Acquisition and Use of Commercial RO Data at NOAA

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National Environmental Satellite, Data, and Information Service

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Acknowledgements

Contributors

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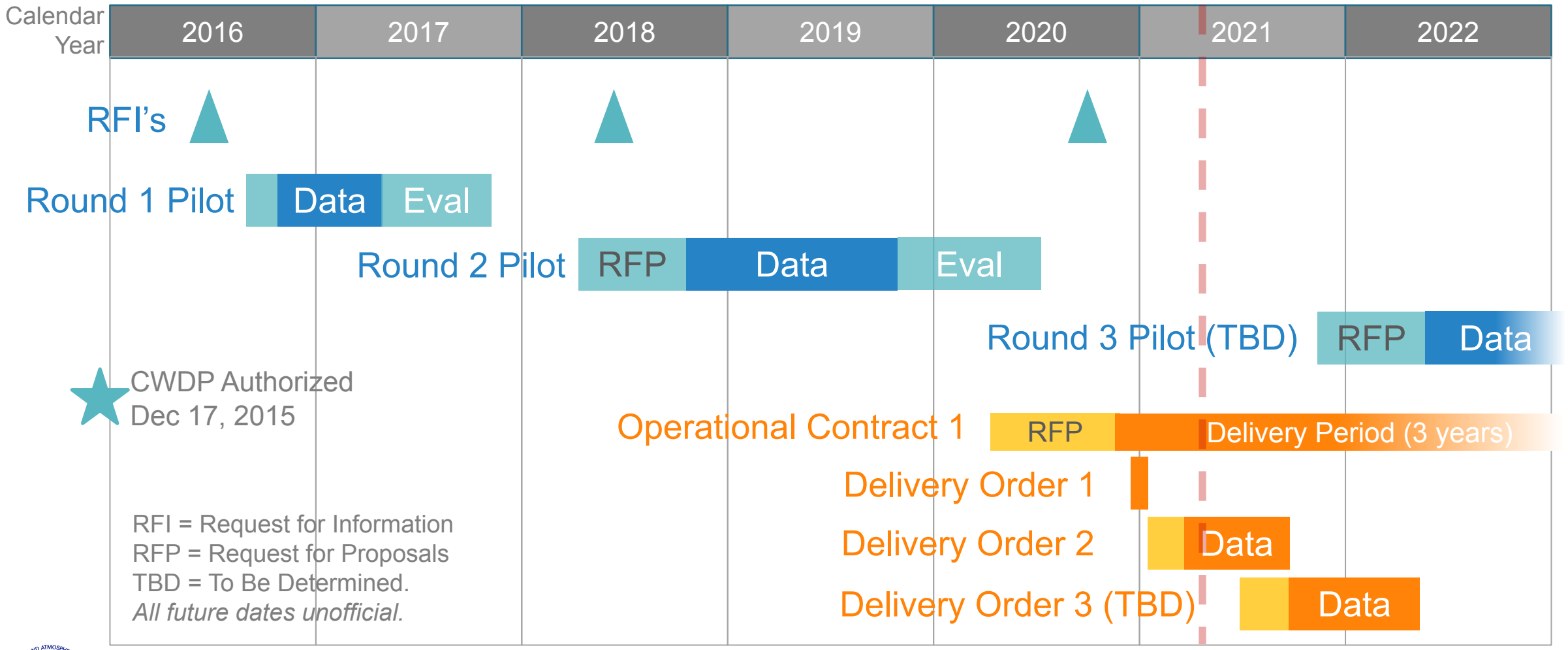
- Kate Becker
- Doug Whiteley
- Vanessa Griffin
- Many others at UCAR, SWPC, JCSDA, STAR, NCEP, NWS, NCCF, NCEP, NCEI …

NOAA Offices at Silver Spring Metro Center

Overview

- In November 2020, NOAA awarded contracts to GeoOptics and Spire to provide near real-time RO data
- This marks the first acquisition of operational commercial satellite data by NOAA
- The purchase is the culmination of the Commercial Weather Data Pilot program, initiated in 2016 to leverage capabilities of the commercial sector in helping meet NOAA's requirements for environmental data.
- In this presentation, we will review the process used to acquire these data and present results from the first delivery.

CWDP Timeline



RFI = Request for Information
RFP = Request for Proposals
TBD = To Be Determined.
All future dates unofficial.

