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Administration**

**Guidance for NOAA
Commercial Data Buys**

**NOAA Observing System Council
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1. BACKGROUND

The National Oceanic and Atmospheric Administration (NOAA) is a science-based services agency charged with understanding and predicting changes in Earth systems to provide critical environmental intelligence to the American public, decision makers, and our partners. NOAA's services are essential to the protection of lives, property, the environment, and the United States economy, underpinning core functions across the entire federal government. These services and the provision of environmental intelligence depend on observations from a variety of systems, including satellite, ship, ground, marine, and in situ networks.

NOAA has long met its mission through collaboration and partnerships with the broader enterprise, including academia, the private sector, and international partners, both using and providing data that supports open science and enables a vibrant downstream private sector. In order to respond to an ever-growing supply and demand for environmental information, however, NOAA recognizes the need to increasingly harness the opportunities of a rapidly growing commercial sector to complement its current observational capabilities, as environmental data sources from the private sector are expanding. Rapid change in the commercial data vendor arena yields new technical and business approaches to environmental intelligence.¹

NOAA also recognizes the need to explore how to satisfy technical requirements at a lower cost than government alternatives while maintaining standards for operational quality, timeliness, continuity, security, transparency, and open data sharing principles that have underpinned the growing Earth observation enterprise. An expanding marketplace coupled with more efficient technologies also may result in data provided at competitive or even less expensive costs than the government has historically produced.

Recognizing the importance the commercial sector plays in helping to fulfill NOAA's mission, the Weather Research and Forecasting Innovation Act of 2017 explicitly authorized the Secretary of Commerce to enter into agreements for the purchase of weather data through contracts with commercial providers.² Additionally, other legislation such as the Hydrographic Services Improvement Act of 1998³, the Integrated Coastal and Ocean Observation System Act of 2009⁴, and the Ocean and Coastal Mapping Integration Act of 2009⁵ specify the importance of acquiring data from and coordinating with non-governmental entities to fulfill NOAA's mission. Congress continually provides funding to further this commitment to engagement with the commercial sector. One significant example of this continual funding is the National Mesonet Program in the National

¹ NOAA Commercial Space Policy (NAO 217-109), January 2016, p. 1
https://www.noaa.gov/sites/default/files/legacy/document/2020/Mar/NAO_217-109_Commercial_Space_Policy_Signed.pdf

² Weather Research and Forecasting Innovation Act of 2017, 15 USC 8532,
<https://www.congress.gov/115/plaws/publ25/PLAW-115publ25.pdf>

³ Hydrographic Services Improvement Act of 1998, p. 3, <https://www.congress.gov/105/bills/hr3164/BILLS-105hr3164rfs.pdf>

⁴ Integrated Coastal and Ocean Observation System Act of 2009, January 2009,
<https://www.congress.gov/111/bills/hr367/BILLS-111hr367ih.pdf>

⁵ Ocean and Coastal Mapping Integration Act, 33 U.S.C. 3501, https://iocm.noaa.gov/reports/2009_PL111-11_SubtitleB_OCMIA.pdf

Weather Service's Commercial Data Buys portfolio, which has evolved into the largest commercial data program in NOAA and its primary program for purchase of commercial weather data from a wide variety of ground-based observing systems and technologies, including in situ and remote sensing systems in a wide variety of geographic domains.

2. GUIDING PRINCIPLES

As NOAA considers engagements with the commercial sector, its guiding principles are:

- exploring the commercial sector's emerging capabilities, scalable production, and rapid technology updates to meet NOAA's science, service and stewardship mission,
- ensuring data quality standards, sustaining service quality, and optimizing mission delivery,
- upholding national and international commitments to ensure access to global observations,
- ensuring best value to the taxpayer,
- enabling a robust economy that depends on NOAA's foundational open data sets,
- managing supply chain risks, system security, and privacy protections, and
- ensuring a vibrant research enterprise.

3. PURPOSE AND SCOPE

This document lays out the considerations and guidance by which NOAA should engage with the commercial sector on commercial data buy opportunities from all sources that contribute to environmental intelligence.

NOAA views commercial data buys as an arrangement for the procurement of data or data products using a FAR-based government contract from non-federal owners and operators of environmental observing networks, including in situ and remote sensing technologies (e.g., ground-, marine-, air-, and space-based), as valuable supplements to enrich the scope of observations by NOAA and its partners. Therefore, Cooperative Research and Development Agreements (CRADAs), Other Transactional Authorities, specifically architectural and engineering contracts (a.k.a. Brooks Act)⁶ grants, and cooperative agreements are out of scope for this guidance, but as important government vehicles, can help inform future acquisitions (see Section 7).

NOAA purchases commercial data to augment and support its foundational observing capability, sustain observations to expand and augment coverage, and to cost-effectively support experimental observation objectives. The following delineates foundational and experimental observations:

- Foundational [or backbone] observations are enduring NOAA-managed and partner observing capabilities supplying a sufficient quantity and quality of observations in order to meet NOAA's mission essential functions at an acceptable level of risk.
- Conversely, experimental observations are those that provide new data to advance human knowledge through enabling basic and applied research, testing and evaluating technical

⁶ While out of scope for this document, A&E contracts may be an effective approach for some programs to incorporate external data sources while maintaining high quality standards.

innovations, and improving public services.⁷

While many commercial data purchases are supplemental, NOAA also leverages commercially purchased data as a foundational data set when appropriate, and the U.S. Group on Earth Observations (USGEO) recognizes that, “with the increase of commercially available Earth observations, commercial data may become the dominant type of data sometime in the future.”⁸

The goals of NOAA’s commercial data buys are to aid the continuity of critical data, satisfy observational requirements, enhance observation capability and resiliency, improve program schedules, pursue potential cost savings, and drive U.S. innovation and global competitiveness in the U.S. Earth observation enterprise. As outlined in this guidance document, commercial data buys will generally be evaluated by NOAA programs and offices based on mission alignment and risk posture, data quality and reliability, and cost effectiveness.

