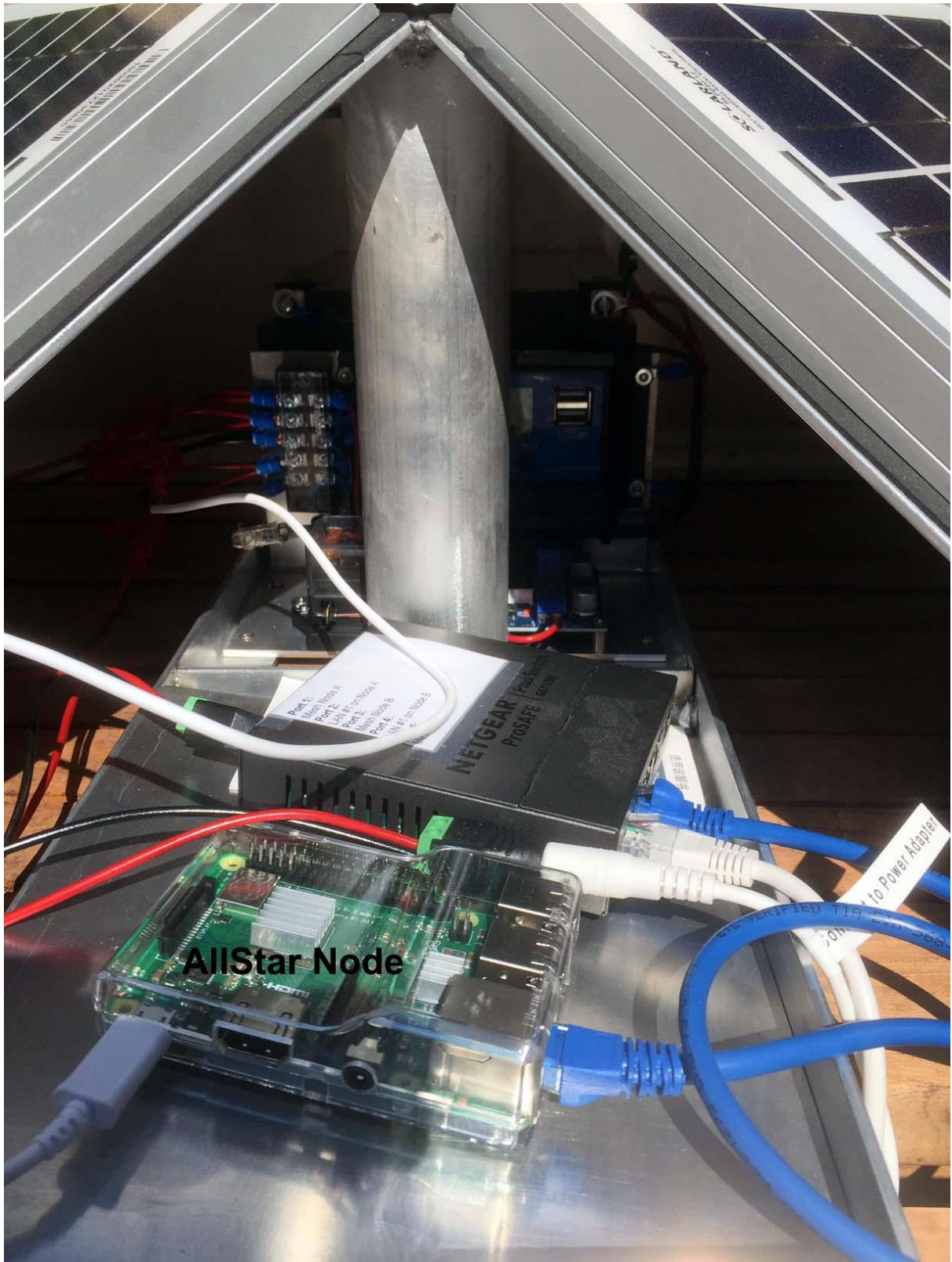
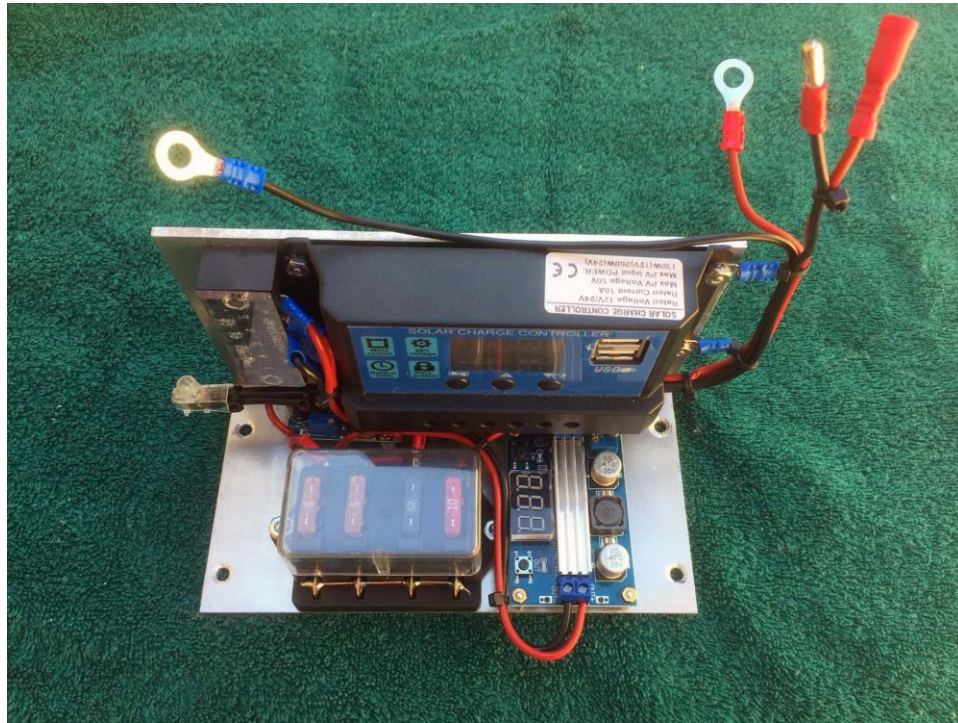


