Student Technology Fee

Grant Proposal

## 2018.005

FY 2018-19

*emailed 12/10/18*

Ron Wright

Comment: Great potential STEM project with external exposure. Potential cost savings on equipment

Tracy Brown

Comment: _____

Shawn Parr

Comment: _____

Chris Parish

Comment: _____

Heath Fitts

Comment: There are no available network switch ports in Fournet Hall to connect new equipment. A switch will have to be purchased or something else unplugged to make room for this connection.

# Northwestern State University
## Request for Student Technology Fee Project Funds
### Project Summary and Signature Form

**Title of Project:** Satellite Ground Station Installation for CubeSat project and other NASA Project Collaborations

**Department / Organization:** School of Biological & Physical Sciences

**Project Contact(s):** Anna Dugas and Michael Scanlan

**What is the expected number of students this project will serve the first year:** 30 for CubeSat, 100+ for events

**Summary of Project (DO NOT EXCEED 250 WORDS)**
(The following items should be included in your summary: A general overview of the program along with how it will be implemented, a description of the population that this project will serve now and in the future, the direct benefits students will receive from this project, how this program will improve the service currently provided to our students, and any negative aspects that may result if this program is not funded.)

We are requesting funds to purchase and install a ground station for satellite communications. The primary goal for this studio is to generate communication capabilities for the CubeSat project being developed through an interdepartmental initiative between the Department of Engineering Technology, the School of Biological & Physical Sciences, Information Technology Services, and LSMSA. A CubeSat is a nanosatellite typically launched as a secondary payload into low-earth orbit (500-600km). The ground station proposed here must be established in order for the CubeSat team to request NASA to launch their payload. NASA will not accept the NSU CubeSat proposal in fall 2019 without a ground station ready to receive data from the satellite.

The ground station will consist of hardware and software to transmit and receive data, including an antenna to be placed on the roof of Fournet Hall, and a computer studio housed in 211 Fournet Hall. The interior studio will have computers programmed with orbital-prediction software compatible with hardware for auto-tracking, a transceiver to transmit and receive data, and a network analyzer to assist in power transfers with the antenna.

The ground station will be used to train the CubeSat team in satellite communications as soon as it is available in the spring. For practice, existing orbiting CubeSats can be tracked. A course will be established next fall to train students on the technology and to prepare students for a Radio Technician's license. The ground station could be used to contact the International Space Station through the ARISS program.

Signature of Project Contact: _____ Date: 10/23/18   10-23-18

Signature of Department Head: _____ Date: 10-23-18

Signature of Appropriate Dean: _____ Date: 10-23-2018

# Northwestern State University
## Request for Student Technology Fee Project Funds

| | |
|---|---|
| Requested equipment will be located/installed/housed in: | Building: <u>Fournet Hall</u>    Room: <u>211 / Roof</u> |

Does the department requesting funding charge lab fees?  (YES) NO

Are departmental property control policies and procedures in place for requested equipment?  (YES) NO

**Who will be responsible for property control of the requested equipment and how will you secure and monitor access to moveable equipment?**

Professors Dugas and Scanlan will be responsible for the security of the equipment. The computer station will be housed in a FOB secured-access room and roof access is restricted by locked doors and keyed-access via the elevator.

**List those individuals who will be responsible for the implementation of the project and describe their demonstrated abilities to accomplish the outlined objectives.**

Professors Dugas and Scanlan will work directly with Ron Wright, CIO, in the implementation of the equipment. Ron Wright has extensive experience with ham radio and is a licensed technician. The authors also plan on testing for technician licensing this winter. Dale Wohletz, Facility Services Interim Director, has reviewed and approved the placement of antenna on the roof of Fournet Hall. Fran Lemoine, Director of the School, has approved $5000 in installation and repairs to be reserved for the ground station.

**List any personnel (technical or otherwise) required to support the project/initiative.**

Information Technology Services will be needed to activate available ethernet ports in 211 Fournet Hall. Facility Services will be needed to connect cabling from antenna to interior studio through exterior wall.

**Provide a timeline for implementation.**

Project initiation will commence once award is made. Vendor registration and part ordering will begin as soon as possible. Rm 211 Fournet will be cleaned and prepared between the Fall and Spring semesters, as well as work orders placed with ITS and Facilities. Installation of antenna and studio to be done in the spring 2019 semester and student observation will start during initial equipment installations and licensing.

**Estimate the expected life of any requested hardware and software. Explain any anticipated equipment/software upgrades over the next five years.**

The expected life of the hardware 5+ years. Antenna will be removable for predictable severe weather, such as tropical storms. School of Biological & Physical Sciences will cover repairs to antenna for unpredictable weather events.