The guidance in this document should not be considered policy. Consistency across the agency in working with commercial data providers is important to maintain the high fidelity of NOAA services and to clearly communicate NOAA’s plans to industry. This guidance is also essential to ensure data quality and technical requirements are met, mission and supply chain risks are mitigated, and current data sharing commitments with national partners, international partners, and downstream private sector entities are honored. The guidance in this document is intended for, and applicable to, NOAA staff offices such as the Acquisition and Grants Office, NOAA line offices, and programs.

4. ORGANIZATIONAL CONSIDERATIONS

Line offices and programs should engage the NOAA Observing Systems Council in planning and implementing commercial data programs. They should ensure that program and acquisition staff seek and obtain training on commercial data and service approaches/ flexibilities, and familiarize themselves with the use of observations to support NOAA’s mission. Line offices should work with the Acquisition and Grants Office (AGO) to establish a commercial data program within their respective organizations to efficiently obtain commercial data from the private sector for operational and research applications. Commercial data programs should establish pilot projects to test, develop and demonstrate new and emerging technologies that have the potential to improve NOAA’s mission.

The commercial data programs should collaborate among themselves to implement these guidelines, avoid duplication, and establish best practices. The commercial data programs should also establish standards for commercial data and associated services, data stewardship requirements, licensing, contingency requirements, and specific guidelines to ensure quality, impact and compatibility of commercial data with NOAA mission requirements. Commercial data programs

⁷ 2019 National Plan for Civil Earth Observations, December 2019, p. 5 <https://usgeo.gov/uploads/Natl-Plan-for-Civil-Earth-Obs.pdf>

⁸ United States Government Commercial Earth Observations Data Purchases: Perspectives from the Earth Observations Enterprises, July 2022, p. 10 [https://usgeo.gov/uploads/USG-Commercial-Earth-Observation-Data-Purchases%20\(final\).pdf](https://usgeo.gov/uploads/USG-Commercial-Earth-Observation-Data-Purchases%20(final).pdf)

should prioritize data sets based on mission impact. Lastly, commercial data programs should consult with their information system leadership to ensure all requirements for data security, risk management, and privacy are appropriately considered.

5. SUPPLY CHAIN RISK

Exponential growth in the commercial sector for providing environmental intelligence has yielded many benefits for government exploitation and significantly expanded the types and methods of collection of observations, as well as expanded the number of applications that can leverage the observations. However, introduction of commercial vendors into the data supply chain comes with potential risks. The commercial sector is primarily driven by profits, leading to innovation and increasing efficiency as a reaction to competition. This innovation and efficiency are the primary benefits to NOAA, but must be balanced against a potentially volatile marketplace and commercial opportunity cost of pursuing other alternatives.

In evaluating supply chain risk of commercial data buys, NOAA programs and offices should ensure that the manner by which NOAA gets data from a commercial entity does not negatively impact the operation of systems or mission and that the commercial entity has a robust enough program to assure delivery of the contracted data. The objective is to ensure that risk is properly considered in the acquisition and use of commercial data, and should be evaluated against the specific NOAA program's risk tolerance, taking into consideration the type of data and whether the data will be foundational or supplemental.

NOAA line offices and programs should pursue commercial data buys to supplement its foundational observations to the extent possible within financial constraints and should conduct market research to consider the following conditions prior to substituting foundational observations with commercial data:

- a) Changes in the macro-economic environment (e.g., would a recession or inflation drive a particular supplier out of the market?)
- b) Reliance on private equity (e.g., how long has the supplier been relying on private equity funding to sustain operations?)
- c) Transparency of supply chains (e.g., does NOAA understand potential supply chain risks the supplier may face, especially for components manufactured overseas?)
- d) Susceptibility to natural disasters (e.g., can the supplier's infrastructure be impacted by natural disasters such as floods, hurricanes, earthquakes?)
- e) Production scalability and capacity (e.g., is the supplier able to scale up, and maintain, observing platform production rates to meet NOAA's requirements? Does the supplier have sufficient capability to deliver observations with adequate margin in their operations? Is there a risk for the supplier to exit the market or reprioritize assets towards other and potentially more profitable business lines?)
- f) Demand fluctuations (e.g., is NOAA the only customer for the supplier or do they supply other private or public customers? Do the other customers provide a stable base?)
- g) Suppliers of observations (e.g., are there multiple suppliers of observations for NOAA to

- mitigate the risk of a single provider going out of business?)
- h) Product evolution (e.g., does the supplier have the capability to improve and evolve the observational baseline to meet changing requirements?)
 - i) Cyber-security (e.g., do the suppliers' digital systems and communications technologies follow industry (e.g., ISO) or governmental standards (e.g., NIST) in securing their capabilities?)
 - j) Data sensitivity (e.g., have CUI or Sensitive PII data buys been reviewed to ensure that data is sourced from platforms that will ensure Privacy, civil rights, and civil liberties, and that confidentiality is maintained for these sensitive datasets?)
 - k) Data use and sharing rights (e.g., does NOAA have the ability to share the data with its contractors for evaluation and improving our operations, for any commercial data procured to substitute foundational observations?) (see section 7)

6. CONTRACTUAL CONSIDERATIONS

The NOAA guidelines for conducting assessments of commercial data and potential suppliers should be standardized and transparent to ensure fair competition. NOAA programs and line offices have rigorous requirements processes⁹ that provide definition of current and emerging measurement and observational needs, which should serve as the starting point for assessing the viability of commercial data products.

