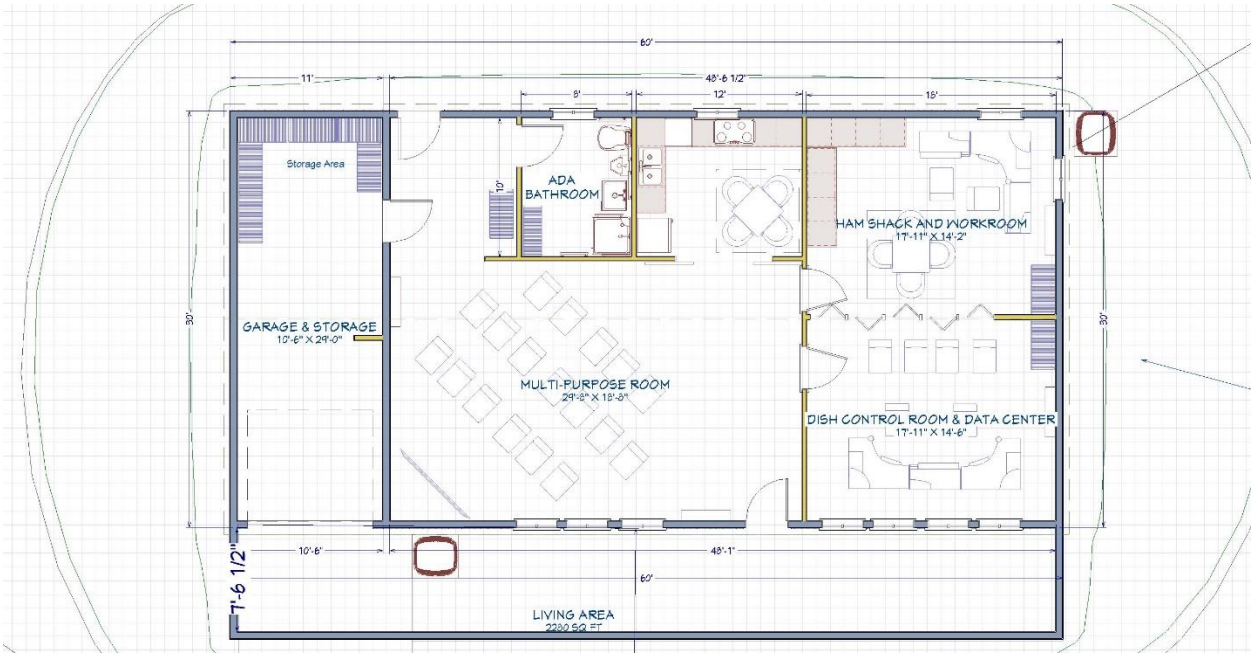
Cindy McCloud came out that afternoon for a tour, was very interested in what we had accomplished with the site from what she remembered as a kid growing up in the area. She gave us some good pointers on contractors and property taxes in the county.

Bill and Gary left the site about 4PM and Ray and Paul Sobon stayed till the next day operating through the night. About 10:30 Saturday Night Michelle Nelson and her son came out to the site and observed the operations and EME and got a good rundown from ray and Paul on how it all works.

**Building Update - Bill Miller**

Bill Updated the quotation package and sent it to several additional contractors. See the attachment for that. He also contacted several leads in the Ordway area, but none could meet with us during the EME weekend.

On Sunday, Oct 16th, one of the contractors we contacted, Maurice Sagner of Precision Home and Lawn in Eads, came out with a friend and Ray gave them a tour of the building site. Maurice contacted Bill by Email later and said he would be able to be our contractor but can't meet until mid-November to work things out.




FUTURE OPERATIONS - EME Contest November 11-12 contact Ray Uberecken
Open Discussion -

Deep Space Exploration Society
4164 Austin Bluffs Parkway #562
Colorado Springs, CO 80918 USA