

CARLETON UNIVERSITY AMATEUR RADIO FACILITIES AND YOTA CAMP 2023



Volunteer Radio Group

Roger Egan – VA3EGY

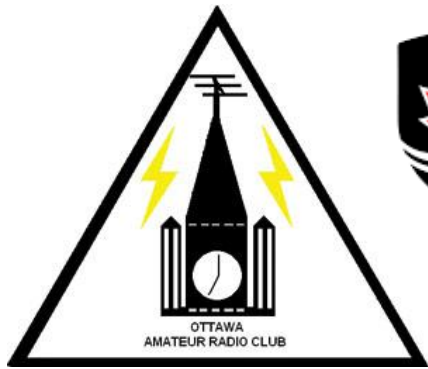
Harrie Jones – VE3HYS

Thane Brown – VA3TTM

Rob Haddow – VE3RXH

September 19, 2023

This new Amateur Radio Facility at Carleton University is made possible with generous financial contributions from the following organizations:

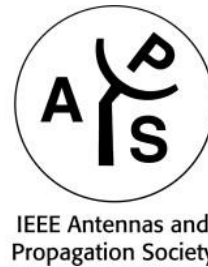


Carleton
University

Faculty of
Engineering
and Design



AMATEUR RADIO DIGITAL COMMUNICATIONS



IEEE Canadian Foundation
Fondation Canadienne de l'IEEE



The **YASME**
FOUNDATION

www.yasme.org

Special thanks to Carleton University stakeholders

- **Linda Cruz**; Conference Services (Dorm Rooms, Banquet facilities, Meals)
- **Alan Steele**; Associate Professor w/ Advanced Amateur Radio Lic. VA3STL
 - ✓ Our internal sponsor & Faculty Advisor for CUARC; holder of VA3CUA
 - ✓ Got several of us approved as Carleton University FED Volunteers
- **Larry Kostiuik**; Dean of Engineering and Design
- **David Hunt**; University Operations & Safety
- **Bradley Crawford**; Facilities Management and Property (FMP)
 - ✓ Helped find the right contractors - Everything is outsourced
 - ✓ Detailed Plans, RFQs, Contractor Site Visits, Contracts, Schedule, Payment
- **Peter Cech**; Risk & Insurance Management



Special thanks to a broad group of local HAMs

- Financial contributors – OARC, OVMRC, Carleton U FED, IEEE, YASME, ARDC
- Equipment donations - DX Engineering and ICOM USA and Canada
- Harrie Jones VE3HYS– Radio Engineer whose temperament and experience have been a huge asset in facilitating the many negotiations to a mutually beneficial outcome for everyone involved. Leveraged numerous contacts to get things done at the least cost.
- Daniel Boulet VA3GLB – OARC Treasurer for managing the money and financial reporting
- Norm Rashleigh VE3LC– Technical review of new Ham Shack plans and loan of the VE3RAM D-Star Repeater during the camp
- Thane Brown VA3TTM – Remote Control Radios and attached Computers configuration, updating and testing
- Rob Haddow VE3RXH – Satellite Stations build and Tracking Automation testing
- Barry Allison VE3NA – Cable assemblies
- Bryan Campbell VE3ZRK– 1U Custom panel for inside SPGP rack
- Jim Bourgeois VA3BJO – coordinated volunteers for our Diefenbunker visit



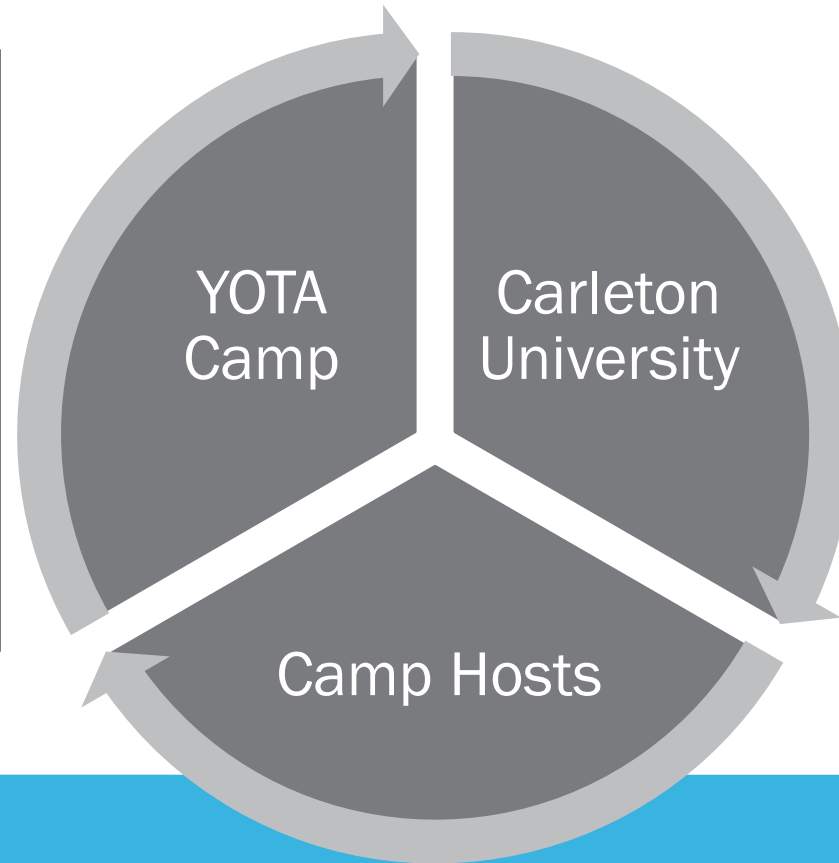
More Special thanks...

- Ward Silver N0AX – Grounding & Bonding for Amateur Radio & personal guidance during the project
- Rod Wilson VE3RXN - Scouts Canada provided support to the camp volunteers with obtaining Police Record Checks, and providing working with youth training required by the Provincial Government.
- RAC – Signed the MOU, provided Insurance coverage that the University required and sourced Helium for our balloon launch



WORKING TOGETHER FOR A SUCCESSFUL CAMP

Camp Marketing and Promotion
Sponsorship to cover all costs of hotel rooms, meals, activities, local transportation, Insurance
Recruit & Train Youth Instructors
Camp Session Presentations
Workshop materials
Laptops
Some Amateur Radio Equipment

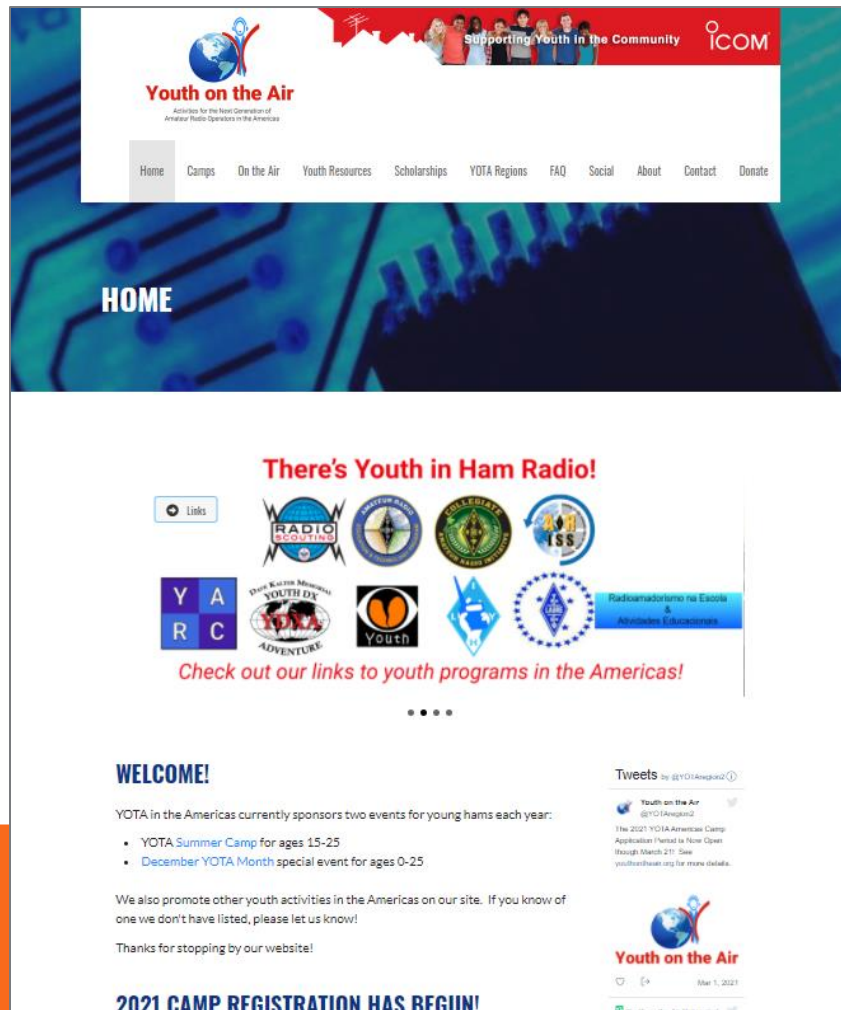


Hotel Rooms
Meals
Banquet Reception Room
Class Rooms
Lab Facilities
Amateur Radio Shack/ Antennas
A/V Equipment
Broadband Internet
Close to Park areas for:

- POTA
- Fox Hunting
- QRP
- Balloon Launch

Local Logistics, booking outside activities, bus transportation, some meals, negotiating with Carleton University for access to facilities and...build an Amateur Radio facility in time for the camp!