Commercial Weather Data Acquisition

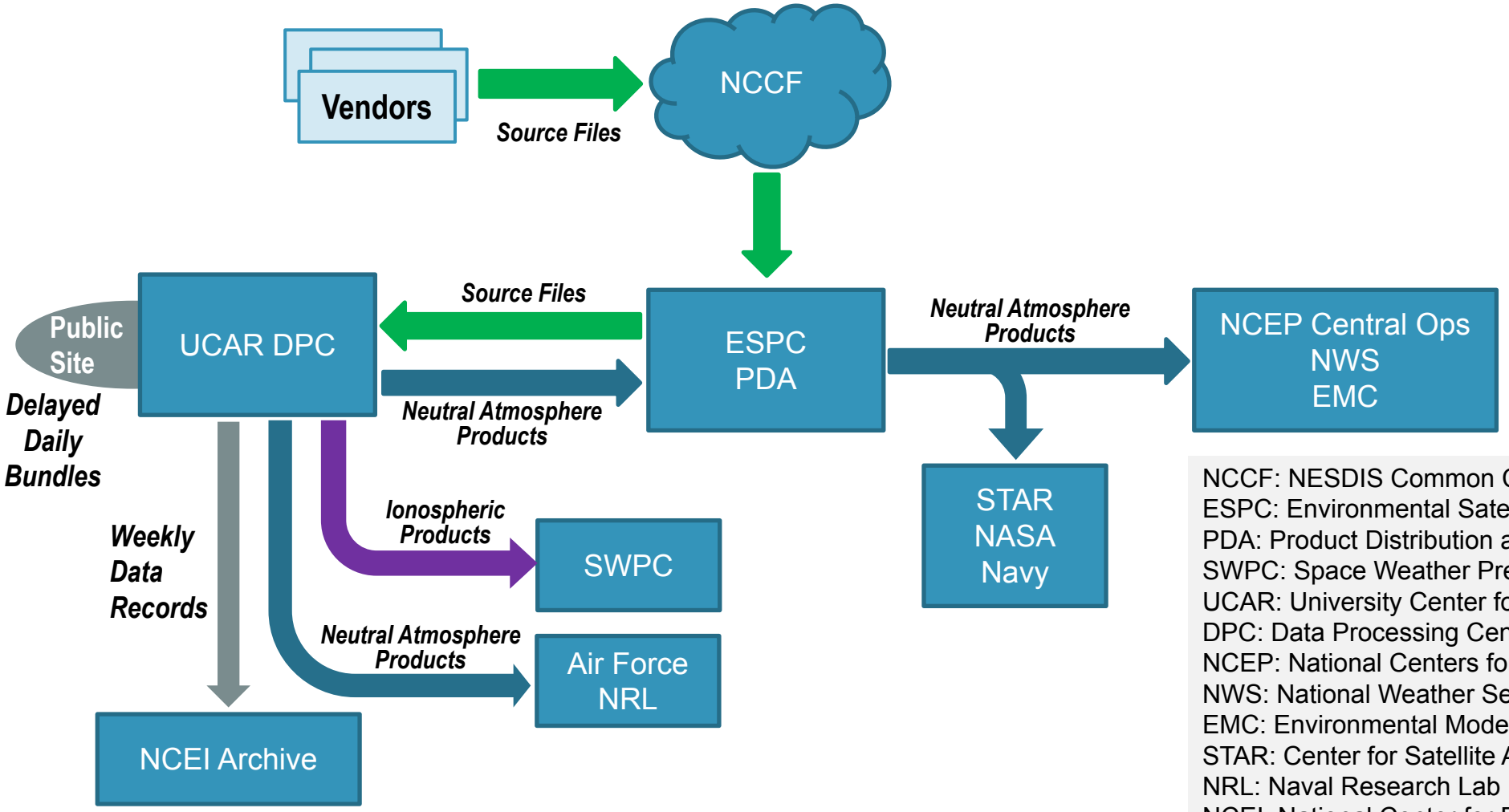
Multi-award IDIQ contract solicited, seeking vendors capable of providing operational weather data

Vendors propose “not to exceed” pricing for various Data Sharing Options and data volumes

Data are then acquired by issuing a “Delivery Order” that specifies data quantity required and duration.

