Ask Me Anything Webinars - Session 6

TX08.2- Observatories and TX08.3 – In-Situ Instruments/Sensor

Subtopic	Question	Answer
S15.03 Environmental Monitoring for Micro-G and Partial G Experiments	What environment is the deployable unit to survive?	This solicitation asks for sensors for a crewed environment. So, the units should survive an interior environment such as ISS or Gateway. If intended for Gateway, keep in mind that the interior environment may change when the crew are not present. And the unit should survive launch and transit.
S11.05	For trace gases, one of the bullet points mentions: CO, CH4, OCS, N2O, ethane at < 1% uncertainty Do sensors need to cover all of these, or are proposals in-scope that only cover one species at this accuracy?	No. Sensors do not need to cover all of these to be considered.
S15.02: In Situ Sample Preparation and Analysis for Biological and Physical Sciences in a Microgravity Environment	What are the dimensions of a Compact Device? Is replenishing of specific microbes and consumables between different experiments, still considered autonomous?	No dimensions are specified. It depends on the nature of the device but tend towards handheld as opposed to full instrument rack. Yes, replenishing small amounts of consumables and microbes may be considered autonomous.
S15.03 Environmental Monitoring for Micro-G and Partial G Experiments	Is this going to be a real-time detection system at a single location or multiple detectors at various locations are needed. If multiple locations, how many locations are needed.	The real-time detection system can be at a single location or multiple, depending on the measurements targeted. NASA is soliciting for a broad range of environmental sensors, and the proposer may design one for which single point measurements are appropriate, or for which an array is appropriate. It is also acceptable to develop a single sensor that could be used in both ways. Either way, the proposal should

		provide a justification for the approach.
S15.02: In Situ Sample Preparation and Analysis for Biological and Physical Sciences in a Microgravity Environment	Does the development of microgravity-compatible consumables and lab ware fall within the scope of this subtopic?	For this year's solicitation, the development of microgravity-compatible consumables and lab ware apply only as they pertain to the current scopes. It has to fall within the current scope.
S13.05: In Situ Instruments and Instrument Components for Lunar and Planetary Science (SBIR)	What type of dust detectors are NASA looking for? For example, the amount of dust, the size distribution of the dust, the electrical charge on the dust, the speed of the dust, the spin rate of the dust etc.? This is for outside habitats.	For subtopic S13.05, NASA is looking for science instruments to address the planetary science objectives of likely future planetary science missions. That's one of the requirements. We are looking for science instruments which fit into the planetary science missions listed in the planetary science decadal survey, such as new frontier missions. If the proposer can justify that their instrument improves measurement capabilities for future planetary science missions, that would fit to our subtopic.
	Telescope control topic includes active control algorithms? If so, NASA will provide basic telescope general control architecture to when awarded to test our novel active controller?	Generally speaking, this subtopic is more hardware oriented. So, we're looking for sensors and control mechanisms to achieve control, but any application should be geared towards one of the hab worlds, EAC concepts. There's three official concepts: EAC 1-2 and 3. This topic should be geared towards looking at solutions for the Habitable Worlds Observatory. One of the conical exploratory analytical case concepts.
S15.03 Environmental Monitoring for Micro-G and Partial G Experiments / Scope 1: Continuous Environmental Sensing to Monitor the Space-Built	Among trace gases, which are of most interest? What about VOCs?	VOCs are of interest. I am hesitant to make a priority list, but I will emphasize that our scope here is really meant to focus on facilitating biological and physical sciences research that is in the area of crew health

Environment and Its Microbiome		and plant health. They can either be an influential on the surface or air microbiome of the environment or that can give us an indication of, for example, plant health or crew health. While this is a broad solicitation the proposer needs to indicate those connections, either as an indicator or as a driver of environmental health in the in the crude environment.
S11.05 Suborbital Instruments and Sensor Systems for Earth Science Measurements, Scope title: Sensors and Sensor Systems Targeting Trace Gases	What do you exactly mean by mated platform/sensors? How much emphasize should be on new type of capabilities that the platform can provide versus sensor development in the mated case? Does the platform need to be able to be infused into existing NASA platforms or can it be separate but capable of augmenting existing capabilities?	The key is that NASA is looking for a sensor that is a functional instrument, and so as described in the solicitation, the expectation or the desire meant for the conclusion of Phase II is that the firm would build a prototype sensor that could be deployed. It's not a breadboard or an optical bench top assembly; it's a sensor that could be integrated onto a platform.
S13.05 In Situ Instruments and Instrument Components for Lunar and Planetary Science	Can you expand on the description of the (High Priority) Seismometers for impactor deployment to planetary surfaces? Is this for lunar surface to look at the lander impacts or is it to look at seismic activity of the moon?	For subtopic S13.05, NASA is looking for science instruments to address planetary science objectives. We are soliciting for seismometers and the other sensors, which can survive high g force and are applicable to impactor deployment to planetary surfaces. This question only mentions the moon, but we're also looking for seismometers with this capability for other planetary bodies. In the case of the Moon, we are more interested in seismic activity of the Moon because that's the planetary science perspective.
S12.04, X-Ray Mirror Systems Technology, Coating Technology for X-Ray-UVOIR (Ultraviolet-Optical-Infrared), and Free-Form Optics	What are the metrics (i.e., reflectance, angles to be covered, etc.) for the requested mirrors?	The Habitable Worlds Observatory (HWO) needs a process to be developed and validated that can deposit coatings with high reflectivity from 100 to 1800 nanometers