WHAT IS...YOUTH ON THE AIR...“YOTA”



- Promotes all youth programs
- Adds more activities to already established ones
 - ✓ YOTA Month (December)
 - ✓ Summer Camp (June/July)

<https://youthontheair.org/>



DECEMBER YOTA MONTH

- Worldwide Special Event all month long
- All Operators Under age 26
- Coordinated in Americas by
 - Kees, WØAAE &
 - Blake Pearson, KN4VKY
- Email:
yotamonth@youthontheair.org
- Promoted by RAC:
- <https://www.rac.ca/youth-on-the-air-month-update/>

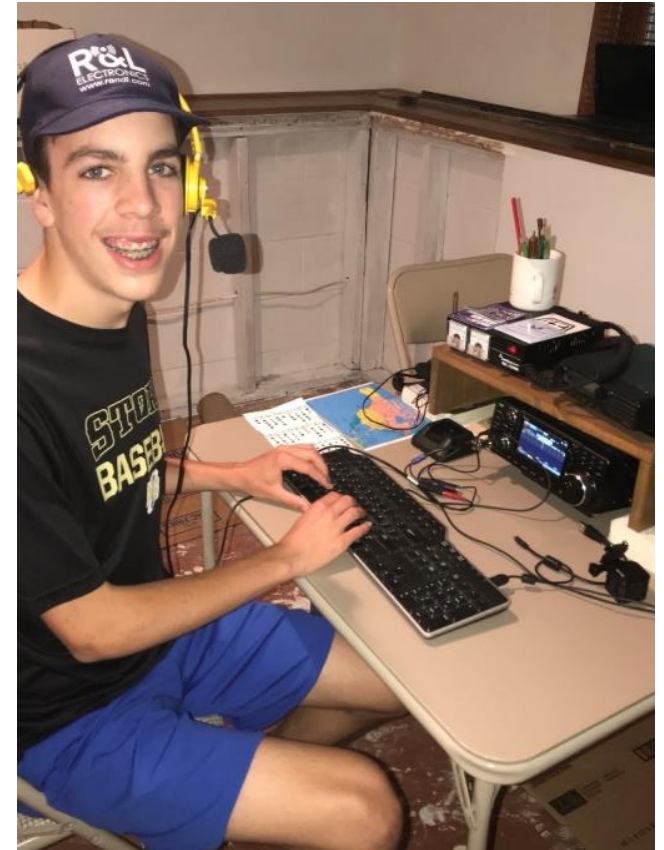


Youth on the Air

DECEMBER YOTA MONTH 2023

DX Participants (Americas)

- Argentina: **LR1YOTA**
- Canada: **VC3YOTA, VB7YOTA**
- El Salvador: **YS1YOTA**
- Honduras: **HQ2YOTA**



Youth on the Air

YOTA Summer Camp 2023

July 16-21: Ottawa, Ontario, Canada
Carleton University

- FOR and BY young hams (ages 15 to 25)
- Nearly all session leaders are 35 and under
- Builds strong relationships with peers and mentors, and developing new radio skills
- Modeled after IARU Region 1 Youngsters on the Air (Europe, Middle East and Africa)

<https://www.ham-yota.com/>



YOTA Summer Camp 2023

July 16-21: Ottawa, Ontario, Canada

Carleton University

- Youth (15-25) can apply at <https://youthontheair.org/>
- \$100 USD fee after acceptance (30 participants max)
- Transportation to and from Ottawa is not included
- All other expenses are included
- Scholarships available (for fee and travel from outside of USA/CAN)
- Special Event Station callsign -- VE3YOTA



YOTA Camp Schedule - 2023

	Sun 7/16/2023	Mon 7/17/2023	Tue 7/18/2023	Wed 7/19/2023	Thu 7/20/2023	Fri 7/21/2023			
8am	Arrivals	Breakfast	Breakfast	Breakfast	Breakfast	Breakfast			
9am		Kit Building	Balloon Prep, Launch, Tracking	Satellite Basics KM4LAO	POTA Activation Part 2	SSTV			
10am						Engineering Tour			
11am						Closing Ceremony / DYM			
12pm		Lunch	Lunch	Box Lunch	Box Lunch	Lunch (& sat passes)			
1pm	Airport Shuttle	Kit Building Continued	ARISS Contact	Water Park Dinner 4:30	Diefenbunker Tour & Operating Dinner 5 pm	Move Out Time			
2pm	Airport Shuttle	D-STAR				Departures			
3pm	Airport Shuttle	Contesting or Digital	POTA Activation			Airport shuttle 2:15 pm			
4pm	Airport Shuttle		Tear Down						
5pm	Opening Ceremony	Dinner	Dinner						
6pm	Dinner - Speaker VA3QR	POTA Presentation	CW						
7pm		TTT	TTT						
8pm		Shack Orientation							
9pm	Northern Lights Show	Station Time / Social Time	Station Time / Social Time	Station Time / Social Time	Swimming Pool ARDF Station Time Social Time				
10pm									
11pm									

Activity at Main Area The shack and remotes are available during these times when you have completed the session.

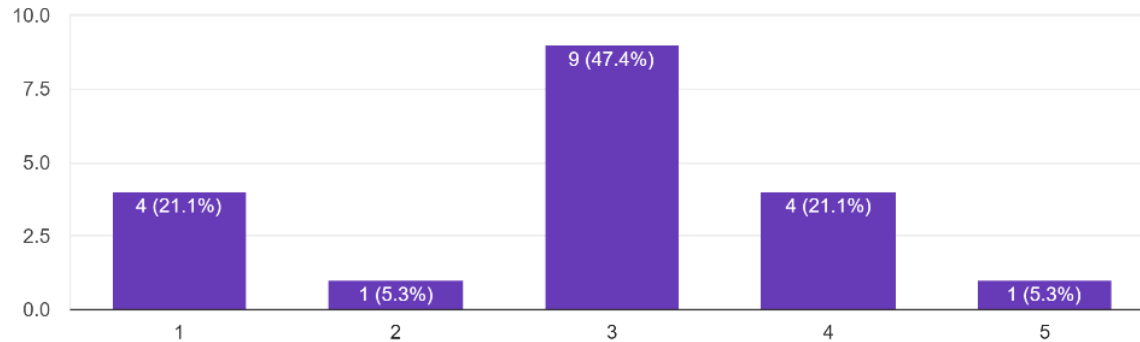
- Social/Flex
- Off Campus
- Cafeteria

[YouTube – 2023 Camp Highlights Playlist](#)



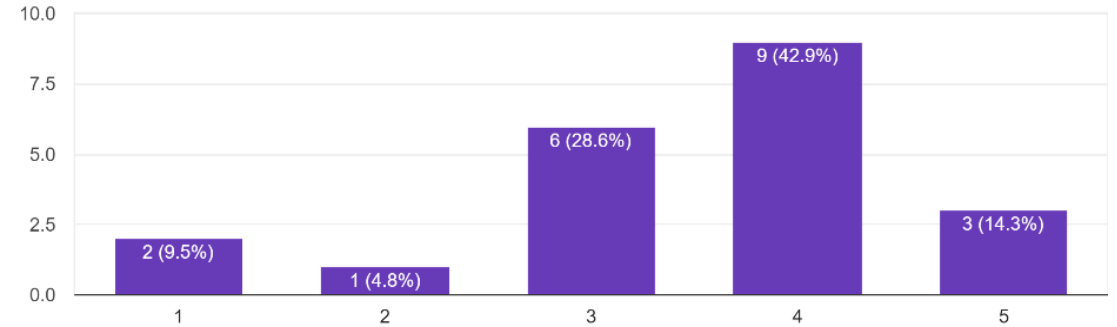
Survey: Rate Your Ham Radio Ability

How would you rate your ham radio ability? (5 being total expert, 1 being beginner)
19 responses



Mean = 2.84

How would you rate your ham radio ability? (5 being total expert, 1 being beginner)
21 responses

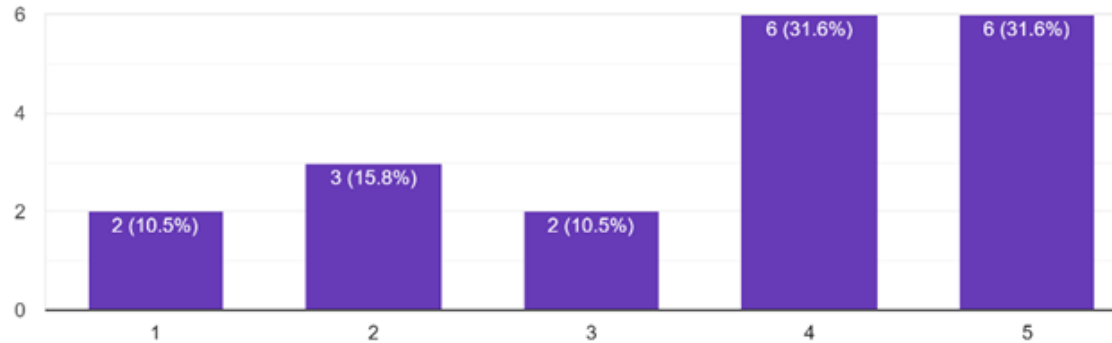


Mean = 3.48

Survey: Comfort on the Air

How comfortable are you to be on the air? (5 being totally comfortable, 1 being not at all comfortable)

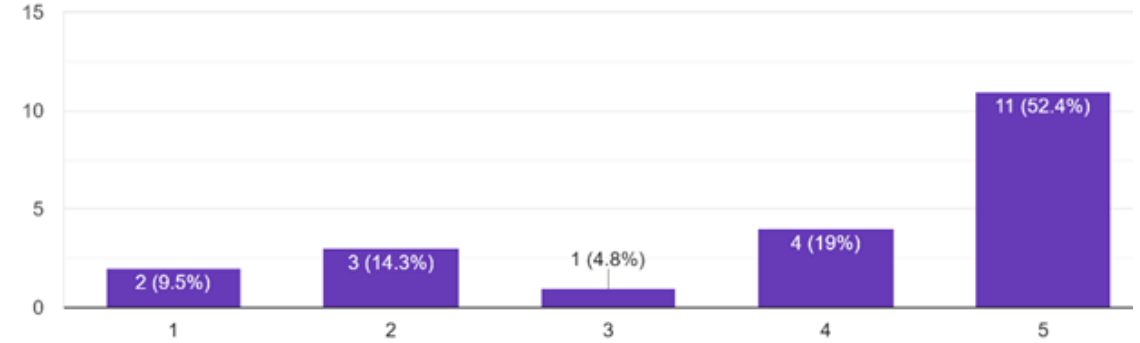
19 responses



Mean = 3.58

How comfortable are you to be on the air? (5 being totally comfortable, 1 being not at all comfortable)

21 responses



Mean = 3.90

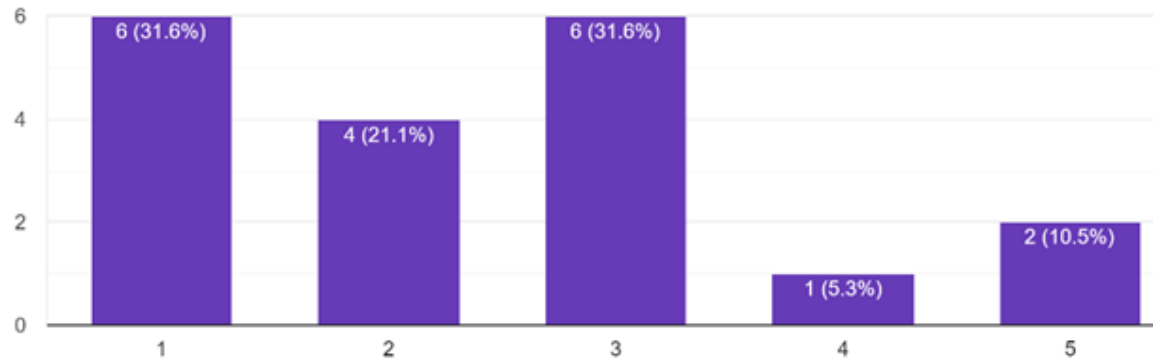


Youth on the Air

Survey: Contesting Ability

How would you rate your contesting ability? (5 expert, 1 beginner)