Pre-solicitation

Before acquiring any commercial systems, services or data, NOAA programs and offices should assess what commercial capabilities exist, how those capabilities may meet NOAA mission needs and fit into planned architectures, and, for data purchases, evaluate the integrity and sustained viability of the data streams (see “evaluation of commercial sector capabilities” below).¹⁰ NOAA should also consider NOAA’s mission requirements, NOAA’s data policy and data sharing commitments, and the cost of obtaining the data in a manner consistent with established principles and policies.¹¹

NOAA programs and offices should take into account how the data will be used and who will need to access it, and develop solicitations accordingly to ensure the data remains accessible to the fullest extent possible. Solicitations may be structured on a case-by-case basis to provide vendors options to respond to different data sharing tiers and allow a provision for “uplift,” or increasing the pool of licensed users for the same Earth observation image, or unit data (see Section 7 for possible tiering options).

⁹ Requirements Management, NAO 216-108, October 2005
<https://www.noaa.gov/organization/administration/nao-216-108-requirements-management>

¹⁰ NOAA Commercial Space Policy (NAO 217-109), January 2016, p. 1
https://www.noaa.gov/sites/default/files/legacy/document/2020/Mar/NAO_217-109_Commercial_Space_Policy_Signed.pdf

¹¹ NOAA/NESDIS Commercial Space Activities Assessment Process (NPR 8010.01A), January 2017, p. 5
https://www.nesdis.noaa.gov/s3/2021-10/NESDIS_Commercial_Space_Activities_Assessment_Process_Final_1.6.17.pdf

Evaluation of Commercial Sector Capabilities

NOAA programs and offices can canvass the commercial sector for submissions of new, emerging or existing capabilities that could meet NOAA's mission requirements. To do so, programs and offices can periodically evaluate, identify, and publish NOAA mission requirements and capability gaps that offer appropriate opportunities for the purchase and use of commercial data that could potentially address NOAA mission requirements.¹²

For evaluation of proposed commercial data, pilot projects can be undertaken to demonstrate the quality and impact on the program's mission before committing to purchase the data operationally, setting expectations that this is a limited data buy for the purpose of evaluation and testing. The Weather Research and Forecasting Innovation Act of 2017 recognized the importance of pilot projects in assessing the viability of commercial data by compelling NOAA to enter into at least one pilot contract with a private sector entity, specifying that the pilot program demonstrate viability and value through "accuracy, quality, timeliness, validity, reliability, usability, information technology security, and cost-effectiveness of obtaining commercial weather data from private sector providers."¹³

In addition to pilot projects through contract, NOAA programs and offices can also evaluate commercial data before operational purchase through CRADAs and Memorandum of Understandings. Pilot projects are low-risk options to test data integration potential before committing to operational purchases, which aids in mitigating integration risks. Data sharing requirements for all pilot projects are also more lenient, which allows both the vendor and government flexibility through the initial phase of the process. Upon completion and evaluation, successful pilot projects may lead to sustained commercial data purchases to support NOAA's research and operational forecasting endeavors.

Contract Development and Procurements

For specific data purchases, NOAA programs and offices should issue focused Request For Information (RFIs) and solicitations in the form of Requests for Proposals (RFPs), or Requests for Quotation (RFQs), complete with data specifications (quantitative thresholds within each criterion unique to individual observations) sought for that data purchase.¹⁴

Previously posted RFIs¹⁵¹⁶ provide examples of the types of specifications that will be made

¹² NOAA Commercial Space Policy (NAO 217-109), January 2016, p. 4
https://www.noaa.gov/sites/default/files/legacy/document/2020/Mar/NAO_217-109_Commercial_Space_Policy_Signed.pdf

¹³ Weather Research and Forecasting Innovation Act of 2017, 15 USC 8532,
<https://www.congress.gov/115/plaws/publ25/PLAW-115publ25.pdf>

¹⁴ NOAA/NESDIS Commercial Space Activities Assessment Process (NPR 8010.01A), January 2017
https://www.nesdis.noaa.gov/s3/2021-10/NESDIS_Commercial_Space_Activities_Assessment_Process_Final_1.6.17.pdf

¹⁵ NOAA Hydrographic Surveying Services Sources Sought, March 2023
<https://sam.gov/opp/a2c810efe4d948dea827c7bec5500c4d/view>

¹⁶ Office of Space Commerce NOAA Satellite Requirements and Data Specifications RFIs and RFQs
<https://www.space.commerce.gov/business-with-noaa/requirements/>

available in focused RFIs and solicitations. NOAA offices and programs should implement their processes in accordance with the National Space Policy, the NOAA Policy, and other applicable documents. Templates for draft language can be found in Appendix 4.

Pricing

In the pricing of commercial data purchases, NOAA programs and offices should take into account licensing schema, as licenses with custom defined use and distribution rights may be priced differently than full and open distribution and is one of the key drivers of price. As industry must ultimately profit off the data NOAA buys, it is beneficial to find the middle ground between affordability for the government and viability for the vendor (which may include profitability, customer base, etc.). Pricing structures should take into consideration the maturation of the industry that is providing the data and perform market research to understand the landscape of providers, while understanding that the evolution of the pricing structure should evolve with the evolution of the industry.

Additionally, evaluation of the cost for NOAA managed observing infrastructure compared to the value of the proposed commercially purchased data product should be performed. This evaluation should take into account the method for acquisition, ingest, processing, delivery mode (e.g., ground antenna, secure data transfer via internet connection, etc.), and utilization of the data. These factors will determine if commercially purchased data presents a competitive advantage to NOAA, compared to similar government owned and international partner datasets over a comparable period of time. The evaluation should be based on the cost to obtain the data sharing rights required (see Section 4). This includes the impacts of necessary modifications to integrate into the value chain.

Cross-Agency Coordination and Cost Sharing Mechanisms

Necessary language should be included in procurement documents so agencies can share the responses and proposals received across the agencies. Additionally, programs and offices should consider including language in commercial data agreements to allow data sharing with other agencies for data characterization and evaluation purposes.¹⁷ As previously stated, NOAA should avoid a scenario in which partner agencies might purchase the same data from the same provider or platform, with the same variables, at the same time. This stipulation can be added to ensure that the data provided to each agency is non-duplicative, and methods should be developed to ensure that data are unique before ingesting in Numerical Weather Prediction.

