CCARC

Clallam County Amateur Radio Club

Volume 22 Issue 5 May 8, 2022

President's Corner

We are on a quest for knowledge, the voyages of our lifetimes. So let's hope this month's is interesting….

> *ASIDE: I'd asked last month for private feedback on Newsletter-as-private-playpen vs a more noncommittal white-space – the few who commented* liked *what I've been doing, so…, better not-entirely-ham-radio than* nada.

Last month I alluded to something first seen by two teams of scientists, a smaller number total than the teams in a Friday night high school football match:

> … how the apparent "overdimness" of the most distant Type 1A supernovae (a handful of such, mind you) has overturned cosmology (with companion piece on what Dark Energy is and isn't) ...

But to explain this will tax my powers; explaining it succinctly…, is quite beyond me. And as this ain't no book, I'm going to ride rough-shod over many big ideas that have occupied millions of minds over tens of centuries, and I'm also going to occasionally simplify (honest), as I don't understand all of this myself….

> *ASIDE2: I intend offense to no one. Science works on testable hypotheses, is never "done"; theories can be (and have been) overturned by contradictory observations. By contrast, no religion that I know of is based upon testing, needs any validation, or can be overthrown by observation; faith needs no proof. I see these as complementary points-of-view into our cosmos.*

So we'll need the current, best answers to two questions: How far away are the stars? How old is the universe?

There is no general method for distances to the stars and beyond, but there are many techniques that operate over different overlapping ranges with different degrees of uncertainty. These collectively form the "cosmic distance ladder"; here are *some* of its rungs:

- Parallax gives us a trigonometric solution for stars close enough that they shift slightly against the distant background when photographed six months (one diameter of the earth's orbit) apart. But the stars have to be very close, or the technique has to be very precise (see Gaia for the latest on that precision).
- Cepheid variable stars ring like bells; their "absolute brightness" is a function of their ringing frequency (thanks, Henrietta Swan Leavitt), that compared to their apparent brightnesses yield their distances. Such can be observed out to nearby galaxies, and so form the first of what are called "standard candles".
- Inferring that associated stars are all about the same distance can lead to *statistically* fixing their absolute brightnesses, and thus distances. The classical cases are the Hyades (a "near rung" on the ladder), and our galaxy's satellites the Large & Small Magellenic Clouds (a "far rung", note that credit for the LMC & SMC usage here also goes to Ms Leavitt).
- Stars blow up; some are more, much more spectacular than others (our sun isn't big enough to explode, but will instead become a planetary nebula in the distant future). The determining factor is initial mass; bigger stars go more violently, more brightly. But there are exceptions, other mechanisms than burning up all the fuel. When a very large & diffuse Red Giant and a small & dense White Dwarf orbit each other, the latter can suck mass off the former. Eventually the dwarf's surface build-up cooks off as a colossal thermonuclear explosion, a Type 1A supernova bright enough to be seen at extra-galactic distances. Of greatest importance for astronomers, these particular explosions all have about the same absolute brightness, so can be used to measure the distances to really distant galaxies. They form a second kind of standard candle, and are more useful at cosmic distances than Cepheids precisely because they're intrinsically so much brighter.

In 1920 astronomers were still working out whether those fuzzy patches on photographic plates were inside the Milky Way that was the entire universe, or beyond, "island universes" themselves and showing that "the universe" was a vastly bigger place than we knew; see https://en.wikipedia.org/wiki/Great_Debate_(astronomy) if you're interested. But then in 1924-29 Edwin Hubble (yes, *that* Hubble) revealed that galaxies were mutually receding from each other (thanks to the hard work of his uncredited assistant Milton La Salle Humason); further, the greater the distance, the greater the speed of recession. The analogy frequently given is of raisins in a loaf of

bread; as the bread rises, the raisins separate, and while there never was a true center, every raisin perceives that *it* is the center. The conclusion became accepted that the universe must be expanding; then rewinding the "cosmic movie" shows that they must have been much, much closer in the past, indeed must have started at a single point about 13.8 billion years ago. And what is the universe expanding *into*? That requires that there be something "outside" the universe, a contradiction in terms. Instead think of "the universe" as being everything continuously connected by space-time; "expanding" is then a matter of the different parts getting further away from each other; there *is* no "outside".

This expansion was independently confirmed by two Bell Labs scientists, Arno Penzias & Robert Wilson, who in the 1960's were cleaning pigeon droppings out of a microwave horn when they discovered that in every direction the sky glows faintly, the "Cosmic Microwave Background", a redshifted remnant of the Big Bang.

