

Advisory Committee on Commercial Remote Sensing (ACCRES)

Tuesday, June 23- Thursday, June 25, 2020 10:00 AM – 1:30 PM via Cisco WebEx

Meeting Attendees**Committee**

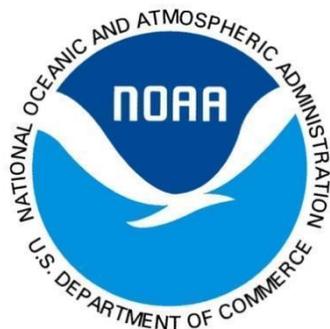
- **Mr. Gil Klinger** (Chair), Vice President of Space, Intelligence, and Cyber, Raytheon Company
- **Mr. Payam Banazadeh**, CEO & Founder, Capella Space
- **Mr. John Bellardo**, Professor of Engineer, California Polytechnic State University
- **Mr. Gregory Black**, Deputy Director, Office of Ventures and Innovation
- National Geospatial-Intelligence Agency
- **Ms. Patricia Cooper**, Vice President of Satellite Government Affairs, Space Exploration Corporation
- **Mr. David Germroth**, Senior Advisor, Defense and Intelligence
- **Mr. Todd Harrison**, Director for Defense Budget Analysis and Senior Fellow, Center for Strategic and International Studies
- **Dr. Henry Hertzfeld**, Director, Space Policy Institute, George Washington University
- **Mr. Adil Jafry**, President & CEO, Chandah Space Technologies
- **Dr. Bhavya Lal**, Research Staff Member, Institute for Defense Analyses
- **Mr. David Langan**, CEO, Umbra Lab, Inc.
- **Mr. Tony Lin**, Partner, Hogan Lovells
- **Ms. Anne Migalrese**, CEO, Radiant Earth
- **Dr. Jamie Morin**, Vice President of Defense Systems Operations, The Aerospace Corporation
- **Mr. Kevin Pomfret**, Founder, Centre for Spatial Law
- **Mr. Robert Schingler, Jr.**, Co-Founder and Chief Strategy Officer, Planet Labs
- **Dr. Brian Weeden**, Director of Program Planning, Secure World Foundation

Special Guests

- **Senator Ted Cruz, Texas (R)**, Chairman, Subcommittee on Aviation and Space
- Senate Commerce, Science, & Transportation
- **Congressman Brian Babin, Texas (R)**, Ranking Member, Subcommittee on Space and Aeronautics House Science, Space, & Technology
- **Congresswoman Kendra Horn, Oklahoma (D)** Chairwoman, Subcommittee on Space and Aeronautics House Science, Space, & Technology
- **Dr. Scott Pace**, Executive Secretary, National Space Council
- **Mr. John Hill**, Principal Director for Space Policy, Office of the Under Secretary of Defense for Policy, Department of Defense

Department of Commerce/National Oceanic and Atmospheric Administration

- **Mr. Wilbur Ross**, Secretary, Department of Commerce
- **Dr. Neil Jacobs**, Assistant Secretary of Commerce for Environmental Observation and Prediction, performing the duties of Under Secretary of Commerce for Oceans and Atmosphere, Department of Commerce
- **Mr. Mark Paese**, Deputy Assistant Administrator for Satellite and Information Services, NOAA
- **Ms. Tahara Dawkins**, Director, Commercial Remote Sensing Regulatory Affairs and Committee Designated Federal Official, NOAA
- **Mr. Glenn Tallia**, Section Chief, Weather, Satellites and Research Section, NOAA Office of the General Counsel
- **Mr. Kevin O'Connell**, Director, Office of Space Commerce

**Meeting Minutes****Day 1****10:00 EDT, Tuesday, 23 June, 2020**

ACCRES Welcome & Introduction of Speakers

Tahara Dawkins, Gil Klinger, Dr. Neil Jacobs

- Tahara Dawkins, Director, Commercial Remote Sensing Regulatory Affairs (CRSRA) and Designated Federal Officer, welcomed participants to the 27th Meeting of the Advisory Committee on Commercial Remote Sensing (ACCRES) (hereafter, "the Committee") and thanked them for their patience as the conference call audio was brought online.
- Gil Klinger, ACCRES chair, thanked Ms. Dawkins and Dr. Jacobs and gave the floor to Dr. Jacobs.
- Dr. Neil Jacobs, Assistant Secretary of Commerce for Environmental Observation and Prediction, performing the duties of Under Secretary of Commerce for Oceans and Atmosphere and Acting NOAA Administrator, thanked many of the day's participants, including
 - the Chair of the ACCRES Committee Mr. Klinger,
 - the attendees of the 27th Meeting of ACCRES, stating that the National Oceanic and Atmospheric Administration (NOAA) and the Department of Commerce (DOC) are happy to see so many participants, and
 - the Committee for its work on the recommendations to NOAA on the final rule for the Licensing of Private Remote Sensing Space Systems (hereafter, the "final rule").
- Dr. Jacobs stated that he looked forward to working with the Committee as CRSRA begins to implement the final rule, for which he then provided background information.
 - The final rule was published in the Federal Register on May 20, 2020.
 - NOAA worked on the rule for over two years.
 - There were multiple rounds of public comment on the rule, including comments by the Committee.
 - The final rule adopts one of the Committee's key proposals, which was to categorize private remote sensing space systems based upon data available from NOAA-licensed sources and sources not licensed in the United States (U.S.).
- Dr. Jacobs highlighted the largest changes to the final rule, such as
 - streamlining the licensing process and timelines,
 - reducing the number of permanent conditions on most licenses to those required by law and international obligation, and
 - prohibiting retroactive changes.
- Dr. Jacobs stated that the final rule has been well-received by industry and that the majority of the 27th Meeting of ACCRES would be devoted to discussing
 - changes in the final rule,
 - changes introduced to the licensing process, and
 - implementation of the final rule.
- Dr. Jacobs repeated his thanks for the hard work of those who worked on the final rule.
- He introduced the morning's first speaker, Senator Ted Cruz of Texas
 - Senator Cruz took office in 2013.
 - Senator Cruz sits on the Senate Committee on Commerce, Space, and Transportation and is chair of the Subcommittee on Aviation and Space.
 - He is a long-time supporter of commercial space industry and has been involved in multiple pieces of space legislation including sponsoring the U.S. Commercial Space Launch Competitiveness Act, enacted in 2015.
 - Dr. Jacobs added that NOAA is grateful for the senator's support of the forecasting initiatives of the National Weather Service

Interim

Gil Klinger, Dr. Neil Jacobs

- While waiting for Senator Cruz to join the line, Mr. Klinger again thanked everyone for taking time to join the ACCRES meeting and repeated that there is a busy agenda.

- He pointed out that during the meeting, the Committee would spend lots of time hearing about the final rule, but that he would be remiss not to recognize the hard work on the part of the staff at NOAA—particularly Ms. Dawkins (CRSRA) and Mr. Glenn Tallia (Office of the General Counsel)—who were able to overhaul the federal government approach to regulating private remote sensing space systems to the benefit of companies, universities, and value-added service providers.
- Dr. Jacobs added his thanks to Ms. Dawkins and Mr. Tallia, stating that he was impressed and grateful for their work on this complicated, complex issue.

American Leadership in Space Commerce

Senator Ted Cruz

- Senator Cruz thanked the Committee for inviting him and opened with an overview of how commercial remote sensing and the commercial space sector, in general, is booming.
 - No longer is space an uninhabited void—from global positioning system (GPS) to communications, weather, and imaging satellites, space has become an integral part of the world economy and everyday life.
 - It has become the next frontier of exploration and international commerce and economic growth.
 - By some estimates the space sector will grow between 1 and 3 trillion dollars in value in the next 3 decades alone. The growth potential is phenomenal.
 - Senator Cruz highlighted ventures—like asteroid mining and in-space manufacturing—by traditional companies and startups that will open new markets.
- Senator Cruz stated that the world of space looks very different today compared to the pre-space race world of 60 years ago and gave several examples:
 - America and the Soviet Union are no longer the only players,
 - government space programs are no longer the only game in town, and
 - technological capabilities to plan missions, the objects that are launched into space, and the duration of those objects' flights are exponentially greater than they were when the space race began.
- Senator Cruz used the Crew Dragon launch as an example of how government continues to leverage the commercial space industry for data, launch services, exploration, and more and noted that it is increasingly important that the U.S. creates the kind of flexible statutory and regulatory framework that allows the commercial sector to flourish
- Senator Cruz congratulated CRSRA on publishing a forward-looking rule that is sufficiently flexible to allow U.S. companies to compete on a level playing field with companies across the world while still protecting national security. The final rule on Licensing of Private Remote Sensing Space Systems, and progress made in commercial space, act as proof that the nation can make important strides in updating its space policy despite partisan interests in Congress that have been preventing space-focused legislation from moving forward. But, much remains to be done.
 - For example, the final rule is a step in the right direction and a marked improvement over the proposed rule, but the implementation will determine if forward progress is made.
 - Senator Cruz believed that if the updated licenses don't end up reflecting the philosophical changes espoused by the final rule, legislative reform will be even more necessary to help move the commercial space industry forward.
 - The Office of Space Commerce (OSC) needs to be elevated to a Bureau of Space Commerce so that commercial space is elevated.
 - Senator Cruz acknowledged that space commerce is here to stay and needs the representation and regulatory certainty that will allow it to keep growing.
 - The jurisdiction over and regulation of non-Earth imaging (NEI) remains a big question.
 - Senator Cruz highlighted that it is unclear who has the authority to do these things and how much authority they have; determining this will be very important to the space economy.