# Northwestern State University
## Request for Student Technology Fee Project Funds
## Budget Summary

**Title of Proposal:** Satellite Ground Station Installation for CubeSat project and other NASA Project Collaborations

**College / Department / Organization:** : School of Biological & Physical Sciences

**Project Contact(s):** Anna Dugas and Michael Scanlan

## I. PROPOSED BUDGET:

| | Student Tech Fee Money Requested | Funding from other Sources | Project Total |
|---|---|---|---|
| A. Equipment | $16, 561 | | $16, 561 |
| B. Software | Free w/ hardware | | $0 |
| C. Supplies | $2000 | | $2000 |
| D. Shipping/Handling | $1036 | | $1036 |
| E. Installation/Repairs | | $5000 | $5000 |

**F. Other Expenses (Identify)**

| | | | |
|---|---|---|---|
| 1. | | Technician licensing $15 ea. | $30 |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |

| | | | |
|---|---|---|---|
| **G. Total Costs (A through F)** | $19,597 | $5030 | $24,627 |

Item:   2MCP22, 2-meter band VHF antenna, 144-148 MHz, cross polarized Yagi

Qty:_1_____Price/each:_$494_____Total Price:_$494_____

Is there a recurring cost associated with this item?_No____If so, how much?__N/A_____

---

Item:  436CP42UG, UHF circular polarized antenna, 420 - 440 MHz

Qty:__1_____Price/each:_$462_____Total Price:_$462_____

I Is there a recurring cost associated with this item?_No____If so, how much?__N/A_____

---

Item:  2-meter polarity switch, PS-2M for VHF antenna

Qty:_1_____Price/each:_$242_____Total Price:_$242_____

Is there a recurring cost associated with this item?_No____If so, how much?__N/A_____

---

Item:  70-centimeter polarity switch for UHF antenna

Qty:__1_____Price/each:_$221_____Total Price:_$221_____

Is there a recurring cost associated with this item?_No____If so, how much?__N/A_____

---

Item:  Antenna Rotator and Controller, Yaesu Medium-Duty Azimuth and Elevation, G-5500

Qty:__1_____Price/each:_$750_____Total Price:__$750_____

Is there a recurring cost associated with this item?_No____If so, how much?__N/A_____

---

Duplicate this page as necessary

Item:  VHF Amplifier, Mirage B-2518-G, solid state 25 W in, 160 W out, Preamp 20dB

Qty:__1_____   Price/each:___$440_____   Total Price: ___$440_____

Is there a recurring cost associated with this item?_No____If so, how much? __N/A_____

---

Item:  UHF Amplifier, Mirage D-1010-ATVN, solid state 10 W in, 100 W out

Qty:___1_____   Price/each:___$470_____   Total Price: ___$470_____

Is there a recurring cost associated with this item?_No____If so, how much? __N/A_____

---

Item:  VHF/UHF Transceiver, Yaesu FT-991

Qty:___2_____   Price/each:___$1500_____   Total Price: ___$3000_____

Is there a recurring cost associated with this item?_No____If so, how much? __N/A_____

---

Item:  Radio Spectrum Processor 2pro with SDRuno software, SDRplay

Qty:___1_____   Price/each:___$200_____   Total Price: ___$200_____

Is there a recurring cost associated with this item?_No____If so, how much? __N/A_____

---

Item:  30 Amp Power Supply, rack mount

Qty:___2_____   Price/each:___$100_____   Total Price: ___$200_____

Is there a recurring cost associated with this item?_No____If so, how much? __N/A_____

Item:   Dell Optiplex 7060 Tower, i7-8700, 16GB RAM, ssHD 256GB, AMD Radeon RX graphics

Qty:   2          Price/each:   $1360          Total Price:   $2720

Is there a recurring cost associated with this item? No     If so, how much?   N/A

Item:   Dell Monitors, 25"

Qty:   4          Price/each:   $350          Total Price:   $1400

Is there a recurring cost associated with this item? No     If so, how much?   N/A

Item:   SmartTV, 55" Samsung 4K UHD HDR

Qty:   2          Price/each:   $550          Total Price:   $1100

Is there a recurring cost associated with this item? No     If so, how much?   N/A

Item:   Antenna Non-Penetrating Roof Mounts, ROHN BRM42510, 10 ft. height

Qty:   1          Price/each:   $675          Total Price:   $675

Is there a recurring cost associated with this item? No     If so, how much?   N/A

Item:   Safety Cabling for Antenna Roof Mount, SCK150

Qty:   1          Price/each:   $57          Total Price:   $57

Is there a recurring cost associated with this item? No     If so, how much?   N/A

Duplicate this page as necessary

Item:   Roof Pads for Antenna Roof Mount, BRM4PAD

Qty:___1_____Price/each:___$149_____Total Price: __$149_____

Is there a recurring cost associated with this item? _No_____ If so, how much? __N/A_____

---

Item:   Coax Cable, Times Microwave LMR-600-DB low loss, 200 ft

Qty:___200_____Price/each: __$2.65 / foot____Total Price: __$530_____

Is there a recurring cost associated with this item? _No_____ If so, how much? __N/A_____

---

Item:   Coax Connector Tool Kit, Times Microwave, TK-600EZ

Qty:__1_____Price/each:__$364_____Total Price: __$364_____

Is there a recurring cost associated with this item? _No_____ If so, how much? __N/A_____

---

Item:   Coax Connectors, Times Microwave, EZ-600

Qty:__12_____Price/each:__$30_____Total Price: __$360_____

Is there a recurring cost associated with this item? _No_____ If so, how much? __N/A_____

---

Item:   Workstation, Omnirax 32 Multipurpose A/V

Qty:__1_____Price/each:__$2727_____Total Price: __$2727_____

Is there a recurring cost associated with this item? _No_____ If so, how much? __N/A_____

Duplicate this page as necessary

Item:   Misc. cables, adapters, mounts, and accessories

Qty:__1_____ Price/each:__$2000_____ Total Price:  __$2000_____

Is there a recurring cost associated with this item?_No____ If so, how much?  __N/A_____