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ECE 4805 – Major Design Experience

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L-Band Satellite Tracking and Characterization System

Engineering Standards

The first engineering characteristic that I investigated was “Power: Battery. Capable of 18 hours continuous “on time” (i.e., while operational, including recording time).” The standard I associated with this characteristic is IEEE Std 1184™-2006

1. This standard was developed and sponsored by the Stationary Battery Committee and published by IEEE. IEEE’s standards are widely accepted as the baseline rules engineers must follow when undertaking projects. I feel this is enough for me to deem them a trustworthy and legitimate source for this information.
2. I found information on this standard by following the link (<https://ieeexplore-ieee-org.ezproxy.lib.vt.edu/Xplore/home.jsp>) and searching for standards that I felt may be sufficiently related to our project. I specified that the documents I was searching for were standards, and I searched “batteries.” Many of the standards were based on specific types of batteries, so I made my search more specific and added the word “continuous” to the search.
3. IEEE Std 1184™-2006, “IEEE Guide for Batteries for Uninterruptible Power Supply Systems.”
4. This standard looks into how to design, install and maintain battery systems that are needed in “uninterruptible power supply systems” to make them as optimized as possible.

The standard also details four different types of widely used batteries. The standard explains the various considerations to ensure that the batteries output a constant power as the battery discharges. This also looks into how factors such as temperature affect the discharging of the batteries. This is important as the system will be used outdoors.

5. We are given a requirement of having 18 hours of continuous “on time.” section 5.3 of this standard talks about how different factors will affect battery life.
6. To fully utilize this standard, it will be necessary to understand more about the types of batteries, as well as the safest ways of using them to power our device while still maintaining the 18-hour battery life without causing too much stress on the battery or the circuit. This can be done by utilizing the resources available to us, such as the library, as well as previously learned skills from classes such as Integrated Design Project.

The second engineering characteristic I investigated was “Tuning range: 1550-1700 MHz required, 1400-1700 MHz preferred” The standard I associated with this characteristic is IEEE Std 1900.1™-2019. This standard is a revision of its 2008 predecessor, making it a much more modern standard compared to the previous standard I mentioned.

1. This standard was published by the IEEE Communications Society as well as sponsored and developed by The Dynamic Spectrum Access Networks Standards Committee, AKA “DySPAN-SC.” I feel the IEEE is reliable for the reasons mentioned above. I also believe that the Dynamic Spectrum Access Networks Standards Committee is also reliable as it was initially started as the IEEE P1900 Standards committee; after a few different changes of leadership and in partnership with The IEEE Communications society, it became what is now known as DySPAN-SC.

2. I found this standard's information using the website given to us in the assignment and then navigated to the IEEE Xplore webpage. Once I made it to the Xplore webpage, I set my search criteria to standards and searched for "satellite communication," then changed that to search specifically for "variable wavelength communication."
3. IEEE Std 1900.1™-2019, "IEEE Standard for Definitions and Concepts for Dynamic Spectrum Access: Terminology Relating to Emerging Wireless Networks, System Functionality, and Spectrum Management."
4. The purpose of this standard is to provide the terminology commonly used throughout dynamic spectrum access. Allowing us to gain a deeper understanding of what we are talking about when we are explaining how we are communicating and tracking the satellite over various frequencies. This is very useful to us so that not only can we understand these topics and ideas more, but it also allows us to be able to express what we are doing and our goals using proper terminology to our customers.
5. In our project description, we are given a target range of 1550-1700 MHz, with a preferred range of 1400-1700 MHz. I feel that understanding how variable wavelengths affect transmission over this available spectrum is a very valuable skill to have.
6. I feel that leveraging my team members' knowledge of communications and electromagnetic fields will be pretty valuable to further understanding the standard and how it should be applied to our project.