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Earth Science Data Systems (ESDS) Program, HQ SMD

Earth Science Division (ESD) Airborne Investigation Data System Requirements

Version 2.0

Headquarters
Washington, DC

National Aeronautics and
Space Administration

Earth Science Division (ESD) Airborne Investigation Data System Requirements

The ESD Airborne Investigation Data System Requirements document details the programmatic data system requirements to be utilized in all Earth Venture Sub-orbitals (EVS) investigations. These Level 1 requirements are documented in the Earth Venture Suborbital Investigation Implementation Plan (IIP) and the applicable investigation Data Management Plan (DMP).

Change History Log

Revision	Effective Date	Description of Changes
1.0	8/23/2018	Baseline document
2.0	6/7/2020	Updated section numbering to match IIP template
		Updated headers in table to better fit needs of airborne campaigns
		Added L1 requirements
		Added text stating requirements for delivery of data to NASA Earth Science Division-assigned Data Center(s).
		Updated Table 8.1 (example)

Earth Science Division (ESD) Airborne Investigation Data System Requirements

To ensure uniform and complete implementation of the principles embodied in the NASA Earth science data policy, the following programmatic data system requirements shall be adhered to by all Earth Venture Sub-orbital (EVS) investigations. These Level 1 (L1) requirements are documented in the Earth Venture Suborbital <<Investigation Name>> Implementation Plan. The investigation data requirements are documented in Section 8 of the plan and are restated in the investigation Data Management Plan.

2.0 LEVEL 1 SCIENCE REQUIREMENTS

The following statements shall be included in the list of L1 requirements provided in Section 2 of the IIP.

> The <<Investigation Name>> science team shall produce the standard science data products and associated metadata from all instruments described in the Data Management Plan within the 6-month post-measurement requirement and deliver these products to <insert designated NASA Earth Science Division-assigned Data Center(s)> within the time period identified in Table <insert table number> in Section 8. All terms and conditions for the transfer of the data products to <insert designated NASA Earth Science Division-assigned Data Center(s)> are documented in the Data Management Plan.
>
> The <<Investigation Name>> Investigation team shall participate in relevant NASA-sponsored product application workshops. Planned activities are described in Section 8.

The IIP Section 8 content is documented below. This information should also be included, in some form, in the investigation Data Management Plan. However, there is no prescribed location for this information in that document.

8.0 DATA AND KNOWLEDGE MANAGEMENT AND DISTRIBUTION

8.0.1 SCIENCE DATA MANAGEMENT

a) The <<Investigation Name>> Investigation shall produce the standard science data products from all instruments as described in the Data Management Plan and summarized in the categories outlined in Table 8.1.
b) The <<Investigation Name>> Investigation standard science data products and associated metadata, along with the scientific algorithm software, coefficients, and ancillary data used to generate these products, shall be delivered to the <<NASA Earth Science Division-assigned Data Center(s)>> within the period specified in Table 8.1. Data shall be delivered to the assigned <<NASA Earth Science Division-assigned Data Center(s)>> as soon as possible, typically within 3 to 6-months of data acquisition. There shall be no period of exclusive access.
c) Should a data product require more time for processing, beyond the 6-month requirement, the expected variations for <<Investigation Name>> airborne and field data products must be identified in Table 8.1. If any unforeseen exceptions to the 6-month requirement arise, the

<<Investigation Name>> team shall work with ESDIS to obtain an agreed upon extension for the specific data product.

d) All final data products and associated information (including science algorithms and calibration procedures) and data used to generate the standard data products listed in the Data Management Plan shall be described in documents delivered to the <<NASA Earth Science Division-assigned Data Center(s)>> to be made accessible to users before the <<Investigation Name>> Investigation closeout.
e) Before presenting findings based on the final science quality data at conferences, the data must be delivered to the <<NASA Earth Science Division-assigned Data Center(s)>> in sufficient time for the <<NASA Earth Science Division-assigned Data Center(s)>> to assign a DOI for use in the presentation. DOIs shall only be assigned to data archived at the <<NASA Earth Science Division-assigned Data Center(s)>>. Data in field archives shall not be assigned a DOI.
f) All terms and conditions of the transfer of data products and associated information to the <<designated NASA Earth Science Division-assigned Data Center(s)>> shall be documented in a Data Management Plan.