So what will happen to the universe in really deep time? If you throw a ball up, it will come back down; if you could throw it up fast enough (and avoid it vaporizing in the atmosphere), it would never return. Similarly, if the density of the universe is high enough, everything would fall back together, Big Crunch time; otherwise, everything would recede, more slowly every eon but destined to forever recede, "For me and my true love will never meet again, By the bonnie bonnie banks o' Loch Lomond".

Knowing the current density of the universe would help a lot, but also knowing the speed of recession now *vs* in the distant past would also. That speed is somewhat of a puzzle; different methods show slightly different, very precise but non-overlapping speeds (everybody should have agreed, given that precision), so two teams chose to tackle this by obtaining both the speed of recession of the most distant Type 1A standard candles (*via* Doppler shift) and their distances (*via* apparent brightness). Either they'd be slowing down modestly (and the universe expands forever, "critical density" too low, an "open" Heat-Death universe), or slowing down a lot, to fall back together in the very distant future (so a finite "lifespan", critical density too high, "closed", the Big Crunch).

And absolutely no one saw it coming, what they found. The distant Type 1A explosions were too faint, the regression curved the wrong way, the cosmic recession was ***accelerating***. Indeed, each team independently thought that they *must* have made a scientific blunder, and so carefully reworked everything…. Eventually they got to comparing notes, published, and won Nobel prizes.

No one yet knows what this means (this is where science gets interesting, not the frozen facts in the textbooks but the edge-of-the-frontier uncertainties, the "that's funny" paradigm shifts). There are already parts of the universe that we cannot see, that we will never see no matter how powerful our instruments; light hasn't had time to travel to us since the Big Bang, and never will because space that far away is, relative to us, expanding faster than the speed of light. But this acceleration means that our sphere of observability will slowly leak "stuff" into the inaccessible beyond, continuously making for a lonelier universe; one day the extra-galactic astronomers will be out of business.... Will a "Big Rip" eventually occur, the acceleration steadily building over cosmic time until the distance to the boundary, where everything is flung into infinity at greater than light-speed, becomes the size of our galaxy, of our solar system, of our bodies (stay with me, this far-out *speculation* is so far out there that not only will everything we ever knew be long gone to dust, but perhaps the proton itself, which means all matter)...?

Only time will tell…. However, the nicest & reasonably accurate *speculation* that I've seen, with really cool music to boot, comes from Youtube's melodysheep. It goes well beyond the frontiers of human knowledge, so remember that it's just a story, albeit the closest to reality that we can tell ourselves right now.

ADDENDUM: About that density part…. Independent lines of evidence show that there *must* be considerable mass that we cannot see; it doesn't glow, and it doesn't reflect or block light. We call it "dark matter"; it's guesstimated at 27% of the total rest-mass of the universe. And the accelerating expansion of the universe requires an unfathomable (but not uncalculable, for someone...) amount of "energy of repulsion"; that's referred to as "dark energy" at 68% (rest-mass equivalent, Einstein's $E=mc^2$). Note that only about 5% of the universe seems to be "the dreams that stuff is made of", stars, planets, humans…. But remember, both dark matter and dark energy are *labels*, placeholders for humanity's almost total ignorance of what's really going on here; no one knows (well, perhaps The Shadow Knows). Stay tuned.

P.S. Dying is easy, succinct writing is hard….

Glen KJ7KLC
CCARC 2022 President & Newsletter Editor

Clallam County Amateur Radio Club

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Board Meeting Minutes

No board meeting this month….

Large & Small Magellanic Clouds (not visible at our latitudes, but if you're visiting Australia, New Zealand, Argentina, Chile, *et al*...) *{(rotated image) from European Southern Observatory, CCA-4.0}*

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Club Meeting Minutes

April 13th, 2022 at 1900 *Via* Video Conference

Attending (19 max counted approximately 1920): Members and Guests: Lee K7KC, Dick KE7Z, Roger K7RGR, Chuck WA7EBH, Doug Welcker, Bill Peterson
K7WWP, Bob Pensworth (and others not identified in video)

Board: President Glen Kilpatrick KJ7KLC, VP Joe Wright, Trustees: Treasurer Rosemary Day, Chairman
Sheldon N7XEI, Bob Sampson K6MBY, Thomas Clark N7DWU, Absent: Secretary Jeramey Johnson KF7PMC (business emergency).

Approximately 1901 Called to Order by VP Joe Wright for President Glenn.