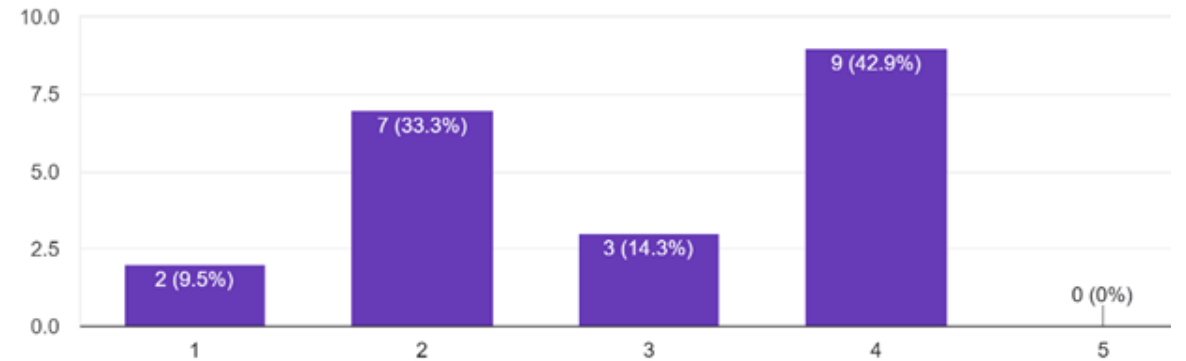
19 responses



Mean = 2.42

How would you rate your contesting ability? (5 expert, 1 beginner)

21 responses



Mean = 2.90

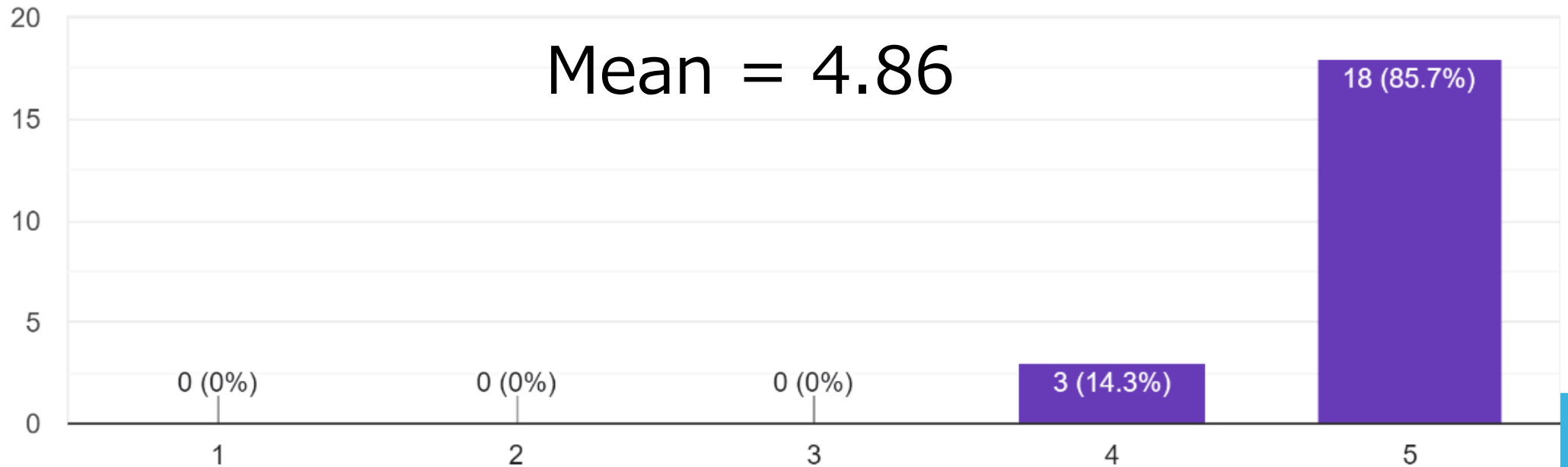


Youth on the Air

Survey: Camp Ratings - Sessions

How would you rate the sessions this week? (5 totally awesome, 1 wish I had stayed home)

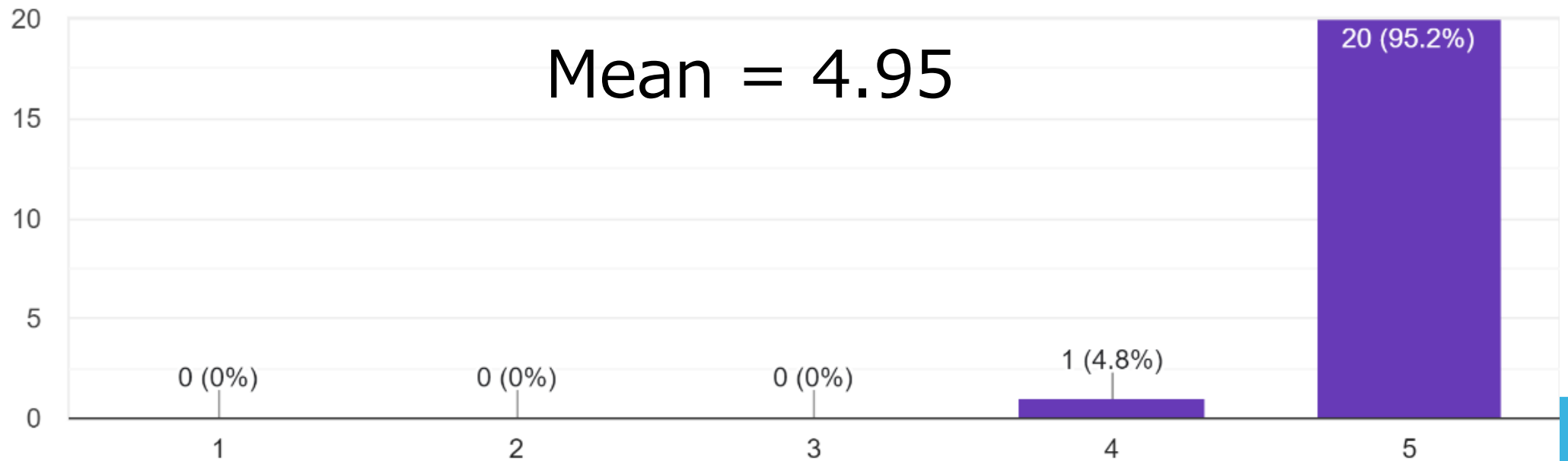
21 responses



Survey: Camp Ratings Overall

How would you rate this week of camp overall? (5 totally awesome, 1 wish I had stayed home)

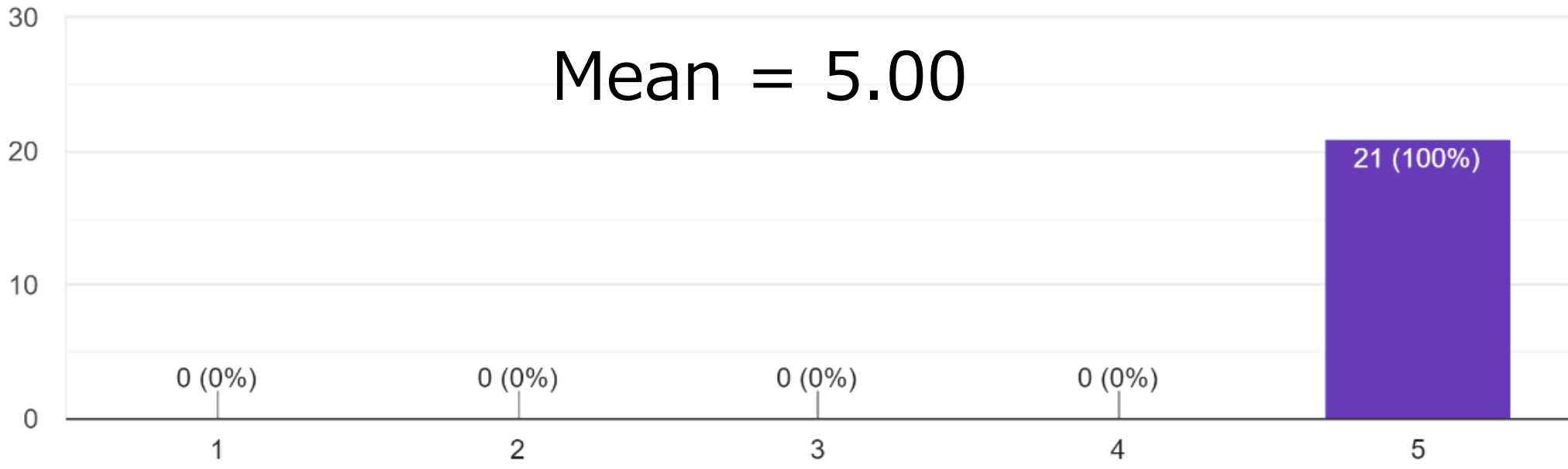
21 responses



Survey: Camp Ratings – Promoter Score

How likely would you be to recommend someone to come to this camp? (5 absolutely, 1 no way)