		on concave mirrors of diameter from 1.5 to 6 meters. For HWO, in addition to high reflectance, coronagraphy requires coatings with very low polarization variation with angle. For X-ray mirror technology we're looking for improvements to manufacturing, machining, rapid optical fabrication, slumping or replication technologies, metrology, performance prediction and testing techniques; as well as active control of mirror shapes. One specific solution needed in X-ray mirror manufacturing is technology for diamond turning of high aspect ratio mandrels. Additionally, NASA Goddard recently won a proposal for Advanced X-ray Imaging satellite. For this reason, NASA is interested in finishing and polishing techniques for mirrors to improve surface figure and surface roughness. A good place to start is to review some of the papers, especially from William Zhang about this next generation X-ray optics.
S11.05: Suborbital Instruments and Sensor Systems for Earth Science Measurements	Are there any other requirements on size, weight, and power restrictions of trace gas sensors, and are there any specific technologies of interest?	The solicitation describes some of the specific desired sensors or platform sensors of interest, but that's not meant to limit the submissions. NASA is seeking suborbital sensors and sensor systems that are relevant to NASA programs. (See the list of references and existing projects.) The reviewers are looking to see proposals summarize the current state-of-the-art and clearly explain how the proposed sensor system represents a significant improvement over the state-of-the-art. That may be in terms of detection

		performance, developing a new technique for measuring that species, or it may be taking an existing technology and reducing its size, weight, and/or power consumption. The key is that the offeror needs to demonstrate they understand how it's done now and that the proposed sensors can improve on it.
S11.05: Suborbital Instruments and Sensor Systems for Earth Science Measurements	Under the Scope Title: Sensors and Sensor Systems Targeting Trace Gases, the last bullet mentions the possibility to include sensors measuring aerosol and clouds, and says that Proposals responding to this specific bullet are strongly encouraged to identify at least one relevant NASA subject matter expert. Is this talking about partnering/collaborating with a NASA subject matter for this submission? We understood that during this blackout period we are not allowed to talk to any NASA expert regarding the solicited topics or is this bullet an exception?	As noted in the solicitation, NASA has three different scopes targeting this year's "targeting trace gases" subtopic. In previous years, NASA has looked at ocean and aerosol clouds. There's a note in the solicitation that NASA may return in future years to those areas. In this year's subtopic, NASA is targeting trace gases and giving some desired sensors as examples. We recognize that the ocean and aerosol cloud community firms are still developing technologies outside of this three-year rotation, so this bullet leaves the door open for firms to submit aerosol or cloud or ocean related proposals. However, it's not a free-for-all. It needs to be NASA relevant. The firm needs to identify somebody within the organization, perhaps a program manager or scientist who's actively researching this topic and for whom the sensor could be infused into their program. That's meant to limit the number of non-targeted submissions in the out years while also leaving the door open if firms want to propose an aerosol cloud or ocean sensor.
S12.03: Advanced Optical Systems and Fabrication/Testing/Control	Any vibration isolation systems, including 3-parameter passive vibration system, reaction wheels, to	In general, yes. It needs to tie back to the subtopic scope.

Technologies for Extended-Ultraviolet/Optical to Mid-/Far-Infrared Telescopes	achieve pioneer resolution for HWO are responsive to this solicitation?	
S15.02: In Situ Sample Preparation and Analysis for Biological and Physical Sciences in a Microgravity Environment	Is proposing a microgravity-compatible fluidic handling robotic system to perform sample preparation of various sample types meeting the topic requirement?	I don't believe so unless it deals with the third scope which is handling the powders.
S12.03: Advanced Optical Systems and Fabrication/Testing/Control Technologies for Extended-Ultraviolet/Optical to Mid-/Far-Infrared Telescopes	The vibration isolation systems for HWO telescope assembly to achieve single pico meter can be designed assuming cryogenic environmental temperature such as 55k?	It depends on what what component you're trying to isolate. For example, some components, such as the detectors, are going to be cryogenic.
S12.02: Precision Deployable Optical Structures and Metrology	Regarding the four bulleted needs: do we need to hit all four of those needs? We can hit two of those easily but we are not actively developing new coatings so we would use existing coatings. Is that ok?	The proposer doesn't need to hit all four. It does need a baffle that blocks micrometeoroids, and it does need to have good thermal properties. It needs to have good stray light suppression, but all those might not be achievable, certainly in any one proposal. Steps that can be taken toward achieving this in a baffle will be considered. So no, you don't have to have all four addressed in your proposal.
S12.03: Advanced Optical Systems and Fabrication/Testing/Control Technologies for Extended-Ultraviolet/Optical to Mid-/Far-Infrared Telescopes	HWO pursues microthrusters. If cryogenic reaction wheels can achieve better performance than a combination of reaction wheels and microthruster to achieve pico meter resolution and stability without a separate vibration isolation systems, under sun shield side of 55k or above, is it applicable for the topic?	There's an open trade in HWO between micro thrusters and reaction wheels, and even control moment gyros. Keep in mind this observatory is going to be 20 to 25 metric tons. Proposers need to consider how to slew 25 metric tons around the sky at a rate of 1° per minute, and then once you get to the targeting how to maintain it. Pointing stability on the order of 1/3 of a milli arc, second requires reducing the vibration. For this reason, we need to reduce JWST demonstrated performance by three or four orders of magnitude in terms of stability. If the proposer has a technology that can move something of that mass and that

		volume around at that rate or faster and then enable ultra stable pointing, that would certainly be of interest to NASA.