- Senator Cruz said that progress made in commercial space has been a bright spot this year, and there is much to be proud of. Although he stated that he is not optimistic about the legislative prospects for space statutory reform this year, there is still time for that to occur.
- A member of the audience asked Senator Cruz what he believes the U.S.'s long-term goals in space should be.
 - Senator Cruz responded that he has tried to bring certainty, clarity, and bipartisan cooperation to the arena of space.
 - He stated that he believes it is neither the exclusive role of government nor of the commercial sector to lead in space, but to engage in a joint partnership. There are certain elements of space that the government must lead in, but because those elements are so capital-intensive, they must leverage massive private investment. Private capital is coming into the space sector and opening new possibilities. The SpaceX Crew Dragon launch was an example of this.
 - He also stated that it is the objective of U.S. space operations to put the first human on the surface of Mars and that as a proving ground for going to Mars, the National Aeronautics and Space Administration (NASA) is moving forward with the Gateway and returning to the Moon. The lunar program will create a sustainable habitat for ongoing research.
- A member of the audience noted that the final rule places the burden of national security on the U.S. Government (USG). The audience member then asked, as an advocate of the Space Force, what role Senator Cruz sees for that organization in protecting the U.S. against evolving commercial space capabilities worldwide?
 - Senator Cruz replied that the establishment of the Space Force is an important milestone because space is the next great domain for military conflict. Although many would prefer there not to be conflict in space, that vision is no longer connected to reality. The U.S. must harden and defend its architecture and be prepared to defend national security.
 - As long as space responsibilities were located in the Air Force, space was a secondary concern. The major benefit of a separate Space Force is that there is now leadership that focuses on space.
 - The Space Force's role will be to protect Americans and American interests in space.

American Leadership in Space Commerce

Congressman Brian Babin

- Dr. Jacobs introduced Congressman Brian Babin, who has served the 36th district of Texas since 2015. He is the ranking member of the Subcommittee on Space and Aeronautics, House Committee on Science, Space, and Technology, and supports space policy and NOAA's program to produce timely and accurate weather forecasting.
- Congressman Babin thanked the Committee for inviting him to speak, saying that, while an obscure topic, commercial remote sensing (CRS) provides immense benefit to the nation. He listed examples such as security, energy, economy, human rights, and agriculture.
- Congressman Babin reviewed his involvement in the American space industry including
 - chairing the House Subcommittee on Space and Aeronautics for 4 years,
 - acting as ranking member of that same committee now, and
 - oversight and regulation of American CRS industry.
 - Congressman Babin also noted that he co-sponsored the Commercial Space Launch Competitiveness Act of 2015, which began the conversation on CRS licensing transparency and streamlining.
 - He reviewed opinions that he has previously published that under the previous licensing regulations, long licensing times, a lack of transparency in conditions, retroactive conditions, and the threat of shutter control were damaging to U.S. industry.
 - He stated that future regulations need to support the growth of new space activities such as hyperspectral sensing, radio frequency tracking, and on-orbit servicing so that the market segment for those activities is not lost, as it was for synthetic aperture radar (SAR).
- The Congressman reviewed the Administration's Space Policy Directive-2—to update and streamline space regulation, including on private remote sensing—was vital to precipitating the update to CRS regulation. While

the original draft rule was not sufficient, the final rule published in May is a “step in the right direction” that will allow American companies to compete in this emerging high tech frontier.

- Congressman Babin stated that the Administration remains limited by the outdated Land Remote Sensing Policy Act of 1992.
 - Congress must update the Land Remote Sensing Policy Act of 1992 to reflect today’s technological landscape.
 - Congressman Babin stated that he believes the final rule could result in USG reverting to its old ways depending on how the rule is implemented and if licensees are subjectively placed in the highest tier.
 - The government interpretation of “Land Remote Sensing” has expanded, yet Congress has not given the government the ability to regulate remote sensing from space or to regulate other satellites.
 - Domestic regulation does nothing to help national security because other nations already have the same capabilities; rather, domestic regulation could do harm to the industry by pushing companies and capabilities overseas.
- The U.S. must fundamentally rethink how the space remote sensing industry is viewed for the following reasons:
 - it is no longer a Cold War space technology,
 - it is an information technology that requires a different regulatory philosophy,
 - the U.S. isn’t the only nation with this industry,
 - the geospatial and remote sensing sectors are global information technology, and the U.S. should facilitate their freedom,
 - aircraft, drones, cell phone cameras, etc., offer similar data, and
 - while space-based remote sensing is unique and presents its own strengths and limitations, it should be viewed in the context of an information technology regulatory framework.
- Congressman Babin advocated new legislation that would consolidate CRS regulatory functions in the OSC and elevate that office within the DOC to allow better coordination with other offices, such as export control. By returning the regulatory office to DOC, where it is authorized, the move would strengthen the Secretary’s ability to advocate for U.S. industry with international partners.
- Congressman Babin thanked a number of entities for their hard work in advocating for and advancing the U.S. CRS industry:
 - the President,
 - the National Space Council,
 - Dr. Scott Pace,
 - Kevin O’Connell,
 - Gil Klinger,
 - the ACCRES members,
 - and CRSRA and DOC staff.
- Congressman Babin concluded by noting his excitement about the national space program and the U.S. Space Force. He stated that it is not the will of the U.S. to push warfighting into space, but that U.S. adversaries have done so. For that reason, he is gratified by the creation of the Space Force.

Remarks and Committee Questions

Gil Klinger

- Mr. Klinger began Committee discussions by noting similarities between comments made by Senator Cruz and Congressman Babin.
 - The final rule has been applauded and is a good paper regulation, but the devil is in implementation; how the final rule is implemented could cause the ideas to crash and burn, so it will be important to see that the new licenses reflect the intent of the final rule.
 - There needs to be a hard look at the regulatory process for synthetic aperture radar (SAR). SAR is not electro-optical imaging, and it would be beneficial to think about what the key elements within regulatory processes for SAR are that ensure that what needs to be protected is protected. The same metrics used for

electro-optical imaging cannot simply be applied to SAR because they are not appropriate metrics for SAR.

- There needs to be a hard look at the Land Remote Sensing Policy Act of 1992 with an eye to how it needs to be updated and revised in the current space environment.
- The final rule is a stepping stone along a path that needs to continue to drive U.S. industry.
- Mr. Klinger introduced Dr. Scott Pace, who is Executive Secretary of the National Space Council and has led a long, distinguished career of public service and has catalyzed the continued growth and expansion of professionals in space disciplines through his work at George Washington University.

National Space Council View of the CRSRA Rule

Dr. Scott Pace

- Dr. Pace thanked Mr. Klinger for his chairmanship and the opportunity to speak at ACCRES.
- Dr. Pace began with comments on Space Policy Directive-2, which pushed this regulatory modernization posture.
 - The Federal Aviation Administration (FAA) continues to work on their streamlined launch regulation.
 - Regulatory reform will meet increasing foreign competition from China, which has growing capability in space across the board but also is increasing its influence in countries that are interested in using space for their infrastructure.
 - The USG is working on making space a normal part of a whole range of areas in the U.S. economy.
 - The obvious goal is removing bureaucratic hurdles and barriers.
 - National security is still important, but we have recognized the need to update the regulations to keep up with changing markets. The final rule has taken that in the right direction by paying more attention to foreign availability and less to national security.
- Dr. Pace then reviewed the final rule.
 - The Notice of Proposed Rulemaking (NPRM) was released on May 14, 2019, and the final rule was issued May 19, 2020. A one-year turnaround is good.
 - The final rule becomes effective on July 20, 2020.
 - Generally, he has been hearing positive feedback so far.
 - DOC is no longer accepting public comment.
 - The final rule was the result of extensive discussion. The fundamental changes are
 - retaining the notion of categories of systems,
 - looking at whether the unenhanced data generated are available here in the U.S. or from foreign sources,
 - eliminating most permanent license conditions, and
 - retaining bare minimum of permanent conditions.
 - The devil is in the details. For instance,
 - how quickly can USG move licenses through the interagency when special conditions are required, and
 - is there general agreement on availability and on the national security conditions that will still be required.
 - The officials that wrote the new regulations are responsible for implementing them, which is good
- Dr. Pace then turned to the DOC's role in space traffic monitoring.
 - He uses the term "space traffic monitoring" because we are a long way away from a true space traffic management (STM) construct.
 - We have to achieve situational awareness for both military and commercial purposes; without improved situational awareness, USG cannot accomplish light-touch regulation but will instead need rigid command and control requirements.
 - The next step is ensuring that the OSC is growing and maturing its cooperation with operations at Vandenberg Air Force Base.