21 responses



Project Approach and Timeline

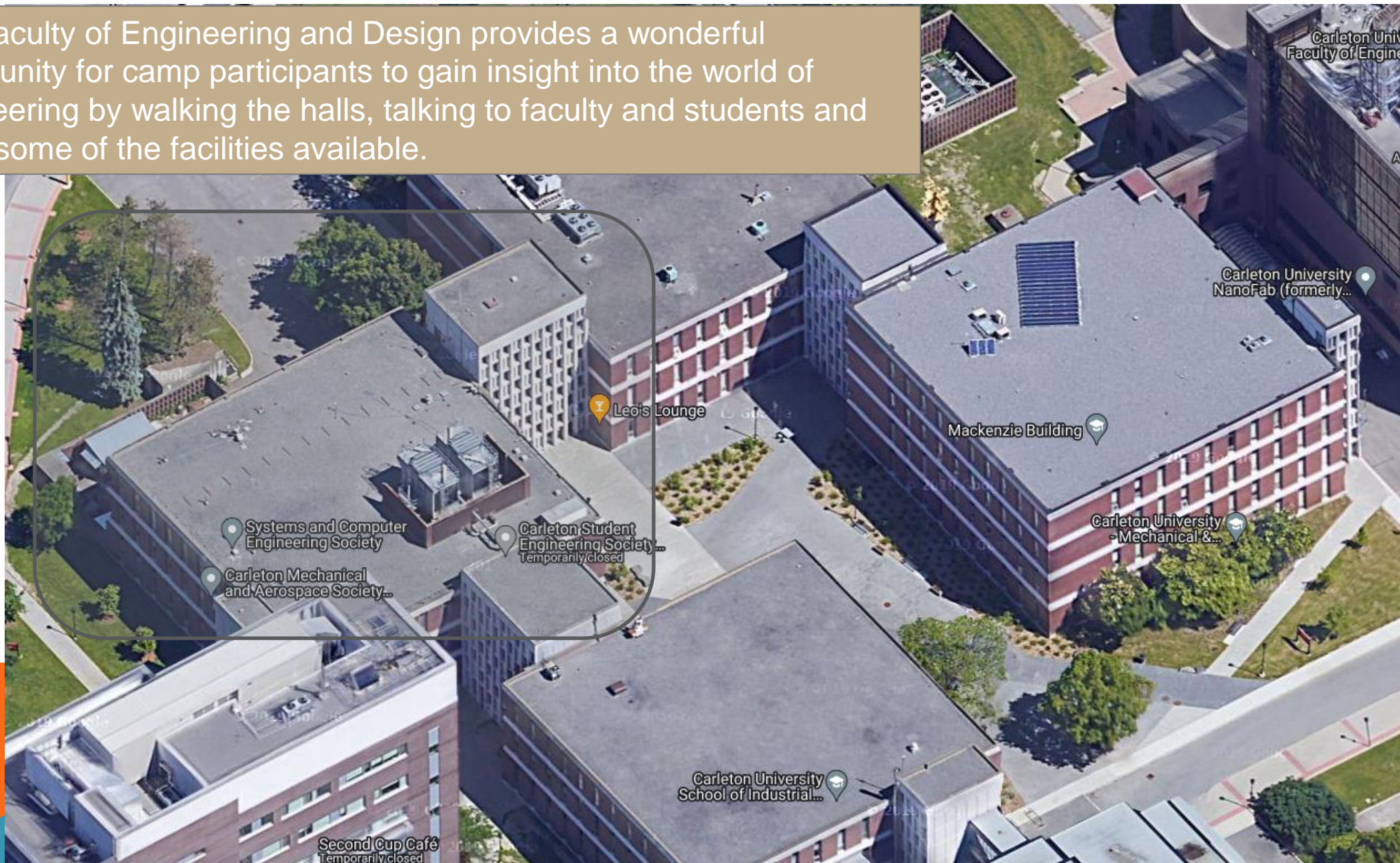
- We started in August 2022 even before the final decision for Ottawa
- Socialized ideas w/ University Stakeholders (Sep-Oct/22)
- Developed an Equipment Plan and Budget (Nov/22)
- Presented MOU for signature(YOTA, RAC, University, Host) (Dec/22)
- Identified & engaged Partners for Grant funding (Nov/22-Feb/23)
- Waited for the money - a bit of a nail biter! (Mar-Apr/23)
- Started working with University Stakeholders in parallel – what’s in this for CU?
- Finally got approval from University June 1st for go live July 16/23
- Work started June 2nd
- The build was complete with Code 6 Certification July 13th
- Camp started on July 16th – we made it happen!!

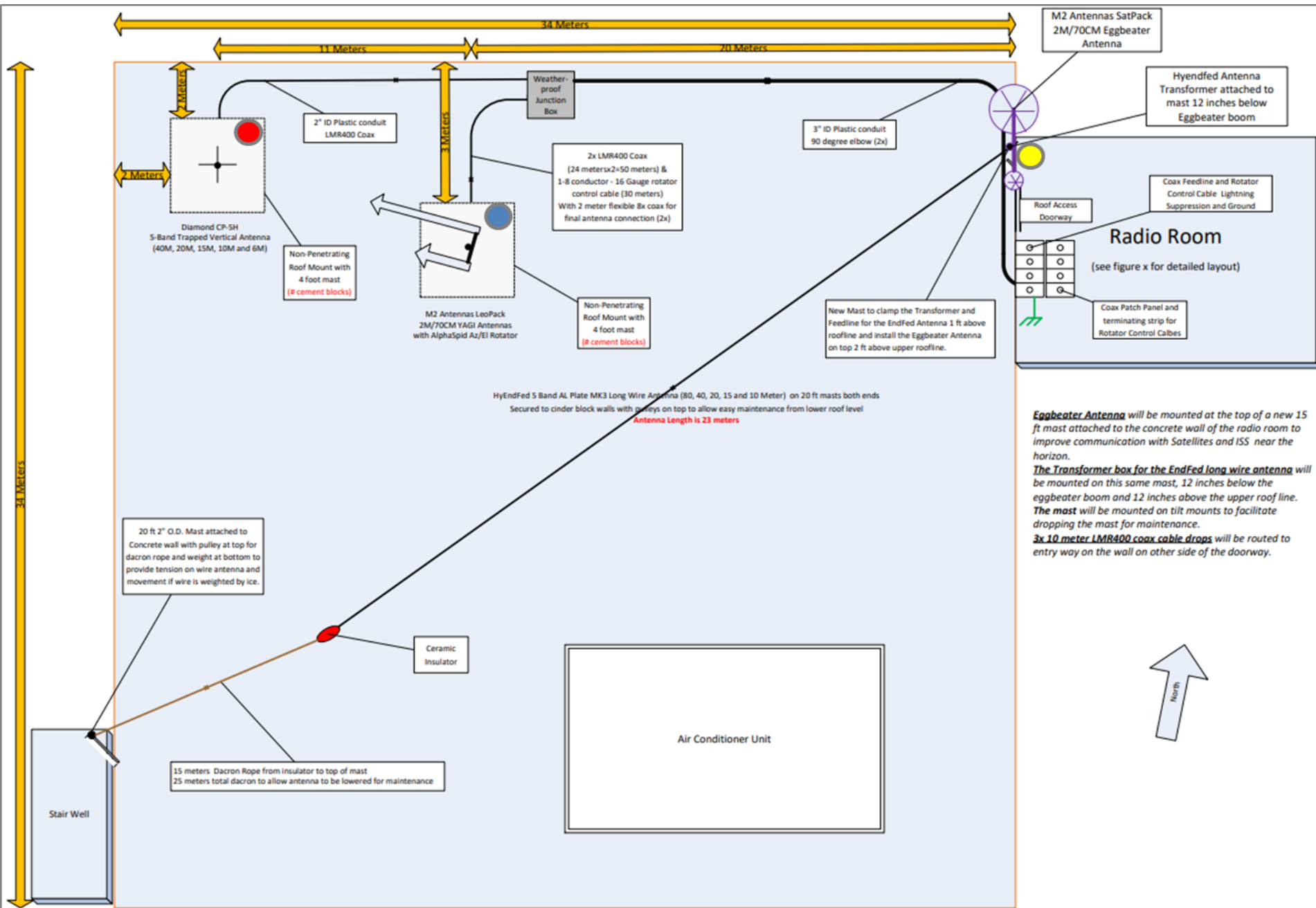


YOTA Camp 2023 chose Carleton University because... they provided: dorm rooms, meals, banquet rooms and lecture halls for large gatherings, classrooms, lab space, park space and amateur radio facilities for operating. 15 minutes from airport! In Canada's hi tech capital city.



The Faculty of Engineering and Design provides a wonderful opportunity for camp participants to gain insight into the world of Engineering by walking the halls, talking to faculty and students and using some of the facilities available.





Eggbeater Antenna will be mounted at the top of a new 15 ft mast attached to the concrete wall of the radio room to improve communication with Satellites and ISS near the horizon.

The Transformer box for the EndFed long wire antenna will be mounted on this same mast, 12 inches below the eggbeater boom and 12 inches above the upper roof line. **The mast** will be mounted on tilt mounts to facilitate dropping the mast for maintenance.

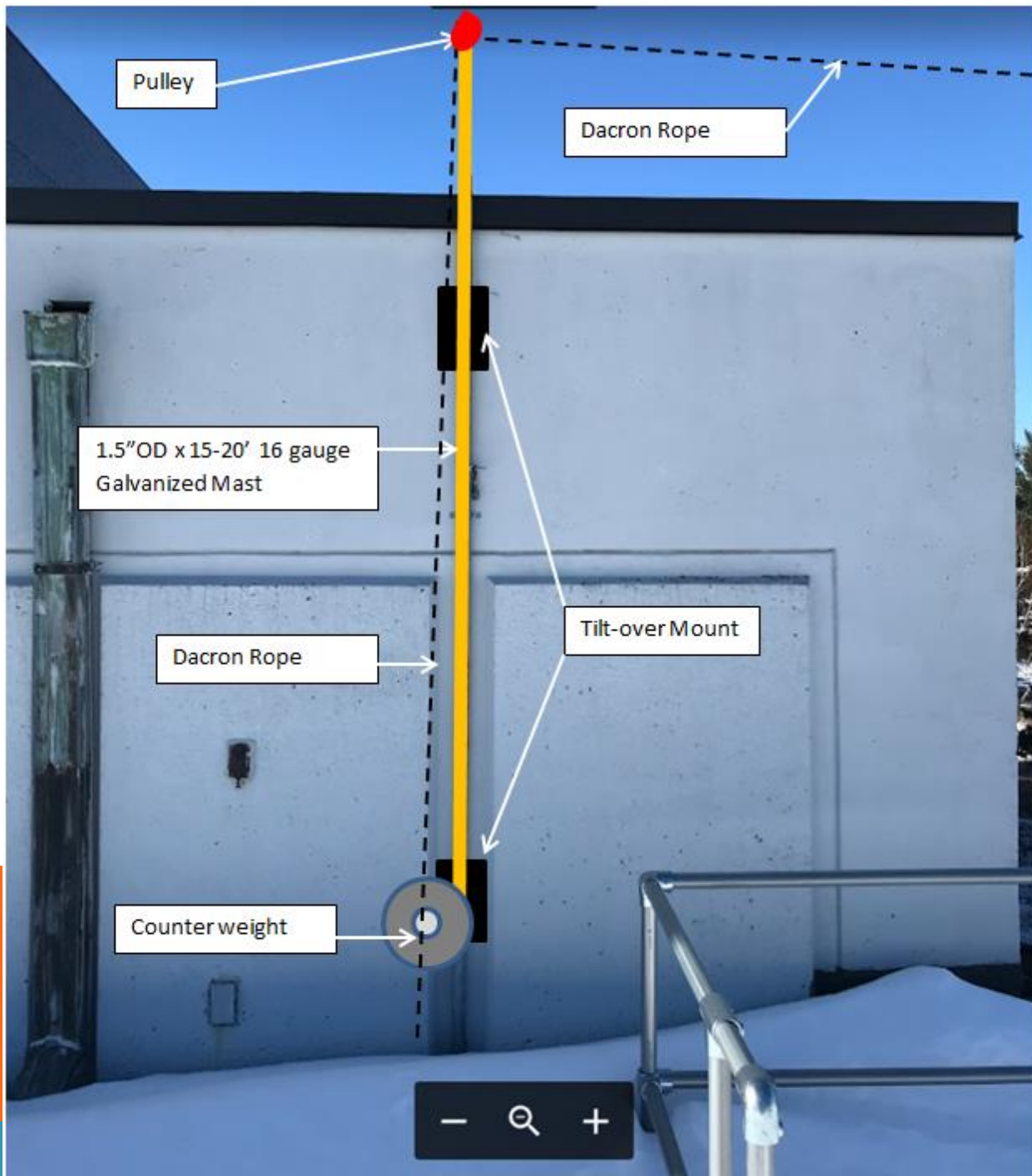
3x 10 meter LMR400 coax cable drops will be routed to entry way on the wall on other side of the doorway.



