I. PROGRAM NARRATIVE

A. Statement of Purpose

The objective of this project is to construct an amateur radio station at the First Ward Community Center and assist minority youths in gaining an entry level amateur radio license. An unused room within the First Ward Center will be converted into an amateur radio station by purchasing amateur radio equipment and installing an antenna system. The station will have very high frequency (VHF) and ultra high frequency (UHF) equipment for local and regional communication. High frequency (HF) equipment, which uses frequencies similar to shortwave broadcasting, will allow participants to communicate with other amateur radio operators all over the world. Since amateur radio is regulated by the Federal Communication Commission (FCC), a class for five to ten youths will be held as part of the regular after school program at the First Ward Community Center. This course will cover the required mathematics, radio theory, and regulations for the Technician level license. (There are three license classes: Technician, General, and Extra. Each class has gradually increasing amounts of frequency privileges. The Technician class has the fewest privileges and serves as the basic, entry-level class.)

Amateur radio is a hobby with scientific, technological, and social facets. Science is fundamental in understanding how radios function, how radio waves propagate, and how changes in the Earth's ionosphere affect radio signals. The design of radios and control hardware requires the application of scientific and engineering skills. Amateur radio operators have a multitude of methods to communicate with each other. Traditionally, amateurs used either Morse code or voice methods to communicate. However, amateurs today can communicate by: using digital computer networks connected together via radio signals; exchanging images across the world using shortwave frequencies; talking through dedicated satellite systems; or typing messages to other operators around the world. Many of these modern systems require the amateur operator to combine computers, radios, and telecommunication systems. One of the exciting aspects of the hobby is that many modern communication tools such as cell phones, wireless data networks, and vehicle tracking systems were originally developed in amateur radio. While technology is important, the primary focus of amateur radio is to communicate with other amateurs. Amateur radio operators frequently talk to amateurs across the nation and in other countries. Conversations range from the type of equipment being used to the weather to the occupation each amateur is in. Farmers, plumbers, writers, engineers, astronauts, and businessmen are amateur radio operators. Amateur operators even can often talk with famous people like Walter Cronkite, King Hussein of Jordan, Chet Atkins, Marlon Brando, and Joe Walsh. The wide cultural cross section of people involved in amateur radio allows people to gain a better understanding of cultures in other parts of the world.

The lack of mathematics and science skills in US students is well documented.[1] Underrepresented minorities in particular have been affected by the structural problems of the US educational system. Amateur radio provides an exciting backdrop for building those skills without youths feeling like they are doing math or science.[2] Instead, their focus is on talking with other people and the "cool" equipment. Youths do not realize that they are learning about mathematics, science, engineering, and geography. Eventually, youths realize that these skills are important because they enable them to do "cool" things. This realization provides important motivation for continued achievement in science and mathematics.

In addition to providing a meaningful backdrop for learning, the proposed amateur radio program presents opportunities for minority youths. Many of the youths served by this program are exposed to a tremendous amount of crime. Frequently these youths participate in crime because there is nothing else for them to do or there is a lack of positive role models in their lives. The proposed program solves both problems by providing an opportunity to spend time talking with people across the nation and world, and the program provides positive role models through interaction with local amateurs. There are also several college scholarships available only to amateur radio operators. Youth participating in this program will

qualify for these.

The proposed project was prompted by the response to a children's program held by the Saginaw Valley Amateur Radio Association (SVARA) and the Public Libraries of Saginaw in March 2006. The program was conducted at the Ruth Brady Wickes and Archer A. Claytor libraries. After a short presentation to amateur radio, the participants used amateur radio to talk to local hams and participants at the other branch (See Figure 1). Youths were also able to experiment with sending messages to each other with Morse code (See Figure 2). Fifty seven children and thirteen adults attended this program.

Figure 1 Participant talking on amateur radio at the Claytor Library

Figure 2 Participants sending Morse code messages at Wickes Library

All the participants were very excited to try something new and thought amateur radio was "cool". Many commented that they were interested in acquiring their own license.

There is currently a licensing class offered in Saginaw. The course is sponsored by SVARA and runs for eight weeks at Covenant Hospital. Usually, the course runs during the fall of each year. However, there are several impediments to participation in this course for minority youths. First, the course runs during the late evening on school nights. Transportation to Covenant is not provided, and minority youths would have to ride the bus to participate. While there is no fee for the course, students must buy a copy of the licensing book ($24.95) and pay the testing fee ($14.00). These costs are a significant financial burden on families that have little or no disposable income. Even if youths could afford the course, it doubtful they could afford the equipment necessary to participate in the hobby. The proposed project eliminates these financial road blocks.

