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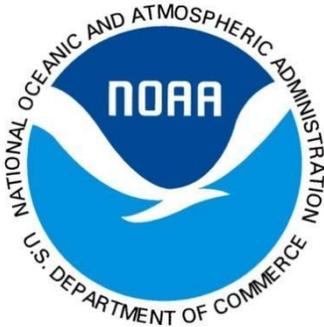
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Advisory Committee on Commercial Remote Sensing (ACCRES)

Tuesday, June 4, 2019 – 8:30 AM – 4:00 PM

Commerce Research Library, 1401 Constitution Avenue NW, Washington DC 20230



Meeting Attendees

- **Gil Klinger** (Chair), Raytheon Company
- **John Bellardo**, California Polytechnic State University
- **Gregory Black**, National Geospatial-Intelligence Agency
- **Sima Fishman**, Euroconsult USA
- **Paul Midzak**, XPressSAR
- **Todd Harrison**, Center for Strategic and International Studies
- **Henry Hertzfeld**, Space Policy Institute, George Washington University
- **Adil Jafry**, Chandah Space Technologies
- **Michelle Kley**, Attorney
- **Bhavya Lal**, Institute for Defense Analyses
- **David Langan**, Umbra Lab, Inc.
- **Tony Lin**, Hogan Lovells
- **Brian Weeden**, Secure World Foundation
- **Jamie Morin**, The Aerospace Corporation
- **Steve Volz**, Assistant Administrator for Satellite and Information Services, NOAA
- **Wilbur Ross**, Secretary, Department of Commerce
- **Scott Pace**, Executive Secretary, National Space Council
- **Tahara Dawkins**, Director of Commercial Remote Sensing Regulatory Affairs and Committee Designated Federal Official, NOAA
- **Derek Hanson, and Kate Abbott**, NOAA General Counsel

Meeting Minutes

25th Meeting of the ACCRES Committee

ACCRES Welcome & Introduction– Gil Klinger & Dr. Volz

- Gil welcomed the Committee for 25th Meeting of the ACCRES Committee
- Gil reviewed the agenda and provided the following opening comments:
 - This is an unprecedented period of ongoing/large scale changes across all space sectors.
 - There has been a fundamental change to the space operating environment. Space had long been considered a “gated community,” i.e., an operational sanctuary in all but an impending U.S.-Soviet armed confrontation. The environment has been transformed, with a diverse range of threats against satellites/services at any orbit.
 - Space also has become a crowded environment, with many nations, commercial entities, universities, and other non-government organizations operating systems, often in many of the same orbital regimes.

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- Finally, the United States Air Force and the Department of Defense are in the process of making large-scale organization and management changes, highlighted by the proposed establishment of a separate Space Force as a sixth Armed Service, along with the creation of a Unified Space Command.
- Gil asked each task group to give an overview of their presentation topics.
- Tahara informed the group that there will be allotted time for public comments and asked that the public reserve their questions until that time.
- Dr. Volz, the Assistant Administrator for the National Environmental Satellite Data, and Information Services, thanked Gil Klinger for taking on the role as chair of ACCRES.
- Dr. Volz expressed his appreciation to the members for their service to ACCRES.
 - *Talking Points:* As most of you know, I serve as the Assistant Administrator at NOAA's Satellite and Information Service (NESDIS). My responsibilities include providing day to day oversight of the activities of NESDIS' satellite operations, data processing, service delivery, and research functions. This also includes oversight of our Commercial Remote Sensing and Regulatory Affairs, which is responsible for the licensing and compliance of private remote sensing systems.
 - I look forward to working with you to continue to improve the commercial remote sensing licensing process and regulatory mechanisms.
 - We have an ambitious agenda for today's meeting that we plan to cover. First, I would like to congratulate all the NOAA licensees that have had successes since our last meeting in October. Here are some highlights:
 - 29 satellites have been launched including those for University High School, Planet Labs, Northern Idaho STEM Center High School, and SpaceX.
 - We welcomed eight new licensees, and we look forward to seeing 15 additional licensees launch over 50 satellites by the end of this year.
- This is great news for the long-term viability of the industry as it marks the growing interest at the academic level.
- Now, it is my distinct honor to present to you this morning the Secretary of Commerce, Wilbur Ross.
- Dr. Volz introduced Secretary Ross: Secretary Ross was sworn in by Vice President Mike Pence as the 39th Secretary of Commerce on February 28, 2017. He is the principal voice of business in the Trump Administration, ensuring that U.S. entrepreneurs and businesses have the tools they need to create jobs and economic opportunity.
 - Secretary Ross is the former Chairman of WL Ross & Co. LLC and has over 55 years of investment banking and private equity experience. He has been chairman or lead director of more than 100 companies operating in more than 20 different countries.
 - Named by Bloomberg Markets as one of the 50 most influential people in global finance, Secretary Ross is the only person elected to both the Private Equity Hall of Fame and the Turnaround Management Hall of Fame. As a philanthropist, Secretary Ross has served as Chairman of the Japan Society, Trustee of the Brookings Institution and Chairman of its Economic Studies Council, as well as many other international organizations.
 - Dr. Volz welcomed Secretary Ross to the 25th meeting of the Advisory Committee on Commercial Remote Sensing.

