



BIG DATA USE IN WILDFIRE MANAGEMENT: HOW NOT GET BURNED BY THE LEGAL CHALLENGES OF DATA SHARING

Centre for Spatial Law and Policy
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True-color image of the Monument and McFarland fires burning in California, taken on August 19, 2021 by the Operational Land Imager (OLI) on Landsat 8. Image credit: NASA Earth Observatory.

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Background

There is a growing awareness of the need for the U.S. Government (USG) to better utilize the commercial Earth Observation industry (to include electro-optical, radar and RF satellites, data aggregators and value-added resellers) to provide imagery¹, products and services to support its mission. The call for greater use of commercial capabilities began with the U.S. Commercial Remote Sensing Policy, dated April 25, 2003 (National Security Presidential Directive (NSPD 27) which established the foundation for the U.S. Government to “rely to the maximum practical extent on U.S. commercial remote sensing space capabilities for filling imagery and USG geospatial needs for military, intelligence, foreign policy, homeland security, and civil users.” It also tasks the agencies to “develop a long-term, sustainable relationship with the U.S. commercial remote sensing space industry.”

More recently, the 2019 National Plan for Civil Earth Observations, dated December 9, 2019, recognized the need to focus “on reducing barriers for engagement with the private sector and incentivizing the use of innovative acquisition approaches to meet Federal Earth Observation data needs.” Further, the recently updated National Space Policy, issued on December 9, 2020, directed agencies to prioritize partnerships with commercial industry and consider inventive and nontraditional arrangements for acquiring commercial space goods and services. It directed heads of federal agencies to “[p]urchase and use United States commercial space capabilities and services, to the maximum practical extent under existing law, when such capabilities and services meet United States Government requirements.”

Congress has also called for increased use of commercial Earth Observation data, associated products, and services to support the national mission. The Weather Research and Forecasting Innovation Act of 2017 and the National Integrated Drought Information System Reauthorization Act of 2018 directed greater interaction with the private sector in providing Earth Observations data and services. More recently, the National Defense Authorization Act of 2021 directed the Secretary of Defense and the Director of National Intelligence to coordinate with the Director of the National Reconnaissance Office and the Director of the National Geospatial-Intelligence Agency to leverage “to the extent practicable, the capabilities of the industry of the United States, including through the use of domestic commercial geospatial-intelligence services and acquisition of domestic commercial satellite imagery.”

One critical area that has shown the potential – and the related challenge – of this vision of greater integration of private and public Earth Observation sources is wildfire management. For years, U.S. fire management agencies have used the unique vantage point of space-based systems, combined with airborne and ground field campaigns, to decipher a fire’s every move - from first spark to final puff of smoldering smoke - to help protect life and property. However, these agencies also recognize that they are not taking full advantage of available commercial capabilities, even as these capabilities continue rapidly evolving and improving.

In consideration of this context, the US Group on Earth Observations (USGEO), working with the National Interagency Fire Center, convened a tabletop exercise to understand the licensing and related legal and regulatory issues that impact the ability of the USG to integrate commercial capabilities (i.e., satellite data and value-added products and services) to address the growing frequency of wildfires in the United States. For example, there are inherent tensions between USG laws and policies that promote “full and open” data with commercial business

¹ For purposes of this paper, the terms “imagery” and “data” both are used to refer to space-based data, including electro-optical, radar, infra-red, radio occultation, etc.

models based upon being able to sell the same data set to more than one customer. The virtual tabletop exercise, which took place on October 13, 2021, included representatives from federal agencies, state and local government, commercial businesses, academia and non-governmental organizations (NGOs). The exercise focused on enabling USGEO to better understand how it can leverage commercial industry to identify the causes and consequences of wildfires, as well as determine the risks to surrounding populations, ecosystems, and infrastructure of these wildfire events. The findings from the discussion, also illustrate the challenges and opportunities facing the U.S. government in advancing its ability to integrate commercial capabilities in other critical application areas.

About the Centre for Spatial Law and Policy

The Centre for Spatial Law and Policy is a non-profit organization with a mission of educating government agencies, businesses and non-governmental organizations on the legal and policy issues that impact the collection, use, storage and distribution of satellite and other types of geospatial data around the world. The Centre has presented to committees of the United Nations and the U.S. House of Representatives and is a member of the United Nations Global Geospatial Information Management Working Group on Policy and Legal Frameworks for Geospatial Information Management. It has conducted training workshops on geospatial legal and policy issues across the globe and the principal author of the UN-GGIM Compendium on the Licensing of Geospatial Information.

About Earth Science Information Partners (ESIP)

ESIP believes that society's quality of life, economic opportunities, and stewardship of the planet are enhanced by regular use of scientifically sound Earth science data and information provided in a timely manner by a collaborative community. For over 20 years ESIP has brought together the leading Earth science data professionals to collaborate and overcome the challenges associated with sound data management and data stewardship. ESIP's initiatives result in the knowledge generation and development of leading practices that make Earth science data discoverable, accessible and usable by scientists, decision-makers and the public. ESIP is a leading collaboration network, with over 160 [active partners](#) ranging from agencies such as NASA, NOAA, USGS and USDA to research networks, academic institutions, and corporations, which make ESIP the go-to place to forge consensus and push the boundaries on emerging Earth science data topics. ESIP's programs center on enabling collaboration to overcome barriers.

Description of Tabletop Exercise

Recognizing that the licensing and legal constraints which limit greater use by USG of commercial industry capabilities often are related to both technical and operational considerations, the exercise brought together approximately twenty-five (25) participants with legal, technical, and operational expertise representing key stakeholders from industry as well as government. (See [Appendix 1](#) for a list of the Participants.) The facilitator spoke with most of the participants prior to the exercise to learn more about their background and provided read-ahead materials to each to include examples of USG licenses and relevant laws and policies as well as articles of how commercial industry can support fighting wildfires.

In addition, approximately fifty (50) observers were invited to the event. Both participants and observers were able to communicate through a chat function, and - upon the conclusion of the two-hour exercise- raise questions and provide comments.

During the tabletop exercise, the facilitator walked the participants through a Use Case to flesh out the key issues. The Use Case was divided into three main sections of licensing, data access, and information sharing. Each section explored distinct legal and licensing issues associated with the collection, use, sharing and storage of Earth Observation information. (See [Appendix 2](#) for the Use Case.) The facilitator reviewed each section and then asked the participants relevant questions. The goal was for the participants to provide their perspectives from an operational, technical or legal perspective. The facilitator asked follow-up questions to the participants as appropriate to ensure the key issues were adequately identified and discussed. The event was held in a non-attribution basis.

Key Takeaways from Tabletop Exercise

Several key themes came up from the participants throughout the exercise. USGEO will need to consider each of these themes in order to use commercial capabilities more fully as directed by policy and legislation. As noted above, while these takeaways arose from a discussion focused on the specific use of data, products, and services for wildfire management, these observations are also relevant when considering greater application of commercial capabilities for other critical use cases.

1. USG Plays a Unique and Critical Role in the Earth Observation Enterprise. The exercise highlighted the unique role that the USG plays in the Earth Observation Enterprise. First, participants noted that the USG collects vast amounts of Earth Observation and geospatial information that is critical to address a wide range of issues. Some of this information is collected from Earth Observation satellites operated by NASA and NOAA, while other information is collected from satellites operated by foreign government agencies, such as the European Space Agency.

Second, while it is a significant customer for commercial industry, it has a unique set of procurement rules and requirements that often differ significantly from commercial customers. For example, procurements with USG are often subject to the Federal Acquisition Regulation and any associated supplements, as well as complicated accounting rules. Understanding and complying with these can be burdensome and expensive for many commercial companies, particular small and medium size enterprises (SMEs). Moreover, while the USG wishes to share data across agencies, the procurement usually comes from the budget of one agency, and therefore is not necessarily reflective of the potential value of whole of government use.

In addition, the USG is also a regulator of commercial industry. The USG passes laws, regulations and policies that impact how commercial industry can collect, use, store, and transfer imagery, products, and services. In many instances the regulating entities are separate from the procurement entities within the USG, so the risk/reward calculation as to the value of the commercial sector and its role in the USG is not fully appreciated.

2. The Earth Observation Enterprise is a Complex Ecosystem, The Earth Observation Enterprise consists of federal, state and local government agencies, a broad range of industry sectors, NGOs, academia and private citizens. Each element of the ecosystem has diverse, sometimes divergent, needs and requirements based upon their operating (or business) model, the legal framework upon which they operate and applicable policies. These needs can also vary depending upon whether a stakeholder is an imagery provider, an integrator, or a user – or a combination of all three. For example, commercial industry generates revenue from licensing imagery, products, and services to a wide range of customers. On the other hand, government agencies are directed – or in some instances required – to broadly share imagery, products, and services within and even outside of government, which at times undercuts commercial industry’s ability to obtain a return on its investment that is acceptable to its shareholders or the investment community. In fact, the needs may vary within a single segment of the

ecosystem. For example, business models between commercial imagery providers may differ, which will have a significant impact on their approach to legal issues, such as licensing. One participant pointed out that it is easier for a company to grant broad use and sharing if its business model is based upon monitoring activities versus mapping the globe. Similarly, federal government agencies are subject to different laws than state or local agencies. In fact, legal and policy requirements, including international commitments, can even vary between individual USG agencies.

