Trailblazer, SPA and Radiation Testing
Overview for CubeSat Workshop
August 2011
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Trailblazer Satellite

• Trailblazer Missions
  – Trailblazer satellites are proof of concept missions for SPA as well as Space Weather science research
  – Trailblazer-I satellite will be launched through the NASA Educational Launch of Nanosatellites (ELaNA) program in March 2012
  – Trailblazer-II satellite will be a 6U CubeSat flying a series of Space Weather experiments
Components

- Clyde Space Powersystem
- Astrodev Radio
- ISIS PMASS
- SPA Dosimeter
- UTEP 3D PCB
- Pumpkin Structure
- Pumpkin Motherboard
- SPA ASIM conversion Board
Space Plug-and-play Architecture (SPA)

• CubeFlow & SPA provide “rapid design modeling” framework for responsive integration of spacecraft subsystems
• Have taught SPA to more than 700 individuals in 24 months
• SPA Fundamentals
  – Xteds
  – ASIMs
  – SSM
One size DOES NOT fit all: Distribution of bandwidth in systems

Number Of Components

Performance of components

- Very low data rate (< 10 kilobit/sec)
  “SPA-1” (future)

- low data rate (< 1 Mbit/sec)
  SPA-U

- high data rate (< 620 Mbit/sec)
  SPA-S

- Very High Data Rate
  SPA-O

“SPA-1” (future)
Environmental Testing

- Environmental Testing of parts in progress
- Main piece of concern is UTEP 3D module
- Ease of access makes processing multiple iterations possible
- Currently completing test plans for TV and Vibe
- Have received PPOD

AFRL Vibration Table and testing of parts
Ground Station

– GENSO is running 24/7
Lessons Learned so Far

– Publicity is great – everyone wants to be part of a winning team. Pick the right person for TV
– Everything takes longer than you think it will
Radiation Testing of Parts

– Are you interested in finding out how commercial parts that are often used in CubeSats operate in a radiation environment?

– COSMIAC has performed Total Ion Dose testing on devices such as COTS microcontrollers, COTS memory components, and some radiation hardened components. Results are available at cosmiac.org (publications)
Phillips Scholars and Space Scholars

- AFRL wants US students. If you are looking for an exciting research opportunity, contact me.

Phillips Scholars is normally for high school through Junior in college.

Space Scholars is normally for Juniors in college through PhD.

Information for Applicants

Requirements/Eligibility

- Space Scholar selectees are made offers at one of the following levels: GS-4, GS-5, GS-7, or GS-9. The Program is generally geared toward college students from Sophomore/Junior undergraduates up through Ph.D. candidates. The requirements governing eligibility for each GS level can be found on the Office of Personnel Management website. Our Personnel Office will use these requirements in determining which level (if any) each selectee qualifies for. The requirements listed below, while not exhaustive, cover the major aspects of eligibility.
- Applicants must be US Citizens; the scholars programs are not open to non-US Citizens.
Further Questions?

- Craig Kief: craig.kief@cosmiac.org
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- If you want further training or education for your team, we offer a free 60 minute Skype presentation

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