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Opening Remarks – Secretary Ross

- Secretary Ross thanked Dr. Volz for the introduction, thanked CRSRA for coordinated the meeting, thanked the committee for their commitment to serving, and acknowledged the public for their participation.
- Secretary Ross acknowledged Senator Ted Cruz and Dr. Scott Pace and indicated their attendance is a clear indication of the focus being placed by Congress and the Administration on one of our nation's most promising and important sectors.
- The Commerce Department depends on industry's and the public's thoughtful and objective feedback to aid in modifying rules/regulations/policies for improving this dynamic industry.
- Secretary Ross looks forward to reading all committee reports. This information along with the listening sessions at the recent Space Symposium will form the basis of discussions for managing the regulations over CRSRA applications
 - Commerce is committed to reviewing carefully each recommendation.
- Individuals, organizations, and companies have reinvigorated interest in the space industry and now it is time for the regulatory environment to match their agility and ingenuity.
- The \$400 billion-space economy will quickly grow to \$3 trillion by 2040 – to reach this we need innovation in traditional areas of space commerce and new markets – robotics, satellite servicing, space tourism, debris removal, and ride sharing.
 - Regulations must be modified to ensure the competitiveness of the industry - there is too much at stake to give away the U.S. lead.
- We are tracking the emergence of new capabilities that are fundamentally changing the economics of space. We are addressing key barriers to success.
- In response to these capabilities, the Department of Commerce (DOC) proposed a significant re-write to regulations that were last updated in 2006. These were published in May, 2019 after months of interagency discussion and negotiations.
 - Although traditional issues still linger, we must lean forward.
 - We need objective views on strengths/weaknesses and suggestions on beneficial corrections.
 - Provide us with your most candid thoughts as we aim to maintaining US leadership in Space.
 - Comments close on July 15 and we will then turn around a final rule.
 - If the agencies cannot agree, we will elevate this to the senior most level of government.
- At the Space Symposium, we heard your concerns about the role of the US as customer/regulator. From those discussions we are looking at how DOC can address these in concert with the National Space and National Security Councils.
 - International cooperation and competition are important components of this.
 - On June 26-27, 2019 we will co-host a Space Enterprise Summit in Washington, DC with Department of State to include international partners and space companies and will address issues from committee and those that impact your industry.
 - As promised in Colorado Springs, the Director of National Intelligence and other national leaders will come together on how to accelerate decisions in this area to alleviate national security concerns over the expansion of CRSRA.
- The House Budget marks for creating a new bureau were disappointing.
 - The funding level proposed fails to recognize the importance of Space Commerce and the need for a strong advocate for the space industry.
 - The hope remains that there will be a better result when the budget is finalized.

- The commercial industry needs representation in high level space policy.
 - There is plenty of work to be done to implement policies – via advocacy and improving our understanding of the space economy.
 - The Administration is looking for us to bridge the gap between regulations and entrepreneurs.

Regulatory Task Group Update: Briefed by Ms. Michelle D. Kley

Michelle acknowledged the task group participants for the significant amount of work completed.