- Attention is turning to improved conjunction warnings, what norms and behaviors for international players will look like, and long-term sustainability of space activities through operations.
- DOC is leading an interagency orbital debris mitigation working group.
- Doing nothing is unwise, but there is no historical data to tell the space community if these are good ideas or not. It is important to make sure that whatever orbital debris or maneuverability rules are published are doable and effective. There will be trade-offs between the zero-risk aspirational goal and a one-in-ten thousand risk.
- A member of the Committee asked if Dr. Pace could speak to ongoing reform of export control or spectrum coordination.
 - Dr. Pace replied that the general movement of space technology items from the U.S. Munitions List to Commerce Control List is not likely to see movement. Focus has been on improving the user experience, which includes streamlining the process and responding to companies.
 - He noted that spectrum is tougher because the Federal Communications Commission (FCC) is an independent regulatory entity. On topics like orbital debris mitigation, there can be good conversations and collaboration, but the FCC doesn't report to the president. It is an issue. The FCC needs to be educated and informed on space-related rulemaking.
- A member of the audience asked how Dr. Pace sees the new regulations changing the international regulatory environment. Will they drive change elsewhere, and what might that change look like?
 - Dr. Pace responded that the regulatory reforms in the U.S. have had the effect of driving change. This doesn't mean others copying the U.S., but instead thinking for themselves, what is it they want to do? For example, the Europeans are developing their own approach to STM after hearing the U.S. talk about its efforts. The Japanese have been developing a space sector focused on both national security and commerce. The important driver is not that other countries will adopt the same approaches, but that they come away with their own positions and views.
- A member of the audience asked if regulators across government have begun to work together toward a “one-stop shop” for space regulation.
 - Dr. Pace is skeptical that the U.S. will be able to get to a one-stop shop where there's one agency that does everything. That's an ideal that the U.S. should work for, but in lieu of that, we should make sure the interagency process is as smooth and fast as possible. Changing the role of the FCC would mean changing the 1934 Communications Act, and that is a bigger deal than just the space community. Anything that touches national airspace has to go through the Department of Transportation—those functions (launch and reentry) can't be pulled out of the FAA. DOC needs to lead everything beyond the atmosphere, and there needs to be a stronger roll for the OSC.
- As a follow-on question, a member of the audience asked what responsibilities Dr. Pace would like to see the OSC/DOC adopt to continue strengthening the U.S. space industry.
 - The first thing Dr. Pace would like to see the President's budget request for OSC be accepted so that OSC is fully funded. There don't need to be new regulatory authorities, but DOC needs to be funded because that's how it can get stability and resources.

NOAA Overview on the Final Rule *(presentation attached)*

Office of the General Counsel, NOAA

- NOAA's Office of the General Counsel (Glenn Tallia, Kate Abbott, and Derek Hanson) provided the Committee and guests with a detailed explanation of the final rule on Licensing of Private Remote Sensing Space Systems, highlighting that the final rule's intent represents a paradigm shift from a regulatory structure based upon the risk commercial remote sensing systems pose to national security to one focused on transparency and adaptability to increasing domestic and foreign remote sensing capabilities. They then went into the details of the final rule, explaining how licenses will be placed into tiers based upon the availability of substantially the same, unenhanced data either in the U.S. or from non-U.S. sources, what the permanent conditions on each tier of licenses will be, and how temporary conditions will be applied.

- A member of the public asked if the cost of data is considered in availability.
 - Ms. Abbott responded that cost is not generally considered a part of availability as defined in the final rule. That said, the data must be “readily and consistently” available, so an exorbitant cost might possibly make data unavailable.
- A member of the Committee noted that there is the opportunity for an applicant to identify competitors and suggest their own tier. The member asked if CRSRA is performing its own analysis of what companies are providing CRS data and what data they are providing, and will this be publicly available.
 - Ms. Dawkins replied that on July 20th, CRSRA will post availability information on its website.
- In follow-up, that member asked if it will be transparent or obvious from the published information and initial license determination which tier an applicant will fall in.
 - Ms. Dawkins replied that for Tier 1 licensees, the tier will be obvious. For Tier 2 and Tier 3 licensees, CRSRA will have reached out to each company and provided them with the opportunity to submit evidence of availability of substantially the same data.
- A member of the public asked if a company owned in Mozambique but operating in Delaware would require a CRSRA license.
 - Ms. Abbott clarified that a Mozambique operation that operates its system in Delaware would be under CRSRA’s jurisdiction.
- A member of the Committee asked a question about NEI, pointing out that there is a whole class of satellites that will only be providing things like space situational awareness (SSA) or inspection or servicing. What happens to these? In order to tier these, you would be looking at a separate category of what is available in the global market of NEI products and data.
 - Ms. Dawkins responded that CRSRA would look at a separate category of available data.
- The Committee member pointed out that companies applying NEI aren’t doing remote sensing and that CRSRA will need to make a determination of what tier applies to the NEI based on the availability of NEI products in the marketplace (provided the mission is capable of sensing the Earth).
 - Ms. Dawkins responded that there is still some ambiguity with NEI. CRSRA is still requesting companies to put in an initial contact form so that their mission can be evaluated. Especially for NEI it is extremely important for CRSRA to talk to these companies to determine if they fall under the final rule. CRSRA is still looking at parts of this question. CRSRA is going to have to ask companies who their competition is and ask the foreign companies what they are doing.
- A member of the Committee asked if CRSRA will provide incremental licenses for constellations that are growing gradually or have capabilities that are improving gradually. For example, up until you reach a 2 hour revisit, you are a Tier 1. Anything beyond a 2 hour revisit is Tier 2 and beyond 10 minutes, Tier 3? Rather than making the whole thing Tier 3?
 - Mr. Klinger responded that that’s a great question. That is one of the things the Committee should discuss. The lens used to implement the rule needs to be the spirit of the rule. This is the same issue as licensed capability vs. operational capability. The regulation, at some level, is a framework that is incomplete. The Committee needs to discuss this, as well.
 - Ms. Dawkins responded that it is the licensee’s responsibility to say what their full capacity will be. If a company comes in with a license for 1 satellite, every time they were to add a satellite, they would need to modify their license. Every time they added a satellite, their tier would be reevaluated. CRSRA asks licensees to provide the office with their best capability. The restrictions will not come into play until the constellation reaches a certain capability. For example, persistence restrictions wouldn’t come into play until the constellation reached a certain revisit capability. CRSRA is not tiering capabilities. It is tiering licenses. Special, temporary restrictions will apply only to what’s special about a constellation (e.g., an extraordinary spatial resolution).
 - Ms. Dawkins also pointed out that if a licensee has a license that exceeds the system’s operational capability, CRSRA must tier based on the requested license capability, NOT the after-the-fact operational capability. This is because CRSRA cannot retroactively change a license’s conditions.

- A Committee member asked for clarification that NEI imaging capability is not based on Earth-imaging capability? So, the data for the NEI images are the criteria, rather than the mission of the spacecraft? A lot of missions involving NEI are not focused on the quality or precision of imaging. Images are ancillary to another objective.
 - Mr. Tallia answered that the authority is over the remote sensing imager, so CRSRA is able to say how that imager can or can't be used but that it will depend upon the specifics of each case and what the applicant is proposing to do.
- A Committee member asked what "operator" refers to.
 - Ms. Abbott answered that the operator "has the final decision-making authority over the actual functioning of the remote sensing instrument."
 - Mr. Hanson added that the definitions are both highly technical and highly legal.
- An audience member asked if CRSRA is developing a formal process for reviewing the technical capabilities of foreign operators on an ongoing basis.
 - Ms. Dawkins responded that the answer is, "yes," and that the topic will be covered in Day 2.
- Ms. Dawkins referred another question back to the prior conversation about NEI.
- During a round of Committee comment, a Committee member noted that the next 4 weeks are critical. There will need to be a lot of conversation because the first round of license tiering is setting a precedent. The more CRSRA can document challenges, what works, and what doesn't, the more helpful it would be. He expressed belief that those would be great things for the Committee to look at post-mortem during the next meeting. He commented that there has been a lot of talk about a huge new sector in industry, and he would like for the Committee to talk about the trillion-dollar space economy. This isn't just about regulatory reform but a shift in the overall role of the USG to facilitate a whole market.