The tabletop exercise highlighted the complexity of this ecosystem simply among the stakeholders that address wildfires. Each of the sectors represented by the participants plays a unique and critical role in fighting wildfires. Every participant agreed on (i) the value that the commercial earth observation industry can and should play in addressing this significant issue and (ii) the need for USG to move more quickly. The challenge for USGEO will be understand and balance the collective needs of the stakeholders within the Earth Observation Enterprise to come up with an approach that satisfies conflicting needs.

Due to the nature of the Earth Observation Enterprise, protecting one sector at the expense of another sector may have significant unintended consequences. For example, the user community is critical to fighting fires and the commercial providers are a vital component in preparing, responding and rebuilding. If the user community is too strongly protected, through licenses that permit broad sharing of commercial imagery and products, it could have a significant impact on commercial industry. This could result in less technological innovation to prevent future wildfires as well as a smaller industry base, which would contravene stated US policy. Similarly, overly restrictive license agreements that limit the use and sharing of imagery and products could put lives at risk, and increase the economic costs of wildfires.

3. Earth Observation Imagery is Diverse. Commercial Earth Observation satellites collect a broad array of data types (e.g., electro-optical, radar, hyperspectral, RF, etc.) and the list of data types is growing. The tabletop exercise highlighted how (i) imagery can be provided in a number of forms; (ii) each of these data types have unique characteristics that impact their role to address wildfires; and (iii) users have different requirements and needs.

For example, imagery is often designated at levels ranging from unprocessed to highly processed. This imagery can be fused with other data types such that the original unprocessed imagery attributes cannot be identified and reused. Participants discussed ways to provide USG imagery with imagery that cannot be identified or reused or that is of lesser quality. In such instances, commercial industry would not be concerned if the original images are shared, as it would not limit its ability to sell and license higher level products to other customers.

In addition, the exercise highlighted how the importance of different data types in a wildfire varies depending upon whether it was needed for preparation, response or recovery. For example, the participants discussed how electro-optical imagery plays a critical role pre and post fire while certain types of infra-red data and radar is more valuable to combat a wildfire. From a commercial standpoint, these differences can have a significant impact on the type of user(s), the amount of imagery to be acquired, and the

need to share. This will then impact the business model of the commercial provider and as discussed further below, the appropriate licensing terms.

For USGEO it is important to recognize that the market for commercial data and products is diverse and understanding which type of data is required for an application, in what form, and for what use, is critical. This will require USGEO balancing the need for taking a standard approach across agencies on the procurement and licensing of commercial data and products, with the need to tailor such procurements and license agreements for certain data types and/or certain applications. A standard approach may be favored, given the way the USG currently acquires these products and services, but the tailored approach may better ensure that the needs of the respective provider and user communities are being met. The latter approach will also require the legal and contracting officials within the USGEO agencies to understand the technical, operational and legal issues involved.

4. Earth Observation Imagery is Versatile. Today's commercial industry is based upon a model where revenue is derived from licensing imagery and products to a variety of government and commercial customers. (This is very different than the traditional aerial imaging industry, which often transferred ownership of images and products to government customers.

One of the benefits of satellite Earth Observation data is that a single image, dataset or product can often be used for a variety of applications. For example, an image can be used by U.S. Forest Service to determine where human lives would be at risk in the event of a fire. It could also be used by a local community for urban planning purposes or a commercial enterprise for site development.² Therefore, a number of participants from industry discussed how licensing products and services to one organization but allowing use by another organization, at no charge, can have a significant impact on the ability of commercial industry to achieve an adequate return on its investment. The issue becomes even more complex if the downstream users have access to the source data.

Moreover, even if a data set can be used for a particular application, it may not be suited for that application. For example, it might not be the right accuracy or precision or be current enough for an application. This can lead to misuse and result in potential liability to commercial industry. It is particularly an issue when a commercial provider licenses imagery and products to the USG because procurement laws limit the federal government's obligation to indemnify the commercial provider for damages that arise due to misuse. Such indemnification obligations are standard in a commercial context and protect the commercial provider.

As noted above, the Earth Observation Enterprise must recognize that the versatility of imagery and associated products presents a challenge for commercial industry, particularly given the current business models. Moreover, while USGEO is unable to change federal procurement laws and regulations on its own, it can recognize that there is a risk to industry if imagery products are misused.

² This issue can arise in the context of a wildfire because an image can be used both to deploy resources in the event of a wildfire and for researchers to do post-fire forensics and analysis.

5. Earth Observation Imagery is Increasingly Being Integrated With Data From Other Sources. While Earth Observation imagery and products play a critical role in fighting wildfires, a number of the participants highlighted the need to be able to integrate that imagery and products with geospatial information (data that can be associated with a location) from other sources. As a result, government customers are looking not only for Earth Observation imagery and products, but also products and services that fuse different types of data from a variety of sources (government, industry social media, etc.)

Data fusion raises several other licensing and legal issues. First, to the extent that the commercial industry is providing such products and services, businesses must not only analyze the impact that licensing with the USG has on their business model, but they also must make sure that the license agreements they enter into with USG complies with the license agreements that they have entered into their data vendors. In addition, to the extent that the USG is working with third parties to create data fusion products and services, commercial industry will be concerned about those third parties gaining access to the source data and developing competitive products and services.

6. License Agreements Will Play a Critical Role. The exercise highlighted the critical role that license agreements (often referred to as End User License Agreements or EULAs) will play in the relationship between USG and the commercial industry. As described above, the evolution of image collection from commercial airborne providers to commercial satellite providers has resulted in the USG licensing imagery and related products rather than purchasing and taking ownership. As a result, imagery and the associated products are an asset to commercial industry the same as other assets, such as machinery, a truck, or computer software. The license agreement consequently is a complex legal document that sets forth the rights and responsibilities of the parties with respect to the image or product as well as their relationship going forward.

In many instances, the license is the manifestation of a commercial entity's business model. For example, a license agreement that permits broad sharing by the licensee of imagery and associated products to third parties limits the ability of the commercial party to license such data itself to those same parties. Consequently, commercial data providers may feel the need to charge a higher price for this opportunity cost. The customer on the other hand might be willing to limit the parties with whom it shares data in order to pay a lower price. Therefore, understanding and describing those rights and responsibilities is critical, which in turn increases the importance – and complexity - of a license agreement.

In preparation for the exercise, the participants received a copy of several licensing frameworks and EULAs that the USG is considering for the licensing of imagery. (Attachment 3 is a copy of the frameworks and EULAs that were sent to participants.) The participants used these EULAs as a starting point to discuss several important aspects of licensing. One topic that was discussed by the lawyers participating in the tabletop exercise was the importance of commonly agreed upon terms and definitions in a license agreement. It is easier to agree to a licensing agreement when the terms and definitions are commonly used and understood by the stakeholders.

There are numerous examples of license agreements for imagery and associated products being used by industry and government. The challenge for USGEO will be to adopt a licensing regime that addresses the key takeaways identified above while also

facilitating “legal interoperability” as it pertains to the use of commercial imagery and products within the Earth Observation Enterprise.

Next Steps

Several next steps were identified that would facilitate the integration of commercial Earth Observation data, products and services with government data to address wildfires. Each of these would also be beneficial for the integration of commercial capabilities with government tools for other critical use cases. Some of these next steps were discussed in detail during the exercise, while others emerged from discussions with participants, either before or after the exercise.

Some of these steps the USG can take on its own if it wishes to increase adoption of commercial products and services. Others are steps that the broader Earth Observation Enterprise, to include USGEO, industry, academia and others across the enterprise, can take together. In either case, the participants agreed that action is needed soon, as wildfires in the U.S. are getting worse and commercial industry can and should play a vital role to address this challenge. Several participants also mentioned that industry and government had an ethical duty to enhance the public's trust and confidence in the data.

1. Increase Funding for Procurements.

A number of participants from government and academia highlighted the desire for commercial imagery and products to be broadly shared across government and the public with limited restrictions. The reasons given varied from legal requirements imposed on government agencies, to USG and agency policy, to academia's need to have access to source data for certain research. However, industry participants replied that if the USG requires that imagery and associated products be shareable across government and with non-government third parties, an option is to increase funding to cover all potential uses.