- A year ago in 2018 – NOAA asked the group to look at existing regulations and come back with suggestions.
- The regulations attempt to balance the need to protect national security.
- Feedback indicates that there is a lot of confusion around the United States regulatory jurisdiction over foreign companies.
- The review of the **Low vs. High-risk** assessment denotes the extreme difficulty for anything to fall into low risk category. Most, if not all, commercial systems will fall into high by default. Low and High Risk are not the best terms to use.
- The ability for the applicant to ask where they are in the **Application Process** is a much-needed improvement. However, the lack of a time constraint on when the applicant will receive a response is not beneficial.
- Some members were concerned some of the **License Conditions** were NOT waivable and that periods should be shortened; things are too rigid and the changes in this area are not a step in the right direction.
- The **Replacement Licenses** approval at the discretion of the Secretary of Commerce is stringent. The task group feels that the waivers/license conditions currently in place, should also be in place for the replacement licenses and that license holders should not have to re-justify these things.
- **Retroactive License** conditions should be modified to explicitly state that the rules are not applicable retroactively unless the licensee requests replacement of the license or where the USG imposes technical modifications on a high-risk license.
- The **USG Required Modifications** suggest a significant capital expense for licensees and they do not appear to be costs that the licensee can recover. Although the Secretary may require that the licensee be reimbursed, this does not appear to be forceful/consistently enforceable
- The **Foreign Ownership/Arrangements** regulations present significant and unnecessarily complicated changes. The view that any level of foreign ownership must be approved as opposed to the current 5% disclosure requirement adds unnecessary complications. As a practical matter, no company will likely be able to disclose immaterial changes – as most will not know all of the changes. The FCC has struggled with disclosure requirement and decreasing the percentage will be challenging.
- **Compliance and monitoring** regulations are outdated and not cost effective. Permitting the “...Secretary to access, at all reasonable times ...” is too vague. If the licensee does not have access to components not owned by the licensee, complying with “the ability to inspect any components...” will be next to impossible.
- The **Appeals** timeline has been shortened to 14 days without explanation.

General Regulatory Task Force Discussion

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- Brian highlighted the non-earth imaging conditions (space objects imaging another space object). This can be achieved, but with conditions. The conditions are out in the NPRM but the restrictions/conditions remain in the draft proposal example.
 1. There are strict limitations on parts of spectrum.
 2. The requirement to be informed 30 days prior to approval being granted and to obtain permission from the owner presents challenges as there is not always enough time to make request that far in advance, and the requestor does not always know the owner. There is no discussion on waiver process or on expediting requests.
 3. There are a lot of NEI restrictions on what can be done with data; for example, if you do not know the owner of the object OR the it is a piece of space debris not in the public catalog maintained by the US military it can not be used easily.
 4. Many of these draft conditions will have adverse impact across industry.
- Gil and Tahara informed the group that NOAA and NOAA General Counsel developed the draft rules. The feedback from the task group will be public record. Additionally, any comments will be on record as official comments.
- Gil informed the group of the following:
 - Our responsibility is to take the strategic context for what we are trying to do. It seems that we are at risk of losing the bubble of what we are fundamentally trying to accomplish. The overriding objectives at the core of existing U.S. policy, and the framework within which the CRSRA should function:
 - Protect the US national and economic security.
 - In accordance with existing U.S. national policy, to the maximum practical extent – the US Government should make use of commercial remote sensing capabilities in cases those capabilities/services can meet requirements. Doing so will enable the U.S. Government to focus taxpayer investments on capabilities/services not available commercially due to policy or technology limits, and/or market conditions.
 - Ensure that the US (and its industry) are the leading global providers of CRSRA goods/services.
 - There needs to be a better regulatory balance between protecting national security and enabling U.S. industry, since the latter objective is recognized as a key element of national security. The Committee’s recommendations should enable Secretary Ross and the other most senior Cabinet officials to review the regulatory changes in the draft rule in light of longstanding national remote sensing policy goals, and changes to the space environment and commercial space sector.
- Brian –
 - We are working to help arm NOAA to participate in discussions and how best to shape their comments. That’s a valuable use of our time. We are not criticizing DOC, but we fully realize that the current NPRM was not entirely under Commerce’s control.
- Henry –
 - Things can be done, but it will take time. I appreciate Secretary Ross’ take on things. The current terms are too limited and we may lose some ground if we don’t open things up more.
- Question - Is it your intention to develop a formal position from the committee – what’s the path?