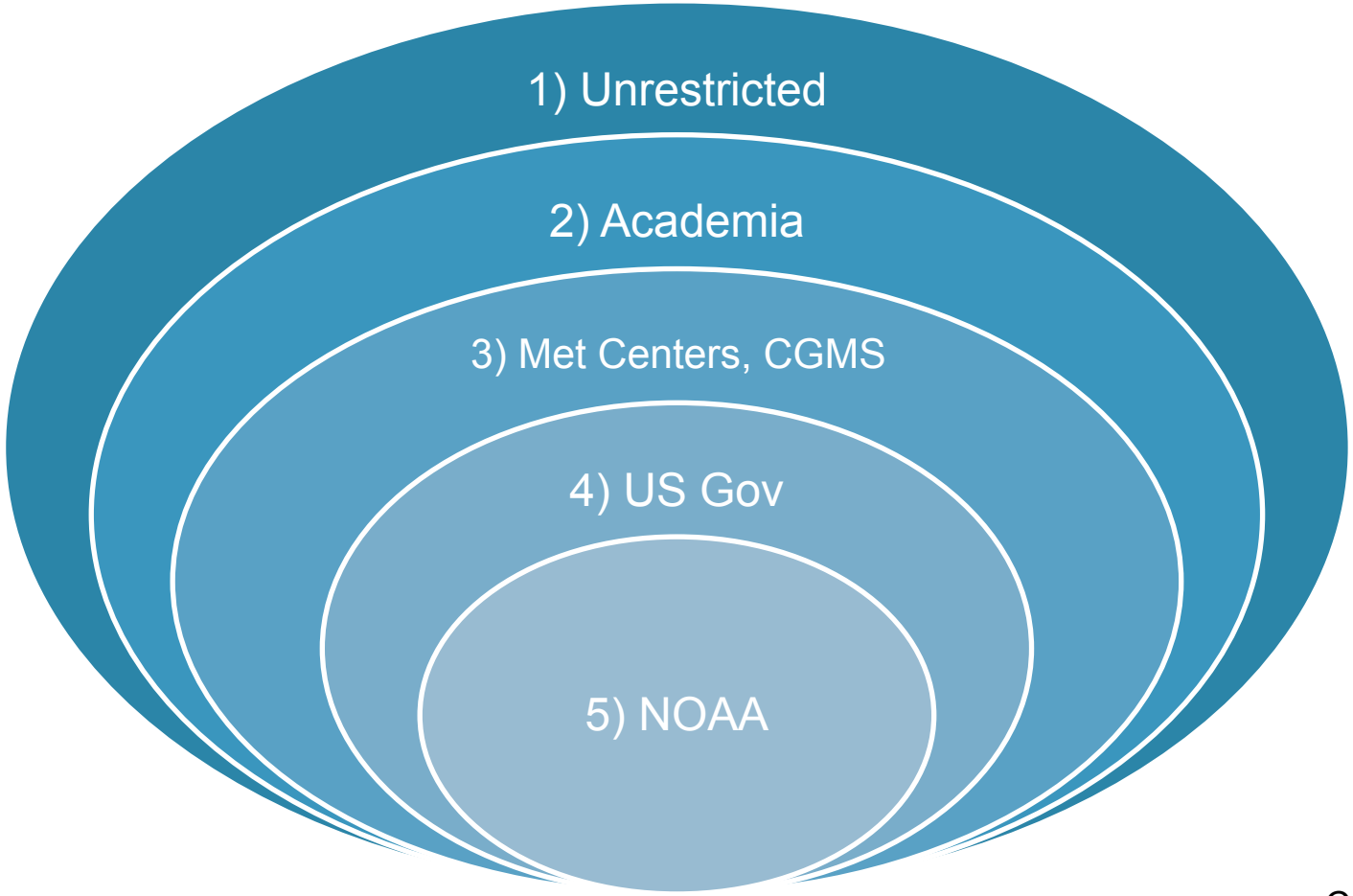
All vendors bid on Delivery Order with revised pricing. Single award generally made based on price.