7. DATA USE AND SHARING RIGHTS

NOAA's ability to provide environmental intelligence depends on having reliable and timely access to environmental measurements from around the world. Given the vast amount of data required to create useful forecast products, for example, no single entity or nation can gather all of this

¹⁷ United States Government Commercial Earth Observations Data Purchases: Perspectives from the Earth Observations Enterprises, July 2022, p. 17 [https://usgeo.gov/uploads/USG-Commercial-Earth-Observation-Data-Purchases%20\(final\).pdf](https://usgeo.gov/uploads/USG-Commercial-Earth-Observation-Data-Purchases%20(final).pdf)

information independently. As a result, multiple domestic policies and international agreements call for data to be shared on a full and open basis. As commercial data buys can present unique challenges to these arrangements, NOAA programs and offices may consider alternative options that better fit the needs of the mission and vendor.

Applicable Policies and Agreements

The Foundations for Evidence-Based Policymaking Act of 2018 requires agency open data plans to make data maintained by the Federal government publicly available by default unless an exception applies.¹⁸ Furthermore, the Office of Management and Budget's (OMB) Open Data Policy specifies that when an agency obtains data via a contract, that agency should also obtain the rights to share the data openly.¹⁹ Additionally, the "reproducibility standard" in the Information Quality Act guidance encourages making third party data used in influential scientific information available to the public, with the caveat that it may instead describe the data used.²⁰ NOAA specifically is required to ensure that all NOAA data used in operational models and data "that the Administrator has the legal right to redistribute" are made available under an open license.²¹

An international data exchange regime exists, in which all nations share essential Earth observations as global public goods, on a full and open basis. The World Meteorological Organization's Unified Data Policy both recognizes the importance of commercial data and reconfirms this long-standing agreement, noting that "members shall provide on an unrestricted basis, the core data that are necessary for the provision of services in support of the protection of life and property."²² This arrangement is the linchpin of weather, water, and climate forecasting around the world, enabling a vibrant downstream industry that uses those data to create value added products.²³ U.S. law requires that when procuring commercial weather data, NOAA must comply with our international agreements and the practices in WMO data resolutions.²⁴

Commercial Data Impacts and Challenges

Commercial data buys can present a unique challenge to this arrangement. While NOAA real-time operational data must be easily accessible to partners and users per U.S. law and international agreements, applying this same concept to commercial data buys could undercut the private

¹⁸ Foundations for Evidence-Based Policymaking Act of 2018 (PUBLIC LAW 115–435), January 2019
<https://www.congress.gov/115/plaws/publ435/PLAW-115publ435.pdf>

¹⁹ Open Data Policy—Managing Information as an Asset (M-13-13), May 2013
https://www.whitehouse.gov/wp-content/uploads/legacy_drupal_files/omb/memoranda/2013/m-13-13.pdf

²⁰ Improving Implementation of the Information Quality Act (M-19-15), April 2019
<https://www.cdo.gov/assets/documents/OMB-Improving-Implementation-of-Info-Quality-Act-M-19-15.pdf>

²¹ Learning Excellence and Good Examples from New Developers Act (LEGEND) Act, 15 USC 8512a(c)(1)(D)
<https://www.govinfo.gov/content/pkg/BILLS-116hr5536ih/html/BILLS-116hr5536ih.htm>

²² WMO Unified Data Policy, p. 8
https://library.wmo.int/viewer/58009?medianame=WMO_Unified_Data_Policy_brochure_en_#page=2&viewer=picture&o=bookmarks&n=0&q=

²³ NOAA Commercial Space Policy (NAO 217-109), January 2016, p. 1
https://www.noaa.gov/sites/default/files/legacy/document/2020/Mar/NAO_217-109_Commercial_Space_Policy_Signed.pdf

²⁴ Commercial Weather Data, 15 USC 8532(e).
[https://uscode.house.gov/view.xhtml?req=\(title:15%20section:8532%20edition:prelim\)](https://uscode.house.gov/view.xhtml?req=(title:15%20section:8532%20edition:prelim))

sector's opportunity to sell to multiple users and create markets. The USGEO report on Commercial Earth Observations Data Purchases notes that many data providers are concerned that the investor community views open licenses as a negative, and therefore the government's use of them may undermine the ability of small businesses to raise investor funds. By contrast, users, including downstream private sector entities, maintain that "data obtained with taxpayer money, whether from a government-owned and operated sensor/system or from a commercial data buy, should be made publicly available for scientific purposes and for creating vibrant downstream businesses."²⁵

Concern has also been expressed by members of the academic sector. Increased use of commercial data by NOAA may result in a loss of access to critical datasets used by academia for climate research reliant on Earth observations data. Additionally, students require access to raw data and metadata when learning the full lifecycle of data analysis and verification techniques, and peer-reviewed journals require access to data for publishing and sharing data for reproducibility.²⁶ If this concern is prevalent for the data being purchased, an agreement might be reached with the vendor to delay distribution of the data to be accessed through archive.

Overall, commercial data offers valuable opportunities to access high-quality, diverse, and timely data. When used properly it can improve decision-making, spur innovation, and promote competitive advantage in today's data-driven economy. NOAA programs and offices should seek to maximize the public benefit derived from environmental data and data products obtained through commercial solutions by negotiating the least restrictive terms of use possible. Moreover, it's essential to recognize that certain international agreements and domestic laws may directly apply to particular commercial data purchases. Therefore, each potential data acquisition should undergo evaluation to ensure that all relevant agreements and laws are duly considered.

In an effort to balance these competing interests, the subsequent section offers insights into various considerations and options for implementing more nuanced licensing schemes. Tailored licensing strategies can create better alignment between the public, commercial interests and meet the specific data requirements of NOAA line offices and programs.