For example, if there is a need for the Department of Commerce to subsequently use imagery initially procured by NOAA to fight wildfires in California, that potential use could be factored into the procurement and NOAA should increase funding of the contract. Similarly, if, as one participant noted, source data contained in derived products needs to be shared within government and academia for peer-reviewed publications, such use should be considered during the procurement process. Otherwise, having one agency issue a contract with a defined budget to license data for one application, such as a wildfire, but allow other agencies to use it more broadly with limited oversight on how the data is used or shared with non-government third parties is essentially requiring commercial industry to subsidize such use. As one participant noted, the costs of building, launching and operating an earth observation satellite constellation that can provide timely, high-quality imagery are significant, and industry needs to be able to obtain an adequate return on its investment. Another participant noted the sensitive intellectual property that can be included in the source data of derived products, and the business risks associated with such data being broadly shared.

Increasing funding for procurements would require USGEO to coordinate between the applicable agencies. However, several participants highlighted good examples of similar interagency partnerships, such as NGA and the Department of Homeland Security partnering to provide nationwide baseline infrastructure content.

2. Establish a Pilot Program.

Several participants suggested that USGEO conduct a pilot program as a next step. A pilot program also would bring together technical, operational, and legal representatives from industry, government and academia to address a real-life situation such as a wildfire. However, it would go beyond the tabletop exercise to include the actual tasking, collection, distribution and use of imagery to create commercial products and services. These commercial products and services could be subject to different licensing arrangements with varying limits on use, users, sharing of derived products and other variables to assess the impact to preparation, response and post-event forensic analysis. USGEO could evaluate the findings from the pilot program and determine the optimum licensing regime to determine required funding.

For example, the pilot program could describe which commercial data and products were required to be shared with which specific government agencies to address wildfires, as well as define the length and purpose of the sharing. Another component could examine what derived products were essential, and when the underlying data would need to be shared to non-government third parties. USGEO could use the results to develop and/or identify the appropriate licensing requirements, which could then be used for procurement purposes.

Several vehicles were discussed for such a program. One participant suggested Cooperative Research and Development Agreements (CRADAs) as a possible vehicle. CRADAs are an agreement between one or more USG agencies and the private sector in which the parties provide resources (personnel, services, facilities, equipment, intellectual property, etc.) for a specific project. However, others pointed out that CRADAs can take time to negotiate and that generally the government cannot provide funds to non-federal agencies under a CRADA. One participant also added that it is difficult for a company to invest in a CRADA unless there is a clear process to accelerate toward a product offering and operational service.

Several participants raised the possibility of using Other Transaction Authorities (OTAs) as a mechanism. OTAs have become a very popular vehicle to develop prototypes outside the normal constraints of the federal procurement rules. As a result, OTAs offer greater opportunities for both SMEs and nontraditional government contractors to participate. However, while several agencies have Congressional authorization for OTAs, including NASA and NOAA, many funded OTAs are through DoD entities. Therefore, USGEO should consider including NGA and/or the NRO in such a program.³ During this discussion several participations suggested creating an “Environmental Innovation Unit” within DoD along the lines of the Defense Innovation Unit (DUI). DUI funds prototype projects, typically for 12-24 months, under OTAs. Upon successful completion, follow-on awards can be issued under both OTAs and traditional FAR-based contracts.

Another option that was discussed after the tabletop exercise was using an organization such as the Open Geospatial Consortium (OGC) to host a pilot program. OGC has a great deal of experience working with government and industry on technical and operational issues associated with technical interoperability for Earth Observation and

³ One topic that the tabletop exercise was not able to address, due to time and operational constraints, was the roles of the defense and intelligence agencies to combat wildfires in the U.S.

other types of geospatial information. Based upon its experience and structure it could be a resource for this type of project.

3. Distinguish Imagery and Products From Government's Existing Use of the Term "Data."

The exercise highlighted that one of the challenges the USG faces is trying to apply existing requirements for government agencies with respect to data to commercial Earth Observation imagery. Government agencies are being asked to address a number of laws and policies related to their use of data. This is proving challenging because not all data is the same. For example, as described above, imagery is much more versatile than other types of data. Moreover, because of the cost associated with collecting satellite imagery, the business model of the commercial satellite segment of the Earth Observation Enterprise often is very different than that of the aerial segment of the Earth Observation Enterprise. As a result, these policies do not take into consideration that for many commercial companies, data can be, and often is, an asset, much like any other tangible or intangible asset.

The exercise highlighted two examples of where this tension is most apparent.

Open Data – There is a growing push within the USG as a whole to make data open and more widely available at little to no cost to the user. This push has taken many forms, including legislation, regulation, executive orders and policies. While a noble objective, it often fails to distinguish between different types of data and can devalue data assets in the eyes of many government officials.⁴ It also puts government lawyers and contracting officials in the difficult – and confusing position – of trying to balance the effort to make data open with the goal of addressing a specific task, such as wildfires. For example, one participant highlighted the government's guidance to be able to license imagery it acquires under a permissive Creative Commons license. Others discussed the importance for the parties to think creatively in licensing regimes, such as making data openly available only after a period of time or at a lower level of processing. The thought is that such an approach would allow commercial data providers greater opportunity to achieve a return on their investment. However, while there may be benefits for such approaches in the abstract, USGEO should also consider whether upholding the objective of open data in every instance is more important than fighting wildfires with all available data and tools.

Federal Acquisition Regulation – This tension is also evident in the Federal Acquisition Regulation (FAR) - the regulation that governs most federal government procurements. The FAR provisions associated with data rights are complicated and essentially treat all types of data as if they were the same. Although there are exceptions, it can be very difficult for a commercial entity to determine which and how its provisions apply in a procurement. Failing to comply with the applicable FAR can be expensive, as the government may then receive unlimited rights in the data.

⁴ The USG generally does not require a commercial software company to agree to make its privately funded commercial software available to the public at no charge as part of a government contract, but the capital investment in building, launching and operating a commercial remote sensing system is as – if not – more significant.

This issue arises even if the FAR does not apply as, quite understandably, government contracting officers and lawyers tend to use concepts and terms with which they are familiar. For example, the USG licensing frameworks and EULA(s) that were circulated to the participants included several important concepts and terms that were similar to the FAR.

While USGEO is unable to unilaterally change the USG's approach to Open Data or the FAR, the respective agencies do have some discretion to develop policies on how these apply within their organization or to specific programs. For example, an agency can provide more clarification as to if and how to apply Open Data policies to commercial imagery. It can also provide guidance to its contracting officers on how to consistently apply the FAR to the acquisition of commercial imagery and make such guidance known to the commercial sector. This discretion can be seen in the NOAA Space-Based Commercial Weather Data License that allows data providers some flexibility to limit which users receive their data. Moreover, USGEO can work within USG to highlight the challenges it faces in applying broad data policies to commercial imagery data, products and services.

4. Work With Industry to Develop Standard EULA(s).

Several participants raised the need for a standard EULA (or set of EULAs) that could be adopted for licensing of Earth Observation data products and services to the USG. This discussion highlighted the challenge USGEO will face in balancing clarity and precision in EULAs to address each party's respective concerns against the benefits associated with ease of use. As previously noted, the Earth Observation Enterprise is broad and diverse with many different types of data that can be collected from a variety of sensors and platforms, and used to create a variety of products and services to address a wide range of applications by users in government, the private sector, academia and the public at large. A single EULA (or limited set of EULAs) that attempts to address all aspects of the Earth Observation Enterprise by necessity must be very general and provide for a number of contingencies.

The tabletop exercise highlighted that government and industry lawyers, both data providers and users – along with legal representatives from other stakeholders - need to work together to reach consensus on EULAs. For example, as discussed above, the participants received the examples of licensing frameworks and EULAs being used or considered by agencies within USGEO.⁵ The three EULAs included definitions for a “Value-added Product” and a “Derived Product.” A Value-added Product is one where the principal features and source materials are retained and extractable through technical means. A Derived Product is one in which the source material is irreversibly modified and uncoupled. However, each EULA provided for broad sharing of both Value-Added Products and Derived Products with third parties.

⁵ Appendix 3 contains (i) the NOAA Space-Based Weather Data Licensing framework used for the purchase of commercial Radio Occultation data awarded in November 2020 (ii) NRO/NASA Public Release End User License Agreement, (iii) the NRO/NASA United States Government End User License Agreement and the (iii) NRO/NASA United States Government Plus End User License Agreement.

One of the concerns expressed by representatives from the commercial sector during the exercise was the ability of the USG user to create products that contained source data that could be accessed by the downstream user. Industry is concerned that this could limit other market opportunities for them. It may also expose third parties to critical proprietary intellectual property. In addition, often the use was not clearly limited to the purpose for which the data was originally procured.

While such broad terms are necessary when trying to address a wide range of uses, if the EULAs were tailored to particular use cases (i.e., sharing limited to government agencies and contractors directly supporting a specific wildfire effort or a specific contract), it would give commercial stakeholders greater confidence that their data and products will not be shared too broadly or end up in the hands of competitors. Similarly, if the EULA limited the sharing of value-added products that included source data, the data provider would have more confidence that its valuable intellectual property was being protected.