Commercial Weather Data Operational Flow



NCCF: NESDIS Common Cloud Framework
ESPC: Environmental Satellite Processing Center
PDA: Product Distribution and Access system
SWPC: Space Weather Prediction Center
UCAR: University Center for Atmospheric Research
DPC: Data Processing Center
NCEP: National Centers for Environmental Prediction
NWS: National Weather Service
EMC: Environmental Modelling Center
STAR: Center for Satellite Applications and Research
NRL: Naval Research Lab
NCEI: National Center for Environmental Information

Data Sharing Options for RO Purchases



- Each level has an ”A” version, which removes all restrictions on day-old data.
- Pilot had restrictions similar to Option 3.
- Operational Delivery Orders 1 and 2 were purchased with Option 4A

CGMS = Coordination Group for Meteorological Satellites

Delivery Order 1

Purchased 500 Profiles/Day from Spire and GeoOptics for 30 days

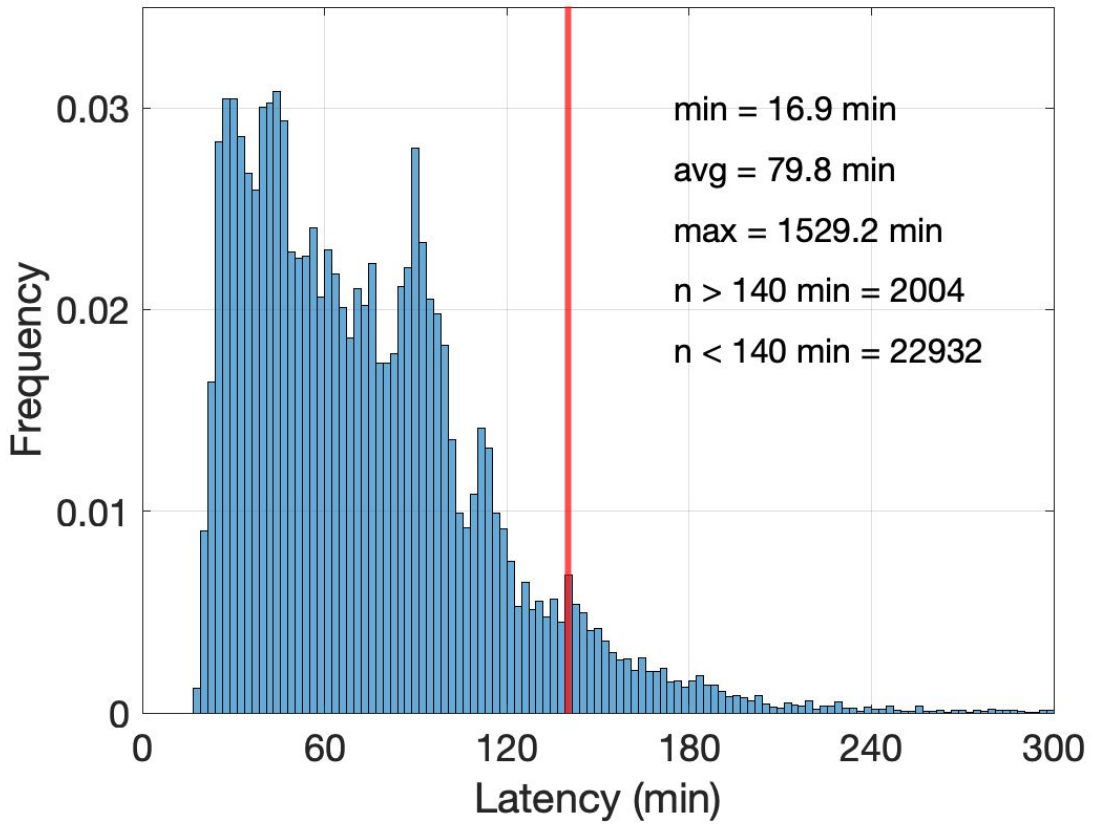
Used to test ingest, processing, and distribution systems

