

Science Users Face Data Discovery Challenges

• Earth Science observations are from more than just satellites! Aircraft, land- and water-based, mobile and stationary platforms

EGU

Sharing is encouraged

- These data are critical for understanding physical processes and variabilities across a range of spatiotemporal scales and science domains.
- Finding and working with suborbital Earth Science data can be quite challenging:
- **Heterogeneity abounds**: data formats, resolutions, measurement methodologies, processing technologies

NASA's observations archived across several discipline-oriented data repositories (Distributed Active Archive Centers or DAACs) - each with long-standing procedures, requirements, and data access pathways

Context is crucial for suborbital observations, yet contextual details are traditionally arduous and very time consuming to locate and verify

> The Airborne Data Management Group (ADMG) within NASA's Interagency Implementation and Advanced Concepts Team (IMPACT) has built the Catalog of Archived Suborbital Earth Science Investigations (CASEI) to streamline data discovery and support science users navigating the wide variety of airborne and field observations and simplify access to NASA's data.



CASEI refines the traditionally lengthy and burdensome process of finding, vetting, and synthesizing authoritative information. This enables more efficient initial data discovery and can give time back to scientists to do science.

Curation of Contextual Metadata

- Creation of the CASEI's contextual metadata inventory first faced **communication hurdles** and inconsistencies in documentation:
- **Various stakeholders often use different** language to represent similar concepts or assign different ideas to identical terms
- The meaning of terms can evolve with time, and vary by science discipline community, organization, or data stewardship roles
- **Relationships** among and between terms and concepts not always clearly conveyed in literature

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Based on extensive review and input from airborne and field data community subject matter experts, ADMG established definitions and decision trees for key concepts within suborbital campaigns. The CASEI field campaign data model is structured with these terms to support both modern-era as well as historical field data collection efforts.



CASEI Field Campaign Data Model Simplified Schematic



CASEI Content Curation:

- Curation team comprised of graduate, undergraduate students and seasoned research scientists
- All curators undergo extensive training to ensure reliance on **authoritative sources** and **objective** determinations
- Three-person vetting of all contextual metadata
- Content organized for synthesis and consistency



An Introduction to NASA's Catalog of Archived Suborbital Earth Science Investigations (CASEI)

Stephanie M. Wingo¹, Deborah Smith¹, Carson Davis¹, Shelby Bagwell¹, Heidi Mok², Ed Keeble², Tammo Feldmann², Anthony Lukach², Elijah Walker³, Alice Rühl², Camille Woods¹, Ashlyn Shirey¹, Jillian Ethridge¹, and Rahul Ramachandran⁴ Contact: Stephanie.M.Wingo@nasa.gov



ommonly encountered in suborbita Earth Science observations



Scan for NASA **ESDIS Standards** Coordination Office report on stakeholder review of the **CASEI** definitions

All metadata in the CASEI database undergoes rigorous internal vetting and curation before being visible to the public



Maintenance Interface (MI)

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- CASEI Curators interact with the CASEI relational database via a purpose-built MI
- **Dashboard** organizes campaign metadata forms for various information levels
- Provides curators an **intuitive view of updates** to existing database records, while tracking occurs within the series of drafts (see Tech Stack section)
- Automated CMR (Common Metadata Repository) **queries** suggest data products for linking to each campaign, platform, instrument
- Campaign Deployment Platform Instrument relationships associated with data products

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LAST UPDATED BY danielle



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Mark as reviewed or deleted

Created

Semi-Automated Keyword Syncing Full Release of CASEI (non-beta) summer 2023! • Curated metadata for well over half (65%) of **GCMD Keyword Drafts** Sync GCMD known campaigns Affected Records Last Edit Date 0 of 0 resolved 03/02/2023 10:08 a.r Extended details for 100 + Platforms and 500 + ited Fields (108 0 of 0 resolved 03/02/2023 10:02 a.m. CMD Items 1088 0 of 0 resolved 03/02/2023 10:01 a.m. Review Changes 🍯 0 of 0 resolved 03/02/2023 10:01 a.m. GCMD Projects Instruments 0 of 0 resolved 03/02/2023 10:01 a.m. GCMD Instruments GCMD Platforms 0 of 0 resolved 02/23/2023 3:33 p.m. GCMD Earth Science 0 of 0 resolved 02/23/2023 1:10 p.m. • Intuitive, nimble, efficient suborbital data 0 of 0 resolved 02/23/2023 12:59 p.m. easurement and P 1 of 1 resolved 09/14/2022 10:06 a.m. 1 of 1 resolved 09/14/2022 10:06 a.m. 1 of 1 resolved 09/14/2022 10:06 a.m. discovery, search, access 1 of 1 resolved 09/14/2022 10:06 a.m. CASEI was born in response to user needs highlighted by the 0.0f 0 resolved 09/13/2022 11:22 a.m. inaugural Satellite Needs Working Group Assessment Cycle. As CASEI progresses into and beyond a full official release, TRY > OXYGEN COMPOUNDS > ATMOSPHERIC OZONE > [NO VALUE] ADMG and ESDS are exploring long term solutions to database records associated with t TRY > OXYGEN COMPOUNDS > OZONE > [NO VALUE] support its unique metadata and discovery capability. are noted. Curators evaluate new associations before changes are applied. Category State METADATA REPOSITOR EARTH**DATA** Instrument Published Yes Instrument Published Ye Instrument Published Ye CASEI database records to associate. **EARTH**DATA

- NASA's GCMD (Global Change Master Directory) keywords are a critical controlled vocabulary included in CASEI and many other scientific metadata models.
- CASEI smoothly adjusts to periodic version updates to the GCMD keywords
- Curators alerted to GCMD keyword up
- → Deleted or Modified keywords: C
- → New keywords: MI suggests potential Curators evaluate before changes are applied.

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Instrument Published Yes









CASEI Components and Tech Stack



- Supports the content curation and approval process → Managed via Python layer over Django object model



Backend and

Maintenance

Interface

CASEI

Frontend

CASEI

The Future of CASE

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COUNTRY	USERS
United States	289
India	33
Canada	16
China	15
South Korea	12
Philippines	9
Japan	6

- even prior to full (non-beta) release of the resource
- CASEI's first public (beta) release occurred in Summer 2021 \rightarrow Initial analytics metrics indicate worldwide user audience
- Curation efforts continue to add contextual metadata for both historical and modern-era field campaigns
- Additional forthcoming improvements include:

AWS EC2

- → Maps for platform locations / tracks
- \rightarrow Even more flexible free text search capability
- Transparent curation status updates
- → Support for determining coincident satellite overpasses

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