Ask Me Anything Webinars- Session 1

TX01- Propulsion Systems and TX09- Entry, Descent, and Landing

TX and Subtopic	Question	Answer
TX01 - Propulsion Systems – A1.04: Novel Aircraft Configurations for Electrified Aircraft Propulsion	Topic A1.04 indicates "Strong proposals will have ... One or more identified launch customers with letters of commitment. " What is a "launch customer", an OEM or airline? What does "letter of commitment" mean?	A launch customer is any company who is willing to buy the product that is developed during the SBIR; letter of commitment would show the company's commitment to buying the product.
TX01 - Propulsion Systems	Letters of commitment from launch customers are one of the Phase I deliverables, but it is also mentioned that a strong proposal will have one or more identified launch customers with letters. Can you confirm that having a launch customer is not a requirement at the proposal stage?	I would highly encourage it because it's listed as an outcome as well. The stronger proposals will have those letters of commitment. There's also letters of intent or interest from companies you can receive as well, so that could be another option that is essentially a step-down from commitment. Looking for showing us that you've explored commercializing this product.
TX01 - Propulsion Systems	Is it possible to perform a clean sheet aircraft designed during phase I? If not, what should be the minimum TRL at the proposal stage?	Yes, clean sheet design is possible for Phase I.
TX01 - Propulsion Systems – A1.04 and A1.09	The following are not within scope for this subtopic: development of propulsion modeling capabilities and systems; dust mitigation and dust modeling; guidance, navigation, and control (GNC) sensors or any sensors not explicitly characterizing PSI physics." Does the scope of Z-LAND.03 include propulsion modeling, dust mitigation, and dust modeling specifically aimed at PSI? Does the scope of Z-LAND.03 include propulsion modeling, dust mitigation, and dust modeling specifically aimed at PSI?	We're not dictating what materials or specifying what materials should be used. If you're concentrating on materials with a heritage of use in space, you're probably in the ballpark and certainly is one of those.

TX01 - Propulsion Systems	For PSI modeling, Phase I deliverables should demonstrate proof of concept, and a minimum of component-level verification" Can you kindly elaborate on what is meant by "component-level verification"? Perhaps an example?	I don't think I'd go really into any specifics here. But in terms of a component level verification, I would suggest reading it as is. Forgive me if it's a little bit self-explanatory. You would be verifying a component instead of, perhaps a whole integrated system, but I don't know that I could go into any specifics on an example there. Basically, showing input/output curves on a component or part of the system being developed.
TX01 - Propulsion Systems – Z-GO.03: Solar Photon Sails Research and Technology Development	What qualifies as an embedded solution? Would actuating or retracting/extending rigid booms qualify as an embedded roll control solution?	If you look at the scope, there's the two different scopes mentioned. One of them is advancing what we call embedded roll devices, which those are out near the distal ends. You can read through that. It looks like something that might be better suited for scope 2. So that's still well within interest. The scope, title, sale materials, coatings and add in control to enable high temperature photon sail missions that scope down, and there is a mention of new or significantly enhanced attitude control and momentum management technologies. So, the embedded there, what we're talking about is really things that are embedded on the sail to help with real control.
TX01 - Propulsion Systems	If the product of the SBIR effort is an aircraft design, would an aircraft manufacturer/partner that takes on manufacturing and production be considered a customer?	Yes.
TX01 - Propulsion Systems	Can these launch customers be outside the USA?	Launch customers should be U.S.
TX01 - Propulsion Systems	For the proposal, should a team already be put together for that specific concept or can team members be pending the result of the SBIR award?	I would say it's usually better to have your team in place, but I understand the risks that that are there when you're waiting on funding to pursue the technology. But I think as long as you can document the experience that the folks have and the timeline for getting them onto your contract, I think you're probably good to go.

