NASAEC_AMA_07282021

(Starbust) Asher Kraut: [00:00:00] Hello, everyone. Thanks for joining. We're going to get started in just a couple of minutes here, so just bear with us and we will get going.

Nicki, if you're on the line. You should be able to talk now and unmute yourself. Just want to confirm that here before we get going. So if you can unmute, just say hello, test check, and we can get going.

Nicki is that you?

(NASA SMD) Nicki Rayl: [00:00:21] Yeah. Does that work that time?

(Starbust) Asher Kraut: [00:00:24] It does. It does. We can hear you. Amazing.

I think we should have Carolyn on the on the phone as well. And then maybe waiting on Florence to join us in here, but I think we can kick off. I will kick off on my side.

And then Nicki, I'll ask you to, to jump in, in a couple of minutes.

(NASA SMD) Nicki Rayl: [00:00:40] Thank you very much.

(Starbust) Asher Kraut: [00:00:42] Thank you.

(NASA SMD) Carolyn Mercer: [00:00:43] Can you hear me?

(Starbust) Asher Kraut: [00:00:45] We can hear you perfect.

(NASA SMD) Carolyn Mercer: [00:00:46] Great. Thank you.

(Starbust) Asher Kraut: [00:00:47] Yup. Well, welcome everyone. Thanks for joining and apologies for the few minute delay there. My name is Asher Kraut from the Starburst team, helping the Science Mission Directorate put on this entrepreneur's challenge again for 2021. For those of you that are back with us again here for the second year of the challenge, welcome back. For the new faces in the audience, great to have you aboard. Super excited about what we're going to do this year with the new focus areas and a little bit of a re-tailored approach here.

I'm going to save a lot of the highlight points to the NASA team that is here with you today. We've got a couple of folks from SMD to talk about what they're looking for in the challenge, what they're hoping to see in the submissions, how to submit, what the deadlines are, and kind of all that good stuff there.

Without further ado just, April, the next slide here. I want to talk a little bit about the challenge as a whole, where we are today in relation to some upcoming deadlines and the release schedule. So we launched this challenge again here on July 12th, just a couple of weeks ago.

Today is our Ask Me Anything session, and our white papers will be due in just about 10 days on August 6th. That'll be at midnight Pacific. And then we will take one month to kind of regroup and evaluate, with the NASA team. And then from there we will notify winners. We

will ask that the round one selectees submit a more detailed white paper as part of that round two submission.

You'll have three weeks to complete those and we'll give templates and guidance on how to do so best, prior to that. And then, we will culminate in the pitch day on November 3rd and 4th. So super excited to get to the end. But of course, a lot of runway here is to left play. So I think without further ado, Nicki, I'll invite you to maybe give us a kind of just glimpse into what's on your mind.

What's your thoughts? Why were you guys so eager to, you know, renew the challenge again for 2021? What are you looking for? Maybe we'll dive into some questions we've received beforehand as well. And then we can take open Q&A as it comes.

Fantastic. Thank you so much, Asher. And just to check again, am I coming through on audio?

Perfectly clear, perfectly clear.

(NASA SMD) Nicki Rayl: [00:03:09] Excellent. Well, thank you all so much for joining us today and a big thanks to Starburst, our partner in executing this activity and for the organization today. And I, I think there's probably some great irony in some of us NASA folks, not being able to connect to the online meeting, but I'll leave that for another day.

I apologize for the delay and that we weren't able to connect. But I'm not sure what's going on. But yeah, as Asher said, so my name is Nicki Rayl and the acting chief technologist for the Science Mission Directorate within NASA and, Mike Seabloom and Florence Tan last year in their role, in their Chief Technology role, kicked off this, fantastic activity to entrepreneur's challenge.

And we are seeking to, to do it again. It was really successful. We want to build off some of the lessons learned from the pilot program and implement it again, mostly because we're interested in what you all can bring to the table, bringing innovation and new ideas, and, and apply those to the context of potentially addressing some of our agency's science goals. We, you know, often at NASA think and you know, decades out and have our focus and our eye on the prize on these long, long time scale missions. And, sometimes we can have some blind spots for what's going on, innovation-wise, with what's happening in industry, commercial sector, and all the entrepreneurial activities.

