

The future of amateur radio...

Virginia Tech and AMSAT are collaborating to launch an amateur radio payload into geosynchronous orbit.

Hands on, Minds on; RF and Security Research at Virginia Tech:

- On-orbit learning laboratory to develop new capabilities in satellite communications and amateur radio
- Digital protocols to enable push-to-talk, wifi, streaming video, etc.
- Onboard processing - geolocation, co-channel, machine learning
- App development and real time experimentation
- Beam steering and coordinated collection
- User authentication and prioritization
- Open cryptography

AMSAT Phase4B Project Program Specifications:

- SDR-based 5 & 10 GHz amateur satellite payload being designed to take advantage of a geosynchronous launch opportunity
- Rideshare opportunity on the US Air Force Remote Sensing Program Office Wide Field of View (WFOV) geosynchronous satellite being designed by Millennium Space Systems
- Software-defined radio (SDR) payload from Rincon Research Corporation

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The Hume Center for National Security and Technology



Outreach and
Education



Aerospace
Systems Lab



Information
Systems Lab



Electronic
Systems Lab

Program Partners:

FEMA

AMSAT

ARRL

Millennium Space Systems

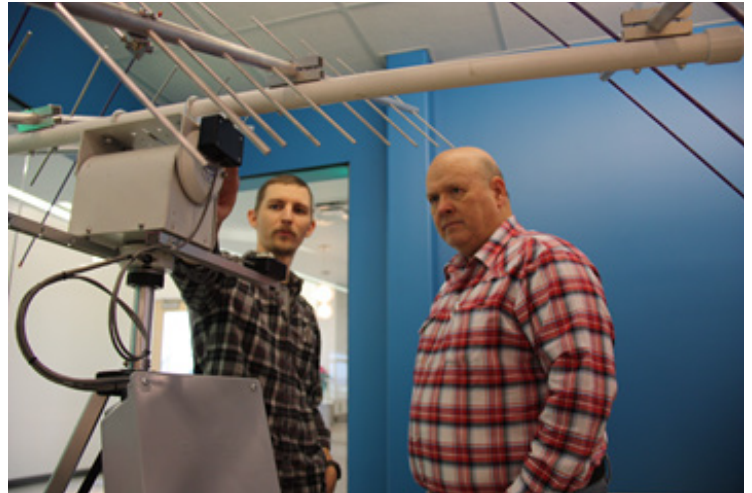
US Air Force

Rincon Research Corporation

NASA Ames Research Center

Virginia Tech

- Hume Center
- Electrical and Computer Engineering
- Mechanical Engineering
- Aerospace and Ocean Engineering

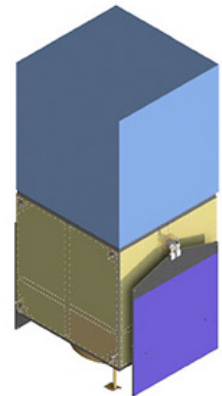


Program Reach:

- Free and open access to the repeater to amateur radio operators worldwide.
- Deployable Ground Stations to provide coverage (wifi hotspots and push-to-talk) through the GEO asset
- Students from across Virginia Tech engaged in payload design and development, and amateur radio operations through the Virginia Tech Ground Station

Program Budget:

- \$6 million (TBR) for payload integration and launch
- \$2 million for payload design and build, ground station development and operations, and program management by Virginia Tech
- \$1 million for operator training, deployable ground stations, AMSAT outreach, and ARRL new operator trainings



*The Millennium Space Systems
AQUILA M8 Small Satellite*

The Payload:

- Digital and analog transponder
- Analog transponder will support 90 voice grade channels using single-sideband (SSB) or single digit number of voice grade channels using narrow band FM.
- Digital transponder will carry up to 100 digital channels uplinked as narrowband PSK channels and an FDMA based protocol not unlike trunk mobile radio.
- Payload will be designed and built by students and faculty of Virginia Tech, utilizing the “Hands On, Minds On” mission to educate the next generation of amateur radio operators and engineers.