8.0.2 SCIENCE DATA REQUIREMENTS

a) The <<Investigation Name>> science data product formats shall conform to one of the ESD-approved Data System Standards.
b) The <<Investigation Name>> science data products shall have accompanying spatial, temporal and product metadata that conform to ESD-approved metadata specifications.

8.0.3 APPLIED SCIENCE DATA

a) The <<Investigation Name>> Investigation team shall participate in relevant NASA-sponsored product application workshops.

Table 8.1 <<Investigation Name>> Airborne and Field Data Products Delivery Requirements

(EXAMPLE TABLE ONLY – information does not apply to any real campaign).

Measurement Types	Description	Time from Data Retrieval to Delivery to DAAC	Estimated Data Volume	Notes
Airborne Instruments				
Level 0	• NASA Land, Vegetation, and Ice Sensor (LVIS) raw ranges	6 mo	800 GB	
Level 1A	• UAVSAR single-look complex images • AVIRIS-NG hyperspectral images	9 mo 6 mo	11 GB 500 GB	Due to extensive processing, it is agreed that L1 UAVSAR data shall be delivered to the data center within 9 months of measurement
Level 1B	• UAVSAR interferometric products • AirSWOT interferogram •	12 mo 6 mo	36 TB	
Level 2	• UAVSAR georeferenced products • AirSWOT georeferenced products • AVIRIS-NG reflectance products • AVIRIS-NG bidirectional reflectance distribution	12 mo 6 mo 6 mo 6 mo	36 TB 100 GB 550 GB 10 GB	
Level 3	• UAVSAR water-level vs time maps • AVIRIS-NG aboveground biomass • AirSWOT water-surface elevation vs time	12 mo 9 mo 9 mo	10 GB 100 GB 4 GB	
Level 4	• Bathymetry maps • Friction coefficient maps • Vegetation maps • Channel discharge • Wetland water flow rates • Ecosystem productivity / Organic soil accretion rate maps	6 mo 6 mo 9 mo 12 mo 12 mo at investigation closeout	100 MB 100 MB 100 MB 100 MB 100 MB 10 MB	The models shall use all the collected data for calibration and therefore take more time to produce

Measurement Types	Description	Time from Data Retrieval to Delivery to DAAC	Estimated Data Volume	Notes
				Other Investigation Data
Aircraft Data	Navigation and atmospheric condition data collected by the ER-2 and P-300 aircraft provided as ASCII CSV data files, one file per flight. Data are considered L0	3 months after last flight	200 MB	
Large ground instruments	This investigation includes truck radars such as MRR and NPOL, ground LIDAR at 3 locations. Data products are typically L1 or L2 and provided as netCDF files.	3-6 months after measurement	250 GB	
Ground instruments	This investigation uses remote rain gauges, snow poles and cameras. Data are provided as L1 ASCII files.	6-8 months after instrument removal	13 GB	
Reports	Flight reports, science reports, plan-of-day reports. All reports are PDF format.	3 months after deployment completion	2 GB	
Human-collected Measurements	Snow water equivalent measurements made at 25 locations throughout the study region, also water samples collected by boat in the delta region. Data are delivered as CSV files.	6-8 months after final measurement	28 MB	
Oceanographic Instruments	This investigation has data from 4 instruments on drifting buoys as detailed in the DMP. Data are in ASCII and netCDF formats.	3-6 months after instrument removal	30 MB	

Table 8.1 is provided as an example and shall be adapted for the investigation. The purpose of the table is to state the expected time of data delivery to the DAAC and to provide an estimated data volume for each measurement type. It is not necessary to list every data product individually, as that information is required in the Data Management Plan. While the investigation team may customize the contents of the table, the columns shown in the example table are to be included in the IIP.

List the types of data products for each data processing level. Processing levels are described at https://earthdata.nasa.gov/collaborate/open-data-services-and-software/data-information-policy/data-levels.