Deployable Autonomous Mesh Node (DAMN) Project





AllStar Node



Updated 2-25-2022

In setting up an Amateur Radio Emergency Data Network (AREDN) in the Las Vegas Valley, it may become necessary to test node locations, which are in remote locations and do not have grid power. To this end, the LV Mesh group is developing a Deployable Autonomous Mesh Node (DAMN). The design should allow the unit to operate at a site for days, weeks, months or years. In addition to AREDN mesh nodes, the design is versatile and allows for an assortment of other equipment to be connected, such as a UHF link for system reset, telemetry and power management; low power UHF repeater, with an AllStar node; PTZ camera and/or a weather station. The possibilities are endless.

The prototype is currently being tested in the following configuration:

- Solar Panels 2 x 20 Watt
- Solar Battery Regulator Charge Controller
- Sealed Lead Acid Battery 12 V @ 26 AH
- DC-DC Power Converters 24 V and 5 V
- 12 VDC supplied by Battery
- Power Distribution System
- Netgear GS105E VLAN Switch
- Ubiquiti Rocket M5 with 90° Sector Antenna 17 dBi

UPDATES - They will be entered by date as the status changes:

10-17-20: After the first 24 hours of testing, the battery voltage remained above 12.3 and the equipment operated as expected. An AllStar node was added to the prototype mid afternoon, however it was discovered the 5 Volt regulator had failed, so it was replaced first. The hardware added was a Raspberry Pi 3B+ running Asterisk version 1.6-01, with a current draw of about 3 watts. The Asterisk server/node was given the private node number of 1504, which was in line with the rest of the node numbers on LVMesh (1500-1504).

10-18-20: The minimum voltage was 12.1 for this charging cycle, and the equipment operated as expected. The added load of the Raspberry Pi 3B+ seems to have caused the time needed for a complete recharge to be more than the 3 hours of direct sunlight provided by the DAMN's current location. I have moved the unit with table on top of the bench in order to increase the charging time.

10-19-20: The minimum voltage was 12.2 for this charging cycle, and the equipment operated as expected. Even with the DAMN/table on the bench, the 3.5 hours of direct sunlight is still not enough to keep the battery charged, so I will have to use grid power to charge the battery, as needed.

10-20-20: The minimum voltage was 12.2 for this charging cycle, and the equipment operated as expected. I gave up on using the courtyard at my house for DAMN prototype testing, there just wasn't enough direct sunlight available at that location. As you can see from the new photo, I have placed the unit on top of the patio cover in the back yard. There should be at least 6 hours of direct sunlight available in that location, even in the dead of winter. The maximum discharge voltage was 12.7.

10-21-20: The minimum voltage was 12.1 for this charging cycle, and the equipment operated as expected. The maximum discharge voltage was 12.7.

10-24-20: The minimum voltage was 12.1 for this charging cycle, and the equipment operated as expected. The maximum discharge voltage was 12.6, which was a bit low due to clouds most of the morning.

10-25-20: The minimum voltage was 12.1 for this charging cycle, and the equipment operated as expected. The maximum discharge voltage was 12.6, which was a bit low due to clouds moving in during the late afternoon.

11-2-20: The minimum voltage was 12.1 for this charging cycle, and the equipment operated as expected. The maximum discharge voltage was 12.3, which was low due to clouds moving through all day.

11-3-20: The minimum voltage was 11.8 for this charging cycle, and the equipment operated as expected. The maximum discharge voltage was 12.4. The voltage was back up from the morning low, due to a very clear and sunny day. That said, the voltages are slowly falling off due to shorter days.

11-8-20: The minimum voltage was 11.5 for this charging cycle, and the equipment operated as expected. The maximum discharge voltage was 12.1. It was way down due to a day mostly cloudy skies.

11-9-20: The minimum voltage was 11.4 for this charging cycle, and the equipment operated as expected. The maximum discharge voltage was 12.3. It was way down due to two days mostly cloudy skies, but recovered nicely with today's sun.

12-2-20: The minimum voltage was 12.1 for this charging cycle, and the equipment operated as expected. The maximum discharge voltage was 12.6. The AllStar node was taken offline due to low sun angles and blocking trees, which prevent a complete battery charge. The DAMN has been operational now for 55 days.

12-23-2020: The minimum voltage was 12.1 for this charging cycle, and the equipment operated as expected. The Maximum discharge voltage was 12.6. The DAMN has been operational now for 76 days.

1-27-2021: The minimum voltage was 12.1 for this charging cycle, and the equipment operated as expected. The DAMN has been operational now for 106 days.

7-8-2021: The minimum voltage was 12.5 for this charging cycle, and the equipment operated as expected. The DAMN has been operational now for 256 days.

2-23-2022: The DAMN is still in operation, however there are outages due to the lack sun and an aging battery.

2-25-2022: The DAMN prototype has been shutdown after 16 months of operation. The battery finally failed due to excessive heat and the electrolyte drying up. The information acquired will go a long way toward the construction of the final version.