Licensing Considerations

End User License Agreements for the next generation of commercial imagery operational contracts have been developed but have not been adopted by NOAA, who instead chooses to maintain flexibility to apply creative approaches as needed to its licensing schema²⁷ as it is not simply a binary open or closed choice.

²⁵ United States Government Commercial Earth Observations Data Purchases: Perspectives from the Earth Observations Enterprises, July 2022 [https://usgeo.gov/uploads/USG-Commercial-Earth-Observation-Data-Purchases%20\(final\).pdf](https://usgeo.gov/uploads/USG-Commercial-Earth-Observation-Data-Purchases%20(final).pdf)

²⁶ United States Government Commercial Earth Observations Data Purchases: Perspectives from the Earth Observations Enterprises, July 2022, p. 7 [https://usgeo.gov/uploads/USG-Commercial-Earth-Observation-Data-Purchases%20\(final\).pdf](https://usgeo.gov/uploads/USG-Commercial-Earth-Observation-Data-Purchases%20(final).pdf)

²⁷ United States Government Commercial Earth Observations Data Purchases: Perspectives from the Earth Observations Enterprises, July 2022, p. 6 [https://usgeo.gov/uploads/USG-Commercial-Earth-Observation-Data-Purchases%20\(final\).pdf](https://usgeo.gov/uploads/USG-Commercial-Earth-Observation-Data-Purchases%20(final).pdf)

NOAA offices and programs should first explore procuring ownership interest in the data or rights under the Creative Commons Attribution 4.0 International (CC BY 4.0), which permits sharing on a full and open basis.²⁸ If exceptions apply or data is not able to be shared under this category, multiple factors should be taken into consideration when determining and negotiating more creative solutions to sharing rights and licensing for commercial data, including:

- Intended program use (operational vs research),
- Non-NOAA user needs,
- Regulatory considerations,
- Applicable intergovernmental/international agreements,
- Impacts due to data restrictions,
- Indigenous/tribal community data collection and privacy concerns,
- Disclosure obligations that may result under FOIA, discovery, Administrative Records, Privacy Act Access and Touhy requests, and
- Partnership efforts with state, local, tribal and territorial governments.

To ensure the best interests of the government, users and vendors are taken into consideration, a tiered approach²⁹ to data licensing may be appropriate with the following tiers offered for consideration (from least restrictive to most restrictive). Note that one key alternative is to buy the right to share data openly with the public (under a CC BY license) after a delay. For some applications, the commercial value dramatically declines after a short period of time, but there remains significant value to academia in archived data. NOAA programs and offices should be careful not to inadvertently buy data rights that don't allow archival.

- **Tier 1:** Unlimited distribution rights (such as Creative Commons Zero (CC0) or CC 4.0 International (CC BY 4.0)).
- **Tier 2:** Distribution to U.S. government agencies, international partners, non-profits, academic entities for non-commercial use, with no further distribution.
 - **Tier 2a:** Distribution to U.S. government agencies, international partners, non-profits, academic entities for non-commercial use, with no further distribution. Right to distribute all data to any entity with no restriction on use or further distribution 24 hours after receipt at NOAA.
- **Tier 3:** Distribution to U.S. government agencies and international partners for non-commercial use with no further distribution.
 - **Tier 3a:** Distribution to U.S. government agencies and international partners for non-commercial use with no further distribution. Right to distribute all data to any entity with no restriction on use or further distribution 24 hours after receipt at NOAA.
- **Tier 4:** Distribution to U.S. government agencies for non-commercial use and no further distribution (except to contractors for use on agency behalf).
 - **Tier 4a:** Distribution to U.S. government agencies for non-commercial use and no

²⁸ Creative Commons Licenses <https://creativecommons.org/share-your-work/cclicenses/>

²⁹Request for Proposal: NOAA Commercial Weather Data Program Radio Occultation Data Buy II (RODB) -2 <https://sam.gov/opp/542f8cf3b9e84c06837bb40169592f9f/view>

further distribution (except to contractors for use on agency behalf). Right to distribute all data to any entity with no restriction on use or further distribution 24 hours after receipt at NOAA.

- **Tier 5:** No distribution outside NOAA (except for contractors and grantees for use on NOAA's behalf).
 - **Tier 5a:** No distribution outside NOAA (except for contractors and grantees for use on NOAA's behalf). Right to distribute all data to any entity with no restriction on use or further distribution 24 hours after receipt at NOAA.
- **Tier 6:** Distribution within NOAA is limited to those on a need-to-know basis, with prior authorization required.

Additionally, to avoid a scenario where NOAA and partner agencies might purchase the same data with licenses to share the data, a stipulation can be added to ensure that the data provided to each agency is non-duplicative, and methods should be developed to ensure that data are unique before ingesting into their models.

Finally, beyond sharing rights, data licenses must ensure NOAA's own use and address the treatment of derived or value-added products. The license should specify that NOAA's use extends to any contractors or affiliates (including grantees and cooperative institutes), and that derived products created by NOAA, where the original contractor-provided data cannot be extracted, can be publicly released with no restrictions on use.

8. DATA QUALITY

Data should comply with specified characteristics for coverage, resolution, volume, location, refresh rate, quality assurance, and signal-to-noise ratio. Ideally the data will have errors and statistical biases comparable to or better than similar data NOAA uses operationally, and the vendor will inform NOAA of these error characteristics. NOAA programs and offices will then do their mission-based data screening prior to using the data for operational support.

Criteria for data quality might be impacted by other requirements, such as timeliness or resolution. As such, NOAA programs and offices should take these trades into consideration when evaluating quality and have the appropriate subject matter experts evaluate the total impact of the data sets on the resultant product.