And so, you know, building off of this activity last year, we're really hoping to see if there's some kind of breakthrough and transformative technologies that we aren't aware of, bringing your ideas, to make science missions more affordable, more capable, more transformative, when it comes to what they are achieving.

In growing the number of our cadre of, folks that are able to contribute to NASA science from the startup and small business sector, that's a demographic that we often have trouble reaching when we work on timescales for our research solicitations of one year to two years for award, and even greater than that for contracts. That doesn't align with, you know, benchtop innovation and what's going on in industry.

And so it's really my hope that we can gain access to your ideas and innovation through this activity, and ways that are possible through our traditional mechanisms. So we can really

advance our science goals. It's kind of a perfect storm right now with these great changes and the commercial space economy and how we are commercializing low-earth orbit and what's going on.

We've never seen, you know, the amount of commercial, robust investment and, you know, advances in technologies that we've seen in the last few years. So I'm really excited this year to bring this program out again, and to really learn from you all, on what your ideas and concepts are.

And just briefly a little bit about, you know, science at NASA and how we kind of operate technology. We have about 23 technology programs right now in the Science Mission Directorate technology portfolio, funding about $250 to $300 million in technology activities. , We break our science kind of broadly into five areas within our organization spanning astrophysics, biological and physical science, earth science, heliophysics, and planetary science. And so we kind of got all of these science divisions together that represent all these really disparate topics, but there's some kind of cross cutting and cutting edge needs that span all of these divisions' topics and, you know, you will see, and you'll hear from later today, some representatives from these divisions to speak in specifics about our topics, but just globally, the three topics we're hoping to address are around small-sats science technology, metamaterial- based sensors, and bio marker detection. I am very appreciative of my NASA colleagues that are on the line today, though I'm gonna speak a little bit more about, what those topics mean and the challenges we face. We're going to kind of do like a, maybe a two minute lightning talk to just share some information about those topics and the, and the challenges as we consider them.

As Asher already mentioned, you know, our competition at this price competition broken into two rounds. And we hope to kind of build off each round from one to the other. I'll mention that in the first round, we're hoping for a five- page white paper, there's very specific evaluation criteria on the website that'll guide the development of that paper, but think of it as kind of, you know, an elevator pitch of what is your concept or idea and the technical credibility that you bring to the table and how you'd kind of go about solving one of our science needs. We plan to award up to 20 submissions for the first round at a 10 K prize per award.

As Asher mentioned, that closes on August 6th. We're going to spend about a month going through an evaluation of those first submitted white papers and we'll be posting on our website and reaching out to winners following that. Then those that have the highest ranking scores, from round one, will be invited to participate in round two, which also entails a white paper of a more developed or fleshed out concept and live pitch events. The white paper will be due on September 27th and the live pitch event will be held November 3rd through 4th, and we plan to make about 10 awards, up to 10 awards, of our second round at ADK $80,000 per award. for that second round participation. And, , it's my hope that as we start these activities, that we'll be able to on-ramp you all into our technology programs and NASA solicitations in the future. That's the big prize at the end of this, right?

It's not only as, you know, we want to incentivize you to kind of participate and think of how you can bring the amazing skills and technologies you have to the table. But then also hopefully further develop those in the coming years and to integrate with missions and science proposals. I just, I really appreciate you all taking the time to come in today.

I would like pivot now, Asher, to our, you know, technology deep dives. Before I do that, invite my colleagues on the line, Mike, Carolyn, and Florence there's anything I didn't touch on, from the beginning part, please jump in.

(NASA SMD) Carolyn Mercer: [00:08:55] Sounds good, Nicki.

(NASA SMD) Nicki Rayl: [00:08:58] Great, thanks carolyn. Florence, were you able to connect with audio?

(Starbust) Asher Kraut: [00:09:07] I do believe we have Florence in here. Florence, are you able to unmute yourself and just test audio quickly?

N/A: [00:09:12] Okay.

(Starbust) Asher Kraut: [00:09:14] I think she's trying now, but, we definitely have Mike in here. Oh, perfect. Great. Yup. Okay. All right.

(NASA SMD) Florence Tan: [00:09:25] Thank you.

