NOAA and the Commercial Sector

Presented to CGMS-52 Working Group II session, Agenda Item 5.2
CGMS-52-NOAA-WP08_v2

Executive summary of the WP

This presentation provided a brief overview of NOAA's Commercial Weather Data Program including recent operational data buys as well as NOAA's Commercial Weather Data Pilot Process and recent pilot purchases for evaluation and assessment purposes.

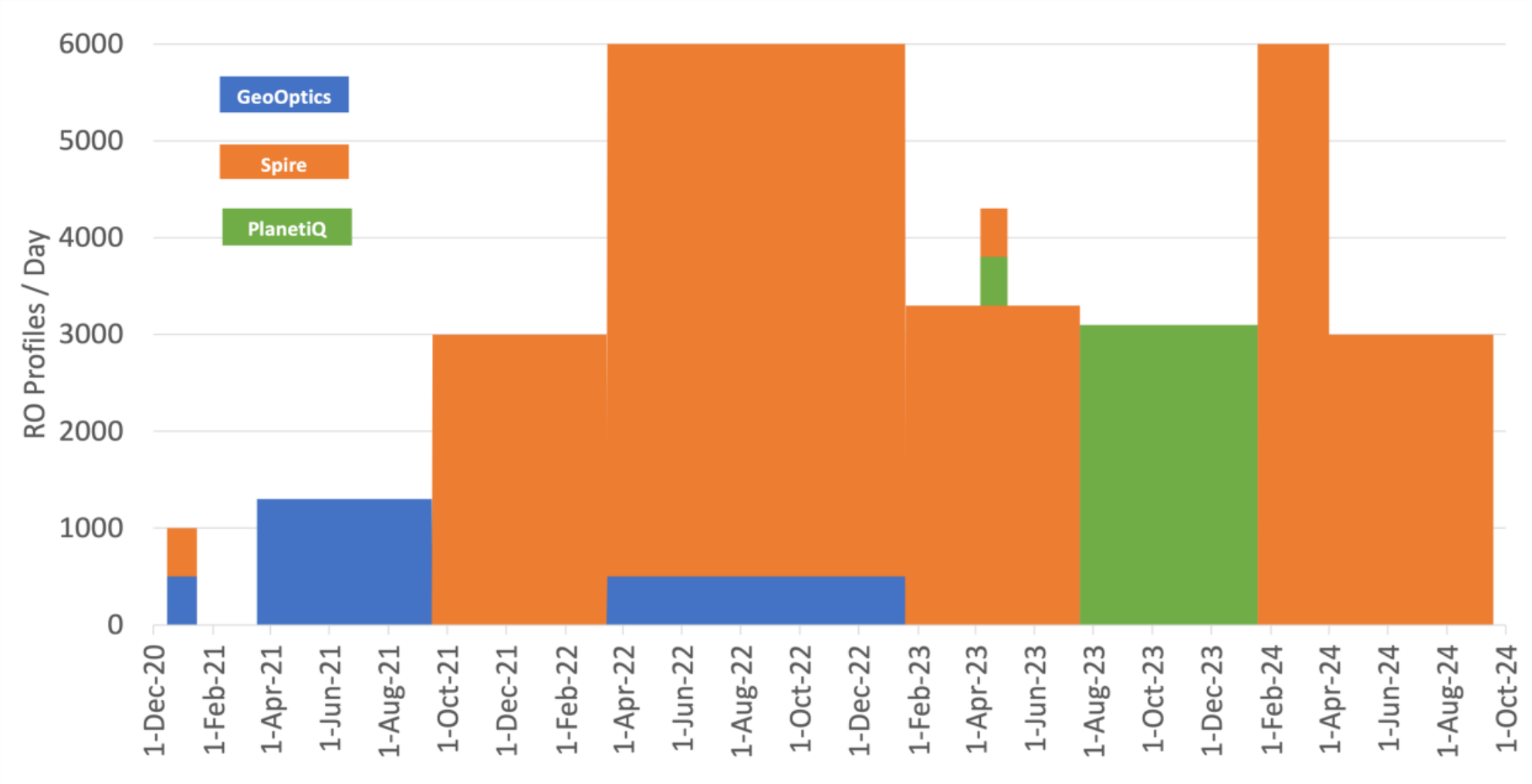
NOAA highlighted key elements of its current operational GNSS-RO contract including a specification that vendors must provide NOAA with unique, non-duplicate data; options for purchasing targeted space weather data; and a preference for unrestricted distribution rights. For current pilot projects, NOAA reported the agency is completing final evaluations under its Space Weather Pilot and began receiving data in January 2024 under its Ocean Surface Wind Pilot.