Early visits and discussions with the Dean's Office, Facilities Management & Property, Risk Management and Safety about the requirements for Antennas and Radio Equipment to be installed on the rooftop level of Mackenzie Building. Some equipment has been there for years but had to be replaced. Our goal was to create something with the capacity for YOTA camp which could be used by the University ongoing for teaching, research, future camps and the Carleton University Amateur Radio Club.



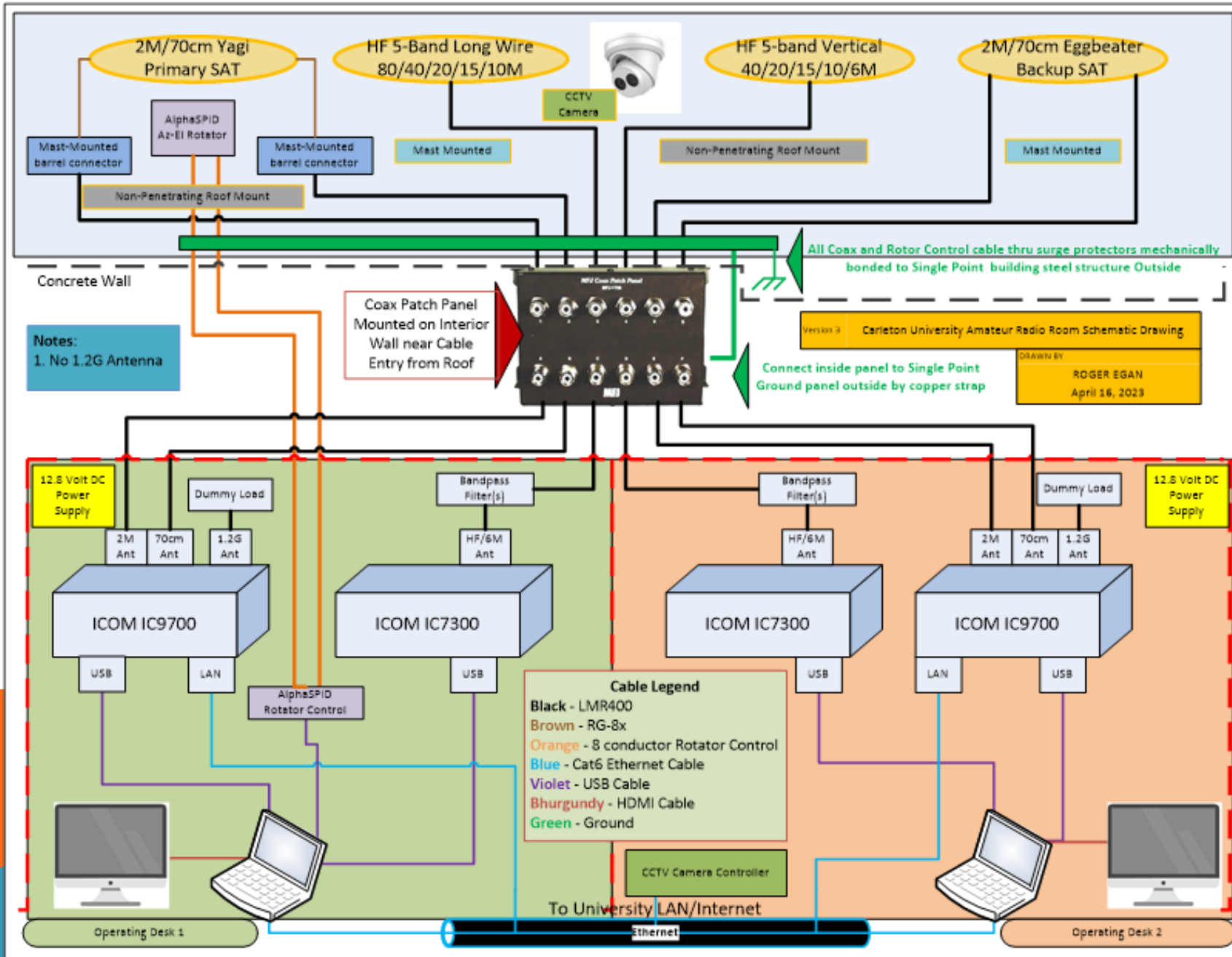
Youth on the Air



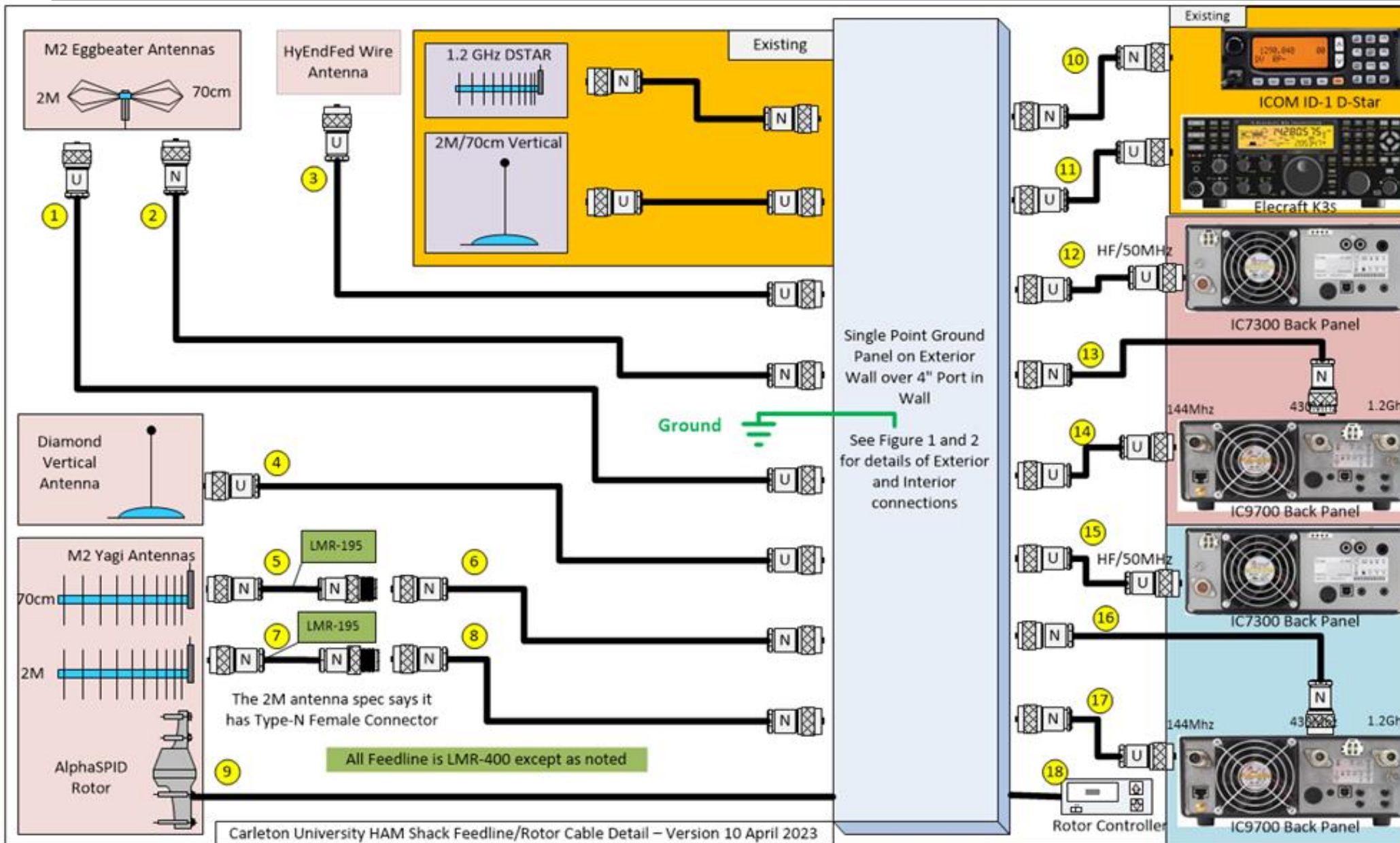
We used the Tilt-over mast mounts from DX Engineering to facilitate installation and maintenance of a variety of different antennas



