

W6VIO Calling



Jet Propulsion Laboratory Amateur Radio Club
PO Box 842, La Canada CA 91012-0842

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Newsletter editor:	Jim Marr, AA6QI, email: aa6qi@arrl.net (your articles for the newsletter are requested, please)		

Upcoming Events:

- **Emergency Communications Net:** Every Monday at Noon, on WR6JPL 224.08/(-)/156.7 & 445.20/(-)/103.5, or WR6AZN 223.96/(-)/156.7 on Table Mountain.
- **JPLARC Regular Membership meeting:** Second working Friday every month from Noon to 1pm and usually in 180-703C. Call-in: 818-354-4044 ID-number: **997 183 539** (without the spaces). Slides (if any) broadcast via JPL WebEx (same ID-number). **Next is November 18th. Guest speaker: Jim Marr AA6QI facilitating a discussion about how to address HF RFI in B310 and B329. The Nominating Committee will announce 2017 club officer candidates and voice voting will take place for offices that have only one candidate.**
- **JPLARC Board of Directors (BOD) meeting:** Normally, the first working Friday, every month, from Noon to 1pm and usually in 180-703C. **The next BOD meeting will be Dec 2nd.** Call-in: 818-354-4044 ID-number: **997 183 539** (without the spaces).
- **For more upcoming events, see the ARRL Los Angeles Section website:** <http://www.areslax.org>
- **JPL Retiree Nets:** Saturdays, 8:30pm on 1.990 Mhz LSB and Sundays, 2:00pm on 7.150Mhz LSB.

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Regular Membership Meeting October 21st

By Jim Marr AA6QI

Present were: Joe Ayers AE6XE, Gary Block[†] KJ6IZX, Jonathan Cameron[†] KF6RTA, Bob Dengler[†] NO6B, Chris Gaylord[†] W6YTB, Dave Gumpertz[†] KM6FCE, Don Hill KE6BXT, Len Reder KB6DVG, Rob Smith[†] W6GRV, Mike Torade (sp?). Phone/JPLWebex: Paul Averill[†] KM6BZX, Chris Carson[†] KE6ABQ, Jim Marr[†] AA6QI.

Note: † indicates a 2016 regular voting member (i.e., JPL/Caltech/Retiree and 2016 dues paid), †† indicates an associate (non-voting) member, and * Indicates a 2016 BOD member. For a regular meeting quorum, the JPLARC Bylaws require a majority of the BOD (four or more) and at least five other regular members. We had 3 BOD members, six other regular members and four non-members (total of 13 attendees), so we **did not** have a quorum.

Jim Lux W6RMK was announced as the chair of the 2017 club officer Nominating Committee.

Guest Speakers: Don Hill KE6BST & Joe Ayers AE6XE (Figure 1), "Mesh Networks for Amateur Radio".

Rather than try to capture the whole presentation story as I usually do, the reader will be better served by going directly to the orange county mesh site and to Don's and Joe's presentation itself.

You can find Don & Joe's presentation at <http://ocmesh.org> near the bottom of the left hand column under the title "Don's and Joe's Mesh

Presentation". The full direct link to the presentation is: <https://sites.google.com/site/orangecountymeshorganization/contact-us/don-joe-s-mesh-presentation>

In this presentation, Don and Joe cover:

- What is a ham mesh network?
- The Amateur Radio Emergency Data Network (AREDN).
- What the current Southern California Mesh network looks like (though it is rapidly growing).
- What frequencies are involved.
- Examples of specific mesh hardware.
- What software is needed.
- How ham mesh networks are used.



Figure 1: Guest speakers Don Hill and Joe Ayers

Specifics of the JPL Mesh Network installation is discussed below in the Nov 4th BOD meeting minutes. Don's and Joe's presentation will help make sense of the details provided there.

BOD Meeting Nov 4th

By Lew Soloway AC6LS

Present were: Jonathan Cameron[†] KF6RTA, Chris Gaylord[†] W6YTB, Rob Smith[†] W6GRV, Lew Soloway[†] AC6LS, Jan Tarsala[†] WB6VRN, Mike Torode. On the Phone: Chris Carson[†] KE6ABQ, Kathleen Harmon[†] KM6GBY, Chuck Sarture[†] KG6NF.

Note: † indicates a 2016 regular voting member (i.e., JPL/Caltech/Retiree & 2016 dues paid), †† indicates an associate (non-voting) member, and * Indicates a 2016 BOD member. For a BOD meeting quorum, the JPLARC Bylaws require a majority of the BOD (four or more) to be present. We had four BOD members present (plus four other regular members and one non-member) so we **did** have a quorum.

