



# Improving Commercial Data Discoverability and Access for NASA's Commercial Smallsat Data Acquisition (CSDA) Program

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# NASA CSDA Program

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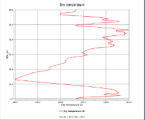

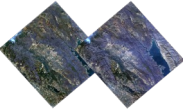
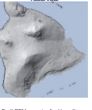
Pilot Program established in November 2017, transitioned to a sustained Program in early 2020

## Objectives:

- Establish **continuous and repeatable processes** to onramp new commercial data vendors and evaluate data for its potential to advance NASA's Earth science research and application activities
- Enable the sustained use of purchased data for broader **use and dissemination by the Earth scientific community**
- Ensure long-term data preservation through the establishment of **data management processes** and systems to support rapid evaluation, access and distribution of purchased data, and long-term access to purchased data for scientific reproducibility
- **Coordinate** with other **U.S. Government agencies** and international partners on the evaluation and scientific use of commercial data

<https://earthdata.nasa.gov/csda>

# Vendor and Data Product Overview

Vendor / Producer	Constellations/ Products	Available Dates	Spatial Resolution	Spectral Characteristics	Sample
Planet Labs, Inc	PlanetScope (3band, 4band, PSScene), RapidEye	12/31/2005 - Present	3 - 6.5 meters	RGB, NIR (440-860 nm), Panchromatic	 <p>PlanetScope 4-band RGB thumbnail with Super RGB thumbnail overlay Includes copyrighted material of Planet Labs Inc. All rights reserved.</p>
	SkySat	3/10/2015 - 12/12/2019	< 1 meter	RGB, NIR (450-900 nm), Panchromatic	
Spire Global, Inc	GNSS Radio Occultation, GNSS Grazing Angle Reflectometry, Satellite Precise Orbit Determination (POD) and Satellite Attitude, Total Electron Content, Ionospheric Profiles, Scintillation, Magnetometer, Raw IF, GNSS Bistatic Radar Cross Section, GNSS Bistatic Radar Normalized Cross Section, Ocean Winds, Soil Moisture, Sea Ice, Altimetry	9/24/2018 - Present (variable)			 <p>Spire GNSS-RO L2A atmospheric vertical profile of dry temperature (left) Includes copyrighted material of Spire Global Inc. All rights reserved.</p>
Maxar Technologies	Worldview 1-4, GeoEye-1, QuickBird, IKONOS	10/24/1999 - Present	0.31 - 4.0 meters	Multispectral and Panchromatic (400 - 2245 nm)	 <p>Maxar WorldView 1-4 satellite imagery Includes copyrighted material of Maxar. All rights reserved.</p>
Teledyne Brown Engineering, Inc.	DESI L1B, L1C, and L2A	11/21/2018 - Present	30 meters	235 channels, 2.5nm from 402 to 1000 nm	 <p>DESI L1B right surface reflectance and L1A left top of atmosphere reflectance RGB satellite imagery Includes copyrighted material of Teledyne Brown Engineering Inc. All rights reserved.</p>
Polar Geospatial Center - EarthDEM	individual strips and mosaics	2009 - Present	2 meters		 <p>EarthDEM mosaic for Iceland Includes copyrighted material of Mosaic. All rights reserved.</p>

# New Available Data Products

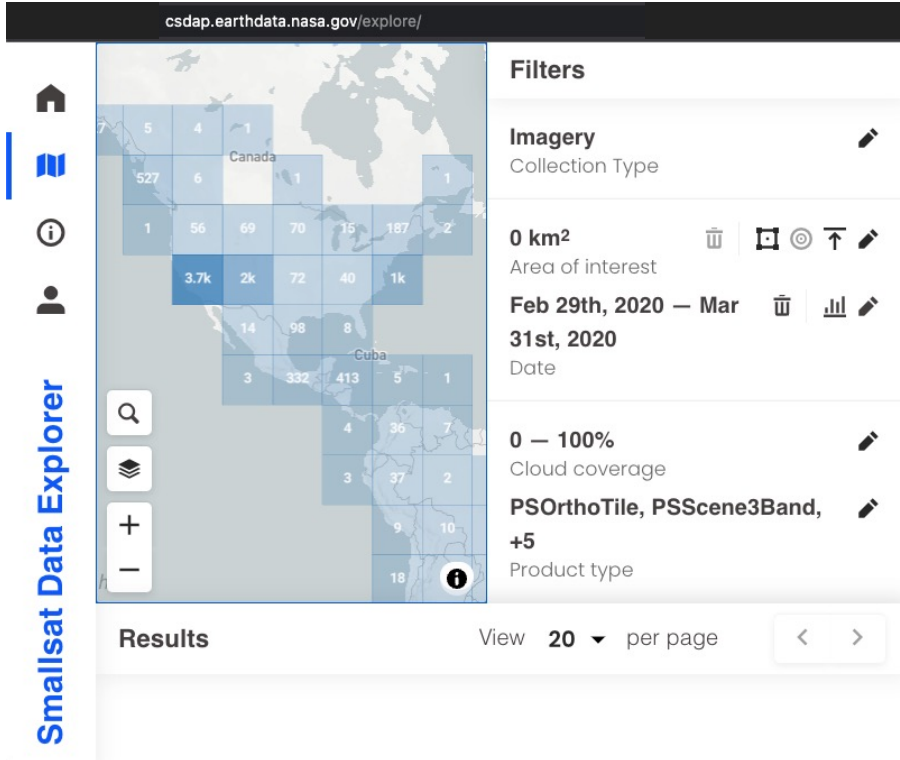
New product evaluations of vendors since the Pilot Program