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- Answer (from Gil) - We will take the lead from Steve and Tahara as we are to act as an enabler. At this point, I don't yet know the best path forward, but we will have a spirited, respectful debate.
- Dr. Volz –
 - We see the global competition and have to embrace change, partner with organizations, and we have to lead the change as opposed to take it on.
 - The first instinct of any organization is that any change is bad unless it is broken already; we recognize this. What will be useful is to:
 - Highlight the benefit of alternatives where use cases show that there are advantages to these alternatives. Show the potential.
 - Frame recommendations to show the added economic benefit.
 - We don't need artificial harmony:
 - Do no mask the intention as we know that this is NOT a personal attack.
 - We want our industry to be smarter, stronger and better.
 - Tell us specifically what will help us.
 - We have a very narrow window of opportunity to advance our benefits in space.
- Tahara –
 - The Secretary said forward leaning; we do not know when we'll re-write the regulations in the future. As such, we are looking for blunt comments and the open dialogue. Tell us what will work.
- Michelle
 - The information communicated in the presentation is “watered down”, but we did include a chart, in our report, that the issue and makes a specific recommendation.
- Brian
 - Some of us represent organizations that are preparing public comments. Tahara expressed that the government actively welcomes ALL comments.
 - Question for Gil
 - Your remarks suggested taking a more strategic approach as opposed to focusing on the practical detail – what are your thoughts on balancing this?
 - Answer (from Gil) -the regulatory framework has to be sufficiently detailed to function effectively and needs to provide workable alternatives. In addition, the framework also should be placed in a strategic context to enable licensees, regulators, and other readers to understand clearly the intent of changes.

Public Comments

- Mark - Firesat project
 - Question - You talked about approximately 6 -12 months for implementation. What short term goals are being undertaken as our group is interested in finding out more information for getting a data buy?
 - Answers
 - Dr. Volz – Do market research on which government agency has overlap in your industry. We can talk offline

- Gil – Much of the data comes from classified means. First stop is NGA, you should likely start there. This would ultimately depend on the type of Data needed.

Regulatory Task Force Hot Button Issues

- **Foreign ownership involvement/agreement** – We are concerned about the level of ownership as well as the requirement to amend licenses when there is an agreement with a foreign company.
 - Tony – There is currently a 5% disclosure requirement. Under the current proposed regulatory changes, any foreign ownership needs to be disclosed. Most companies have some foreign ownership. Our recommendation is to stick with the SEC rule of disclosure (5%). The approval requirement should only kick in when there is foreign control. Publicly traded companies could not as a practical matter comply with the proposed disclosure/approval requirement.
 - As it pertains to a foreign subsidiary/affiliate – There is a very broad definition used by security. Our recommendation is to borrow from other agencies; look at how they apply rules for foreign ownership/subsidiary/affiliates.
 - Brian – A lot of license applications are coming from small companies/start ups/etc.
 - Question- Do we have any idea on how they would comply or how onerous this would be to them?
 1. Answer-We don't believe that we could tailor the rules – they would be applied across the board.
 - Tony – the proposed foreign ownership disclosure/approval requirement would also be burdensome on small companies.
 - Hertzfeld– The proposed rule is not friendly to Universities.
 - Question- What about Research & Development and cooperative R&D with foreign companies – Does this fall under the disclosure requirement and is this discouraging to companies as well?
 - Brian and John - We need clarity on how much foreign collaboration is allowed before a licensee would become high risk.
 - Question-Is there any way to consider our partners/friends/allies and allow ease of process for them?
 - Gil-As a policy and regulatory matter, we should recognize that there is not a “one size fits all” standard for assessing risk. There are obvious differences among the relationships the U.S. Government maintains with foreign governments; these differences should be integrated into a risk assessment conducted within the regulatory framework. This may need to be conducted in a classified environment, but that consideration should not preclude its application.
 - Tahara – if you don't fall in low risk you don't automatically become a high risk. There is additional review performed by the government prior to the assignment of high risk.
 - Brian – The regulations say no foreign involvement at all with NO distinction on allies, enemies, etc. If there is any way to circumscribe this to avoid our friends, allies and partners?