(NASA SMD) Nicki Rayl: [00:09:27] All right. So Asher, I'd like to turn it over to Ms. Florence Tan, Dr. Mike Seabloom, and Dr. Carolyn Mercer for diving into these topical areas. If that sounds like, that'll work.

(Starbust) Asher Kraut: [00:09:36] Yeah, that'd be great. Maybe we can start with Mike. If you can unmute yourself and tell us a little bit more about all things metamaterial.

(NASA SMD) Mike Seablom: [00:09:49] I'll do my best. So, this is a exciting topic. I think it was suggested by the earth science division, but I think it has applicability to perhaps all of our research divisions.

I'm really happy that it appeared this year. Metamaterials offer unique opportunities for enhancing the performance of our space-based spectrometers and other types of instruments through increased sensitivity and at the same time offering significant reduction in power and mass.

At a fundamental level metamaterial photo detectors, for example, offer the manipulation of light sources at very specific wavelengths, with the ability to measure polarization, angle of incidents and, handedness. So these materials actually, enable, you know, left-handed materials that can have a negative index of refraction.

That's where we get the unprecedented resolution possible. In general, we're interested in the broad applicability of this technology to detectors, lasers, thermal emitters, and other types of filters to address our science needs that are articulated in the decatal surveys.

The real issue here is, we had some very specific questions about the types of metamaterial, technology that we may have an interest. The real question is, what can it do for enhancing our science? So, whatever you have to offer that can address the science needs, particularly reduction of power and mass and increased resolution of our instruments. That is really the key to a successful proposal. And I'll turn it back over to you Asher.

(Starbust) Asher Kraut: [00:11:45] Thanks, Mike. Appreciate that. Well I think we still have two more topic areas to run through. We're going to get into questions later on more

specifics and encourage those in attendance, (we do have a bunch of people listening in) to use the chat or Q &A feature. If something comes to mind that you hadn't previously submitted to us and you want it answered live while we've got everybody on the line.

Next we will jump to biomarker detection. Carolyn, you want to give us a couple minute overview of what you're looking for?

(NASA SMD) Nicki Rayl: [00:12:15] Sure. Can you confirm that you can hear me?

(Starbust) Asher Kraut: [00:12:17] Perfectly.

(NASA SMD) Carolyn Mercer: [00:12:19] Perfect. Okay. So, I represent the planetary science division within the science mission directorate.

And one of the areas of interest for science is necessarily, we want to understand if we are alone in the universe or whether there might be life on other worlds. And one of the places that we'd like to explore is Jupiter's moon Europa. It has a liquid water ocean that's encased by a thick ice sheet.

If there was one's life there, there might be biomarkers. But if they are there, it's very likely that any samples that we might find would be very highly diluted with water. So we'd like to send some instruments similar to what's used on earth to study microscopic organisms and life processes, but we really need to concentrate those samples for interrogation by the instruments.

So that's where you guys come in. We need sample processing technology to make sure that any concentration methods don't introduce impurities, they don't cause spurious results, and they don't destroy the. If I had access to the chat, I would give you a link to a science definition team paper that was written in 2016, that shows representative sample concentrations of the kinds of materials that we would like to detect.

So I'll work with Asher and somehow get that to you guys. I'll just go ahead and stop there and respond to any questions you might have.

https://europa.nasa.gov/resources/58/europa-lander-study-2016-report/

(Starbust) Asher Kraut: [00:13:44] Yeah, we will definitely get that link from you. Make sure we post it to the challenge website so that everybody listening in and for those that view later can access that information. Florence, maybe we'll turn it over to you, just to give a quick overview of the small sat category before we dive into the specific question.

(NASA SMD) Florence Tan: [00:14:01] Hi everyone, welcome. I am Florence Tan, and I am also in the Science Mission Directorate. Besides being Nicki's deputy, I'm also the chair of the small spacecraft coordination group at NASA. And we at NASA of course recognize the potential of small sets and have adopted small sets as a part of a balanced portfolio for our innovative science and exploration activities. And we, eager to leverage innovations from the small set sector to incorporate this new technology, to perform unique multi-point measurements from distributed spacecraft systems. So the principal goal is to enable new science measurements that are not attainable using traditional approaches.

