



UNIT GRANT APPLICATION

Form also found at AFA link at

www.capmembers.com/ae

Partners for the Future

AIR FORCE ASSOCIATION AE GRANT APPLICATION FOR CAP UNITS CAP Aerospace Education Officer (AEO)

AEO Name: Lt Col Scott Van Cleef, Commander and AEO

(Personal Info Omitted for Public Posting)

Squadron or Unit Complete Name

MAR-VA-048, Roanoke Composite Squadron
Roanoke, VA

Project Impact (Squadron and Collaborative and Outreach:

of persons involved: 100+ **Ages of Participants:** 12 yo - 80 yo

Check all STEM areas involved in your project:

Science Technology Engineering Math

Check the correct Unit Grant Cycle Due Date:

June 30 December 31

Please provide a narrative response to each area on next page to describe how the AFA/CAP Grant will be used in the unit to promote science, technology, engineering and math (STEM)-related initiative and career options via the aerospace theme. To increase chance of being selected, provide thorough responses.

Submit to Civil Air Patrol/Aerospace Education by Cycle Due Date to:

afa@capnhq.gov

1. Project Objective (Purpose):

TITLE: BUILDING A 'CAP' TELESCOPE TO OBSERVE RADIO EMISSION FROM PLANETS AND STARS USING A NASA "JOVE" RADIO TELESCOPE KIT

1. Science: Detect, observe and analyze radio emission from Jupiter, its moon Io, and the Sun.
2. Technology/Engineering: To build and use CAP's very own Decametric Radio Telescope.
3. Math: Basic intro STEM concepts: i) Physical science, ii) Earth science and iii) Physics.

***WHAT IS A NASA JOVE KIT? The JOVE project is hands-on project allowing students and teachers to build their own telescope with a kit, and using it to detect astronomical radio signals.

2. Project Description (Plan):

CAP cadets and SMs have the opportunity to learn about extraordinary STEM concepts, sometimes through general AE, or progression through CAP achievement levels (e.g Yeager Award). Many concepts are complex, therefore "learning by doing" is an exciting approach to understanding the underlying STEM. This project will do that! The work will be broken up into 4 distinct PHASES:

1. PREPARATION (3-4 WKS): Participants will learn about relevant STEM over a two-presentation series, including electromagnetic waves, magnetic fields, motors/generators, basic astronomy (Jupiter and Io) and charged particles.
2. BUILD THROUGH TEAMWORK (4-8 WKS): Participant teams will lead unique parts of the JOVE project. Teams will need to work together to successfully complete the telescope kit construction.
3. OBSERVE & DETECT (2x4 HRS): Participants will use the newly constructed JOVE radio telescope to detect the Jupiter/Io magnetic field loop, as well as the Sun's magnetic field.
4. ANALYZE & SHARE (4 HRS+): Participants will analyze radio data, confirming the magnetic fields; will construct & produce sound bites of the emission; and will share on social media.

3. Budget (How specific amounts of funds will be used):

BILL OF MATERIALS:-

Complete Radio JOVE Kit (not assembled):

- Radio JOVE Receiver Kit (RJR)
- Antenna Kit (RJA)
- Printed construction manuals
- RJ Reference CD Files (RJC)
- Radio-SkyPipe and Radio-Jupiter Pro software Licenses

JOVE price: \$210.00

USPS shipping inside U.S.A.: \$15.00 (3-4 wk delivery)

TOTAL: \$235.00

4. Desired Project Outcome:

+AE Education: Participants will learn about physical, Earth and space sciences, but also about 'communications' concepts - helpful for many areas of CAP.

+Social Media: The team will share their experiences from the classroom; building their own telescope, observing planets and stars! They will share their progression on Social Media and proudly advertise the CAP-built radio telescope and promote CAP's aerospace/STEM programs.

+Multiple Youth/Squadron involvement: Cadets from Roanoke and Montgomery Squadrons will work together as a team to achieve a technically challenging goal.

+Large AE event: Assistant AEO SM Harding is Virginia Tech (VT) aerospace faculty and has arranged for a VT optical telescope during PHASE 3; the team will see Jupiter with this telescope while detecting and listening to its radio emission with their CAP telescope. The team will also get a tour of VT's Spacecraft Control Center and will present their results to VT astronomers.