- Dr. Volz-In the Low vs. High risk framework, should some nations be considered to be on the “friendly list”? Would this change yearly? We ask that the task force let us know who should be on the friends list – please provide this information.
- Gil – A blanket requirement makes no sense. We need more clear regulations (e.g. what does 5% mean?) The Committee should consider why the existing SEC requirement would be insufficient in this case. We also need to find out the basis and rationale for the existing SEC requirement. Consistent with the broader risk assessment, it would also be beneficial to assess alternative means to recognize that the U.S. Government has a range of relationships that are specifically intended to open up relationships in a less restrictive manner.
- Low vs. High Risk
 - Tony – the way the proposed rules are currently established, one has to meet all 12 and then you are classified low. No commercial entity could meet all 12 criteria. By default everyone should be low, but if you meet certain criteria then you should be classified as high.
 - Tahara - NOAA has the discretion to make them high regardless
 - Gil – I don’t think the Committee should put forward recommendations that we judge would be unacceptable under any circumstances to the DoD and the Intelligence Community. Blanket classifications are unlikely to be viable.
 - Henry Hertzfeld-- The regulations say relative risk to national security – that’s unclear as to what that truly means. We cannot predict other nations’ regulatory environment.
 - Gil – Some U.S. allies take a more stringent position regarding risk than does the U.S. Government
 - Dr. Jamie Morin– From an industry perspective the draft regulation offers two value propositions. One is the addition of the “low risk” category for the easiest missions to approve. That is designed to be very fast and light footprint. The second is the significant streamlining of the approval process for all other missions. Even activities that don’t fall into the low risk category will benefit from faster review. As the committee thinks about potential recommendations, we should recognize that there are tradeoffs between how large a share of missions fall into the low risk category and how streamlined that review is – if higher risk missions are moved into low risk, we should expect that the scrutiny there will need to get more serious to protect other equities.
 - Brian – The entire system is a presumption of yes, but the process seems long
 - Tahara – Most universities fall into low risk. What do you want to see fall into low risk?
 - Brian- The structure of two cats are good, but the semantics are a little off. The criteria to meet low risk are questionable and why do you need to meet all of them is questionable as well.
- Encryption
 - General discussion around the hijacking of a satellite – The group discussion why encryption is needed solely because of propulsion.
 - Gil – What is the rationale for encrypting? Is there a concern about data OR a need for cyber protection? We need to parse the data protection piece from the intelligence value of the information itself, as opposed to encryption measures taken to protect the safe operation of the spacecraft.
 - Brian – rationale seems to be a concern that any satellite with propulsion can be turned into a weapon, but that’s not true unless the satellite is equipped for RPO capabilities.

- David – Encryption is not the protection that the government is looking for. What is desired is authentication – that the command sent to the spacecraft is valid. If communication needs to be secured, look towards using authentication.
- Tahara – Are you suggesting a different way to authenticate low risk vs high risk?
- Gil- It is very important the final rule include an opening discussion that lays out the “what and why” changes have been made. For example, include some detail about the rationale for tiering/differentiation. It’s important to set the context so that everyone is clear on the regulations, and the rationale for the changes.
- Brian- The 30 day prior to notice is easier to deal with than 90 day notice or requiring prior approval. At the minimum, there also needs to be some discussion on the process of expediting approval and/or a waiver process.
- Gil – What’s the rationale for the notification?
- Tahara – That restriction has evolved, but we can’t go into detail on the evolution.
- Gil – There are ways to handle this without requiring 30 days prior notification. A middle ground needs to be established.
- Dr. Volz – Why is it in our interest to remove the 30 day requirement?
- Gil – The committee is more comfortable with notification.
 - The homework for the task force is to:
 1. Come back with rationale for removing the 30 day requirement.
 2. A recommended waiver process.
- Brian – In reading of the rules if one is doing imagery of more than 3x3 pixels – one must have prior consent. If you have not received permission, you can’t keep the data. That’s very restrictive especially for companies wanting to remove debris. This is basically saying don’t do anything better than the DoD. The requirement for prior owner/operator consent should be eliminated for known/cataloged items.
- David – As drafted, the constraints go far beyond what can be done from the ground. It places us at a severe disadvantage.
 - Brian – There are no restrictions on what can be done with ground-based remote sensing because those don't require a license.
- Tahara – We will hold another meeting with the task group. We’ll have the task group submit formally and summarize all other comments discussed here. Items that we were unable to discuss, you can submit for your company individually.
- Gil – I recommend that we have another full committee meeting because this set of topics needs a fair amount of discussion.
- Tahara – I will submit paperwork for an emergency meeting on July 11, 2019. Your presentation will be submitted for the official record.

SAR Task Group Updates: Briefed by Mr. David Langan,

- Established after previous ACCRES meeting to review landscape and identify barriers for industry for the US.
- Conducted several meetings and recruited others. NOAA was involved and Tyvak. The work group created an interim report and it was submitted to Gil Klinger.
- 1. Financial support – industry specific grants, loans, tax credits.