Finally, NOAA reflected on several lessons learned including challenges with configuration control and transparency, the lack of reliability of some vendors, unrestricted data sharing licenses, and the volatile vendor pricing.

CDP Operational Radio Occultation (RO) Data Buys:

- **First RO Data Buy (RODB-1): Dec 2020 to July 2023**
  - *Approach*:
    - 2-year, multi-award, Indefinite Delivery Indefinite Quantity (IDIQ) contract with $23M total ceiling
    - Delivery Orders issued which specified quantity, sharing license, and duration
  - *Data Specifications*:
    - Level 0 and Level 1 RO data from which NOAA derives neutral atmospheric and ionospheric products.
    - Latency < 140-min; signal to noise ratio > 200; coverage ~ global
  - *Execution:*
    - IDIQ awards issued to **GeoOptics** and **Spire Global**
    - Total of 5 Delivery Orders were executed, spanning Dec 2020 to July 2023
- **Second RO Data Buy (RODB-2): March 2023 to March 2028+**
  - *Changes/modifications relative to RODB-1*:
    - $59M ceiling, **5-year** period of performance
    - Added options for purchasing **targeted space weather data**
    - Specified stipulation to provide **unique, non-duplicate** data
    - Added **onramp mechanism** for emerging vendors
    - Preference for unlimited data sharing license
  - *Execution:*
    - IDIQ awards issued to **PlanetiQ** and **Spire Global**
    - Total of 3 Delivery Orders issued to date

NOAA CDP Operational RO Data Purchases:



Commercial Weather Data Pilot (CWDP) Process:

Market Research

- Pulse community: Issue *Request for Information* or *Sources Sought* Notice to identify potential data types of interest
- Evaluate responses against NOAA goals, requirements, resources and schedules

Pilot Planning

- Organize team and allocate resources
- Develop requirements, engaging user community and experts
- Release draft “Statement of Work”
- Issue solicitation (“Request for Proposals”)
- Evaluate proposals
- Award contracts as appropriate

Pilot Execution

- Plan for data ingest, processing, dissemination and archive
- Conduct data delivery period
- Evaluate data quality and impact
- Report results to leadership and community at large
- Recommend data type for operational purchase when appropriate

Commercial Weather Data Pilots

- 2016 - 2017: **GNSS-RO Pilot, Round 1**
  - Spire
  - Bending angle profiles and space weather products
- 2018 - 2020: **GNSS-RO Pilot, Round 2**
  - GeoOptics and Spire
  - Bending angle profiles and space weather products
- 2022 - 2024: **Space Weather Pilot** (wrapping up final evaluations)
  - PlanetiQ and Spire
  - Space weather products: ionospheric scintillation and total electron content
- 2023 - TBD: **Ocean Surface Wind Pilot** (6-month data delivery commenced in Jan'24)
  - Spire
  - Surface wind speeds over water from GNSS-Reflectometry

Reflections after 8 years of NOAA Commercial Data

- Using RO as proof-of-concept, CDP and private industry have demonstrated that satellite data-as-a-service is a viable model for NOAA to help meet observational requirements.
- However, some characteristics that differentiate commercial from Government-sponsored data sources have emerged:
  - Configuration control and transparency:
    - Unlike USG-sponsored missions, commercial data have limited documentation and specification.
    - Changes in the measurement/processing occur outside our control and not always communicated.
  - Reliability:
    - All of NOAA's commercial RO vendors have, at times, been unable to deliver their proposed quantity.
  - Availability:
    - Although NOAA's recent purchases have all had unrestricted licenses, some commercial datasets have been, and may in the future be, restricted in their distribution or use, especially for near-real-time data.
  - Cost/benefit fine points:
    - Vendor pricing is volatile
    - USG-sponsored missions often include additional instruments and datasets for "free"