The proposed project is a new enterprise for the four cooperating organizations. The Mechanical Engineering Department at SVSU has supported K-12 outreach programs; yet, it has not had a lead role before. Concerned about the lack of engineering students from underrepresented groups for some time, the department has decided to take a leadership role in this project. Amateurs in the Saginaw Valley Amateur Radio Association have been active in various community activities: school demonstrations, programs at the Public Libraries of Saginaw, and Metro Youth Day in Detroit, Holidays in the City, and Carebreaks. However, until recently there was no opportunity or location to construct an amateur radio station for low income youths. The First Ward Community Center and Public Libraries of Saginaw have played an important role in assisting low income and underrepresented people in Saginaw, but do not posses the required technical expertise. All four organizations have decided that working together on this project will help the community and enrich the lives of low income youths.

References

1. National Assessment of Educational Progress, *The Nation's Report Card,* NAEP, 2006. (Available at http://nces.ed.gov/nationsreportcard/).
2. Frant, J., "Technology Awareness Program: Adventures in Wireless Telecommunications", *Proceedings of the 2001 American Society for Engineering Education Annual conference & Exposition,* American Society of Engineering Education, pp. 1-12, 2001.

B. Project Impact

The project will initially provide the opportunity for five to ten minority youths to earn their Technician level amateur radio license. After receiving their license, youths will have access for operating the new amateur radio station.

C. FORCE

Not Applicable

D. Implementation/Timeline

Project Task	Duration
Purchase Equipment for Amateur Radio Station	5/1/2007-5/31/2007
Purchase Licensing Manuals	5/1/2007-5/31/2007
Install Conduit for Antenna Lines	6/30/2007
Install Antennas	6/30/2007
Install Station Equipment	6/30/2007
Licensing class	6/1/2007-7/31/2007
Conduct Licensing Exam	8/1/2007

E. Collaboration

The project has four collaborators: Saginaw Valley State University (SVSU), the First Ward Community Center, the Claytor branch of the Public Libraries of Saginaw, and the Saginaw Valley Amateur Radio Association (SVARA). SVSU will provide overall project coordination and technical expertise for the entire project. First Ward Community Center is providing space to house the amateur radio station and conduct the licensing class. Claytor branch will develop its collection to include more amateur radio related books and house the licensing class manuals at the end of the project for future classes. Volunteers from SVARA will assist in running the licensing class and constructing the station.

F. Future Plans

It is the desire of this coalition to continue licensing efforts using the materials purchased under this project. Equipment purchased under this project will remain in the First Ward Community Center to allow participants to use their amateur radio privileges and inspire interest in amateur radio in other youths. Future plans also include, classes to help individuals upgrade their privileges will occur. Funding for future class materials and equipment may be funded through private donations, grants from organizations or foundations, and state or federal programs.

G. Evaluation

Successful completion of the project will requite meeting the following standards:

- Construction of an amateur radio station that has VHF, UHF, and HF capabilities.
- The successful licensing of five to ten minority youths.
- The addition of at least five amateur radio related books at the Claytor Library.

II. YOUR ORGANIZATION=S BACKGROUND

A through D are addressed in the following Institutional Narrative.

Saginaw Valley State University (SVSU) is the newest of Michigan's state universities. Founded in 1963 as a private institution, SVSU became a state supported public college in 1965. In 1987, the name was changed from Saginaw Valley State College to Saginaw Valley State University. This comprehensive regional university is organized into five colleges: Arts and Behavioral Sciences; Science, Engineering, and Technology; Business and Management; Education; and The Crystal M. Lange College of Nursing and Health Sciences. Sixty-eight undergraduate programs of study are available. Approximately sixty percent of SVSU's students come from the surrounding counties.

SVSU=s mission and goals have evolved in harmony with the institution=s dynamic nature, continued growth, and regional constituency. The mission statement is: AThe University produces value for the Region, State, and Society by preparing highly qualified graduates who contribute to the betterment of a culturally diverse world and by providing intellectual and cultural opportunities that enrich the lives of people.@ The Statement of Mission and Purposes of the University are examined on a regular basis to affirm the relevancy to the changing needs of SVSU=s students, the region, and society in general. This ongoing review reflects SVSU=s institutional commitment to provide quality education, which will prepare graduates to contribute to the vitality of the region.

As previously stated, SVSU will collaborate with three other organizations: SVARA, the Public Libraries of Saginaw, and the First Ward Community Center. Currently, there are not any amateur radio licensing classes aimed at youth, particularly minority, nor a publicly accessible station for such youth to use. The purpose of the project is what differentiates the collaborating groups from others.