Closing Remarks

Gil Klinger

- In closing, Mr. Klinger provided a few final thoughts on key topics and issues raised during the day's meeting:
 - Implementation. There are a couple of things that are profoundly important. For the members of the Committee and public in the industry, it is almost impossible to overstate the importance of giving the government a heads up if there's an ambiguity or concern about the regulations. The government would rather hear it sooner rather than later.
 - The lens through which the Committee needs to look at the final rule is to recognize the fundamental changes behind the regulatory framework and think about the possible issues both in the letter of the final rule and the intent.
 - When does the one-year clock on temporary conditions start? First launch? That is obviously going to be key with constellations. Modeling, simulation, and visualization capabilities now exist that would have been unimaginable twenty years ago. These can assist in characterizing what the data will be like. When we talk about when the one-year period starting and accepting risk, it is incumbent upon industry and government to make the maximum use of modeling capabilities.
 - NEI: This is a persistent, third-rail issue.
 - What is a system licensed for vs. what is going to be the capability of the licensee vs. what is the system operated at? Licensees and regulators need to be on the same page.
 - SAR: There are many SAR questions outside of national security issues. What does a regulatory framework for SAR really look like?
 - The Land Remote Sensing Policy Act of 1992 is old. It is worth a conversation reviewing this act for the purposes of making sure it remains current and suggestions what changes might be needed. The 2020 commercial space sector is totally different from what existed in 1992. Should the Committee partner with other bodies like the Landsat advisory group that have been focused on this issue?

<u>Meeting Adjourned, 1:30 pm EDT</u>	<u>Tahara Dawkins</u>
Day 2 10:00 am EDT, Wednesday, 24 June, 2020	
<u>Welcome & Day 1 Recap</u>	<u>Gil Klinger</u>
<ul style="list-style-type: none">● Ms. Dawkins welcomed the Committee and public to the second day of the meeting and turned the meeting over to Mr. Klinger.● Mr. Klinger reprised key points made during the prior day.<ul style="list-style-type: none">○ There is a shift in the government in terms of the regulatory approach being taken, with the onus of national security shifting from industry to the government.○ The final rule will enable U.S. industry to maintain, extend, or regain its role in the global market; the final rule focuses on national economics as it does on national security and will provide greater transparency, flexibility, and tailoring.○ Questions remain.<ul style="list-style-type: none">▪ When does the clock start on temporary conditions?▪ How do you manage a constellation that will be deployed over time or have multiple sensors?○ SAR remains a key issue. How can the industry be fostered, and how can regulation assist?○ The aging Land Remote Sensing Policy Act of 1992 and how it might be updated to retain relevance.● Kevin O’Connell, Director of OSC, introduced Congresswoman Kendra Horn, who represents the 5th District of Oklahoma and is chair of the Subcommittee on Space and Aeronautics, House Committee on Science, Space, and Technology. Congresswoman Horn has worked at Space Foundation and a small satellite startup, and is familiar with the space industry.	
<u>American Leadership in Space Commerce</u>	<u>Congresswoman Kendra S. Horn</u>
<ul style="list-style-type: none">● Congresswoman Horn thanked Mr. O’Connell for his introduction and the Committee for the invitation to speak. She stated that the U.S. is on the cusp of realizing tremendous opportunities in space, including novel remote sensing capabilities with increasing spatial, spectral, and temporal resolutions combined with artificial intelligence and data analytics. Sustaining global leadership requires transparent, efficient, and effective regulation that balances risk with innovation.● She reviewed the history of the origins of the CRS industry in government programs. From that origin the industry has grown, which requires an update to a structured and encumbered regulatory system that no longer reflects the modern CRS environment. The final rule on Licensing of Private Remote Sensing Space Systems takes a necessary step forward, introducing transparency to the process and reflecting a mindset to enable the commercial sector.● Looking at the final rule, Congresswoman Horn believes there are a few remaining questions, most of which focus on the details of implementation.<ul style="list-style-type: none">○ How will the decisions on the tiers be made, and who will make those decisions?○ Most of the decisions rely on if there is unenhanced data substantially the same as the capability being licensed. What is “substantially the same” in practice, and what does it mean for those data to be “available”? Those are important questions to maintaining security and transparency.○ Who will monitor what data are available globally, what expertise is required, how much does this cost, and how often is it done?○ Why does the final rule reduce cyber requirements?○ What issues does Congress need to be monitoring? For example, radio frequency tracking? What about in the context of reevaluating the Land Remote Sensing Policy Act of 1992? Would a radio frequency-monitoring constellation count as remote sensing?	

- Congresswoman Horn concluded by saying that this is a timely conversation that takes important steps forward. The bottom line is that CRS is fundamentally important to U.S. commerce and security, it must succeed, and the U.S. must continue to lead in areas surrounding space, innovation, and technology.
- A member of the audience asked that, given the time pressure the coronavirus disease 2019 (COVID-19) has put on Congress, what space-related topics may be addressed in the time remaining in the fiscal year?
 - Congresswoman Horn responded that earlier this year the House introduced a NASA authorization bill. It has been passed out of subcommittee and is going to be marked up in the full committee. The committee considers it important to get the authorization through because there must be a long-term, clear policy in space that continues across administrations. They are currently working on hearings for that authorization bill.
 - She also believes there are a number of other topics, including STM, on the docket to assist the civil and security space programs and create avenues for commercial growth.
 - She concluded by saying these are critical despite COVID-19.
- A member of the audience asked the Congresswoman what she believes the role of commercial companies in the national civil space program is.
 - Congresswoman Horn responded that the nation's civil space program, the Space Force, and the intelligence community space agenda are all different national programs.
 - The civil space program—and the investment behind it—has changed the way that we live and work in the world in ways we have taken for granted. Cutting-edge discovery is in the purview of the nation. There are opportunities for new companies, but NASA as the nation's space program, needs to be at the center of these things.
 - Where there is the expertise and there is a marketplace, there is opportunity to use commercial technology and providers.
 - USG needs to ensure that NASA has direction and oversight of technologies and programs that are on the critical path and are critical to the national space program.
 - NASA must be the center of critical space technology.
 - Congresswoman Horn also raised the issue of, “What is commercial?” stating that it is an easy term to use but has different meanings.
 - If NASA is directing the program and making the investment for the program, then that is a government program.
 - The question isn't, “Do we need companies?” but the USG is transparent, direct, and consistent, so there is an important role for the government.
 - Need to be clear on where there is a commercial market so that the USG can foster it.
 - Need to be clear what is actually “commercial” vs. where the federal programs are just bringing in new contractors.
- Ms. Dawkins thanked the Congresswoman for her remarks, which were exceptionally timely, and welcomed Kevin O'Connell.

Next Steps for DOC

Kevin O'Connell

- Mr. O'Connell thanked the Committee for its input on the final rule and hoped that ACCRES would assist in the implementation of the final rule. He thanked the CRSRA and NOAA staff, all of those who worked on the deliberations on the final rule, and the other ACCRES speakers.
- Mr. O'Connell stated that the final rule is the needed “shock to the system.”
 - The innovations in the final rule involve flexibility and, especially, transparency and efficiency.
 - Time is a source of competitive advantage, and the final rule will drive down licensing timelines even more than they already have been.
 - The data availability test is of central importance and focuses licensing attention on truly novel systems. The analysis needs to incorporate as many sources as possible, including competitive information from