Key issues of relevance to CGMS:

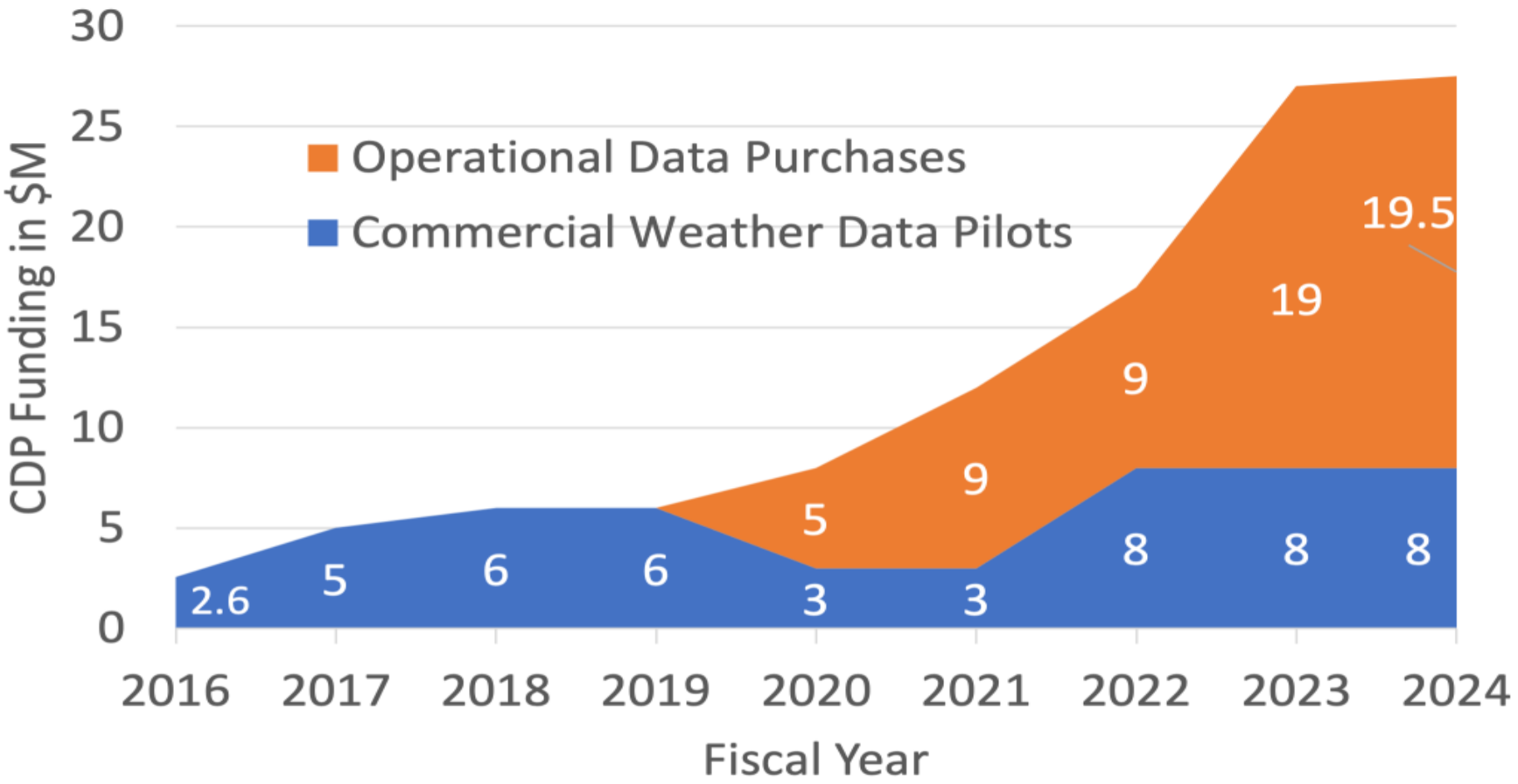
- ☐ NOAA has found satellite data-as-a-service is a viable model for NOAA to help meet observational requirements
- ☐ Members considering purchasing commercial data can learn from the issues NOAA has experienced with configuration control and transparency, unreliability of vendor commitments, data sharing licenses, and volatile vendor pricing.