We are, you know, interested in rapid, more affordable missions, right? To utilize these latest technologies, of course, leading to greater science returns. So, these technologies, as Mike pointed out, we would be very interested in low swap, low size weight and power, reliable components and subsystems that are able to operate in the harsh environment of space.

Right? Think, from the point of launch all the way to operations in that environmental vibration radiation, thermal right, cold, hot, and it's effect on materials as well. So, even the materials that we pick has to be low outgassing materials, for example. So, our systems of interest include things like,electric propulsion systems that are reliable.

Lifetime, high reliability, these highly versatile reconfigurable, low swap, again, size, weight, and power, readout technologies. Pointing systems, cryo coolers, control systems, sounders, right? Micro Sounders details. Giving you an idea of what we're looking for, you know, sensors that are, that are also, small, weight mass and power type thing, but high sensory in low noise, high dynamic range, fast response.

And suitable again, electronics. So, hopefully, you have an idea of the types of detectors, you know, imagers, gravity meters, fuel sensors, et cetera, LIDAR radar. So I've given you a whole array of things. I' ll turn it back to Asher.

(Starbust) Asher Kraut: [00:16:23] Awesome. Thanks Florence. There's some to unpack there. Without further ado, let's dive into the questions we've received through the website and via email before this session, again. Just to remind you for those in attendance, if you do have questions, feel free to submit those through the chat or the Q&A, I saw a couple that come through, so we'll make sure to get those answered as well.

Starting off with our first one here, and I think this could be answered by anybody, so whoever feels comfortable, just answer it. Do you have specific TRL level requirements for proposed concepts?

(NASA SMD) Nicki Rayl: [00:16:56] Hey Asher, this is Nicki. I'll jump in on that one. So any TRL level is as long as it meets the evaluation criteria set forth.

We aren't biased one way or the other. It's the idea, the concept, and the alignment to our evaluation criteria.

(Starbust) Asher Kraut: [00:17:11] Okay. Makes sense. The next one here, that's also on a more logistical note, can an innovation lab within a large corporation participate? Do they have to be a smaller company to participate?

(NASA SMD) Nicki Rayl: [00:17:27] Hey, Asher, it's Nicki again, and this is certainly open for an innovation lab as part of a larger company. They're eligible as long as they meet the criteria. I sound a little bit like a broken record, but you know, that's totally fine. As long as it meets that, you know, the eligibility criteria.

(Starbust) Asher Kraut: [00:17:41] Thank you. Cool. That takes care of actually another question we have here, which was “can a university participate in this competition”. My assumption there, given your answer, would be absolutely. Any team from any university is open to participate. Correct me if I'm wrong there, but I think that that's spot on. So now jumping a little bit to first round submission of white papers and notification, do you guys plan to give feedback to those who submit first round white papers and the questionnaire

being to all first round white papers submitted? And when will winners and losers be notified of that first round?

(NASA SMD) Nicki Rayl: [00:18:20] Hey, Asher, it's Nicki again. We will not be in a position to get you back to everyone that submits, just from the amount of judges that we'll have on our side. We will be able to take requests for feedback, of course, for those that come in, but we're going to treat it very much like a NASA solicitation process where we will be giving feedback to those that are selected to go on to further rounds, or maybe specific questions, based on their submission.

And if there's anybody that has questions outside of that process, please do let us know. We are certainly doing our best and understand the value of feedback and how important it is. But I also want to be realistic with the number of people that we have on our team and the unknowns around how many submissions we might have.

We do plan to, and Asher, correct me if I'm wrong, you know, we have that evaluation period, September 7th for the first round submissions, when we'll be finalizing our input and our ranking and scoring, and following that I would say within short order, within the next day or so, we'll be able to post the selections on our website, unless you're thinking of different Asher, please let me know.

(Starbust) Asher Kraut: [00:19:19] No, no, I think that's good. It makes sense. Of course. Ultimately, it's a question of bandwidth. If we get 5,000 proposals, it's just not gonna have the time. So, thanks for answering that one, Nicki, totally appreciated. And, on the same wavelength, that's pretty much the bulk of the logistical notes we had here. We'll take the rest of the time to dive into the focus areas themselves. We'll start first with a question on the small sat category. So maybe Florence, if you could answer this one, I will read off this question. It's a bit of a mouthful. So bear with me and happy to repeat if you need it.