- industry on topics such as technologies and business models. The data availability test will yield important information on where the sector is heading.
- The final rule allows adaptation to fast-changing market conditions.
 - The final rule adjusts the U.S. mindset toward CRS and national security
 - Mr. O’Connell continued by saying that regulatory reform is only one part of creating the trillion-dollar space economy. OSC sees a number of other elements that are critical to the trillion-dollar space economy. These include
 - continuing innovation,
 - supporting the finance and insurance ecosystem,
 - dealing with the space debris problem, and
 - fostering and growing technical talent and skills.
 - Mr. O’Connell highlighted that American companies must succeed in an intensely competitive market.
 - A member of the Committee asked to what extent Mr. O’Connell sees OSC’s continued work on STM as a critical enabler for the trillion-dollar space economy and if OSC has been interfacing with the National Academy of Public Administration (NAPA) study regarding this issue.
 - Mr. O’Connell responded that OSC is deeply engaged with the NAPA study.
 - There has been a maturity in thinking about the space policy directive on STM. Central to this is improving SSA, deepening understanding of the space environment, and making sure there is more timely and persistent SSA data than is available today. These things will enable activities like satellite servicing. The SSA piece is critical. Until there is an understanding of the space environment, the government cannot create regulation to control it because it could never judge the impact of those regulations.
 - A member of the Committee asked what OSC’s top 3 priorities are and what Mr. O’Connell’s sense of where the Committee should apply its thoughts is.
 - Mr. O’Connell responded that he believes ACCRES needs to be involved in implementation.
 - He also highlighted that the Committee performs a horizon-scanning function to warn the DOC about what is coming next and how fast it is coming. Anticipation of what is coming forward in the market is very important.
 - A member of the Committee commented that innovation is occurring around Tier 3 licenses. Tier 1 and Tier 2 are competing with an already-existing competitive base, but a Tier 3 application is where the innovation is occurring. There must be a sense of urgency in evaluating those applications in concert with the applicants so that there is no impediment to the speed at which the industry innovates. The member then noted that, when comparing the U.S. space program in the civilian sector with that of the European Union’s Copernicus program, there is a big gap in the last mile of application development. There are some U.S. agency funds for application development, and those go to select academic principal investigators that are not necessarily related to real-world applications and growing the marketplace. By comparison, the Copernicus program has a robust funding program for commercial entities to develop applied functions. This is outstripping U.S. companies’ application developments.
 - Mr. O’Connell agreed that there are lessons on commercialization that the U.S. still hasn’t managed to bring to bear on current NOAA functions.
 - A member of the Committee asked what DOC’s role is in coordinating with other regulatory agencies, such as FCC, so that the regulatory bottleneck doesn’t move from one agency to another.
 - Mr. O’Connell responded that it’s a secondary question behind the “one-stop shop” question asked to Dr. Pace the prior day. As a normal part of business OSC stays engaged with colleagues in other government agencies. They are now having that conversation in order to prepare for a larger conversation with industry.
 - A member of the Committee asked what is next in the trillion-dollar space economy, and how can the Committee support the broader policy shifts that will accelerate that idea becoming reality?
 - Mr. O’Connell noted that this Committee has always served to highlight some of the trends coming in the market and the extent to which the government needs to be alert to them.
 - In terms of what’s next, when we see what’s happening in satellite servicing, satellite refueling and repair, those things will literally change the economics of space. The Committee may have something to say

about that, but it is why the space environment must be understood better and why the government must be able to anticipate those types of things.

- A member of the Committee asked what the OSC involvement with NASA has been when it comes to crafting the Artemis Accords in a way such that they will advance DOC's objectives, such as international cooperation for debris mitigation, STM, etc.?
 - Mr. O'Connell answered that OSC was very much involved in the run-up to the Artemis Accords. On the broader international front, OSC has been in discussion with a number of allies who are excited to participate on the civil side of SSA. OSC is engaged in all of those efforts as well as with NASA more broadly on the topic of low-Earth orbit commercialization.
- A member of the Committee asked how much interaction there was with other space agencies in the most recent update to the final rule.
 - Mr. O'Connell responded that OSC believes international partnerships are critical, and partnership is taking place in a host of areas. There has been intensified interest in international space regulation and cooperation. OSC is discussing technological and economic trends in the space markets in other countries with international partners. The Bureau of Economic Analysis is working on defining the space economy, and other agencies around the world have expressed interest in participating in that study. There is a lot of room on the DOC side, specifically, and more broadly for international partnerships.
- A member of the Committee asked if the intent of the SSA working group meetings between DOC and other agencies is to generate regulations.
 - Mr. O'Connell responded that the conversations and partnerships started with the Department of Defense (DOD). The conversations are geared for the DOC to take over the civil and private sector conjunction alerts and warnings. This requires a core competency of collecting data and packaging it for dispersal. The early partnerships have been primarily with the DOD and with NASA. DOC is now looking at questions such as what technical analyses are needed to underpin SSA goals.
 - OSC is working on getting this information into the FCC regulatory process for orbital debris mitigation, as well.

CRSRA Implementation of the Final Rule *(presentation attached)*

Tahara Dawkins

- Ms. Dawkins reviewed CRSRA's plan to implement the new regulations. She focused on explaining how CRSRA establishes data availability and sets foreign and domestic benchmarks for assigning licenses into tiers, how compliance will change under the new regulations, and how existing licenses will be transitioned. She emphasized that the office is committed to transparency and will work closely with licensees when assigning tiers to licenses.
- A member of the Committee asked about the delay from design and build to data that are commercially available. For something that the national security community doesn't believe jeopardizes the national security community, how does industry partner with CRSRA to ensure there's no slow-down in the licensing process?
 - Ms. Dawkins responded that CRSRA welcomes any information and watches worldwide operational capabilities continuously and to the best of its capabilities. Once a system is operational and CRSRA can see that the company is selling data that are substantially the same as a licensee's, a tier will be changed immediately. One of the issues is that what is advertised isn't what is actually being sold, which is why CRSRA has to wait until the data are being sold.
 - CRSRA is also looking at the question of unenhanced data vs. enhanced data. Many companies now only advertise products that are "enhanced" (manipulated). In short, they advertise capabilities their systems can't reach without processing the product. Are those data substantially the same when marketed against U.S. products?
 - CRSRA needs to also get a better idea of what the cutoffs should be between tiers. Is a 0.72 meter (m) resolution substantially the same as a 0.5 m resolution? Perhaps the answer won't be the same every time.

- A member of the Committee noted that this task is immensely difficult and asked if there are ways of verifying the truth and accuracy of information in CRSRA's process. This is sensitive because it has real-world impacts on U.S. companies.
 - Ms. Dawkins responded that, certainly, some data are easier to verify than others (e.g., NEI data are hard). This is something CRSRA is working on. It will depend heavily on CRSRA's communications with licensees because they know our competition better than anyone. As of right now, there are a minimum of 51 restrictions on every single license. Some CRSRA licenses have as many as 81 operating conditions. Under the new rule, a Tier 1 system will have 13 conditions, a Tier 2 system will have 19, and a Tier 3 system will have 20 permanent conditions. That is a strong example that the onus is now on the government to protect assets, not industry.
 - Additionally, license conditions will be reexamined on an ongoing basis.
- A member of the Committee noted that there wasn't NEI on the data availability chart shown by Ms. Dawkins because there's no NEI data being sold publicly. At the same time, there is now a U.S. system that is offering commercial servicing. The data are not being sold, but they are being collected. The Committee member then asked how CRSRA tiers a license such as this based upon data availability, given that the system is selling a service, not remote sensing data.
 - Ms. Dawkins responded that currently, there are 10 NEI licenses. After the rule changes, CRSRA will only have 2. The other 8 won't get a license based on the final rule. So CRSRA will work with those 2 companies closely to ensure lighter touch regulation. Especially on a competitive front, those companies know their competitors.
- A member of the Committee noted appreciation for the complexity of the problem and the great deal of work in this task. That member noted, however, that there is a disparity in defining "availability." With respect to U.S. CRS companies, CRSRA is looking at applying conditions based on the highest capability of the sensor. The tier is defined by commercial availability, though (not best capability). This creates a double standard.
 - Ms. Dawkins replied that if CRSRA knows there is a 0.25 meter system, but then sees 1 m imagery sold, that's a discrepancy that CRSRA will flag. If that company is regulated by another government, CRSRA needs to know what their government allows them to sell. CRSRA has to verify if the data are actually being sold.
 - The Committee member noted that that company might be heavily subsidized and therefore might not be honest in response to inquiries about what they can sell.
- A Committee member voiced that concern that if the primary motivation for commercial use of data is to deal with security concerns, the people seeking those capabilities wouldn't be going through websites or inquiries. It may be a challenge to get that information.
 - Ms. Dawkins responded that it's important to remember that the data have to be available. If a country isn't making the data available, that in and of itself means it's not available.
- A member of the Committee asked if it matters who is doing the buying. There may be companies with heavy government influence that would be unwilling to sell to the USG but would sell to more commercial players.
 - Ms. Dawkins replied that she is open to any possible way of getting information. She began by asking licensees to provide information on data available from their competitors.
 - Another Committee member noted that they see no reason for a commercial company to hide its capabilities.
- A member of the Committee asked if a company has a capability built and operating that is given a Tier 1 license, but if that company ends up adding more satellites or making improvements such that a specific satellite is providing a novel capability, would the entire constellation be made a Tier 3.
 - Ms. Dawkins responded that it depends. If "a different satellite" means it's a brand new license, it wouldn't change the tiering on an existing license. If it's on an existing license, it would be a modification and the tier would be reevaluated.
- A member of the Committee asked if this is incentivizing companies to license each satellite individually.