NOAA uses a variety of data specifications, such as quantitative thresholds within each criterion unique to individual observations, for data determined to be of requisite value for fulfilling NOAA's observational requirements. These thresholds are subject to change over time as capabilities change or as NOAA improves understanding of the impact of the measurements on the overall observing system.³⁰ These will be addressed through the procurement process for both demonstration and operational data use, with specifications identified in relevant solicitations

³⁰ NOAA/NESDIS Commercial Space Activities Assessment Process (NPR 8010.01A), January 2017, pp. 8-9 https://www.nesdis.noaa.gov/s3/2021-10/NESDIS_Commercial_Space_Activities_Assessment_Process_Final_1.6.17.pdf

forming the basis for evaluation of the data. Data for research purposes may be held to different standards, and should be determined by the purchasing office or program.

To assure quality of data, especially in the case of satellite data, NOAA offices and programs should review how often suppliers modify their offerings to maintain pace with technological and scientific advancements, and how these advancements may change mission requirements. In addition to considering advancements, offices and programs may wish to consider situations, based on impact to the mission, where relaxing requirements for Earth observations may provide additional options for obtaining these observations. A trial run of the data to be purchased should also be tested to account for quality and coverage (see Evaluation of Commercial Sector Capabilities in Section 7).

NOAA programs and offices should also ensure that the supplier can maintain the quality, availability, and reliable delivery of observations provided to the government. Commercial vendors should be able to demonstrate they have a process by which they evaluate and calibrate their data to assure quality, calibration, transparency into quality control, configuration control, and routine maintenance.

9. DATA MANAGEMENT AND DELIVERY

Generally, commercially purchased data should be made available to NOAA in a timely manner to meet NOAA's intended application of the data and within specified limits of regularity, accounting for enumerated tolerance levels for gaps and outages.³¹ The data should be tested, calibrated, verified, and validated to standards identified by NOAA, and the vendor should provide the data in an agreed-upon common format, complete with metadata, and with spectral response functions where applicable (see Data Assimilation below).

Additionally as part of the procurement process, the vendor should be asked to provide a comprehensive data dictionary that details the structure, definitions and relationships of the data elements. This documentation will assist NOAA in understanding and effectively using the purchased data in alignment with organizational requirements and standards.

Data rights should also be consistent with NOAA intended use and relevant U.S. policies and international obligations (see Section 6 and Appendix A1). Requirements and guidelines as outlined in the NOAA Data Management Handbook³² should be followed when feasible and reasonable to do so, but programs can be afforded flexibility to adopt standards that best serve their needs.

Operational sustained observations should comply with the general characteristics as outlined below, and where appropriate, should ensure they are consistent with and anchored by current systems, sensors, and requirements. Data specifications, or the acceptable thresholds for each criteria, will be addressed through the procurement process for both demonstration and operational

³¹ NOAA/NESDIS Commercial Space Activities Assessment Process (NPR 8010.01A), January 2017
[https://www.nesdis.noaa.gov/s3/2021-10/NESDIS Commercial Space Activities Assessment Process Final 1.6.17.pdf](https://www.nesdis.noaa.gov/s3/2021-10/NESDIS%20Commercial%20Space%20Activities%20Assessment%20Process%20Final%201.6.17.pdf)

³²Management of NOAA Data and Information, NAO 212-15B, November 2023
<https://www.noaa.gov/sites/default/files/legacy/document/2020/Mar/212-15.pdf>

data use, with specifications identified in relevant solicitations forming the basis for evaluation of the data.

Data Assimilation and Modeling

Where applicable, NOAA programs and offices should be responsible for assessing observational impact of the data by assimilating the data into their operational models to ensure the data is usable/viable and to show its value. Low level, or non-quality controlled, data should be provided to allow the mission to develop, process and validate government and commercial data products seamlessly. To enable data assimilation, NOAA programs and offices should at a minimum contractually ensure the vendor provides the data in an agreed-upon common format, complete with metadata, and tools to perform conversion between various formats accepted in the community. NOAA programs and offices may also request the vendor prepare the data for seamless interfacing with existing NOAA capabilities for communication, computational power, assimilation and visualization of similar datasets.³³ The “From the Ground Up” report from the National Academy of Sciences (2009) provides the seminal blueprint for data management and metadata standards for data sourced from commercial and non-federal networks.³⁴

While NOAA programs and offices should be ultimately responsible for evaluating data utilization, they can collaborate with vendors to share responsibility for data assimilation or other quality assurance activities when appropriate or necessary. For example, NOAA can work with the vendor to perform data impact experiments, calibrations for quality control checks and communications, and in some cases develop a forward operator to map the model state variable to the observable.

To enable data assimilation or other observational impact techniques, programs and offices should harness available resources from across NOAA when available and appropriate. NOAA’s Quantitative Observing System Assessment Program, for example, is able to run global simulations to evaluate the quality and impact of observations during pilot projects that eventually were transitioned to full data buy for operation. The Earth Prediction Innovation Center (EPIC) is another NOAA partnership among government, academia, and the private sector with similar capabilities. NOAA programs and offices should also take into consideration the availability of internal data storage and sharing infrastructure for assimilating data from external partners.

Cybersecurity Considerations

NOAA offices and programs should understand, mitigate, and factor into their planning cybersecurity risks to commercial or government systems that impact the availability, integrity or confidentiality with the purchase and use of commercial data. To protect mission operations from cybersecurity risks, offices and programs should require commercial operators to follow established practices to protect their systems, government systems, and data integrity. Data delivery pathways from commercial data providers shall comply with federal government and NOAA IT security

³³ NOAA/NESDIS Commercial Space Activities Assessment Process (NPR 8010.01A), January 2017 [https://www.nesdis.noaa.gov/s3/2021-10/NESDIS Commercial Space Activities Assessment Process Final 1.6.17.pdf](https://www.nesdis.noaa.gov/s3/2021-10/NESDIS%20Commercial%20Space%20Activities%20Assessment%20Process%20Final%201.6.17.pdf)

³⁴ Observing Weather and Climate from the Ground Up: A Nationwide Network of Networks, National Research Council, 2008, pp. 234

requirements, as described in the NOAA IT Security Manual.