Officer Reports:

- Approve Minutes for March, M: Sheldon, 2 nd : Bob Sampson, approved unanimous by members present.
- President: No comments.
- Board: VP, Joe Wright recapped the Board Meeting for April:
  - New Business: Upcoming vote for modification of the Bylaws. A submission was received by the Board, made by many Board Members, to restore a provision inadvertently removed during the last Bylaws revision to remove a Member “Any willful activity detrimental to Amateur Radio or to the Club” into Article III: Membership, Paragraph 4, Section (C). This will be voted on at May General meeting.
  - Checking to see if PAFD is allowing in-person meetings.
  - PUD has a new station installation out West. Joe and crew will be doing some testing.
- Treasurer: Deposit since last meeting *{$withheld}*; 1 check outstanding, New Balance *{$withheld}* (up to today); Savings *{$withheld}*; Memberships 84 (1 delinquent) members + 10 life members, 21 unpaid (2 moved).
  - Rosemary is moving and hopes to be moved around July 1st, discussion about the Club and Board’s appreciation for her most dedicated work and many years of excellent service. Interested members to be Treasurer should contact Rosemary.
- Swiftsure Race upcoming and using W7FEL as backup repeater (approved by Board).
- COB: Review of items discussed by VP Joe Wright.

Committee Reports:

- Old Business
  - Upcoming Field Day planning meeting – Sheldon will be in touch.
- New Business/Announcements: None
- Program Presentation by our own Bill Peterson, K7WWP: Part II – Battery Technology: LiFePO4 Batteries (Lithium Iron Phosphate).

Meeting adjourned at approximately 2017, M: Bob Sampson K6MBY, 2nd: Dick KE7Z

# # #

Respectfully Submitted,
Jeramey Johnson, KF7PMC
Secretary

Note: Although absent at the meeting due to a outside emergency, these minutes were generated by viewing the live video recording subsequent to the meeting provided by Bob Sampson.

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Travels with Rita

On hiatus, hopefully to return in June.

The most exotic-looking planetary nebula I could find *{Hubble image, public domain}* – our sun should look so good in its dying….

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Solar Power for the Curmudgeonly

Bill Sands – AC0ED

Preface

Solar power has had a stranglehold on my interests for more than two decades. I never really had the opportunity, land area, time, and finances to incorporate solar power until I moved to Sequim last summer. I've been trying to build my solar capabilities and capacities to handle the occasional power outage, evacuation threats (I live close to the strait), and off-grid necessities. I am an unapologetic prepper. Power, food and medicine storage, shelter, and bug-out necessities are essential. While living in Salt Lake City, my wife fought cancer, and we had a power outage from an outrageous wind storm. The power was out for seven days. My wife needed an oxygen concentrator to breathe, and luckily, I had a gasoline generator as part of my off-grid prepping that ran 24/7 for that week (Honda 2000). When we lived in the Wasatch Mountains, we had regular outages from blizzards, car vs. electric poles, etc. As a former member of two Colorado Search and Rescue teams former wilderness and fire/rescue EMT, I've seen my share of carnage. Nearly all were due to poor preparation. Comms are almost always contentious when you need them. Once when working on a bomb detonation in a school exercise, one of the fire chiefs asked if he could get some carrier pigeons. Thankfully, the problems arose from interagency clumsiness, but it wasn't very pleasant.

I am not an engineer; my doctorate is in physiology, specifically high-performance sports physiology. Muscle membrane kinetics, training for high-performance, and metabolism are more in my background than soldering and circuits, although I've had to learn the latter to build things. I'm not very good at it. I co-directed the Motor Behavior Lab at Utah but where I often had to build, repurpose, and fix lab equipment for my graduate students. But, not knowing what I'm doing never stopped me before, and I don't see why it should stop me now.

My Tiny House

After collecting lead-acid automobile batteries for several years, I put together a battery bank of eight batteries. There are only four connected now, but they work fine and supplement electrical needs outside. In addition, I can run an extension cord to the house to power everything except the drier and the septic pump (240 Volts required).

I started with one, but now I have four 100W solar panels (Figures 1 and 2). These are connected parallel through Anderson Power Poles at every junction to my charge controller and inverter. I'm sure there are more optimal ways for using these, but they work. The battery bank(s) are housed in a shed used for an RV washer and drier by the previous owner.

I didn't know diddly about these specific units until I purchased them used from eBay based on a YouTube recommendation. I thought I broke something when the inverter beeped the first time I turned it on. I later discovered that the beep meant it was working (duh). I have a fire extinguisher in the shed and monitor device temperatures after every new hookup, just in case.