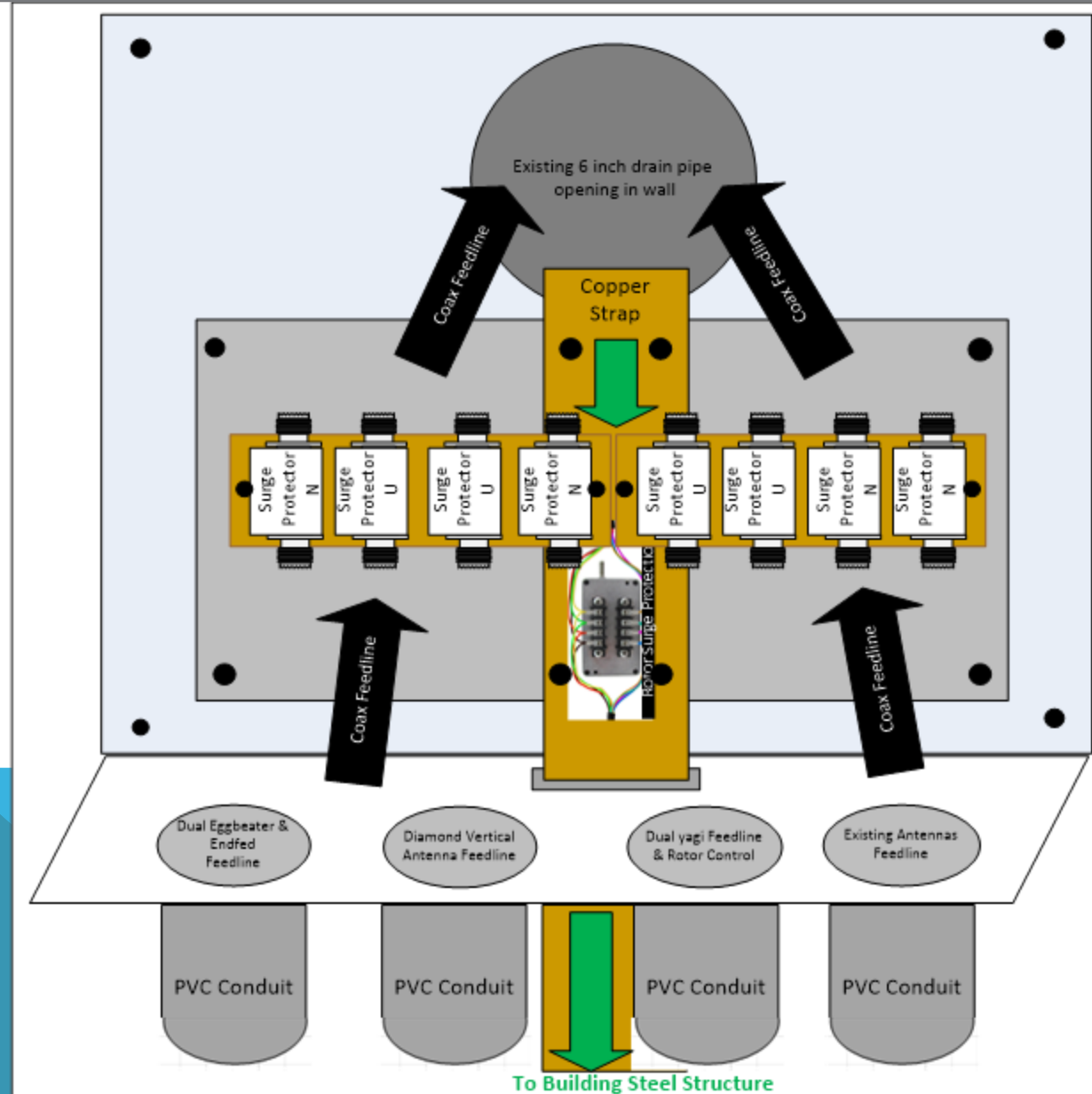
Amateur Radio Facility Schematic Drawing using VISIO



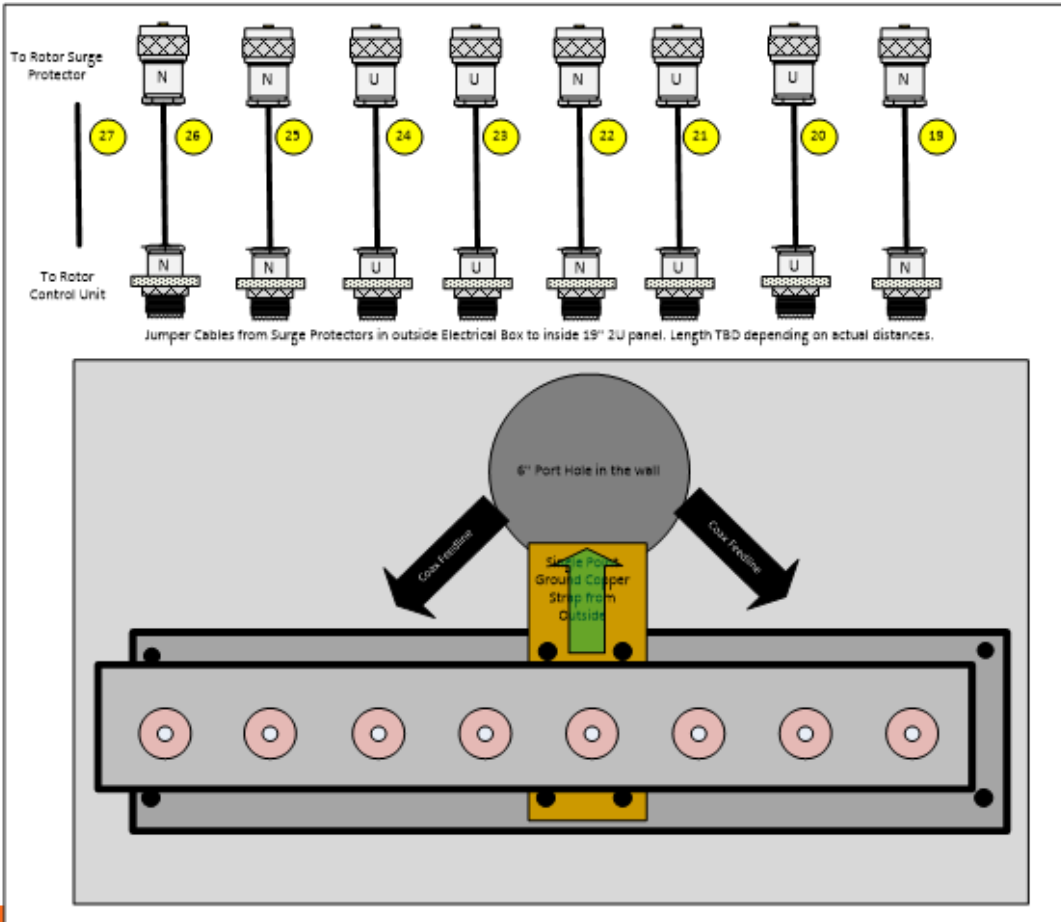
We created a Bill of Materials and Cable Assembly list to ensure we had all the equipment, coax and connector types on hand over the winter to facilitate a quick(er) installation in the spring



We installed a Single Point Ground Panel outside to provide a path to ground for static and surges. For Lightning Protection, we disconnect all the feedlines at a wall-mounted panel just inside the radio room.



There are many pieces required to fabricate a custom single-point ground panel.



1.813" 1.813" 1.813"

1.688" 1.25" .375" 1" 10.813"

1.438" 1.188" 0.5" 1.25"

.094" Thick Copper Holes are .266" DIA

4-1/2" 2-1/2" 1" 3/4"

9/16" 1-1/4"

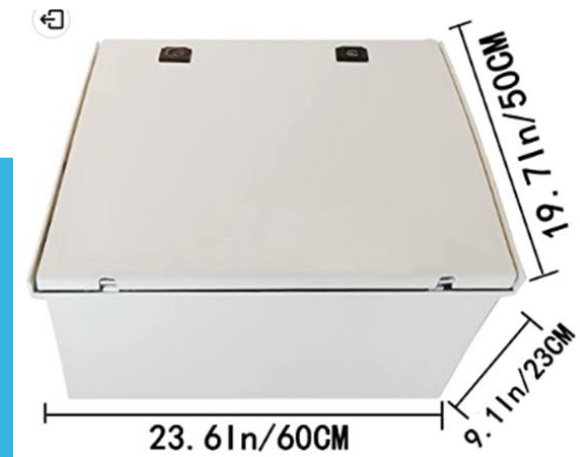
Copper-Ground-Bus-Wall-Mount

Rotator-Control-Line-Protector

Coax-Cable-Surge-Protectors

Grounding-Clamp

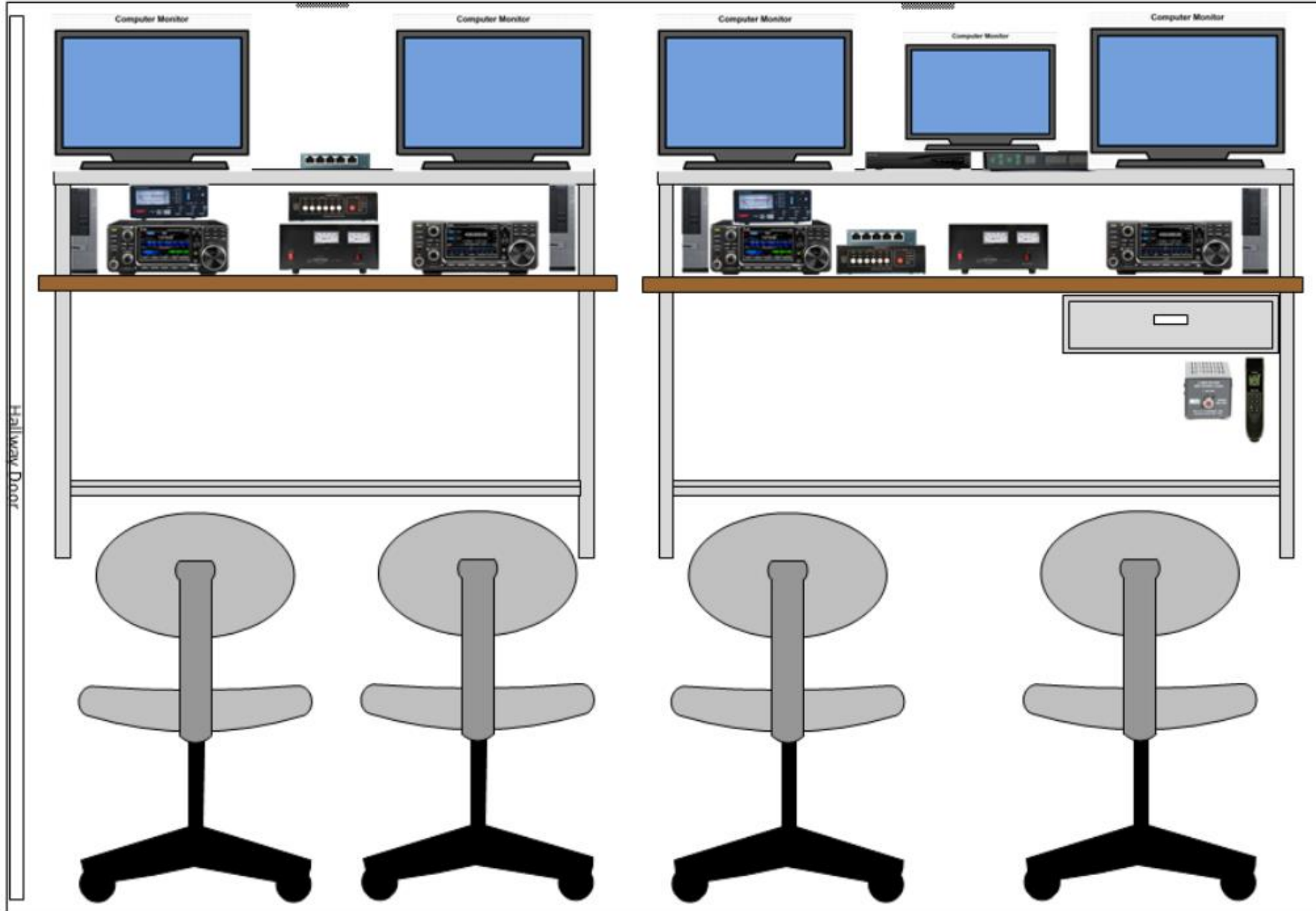
Wall-Mounted-Assembly



This is the Final Equipment layout on the furniture that we included in our proposal.