"We're studying a unique method of experimentally measuring the electrical conductivity of the space plasma on orbit through a suite of sensors to provide a valuable data set for spacecraft manufacturers to use for electrostatic, discharge and grounding method designs. Will this fit within the category?"

(NASA SMD) Florence Tan: [00:20:15] So just to repeat the question, for studying electrical conductivity of space plasma and ESC discharge methods.

(Starbust) Asher Kraut: [00:20:24] That's correct.

(NASA SMD) Florence Tan: [00:20:24] Request is certainly for small spacecraft. And if it fits in the small spacecraft, you know, size, weight, and power, criteria, certainly it's possible to propose to that quality, but, you know, I want to, again, look at, have you looked at the application guidelines and the application criteria and to make sure that, you know, it matches what we're looking for.

Right. We are trying to use the technologies to operate a small spacecraft in space. And we would want to make sure that this hardware or software that we have this technology is quite ready or towards its flight radius eventually, and of getting it to be infused into our missions.

So to answer your question, you know, if the proposal links how this technology can be incorporated to our small set missions to enable all signs, then it matches the criteria. Thank you.

(Starbust) Asher Kraut: [00:21:28] Thank you. Makes a lot of sense and I appreciate the response there. I'm sure whoever's question that was does as well. As a reminder to all as well, we will be recording this session and posting both the actual video and the transcript of this dialogue on the website. So you can reference that later. No need to write everything down. We're going to move a big quick, so totally okay to reference it later. Mike, I think we'll move next to you on metamaterials here.

And we'll jump around a little bit. So, Florence, will come back to you, but we have someone who asks under the category of metamaterials based sensors. "Has there been previous consideration for laminating a thin membrane air permeable oleophobic membranes with printed sensor arrays to reduce the size and weight of space-born sensors?"

(NASA SMD) Mike Seablom: [00:22:14] The answer is not to my knowledge. But it doesn't matter if you can. The important thing here is to connect that to our science measurement needs. If your lens that you're talking about can fit over a sensor and give us some unprecedented improvement in resolution, or like I said, reduction in power and mass, that's the important thing.

(Starbust) Asher Kraut: [00:22:42] All right, well, simple enough. So moving back to smallsats here, and I think you touched on this one briefly Florence, maybe if you just want to elaborate again, somebody more or less here says that they have a brand new method of generating electrical power on. Rather than solar panels, they want to respond to the challenge.

"We think that it may fit within the small sat category, but don't see a specific mention of power generation in the description. Would this fit within the challenge area and, is it something that they should submit?

(NASA SMD) Florence Tan: [00:23:14] Yes, absolutely. It clearly, you know, again, they should make their case, in their proposal, to match the evaluation criteria and that the data they have.

I mean, if you don't have to carry your own power supply, and you're somehow able to generate, you're saving. Big savings. So, whatever improvements they can make to what, a small spacecraft system, it's certainly a criteria.

(Starbust) Asher Kraut: [00:23:38] Right. Thank you. Makes sense. We're going to move next to biomarker detection. For the biomarker detection topic, we have somebody here that's actually with us in the audience that asks, "what state are the samples? Are they liquid solid or possibly both?"

(NASA SMD) Carolyn Mercer: [00:23:53] Probably what we're thinking of for this challenge is that they are highly dilute samples in water.

(Starbust) Asher Kraut: [00:24:00] Okay. Makes sense.

(NASA SMD) Carolyn Mercer: [00:24:01] Well, liquid water or ice water, of course. But the ice would presumably be melted.

(Starbust) Asher Kraut: [00:24:08] So another one here on biomarker detection: "is the interest focus solely on extraterrestrial life bi-products detection, or is there also an interest in sensors that might have the capability to, monitors space crew health and trace levels in body fluids?"

(NASA SMD) Carolyn Mercer: [00:24:26] The focus of this is simply for extraterrestrial life detection. If a proposer can make the case that it would be useful for both applications, that will be fine, but you have to be relevant to biomarkers on other planetary bodies.