Main Requirements

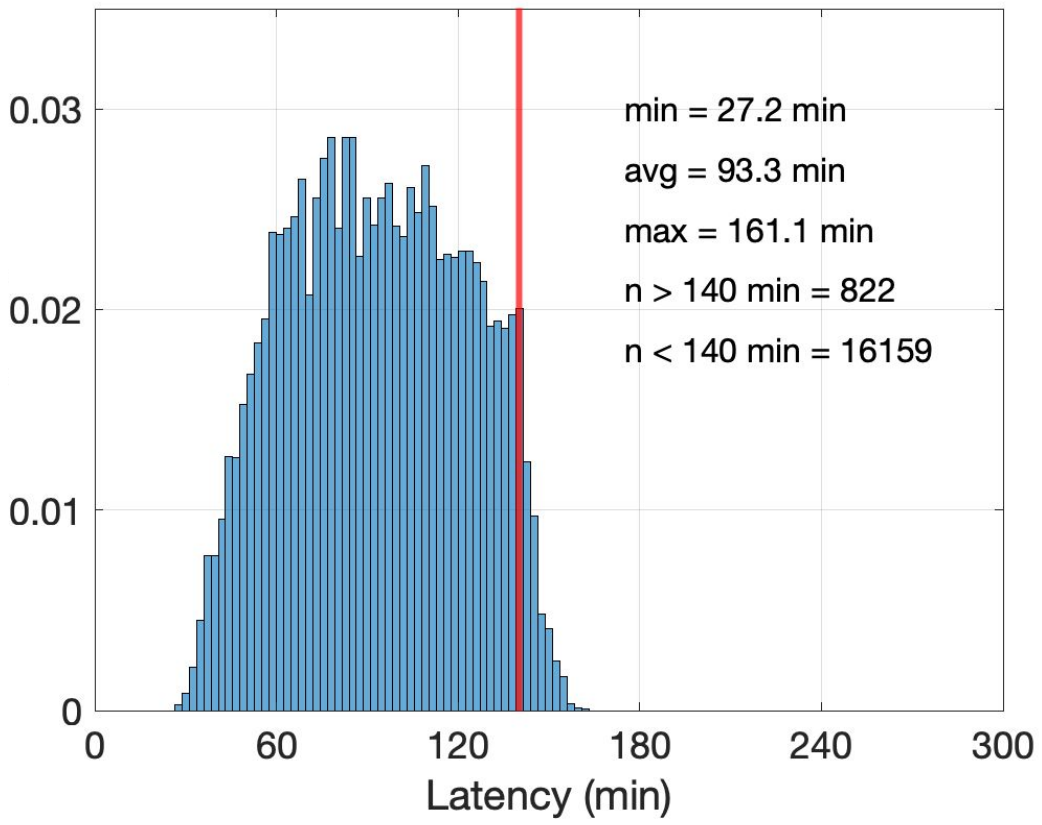
- ✔ Level 0 and Level 1 data
- ✔ Latency < 140 min
- ✔ GPS or GLONASS only
- ✔ SNR > 200 V/V
- ✔ Global coverage