Unfortunately, it is not feasible for USGEO to negotiate a EULA for each application. Moreover, commercial entities often do not wish to spend time and money negotiating a EULA on a case-by-case basis for smaller procurements. Therefore, an alternative would be to develop a standardized EULA with attachments to address specific critical issues that will vary depending upon the type of data, the required use and the products and services. Such attachments could be negotiated between the parties to address whether sharing is limited to certain users, or for a fixed time (or event) or tied to a specific contract. This type of approach would allow for ease of use, but also enough flexibility for both sides to ensure their concerns were adequately addressed.

It may be helpful to conduct one or more additional tabletop exercises examining other use cases that require different types of data and different users. For example, a use case involving hurricane response would include different participants, different users and different types of data, products and services than those used in wildfires. These additional use cases could help flesh out other legal, operational and technical issues and/ or provide additional clarity on the issues that were identified in this tabletop exercise. This could also help inform the content of the attachments in a standard EULA as these different use cases could illustrate specific considerations that must be addressed.

One of the challenges is choosing the best forum in which to bring together appropriate representatives from government, industry, and academia to develop a EULA framework. One alternative would be to continue to use USGEO as a convening authority. Alternatively, USGEO could partner with an organization such as the United States Geospatial Intelligence Foundation (USGIF) to work on such issues, perhaps under its Geospatial and Remote Sensing Law Working Group. Alternatively, if the objective is to increase involvement from the legal community, USGEO might consider working with the American Bar Association, which has several working groups that could take up this issue.

5. Work With Industry to Develop a Set of Common Terms and Definition in EULAs.

Given the importance and complexity of EULAs it may take time to reach consensus on standardized licenses. In the interim, there was general agreement among the lawyers

participating in the tabletop that it would be very helpful to develop an agreed-upon set of terms and definitions for use in EULAs for USG customers. The participants noted that there are significant differences between the EULA provided by USG and those used by the commercial sector. For example, the EULA permitted “sharing” with “contractors” working on a “contract.” The definition of the term “sharing” did not make it clear whether such sharing would constitute a “ sublicense,” which could have significant impact for a commercial provider, particularly if – for instance – it had acquired data from a third party under a license that did not permit sublicensing. Meanwhile, the terms “contract” and “contractor” were not defined, raising questions as to whether such sharing would go beyond the purpose of the original procurement. Moreover, USG is only required to use undefined “reasonable efforts” to comply with, and monitor third-party compliance of, the terms of the EULAs. An agreed-upon set of terms and definitions would make it easier and quicker for industry and government to reach agreement on key language.

In other industries – such as the software industry – a common set of licensing terms and definitions have developed over time, as business models have become more standardized, as lawyers have reached consensus through negotiation and awareness, and as there is greater certainty with respect to case law and regulatory requirements. This has not yet happened in the Earth Observation Enterprise. One of the reasons is that the technology has moved so quickly that lawyers have not had a chance to reach consensus. Also, there are relatively few lawyers in government and industry that have worked on these types of agreements, and there are not the traditional sources of insight and education as found in other industries from organizations such as the American Bar Association.

Both government and industry would benefit from lawyers further enhancing the terms and definitions that are used in EULAs for USG procurements. A commonly understood set of terms and definitions would make it easier for industry and government to reach agreement. It would also make it easier for industry to include these terms in their EULAs with any vendors to ensure consistency, as one of the challenges expressed in the exercise is that even if an Earth Observation company can agree to a government EULA with respect to its own data, it may have third party data in its products/services that have different defined terms.

Conclusion

The tabletop exercise highlighted both the value the commercial sector can provide to address issues such as wildfires, but also the challenges that the USG will face in integrating commercial imagery, products, and services into the Earth Observation Enterprise. These challenges are due to a number of factors including USG's procurement process; some unique aspects of Earth Observation imagery; the fixed costs associated with building, launching and operating commercial satellites; the wide range of businesses that comprise the commercial sector; and the resulting divergent business models. However, the need to integrate commercial data, products, and services continues to grow, and as the technology improves will become even more critical. USGEO has the opportunity to gather lessons learned from this discussion to begin taking bold measures to work through these issues. Working with industry, it can begin to address the challenges in integrating commercial Earth Observation data to address shared national challenges.

Appendix 1: Participants

Vince Ambrosia (Assoc. Program Manager - Wildfires; NASA Applied Science Program, ESD, NASA HQ) Vince Ambrosia is a Senior Research Scientist / Adjunct Faculty Member in the Department of Applied Environmental Sciences, College of Science, California State University – Monterey Bay (working at NASA-Ames Research Center), and also serves as the NASA Applied Science Program, Associate Program Manager for Wildfire at NASA HQ, responsible for management of a portfolio of projects related to Earth Observations in support of wildland fire applications developments. He currently supports the Group on Earth Observations (GEO), Global Wildfire Information System (GWIS) initiative as the NASA representative, and since 2003, co-chairs the NASA / U.S. Forest Service Tactical Fire Remote Sensing Advisory Committee (TFRSAC). He has received the 2009 NASA Outstanding Public Service Medal for supporting emergency wildfire observations with UAS / sensors; the 2009 Federal Laboratory Consortium for Technology Transfer, Interagency Partnership Award for improving the U.S. wildfire observations; and the 1999 ASPRS Best Remote Sensing Paper Award in the journal Photogrammetric Engineering & Remote Sensing (PE&RS) for his article entitled: *“An Integration of Remote Sensing, GIS, and Information Distribution for Wildfire Detection and Management”*. In 2019, he also received the journal Remote Sensing award for the top peer-reviewed article in the journal’s 10-year history, entitled: *“Considerations for the Use of Unmanned Aircraft Systems in Remote Sensing and Scientific Research”*. He is the author / co-author of over 200 papers, book chapters, and presentations. He holds a BSc. in Geography from Carroll University (Waukesha, WI) and the MSc. from the University of Tennessee-Knoxville (1980) and has been at NASA-Ames Research Center in various positions since 1980.

Christopher Bowen (Commercial Counsel – Spire) Christopher Bowen has been at Spire Global Inc since July 2020 and provides legal advice on all aspects of Spire's Federal and commercial business, including maritime, aviation, and weather data orders, as well as launch services contracts, orbital services deals, and supplier agreements. Chris also leads the compliance efforts for the Federal team, including information security, FAR/DFARS compliance, and ethics issues including conflicts of interest and antitrust. Chris has been an attorney for 16 years, and, prior to working at Spire, was a trial attorney for the U.S. Department of Justice, a Government Contracts associate at Arent Fox, and Counsel at IBM. At IBM, Chris supported IBM's hardware, software, as-a-service, and consulting contracts with the Federal Government, including negotiation of licensing agreements. Chris has guided his clients through all aspects of the Government contracts process, from proposal preparation to bid protests to claim resolution to contract closeout and DCAA audit. Additionally, for prior clients, Chris has assisted with mitigation of FOIA concerns and False Claims Act, antitrust, and fraud investigations, including negotiation of resolutions.

Tony Busalacchi – (President – University Corporation for Atmospheric Research) Tony is an expert in Earth’s climate system and ocean-atmosphere interaction. He helps guide UCAR’s world-leading research into the Earth system sciences and its support of the research community through supercomputing, observing instruments, and community models. His priorities include fostering a broad interdisciplinary approach into researching the Earth system and increasing diversity across the geosciences. He has had a distinguished career in the geosciences; extensive experience in management of academic, laboratory, and government programs; and a broad knowledge of the research community.

Robert Cardillo (Chairman of Board - United States Geospatial Intelligence Foundation)-

Robert is the president of The Cardillo Group (TCG). TCG delivers strategic and operational expertise to create an enhanced awareness of our planet to enable improved decision-making. TCG's portfolio includes academic, non-profit, and national security-related clients. Before TCG, Robert held leadership positions with the Chairman of the Joint Chiefs of Staff, Defense Intelligence Agency, and Office of the Director of National Intelligence. Until 2019, Robert was the sixth Director of the National Geospatial-Intelligence Agency. He transformed the Agency's future value proposition through innovative partnerships with the growing commercial geospatial marketplace.

Melanie Corcoran (CEO - Analytic Fusion) Melanie is an advisor to over 7 innovative new Space 3.0 AI startups, System Integrators, and new commercial space providers. She has over 25 years plus experience in Geospatial Analytics, Commercial Space, AI, advanced data fusion. Her technical expertise focuses on developing dual-use, commercial and government sector, fused data and small satellite outputs that deliver alpha and decision advantage across spectrum (RF/SAR/EO etc.), disparate data sets, and time. She is a Los Alamos National Lab Guest Scientist. She spent 10 years as a Senior Scientist running government satellite and analytic based R&D and Analysis. She was the CTO of Ursa Space. Ms. Corcoran has an MBA from USC Marshall School of Business Finance and an undergraduate degree from the University of Virginia in Environmental Science.