(Starbust) Asher Kraut: [00:24:41] All right. We've got a bunch more, maybe Mike on the metamaterials front, we have someone in the audience here today that asks, "could you provide examples of metamaterials that are permissible or that would be of interest?"

(NASA SMD) Mike Seablom: [00:24:58] I can, and I will, but I don't want you to be constrained. Again, the goal here is to give us improved sensitivity with our instruments. So we're not restricting to any particular type of metamaterial. So one example of investment that we have made has been with a mid- wave infrared hyperspectral sensor.

There's a metamaterial hyperspectral filter that goes on top of the right at the CCD. And that has resulted in a much better spectral resolution. We're able now to measure trace gasses much better than we have before. We don't have a lot of other examples of metamaterial investments in earth science.

Again, that's certainly within scope, but there's a lot more than just that. So metamaterials, it's a wide open field and again, the important thing is to demonstrate applicability to NASA problems.

(Starbust) Asher Kraut: [00:26:02] Make sense. Thank you for that response. We have a question here, actually that I can answer: "can a small startup company submit more than one round one white paper?"

The answer to that one is yes. Please submit one white paper per focus area that you want to apply. And Nicki correct me if I'm wrong on that. So if you want it to apply to multiple focus areas, just do separate white papers for each one of those responses.

(NASA SMD) Nicki Rayl: [00:26:28] Yep, absolutely. That's what we're looking for.

(Starbust) Asher Kraut: [00:26:31] Great, so let's see. Let's keep going down the list here. Florence for small sat category, are communication systems, such as, RF, optical, of interests for the challenge.

(NASA SMD) Florence Tan: [00:26:42] Yeah.

(Starbust) Asher Kraut: [00:26:45] Simple enough. Loud and clear.

(NASA SMD) Florence Tan: [00:26:50] I want to add, sorry. I meant to add more, certainly, radio systems, of course of interest and you know radio systems with encryption, multi-band radios, low back low cost.

Very, very interesting. Right. Okay. That's it. Thanks.

(Starbust) Asher Kraut: [00:27:08] Let's see… we have another small sat one here. "Our goal is to add an infrastructure piece that can enable other more complicated operations to occur in space than what's possible right now. How does this facilitator role play into the goals of the challenge?" And I think maybe I'll answer part of that for you Florence, which I'd imagine is, if you can make a case that it's applicable, , to improving science missions, then I think the role there would definitely be applicable.

(NASA SMD) Florence Tan: [00:27:36] Absolutely. Yes. You know, it seems to me this might be an architecture question or a scheduling question. The new type of spacecraft is changing and, , we are interested in how to use it. Some of this for our science purpose. And I mentioned it, I think, early on by saying that we want to make unique multi-point measurements from distributed spacecraft systems.

Thank you.

(Starbust) Asher Kraut: [00:28:04] Thank you. Moving now back to biomarkers. "Can you list some specific technological hurdles you're hoping to see address with innovation and the proposal submissions, as opposed to repackaging of existing solutions, such as biomarker concentration via microfluidic devices, and then separate to that.

Is there a particular biomarker that's of preference here to see responses for?"

(NASA SMD) Carolyn Mercer: [00:28:32] Yeah. So let me open up that report. Some of the biomarkers that we're looking at are organic carbon, aspartic acid, aspartes.

We'd like to detect native autofluorescence and identify cells and other micro structures, identify and characterize morphological texture.

And other indicators of life. We'd like to identify life processes and that includes things like detecting enclosed vesicles that contain a chemical environment that differs from the macro environment and in catalytic action that might be carried out, metabolic uptake of tracer molecules from surroundings, metabolic products generated by living organisms, detect indicators of extent, life like metabolism, motility, chemical disequilibrium, biological cattle, metallosis and reproduction. The specific biomarkers that I listed as far as the chemicals and the concentrations that are in the report that you guys should have now in the link that was posted to chat.

And as far as specific problems that we're trying to address, you know, we're looking for innovation, we're looking for how might we do this better, accurately. It's a real problem to try to highly concentrate samples without killing the sample. You're trying to detect and without introducing any kinds of contamination or, you know, unexpected effects.

So, try to do that better, accurately, and cleanly. We think there's a lot of opportunity for doing that, especially in an environment that would survive on a you know on a planet. So we would like it to be low mass, low power consumption. That sort of thing.

