Powering Spacecraft Within Cost and Schedule Constraints

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PMAD Workshop Discussion

- Customers are buying services from large constellations of spacecraft
- This has led to a shift in reliability from individual satellites to group fault-tolerance
- However, too many sat failures can mean contract cancellation and even bankruptcy
- We will discuss concepts and strategies compatible with mass-produced & tested Electrical Power Systems that maximize success
- We will also discuss some emerging trends on fault propagation that are impacting new systems
  1. *What does Power System reliability look like?*
  2. *Can we rapidly incorporate new components and improvements as part of the process?*
  3. *Can we "push back" against pressures to cut design margin beyond reason?*

Questions related to rapid and agile contractor support

Government supporting a mantra of Rapid and agile acquisitions – What we are seeing

- Consider Potential development work with re-buy mentality by our customers
- Firm fixed price is now a contract norm
- Consider privatization in space, with acquisitions in a commercial model to existing bus technologies
- What drives success for new SmallSat companies?
- Given contractor proprietary designs, what enables customers to move at the speed of ok to fail and safe to launch?
  - *How can we the space power community help with the effort of success for smaller companies*
  - *How is our support in-line with customer needs?*
- How does the power community ensure reliability in power systems in our Rapid Agile environment (*Robustitude*)
  - *New business companies agile in product development and delivery considerations*
- Redundancy at constellation level vs individual or small constellation level (vehicle class & robustness considerations)
  - *Customer buying services – a way of life*
  - *Experimental flights up to high stakes mission requirements – considerations*
  - *Power margin, Solar array maturity margin , load uncertainty , system margin (flight margin relative to newness of mission and hardware)*
  - *Margin in unit circuit and parts level given use of COTS*
- What are companies push back to requirements and standards (i.e. tailoring)?
- Dealing with a landscape of increased denial of services - a risk going forward

Other thoughts?

Thank you for the discussion --