- 2. Phase history data – what is it/it's confusing. Recommendation for definitions were provided Sales of this data be permitted to specific industries.
- 3. Present spatial resolution restrictions – recommendation to reduce to less than the current limit. The broad movement of commercial SAR is towards 25cm commercial movement. Resolution drives the economic value of the data.
- 4. Direct downloads – Concern on providing it to foreign assets.
- Remove recommendations to NIIRS; Address ambiguity in the language.
- Gil - What's the regulatory limit for the US – 50 cm.
- Brian – There are also companies who are now working to fuse both radar imagery and RF signal detection, particularly for maritime surveillance.
- Tahara – All of these task groups were put together before the NPRM . A lot of these comments should be rolled into specific comments in the NPRM. We need to know how the regulations are holding the industry back yet again. We need to know the specifics and not just the big picture.
- Dr Volz – About adding SAR data with something else. Look at the addition of two or three – the value of interoperability of aligning several together.
- Paul- The requirement that SAR data be downlinked in the US. That's a big concern to many companies.
- Gil – This is the text book case of what CRSRA is all about.
- We should think about having a classified session with our National Security advisors.
- Tahara – We need to explain this in an unclassified way so that everyone has access to the information.
- Dr. Volz – The point of this group is to give us ammunition
- Gil to David – We need to sharpen our pens – David we have several specific recommendations on how to edit certain rules. Tahara – the impact piece will be very important.
- Would the annex carry over – the rule is designed to be self-contained.
- Brian – This whole example of what happened with commercial radar imagery in the US.
- Gil – To the point you made this morning about presenting benefits to the Government. The value of the classified conversation is to strip away things that MUST be talked about in that environment.

DPP Task Group Updates: Briefed by Mr. David Langan

- The group convened several times via phone.
- We were tasked with analyzing and revising the Data Protection Plan template.
- A consolidated draft was formulated and forwarded to the ACCRES chair and regulatory body. It appears that the DPP is no longer required, but that depends on the NPRM.

Recommendations

1. Licenses default to use NIST- approved modes of operation.

2. Encryption provides confidentiality, but it alone does not prevent an actor from (inaudible). Authentication is needed.
3. Licenses to consider these as first choice of modes.

The committee accepted the recommendations.

National Space Council – Scott Pace

- There is some overlap in what we (the Space Council) are doing in the transportation organization. It is important to come up with a consensus.
- Noted that this is for a larger international environment than originally planned/thought of.
- In early 1990s the council, under Vice President Dan Quayle, there were various issues that included, but were not limited to high resolution, access from other companies, etc.
- In January 1993 – we went out to industries of different sizes to get different views, but we did not foresee how technology would change – we did not think about it.
- We need to seize the future – in this space technology environment – space technology.
- Globalization was spawned with foreign competition
 - Chinese commercial space companies are looking for opportunities in the commercial space sector.
- The American space industry should be “second to none” – we want to enable regulations. We have modernized our posture. Our goal is for firms to come/grow within the US and regulations are crucial to make this happen
- We would love to see our analysts spending time/effort on cutting edge things, but we need our underlying regulations to be strong and to support their efforts.
- There is some encouraging news as we have made inroads in other areas:
 - export controls;
 - to improve the user experience; and
 - addressing the challenges in space traffic management.
- Questions
 - Dr. Volz – any comment on what would be an appropriate regulatory floor for entrepreneurs to get into space?
 - Cyber security as there are attacks regularly. We need to look for improvements from where we are today.
 - We need to set the best standards and practices.

Committee Discussion

- Gil – What’s the most effective way to provide information? Tahara - Public should be in the NPRM. When it comes to the licenses, that feedback should be sent to us directly.
- Gil – One thought some of us represent some portion of the industrial base. Is there a way for us to run up a flagpole to inform folks that we need/want comments?

- Volz – The intention is to establish a process that occurs more frequently. Identify that in your recommendation (for the revisit) add focus on the importance of regular re-visits
- Gil – In terms of recommendations to Secretary Ross, NSPD-27 is outdated and does not reflect the existing marketplace for commercial remote sensing. It would add value is to issue a new national policy that will replace NSPD-27. This might be a jointly led update, including both the National Space and Security Council staffs.