III. PERSONNEL

A. Key Staff Members

Dr. Robert Tuttle is an Assistant Professor of Mechanical Engineering at Saginaw Valley State University. He has numerous publications related to molten metal processing and refractories. Dr. Tuttle is an active member of the American Foundry Society, where he serves as a member of the Programming committee for the local chapter and serves on the Steel Division's Program and Papers and Mechanical Properties committees on the national level. His primary teaching duties are instructing students in materials science and manufacturing.

Dr. Tuttle earned his Technician license 1993, and now holds an Extra class license. He has talked with other amateurs in approximately one hundred countries and three continents. Dr. Tuttle taught a Technician licensing course for seven students in 2004; all successfully passed their licensing exams. He is an Amateur Radio Relay Leauge (ARRL) certified Volunteer Examiner. Dr. Tuttle has published a web article on station installation on the ARRL web site (http://www.arrl.org/news/features/2006/04/28/2/). He has also constructed the majority of his own radio station equipment. He was a member and served as president (2000-2001) of the Worcester Polytechnic Institute Wireless Association in Worcester, MA. While in graduate school, he was an active member of the University of Missouri-Rolla Amateur Radio Club in Rolla, MO. Currently, he is a member of the Saginaw Valley Amateur Radio Association. As a member of SVARA, he has participated in Detroit's Metro Youth Day, CareBreaks, and Field Day.

Michelle McGregor is the Program Coordinator for First Ward Community Center's After School Program. Her highest degree is a Master's Degree in Human Nutrition. Michelle is certified in CPR/First Aid and also certified in Nonviolent Crisis Intervention. As program coordinator, Michelle plans and supervises all After School/Summer Day Camp Program activities for children and their parents. Michelle coordinates activities with representative of other agencies. She maintains liaison with community care staff and communicates with parents of youth regarding individual case planning and progress. She also prepares reports and maintains records regarding progress and related matters on youth in the program.

B. Additional Staff

Angela Barris,branch manager for Claytor Library, will assist by adding amateur radio related publications to the library's collection. The addition of these books will provide participants with materials to continue to learn after the licensing course. The collection will also be available to other area amateurs through the library system.

Volunteers from the Saginaw Valley Amateur Radio Association will assist with teaching the licensing course and assembling the amateur radio station.

IV. PROJECT BUDGET

A. Project Budget

Qty.	Description	Unit Cost	Extended Cost
1	Kenwood TM-G707A 144/440MHz radio	$ 279.99	$ 279.99
1	Astron RS-50M DC power supply	$ 239.99	$ 239.99
1	Tripplite Surge supressor	$ 99.99	$ 99.99
1	Hustler G6-270R 144/440 MHz antenna	$ 189.99	$ 189.99
2	Polyphaser IS-50UX-CO lightening protection	$ 62.99	$ 125.98
1	Harger GBIS18114AE Entrance ground bar	$ 39.99	$ 39.99
1	Harger GEL3AE ground lugs (pk of 5)	$ 26.99	$ 26.99
1	MFJ 108B dual timezone clock	$ 21.99	$ 21.99
300	Belden RG-8U coax cable (price per ft)	$ 0.46	$ 138.00
2	coax seal	$ 3.99	$ 7.98
10	Van Gorden PL-259 connectors	$ 2.99	$ 29.90
1	Yeasu FT-897 HF radio	$ 899.95	$ 899.95
1	Hustler Model 6-BTV HF antenna	$ 189.99	$ 189.99
1	RIGrunner RR/4010S/C 10 outlet, 40 amp panel	$ 129.99	$ 129.99
1	Bencher RJ-1 straight key	$ 105.99	$ 105.99
1	MFJ 941E Versa Tuner II	$ 119.99	$ 119.99
1	MFJ 250 Versa Load	$ 29.99	$ 29.99
1	ARRL World Map	$ 15.00	$ 15.00
1	Anderson Power Pole Connectors (pk of 30)	$ 11.99	$ 11.99
1	Estimated shipping	$ 300.00	$ 300.00
10	ARRL Ham Radio License Manual	$ 24.95	$ 249.50
10	Testing Fees for Participants	$ 14.00	$ 140.00
		Total	$ 3,393.18

The first twenty items in the budget are to construct the amateur radio station. The last two items are to support the licensing course. Each participant will be given a copy of the Ham Radio Licensing Manual to use during the course. These books contain all the information needed for licensing and will assist participants in preparing for the licensing exam. After this program, the manuals will enter the collection at the Claytor branch to allow others to become licensed. A testing fee is required for the licensing exam. Each participant in the program will be able to take the test for free.

B. Foundation=s Money

Funds provided by the Saginaw Community Foundation will fund equipment purchases for the amateur radio station; the cost of the licensing manuals; and testing fees for ten youths to become licensed.

C. FUND REQUESTS COMMITTED/PENDING

Not applicable