President Jonathan Cameron chaired the meeting.

Treasurer's Report: Treasurer Chuck Sarture KG6NF presented the current budget status: Previous balance of \$4,398.75; Income of \$20.00 from one new member and \$2 in commission from an ARRL membership renewal;

No expenses; Ending balance \$4,420.75

Membership Report: We had one new-ham/new-JPLARC-member, Kathleen Harmon KM6GBY, bringing us to 58 total members, of which 47 are voting members and 68% are ARRL members.

Guest speaker program update: Our Guest speaker for November is still TBD. We will try to have something from Palomar Engineers regarding RFI mitigation but that is not yet confirmed.

Jonathan Cameron would also like suggestions for 2017 guest speakers, at least for the first few months thereof.

Mesh Network Update: The club now has permanent MESH capability on the Mesa, on building 180 and in building 329 (our new shack), as follows:

On the Mesa:

- KE6BXT-W6JPL-M5R-MESA via a Upiqity Rocket M5. Has a 120°, 19 dBi sector antenna providing coverage to the greater Pasadena area. Channel 171, 10 MHz channel width at 5.855 GHz, with SSID AREDN.
- KE6BXT-W6JPL-M5NS-XW-MESA via a Ubiquity NanoStation M5. Has a 41°, ~15 dBi sector antenna providing a wireless link from the Mesa nodes down to 180-R6.

On building 180 (roof near R6):

- AE6XE-W6JPL-M5R-180R6 via a Ubiquity Rocket M5. Has a 120°, 16 dBi sector antenna providing mesh access for the JPL campus. Channel 174, 20 MHz channel width (5.870 GHz), SSID AREDN.
- KF6RTA-W6JPL-M3NS-180R6 via a Ubiquity NanoStation M3 with reflector. Provides 3 GHz point-to-point link to the Orange County mesh network on Pleasants Peak.
- KE6BXT-W6JPL-M5NS-180R6 via a Ubiquiti NanoStation M5. Has a 41°, ~15 dBi sector antenna providing a wireless link from 180-R6 up to the Mesa. Channel 168, 10 MHz channel width (5.840 GHz), SSID AREDN.

At building 329:

- KF6RTA-W6JPL-M5NSL-XW-B329 via a Ubiquiti NanoStation M5. Links to our shack from AE6XE-W6JPL-M5R-180R6 with 115+ mbps. Now have 2 VOIP phones in B329.

Purchase of Mesh equipment:

- A request was made and approved by the Board to reimburse Joe Ayers AE6XE the amount of \$270 for Mesh equipment that he has loaned to the club. These items were: (1) \$60 antenna reflector for the 3 GHz link from 180-R6 to Pleasants Peak, OC; (2) \$150 for the 120°, 16 dBi, 120° Ubiquiti AirMax BaseStation Antenna AM-%G16+ Rocket M5 Kit; and (3) \$60 for the antenna reflector for a NanoStation M3 to be installed at

Pleasants Peak for point-to-point link to JPL (NSM3 unit already provided by KF6RTA).

- A request was made and approved by the Board to reimburse Don Hill KE6BXT the amount of \$408 for the Mesh equipment that he has loaned to the club. These items were: (1) \$65 for the M5 NanoStation in 180-R6 used to link to the Mesa; (2) \$65 for the M5 NanoStation on the Mesa used to link to building 180; (3) \$278 for four items used in the 5 GHz link from the Mesa to the ESW area (\$89 for an M5 Rocket; \$139 for a Ubiquity AM-5G19-120; \$25 for a Netgear GS105E Switch; and \$25 for miscellaneous cables).

Great Shakeout Exercise held Oct 20th:

JEARS was activated, with Matt Bennett KF6RTB assuming Net Control in B329, Jonathan Cameron KF6RTA serving as JEARS liaison at the Logistics Desk in the JPL Emergency Operations Center (EOC), Alexandra Holloway AE6IN serving as liaison to ARES and ALERT from the Comm Van, with help from Jim Lux W6RMK, Jan Tarsala WB6VRN and Nasrat Raouff K1NAR.

Thanks to a lot of behind-the-scenes work by Josh Millar KB3UUS to set up VOIP phones at B329, the EOC and the Comm Van, our Mesh networking was successfully tested between the EOC and B329 but the Mesh links to the Comm Van did not work.