Matthew Eby (Founder and Executive Director of First Street Foundation) Matthew Eby is the Founder and Executive Director of First Street Foundation, a research and technology nonprofit working to define America's climate risk. Under Matthew's leadership, the Foundation created a first-of-its-kind, peer-reviewed flood model, to calculate the past, present, and future flood risk of every property in the United States. The Foundation has also calculated the associated economic damage for every property and made all of this data available through Flood Factor, a consumer facing website that is directly integrated for every property on Realtor.com and Redfin. Matthew holds an Honors Business Commerce degree and an MBA from McMaster University in Canada. Matthew is a recognized business leader with global experience. He has worked and lived in Toronto, Tokyo, London, Atlanta, and New York. Before creating the First Street Foundation, Matthew founded and served as CEO of Anthro, a digital marketing agency serving social good and non-profit organizations. Before that, he was the Senior Vice President of Consumer and Brand Marketing for The Weather Company, where he managed a portfolio of brands including The Weather Channel (digital and broadcast) and the Weather Underground.

Kyle Gertridge (Salo Sciences, Head of Business Development, Partnerships, & Legal)

Salo's resident non-scientist, Kyle's efforts focus on expanding the use of Salo's data and tools to new partners and markets in both the public and private sectors. He is also an attorney with experience in intellectual property and technology transactions and handles legal matters at Salo. Kyle attended UC Hastings College of the Law and The Johns Hopkins University.

Angela Hall (NASA) Alfreda Hall is currently serving as Project Manager as well as the Contracting Officer's Representative - Technical (COR) for the Commercial Satellite Data Acquisition (CSDA) Program under NASA's HQ Earth Science Data Systems. Established in 2018, the objective of the CSDA Program is to identify, evaluate and acquire data from commercial sources that support NASA's Earth science research and application activities. Additionally, she serves as Senior Systems Engineer for the Earth Science Data Information System (ESDIS) Project. Ms. Hall has been with NASA for more than 30 years.

Derek Hanson (Counsel – NOAA) Derek Hanson is an attorney-advisor at the National Oceanic and Atmospheric Administration (NOAA). Derek provides legal counsel related to the activities of NOAA's environmental satellite, weather, and research divisions, advising on issues including open data policies and licensing, commercial data buys, and the regulation of private remote sensing satellites.

Barron Henderson (Environmental Protection Agency) Barron is a Physical Scientist in the Air Quality Analysis Division's Air Quality Modeling Group of the Office of Air Quality Planning and Standards. He uses theory and computer simulation to explore scientific and societal issues related to air pollutants. Barron's body of work advances process-level understanding within air quality models and uses those models to quantify integrated impacts of air pollution at local, regional and global scales. Before coming to the EPA, he was an Assistant Professor at the University of Florida. His research there ranged from South Florida single source issues, to characterizing pollution in Bogotá Colombia, to characterizing chemical kinetics important for long-range transport. His work at the EPA includes collaborative research to improve atmospheric models and quantify global contributions to local pollution.

Everett Hinkley (US Forest Service) As the National Remote Sensing Program Manager for the FS, Everett provides remote sensing policy, oversight and direction to primary agency stakeholders including the Geospatial Technology Applications Center, the National Interagency Fire Center, Law Enforcement and Investigations, Forest Health Protection and regional remote sensing coordinators to insure that agency remote sensing requirements are understood and needs are met and that new technology is appropriately exploited to match current and evolving agency mission requirements. Within the Washington Office, Everett coordinates with the Geospatial Management Office Leadership Team to develop the annual remote sensing program of work and provide guidance to the field. Everett serves as the primary remote sensing liaison to other federal departments/agencies. In this capacity, Everett works with NASA, DHS, the BLM, the USGS, and the National Geospatial-Intelligence Agency to ensure that the Forest Service is utilizing the most up-to-date data sources, applications and best practices for data exploitation and use. This role promotes collaboration on remote sensing activities which helps to reduce redundant efforts within the federal government. Everett also serves as the USDA Representative to the Civilian Applications Committee (CAC). The CAC is an interagency committee that coordinates and oversees the Federal civil use of classified assets and provides Federal civil agencies access to National Systems data in support of mission responsibilities. This role ensures that agency mission needs are being met utilizing a broad range of environmental and remote sensing applications central to Forest Service agency missions such as detecting wildland fires, monitoring ecosystems, and mapping wetlands. As co-chairman of the CAC - Thermal Working Group, Everett developed with the DoD and Intelligence Community, a fire detection and reporting capability which successfully leverages National Systems to improve wildfire detection and reporting nationwide.

Chris Lin (General Counsel, BlackSky) - Ms. Lin brings nearly two decades of experience working with business, government and legal teams during growth and innovation cycles with a focus on data and technology companies. During her 17-year tenure at Comscore, a pioneer in media measurement and analytics, she helped grow the data and analytics business from an early-stage start-up to a multi-billion-dollar public company with teams across Europe, APAC and the Americas. Ms. Lin also served as partner at NextGen Venture Partners and Outside GC, representing startup technology companies to position themselves for growth. Ms. Lin was most recently general counsel, chief privacy and administrative officer for Rakuten Advertising, a leading global provider for marketing and advertising services, data analytics and technology,

where she helped restructure legacy business lines to increase profitability and built the foundation for accelerating the growth of emerging business lines. During her career, Ms. Lin has held positions in the White House and the Department of Defense with a focus on law enforcement, and special operations and low-intensity conflict. Ms. Lin holds a JD from Georgetown University Law Center and a BA from Yale University.

Joe Morrison (VP of Commercial Product – Spire) Joe Morrison is the VP of Commercial Product at Umbra, a radar satellite imagery company. Joe is responsible for all things related to Umbra's customer experience. He won't rest until tasking satellites is as easy as booking hotel rooms. In his spare time he writes a newsletter on the business and strategy of modern mapping and tweets too much.

Kevin O'Brien (CEO - Orbital Insight) Prior to his role at Orbital Insight, Kevin was the Regional Director for the Americas, Global Banking & Brokerage, for FactSet Research Systems. Kevin joined FactSet in conjunction with the acquisition of Revere Data, LLC, where he was President and CEO. Originally trained as a software engineer, Kevin earned a BBA in Management Information Systems from James Madison University. He earned an MBA in Innovation, Strategy & Information Technology from the EDHEC Business School in Nice, France

Kevin Pomfret (Partner - Williams Mullen; Centre for Spatial Law and Policy) Mr. Pomfret is the founder and Executive Director of the Centre for Spatial Law and Policy, and a corporate partner at the Williams Mullen law firm. He is recognized as a leading authority on the legal and policy issues that impact the collection, use, storage and distribution of geospatial information, such as licensing, privacy and data protection, data quality and liability and regulatory matters. He has presented to committees of the United Nations and the U.S. House of Representatives and is a member of the United Nations Global Geospatial Information Management Working Group on Legal and Policy Frameworks for Geospatial Information Management. He has conducted training workshops on geospatial legal and policy issues across the globe and teaches a course on Geospatial Law and Ethics at Johns Hopkins University. Mr. Pomfret began his career as a satellite imagery analyst with the National Photographic Interpretation Center. In that capacity he helped to develop imagery collection strategies and identify requirements for future collection systems.

Brad Quayle is a program lead for the Disturbance Assessment and Services (DAS) Program at the Forest Service Geospatial Technology and Applications Center (GTAC) in Salt Lake City, UT. We provide remote sensing/geospatial support services and products to our fellow Forest Service staff areas (e.g. Fire and Aviation Management, Forest Management, etc.), other agencies and the general public. Activities include facilitating satellite-based, strategic scale active fire detection/mapping, technical support to our airborne tactical scale fire mapping activities, satellite-based post-fire burn severity mapping and assessment of other hazard/disaster events (hurricanes, tornados, floods, etc.) impacting National Forest System lands.

Jason Sarfati (Chief Privacy Officer, VP of Legal – Gravy Analytics) Jason Sarfati is the Chief Privacy Officer and VP of Legal at Gravy Analytics, a leading location intelligence company that delivers real-world consumer intelligence to help organizations overcome today's biggest challenges. As Chief Privacy Officer Jason dedicates his time to guiding his organization through the multitude of challenges that exist at the intersection of privacy, technology, and geolocation data. Jason's role also makes him well versed in the regulatory and legislative updates around data privacy, with an emphasis on the shifting attitudes towards

location data.

Robbie Schingler (Co-Founder and Chief Strategy Officer – Planet) In the ten years since founding Planet with two former NASA alumni, Robbie has led the company's long term strategy that has included three acquisitions and business growth that currently serves more than 30,000 users and 500 customers, in over 40 countries. Prior to Planet, Robbie spent nine years at NASA, where he helped build the Small Spacecraft Office at NASA Ames and was Capture Manager for the Transiting Exoplanet Survey Satellite (TESS). Robbie later served as NASA's Open Government Representative to the White House and Chief of Staff for the Office of the Chief Technologist at NASA. He received an MBA from Georgetown University, a masters degree in Space Studies from the International Space University, and a B.S. in Physics from Santa Clara University. Robbie was a 2005 Presidential Management Fellow

Paul Steblein (USGS) – Paul is the Wildland Fire Science Coordinator at the US Geological Survey working with about 150 scientists to produce essential information, data and tools used by decision makers before, during and after wildland fires. He has served for several years on the Governing Board for the Joint Fire Science Program. Paul has enjoyed tackling complex natural resource and land management issues for over 30 years from a variety of positions in the Department of the Interior, including Deputy Director of the DOI Office of Wildland Fire and a wide variety of field, regional, and national positions in the National Wildlife Refuge System.

