Open lunar foundation funded research for lunar timekeeping

- Keep time standard like UTC for the moon
- Pain because of relativity -> distance from earth's surface
- updating spacecraft with this standard
- Governance of maintaining lunar coordinated time
- Met with someone from Meta who was with a group that made timecards that use PCIe
    - synchs with gps
    - holds time with nanosecond precision
    - people have used this with home computers
- NASA does this very expensive, with overkill specs
    - >$100,00
- Having a "good-enough" clock for a standard that everyone can share
- FOCUS IS THE MOON
- Build components to standard that are "plug and play", and make it cheap and easy
    - Incentive to use cubesat standard is to have SOME standard
- Not inventing anything new, putting together existing technologies and methods
- Reason for working with RIT is that they thought they could do it themselves, but they did not have the shared space for it
- Idea is to launch into orbit, this is the first step
- OpenLunar is nonprofit
    - Caring about the way technology, economy, etc. progress towards space
- MoonDAO
    - Volunteer internet space program
    - Sent people to space on a blue origin rocket
    - Timecard designed and built as part of openCompute project (by people at Meta)
    - Decentralized

Open up for questions

- End goal and envision for uses
    - Originally WANTED LUNARxPrize competition between colleges to synch ime between two different sattiliites
    - Satilites can measure distance btween each other using wifi signal driven by atomic clock
        - Needs easily accessible clock for those satellites
    - Idea to have a competition for different colleges to build timecards
        - THis is the first step for said competition
    - Showed requirements that we were already given
        - Get to TRL 6
            - Physical prototype
            - physical analysis
                - vibration
                - impact
                - temperature fluctuations
        - We should actually build prototype that testing can be performed on
    - SpaceX and NASA have publish profiles 91710

    - 91710 gives all data needed for testing requirements
    - “work in space” is up for interpretation
        - People have built cubesats, so there are many “knowns” but there are always tradeoffs
    - **Requirements are that it works in space and it is cheaper so that teams like us can use it**
        - They are a volunteer and nonprofit organization
    - Able to interpret a lot of things on our own
        - Plug and play
        - cheap alternative
        - thing in space
        - done
    - Look up what a good connection would be. Not necessarily has to be PCIe, but give justification for wanting to change it
    - Original ask is to start with existing thing and change as needed
        - But we have complete freedom
    - Can use testing connectors
- GNSS
    - Takes reference signal it knows is good
    - every once in a while it receives *the time*
    - GNSS is not practical to bake into the system
    - GNSS is good for testing, but can be swapped with something else in the real application
    - Sattilites typically constantly asks GPS where it is
    - Take away GPS crutch
    - This timecard IS what the GPS system would send out on the moon
    - APRS is an example of decentralizing positioning
    - TImecard can be foundation for similar to APRS
- Electrical expertise
    - Phillip: Experience reading but not writing electrical design
        - Working relationships with the people that made the OG timecard
    - Ashly: Has contacts that worked on starlink
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- *This seems laid back*
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