TX09 - Entry, Descent, and Landing - Z-LAND.01	Wondering for steerable parachutes if it has to be wireless or if we can integrate components into the parachutes directly?	Wireless control systems or electronics is NOT required. However, any system integrated must be robust and reliable as appropriate to a single fault subsystem.
TX09 - Entry, Descent, and Landing - Z-LAND.02	Will you accept submissions for a new aerodynamic decelerator? It does not involve any mechanical systems, etc.	We are not looking for any new aerodynamic decelerator concepts at this time. We are only looking for what is requested in each scope for this subtopic. I'm not sure if there is another subtopic that might be looking for new aerodynamic decelerator concepts. A NASA project would have to consider and specifically include a request for new decelerator concepts as part of a future solicitation for that to happen.
TX09 - Entry, Descent, and Landing - Z-LAND.02	Is there a minimum TRL or expected TRL? We have an idea for a better gas generator	I would say especially at the end for phase one, we've always gone very low TRLs. Then as you work with phase one, you look at where you can end up TRL-wise for the end of phase two development. We've had everything from phase one for material one up to three, I think starting phase one development.
TX09 - Entry, Descent, and Landing - Z-LAND.01	Are their specific environmental conditions (temperature ranges, vibration levels, etc.) that the wireless DAQ system needs to withstand during parachute deployment that we should directly address in the proposal? Are there any specific requirements for data latency or real-time processing during the deployment phase?	The specific performance characteristics of the wireless data system are addressed in the solicitation. If there are other aspects of the design solution that a firm would like to consider, then that certainly is good to have. In terms of the minimum number of performance characteristics that should be addressed, those are the ones that are listed in the solicitation.
TX09 - Entry, Descent, and Landing - Z-LAND.01	Should the functionality demonstrations listed include any type of relevant/emulated environments (esp. for Phase II). For example, "drop tests" or temperature tests?	The solicitation does not give specific requirements other than for the distance and number of sensors transmitting to the central node/data recorder, but a demonstration in a relevant/emulated environment could strengthen a proposal since the expected TRL at the completion of the project is 4 to 6.

TX09 - Entry, Descent, and Landing - Z-EXPAND.03	Was there a particular vision or interest in specifically the sensor or integration with GNC system? Is there interest in using a camera to be able to increase detection of Space Debris	Specifically, this subtopic is space debris prevention geared more towards small spacecraft activities. And there are two scopes within that. Both of them are mitigation techniques and as you can see in that subtopic this year, we've added avoidance mobility. That was very key because if there is a sensor that you believe is a new innovation that can enhance existing state-of-the-art previously already used elements, it would need to be coupled with an energetic system. In other words, just detecting it is really not the specific interest, it is the capability of a system to detect and move. So those two elements of functionality are really required in that. However, once again, if there's an existing state-of-the-art technology or proven technology that the sensor system could be coupled with. One would think that you would need to propose that entire approach.
TX09 - Entry, Descent, and Landing - Z-LAND.01	Can you say what the strap material is for the parachute is? We are already working with Vectran as part of another program	Not dictating what materials should/can be used. However, they must be validated as suitable for long duration space applications though.
TX09 - Entry, Descent, and Landing	Sorry just wanted to double check on something after reading the document again. So, a dust mitigation/modeling solution for lunar PSI will be within scope, right?	I'm maybe not 100% certain what the questioner is getting at. I guess I would point them back to the language, basically saying that dust and dust mitigation and dust modeling is not within scope according to solicitation and so I would just encourage them to look at the statements where NASA's seeking support. Things to do with modeling test and instrumentation techniques to understand PSI and PSI physics.
TX09 - Entry, Descent, and Landing - Z-LAND.03	Was an answer given for [Chandler Moore (Corvid Technologies) (Unverified)11:01 AM] question re Z7.07 PSI, "ne computational particle represents multiple physical particles?"	I'd just say that they don't have a specific type specified. So basically, I don't think it'd be appropriate to comment on specific types of models. But you can note in the solicitation text that we're looking for. Validated robust models and tools. For predicting psi physics that as far as

		specifying a particular method or something like that. That's not something we're doing.
TX01 - Propulsion Systems – Z-GO.03: Solar Photon Sails Research and Technology Development	What is the status of the steering mechanism on the solar sails and if there is a need for improvement on that?	You'll see in the scope we have a couple of things mentioned that are current technology developments in that first scope about embedded role control for solar sales that was reflective control devices and diffractive sale mechanisms. So, there are some things out there, but at the same time we don't want to limit new innovation. There are certainly areas for improvement, not only on those mentioned in the scope, but also elsewhere that somebody has an idea, we could certainly use improvement on that front. In both of those areas, either improving what we're already kind of looking at or new designs that exceed what those can do.
TX09 - Entry, Descent, and Landing - Z-EXPAND.03	Would you be interested in high delta v / quick response chemical propulsion for collision avoidance?	The primary outcome purpose of this is maneuverability of spacecraft, so it certainly has to be something from a swap standpoint that is compatible with small spacecraft, and they're defined within the subtopic as well. In addition to that, the use of chemical propulsion is fine. In fact, we stress a high desire for green propulsion type techniques that will help preserve the space domain with regard to some of that. It's not required, but it is certainly a preference to find green techniques with respect to these propulsion capabilities. That propulsion system, of course, you would need to define that within an architectural or system approach that would be compatible with existing technologies once again are something that state-of-the-art in development.
TX09 - Entry, Descent, and Landing	Is improved modeling of Plume-Surface Interactions an appropriate subject to propose	I guess point to the language that says we're looking for innovative robust and validated modeling approaches. A strong proposal would address that in