“The Shack”

Room 5324



Youth on the Air

Remote Control Radios too!

- We needed remote control radios for accessibility and late night operating from the dorm areas and anywhere else on or off campus
- Radio Locations
 - Scouts Canada HQ Museum on Baseline Road
 - The Diefenbunker in Carp, ON
- Thanks to Thane Brown VA3TTM for setting up, testing, debugging and negotiating with these venues to get our gear approved to operate remotely from these locations



Income Summary

Funding Sources			
YASME	5,000.00	6,501.00	actual
OVMRC	912.50	1,250.00	actual
OARC	1,825.00	2,500.00	actual
IEEE SP-S (only after the Camp event)	1,750.00	2,397.50	
IEEE AP-S/ MTT-S/Canadian Foundation	2,190.00	3,000.00	actual
ARDC (YASME sponsor)	30,000.00	39,582.00	actual
Total Income from Grant Funding	41,677.50	55,230.50	actual
Plus Contribution from Engineering Faculty	5,840.00	8,000.00	actual
Total Income	47,517.50	63,230.50	actual
Contingency Money Available		9,231.80	



Expense Summary (so far)

Equipment Purchase Summary	USD	CDN
Antenna Mounts for Rooftop		1,265.79
Two Multi-band HF Local radios with Antenna	4,853.38	6,649.14
Multi-band HF - Remote at Diefenbunker or Scouts HQ	2,352.21	3,222.52
ARISS Ground Station - Primary	7,187.65	9,847.08
ARISS Ground Station - backup	2,269.17	3,108.76
Radio Shack Furniture	2,945.15	4,034.45
19" Rack components	70.92	97.15
Computer Equipment for Radio Shack	4,794.71	6,568.09
CCTV Camera		1,405.72
Misc Expenses		
Equipment Subtotal		36,198.70
Engineering/Construction Contracts		
Structural Engineering	730.00	1,000.00
WSP Grounding	4,380.00	6,000.00
Electrical Work to Install Grounding-Time & Materials	1,460.00	2,000.00
Antenna Mount Installation	5,110.00	7,000.00
Safety Code 6	1,314.00	1,800.00
Engineering/Construction Cost at Carleton U - Subtotal	10,804.00	17,800.00
Total Expenditures	48,271.18	53,998.70



Amateur Radio Facility Build Photo Album



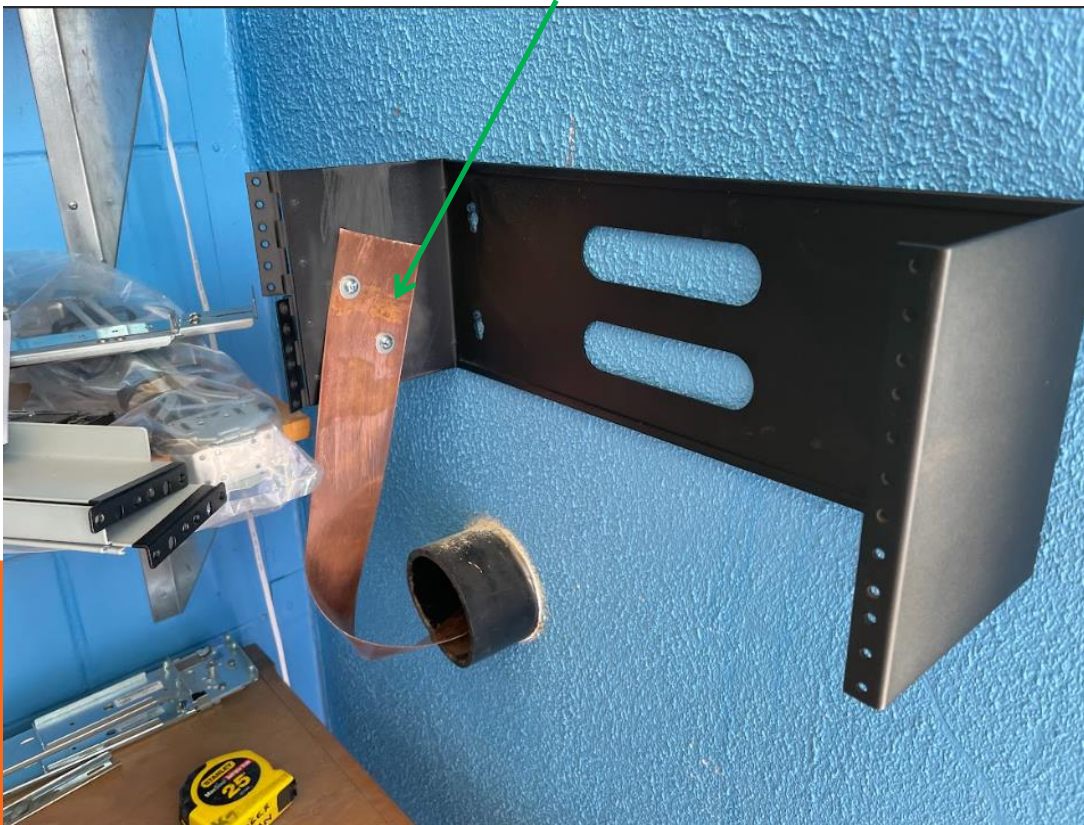
Youth on the Air

THE SHACK WITH 4 OPERATING POSITIONS

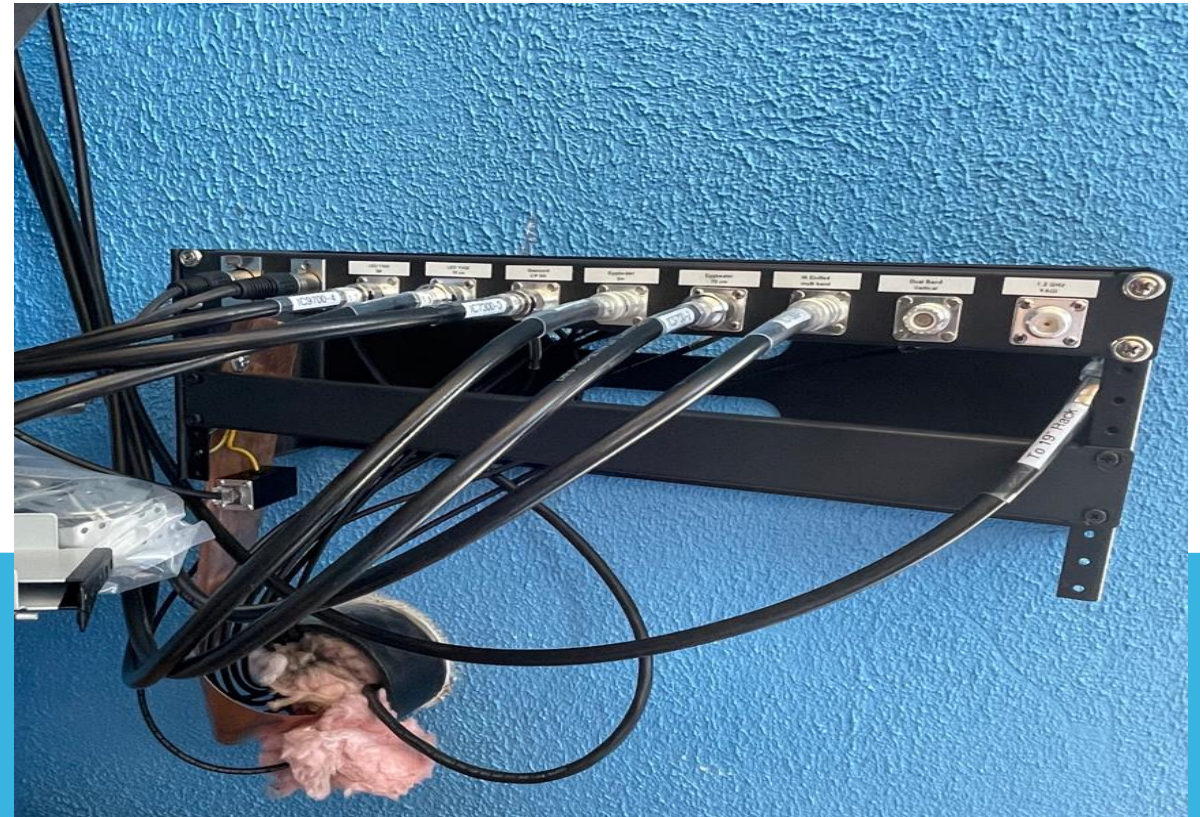


INSIDE CABLE TERMINATION BULKHEAD REMOVED WHEN NOT IN USE FOR SAFETY

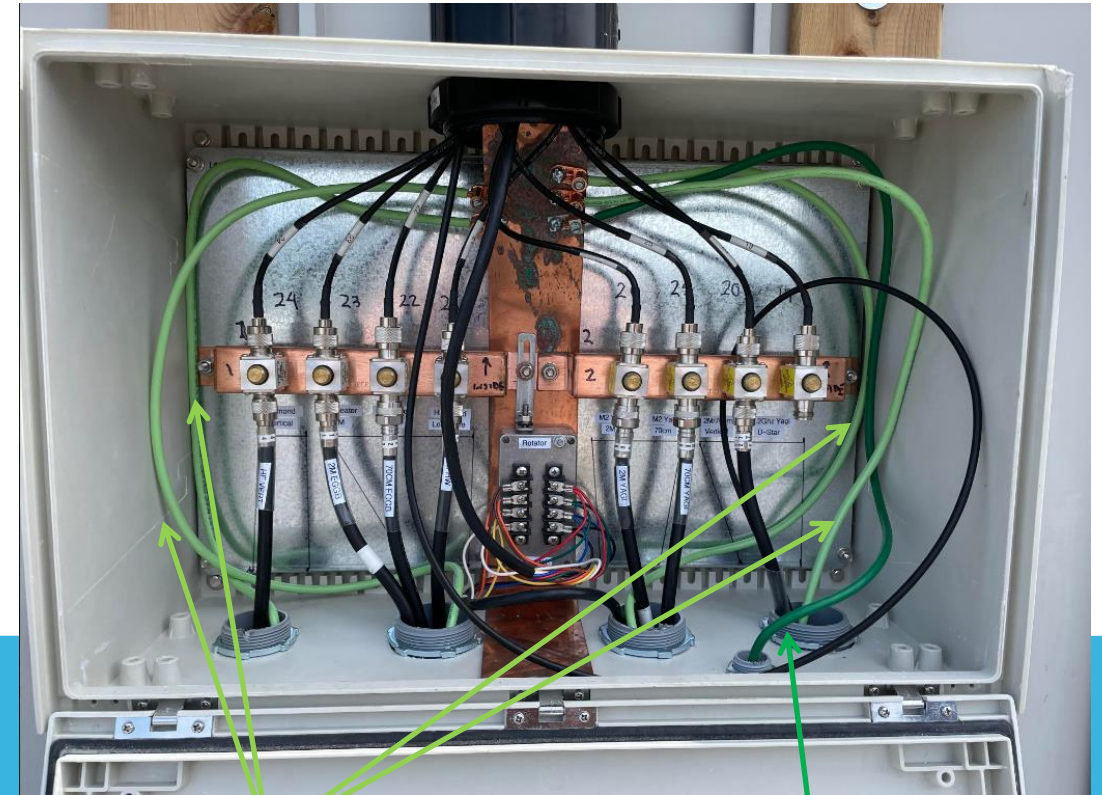
19" Rack frame with Ground Strap from Single Point Ground Panel outside