David Tonini (Head of Compliance - Maxar) David joined Maxar Technologies in July 2021. Prior to Maxar, David served for nine years as an Assistant U.S. Attorney and the Chief of Cybercrime and National Security for the District of Colorado. There he investigated and prosecuted data breaches, export control violations, and insider threats, among other offenses. David practiced as an IP and litigation associate at an international law firm for seven years before the DOJ. He also has 23 years of commissioned service as a logistics officer in the U.S. Navy where he has served in both active and reserve capacities.

Allison Wolff (Chief Executive Officer- Vibrant Planet) Allison worked in Silicon Valley for 20 years on corporate strategy, product strategy, customer experience design, and marketing. After overseeing the development of the Netflix brand and digital experience Allison advised corporate and nonprofit leadership teams on vision, strategy, and social and environmental innovation. Clients included Drawdown, Google, eBay, Facebook, Chan Zuckerberg Initiative, Omidyar Network, Patagonia, Nike, HP, Conservation International, and GlobalGiving.

Steve Woll (President- Synoptic) Steve served as a Meteorology and Oceanography Officer in the U.S. Navy for 21 years, providing direct support to aviation, surface, submarine, and special operations forces and including an Area of Responsibility covering half the globe. After retiring, Steve headed up Business Development for WeatherFlow Inc and then Synoptic Data Public Benefit Corporation and was selected to serve as Synoptic's President in 2020. Areas of activity in recent years have included renewable energy, hurricane forecasting and impacts, public-private cooperation, and the integration of geophysical data and metadata. He holds an MBA from the College of William and Mary, an M.S. in Meteorology and Physical Oceanography from the Naval Postgraduate School, and a B.S. in Computer Science and Zoology from Duke University.

Dave Zader (Wildland Fire Policy Committee Member - International Association of Fire Chiefs) Dave Zader currently is a Member of the International Association of Fire Chiefs - Wildland Fire Policy Committee and recently retired from the City of Boulder Fire Department where he served as the Wildland Fire Administrator, Dave started his fire career in 1987 in

Prince William County Virginia, Dave has worked for the USFS and Yosemite National Park as a Heli rappeler and at multiple municipal fire departments. He spent 14 Years with the Boulder Fire Department and works in Operations and Air Operations on local and national incident management teams. He is qualified as a Division Supervisor, Helibase Manager, Incident Commander, and Burn Boss. Dave was the creator and author of the Boulder Structural Protection Plan. Dave teaches at numerous local, state and national courses. Dave works very closely with national guard and active duty aviation units to help prepare them for firefighting and domestic operations. Dave has been awarded 2 medals of valor and numerous commendations throughout his career and has served in many roles on large incidents from Hurricane Sandy to Colorado Floods, and Boulder County Fourmile Fire. Dave has been involved in structural and wildland firefighting, search and rescue, technical rescue, hazardous materials and incident management throughout his career. Dave has a passion for firefighting, aviation, technology, communications and graphical information sharing systems. Dave has a bachelor of science in Forestry and Wildlife Management from Virginia Tech. Dave currently serves as a wildfire advisor and consultant to industry, local, state, federal and foreign governments.

Appendix 2: Use Case

Section 1 – Impact of Licensing on Cross-Government Collaboration

Federal, state and local government authorities are preparing for wildfire season. They have requested commercial satellite remote sensing companies update them on their capabilities to provide data on fuel loads, weather patterns that impact the spread of wildfires. The goal is for this data to be with government-generated data and other types of publicly available information. In addition, they are seeking input on commercial capabilities to analyze and visualize commercial data with other datasets for federal, state and local authorities. They are also interested in identifying tipping and tasking capabilities of the commercial sector.

Discussion topics:

1. **What are the best types of data from a technical standpoint (i.e. sensor type, resolution, accuracy, etc.) to address these issues?**
 - a. **Who will provide this data?**
2. **What types of products and services will need to be created from the data?**
 - a. **Who should create the products/services?**
 - b. **Who has ownership rights in these products?**
 - c. **Are they considered derivative products?**
3. **What impact will the Foundations for Evidence-Based Policymaking Act of 2018 have on federal agencies?**
4. **What impact will the Information Quality Act have on the reliance on, and sharing of, non-government data?**
5. **Licensing**
 - a. What restrictions could there be on using the data?
 - b. What restrictions could there be on sharing the data?
 - c. What restrictions could there be on any derivative products created in whole or in part with external data?
 - d. What restrictions could there be on third parties using this data or any derivative products?
 - e. Which of these restrictions are based in federal procurement law (i.e. Federal Acquisition Regulation)?
 - f. How would these restrictions impact the ability to protect these vulnerable communities?
 - g. What could be done from a legal standpoint to make it easier to use and share the data?
 - h. How could the use of data for active response purposes, as opposed to data accessed for management and planning purposes, impact what license is used?
6. **Are there any federal or state privacy laws that must be considered?**
7. **What is the role that the academic sector should play?**
8. **How much data needs to be stored and where?**

- a. data from U.S. government Earth Observation platforms,
- b. publicly available data collected by the U.S. government,
- c. proprietary data licensed by the U.S. government and other end users.

Section 2 - Facilitating Data Access within Legal Limits to Prevent Harm

There are multiple fires across several states. Several localities have advised their citizens to evacuate. Authorities are looking for commercial providers to help them maintain situational awareness on the fires, and the risk to life and property. Specifically, they wish to map the perimeter of the fires, characterize intensities, detect spot fires, and track movements of individuals so that they can efficiently deploy their limited resources. They are also looking for a common operating picture of the fire situation, to include dashboards for all levels of government to access and share as necessary. In addition, experience has taught that wildfires are fast-moving, and dynamic and often require overhead imaging with high revisit rates and rapid tasking capabilities.

Discussion topics

- 1. What legal restrictions could there be on sharing the data collected regarding individuals:**
 - a. Within the affected communities?
 - b. Within the various levels of government (local, state, and federal), and with various government agencies?
 - c. With third parties?
- 2. What steps should agencies and businesses be required to take to protect the privacy and data of individuals within the affected communities? Are there any applicable laws or policies that must be followed?**
- 3. Do these agencies and business have the requisite consent from individuals within the affected communities to use, share, and/or store this data?**
- 4. Do the government agencies and commercial businesses have any obligations to tell individuals within the affected communities about how they are using the data? Does this vary depending upon the source and spatial resolution of the data?**
- 5. Which party is responsible if errors are made in the storage, and/or use of the data collected?**
- 6. What legal issues should the agencies and businesses consider before sharing the data?**
- 7. If sharing of the data is permitted under applicable law, what restrictions, if any, should be placed upon the use of the data?**
- 8. Who is responsible if the data is improperly shared or used?**

9. **What are the means of making the data available at the local level? How is the data shared in compliance with existing commercial data licensing agreements? Can it be?**
10. **What, if any, licensing issues could arise with the use of archived commercial imagery, as opposed to more recently obtained imagery?**

Section 3 - Sharing Information to Protect Lives and Resources

A number of stakeholders, including federal, state and local government agencies, businesses, academic and research institutions, and not-for-profit community organizations wish to use commercial data and solution providers and to evaluate the response efforts and to help better understand the flow-on effects of the fires. Such effects include the direct and indirect economic implications caused by fires, such as power outages, significant damage to public and private infrastructure (whether directly by the wildfire or flooding as a consequence of combatting them) and insurance claims. Given the implications wildfires often have on businesses, it is likely that the data collected will be shared in order to inform affected businesses and individuals to better prepare them for wildfires, and fire seasons in general.

Discussion topics

1. **What data is involved in tracking the break-down of infrastructure?**
 - a. **Could this data be used to analyze damage caused to property for insurance claims purposes? If yes, what restrictions would apply?**
2. **What licensing agreements would need to be in place to ensure accurate data and derived products with respect to loss of private infrastructure?**
 - a. Can that data be shared?
 - b. What privacy considerations need to be made?
 - c. Can the data be merged with other data sets?
 - i. If so, what privacy concerns exist, and how are they managed?
 - ii. Who is liable?
 - iii. Who can access, use, store and share that data?
3. **Are there any ethical considerations?**
4. **What other limitations could there be on sharing the data? How could those be addressed from a legal standpoint?**
5. **If there is an error in the data provided, which is then relied upon by other agencies or businesses, who is liable for these errors and any consequences?**
6. **How will evolving privacy laws impact the collection, use and sharing of EO and other types of geospatial information?**
 - a. Virginia Consumer Data Protection Act
 - b. State drone laws.