On HF, we could hear NASA Armstrong but they couldn't hear us. This should improve once the Mesa HF antennas are restored to operation.

Mesa HF Antennas:

As a reminder, our Mesa HF antenna goals are: (1) To get the antennas near the main (Rohn) tower working (160m dipole, 80m dipole, Cushcraft XM-240 2-element 40m Yagi, and HyGain TH-7DX 20-15-10m 7-element Yagi); and (2) To put up a WARC 30-17-12m Yagi and a 6m Yagi on the tower between the JPL Water Tanks at the far east end of the Mesa.

Will Michael KC6LOK volunteered to provide a tech to help get the Mesa HF antennas working.

Current HF antenna work list and status: (1) Clear tall grass around HF antennas (Done); (2) Catalog our current HF antennas on the Mesa (Done); (3) Install junction box on the main (Rohn) tower at waist-level (Completed by Jonathan Cameron and Matt Bennett, Figure-2, on Monday, Oct 31st - thanks to JEARS for purchasing the junction box!); (4) Inspect and repair the Rohn tower as necessary (may have some damage to the top section - considering options); (5) Repair/replace the Rohn tower rotator; (6) Verify Rohn tower ground rods (or install new ones, as necessary); (7) Set up ground bus-bar below the Rohn tower junction box and attach to ground rods; (8) Terminate all 4 hardlines at the Rohn tower junction box; (9) Identify which lines at the Rohn

tower correspond to which lines at B329); (10) ground all four hardlines at the junction box (with PolyPhasors); (11) Cut and terminate antenna lines coming down the tower from the antennas; (12) Redo antenna tests with band-pass filter; (13) Perform any necessary antenna repairs; (14) Perform end-to-end tests of hardlines to/from B329; (15) Hook up Rohn tower antennas to hardlines; (16) Install HF patch panel in B329.



Figure 2: Mesa HF junction box installed on the Rohn tower

New HF Radio to replace FT-1000D: It was suggested that the club purchase either a Yaesu FT-991A or an ICOM IC-7300, with the decision being more focused on Emcomm use rather than DXing. It was also noted that the FT-991A has an all-bands option for government use that is not available to individual hams.

Monday Noon Nets: Continue to go well with typical participation in the mid to high 20's. We now have at least six experienced Net Control Operators, including our latest: Alexandra Holloway AE6IN who ran the net on Oct 31st. We were reminded that we plan to continue using the check-in/check-out style on the first Monday of each month. It was suggested that when folks are aware of a fire drill that they turn on their radios to the 445.20 repeater (J400).

Other nets/clubs: (1) *JPL Retiree nets:* (a) 160m net: Saturdays 8:30pm-9:30pm on 1.990MHz LSB, and (b) 40m net: Sundays 2:00pm to whenever on 7.185MHz LSB; (2) *Pasadena Radio Club*, meets 4th Tuesday of every month at the Kaiser facility in Pasadena. See w6ka.net; (3) The *ALERT net* meets Mondays at 8pm on the W6MPH repeater (145.18, -, 156.7), followed by a simplex net on 147.480 MHz (ALTA1).

Repeater Committee: Jan Tarsala WB6VRN suggested that the Repeater Committee has an opportunity to put up a remote receiver on a site at Mt. Wilson. Mesh equipment is a viable option to get voice down to JPL rather than using a portion of the bandwidth Stan gets from his Verizon T1 line. Bob Dengler NO6B offered his home as a Mesh link site since he has direct line-of-sight to Mt. Wilson and to JPL. Chris suggested that since we already approved equipment for Pleasant Peak that we do it there and not have to rely on a person's home. Jonathan Cameron asked whether the club would like to purchase Mesh Networking equipment for this, which would run about \$800, as follows: \$500 for the Mt. Wilson to Diamond Bar (or Pleasant Peak), and \$200 for the Diamond Bar (or Pleasant Peak) link to JPL and \$100 for other miscellaneous hardware. The Board voted in favor of making this purchase.

JEARS

By Chris Gaylord W6YTB

Great ShakeOut Thank You:

Thank you to everyone who participated in the JEARS component of yesterday's (October 20th) Great ShakeOut earthquake exercise. It was very encouraging how quickly the Net was up and to hear so many people checking in. I want to specifically thank Jonathan Cameron KF6RTA for stepping up at the last minute to staff the EOC, Matt Bennett KF6RTB for serving as Net Control at B329, Alexandra Holloway AE6IN and Nasrat Raouf K1NAR for operating the Comm Van down at the Main Gate, and Bob Dengler NO6B and Jan Tarsala WB6VRN for assisting with relay communications while we were attempting HF contacts with both Goldstone DSCC and NASA Armstrong.