Finished rack with labelled faceplate, connectors and cables attached



SINGLE POINT GROUND PANEL (SPGP) OUTSIDE THE SHACK FOR SAFETY ALL CABLE RUNS IN PVC CONDUIT

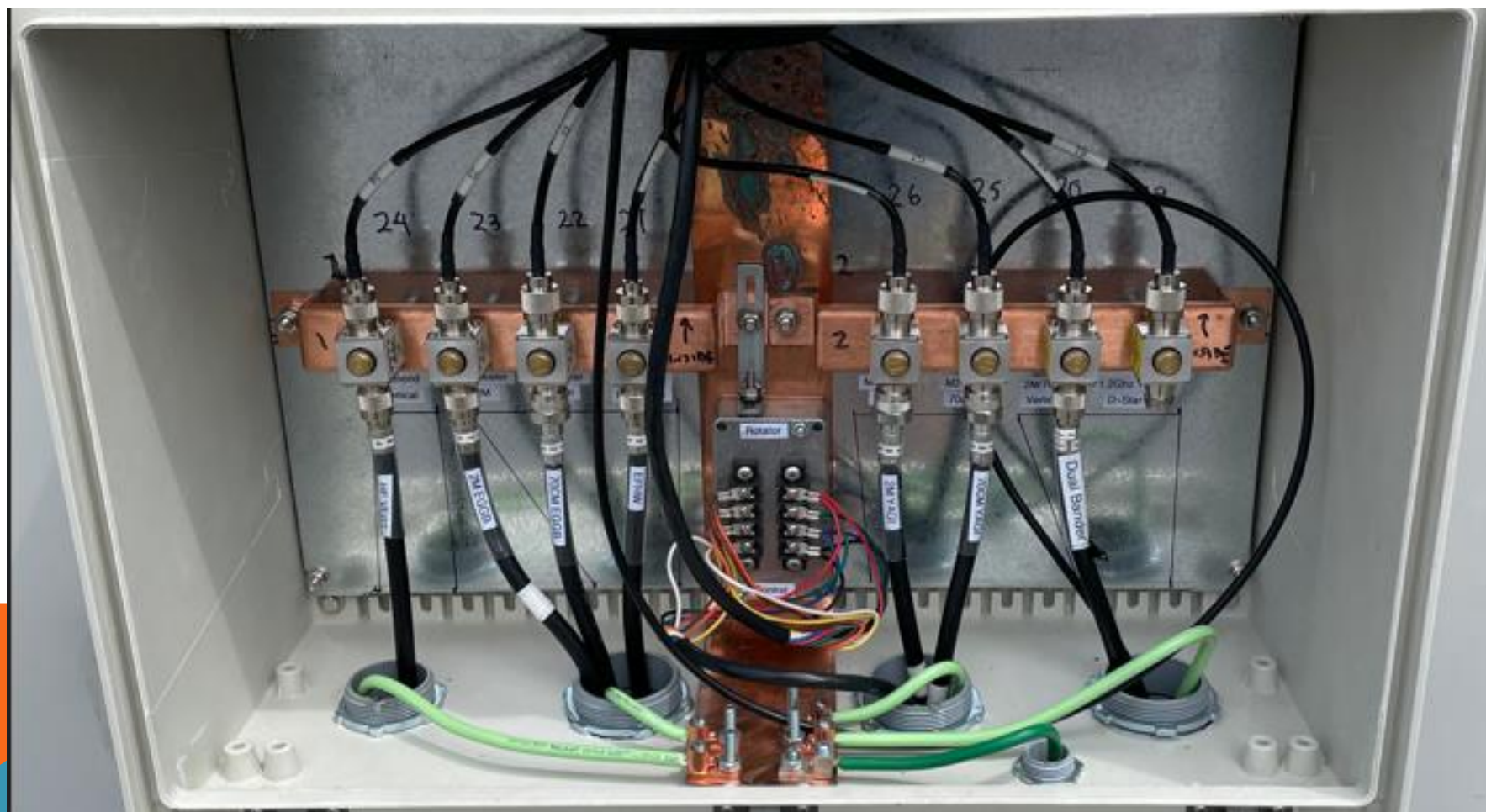


Ground Wires from
Masts & NPRMs

Ground Wire to
Building Steel

CORRECTED SPGP

Ground Wires Moved to Before Surge Protectors



ROOF GROUND WIRE INSTALL ATTACHED TO BUILDING STEEL



Ground Wire to
Building Steel

ROOF GROUND WIRE INSTALL ATTACHED TO METAL STRUCTURES

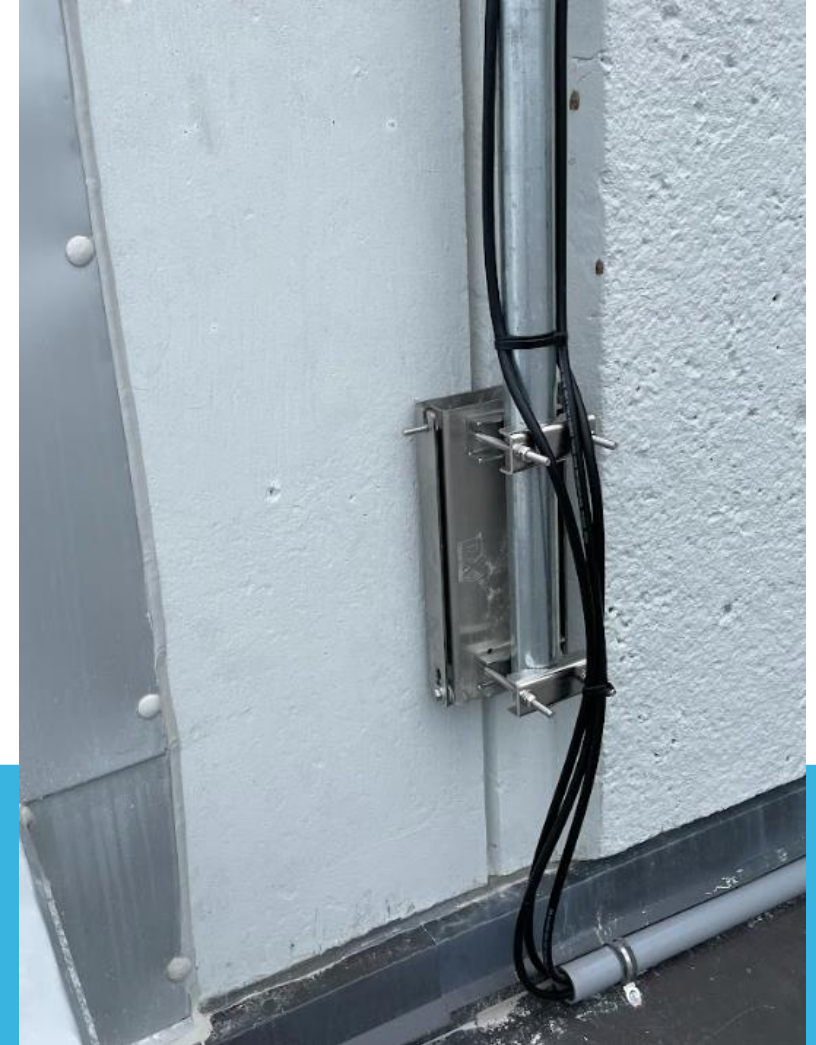


Ground Wires bonded to Metal Structures and run back to SPGP

TILT-OVER MOUNTS FOR MASTS TO FACILITATE MAINTENANCE W/O CLIMBING



- Secure top of mast with safety rope on 3/8-inch Zinc-Plated Quick Link Connector with 1800 lb. Safe Working Load attached to clamp bolt
- Lift mast with one person on the rope for safety and two people supporting weight of the mast and antennas.
- Walk mast out and down.
- Lay upper portion of mast on workhorse to keep antenna from touching roof.



HF VERTICAL & DUAL YAGIS

Diamond CP5H Trap Vertical Antenna
40M, 20M, 15M, 10M & 6M



M2 LEO-Pack Dual Yagi Antenna System 2M/70cm
with AlfaSPID Rotator for Satellite Communications



2M/70CM EGGBEATERS AND VERTICAL 80/40/20/15/10M HYENDFED




Backup Satellite Antenna System



2M/70CM VERTICAL FOR DSTAR REPEATER CCTV CAMERA TO WATCH SATELLITE TRACKING



WHERE DO WE GO FROM HERE WITH CARLETON?

- Identify a broader set of stakeholders (faculty, students)
 - Engage to explore the possibilities– Steering Committee
 - Develop a set of priorities and plans with ownership
 - Focus on Succession Planning from the outset
 - Encourage and support student led initiatives (this could include further financial grants)
 - Focus on teaching research, camps, alumni and the Amateur Radio Club
 - Establish and maintain a Volunteer Radio Group to support Carleton from local HAMs
 - Deliver Basic Amateur Radio Course every year in October (and maybe January)
 - Achieve goal of 10 new active licenced amateurs (students and faculty) each year
- 

WHERE DO WE GO WITH CARLETON – MORE...

- Participate in ARRL's Collegiate Amateur Radio Program
 - ❖ <http://www.arrl.org/collegiate-amateur-radio>
- Participate in HAMSCI
 - ❖ <https://hamsci.org/about-hamsci>
- Support proposal submissions to CSA CubeSat Program
 - ❖ <https://www.asc-csa.gc.ca/eng/satellites/cubesat/what-is-the-canadian-cubesat-project.asp>
 - ❖ <https://albertasat.ca/about-us/>
- Assist with governance of university's Amateur Radio Club
- Provide training and support for New HAMS on campus
- Bring new ideas to the table for discussion
- Continue YOTA into new markets in Canada - explore integration with STEM Camps like Virtual Ventures at Carleton University

QUESTIONS?