- Ms. Dawkins replied that, if a company has a two-satellite constellation and applies for a second license for a similar two-satellite constellation, then does the same thing the next year, CRSRA will bring that company in to talk. CRSRA will not permit a company to have 500 licenses for 500 satellites.
- A member of the Committee then asked if CRSRA is considering aggregate capabilities from, for instance, a virtual constellation or organizations that aggregate data from multiple providers.
 - Ms. Dawkins responded that it is not something being considered.
 - Mr. Tallia added that if there is a business relationship behind the aggregation of satellites, it is possible but that there has not been made a final decision. He stated he was not going to give a definite legal answer, but it's a topic for thought.
 - Mr. Klinger interjected that this is a policy issue, not a regulatory issue, and it demonstrates why the Committee needs to think about implementation. This goes to what constitutes "widely available."

Department Of Defense (DOD) Perspective of the New Rule

John D. Hill

- Ms. Dawkins introduced Mr. John D. Hill, who has served as the Principal Director of Space Policy in the Office of the Under Secretary of Defense for Policy, Department of Defense since November, 2013. Mr. Hill has worked closely with CRSRA in developing the final rule and gaining DOD support for the final rule.
- Mr. Hill stated that the DOD sees the new rule through the lens of the recent Defense Space Strategy (*document attached*)
 - The strategy sets out a clear statement of desired conditions that those in DOD want to achieve in the space domain. These are stability, security, and accessibility, which are gained by sustained, comprehensive U.S. military strength.
 - U.S. ability to use space is intertwined with the U.S. commercial space sector. Commercial space capabilities and innovation are fundamental to the nation's space capabilities, including in defense.
 - The strategy recognizes the challenges presented to security in commercial remote sensing, which impede the U.S. armed forces actions in all domains.
 - Mr. Hill then stated that the Defense Space Strategy sets out three objectives for the DOD. These are to
 - maintain space superiority;
 - provide space support to national, joint, and combined operations; and
 - ensure space stability.
 - Mr. Hill stated that commercial space capabilities are foundational to these objectives.
 - Mr. Hill proposed that commercial space capabilities and commercial innovation are fundamental to the sum of the nation's space capabilities and ability to achieve national objectives, including in defense.
- Mr. Hill explained that the Defense Space Strategy acknowledges that there are space-based threats outside the reach of U.S. regulations, and heavy-handed U.S. regulation is not an effective means of handling these threats. He noted that this is reflected in the final rule, that DOD was actively involved in writing the final rule, and there is high-level buy-in for it.
- The DOD role in the final rule boils down to
 - determining if there are national security considerations that should inform a tier decision,
 - determining what temporary conditions (if any) should be included in tier 3 licenses to deal with national security concerns,
 - determining whether extensions of temporary conditions are necessary,
 - determining if there is a need for limited operations directive, and
 - having sufficient awareness of commercial operations of ARSO.
- DOD agrees that the final rule represents an improvement because it greatly simplifies the workload.
 - Tier 1 systems: DOD has already determined there are no national security issues.
 - Tier 2: DOD has already determined that those systems only need shutter control or need to have warning of NEI.

- Tier 3: DOD cannot anticipate the national security conditions.
- A member of the Committee noted that Hill used the term “commercial space industry” and “private space industry,” and asked if these were being used interchangeably?
 - Mr. Hill responded that he was using the terms interchangeably.
- A member of the Committee highlighted that the new space strategy doesn’t emphasize improving resilience for deterrence and asked if that is the benefit of leveraging the commercial sector moving forward.
 - Mr. Hill responded that the DOD purchases a lot of commercial space products—including some imagery and a lot of communication—so the capacity is commercial, and there is a diversity aspect as well. So, “yes,” in all respects.
- A Committee member asked what role the DOD plays in facilitating the trillion-dollar space economy?
 - Mr. Hill replied that the DOD is a big customer. It has peculiar national security requirements that are driven by peculiar needs, but that does not mean it needs peculiar system designs. DOD has developed acquisition processes to try to get away from developing all of its own capabilities in-house. Having multiple aspects of the departments all doing space acquisition means there is a lot of cross-fertilization and need for innovation inside of the DOD.
 - A Committee member noted that the DOD plays an outsized role in developing the healthy commercial ecosystem and driving desirable behavior of the government shifting from the primary customer to one of many customers.
- Mr. Klinger noted that, with respect to Mr. Hill’s comment about Tier 3 capabilities being things that can’t be foreseen, if ACCRES were to take on answering the question Mr. O’Connell raised about what’s next and when it is coming, it seems that there is a host of information in the public sphere about what the next “killer app” with respect to space is going to be. Given that the Space Force just released a request for information about modeling simulation and visualization requirements, as the Space Force matures these capabilities, one of the applications might be to use such tools as an aide to the licensing review process, to inject into those models and simulations whatever the next big thing is. Can this be used to expedite the review process?
 - Mr. Hill responded that this gets to the point about adapting to the new world, which means modeling and simulating things that might be in the future, and what sort of training and tactics would be needed in that world with that capability. He hopes to see many novel things from U.S. industry, and he is most interested in understanding what is novel and if it matters from the national security perspective. The objective is to create conditions in which people want to bring things to market in the U.S. but that it’s not done without due diligence on the national security side.
- A member of the audience asked, with the focus on international partnerships and foreign military sales, how the DOD is supporting commercial companies for all tier levels.
 - Mr. Hill responded that he is not familiar with what may be foreign military sale cases. There are lots of U.S. partners buying commercial imagery, and lots of U.S. partners are interested in seeing what the DOD is buying. He is aware that a lot of countries are using imagery they buy from commercial companies.
- A member of the audience asked how the DOD leverages commercial remote sensing capabilities to improve operations or decrease costs.
 - Mr. Hill responded that the National Reconnaissance Office and National Geospatial-Intelligence Agency do most of the acquisition on behalf of the U.S. security community. They work for both sides (the intelligence community and the defense community). DOD operators pull information out of those agencies, and operators in those agencies push data to DOD operators. Otherwise, DOD does not do a lot of imagery acquisition for itself.
- A member of the audience noted that the burden of national security is now on the government and asked if the DOD has thought about how it will respond to increasing commercial capabilities and how it will help CRSRA to meet licensing timelines?
 - Mr. Hill responded that this environment is not just about U.S. commercial imagery, but also foreign imagery. DOD has to operate in a new world in which the U.S. had this market to itself. DOD wants to avoid creating false senses of confidence, which is to say “I have a regulation and can protect myself.”

DOD would rather start from the place assuming there is no regulation and asking, what do I have to do to protect myself if there is no regulation?

- You want a national security return on investment in your regulation, because you leverage a cost for the regulation you place on the industry. This has to be taken into account.

Discussion

ACCRES

- Mr. Klinger opened the floor to each Committee member to comment or ask questions.
 - Mr. Bellardo commented that Tier 3 licenses have certain conditions and asked if it will be explicit when those conditions go into effect.
 - Ms. Dawkins clarified that restrictions will only be on exquisite capabilities.
 - Mr. Hertzfeld made two comments.
 - The final rule includes nothing about penalties under enforcement, and
 - The final rule eliminates end-of-life and disposal mandates.
 - Mr. Tallia responded that the fines are still there, and that NOAA determined that disposal is the FCC's role. NOAA didn't want to try to include its own stipulations on end-of-life disposal because every system that needs a license from NOAA requires an FCC license. It would have been redundant regulation.
 - Mr. Langan noted that he was anticipating a robust discussion the following day on the subject of SAR restrictions. More broadly, he highlighted a potential double standard that could hold back U.S. industry. He asserted that in evaluating the foreign commercial market, CRSRA should be focused on the best capabilities of those systems—either of one sensor or aggregate capabilities (e.g., virtual constellations). He also noted that he is not sure where NOAA might come down with temporary restrictions, but CRSRA needs to be conscious of possible tension.
 - Mr. Lin stated he didn't have a good sense of what criteria or thresholds might separate Tier 1, 2, and 3 licenses in terms of sensor capabilities. If tier classifications of licensees will not be disclosed publicly so parties can ballpark where they are, CRSRA should consider other ways to increase transparency.
 - Mr. Pomfret noted that a lot of these issues are at the intersection of law, policy, business, and technology and that working through each of these makes the issues complex.
 - Mr. Schingler had 3 points.
 - Acquisitions. There will most likely be consolidations in the industry in the near future, domestically and internationally.
 - Unintended consequences. Where are they, and what might they be? The biggest danger is disincentivizing new market opportunities.
 - Government as a customer.
 - Dr. Weeden wondered if NOAA regulation will eventually follow the FCC orbital debris mitigation guidelines.
- Mr. Klinger then opened the floor to members of the public.