How about a vehicle. I have had radios in my vehicles ever since my original Jeep Wrangler back during the Cretaceous Period. I often served as the only comms person on searchers for Teller County SAR. The darn firewall is the most challenging part of putting radios in your vehicle. Fortunately, jeeps are much easier to modify than almost any other vehicle. There are grommets for passage from the engine compartment to the cab in many vehicles, but they're usually well hidden. I couldn't find anything in my late wife's Honda Ridgeline nor my Titan for passenger compartment access. I had to rely on professional help to drill the holes, although now I could do that on my own with a bit of preparation. Be sure to do your research before drilling.

Now I have a new Jeep Gladiator. My FT-857 is bolted near the roof to a CB BarTM. My Byonics APRS unit is also on the CB BarTM behind the 857 (Figure 3). Cable access can be had via a grommet under the dash.

A solar panel is placed on the rear portion of the roof using a typical but rugged luggage rack. The panel is a Renogy 100W panel attached clumsily to the roof with one cable going to the truck's bed and into a trunk housing a 3000W Yeti (Goal Zero) (Figure 4).

The Yeti is my power system for off-road and off-grid use. With an extension cord, it can also power my tiny house. The Yeti comes with nearly every socket connection you could want, including Power Poles. Moreover, I have two more 100W briefcase-type panels from Goal Zero for more solar power. Numerous other solar power stations are portable. The image to the left shows the Yeti in the trunk (Home Depot) with the Power Poles from the solar panel on the left and an extension cord for 110V power on the right (Figures 5 and 6). Note that the Yeti is kept charged by the solar panel.

If I have to leave or abandon my vehicle, I use the KX2 HF radio and handhelds for UHF/VHF (Figure 7). The radio has an internal rechargeable battery, but I also take along a Lithium iron phosphate (LiFePO4) battery that is tiny and light (X2 Power, 12V, 7Ah). As a former ground pounder, I want the lightest equipment.

Okay, so what? If a moron like me can use solar, anybody can, probably a lot better. Note that the Yeti is kept charged by the solar panel.

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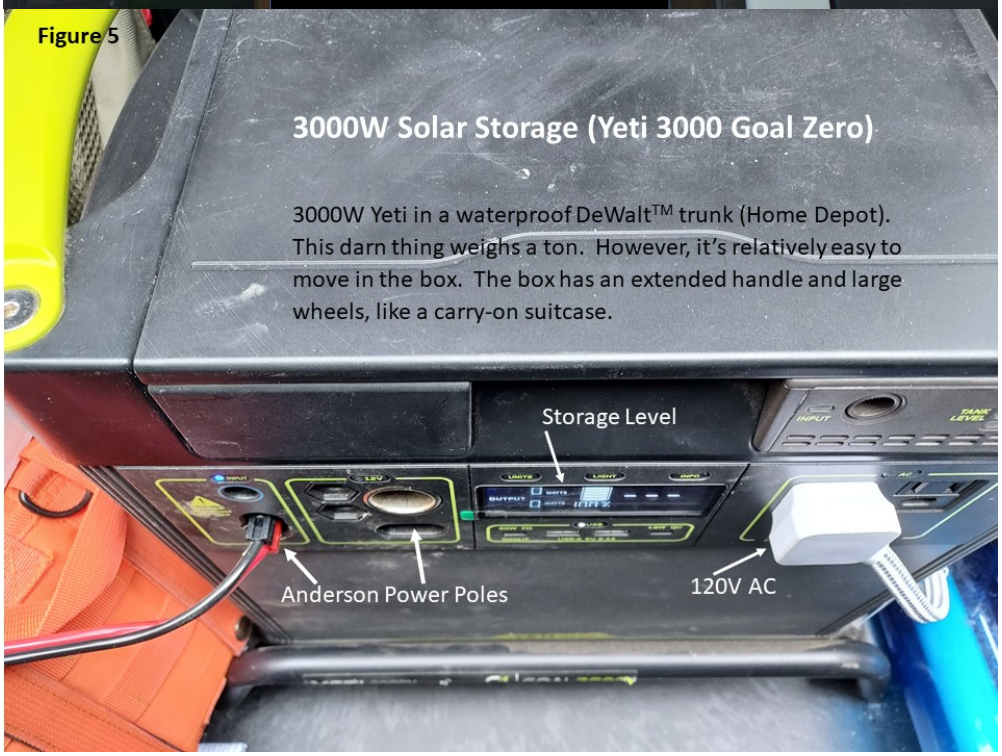

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Figure 6

Charge status indicator for the Yeti. Note that the unit indicates 0W because it's fully changed.

