II. GROUND STATION INSTALLATION

Proposed Ground Station Locations

Dixon-Patterson Hall which is located on the ECSU campus met several key criteria for the installation, including; flat roof, clear sky view, and space to position the associated server. Thus Dixon-Patterson hall was chosen as the most ideal location for the 3.6 meter X/L band and 3.7 meter C-band ground stations. Data acquisition is established from horizon to horizon for these particular ground stations and therefore limited building and tree obstruction is essential.

Due to criteria that had to be met for the installed 5 meter L-band ground station; it's location was scheduled to be in the vicinity of the ITC (Information Technology Center) building on the east side grounds Due to the 5 meter L-band ground station being a fixed axis dish (meaning it does not rotate its focal point) that stays positioned at the clarke belt of geostationary satellites, it will need to be pointing a few degrees below the equator line from the ground where the visibility is not effected.

Installation Procedure and Tools Required[3]

Timeline

ECSU had a building committee approve the installation of the ground station locations after the MOU was signed and put into effect. In July of 2013, the 2.3 meter ground stations were installed on the roof of Dixon Paterson hall. To assure that the roof structure can hold the load of the 3.6 & 3.7 dishes an Engineering Report was generated by a local engineer to analyze the roof of Dixon-Patterson Hall. The B&M roofing company came and was able to support and anchor the radomes to the roof shown in figure x.x. In order to limit the amount of holes drilled in the concrete roofing a Rail Design or Frame mount was designed, constructed, and installed. A welder was required to assist with rail installation to weld the base to the rail track. The conduit runs through the roof to power both stations. This conduit contains power and other AUX cords to the server room. SeaSpace subcontractors have been procured to unpack, assemble, and install the ground stations after being lifted by crane into position.

A proposal will be sent for the approval of the University. The proposals will cover the removal of the trees and the preparation for the site, which should take place within August 2014. The preparation contain mending the ground station's

Operational Environmental Satellites (GOES) and the Meteorological Satellite Second Generation (MSG).

Both the MSG and GOES satellite platforms are geostationary. Geostationary is a flight path of an orbiting satellite that circles around the earth once per day so as to appear stationary in relation to the earth's surface [7]. This type of orbit is also called geosynchronous.

The satellite MSG is an improved atmospheric satellite in a series of four geostationary meteorological satellites owned by the European Organization for the Exploitation of Meteorological Satellites (EUMETSAT) [8]. The satellites transmit imagery data once every 15 minutes. European forecasters and researchers use the MSG advanced weather satellites to provide key information and imagery for weather forecasting as well as other applications such as hydrology, agriculture, environmental studies as well as risk prevention and disaster warnings. GOES is a weather satellite, which orbits 22,300 miles above the earth [9]. It transmits imagery once every five minutes. Due to the fact that GOES satellites are geostationary, they provide warnings for severe weather conditions such as tornadoes, flash floods, hail storms, and hurricanes. When these conditions develop the GOES satellites are able to monitor storm development and track their movements. GOES satellite imagery is also used to estimate rainfall during the thunderstorms and hurricanes for flash flood warnings, as well as estimates snowfall accumulations and overall extent of snow cover.

SITE PREPERATION [3]

Going forward one looks to make sure that things are more suitable for the ground stations. This includes safely securing the previously installed ground stations which mainly supported by sand bags at this point; and also ensuring a clear path is visible for interaction between the ground stations and satellites. This includes doing things such as making sure trees are not blocking the communication pathway. The school will need to hire contractors and set a time that is convenient. We will look to correct the sway that was discovered by engineers recently, and also make sure the roof is suitable to sustain the weight of the ground stations. A Gantt chart will also need to be constructed. Information is to also be given to Dr. Hayden in order to gain funding for the ground stations. This must b

installation date is set.

TRAINING CENTER

According to the MOU the ECSU training center components will be providing: fax, phone, photocopying machine, computer access, and projection capability. The ECSU training center will host scheduled training events each year for local coast guard, navy, and NASA partners. The training center will integrate Terascan sets and software into ECSU-sponsor teaching and projects. At Dixon Hall we are currently lacking teravision. TeraVision is the main tool for visualization in the TeraScan software package. Uniform to seaspace teravision software will not run in either a virtual machine or boot camp. This means the teravision will not be capable with current I-Macs. The need for the pc comparable with TeraVision has been identified and will be addressed.

SUMMARY

In summary the SeaSpace team has outlined the site preparation and installation procedures for the proposed SeaSpace satellite systems at ECSU. This included garnering the proper permissions and having required studies done to choose the most logical installation sites for the SeaSpace antenna systems, and location of the training center. The MOU considerations were also reiterated and examined. Primary tasks included:

- Ground Station locations were vetted and selected.
- Rail design for rooftop installation was accomplished.
- Subcontractors were proposed for individual tasks.
- Training center assets and liabilities were identified and addressed.

The purpose of our research was to view the overall project and provide a guide for site preparation and installation as well as a record for future exploitation.

FUTURE WORK

As of now the future work of this project consist of the contractors accepting a proposal to conduct landscaping that may be needed in order to cut down trees blocking the communication pathway between the ground stations and the satellites.

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