Appendix 3: Sample End User License Agreement (EULA)
(Attached)

End User Licenses Agreement and Other Licensing and Data Sharing Frameworks

NOAA Space-Based Commercial Weather Data Licensing

Under NOAA's Indefinite Delivery Indefinite Quantity (IDIQ) contracts for the purchase of commercial Radio Occultation data awarded in November 2020.

- Option 1: Unlimited right to distribute all data to any entity immediately after receipt at NOAA, with no restrictions on use or further distribution (distribution rights included in the unlimited data rights definition at FAR 52.227-14).
- Option 2: Right to distribute all data to US Government agencies; National Meteorological and Hydrological Services; World Meteorological Organization (WMO)-designated Regional Specialized Meteorological Centers; members of the Coordination Group for Meteorological Satellites; non-profit entities and academic entities immediately after receipt at NOAA. Data is for non-commercial use but not for further distribution.
- Option 2A: Right to distribute all data to U.S. Government agencies; National Meteorological and Hydrological Services; WMO-designated Regional Specialized Meteorological Centers; members of the Coordination Group for Meteorological Satellites; non-profit entities; and academic entities immediately after receipt at NOAA. Data is for non-commercial use but not for further distribution. Right to distribute all data to any entity, with no restriction on use or further distribution, 24 hours after receipt at NOAA.
- Option 3: Right to distribute all data to U.S. Government agencies; National Meteorological and Hydrological Services; WMO-designated Regional Specialized Meteorological Centers; and members of the Coordination Group for Meteorological Satellites immediately after receipt at NOAA. Data is for non-commercial use but not for further distribution.
- Option 3A: Right to distribute all data to U.S. Government agencies, National Meteorological and Hydrological Services, WMO-designated Regional Specialized Meteorological Centers, and members of the Coordination Group for Meteorological Satellites immediately after receipt at NOAA. Data is for non-commercial use but not for further distribution. Right to distribute all data to any entity with no restriction on use or further distribution 24 hours after receipt at NOAA.
- Option 4: Right to distribute all data to U.S. Government agencies, immediately after receipt at NOAA, for non-commercial use but not for further distribution (except to others to use on their behalf, including contractors and federal grantees). [grantees in this case are grantees from all U.S. government agencies]
- Option 4A: Right to distribute all data to U.S. Government agencies, immediately after receipt at NOAA, for non-commercial use but not for further distribution (except to others to use on their behalf, including contractors and grantees). Right to distribute all data to any entity with no restriction on use or further distribution 24 hours after receipt at NOAA. [grantees in this case are grantees from all U.S. government agencies]

- Option 5: No right to distribute any data outside NOAA immediately after receipt at NOAA (except to others to use on its behalf, including contractors and grantees). [grantee in this case NOAA grantee]
- Option 5A: No right to distribute any data outside NOAA immediately after receipt at NOAA (except to others to use on its behalf, including contractors and grantees). Right to distribute all data to any entity with no restriction on use or further distribution 24 hours after receipt at NOAA. [grantee in this case NOAA grantee]

NOAA Air- and Ground-based Commercial Weather Data

Lightning Data

Definition of Data Levels:

- Level I – Streaming data from vendor (NOAA has right to archive at several centers, including National Centers for Environmental Information (NCEI))
- Level II – Vendor-generated products containing lightning data.
- Level III – NOAA repackaged data for dissemination purposes
- Level IV – NOAA-generated and value-added products that display and integrate lightning data with other types of data.
- Level V - NOAA-generated and value-added products that integrate, but does not display, lightning data with other types of data

Redistribution of Real-Time Data

- Level I – IV accessible inside NOAA
- Level I – IV accessible to other federal agencies who are collaborating with NOAA under written agreement for purpose of advancing NOAA’s mission.
- Level I – IV accessible to other state and local government agencies who are collaborating with NOAA under a written agreement for purpose of advancing NOAA’s mission.
- Level I – IV accessible to non-government users who are collaborating with NOAA under a written agreement or contract for the purpose of advancing NOAA’s mission, with coordination with the vendor.
- Level V Data - NOAA may freely distribute these data to any user

Unauthorized Distribution of Level I-IV Data

- Organizations not having a relationship with a NOAA user under a written agreement.
- Organizations, including government agencies, using the data for any commercial purpose.
- Non-U.S. governments, unless a specific bilateral or multi-lateral agreement has been established. Such agreements will be coordinated with the prospective vendor.

MESONET Contract: (MESOScale NETwork). In meteorology, “mesoscale” refers to weather features at medium space and time scales, such as thunderstorm cells, squall lines and clusters of thunderstorms, (i.e features lasting from hours to a day or so). Distribution is dependent on data source and type and follows data distribution categories that are established in metadata records before distribution:

1. N/A (discontinued category),

2. Distribution to government, research, and education organizations,
3. Public - full distribution,
4. Distribution to NOAA only,
5. Distribution to NOAA, Department of Transportation (DOT) (specifically Federal Aviation Administration (FAA) and Federal Highway Administration) or DOT specified Federally Funded Research and Development Centers only,
6. Distribution only to NOAA and other WMO Members (the "National Meteorological and Hydrological Services" of other nations) in accordance with WMO Resolution 40.

Almost three-fourths of the MESONET data falls under Category 4, above.

Aircraft-Based Observations

- Data is shared in real time with FAA, United States Airforce, and participating airlines (7 major airlines participants)
- Data is shared freely to the public after 48 hours.

EULA Language

This Appendix Includes the EULA agreements as of 16 February 2021.

Public Release

This Public Release End User License Agreement (EULA) hereafter referred to as “this Agreement” is an agreement between the United States Government (USG) (Licensee) and the Contractor (Licensor). The EULA is incorporated into Licensor’s contract (“the Contract”) and is legally binding on the parties.

1. The following definitions apply to this Agreement:
 - 1.a “Licensed Material” means the imagery data, metadata, and products provided by Licensor that are delivered or otherwise made available for Licensee’s use as set forth in the Agreement. This term strictly applies to the forms, formats, and other supporting data as received by Licensee.
 - 1.b “Licensed User” means an authorized recipient and end user of Licensed Material according to Section 3 of this Agreement.
 - 1.c “Value-Added Product” means a work that is created when a Licensed User modifies Licensed Material—through technical manipulation, addition of data, or both—where the principal features and characteristics of the source Licensed Material are retained in the work and are extractable through technical means. Value-Added Products created from Licensed Material received under this agreement will be considered as Licensed Material.
 - 1.d “Derived Product” means a work that is created when a Licensed User exploits Licensed Material in a manner that irreversibly modifies and uncouples the work from its source, such that extraction of the principal features and characteristics of the source Licensed Material is impracticable. This includes but is not limited to Digital Elevation Models. Derived Products are not considered Licensed Material.
 - 1.e “Share” or “Sharing” means the transfer of Licensed Material to a Licensed User.
 - 1.f “Third-Party” means any organization or party that is not listed as a Licensed User in Section 3 of this agreement.
2. Per this Agreement, the Licensor grants the USG a perpetual, non-exclusive, non-transferable, irrevocable, worldwide license to the Licensed Materials as set forth below:
 - 2.a License purchased rights for Licensed Materials are in perpetuity.
 - 2.b Licensed Users may generate and share unlimited hardcopies and softcopies of the Licensed Materials purchased under Section 3.
 - 2.c Licensed Users may generate unlimited Value-Added Products from Licensed Materials and share such products as described in Section 3.
 - 2.d Licensed Users may generate unlimited Derived Products from the Licensed Materials and share without restriction.
 - 2.e Licensee and Licensed Users shall preserve Licensor’s copyright markings and copyright metadata in Value-Added Products.
 - 2.f Copyright markings shall be included on all Derived Products as appropriate.
3. Per this Agreement, Licensor grants the Licensee the following Public Release license for the purchase of products which allows for unlimited sharing to Licensed Users as described herein:
 - 3.a Licensee is granted unlimited rights to the Licensed Materials to permit full public dissemination by Licensed Users without restriction unless stated herein.
 - 3.b Licensed Material that is publicly released does not become public domain or otherwise convey to the public any right to the Licensed Material beyond what is provided for by fair use and other copyright limitations.