The screenshot displays the SmallSat Data Explorer interface. At the top, there is a world map with a purple grid overlay. Below the map is a search results table with columns for Item, Title, Type, and File Size. The table lists several assets related to GNSS Science and Grazing Angle data. On the right side, there is a 'Filters' panel with various options like 'GNSS Science Collection Type', 'Grazing Angle GNSS-R Allometry', and 'GNSS Bistatic Radar Cross Section'. At the bottom, there are buttons for 'Get Download Script' and 'Download Inventory'.

Item	Title	Type	File Size
2020-03-01T06-26-18_FM099_G29_grtce	1 asset	NetCDF	871.8 KB total
2020-03-01T08-33-22_FM108_G13_grtce	1 asset	NetCDF	162.0 KB total
2020-03-01T10-07-09_FM108_G10_grtce	1 asset	NetCDF	262.1 KB total
2020-03-01T11-07-09_FM108_G10_grtce	1 asset	NetCDF	840.8 KB total

- **Spire Global Inc.** (download available)
  - GNSS Bistatic Radar Cross Section, GNSS Bistatic Radar Normalized Cross Section, Ocean Winds (track and hourly merged)
  - Sea Ice, Altimetry
  - Soil Moisture
- **Planet Labs, Inc.** (SDX search only; download available from vendor)
  - PSScene (8-band product)
  - 3band and 4band products will be deprecated by Planet in January 2023

# Smallsat Data Explorer Enhancements



Front-end web application for **search, discover, and download** of commercial data

- Heatmap
  - Promote discovery of spatially and temporally discontinuous data
  - Pre-aggregated for high responsiveness
  - Simplified subsetting
    - Spatial grids
    - Temporal histogram
- Quota-based data download
  - Users manage downloads
  - Direct download button (individual files)
  - Download script (large orders)
- New layout to emphasize results

# Maxar for NASA Funded Investigators

## Transition from CAD4NASA to CSDA Data Management Team

- Support for NASA funded investigators only
- **~10 PB archive** at NCCS to AWS Cloud storage
- Request process similar to CAD4NASA process

## Data Request Process

1. Request authorization for access
2. Identify data with the Maxar Discover Tool
3. Place data request using online form
4. Data staged for download
  - a. Archive available in 2-5 business days
  - b. New data / tasking 2-3 weeks



# NASA EOSDIS Integration

Goal: Publish NASA acquired commercial data alongside NASA Earth Science standard data products

- **Cloud native** data publication utilizing enterprise tools
- Expect to be operational in **January 2023**
- Data **discoverable** and **downloadable** (Maxar only) in NASA's Common Metadata Repository (CMR) and Earthdata Search

The screenshot displays the EarthData Search web application. The header includes the EarthData logo and a search bar. The main content area shows search results for 'PlanetScope Satellite Imagery 3 Band Scene' under the 'CSDA' (Commercial Smallest Data Acquisition) program. A sidebar on the left provides filters for Granule Search, Temporal (Start/End dates), Day/Night, and Data Access. The main results area displays a grid of granules, each with a thumbnail image, a title, and start/end dates. A 'Download All' button is visible at the bottom of the results grid. On the right side, a map shows the geographic location of the data, with a scale bar and various map controls. The footer contains version information (v1.158.3) and links to NASA's privacy policy and accessibility information.





# Expanding Data Availability

## High Value Target Acquisitions

Contribute to building a valuable data archive by utilizing NASA resources to identify and acquire data from areas of interest

- Utilize existing science stories and **recent events**
- Leverage **machine learning** to automatically extract and generate vendor orders
- Publish data through **standard processes**



# FY23 Activities and Beyond

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## **Onramp #3: Onramp of qualified vendors from third RFI (December 2020) underway**

- Sole source synopsis posted for Capella Space, ICEYE US, Inc, GeoOptics, Inc, and GHGSat, Inc. in November 2021.
- Selection of PIs for evaluation via ROSES 2022 (A.43)

## **Commercial SmallSat Data Analysis solicitation released (ROSES 2022 A.44)**

- Promote scientific use of purchased data

## **Data management activities**

- Continued process and tool refinement based on requirement and end-user feedback
- Focus on archiving data in Earthdata Cloud
- Make Onramp #2 data available as evaluations are completed

# Additional Information

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Form to request access to CSDA managed data (subject to review and approval):

<https://csdap.earthdata.nasa.gov/signup>

Activities regularly announced on CSDA website: <https://earthdata.nasa.gov/csda>

Evaluation reports:

- Pilot Evaluation report: <https://www.earthdata.nasa.gov/esds/csda/csda-pilot-evaluation>
- New product evaluation reports:  
<https://www.earthdata.nasa.gov/esds/csda/evaluations>

ROSES A.44: <https://nspires.nasaprs.com/external/index.do>



# Contact Us

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Program related questions:

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**Thank you.**

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