Compliance to NOAA IT Security requirements should be verified for IT system interconnections required for data delivery or, where applicable, mission management portals. NOAA offices and programs should also consider the possible need of a Supply Chain Risk Assessment (SCRA) (section 5). This need can be offset with prior verification of potential vendors against supply chain risk criteria.

10. SUMMARY OF GUIDANCE

1. This document applies to the procurement of data or data products using a FAR-based government contract from non-federal owners and operators of environmental observing networks, including in situ and remote sensing technologies.
 - a. CRADAs, OTAs, grants, and cooperative agreements are out of scope for this guidance, but as important government vehicles, can help inform future acquisitions.
2. The guidance in this document is intended for, and applicable to, NOAA staff offices such as the Acquisition and Grants Office, NOAA line offices, and programs.
3. In considering and engaging the commercial sector for data buy opportunities, NOAA line offices and programs should:
 - a. engage the NOAA Observing Systems Council and the Acquisition and Grants Office (AGO) in planning and implementing commercial data programs.
 - b. ensure that risk is considered in the acquisition and use of commercial data, evaluated against the specific NOAA program's risk tolerance, taking into consideration the type of data and whether the data will be foundational or supplemental.
 - c. conduct market research, peer reviews, trade studies and/or pilots to evaluate what commercial capabilities exist, how those capabilities may meet NOAA mission needs and fit into planned architectures, and evaluate the integrity and sustained viability of the data streams.
 - d. first explore procuring ownership interest in the data or rights on a full and open basis; if exceptions apply or data is not able to be shared as such, more creative solutions to sharing rights and licensing for commercial data may be negotiated.
 - e. ensure data licenses guarantee NOAA's own use and address the treatment of derived or value-added products, specifying that NOAA's use extends to any contractors or affiliates (including grantees and cooperative institutes), and that derived products created by NOAA, where the original contractor-provided data cannot be extracted, can be publicly released with no restrictions on use.
 - f. ensure that the supplier can maintain the quality, availability, and reliable delivery of

observations provided to the government.

- g. maintain responsibility for assessing observational impact of the data by assimilating the data into their operational models to ensure the data is usable/viable and to show its value.
- h. understand, mitigate, and factor into their planning cybersecurity risks to commercial or government systems that impact the availability, integrity or confidentiality with the purchase and use of commercial data.

APPENDICES

A2. Applicable Laws, Policies and Reference Documents

This document is issued with awareness of national and international policies, agreements and cooperative arrangements. The following documents are listed for context only; any specific request for information or procurement released by NOAA will identify all requirements applicable to the request.

1. 2019 National Plan for Civil Earth Observations, December 2019
<https://usgeo.gov/uploads/Natl-Plan-for-Civil-Earth-Obs.pdf>
2. 2020 Report on Earth Observation Trends - Informing NESDIS's Strategic Vision, October 2020
https://drive.google.com/file/d/147t_jSdNM1DKlfoRBd37zK0jlaCnWFqv/view?usp=sharing
3. Department of Commerce Controlled Unclassified Information (CUI) Policy and Guidelines August 2019 <https://www.commerce.gov/sites/default/files/2022-02/Controlled-Unclassified-Information-Policy.pdf>
4. Foundations for Evidence-Based Policymaking Act of 2018 (PUBLIC LAW 115–435), January 2019
<https://www.congress.gov/115/plaws/publ435/PLAW-115publ435.pdf>
5. The Freedom of Information Act, 5 U.S.C. § 552 As Amended By Public Law No. 110-175, 121 Stat. 2524 <https://www.justice.gov/sites/default/files/oip/legacy/2014/07/23/foia-final.pdf>
6. Hydrographic Services Contracting Policy, Federal Register Vol. 74, No. 159, August 19, 2009
<https://www.govinfo.gov/content/pkg/FR-2009-08-19/pdf/E9-19819.pdf>
7. Hydrographic Services Improvement Act of 1998, Public Law 107–372, December 19, 2002,
<https://www.congress.gov/105/bills/hr3164/BILLS-105hr3164rfs.pdf>
8. Improving Implementation of the Information Quality Act (M-19-15), April 2019
<https://www.cdo.gov/assets/documents/OMB-Improving-Implementation-of-Info-Quality-Act-M-19-15.pdf>
9. Integrated Coastal and Ocean Observation System Act of 2009, H. R. 367, January 9, 2009,
<https://www.congress.gov/111/bills/hr367/BILLS-111hr367ih.pdf>
10. Management of NOAA Data and Information, NAO 212-15B, November 2023
<https://www.noaa.gov/sites/default/files/legacy/document/2020/Mar/212-15.pdf>
11. NOAA/NESDIS Commercial Space Activities Assessment Process (NPR 8010.01A), January 2017 [https://www.nesdis.noaa.gov/s3/2021-10/NESDIS Commercial Space Activities Assessment Process Final 1.6.17.pdf](https://www.nesdis.noaa.gov/s3/2021-10/NESDIS%20Commercial%20Space%20Activities%20Assessment%20Process%20Final%201.6.17.pdf)
12. NOAA Commercial Space Policy (NAO 217-109), January 2016
[https://www.noaa.gov/sites/default/files/legacy/document/2020/Mar/NAO_217-109 Commercial Space Policy Signed.pdf](https://www.noaa.gov/sites/default/files/legacy/document/2020/Mar/NAO_217-109_Commercial_Space_Policy_Signed.pdf)
13. Observing Weather and Climate from the Ground Up: A Nationwide Network of Networks, National Research Council, 2008, pp. 234
14. Ocean and Coastal Mapping Integration Act, 33 U.S.C. 3501,
https://iocm.noaa.gov/reports/2009_PL111-11_SubtitleB_OCMA.pdf
15. Open Data Policy—Managing Information as an Asset (M-13-13), May 2013
https://www.whitehouse.gov/wp-content/uploads/legacy_drupal_files/omb/memoranda/2013/m-13-13.pdf