General Committee comments

- Tahara – Please send recommendations/Michelle’s chart to the entire committee, then we will have a public meeting to air those out. We will then subsequently submit comments for the official record.
- Jaime – Is the goal is to produce something that would represent an official recommendation?
 - Conduct a working session with goal of drafting an 85% solution. Michelle or a designee should update and circulate the document for final review from committee and at which time this information should be made available to NOAA (by July 14th)
- What constitutes committee approval?
 - Consensus
 - You all should take another pass at the suggested changes that emerge from this ACCRES conversation (and subsequent near future discussion) and the Regulatory Task Group’s chart
- Tahara – One of the areas that we, CRSRA, struggle with is determining/defining who the licensee is – is the operator, the owner of the camera or both. The next presentation sheds light on the innovation and challenges within the space community.

Public Comments

- No public comments were given at this time

Making Space Simple: How Loft Orbital Provides Space Infrastructure as a Service – Alex Greenberg

- Thanked Tahara and Alan for the inclusion.
- Example of how new models for providing space-based infrastructure and services challenge existing licensing paradigms. COO – Started up in San Francisco.
- Makes it simple for a business/government to access low Earth orbit. Loft owns and operates microsattellites, and flies customer payloads onboard. Loft handles the entire mission on behalf of customers, enabling them to focus on payload development and data exploitation. Loft is building the technology and products to accommodate multiple sensors on a single satellite, while giving customers complete ability to request payload tasks.
- Co-founders came from Spire and had experiences with customers that wanted to put a variety of unique payloads in low Earth orbit. A significant opportunity is to be the platform provider in space and to collect any kind of data.
- Solving many issues on behalf of their customers: tech complexity, long development cycles, complex regulatory and lengthy procurements.
- 50 – 100 kilogram class is their focus – a single customer or rideshare for multiple customers.

- For organizations trying to collect and distribute lower orbit data – We want to make their lives easier to provide access as a service.
- Making everything plug and play – to win on speed, simplicity, and affordability.
- Unique – A satellite company that doesn't build satellites. Looked at the small satellite life chain – We can buy off the shelf satellite buses.
- We focus on two key products. We use the same exact technology to fly any kind of payload:
 - 1. Payload hub – A combination of a mechanical accommodation unit and an interface control unit, which acts as a data interface between the payloads and the bus.
 - 2. Cockpit – Enables customers to request tasking.
- In general, data is completely owned by the customers.
- Spoken to 250+ customers over the last two years. The service is payload agnostic – allows them to talk to the entire industry.
- On the customer side – start-ups, international companies, government.
- First mission – Yam2 (yet another mission) – repeatable mission(s).
- The payload hub is the only thing that flies each and every mission. The Payload Hub de-couples payload development from satellite bus development. The impact is that Loft can use a virtually unchanged satellite bus for each mission, despite varying payload configurations. The company's goal is to restrict non-recurring engineering to a bare minimum, to facilitate fast deployments of missions.
- Maintain shutter control the entire time. There is a customer interface – scheduling algorithm in the cloud – the customers interface is very easy and intuitive.
- Business model – the capital requirement of a space mission are a burden for most customers in the space industry. Loft spreads out payments (quarterly), pay post launch, they have agreements in place SLAs which dictate if they get paid.

Questions

- Question-Todd Harrison - How do you maintain shutter control?
 - Answer – We can cut downlink, and turn off a payload. The ordering system is simple. Company controls the payload.
- Question for NOAA – Who has the license?
 - Answer-No one has the license and they are coming to talk to NOAA. US owns their sensor.
- Question-Would this be considered a US satellite?
 - Answer – Yes.
- Question-Brian – Who would register the satellite – US or India? Who have you talked to in the U.S. Government?
 - Answer –We have not engaged with the government
- Question– With regards to the remote sensing data – are you keeping the data?
 - Answer-- We may hold on, as a buffer, but we aren't adding value, monetizing, etc – we simply deliver it.
 - Question-Do you retain anything?

- – A-For a couple of weeks, but we don't build an archive.

- Question – What about ground stations?
 - Answer--We have a number of different ground station partners – the first partner is KSAT.
- Question-- -You mentioned the system could be built in the U.S. or internationally would that be turnkey?
 - A – Part of the reason that we opted for a U.S. provider was to avoid any ambiguity. We'd still license through the FCC. The only change would be importing hardware to the US. It would not be delivered on orbit.
- Question-- Ann- Will Yam2 operate under your license?
 - Answer – Assumption is that Alex is licensee and things will operate under their license.
- Question-Doesn't the burden fall on them to operate?
 - Answer-Tahara - they have operational control