4. Per this Agreement, Licensor grants the Licensee the rights to share Licensed Materials publicly with no restrictions.
5. Limited Warranty:
 - 5.a The Contractor disclaims all other warranties of any kind, whether express or implied, relating to the product, including: (a) any implied warranty of merchantability, fitness for a particular purpose, title, or non-infringement; and (b) any warranty arising out of course of dealing, usage, or trade. The Contractor does not warrant that the product will be uninterrupted, or free of errors. Upon notification, corrective action will be taken in accordance with the contract or purchase order the USG will notify the licensor in writing within twenty-one (21) days after the date of delivery if the product does not conform to the stated specifications.
 - 5.b The USG will notify the Licensor in writing within twenty-one (21) days after the date of delivery if the product does not conform to the stated specifications.
6. Liability:
 - 6.a To the fullest extent permitted by law, in no event will the Licensor or its affiliates be liable to the USG or any party identified in Section 3 for any indirect, incidental, special, consequential, or punitive damages (including damages for loss of profits, goodwill, or any other intangible loss) arising out of or relating to their use of the product whether based on warranty, contract, tort (including negligence), statute, or any other legal theory.
 - 6.b This Agreement shall not impair the USG's right to recover for fraud or other crimes arising out of or related to this Agreement under any federal fraud statute, including the False Claims Act, 31 U.S.C. 3729-3733. Furthermore, this Agreement shall not impair nor prejudice the USG's right to express remedies provided in an existing government contract.
7. Any provisions of this Agreement that conflict with USG regulations are hereby superseded by the USG regulations to the extent required by applicable law. If there are any inconsistencies in this Agreement, the contract terms and conditions and Statement of Work shall take precedence.
8. The Program Office is granted authority to unilaterally uplift (as defined in the SOW within the Limitations of Funds Clauses) Licensed Material upon request from a Licensed User.
9. The Licensee may not assign or transfer this Agreement, or USG rights under this Agreement, outside the scope of this Agreement, in whole or in part, by operation of law or otherwise, without the Licensor's prior written consent.
10. Questions or concerns regarding this Agreement or the Licensed Material described under this Agreement should be directed to the {Appropriate Acquisition Office}

US Government

This United States Government End User License Agreement (EULA) hereafter referred to as “this Agreement” is an agreement between the United States Government (USG) (Licensee) and the Contractor (Licensor). The EULA is incorporated into Licensor’s contract (“the Contract”) and is legally binding on the parties.

1. The following definitions apply to this Agreement:
 - 1.a “Licensed Material” means the imagery data, metadata, and products provided by Licensor that are delivered or otherwise made available for Licensee’s use as set forth in the Agreement. This term strictly applies to the forms, formats, and other supporting data as received by Licensee.
 - 1.b “Licensed User” means an authorized recipient and end user of Licensed Material according to Section 3 of this Agreement.
 - 1.c “Value-Added Product” means a work that is created when a Licensed User modifies Licensed Material—through technical manipulation, addition of data, or both—where the principal features and characteristics of the source Licensed Material are retained in the work and are extractable through technical means. Value-Added Products created from Licensed Material received under this agreement will be considered as Licensed Material.
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 - 1.e “Share” or “Sharing” means the transfer of Licensed Material to a Licensed User.
 - 1.f “Third-Party” means any organization or party that is not listed as a Licensed User in Section 3 of this agreement.
2. Per this Agreement, the Licensor grants the USG a perpetual, non-exclusive, non-transferable, irrevocable, worldwide license to the Licensed Materials as set forth below:
 - 2.a License purchased rights for Licensed Materials are in perpetuity.
 - 2.b Licensed Users may generate and share unlimited hardcopies and softcopies of the Licensed Materials purchased under Section 3.
 - 2.c Licensed Users may generate unlimited Value-Added Products from Licensed Materials and share such products as described in Section 3.
 - 2.d Licensed Users may generate unlimited Derived Products from the Licensed Materials and share without restriction.
 - 2.e Licensee and Licensed Users shall preserve Licensor’s copyright markings and copyright metadata in Value-Added Products.
 - 2.f Copyright markings shall be included on all Derived Products as appropriate.
3. Per this Agreement, Licensor grants the Licensee the following U.S. Government license for the purchase of products which allows for unlimited sharing to Licensed Users as described herein:
 - 3.a Licensed Materials are shareable across all portions of the USG defined under Title 5 U.S.C. 101–105.
 - 3.b Licensed Materials are sharable with the Executive Office of the President (EOP), members of Congress, and Congressional staff involved in the oversight of the entities identified in Section 3.a.
 - 3.c Licensed Materials are shareable with State and Local Governments, Territories, and Tribal Authorities within the US for government purposes.
 - 3.d Licensed Materials are shareable with Non-Governmental Organizations and/or Non-Profit Organizations working for the purpose of entities found in Sub-Sections 3.a, 3.b, and 3.c.

- 3.e Licensed Materials are shareable with contractors, and/or grantees supporting entities identified in Sub-Sections 3.a, 3.b, 3.c, and 3.d for the purpose of executing their contracts.
4. Per this Agreement, Licensor grants the Licensee the rights to share Licensed Materials subject to the following restrictions:
- 4.a The Licensee will provide reasonable efforts to avoid providing copies of or access to the Licensed Materials beyond what is necessary for the operation of the contract. The USG will notify Licensor upon awareness of any issue. The Licensor and Licensee will collaborate and coordinate regarding any concerns.
 - 4.b The Licensee will exercise reasonable efforts to avoid making the Licensed Materials available under any open source license or agreement to any third party or use the Licensed Materials in a manner that would subject the Licensed Materials to become subject to any open source license, except where stated herein. The USG will notify Licensor upon awareness of any issue. The Licensor and Licensee will collaborate and coordinate regarding any concerns.
 - 4.c The Licensee will exercise reasonable efforts to avoid making the Licensed Materials available to a commercial entity or other third party for any commercial or revenue generating purpose except where stated herein. The USG will notify Licensor upon awareness of any issue. The Licensor and Licensee will collaborate and coordinate regarding any concerns.
 - 4.d The Licensee will exercise reasonable efforts to avoid providing copies of or access to the Licensed Materials to a third party for their own use, apart from supporting the applicable contract, except where stated herein. The USG will notify Licensor upon awareness of any issue. The Licensor and Licensee will collaborate and coordinate regarding any concerns.
 - 4.e The Licensee will exercise reasonable efforts to avoid allowing a third party to disclose or share the Licensed Materials with another third party (or the public), either publicly or privately, except where stated herein. The USG will notify Licensor upon awareness of any issue. The Licensor and Licensee will collaborate and coordinate regarding any concerns.
 - 4.f The Licensee may not place the Licensed Materials, or allow the Licensed Materials to be placed, into the public domain, or otherwise be publicly shared (e.g. public websites), except where stated herein.
 - 4.g The Licensee will exercise reasonable efforts for oversight and control of the use of the Licensed Materials. The USG will notify Licensor upon awareness of any issue. The Licensor and Licensee will collaborate and coordinate regarding any concerns regarding improper use of the licensed material.
5. Limited Warranty:
- 5.a The Contractor disclaims all other warranties of any kind, whether express or implied, relating to the product, including: (a) any implied warranty of merchantability, fitness for a particular purpose, title, or non-infringement; and (b) any warranty arising out of course of dealing, usage, or trade. The Contractor does not warrant that the product will be uninterrupted, or free of errors. Upon notification, corrective action will be taken in accordance with the contract or purchase order the USG will notify the licensor in writing within twenty-one (21) days after the date of delivery if the product does not conform to the stated specifications.
 - 5.b The USG will notify the Licensor in writing within twenty-one (21) days after the date of delivery if the product does not conform to the stated specifications.
6. Liability:
- 6.a To the fullest extent permitted by law, in no event will the Licensor or its affiliates be liable to the USG or any party identified in Section 3 for any indirect, incidental, special,

consequential, or punitive damages (including damages for loss of profits, goodwill, or any other intangible loss) arising out of or relating to the use of the product whether based on warranty, contract, tort (including negligence), statute, or any other legal theory.

- 6.b This Agreement shall not impair the USG's right to recover for fraud or other crimes arising out of or related to this Agreement under any federal fraud statute, including the False Claims Act, 31 U.S.C. 3729-3733. Furthermore, this Agreement shall not impair nor prejudice the USG's right to express remedies provided in an existing government contract.
7. Any provisions of this Agreement that conflict with USG regulations are hereby superseded by the USG regulations to the extent required by applicable law. If there are any inconsistencies in this Agreement, the contract terms and conditions and Statement of Work shall take precedence.
 8. The Program Office is granted authority to unilaterally uplift (as defined in the SOW within the Limitations of Funds Clauses) Licensed Material upon request from a Licensed User.
 9. The Licensee may not assign or transfer this Agreement, or USG rights under this Agreement, outside the scope of this Agreement, in whole or in part, by operation of law or otherwise, without the Licensor's prior written consent.
 10. Questions or concerns regarding this Agreement or the Licensed Material described under this Agreement should be directed to the {Appropriate Acquisition Office}

US Government Plus

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1. The following definitions apply to this Agreement:
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 - 1.b “Licensed User” means an authorized recipient and end user of Licensed Material according to Section 3 of this Agreement.
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 - 3.c Licensed Materials are shareable with Foreign Governments, inter-governmental entities, and International Defense and Coalition Partners for USG purposes.
 - 3.d Licensed Materials are shareable with State and Local Governments, Territories, and Tribal Authorities within the U.S. for government purposes.

- 3.e Licensed Materials are shareable with Non-Governmental Organizations and/or Non-Profit Organizations working for the purpose of entities found in Sub-Sections 3.a, 3.b, 3.c, and 3.d.
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6. Liability:

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