Delivery Order 1 – Latency

GeoOptics



Spire



Data compiled by UCAR

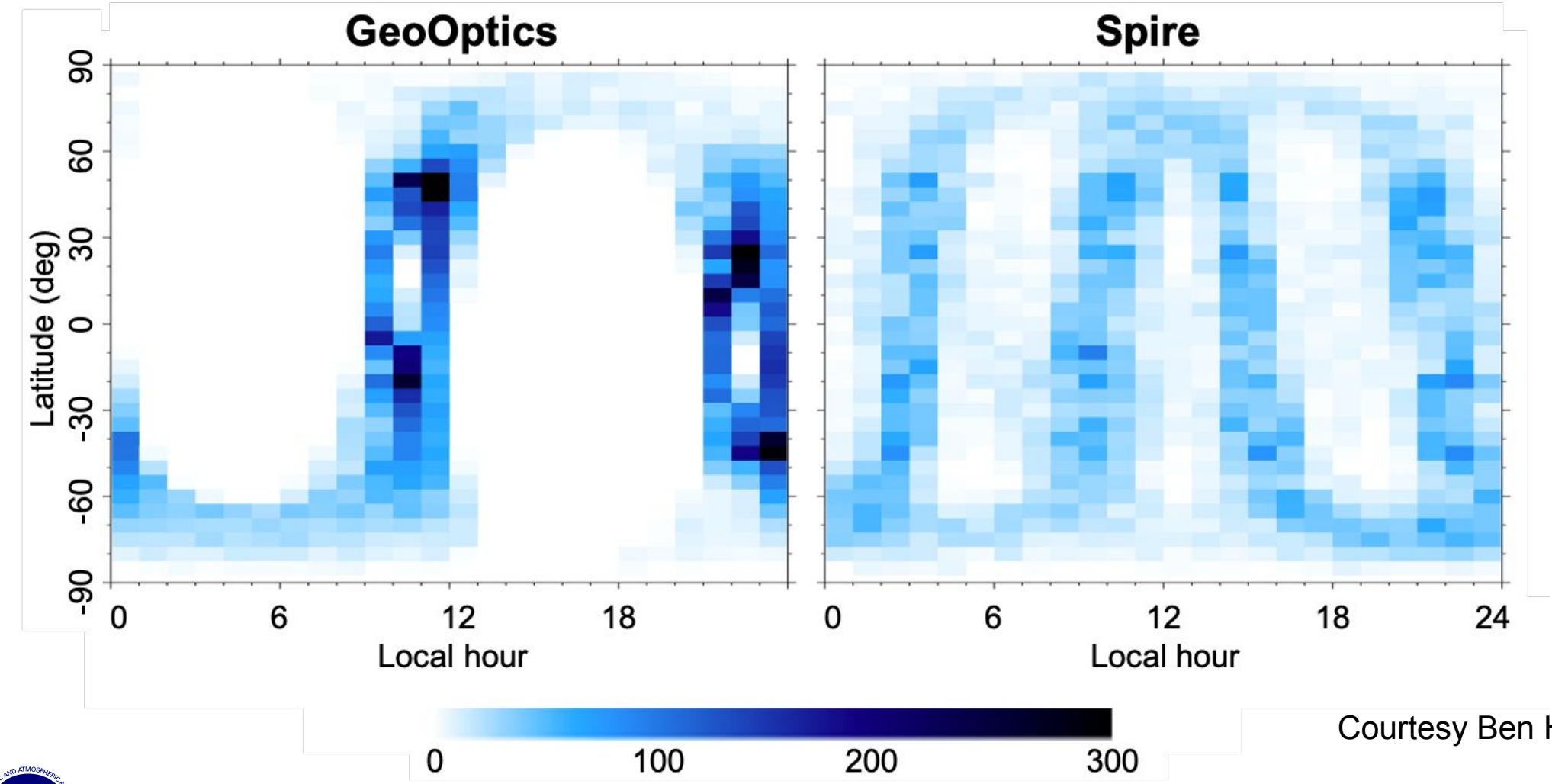
Delivery Order 1 - Precision

Table 1—Precision metrics for DO-1 data. SNR is in Volts/Volt and STDV is in microradians. (Higher SNR and lower STDV indicate better precision.)

Vendor	GPS			GLONASS		
	L1 SNR	L2 SNR	*STDV*	L1 SNR	L2 SNR	*STDV*
GeoOptics	546.9	258.0	*1.59*	577.3	498.0	*2.13*
Spire	377.1	219.9	*1.58*	944.8	219.5	*2.05*
COSMIC-2	1336.2	499.6	*1.12*	1122.0	797.8	*1.95*

Data courtesy UCAR CDAAC

Delivery Order 1 – Local Time Coverage



Note: No local time coverage requirements were solicited or required

Courtesy Ben Ho, *STAR*

Delivery Order 2 and Beyond

- Delivery Order 2
  - Single Award to GeoOptics
  - 6-month period (March 17 through September 16, 2021)
  - 1300 Profiles/Day
  - Same requirements as Delivery Order 1
  - Sharing Option 4A (NOAA + US Gov't; unrestricted after 24 hours)
  - Will be ingested operationally in GFS 16.1 (~May 2021)
- Delivery Order 3
  - Planning underway, RFP anticipated this summer
  - Goal is to dovetail with Delivery Order 2

Lessons Learned, Work to Do

- Commercial RO is mature and ready
  - Vendors were helpful in working with technical teams to understand their data. This is essential for success.
  - For future Pilots, operational requirements and goals should be more clearly defined up front

- More work is needed to be ready to adapt to rapidly evolving capabilities
  - Cope with “interchangeable” satellites, perhaps grouping them to exploit characteristics
  - Coverage could be optimized to achieve highest impact
  - Benefit of full local time coverage needs to be explored

- New formatting standards should be established
  - Use of BUFR vs NetCDF or alternatives should be decided
  - Expansion of WMO ID’s to handle many hundreds of sensors is required

Thank You!

Courtesy NASA