Statements

- Tony - It may be helpful to ask industry who they want to be the licensee and how to structure it.
 - Alex – We view ourselves as making NOAA/the government life easier for those in the industry
- Statement from CRSRA-We had another company that came before and all of their cameras had their own license
- Alex – We only sell the customer what they specify up front. If there is a geographical exclusionary area over their area – The company controls what they see
- Tahara agrees that one challenge with the current regulatory framework is to make data available to the national archive – that's a hangup.
- Derrick - In the new regulation they proposed that no data be provided to the archive, but that's under review.
- Paul- Who is the burden on to copy to the archive – Alex-The customer

Space Economy – Dr. Bhavya Lal

- We will talk about the size of the space economy and the genesis of this was the constant communication of \$360B.
- Wanted to examine the underlying technology
- Three challenges:
 - 1. Multiple categories and things are double counted - overcounted \$8 – 20B;
 - 2. Includes services that are generated on the ground – adds ~\$80B; and
 - 3. Includes cost unrelated to space – navigation equipment, data analytics – adds ~\$70B.
- On the whole we believe that the space economy is about ½ the size of current projections.

- Projections started with a very high base.
- Include second order impacts.
- We need to fix the boundaries of what's in and what's out.
- Challenges with numbers – they seem inconsistent with trends.
- We realize that predictions are hard to make, but there are some clear errors:
 - Comparing unlike items, misunderstanding of technologies and difference between the final and derived demand.

Questions-

- Question- How should the scope of the space economy be defined?
- Statement-Henry– No issue with what you said. We are often asking different questions and the numbers are the product of different issues.
- Question-Brian – Is there going to be a report?
 - Answer-We want to publish the report. How do we provide ammunition for Commerce to act on behalf of the industry? Bhavya is working on getting it released publicly. It's getting more difficult to get numbers – between classified programs and proprietary information. Companies are not willing to provide information.
- Question-Do we consider money for space and there are things that enable and/or are enhanced by space?
- Question-Gil – Have we framed the question OR do we have the right question? There are both qualitative and quantitative pieces – what exactly are we measuring?
- Question – What can you do to help us advocate for more open competition?
 - Answer – frame the question back around to the value. Leadership, first and best. We need to quantify things.
- Question-Is the assertion that we can scale back our investment into this sector of the industry – what are the secondary and tertiary implications?
- Question-Sima – Have you looked at the US space economy?
 - Answer-We only looked at the global space economy. That level of data needs to be factored in.
- -Henry Hertzfeld- You have to divide this type of analysis to a number of segments b/c the government is a huge purchaser of all types of data.
- Brian - Keep in mind that the other side of the debate – can make a life and death argument, as was done in the fight against turning off Selective Availability for GPS. We can't just focus on the number side, need to be able to counter the life/death argument.

In the July meeting – we'll do the CRSRA update. Our current update will be posted on the website.

Public Comments

- Amy Kirk (concerned citizen) Sub-1m resolution imagery over Israel is currently available from at least 4 non-US satellite companies: Airbus (French), Kompsat (South Korea), DMC3/TripleSat (Anglo-Chinese) and Deimos Imaging (Spanish operator with overall Canadian ownership). These details are recorded in a paper on the Kyl-Bingaman Amendment published online in the journal Space Policy in March 2018, with the paper including a figure showing the extensive archive coverage that the companies already have for their products covering Israel. Is there going to be a report on the methodology on how the data was attempted? Europeans have been able to purchase the data.
 - Tahara – We did post a federal register of the findings. We will re-look at the Kyl-Bingaman Amendment next year and will take another look/do another study.
- Thanks Tahara and the committee. During the discussions have to through about the mismatch between the two tiers low/high res. Have you thought about proposing a middle ground tier that?
- Derek – We can consider and welcome comments. Low or High and high can be novel (which will push you in the streamlined process). TD – as we were implementing the DPP – we had three buckets, but we only have companies in two categories, but it was hard to find the middle ground.
- Adonica – We were suggesting or seeking a comment/input does the regulatory task group have the ability to create a sub-committee with industry that others can participate in.
 - Tahara – the membership is now closed. We ask that everyone respond to the NPRM.

Closing Remarks & Wrap Up – Gil Klinger

Steve closing comments

- Thanked everyone for their efforts. Other duties as assigned. I am looking forward to receive feedback from industry and we really value your opinions.

Gil closing comments

- Gil asked folks around the table for comments.
- Gil thanked everyone for their participation and for the public as well. Thanks to the study group – acknowledged Michelle. We will be back together much sooner than later.