Public Comment

ACCRES & Guests

- A member of the audience asked if a U.S. operator can expect their tier to be downward-revised in the multi-year period between applying for a license and putting a system on orbit.
 - Ms. Dawkins responded that a U.S. system will move down in tiers as more data become available. Between a license date and a launch date, a license tier can go down. In other words, systems will not necessarily launch with the same tier the license was issued at.
- A member of the audience asked if U.S. capabilities will be considered at the time of application, license issuance, or when the data become operational, and if multiple similar systems receive licenses, will they be Tier 2 or Tier 3.

- Ms. Dawkins responded that if there is a system with a Tier 3 license and there is an application for a similar system, both licenses will be Tier 3. That will last for a year (or up to 3 years, depending on the temporary conditions on the *first* Tier 3 license). After the temporary conditions expire on whichever Tier 3 license came first, both systems become Tier 2.
- A member of the audience asked if any specific restrictions exist that govern the export of imagery, and if there is licensing for that.
 - Mr. Tallia responded that the U.S. does not try to regulate the export of imagery. There are other legal regimes that could cover it, but it is beyond the scope of CRSRA.

Closing Remarks

Gil Klinger

- Mr. Klinger stated there are a few things to discuss moving forward.
 - ACCRES should be focused on “are we doing the right thing” instead of “are we doing things right?”
 - What’s next for this industry and how fast is it coming?
 - SAR remains an industry and regulatory issue.
 - Space domain awareness/SSA/STM and orbital debris mitigation. All of these topics are viewed through the lens of remote sensing because there is a big undiscovered country out there with respect to them.
 - The definition of remote sensing. Right now, it encompasses panchromatic, multispectral, infrared sensing, hyperspectral, and SAR. Radio frequency sensing is on the horizon. As much as a difficult issue as this is, the industry is beginning to see a commercial interest based on the belief there is an addressable market here.
 - CRS issues with respect to lunar remote sensing.
- Ms. Dawkins noted that CRSRA will not regulate the Moon and commented that on the third day of the meeting, ACCRES needs to consider task groups and where the Committee should focus its efforts. The only standing task group is the SAR task group.

Meeting Adjourned 1:30 pm EDT

Tahara Dawkins

Day 3

10:00 am EDT, Thursday, 25 June, 2020

Welcome & Introduction

Gil Klinger

- Mr. Klinger began by asking the members of the Committee to raise comments or questions. There were no comments. He then set the expectation of coming out of the meeting with a well-defined homework assignment.
- Mr. Klinger said that with so much going on, his sense was that the normal meeting cadence of the Committee may not be sufficient and should be accelerated during implementation of the final rule. Further, the pace of events and change in every sector of the space industry is fast enough that the Committee should take advantage of the remote format to meet more frequently.
- He laid out the working groups that might be established and the topics they would cover.
 - Implementation Working Group. The group would work according to NOAA’s preference, either concurrently with implementation or independently, to think about key issues that remain in implementation of the final rule.
 - Next Steps for SAR. To the extent that whatever the regulatory framework for commercial SAR is, that framework needs to follow the spirit of the revised regulation by empowering U.S. industry and streamlining the regulatory process. It would consider the specific things that might be the focus of action as well as taking a look at the existing framework for electro-optical, multi-spectral, and infrared sensing. SAR is sufficiently different that it may require a different regulatory perspective.

- The Horizons Working Group. This working group would examine what is coming next, how fast it is coming, and what is the relevant prioritization of things on the horizon. The more that the Committee can do to help shed light on this topic, the better.
- With respect to the working groups, it is important to under-promise and over-deliver. They need to perform a smaller number of tasks and do a comprehensive job that is value-added to NOAA.
- Mr. O’Connell clarified that industry can be helpful in providing NOAA insight about the quality and speed of investment in this sector because industry has a unique perspective of what’s happening.
- A member of the Committee added that ACCRES could perform its own assessment of foreign commercial data capability.
 - Ms. Dawkins agreed that it would be helpful to have a separate working group studying foreign data availability.
- Dr. Neil Jacobs, NOAA Acting Administrator, introduced Wilbur Ross, Secretary of the DOC. Secretary Ross has led DOC since February 28th, 2017. He has over 55 years of banking and private equity experience and has been chair or lead director of more than 100 companies operating in more than 20 nations. Since his appointment in 2017, Secretary Ross has been a strong advocate within the Administration for streamlining and modernizing regulation on the CRS industry, and he played an active role throughout the rulemaking process. His participation was crucial to the final rule’s success.

DOC Perspective on the New Rule

Secretary Wilbur Ross

- Secretary Ross thanked the Committee members for volunteering their time to sit on the Committee, stating that their expertise and guidance is important to future prosperity. He also thanked the members of Congress who attended the meeting and whose presence spoke to the importance of the ACCRES work.
- He noted that it is gratifying to see the innovation and growth that is taking place in American’s space sector, highlighting as examples the Crew Dragon launch and private advances in addressing space debris tracking.
- Secretary Ross listed several statistics on the global remote sensing sector.
 - The entire planet is imaged at least once per day.
 - There are now capabilities to view and image one place on Earth up to 12 times over a 24-hour period.
 - In 2019, 26% of small satellites launched were devoted to remote sensing, and 60% of these were produced by U.S. companies.
- He noted that the final rule was published in May and will take effect in July.
 - The final rule is a win for industry. By eliminating risk, the final rule allows the U.S. commercial industry to accelerate innovation and introduce new products and services.
 - The final rule is intended to advance America’s leadership and was developed with the guidance of U.S. industry. The final result would not have been as good without the help of ACCRES.
- DOC continues to make progress in reducing the regulatory burden on the U.S. space sector.
 - Licensing timelines have been reduced by 70%, from an average of 214 days in 2017 to 65 days in 2019.
- In drafting the final rule, industry told the DOC that the first draft of the rule would be detrimental to U.S. industry and provided DOC with assessments of technology, foreign competition, and the impact of new remote sensing applications
 - DOC advocated for U.S. industry with its government colleagues in the DOD, saying
 - U.S. industry must innovate and introduce new products as quickly as possible, and
 - it is no longer possible to control new applications in the intensifying global competition in space.
 - The DOC incorporated DOD ideas into the final rule and was able to publish revised regulations while protecting national security.
 - The military understands that it must adapt to capabilities now available to many nations around the world.
- The final rule

- increases transparency for licensees and removes permanent technical restrictions placed on their operations and products;
- incorporates a new data availability standard that allows for the development and marked introduction of novel systems; and
- limits the timelines for conditions to a total of 3 years unless there is direct Secretary engagement.
- Secretary Ross concluded by welcoming the continuing input of ACCRES as the final rule is implemented and thanked numerous parties including NOAA General Counsel, the CRSRA office, the OSC, Dr. Scott Pace, and ACCRES.

Kyl-Bingaman Update (*presentation attached*)

Dr. Sarah Brothers

- Dr. Brothers, an Aerospace Corporation expert supporting CRSRA, provided a brief history of the Kyl-Bingaman Amendment, which restricts CRSRA licensees from disseminating satellite images of Israel at a Ground Sample Distance (GSD) better than what is available from foreign commercial sources.
 - The current Kyl-Bingaman resolution limit is 2.0 m, which is instrument agnostic.
 - The 2-meter limit has been in place since 1998 and was last reviewed by CRSRA in 2018.
- The Kyl-Bingaman assessment demonstrated that there are a number of foreign governments and private entities outside of CRSRA's jurisdiction that are producing and selling satellite images below a resolution of 2.0 m. The assessment found that these include
 - 12 commercial entities in 8 foreign companies, and
 - 13 foreign nations operating dual-use satellites.
 - In addition, over 20 commercial and dual-use systems are planned, in development, or awaiting launch.
- During the course of the review, Aerospace Corporation conducted a resolution analysis on 12 sample satellite images representative of those that can be purchased over Israel.
 - The images ranged in resolution between 4 m and 0.4 m GSD.
 - Deviation from advertised resolution ranged from 0 cm to 9.8 cm; all images were within 10 cm of their advertised resolution.
 - Average deviation from advertised resolution was 5.8 cm.
- Based on the findings, CRSRA has concluded that satellite images of Israel at a resolution finer than 2.0 m are available for sale from a number of non-U.S. operators and foreign and domestic resellers.
 - The resolution analyses confirmed that the resolution of received products agrees with the advertised resolutions and may be better due to reseller enhancements.
 - The best resolution of received products was 0.4 m GSD, and these are readily and consistently available over Israel.
- Dr. Brothers stated that CRSRA will be changing the Kyl-Bingaman threshold according to these results.
- A member of the Committee asked how CRSRA inquired to companies about purchasing images over Israel.
 - Dr. Brothers and Ms. Dawkins responded that inquiries were made as unattributed individuals looking to buy imagery.
 - Dr. Brothers noted that over the course of the study, CRSRA discovered that asking companies about image sales as an individual appeared to result in more difficulty acquiring imagery than it would have if a business had been inquiring. The remote sensing industry, she noted, is geared toward sales to businesses, as opposed to individuals.
- A member of the Committee asked if, given the foreign policy implications of changing the resolution limit, the appropriate Congressional committees had been notified.
 - Ms. Dawkins responded that CRSRA will be notifying those committees as part of the process of changing the resolution limit.
- A member of the Committee asked if CRSRA has considered why the results of the review have changed between this year (2020) and 2 years ago (2018).