16. Requirements Management, NAO 216-108, October 2005
<https://www.noaa.gov/organization/administration/nao-216-108-requirements-management>
17. United States Government Commercial Earth Observations Data Purchases: Perspectives from the Earth Observations Enterprises, July 2022 [https://usgeo.gov/uploads/USG-Commercial-Earth-Observation-Data-Purchases%20\(final\).pdf](https://usgeo.gov/uploads/USG-Commercial-Earth-Observation-Data-Purchases%20(final).pdf)
18. Weather Research and Forecasting Innovation Act of 2017, PUBLIC LAW 115–25, April 18, 2017, <https://www.congress.gov/115/plaws/publ25/PLAW-115publ25.pdf>
19. World Meteorological Organization Unified Data Policy, April 2022
[https://library.wmo.int/viewer/58009?medianame=WMO Unified Data Policy brochure en#page=2&viewer=picture&o=bookmarks&n=0&q=](https://library.wmo.int/viewer/58009?medianame=WMO_Unified_Data_Policy_brochure_en#page=2&viewer=picture&o=bookmarks&n=0&q=)

A3. Definitions

Commercial Data Buy: An arrangement for the procurement of data or data products using a FAR-based government contract from non-federal owners and operators of environmental observing networks, including in situ and remote sensing technologies (e.g., ground-, marine-, air-, and space-based).

Data: Recorded information, regardless of form or the media on which the data are recorded.

Data License: the specific contractual terms that prescribe the procuring agency's rights to use and, if applicable, disseminate the data to third parties. It further addresses the treatment of value-added and derived products and, if applicable, the rights of third parties to use the provider's data and any value-added and derived products.

Derived Products: work 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.

Earth Observations: measurements of the physical, chemical, geological, and biological characteristics of Earth that are obtained from space-based, aircraft-borne, ship-borne, ocean, or land-based sensors. It includes in situ measurements as well as surveys and reference systems, such as the Global Positioning System.

End User License Agreement (EULA): an agreement between the licensor of a licensed product and the licensee. EULAs detail the conditions for the licensee's use of licensed material, such as distribution and third-party use rights.

Foundational Observations: Enduring NOAA-managed observing capabilities supplying a sufficient quantity, and quality of observations in order to meet NOAA's mission essential functions at an acceptable level of risk.

A4. Procurement Contract Sample Text

Data Ownership Approach: Contractor transfers ownership of the data to NOAA. Include FAR 52.227-17 and CAR 1352.227-70 and add this text to the Statement of Work:

Copyright Assignment

By performing task orders and providing deliverables, the Contractor assigns NOAA the copyright of all contract deliverables, including, but not limited to, raw and processed data and documentation, for all task orders executed under this SOW.

Data Licensing Approach: Contractor maintains ownership of the data, provides NOAA with a license containing use and if applicable, dissemination rights.

Per this contract, the Contractor grants NOAA a perpetual, non-exclusive, irrevocable, worldwide license to use, reproduce, and create derived and value-added products with the data, in any manner and for any purpose, and to authorize others to do so on its behalf (including other contractors and recipients of financial assistance awards).

A derived product means a work that is created when data are manipulated to such a degree that it cannot be reverse engineered. Derived products created using data received under this contract are not subject to the data rights provisions in this section or any other contractual, licensing, or intellectual property claims by the Contractor, and therefore may be publicly distributed without use restrictions.

A value-added product means a work that is created when data are modified—through technical manipulation, addition of data, or both—where the principal features and characteristics of the source data are retained in the work and are extractable through technical means. Value-Added Products created using data received under this contract are subject to the data rights provisions in this section.

[If known, describe products planned to be created that NOAA considers to be value-added products, as defined above] created by NOAA or its affiliates from Contractor-supplied data are considered to be value-added products. All other products created by NOAA or its affiliates from Contractor-supplied data, including but not limited to model output, are considered to be derived products.

[Select single data sharing option or obtain pricing on multiple options]

Furthermore, the Contractor shall provide pricing for various external data sharing rights, including but not limited to the external distribution and use rights described in the options below.

Option 1: *Right to distribute all data to any entity immediately after receipt at NOAA with no restrictions on their use or further distribution, under a Creative Commons Attribution 4.0 International license (CC BY 4.0).*

Option 2: *Right to distribute all data to U.S. Government agencies, International Partners, including but not limited to [define international partners], and nonprofit entities and academic entities, immediately after receipt at NOAA, for non-commercial use but not for further distribution.*

Option 2A: *In addition to the rights under Option 2, Option 1 rights will apply to all data beginning at 24 hours after collection.*

Option 3: *Right to distribute all data to U.S. Government agencies, International Partners, including but not limited to [define international partners], immediately after receipt at NOAA, for non-commercial use but not for further distribution.*

Option 3A: *In addition to the rights under Option 3, Option 1 rights will apply to all data beginning at 24 hours after collection.*

NOAA will ensure that any non-NOAA entity receiving restricted data is made aware of the identified use and distribution restrictions associated with the data rights specified in the IDIQ contract and this Delivery Order. If NOAA becomes aware that an entity is not adhering to those restrictions, NOAA will seek to ensure compliance, and if unsuccessful, may terminate the entity's access to the data. NOAA, however, has no additional obligations under the IDIQ contract or this Delivery Order related to data use by third parties. In no event is NOAA liable to the contractor for third party use or release of contractor data.

A5. Document Updates

With NOSC oversight, the NOAA Commercial Data Buy Task Team is responsible for the coordination of updates to this document. Updates will be made on a biennial basis, or more frequently as determined by the NOSC.