		whatever modeling technique is proposed.
TX09 - Entry, Descent, and Landing - Z-EXPAND.03	What size spacecraft? Green chemical propulsion for anything larger than 12U acceptable?	12U is fine. And actually, goes larger than that, the preface for it defines what we mean by small, both with respect to the spacecraft as well as the debris element of avoidance. And green chemical propulsion is fine. As well as just standard chemical, we have a preference with respect to trying to keep green within the propulsion intent, but that would be acceptable.
TX09 - Entry, Descent, and Landing - Z-EXPAND.03	Is there a minimum or maximum thrust class here?	No, there is not a minimum required. One has to look at it in terms of the intent, which is avoidance maneuvering. You could take the standard processes by which we would get predictions with regard to potential conjunction events and base your reaction times on that. I would say that you need to also consider the technological capability of the systems that would be necessary for that propulsion system to react as well.
TX09 - Entry, Descent, and Landing	Thank you for the response. I understood that maneuverability is the priority. Just want to clarify, having an innovative sensor system that can be coupled with a GNC system? Are there any specific parameters that should be considered overall? Parameters for sensor?	As long as that is coupled in a system architecture where you can define existing technologies that would be necessary to support the maneuverability given the GN and C signal that you get, and the other parameter of course is the swap with regard to small spacecraft.
TX09 - Entry, Descent, and Landing	Ejecta tools or analyses that use PSI-ejecta field data to predict effects on the vehicle and surface infrastructure for landing and mission design?	What the scope that is in mind is understanding how erosive effects you know if you're analyzing a landing an ejecta tool would be something that you can look at a particular landing and then use that to understand the effect of ejecta from that event. Then that could be used to perhaps predict effects away from the landing side or things like that. But looking at basically the conditions that would be set up by a landing event.

TX01 - Propulsion Systems – Z-GO.03: Solar Photon Sails Research and Technology Development	What size (area) solar sails are of most interest to NASA currently?	Solar sales of various different sizes. I don't want to pigeonhole anyone. I can tell you that some of our latest designs and what we're looking at going forward as a point of reference is 1600 square meter and above. But if you've got something for a smaller one, I don't want to discourage because a lot of times technology development happens at smaller scales and and then can be scaled up to larger things.
TX01 - Propulsion Systems	Need for improvement on stirring for solar sails?	There are some areas for improvement.
TX09 - Entry, Descent, and Landing - Z-EXPAND.03	Are there and specific requirements or preferences for deorbit devices regarding autonomous versus ground operations? For example, should the device be capable of fully autonomous deorbit operations if the satellite becomes unresponsive or should operator-in-the-loop only be considered?	Obviously, economy is very important with regard to having a very crowded space. So it isn't that human in the loop is not acceptable. That is an acceptable approach, but certainly the more autonomous it can be activated. The better, relative to the innovation. With respect to the deorbit capability, one of the elements of deorbit now with respect to the new regulations is you have to have some fault tolerance within your system to ensure that even if you lose control of the spacecraft, it has to still deorbit in the reasonable time frame that's remaining for the mission life. I think that the operator in the loop is certainly something that is acceptable. However, once again, within architectures that are more autonomous it certainly mitigates loss of communication with your satellite from a safety standpoint, and it also enhances the responsiveness with respect to the deorbit action itself.
TX01 - Propulsion Systems	Solar sails will placed in LEO or GEO? How much is the minimum expected energy they can provide?	We have a lot of different use cases for solar sales. It may include Leo may include nano may include beyond a lot of what we're looking at is beyond low Earth or Geo. We are looking beyond Leo beyond Geo, the minimum expected energy that can provide. We have really a large matrix as options depending on the design reference

		mission. I would say for that I don't want to give too much details on and pigeonhole anyone, but it really depends on the spacecraft as well. Solar sales? It depends on the mass of spacecraft. That's a complicated answer that would require a lot of a lot of variables, but you can imagine, any use for a cell or sale you know is up for grabs in this solicitation.
TX09 - Entry, Descent, and Landing - Z-EXPAND.03	What are the expected TRLs at end of Phase I and Phase II?	TRL2 to TRL5 with respect to the expectation of the project in Phase I.
TX01 - Propulsion Systems - A1.09: Zero-Emissions Technologies for Aircraft	It says hybrid engines. Can the proposal be for fully electric?	Fully electric or hybrid are both valid.
TX09 - Entry, Descent, and Landing - Z-EXPAND.03	TRL2 to TRL5 in Phase I, correct?	Yes, with respect to the expectation of the project.
TX01 - Propulsion Systems	For thermal management of solar sails is passive method or active one that is suggested to be sued?	I would say both are within the scope. It depends on the technology we do. We're not pigeonholing to one or the other, we are open to both and weighing the pros and the cons.
TX09 - Entry, Descent, and Landing - Z-EXPAND.03	Debris prevention. DoD customer ok?	Yes.