(Starbust) Asher Kraut: [00:30:15] Definitely. Well, I appreciate that response there.

I think we will move next to, it seems one of our last questions, actually, it started here towards the end of the pile here. Moving back to small sats. So with you, Florence, ?Can you talk a little bit more on the higher multiplexing, fast electronics and readouts piece. And what do you consider higher multiplexing fast electronics, and what kind of readouts are you specifically looking for?"

(NASA SMD) Florence Tan: [00:30:46] So, you know, again, as Mike said, we're not trying to limit, the innovation and the ideas that are coming here. You know, last year when we ran this, I thought, wow, you know, mass spectrometers, I think, you know, I've worked on mass spectrometers. I know what's going on, you know, but I was very, very pleasantly, delighted, right.

To see the different ideas that float through so similarly this year, you know, what I'm going to say is when I say fast, most sexy how fast, right? But so, signals, it's not just fast, most sexy. It's also, you know, how fast can you capture that, you know, what, what's your settling time for your, your electronics and how fast can you capture that?

What's fast, right? Sometimes some systems, like, for example, mass spectrometry, if I can catch all my signals to settle in a millisecond, that's pretty fast, right. , but how fast can you, how low can you go? But not in some other sensors, like, you know, CCD. So, it depends on the sensor that you're trying to catch the information for.

But what it is is we want versatile, configurable, right? High density, you know, multi-channel high density. And if you're going to talk about the channels again, to avoid going through this whole way, I tried to specify things. I really prefer that you guys come up with your great ideas.

And again, low noise, high dynamic range in the relevant wavelengths range with suitable electronics that are, you know, low preamps, fast beat out low noise, and high sensitivity detectors. And if you have that detector slash, electronic, I guess, integrated photonic in some ways.

Great. Right. But it depends on your detectors and depends on what images, what spectrometers, what type of sensors, you know, the different things that you can read. And we're interested in sensors that will provide us with the data we need to do our, you know, numerical modeling of weather systems.

All those things are important, but also interested in understanding, say the component in- situ measurement of certain systems. Right? So I hope this answers your question. Thank you.

(Starbust) Asher Kraut: [00:33:12] Awesome. Thanks for the reply there, Florence. We've got, I would say our last two here and maybe Nicki, these are best reserved for you, naturally, someone asked, "how is alignment with NASA science measurement needs addressed?"

(NASA SMD) Nicki Rayl: [00:33:28] Yeah, that's a great question. Probably one of the most driving questions and why we're here today, right. As we have these overarching science goals limits our capabilities. That's part of the scoring criteria that we're going to be looking at. And the evaluation is how it addresses, you know, an existing science need or, applies to a science need.

And, that's going to be a driving force. And when it comes down to how we kind of define those, you know, we at NASA tend to work in, at least in science work in the world of like decadal survey. And how that informs our science, which are huge lengthy documents that are there tomes on, you know, discipline areas.

But you can see the links on the website and there's an abstract and a short version of the findings up front that will help point you in the direction on those. But going back to the round one evaluation criteria - you know, the significance and unmet science needs, you'll see, is the first item that we'll be scoring, that the team of judges will be scoring against, and how it either enables or improves NASA science, what kind of difference it would make for NASA science.

And so that's a really important area for us, and I thank you all for considering that. That's ultimately one of the drivers, big drivers for being here today.

(Starbust) Asher Kraut: [00:34:43] Awesome. Thanks for that one. And then this last one here, I think is also another one for you. And I know the rest of the folks on the line probably have something to say here, but it's around confidentiality, and proprietary IP or technology.

" Can you discuss a little bit more about, are you expecting to see any sort of proprietary info in the white papers? Do you want that at all? And you know, what is the kind of mitigation plan there, and are you going to publish non-selected submissions, et cetera?"

(NASA SMD) Nicki Rayl: [00:35:13] Yeah, that's a great question around just IP in general.

And so we of course, would not claim any IP rights from any source submissions. So everything, anything that's patented, software rights, copyright trade secrets, proprietary information would remain with each respective participant and their submission. We don't plan to publish any proprietary information or submissions.