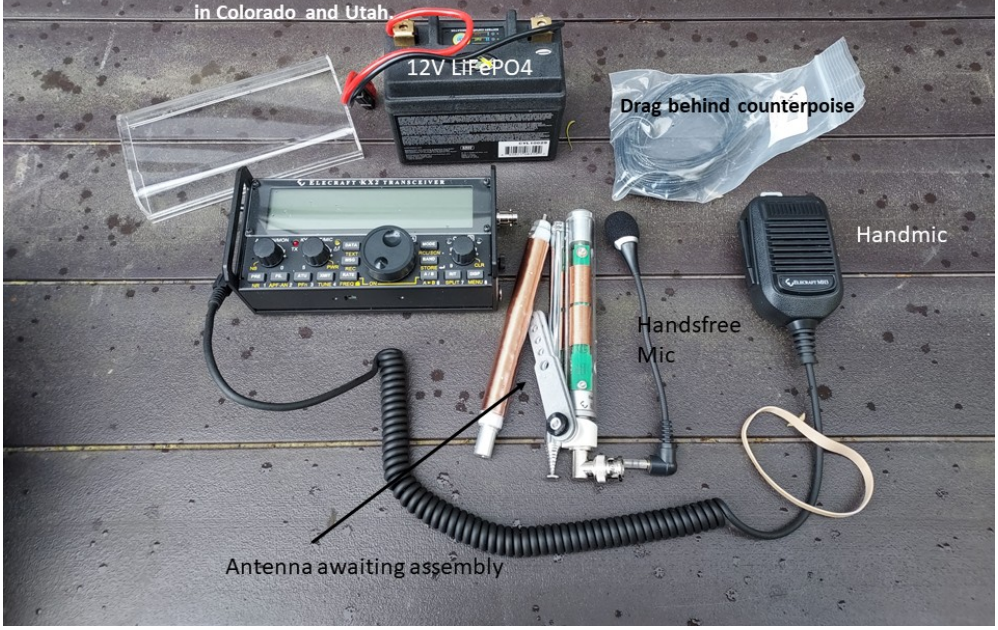

Figure 7

The KX2 with some accessories. The antenna (with the coils) covers 20 and 17m. An external wire antenna is also possible, and I generally carry one. The KX2 offers CW and SSB but only 10W. It hears much better than it hollers, but it is still a sound radio for emergencies when on foot. I've used it chasing SOTA experiences in Colorado and Utah.

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Officers and Board Members

- President (& Newsletter Editor) Glen Kilpatrick KJ7KLC 503-776-0877
- Vice President Joe Wright KG7JWW 360-640-9548
- Secretary Jeramey Johnston KF7PMC
- Treasurer (& Membership) Rosemary Day KI7MZH 360-457-6895
- COB Sheldon Koehler N7XEI
- 2nd Year Bob Sampson K6MBY
- 360-477-0776
- 1st Year (& Inventory Manager) Thomas Clark N7DWU 719-238-8576
- Trustee Clif Keely AA6FE

Nets, Frequencies, *&c*

- CCARC Net every Thursday at 7:00 pm on Striped Peak Repeater 146.760 minus with tone 100 Hz
- Clallam ARES Net Tuesdays at 7:00 pm on Striped Peak Repeater 146.760 minus with tone 100 Hz
- “Weather Net” daily at 9:00 am on Striped Peak Repeater 146.760 minus with tone 100 Hz
- “The Watering Hole” SSB Net daily at 5:30pm Port Angeles 28.450 (USB)
- Olympic Peninsula DMR Sunday afternoon 4:30 pm Talk Group 31531 on K6MBY DMR or WF7W DMR or KC7EQO DMR or your local hotspot
- WF7W Port Angeles 145.310 minus tone 100 Hz
- KC7EQO Blyn Lookout 442.100 plus tone 100 Hz
- K6MBY/W6MPD 444.900 plus K6MBY (Sequim) tone 131.8 Hz or W6MPD (PA) tone 107.2 Hz

New Members

- *"Lorem ipsum...”*

Items for sale

- *"Lorem ipsum...”*

Items wanted

- *"Lorem ipsum...”*

Announcements

- *"Lorem ipsum…”*

The stuff that dreams are made of…. *{Copyright Law Casebook, CCA-4.0}*