To be considered by CGMS:

- ☐ Note NOAA presentationl

Back-up

NOAA CDP Budget:



NOAA/NESDIS Commercial Data Program Background:

Purpose: Manage NESDIS' space-based commercial weather pilot and data purchase projects. Assess and acquire value-added *space-based* commercial *environmental* observation data to augment existing data streams in support of NOAA's operations and research.

The **Commercial Data Program** contains two lines of effort:

Commercial Weather Data Pilot:

Demonstrates the quality and impact of commercial data on weather forecast models

Commercial Data Purchase:

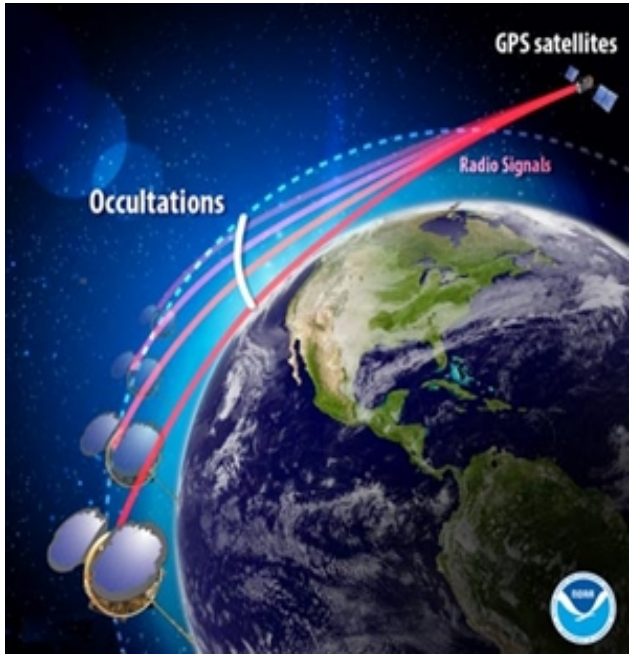
Supports operational weather forecasting

Commercial Data Program Information:

https://www.space.commerce.gov/business-with-noaa/commercial-weather-data-pilot-cwdp/
https://www.nesdis.noaa.gov/data-research-services/data-purchased-noaa

NESDIS Commercial Data Purchase Background:

- In Nov 2020, NOAA/NESDIS awarded their 1st Commercial Data Buy (RODB-1) to Spire Global and GeoOptics for 2 years.
- **Use of commercial data in operational NWP models in May 2021**
- On Mar 27, 2023, NOAA/NESDIS awarded the 2nd Commercial Data Buy (RODB-2) to Spire Global and PlanetiQ for 5 years.
- Today, NOAA uses commercially available Radio Occultation (RO) data to respond to the ever-growing demand for environmental information and satisfy observational requirements, *potentially* at a lower cost than government alternatives.
- Derive Neutral Atmosphere and Ionospheric products from RO:
  - Neutral Atmosphere products include: Bending Angle, Refractivity, Temperature, Winds, Heights and Water Vapor
  - Ionospheric products include: Total Electron Content (TEC), Electron Density Profiles and Scintillation Indices
- Benefits of assimilating RO into Numerical Wx Prediction models:
  - ~ 10% forecast error reduction (FSOI studies)
  - Tropical cyclone forecast improvements (OSE studies)



GNSS-RO receivers observe distortion of GNSS signals as they transit the atmosphere. NOAA produces quasi-vertical RO soundings based on bending angles from satellite-based RO open-loop measurements made during a GNSS occultation event.

CDP FORECAST: FY 2024 - 2025

DISCLAIMER: This is for planning purposes only and is subject to changes