- Dr. Brothers responded that the increasingly global nature of the CRS industry, along with growing international reseller networks, has opened access to data that were previously difficult to access.
- This applies particularly to data from Asian systems.

ACCRES Recommendations, SAR Task Group (presentation attached)

David Germroth

- David Germroth, Senior Advisor, Defense and Space, and ACCRES member, reviewed the members of the SAR task group and the group's mandate to focus on the current commercial SAR (COMSAR) market, identify barriers to entry into the market for U.S. industry, and make recommendations on how a U.S. COMSAR industry could be nurtured to compete effectively on the global market.
- The working group found
 - that the global COMSAR market is inherently governmental;
 - all operational COMSAR systems are non-U.S. owned and operated, enjoy government subsidies, and deliver high-quality SAR products worldwide;
 - U.S. licensing policy applied stricter operational and dissemination controls on SAR products than electro-optical products, which prevented the U.S. COMSAR industry from developing earlier;
 - emerging U.S. COMSAR entities offer an opportunity to work toward regaining U.S. leadership of the market;
 - a strong U.S. COMSAR industry would provide an accountable alternate to foreign competitors;
 - the U.S. industry must be competitive with next-generation foreign SAR capabilities, which will require a leapfrog over the subsidized, established competition; and
 - U.S. startups are still in their technical and business infancy and are handicapped in the competition against foreign competitors.
- Mr. Germroth reviewed what SAR is, how it works, key metrics and parameters for evaluating SAR systems and data, and how these impact image product quality and the information returned. He reviewed the European and North American players in the global COMSAR market and the differentiating characteristics of their respective systems. Mr. Germroth paid particular attention to the parameters that cause SAR image products to differ despite being at the same resolution (e.g., signal-to-noise ratio).
 - A member of the Committee asked if Mr. Germroth would address moving target indicators from SAR. Mr. Germroth responded that the working group did not address that particular aspect. The Committee member stated this might be a good topic for the SAR working group to discuss in the future.
 - Ms. Dawkins asked what metric was being used for spatial resolution. Mr. Germroth replied that it is a combination of range and azimuth resolutions with energy from signal-to-noise return.
- Mr. Germroth stated that the working group initially made 6 key recommendations, but the final rule made 5 of the 6 key recommendations moot, leaving only one: Explore Financial Support of U.S. COMSAR Industry
- The Committee discussion of SAR fell into several broad topics.
 - An infant industry with established foreign competition
 - A member of the Committee noted that not only is the U.S. COMSAR industry starting from "ground zero" in the face of a well-developed foreign market, well-established foreign companies are now establishing subsidiaries in the U.S. to compete as U.S. companies.
 - A committee member noted that many of the SAR working group's findings apply to other remote sensing phenomenologies, as well. There is not necessarily a level playing field anywhere, and any U.S. regulations or policies may be met by regulations or policies from other nations that could limit U.S. companies' competition in the market globally.
 - How might a regulatory framework just for SAR differ from the regulatory framework used for electro-optical remote sensing?
 - It is very difficult to try to shoehorn SAR into a regulatory framework used for electro-optical, and it may not be advisable to try.

- There is no single metric that can be used to compare SAR systems, therefore, how do you compare SAR data on a level that puts every company on the same playing field?
- Is the objective in regulating SAR going to be to retake the commercial industry or to protect national security?
 - The two objectives would each lead to considering a different set of parameters when evaluating SAR systems.
 - National security is important, but we need to know if the capability is available elsewhere (otherwise it will render U.S. restrictions ineffective). That data availability is the key thing of importance to CRSRA now creates a culture change to “what is already out there.”
- Is it reasonable to talk about the concept of unenhanced data for SAR?
 - SAR is, fundamentally, processed.
 - More generally, is unenhanced data a metric used anywhere outside of the U.S.?
- It was concluded by the Committee that the SAR task group will continue its work and needs to explore questions such as the parameters that can be used to compare SAR systems and what those parameters mean as well as review what COMSAR companies are doing around the world. CRSRA needs a better understanding of the capabilities that exist on the global COMSAR market.

Committee Discussion

ACCRES

- Mr. Klinger led the Committee discussion, noting that the Committee needed to form other working groups and determine what their tasks would be and that the Committee could return to SAR, time permitting.
 - **Implementation Working Group.** The group will be led by Kevin Pomfret and will include ACCRES members Greg Black, Henry Hertzfeld, Tony Lin, Robbie Schingler, Brian Weeden, John Bellardo, and Payam Banazadeh. CRSRA representatives to the group are Alan Robinson (USG representative) and Sarah Brothers (subject matter expert).
 - One topic covered might be where the tiers boundaries should be drawn.
 - **SAR Working Group.** The group will continue to be led by David Germroth, and will include members David Langan, and Payam Banazadeh. CRSRA representatives to the group are Frank Rostan (USG representative) and Brooks Cressman (subject matter expert).
 - This group will continue to examine the SAR industry and how it can be effectively nurtured by USG regulation, how to best regulate SAR systems under the final rule, if a different regulatory framework might be required for SAR, and what metrics can be used to compare SAR systems on a level playing field.
 - **Data Availability Working Group.** The group will be led by David Langan and include ACCRES members Adil Jafry, Greg Black and Henry Hertzfeld. Additional subject matter experts from industry will be invited by NOAA to join this task group. CRSRA representatives to the group are Frank Rostan (USG representative) and Sarah Brothers and Brooks Cressman (subject matter experts).
 - A Committee member raised the question, is this part of what’s coming (futures working group)?
 - Ms. Dawkins stated that she imagined having it as a separate, ongoing task group.
 - Mr. Klinger clarified that it’s a separate group.
 - **Futures Working Group.** The group will be led by Bhavya Lal and includes ACCRES members Jamie Morin, Tony Lin, Keven Pomfret, Brian Weeden, and Ann Miglarese. CRSRA representatives to the group are Anje Hall (USG representative) and Sarah Brothers (subject matter expert).
 - NEI is a topic that should be discussed by this group.
 - NEI isn’t really a commercial data market. It’s a byproduct of some other missions. This raises questions around “is commercial availability the right measure?” to be assessing in regulating NEI missions. NEI missions produce imaging data as a by-product of a separate mission. This needs to be included as part of the forward-looking topics.

- A Committee member raised the topic of how the government buys commercial data to create a commercial marketplace.
- A Committee member noted that this may belong in both implementation and futures working groups
 - Government as a customer is a sticky situation for the Committee because ACCRES can't have input on how the government buys data.
 - Examining the trade space of government's relationship with the commercial sector seems to pair with implementation and goes hand-in-hand with new regulation of the commercial sector
- A Committee member pointed out that the government as a buyer is a topic implicitly outside of scope of ACCRES because CRSRA/NOAA doesn't buy data, so while the working group or Committee could make recommendations on this topic, the recommendations would not be directed at anyone and would therefore be unlikely to be acted upon.
- A Committee member wondered "what is the role of ACCRES in the 1 trillion-dollar space industry, and would it relate to something on the side of "government as a market" and how the government helps create the space industry."
- Mr. Klinger laid out a rough timeline for the working groups to begin developing their findings
 - By July 31, 2020, working groups will have written coordination on the part of the committee members including a 1-2 page Terms of Reference for each group. The Terms of Reference will lay out scope, key questions, and timeline of work.
 - Mr. Klinger suggested initial reports might be due in mid-to-late October.
 - The 4 group leads will deliver a draft Terms of Reference to their members in the next couple of weeks, with an eye toward the 3rd week in July circulating an agreed-upon reference.
 - By August 1, 2020, the working groups will have had an electronic meeting to talk about open issues. Team leads need to get their respective groups together while putting together Terms of Reference to make sure the teams are satisfied with scope. The Terms will then be presented to the full Committee
 - Mr. Klinger envisions a meeting cadence every 3-4 months.
- Mr. Klinger turned the floor to Ms. Dawkins to accept public comments. There were no public comments

Closing Remarks

Gil Klinger

- In closing, Mr. Klinger thanked the CRSRA team and the Committee and stated that he believes the meeting went well.
- Ms. Dawkins thanked the participants.

Meeting Adjourned 1:30 pm EDT

Tahara Dawkins