We accomplished quite a few different goals for JEARS, some with varying levels of success, but one of the main purposes of these types of exercises is to identify these types of issues.

- Successfully transferring B329 to generator power using the new power transfer procedure.
- Testing the check-in and Net Control process for an emergency.
- Staffing the EOC and helping to demonstrate the capabilities that JEARS can provide.
- Testing the Mesh network system. We were able to activate VOIP phone access between the EOC and B329

over the network. We had hoped to also have this access to the Comm Van as well as a camera feed from the van, but unfortunately we were unable to connect the van to the network despite having tested it the day before.

- Interoperability checks with other JPL and NASA facilities and local partners: Alexandra was able to check in on both the ARESLAX and LAECT nets early on in the exercise. Nasrat was also able to check-in with the ALERT team, however there were some challenges reaching them on their simplex frequencies and it took a bit of coordination to reach them. We also had limited success reaching Goldstone and NASA Armstrong – we were able to make contacts via the TMO repeater link, however HF success was limited – we were able to hear Armstrong, but they could not copy us.

Overall, the exercise was a great success and we're in the process of collecting feedback from participants for areas of improvement. A few items I've already received include:

- Obtaining papers, pens, and other general admin supplies for B329.
- Anchoring the radios in B329.
- Evaluating additional VHF/UHF capabilities for B329 since it was difficult to conduct both Net Control and other communications on a single tri-band.
- Developing a cheat-sheet for the FT-1000D HF rig and better utilizing the pre-sets.
- A slight modification to the generator power transfer procedure.
- Continuing the work on the Mesa antenna farm to improve our HF capabilities.
- Greater use of tactical call signs for incident communications (keeping in mind the 10 minute FCC identification requirement as well).

If you have other feedback or suggestions, please let me know and I'll incorporate those into our list.

JEARS Participation Invitation:

Club members who work on-Lab and are interested in providing communications support during emergency situations are encouraged to join the JPL Emergency Amateur Radio Service (JEARS), a volunteer team co-sponsored by the Club and the PSD Emergency & Continuity Management Group (203A).

Prospective JEARS members must be currently licensed (any class) and complete the FEMA IS-100, IS-200, IS-700 & IS-800 courses. An online application and links to the courses are available at <http://goto/jears> (only accessible from on-Lab). Emergency credentials and additional training will be provided by 203A after joining.

For more information, please contact Chris Gaylord W6YTB at christopher.gaylord@jpl.nasa.gov or (818) 354-5584.

ARRL Membership:

By Jim Marr AA6QI

As an ARRL affiliated club, we need to maintain at least 51% ARRL membership among our voting members.

While there are no requirements to maintain ARRL membership, there are some clear advantages to having ARRL membership. Some of these are:

- Receiving the monthly QST magazine and having access to all back issues electronically.
- Being able to subscribe to weekly ARRL news, propagation forecasts, and satellite ephemeris notifications.
- Being able to subscribe to the electronic monthly Amateur Radio Emergency Service (ARES) newsletter that may be of interest to members who wish to stay current on emergency communications.
- Member discounts on materials and training. For example, the ARRL Introduction to Emergency Communication Course is \$85 for non-members but only \$50 for members.
- You support ARRL, the only significant amateur radio advocacy organization in the U.S. that is fighting to protect our access to the airwaves.

Should those of you who are not already members and may wish to join, **please do so through the Club** rather than joining directly through ARRL. Why? If you join through the Club (new members), the Club retains \$15 of your membership fee to support Club activities. From your point of view, the amount you pay is the same either way. Even if you are a member who is just renewing, doing so through the Club nets the Club \$2, again without changing your costs at all.

To renew through the Club, see Secretary Chris Gaylord who will help you with the paperwork (don't worry, it's really simple!).

Thanks in advance for considering joining ARRL or for maintaining your membership.

Future Meetings

By Jim Marr AA6QI

All JPLARC meetings are being held on non-RDO Friday's from Noon to 1 PM in 180-703C (unless otherwise indicated). Upcoming talks (always subject to change):

January 27th: Guest speaker is still TBD. 2017 Officers assume duties.

2016 JPLARC Organization:

