

Grant Proposal to ARDC

Amateur Radio Station K7UAZ

Curt Laumann, Station Manager

April 27, 2021



Student Involvement - 2m FM



Digital modes, weekly net, fox hunting

Satellite Communications



FT-736R



IC-9700

Update 30+ year old transceiver

Lightning Protection



No protection currently in place!

Refresh Rotor Systems



HF and Sat rotor systems >25 years old

Administrative Information



Name and Title	Curt Laumann	Designated Campus Colleague K7UAZ Station Trustee / Manager University of Arizona
Name of Organization	University of Arizona Amateur Radio Club	
Organization Eligibility	School / University	
Date of submission	April 26, 2021	
Organization Address	1127 E. James E. Rogers Way, Room 303, Tucson, AZ 85721	
Phone number of submitter	520-440-6503	

SUMMARY OF REQUEST

What we hope to accomplish, and when we hope to have it done!



- **Grow the number of active students in our club**
 - Currently at seven active students
 - Add three more active students
 - Completion by Dec 31 2021

- **Greatly improve the reliability of the K7UAZ station**
 - Mitigate risk of lightning damage
 - Replace three old antenna rotor systems (one broken) with modern, reliable equipment
 - Completion by Oct 1, 2021

Summary of K7UAZ grant request



- **Provide reliable 2-meter FM stations** to students, so they can:

- *Participate in weekly on-the-air net*
- *Learn and practice digital modes (SSTV, RTTY, etc.)*
- *Participate in direction-finding activities*
- *Five stations would be available for rotating loans*

\$2900

- **Satellite transceiver**

- *Replace 30+ year old transceiver (FT-736R)*
- *Refresh control computer*

\$1863

- **Install an effective lightning protection system**

- *currently none exists – poses significant risk to equipment*

\$1909

- **Refresh >25 year old rotor systems**

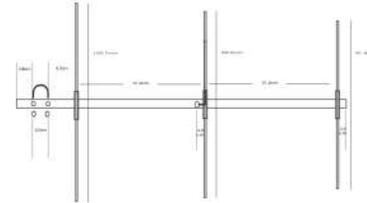
- *Both satellite and HF rotor systems need refresh*

\$1625

TOTAL \$8287

Reliable 2m FM stations for students

- Our current students enjoy, participate, design and run a 2m FM net on a weekly basis.
- Students operating radios – usually encounter the following:
 - Rental house / apartment: difficult to install outside antennas with a transmission line through walls. Inside antennas work, but usually need 10 to 20 watts to provide clear signal to repeater.
 - Tight budgets: students have bought \$35 Baofengs HT's, assuming they will work well (they don't)
 - Distance from the university repeater: >5 miles
- Our club has practiced digital modes on our 2m repeater with great success, including: PSK31, RTTY, SSTV (many sub modes), FeldHell, and others. This type of practice is very popular (esp. SSTV!)



3-el yagi antenna
Direction finding



Student-built vert antenna
(usually inside)



Power supply



FM transceiver

Switch between voice / dig modes



Student-provided computer



Digital mode interface



Speaker – to hear dig modes being transmitter

Satellite Communications



- The University of Arizona recently hired a faculty member into the Astronomy Department, with the goal of becoming more competitive in space communications (against other universities)
- The K7UAZ satellite station is in the process of a significant restructuring
 - New, more serviceable CP yagi's for 2m and 70cm
 - New, high-performance low-noise amplifiers
 - Need to refresh computer (CAT and pointing control)
 - SOLD a 30+ year-old satellite transceiver (Yaesu FT-736R)
 - **A replacement transceiver is needed: Icom IC-9700 \$1500**

Two possible sources of funding for IC-9700

ARDC
Submit May 1
Decision date June

Univ of AZ
Submit April 28
Decision date TBD

If the University of Arizona funds this procurement we will promptly notify ARDC.

- Current state
 - NO protection exists - *equipment is disconnected when not in use*
 - Wooden building from the 1910's has no high-quality ground
- Desired state
 - Lightning rod, grounding wire run over side of building, multiple ground rods
 - Polyphasers to protect equipment
- We plan to install new HF yagi later this summer – it is highly-desirable to add lightning protection on the tower at that time.

Refresh two rotor systems



Satellite Antennas

- Current system has failed twice
- Currently under repair
- >25 years old
- Recommend replacement



HF Yagi

- Current system is >25 years old
- Recommend replacement to mitigate risk of failure

DETAILS OF REQUEST

Detailed bill of material



Purpose	URL	Retailer	Retail P/N	Manuf	Manuf P/N	Description	Qty	Price	Sub Total	Tax	Ship	Line Total	Cost
Student Station	https://	DXE	ICO-IC-2300H	Icom	IC-2300H	Transceiver	5	\$179.95	\$899.75	\$71.98		\$971.73	\$2,890
	https://	DXE	ASR-SS-18	Astron	SS-18	Power Supply	5	\$125.95	\$629.75	\$50.38		\$680.13	
	https://	Tigertronics	SLUSBRJ4	Tigertronics	SLUSBRJ4	Signalink Audio Interface, with cable	5	\$139.95	\$699.75	\$55.98		\$755.73	
	https://	Amazon		CablesOnline	SB-034	RJ-45 Switch	5	\$17.95	\$89.75	\$7.18		\$96.93	
	https://	WireCo	RG8X_20FT1	n/a	n/a	Transmission Line, RG-8x 20 ft	5	\$11.96	\$59.80	\$4.78		\$64.58	
	various	n/a	n/a	n/a	n/a	Powered Speaker (club to build these)	5	\$20.00	\$100.00	\$8.00		\$108.00	
	https://	Amazon	n/a		n/a	Ethernet cable, 3 ft, RJ-45 connectors	5	\$4.49	\$22.47	\$1.80		\$24.27	
	https://	K7AJF	n/a	K7AJF	n/a	Yagi, 2m 3-element	5	\$30.00	\$150.00	\$12.00		\$162.00	
https://	Home Dep	1004185558	Sterilite	16446A12	Storage Case, Sterilite 16 Qt. Storage Box	5	\$4.98	\$24.90	\$1.99		\$26.89		
Satellite	https://	DXE	ICO-IC-9700	Icom	IC-9700	Satellite Transceiver	1	\$1,499.95	\$1,499.95	\$120.00		\$1,619.95	\$1,863
		Local supplier				Computer (need to refresh an old computer)	1	\$225	\$225.00	\$18.00		\$243.00	
Lightning	https://	DXE	CL-5021-TIN-1	Georgia Copper	5021-TIN-100	Heavy-duty lightning wire, 100 ft, 2 AWG	2	\$208.99	\$417.98	\$33.44		\$451.42	\$1,909
	https://	DXE	PR-IS-50UX-C	Polyphaser	IS-50UX-CO	Polyphasers, SO-239, flange mount	3	\$74.99	\$224.97	\$18.00		\$242.97	
	https://	DXE	PR-IS-50NX-C	Polyphaser	IS-50NX-CO	Polyphasers, N, flange mount	3	\$70.99	\$212.97	\$17.04		\$230.01	
	https://	DXE	E-LRMM-2-45	Various	Various	Lightning Rod Kit (Erico 5/8 in 48 in diam rod, mast clamp)	1	\$187.47	\$187.47	\$15.00		\$202.47	
	https://	DXE	ERO-613460	Erico	613460	Ground Rod, 6 ft x 0.681 in	4	\$28.99	\$115.96	\$9.28		\$125.24	
	https://	DXE	D-GR1-181VPI	Erico	R1-181VPLU	One Shot Plus, #2 Solid, 0.677 in. Rod, One Wire	2	\$16.69	\$33.38	\$2.67		\$36.05	
	https://	DXE	D-GT1-181VPI	Erico	T1-181VPLU	One Shot Plus, #2 Solid, 0.677 in. Rod, Two Wire	4	\$18.19	\$72.76	\$5.82		\$78.58	
	https://	DXE	RO-PLUSCU2L	Erico	PLUSCU2L6	CAD welding - control / igniter unit	1	\$241.99	\$241.99	\$19.36		\$261.35	
	https://	DXE	D-PLUSCULD15	Erico	LUSCULD15C	CAD welding - spare ignitor leads, 15 ft	1	\$89.99	\$89.99	\$7.20		\$97.19	
	placeholder	placeholder	placeholder	placeholder	placeholder	Wire, tower standoffs (custom design)	10	\$10.00	\$100.00	\$8.00		\$108.00	
https://	Erico	CSS1314050	Erico	CSS1314050	Wire, building standoffs	25	\$2.79	\$69.75	\$5.58		\$75.33		
Rotor Refresh	https://	DXE	SU-G-1000DX	Yaesu	G-1000DXA	HF Rotor System: Motor and Controller	1	\$619.99	\$619.99	\$49.60		\$669.59	\$1,625
	https://	DXE	DXE-YRC-100P	Yaesu	YRC-100PE	HF Rotor System: Control Cable, 100 ft, 6 cond, 18 AWG	1	\$134.99	\$134.99	\$10.80		\$145.79	
	https://	DXE	SU-G-5500DC	Yaesu	G-5500DC	Satellite AZ/EL Rotor	1	\$749.99	\$749.99	\$60.00		\$809.99	
										TOTAL		\$8,287	

<https://drive.google.com/file/d/1LIE3ph0sgoA41oRitX-q17z7RR67E1JL/view?usp=sharing>

BACKGROUND INFO ON CLUB

K7UAZ ARC Background

shack on 3rd floor of UA Engineering Building



HF Operating Position



Test and Build Area



2m Repeater



Satellite Operating Position



Library
Equipment Storage

Picture of
whiteboard tracking
equipment checkout

1. Support **current and potential curricula at University of Arizona**

Communications experiences relating to studies.

2. Provide a **diversity of radio experiences** to students.

portable radio (hiking / parks)

computer control

digital modes

building equipment / systems

contest competitions

3. **Station simplicity**

Minimize maintenance

Maximize reliability

K7UAZ ARC Background Activities (pre CV-19)



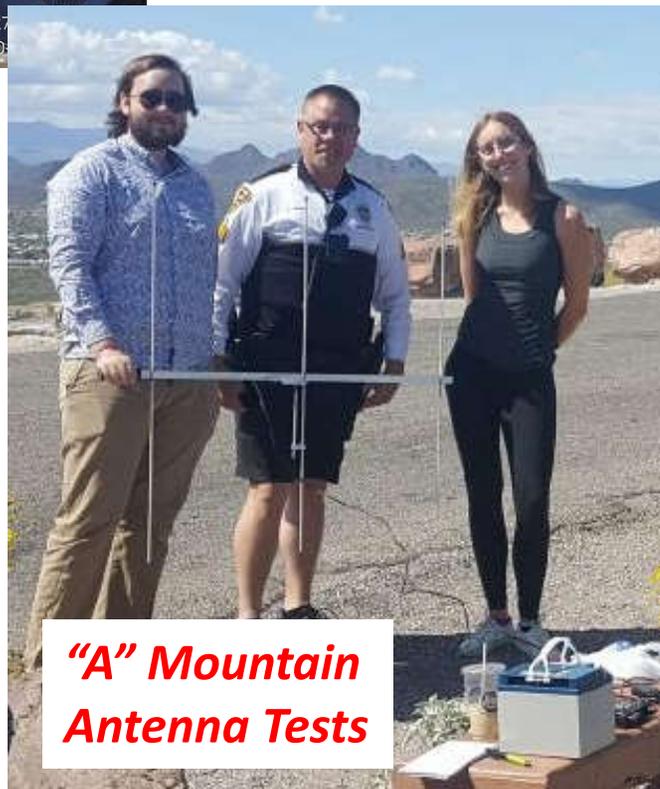
Field Ops in the Desert



Building Antennas



Building Digital Transceivers



"A" Mountain Antenna Tests



Space Communications

4/27/20

K7UAZ ARC Background

Who are we?

*We aim to grow our membership
in '21-'22 academic year*



Call	Name	Position	Yrs in Club	Notes
KG6T	Ken	Pres	4	PhD Geology student. Learned CW this past year. New contester. Very active in POTA / goal to activate all parks in AZ this year! POC for much of our club business.
KG7YTR	Anthony	V Pres	4	EE grad student, part time. Air Force veteran. Repeatedly states how much amateur radio is helping him in his new career at Raytheon. Coordinates presenters at our meetings.
K7CHM	Casey	Sec/Trea	3	IT grad student. Interested in digital modes, good with computer networking, handles our finances & correspondence flawlessly.
K7ASQ	Andrew	Student Member	4	Army veteran, IT undergraduate student. SOTA experience, enjoys portable ops.
KJ7RLT	Arash	Student Member	1	Astronomy PhD candidate. Recently licensed. Last fall Arash used a LNA and SDR, and 3-el yagi to copy SSTV images from the ISS. Loads of energy, helps out on the roof with antenna maintenance.
KJ7WVH	Maricruz	Student Member	0.3	EE Undergrad student. Brand new ham! Faculty member Dr Bose helped recruit her. We loaned her a HT last week, helped her build a 2m vertical, and she's on our weekly 2m net!
KJ7SYO	Samantha	Student Member	1	Library Science PhD candidate. Super helpful, assisted on antenna maintenance last week, checks into our weekly net.
KG7WVE	Noel	Student Member	2	EE PhD candidate. Not very active in our club, but we hope to get him more involved in the future.
K7ZOO	Curt	Station Manager	15	Licensed for 40+ years, active in wide diversity of aspects of ham radio, certified climber, enjoys teaching, well connected in community.
AF7SQ	Tamal	Faculty	2	EE Dept Manager. Helps promote amateur radio and recruit students.

SEVEN
Active Students

Recent club activities



- Activities during CV19 have been remote, e.g. networked contesting, monthly meetings.
- Feb 2020 Summit On The Air: 7 students hiked Pistol Hill and made VHF / HF contacts
- Dec 2019 Received SSTV images from the International Space Station using yagi antennas at 145 MHz
- Dec 2019 Hosted and operated high-volume on-the-air event to commemorate Pearl Harbor Day
- Aug 2019 Assisted the National Weather Service to improve their emergency HF communications system
- June 2019 ARRL Field Day: portable operations in Sonoita AZ, emergency practice, approx.. 10 students attended
- June 2019 ARRL VHF Contest: portable operations Mt Lemmon, using two yagi antennas built by students, 6 students attended
- May 2019 “Foxhunt activity” – using radio direction finding techniques to locate a hidden radio transmitter.
- April 2019 Built yagi antennas – four students engaged building two antennas
- March 2019 Built vertical antennas – four built, used by students
- March 2019 Participated in the School Roundup where school clubs interact over radio.
- May 2019 (requested by Hal Tharp, ECE) Instruction and demo to high school students on satellite communications

K7UAZ Background

Weekly 2m FM net

- Monday's at 8pm on K7UAZ repeater (RF and Echolink)
- PURPOSE OF OUR NET
 - Connect with one another
 - Keep momentum
 - Learn a different topic every week
 - Practice using our radios

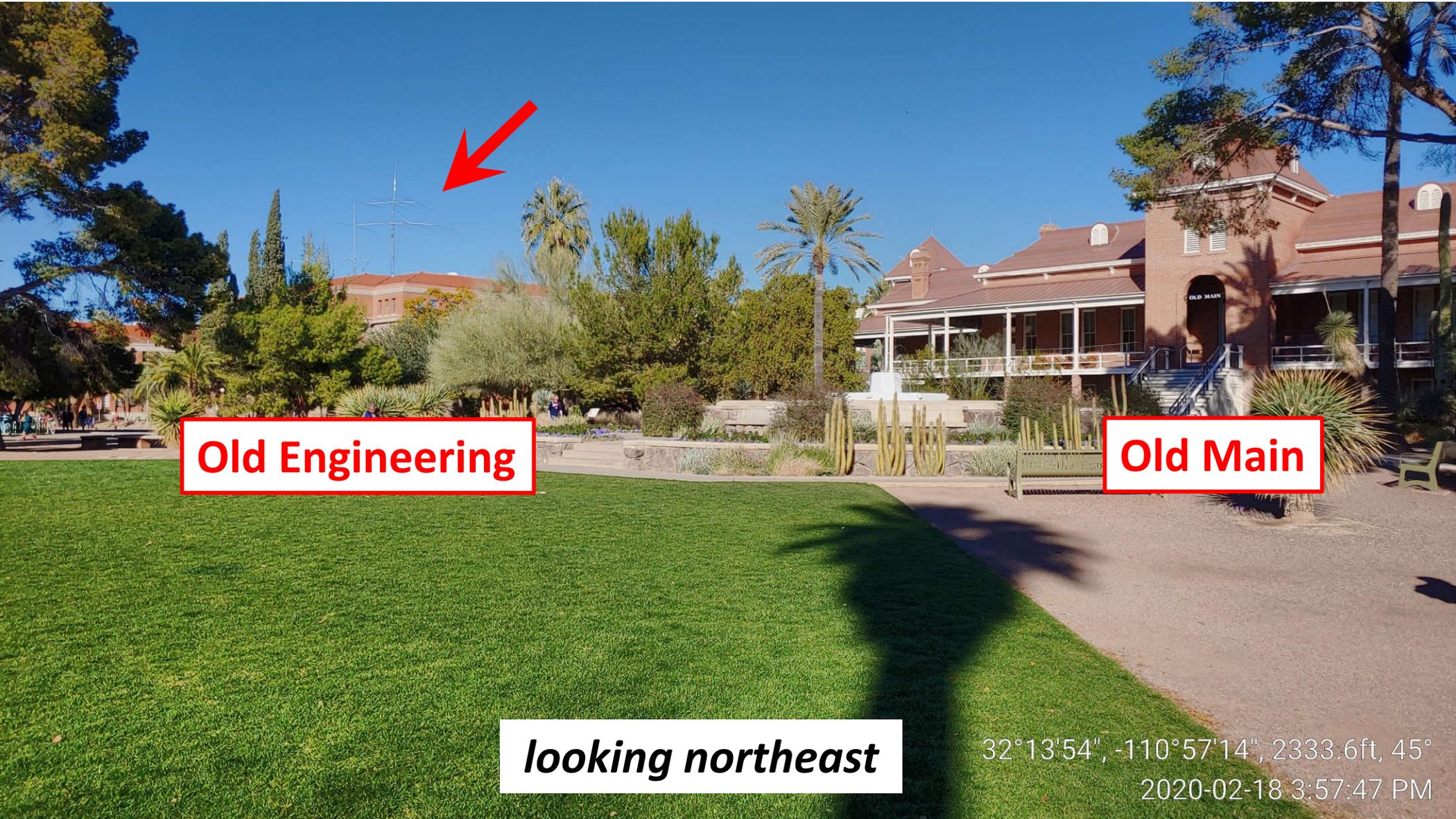


---ROTATION THROUGH THE MONTH---

1st Monday of the month	K7ASQ
2nd Monday of the month	KG7YTR
3rd Monday of the month	KJ7QPD
4th Monday of the month	KJ7RLT
5th Monday of the month	K7CHM, K7ZOO, or other sub (if

- Students serve as net control once a month
- On months with five Mondays we plan to review / discuss students' progress on our club curriculum.

K7UAZ Background *Facilities on campus*



Old Engineering

Old Main

looking northeast

32°13'54", -110°57'14", 2333.6ft, 45°
2020-02-18 3:57:47 PM

K7UAZ Background

Antennas on Engineering building



END