I think, you know, ultimately there's been some short kind of bullets or highlights over what was submitted and please do not include proprietary information in your white paper. Just as a general approach to challenges, but anything that comes to us will of course, the rights remain with the submitter, and we will not be publishing that or sharing that. We often take a similar approach on our research solicitations: there's pre-publication information, proprietary information. And so we certainly understand how to protect and work with that. But we strongly encourage you to not include proprietary information in your white papers just given the commercial aspect of this. Does that answer that question Asher, or you had some more?

(Starbust) Asher Kraut: [00:36:12] Yeah, definitely. I think the takeaway there for everyone listening and for those that will watch this later is that there is no proprietary info in the white paper submissions. Please, please, please. Make everyone's lives easier.

The point of the first white paper in particular is really just to flesh out the idea. talk a little bit more about the concept. No need for, for anything too, technically in detail there. So with that said, that takes care of all of the questions we had come through during this live session as well the ones we received beforehand. We have a few minutes left. If maybe anybody on the NASA side on the line wants to just give some closing words on, either words of encouragement or just keys to hone in on, on what you're looking forward to, technology-wise. And then, I think we can wrap it up!

(NASA SMD) Nicki Rayl: [00:36:57] Sounds good, Asher. I'll start and I'll invite my colleagues to weigh in too. I just want to thank everyone so much for taking the time to do this in the middle of the week. I'm so sorry I'm a talking voice on a phone with no face and hopefully next time we have an event you'll see my smiling face from afar. I can't thank you enough.

We're really looking for, you know, creative ideas, you know, kind of the swing for the fences, blue sky ideas of things. We're not thinking of bringing our thinking and our pipelines and really appreciate you all taking the time to consider how to improve the science we do at NASA, which is ultimately, it's hope, you know, benefit everyone, globally and to advance our science goals. I really appreciate you taking the time to consider this and I hope you will continue participating. Florence, Mike, Carolyn, any other comments?

(NASA SMD) Florence Tan: [00:37:44] None from me, thanks.

(NASA SMD) Carolyn Mercer: [00:37:48] I'd like to echo what you said there, Nicki, about the creativity and exciting ideas that we're looking from this community. That's really what I'm interested in. We can, we write these solicitations in a lot of different formats, but I was delighted with some of the ideas that came out last year during our entrepreneur's challenge.

And we just really encourage you to be as creative as possible. We look forward to seeing the exciting ideas that you're going to propose.

(Starbust) Asher Kraut: [00:38:16] Well said. Mike, anything from you before we close out?

(NASA SMD) Mike Seablom: [00:38:22] Yeah, I'll just, I'll say that we're working with a couple of the companies from last year's challenges. One is writing a proposal to NIAC as we speak. Another had written a proposal into a SBIR. So that's really the goal here is to transition into our regular technology programs, not only just SMD programs, but STMD programs as well.

Like Carolyn said, we really saw ideas last year that we had not seen before. We hope that happens again this year.

(Starbust) Asher Kraut: [00:38:56] Awesome. Well, I just want to highlight for everyone else listening, before we close out, a couple of main takeaways. As you see on the slide there that Elizabeth is presenting, 10 days, including today, until first round applications close. Please get those in by the top of the evening, August 6th. We'll be on the lookout for those.

It'll be a month until you hear yes or no, and then we'll go from there. Everybody who has questions that maybe didn't get to ask them now, feel free to reach out to the website. There's a contact form there. We'd like to be pretty prompt on replies.

So we'll be sure to get those answered, this recording along with the transcript, and maybe a couple of the good questions from here will be posted to the website and in the FAQ section. And then also to our dedicated webpage. We look forward to your submissions. Definitely appreciate you joining us today.

And again, we've put the link to the challenge: NASA, hyphen, science, hyphen, challenge dot com. Reference that; it's got all the information you need and more. Thanks everybody for joining in. And I think Nicki, if nothing more on your side, then we'll wrap it up.

(NASA SMD) Nicki Rayl: [00:39:58] Well, that sounds great. Thanks so much for your help today, Asher, it's much appreciated, and thank you all again for joining us. Please, like Asher said, reach out if more questions come in and we'll address them as soon as possible.

(Starbust) Asher Kraut: [00:40:09] Awesome. Well, thanks all.