

BREAKOUT SESSION 9.

POWER AND ENERGY STORAGE

Question: Fuel cells. Would that include hydrogen storage and generation?

Answer: Yes, it would include storage technology and everything else.

Question: You mentioned that you were not specifically looking for systems that are lighter or smaller or less volume. However, small satellite description mentions these are important.

Answer: Power systems need to be better from the generic point of view. Competition is intense. From NASA's point of view, just because something is more efficient but doesn't impact volume then it may not be the best option. We need technology to allow us new capabilities and new missions we've never done before.

Question: Do the numbers presented represent goals or minimum power performance levels.

Answer: Those are goal targets. You have to be able to back it up.

Question: Is it always DC power grid that is used in spacecraft or space station? Is there any requirement for AC power grid or is there any requirement for mixed AC and DC power grid?

Answer: it depends on the application. Dynamic conversion area and all of it is AC.

Question: Diamond Technology for power semiconductors offers a significant improvement in capability in comparison with SiC and GaN, that will allow systems to operate at higher voltages and temperature and offer greater efficiency. Are you interested in development diamond-based high power devices (Schottky diodes, FETs)?

Answer: NASA is interested in higher temperature and power applications of all sorts.

Question: What is the current thinking on launching nuclear materials?

Answer: Depends on the material. Assuming this is specifically about fission. You cannot turn them off, they are active all the time. We interact with DOE and their consideration on safety.

Question: There is recent grant for dynamic power converters asking for replacement thermoelectric ranking cycles. A bit surprised because I didn't know if it was under consideration. Is there any interest?

Answer: Yes, there is interest.

Question: What kind of backup power converter is used in a system level - do you use back up converter for every power converter?

Answer: There are no hard requirements for it yet. It depends on how reliable your system is.

Question: How does NASA make decisions on equipment that moves and equipment that doesn't move. Energy storage - fly wheel vs. battery.

Answer: There is no preference, we are looking at all of these options and how well they trade. We are still interested in power conversion. It also depends on mission directorate requirements.

Question: Would efficiencies improvements ever fall under this group on SBIR?

Answer: Where will there be most impact? If it is written for power conversion regarding efficiency, then it would fall under the topic and you would have to show how it relates to our figures of merit and talk to us in that language.

Question: Regarding the surface storage and surface power generation subtopic, is it fair to say that impact for the system level is more important than TRL level for these subtopics?

Answer: Yes. TRL level itself is not a huge discriminator. There still has to be commercialization and keep in mind that lower TRLs will take longer.

Question: Things that move versus things that don't move. Things that move have different applications and have reliability issues. Will you spell out that NASA is not looking for something that is dynamic. Or you will look for something that is dynamic?

Answer: The subtopics are written in a way that should make it clear. We are not looking into the difference between dynamic or static but rather focus on reliability and impacts to space craft.

Question: In your presentation you mentioned that for rechargeable batteries the requirement is over 300 watt hours. It concerned the lithium batteries. Do you have any preference for battery chemistry?

Answer: NASA has limited resources in this area. There have been discussions about the batteries. What NASA is looking at now it believes that it should be focusing beyond the lithium ion technology.

Question: Could you tell us what goals are that go beyond lithium ion? What are the criteria explosions, temperatures?

Answer: It depends on the specifics of the application. Safety is an issue for manned missions. It is also important for robotic missions too. There are no hard numbers since every mission is different. Whatever Small Businesses are proposing is being looked at in terms of variety of applications.

Question: Do you have an example of a success story of a company that went to Phase I and II?

Answer: In the presentation, there was a picture of two different solar rays. One developed by ATK Space Systems - Mega Rosa, and the other one is by Deployable Space System – Mega Flex. These technologies started as an air force SBIR.