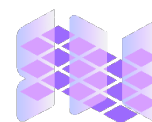


Document title

SDC PROCESSES: ISS DATA TO SDC

Prepared by	Jacobo Rodríguez Otero Daniel Luque Hector Gonzalez
Reference	SDC-RP-PROC001
Issue and revision	i2, r2
Date of issue	10/03/2021
Status	Final
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SIGNATURES SHEET

Title: SDC PROCESSES: ISS DATA TO SDC	Issue: i2, r2
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CHANGE LOG

Reason for change	Issue	Date
First release of the document	i1, r0	13/12/2019
Update after ESA review	i1, r1	27/01/2020
Additional updates after ESA review collocation meeting	i1, r2	12/02/2020
Second release of the document (inc. sensitive data)	i2, r0	11/12/2020
Corrections on the second release	i2, r1	15/12/2020
Additional updates after ESA review	i2, r2	09/03/2021

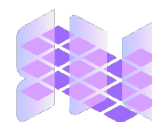
CHANGE RECORD

Issue: i1, r1

Description of change	Page(s)	Paragraph(s)
Added the specific ESA data categories in the scope of the document.	5	1
Added ESA data security reference documents.	5	2.1
Changed colour of “Pre-flight ground experiments” box.	7	3 (Fig. 1)
Added clarifications on the nomenclature used to refer to the different entities.	7-8	3
Added HREDA entity to the relevant processes.	7-10, 17	3, 4.6
Removed ESR/ERD section names to avoid inconsistencies.	10-11	4.1
Added clarification for open and standard data formats.	11	4.1
Added colour legend to figures 2 and 3.	12, 15	4.2 (Fig 2), 4.4 (Fig. 3)
Removed reference to undefined document.	13	4.2
Fixed typo.	14	4.4

Issue: i1, r2

Description of change	Page(s)	Paragraph(s)
Added reference document SDC-RP-PROC002	6	2.2
Changed colour of “Experiment execution” and “Blank book update” boxes to be consistent with the rest of the document.	7	3 (Fig. 1)
Changed format of “Experiment execution” rows to be more in line with the rest of the table.	9	3
Fixed links to SDC website.	13, 15, 16	4.3-4.5
Added SVT and ground reference data collection as possible examples of pre-flight ground experiments.	14	4.4



Issue: i2, r0

Description of change	Page(s)	Paragraph(s)
Included details about the handling of sensitive data		3, 4.3, 4.4, 4.5, 5.3
Removed some processes not related to data producers and not in the scope of this document		3, 4.6
“Flight datasets” renamed to “Pre-flight and flight datasets” for clarity.		3, 4.4
Updated the applicable documents table		2.1
Updated the Investigation Data Lifecycle		3
Changed step 2 on the blank book process to remove ‘data products’ from the ESA protection level classification process		4.2

Issue: i2, r1

Description of change	Page(s)	Paragraph(s)
Small correction on the postflight data to be archived by the SDC		4.5

Issue: i2, r2

Description of change	Page(s)	Paragraph(s)
Updated the list of applicable and reference documents		2.1, 2.2
Added the ‘Reference milestones’ (T0, T1, etc.) to the investigation data lifecycle (figure 1)	8	3
Added a clarification about the meaning of ‘typical due dates’	11	3
Included extra information on how to deliver encrypted data to the SDC		5.3

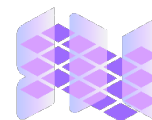
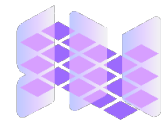


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1. Introduction

The Science Data Centre (SDC) supports the dissemination, potential valorisation and long-term preservation of the data generated by experiments sponsored by the ESA HRE Directorate.

This document defines the processes to be followed between the SDC and other entities related to the definition and delivery to the SDC of data from ISS investigations. The document is applicable to ISS experiment data to be archived by the SDC, which may include (as determined by ESA) data from:

- SciSpacE activities.
- ESA-sponsored activities.
- Education activities.
- National contributions (subject to specific agreements).
- Commercial activities (subject to specific agreements).
- ISS investigations from other Space Agencies supported by ESA (subject to specific agreements).

The scope of the document is restricted to data belonging to the following ESA categories (as defined in [AD3] and [AD4]):

- ESA Unclassified - Releasable to the Public (cf. public).
- ESA Unclassified - for ESA Official Use (cf. Not sensitive - Internal Use).
- ESA Unclassified - Limited distribution / Sensitive Personal Data (cf. Sensitive).
- Third-Party Controlled.

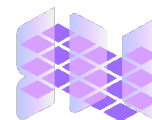
Section 3 gives an overview of the interactions between SDC, ESA, data producers and other possible entities by describing the data lifecycle of an ISS investigation and linking processes to its different stages. These processes are then organised in groups (experiment requirements, blank book development, example dataset, pre-flight and flight datasets, postflight datasets, investigation data archival) which are detailed in section 4.

It is noted that this document is mainly addressed to ESA and to data producers (e.g. USOCs, Payload Developers, etc.), so processes in which they are not involved are only briefly described for an overall understanding of the data lifecycle.

2. References

2.1. Applicable Documents

Document	Document title	Issue	Source
[AD1] ESA-ISS-COL-USOC-PL-0001	USOCs Data Management Policy	i2-r0 (or latest version)	ESA
[AD2] ESA/PB-HME(2018)35	Human and Robotic Exploration Data Policy	latest version	ESA
[AD3] ESA/ADMIN/IPOL-SECU(2020)1	ESA Security Directives	Rev. 1 (or latest version)	ESA
[AD4] OPS-RQ-0-010-ESA	ESA ISS Exploitation Program Security Policy Document	i2-r0 (or latest version)	ESA



[AD5] SDC-SP	SDC Security Management Plan	i1-r1 (or latest version)	SDC
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2.2. Reference Documents

Document	Document title	Issue	Source
[RD1] SDC-TN-PROC001	USOCs To SDC Metadata Template	i1-r0 (or latest version)	SDC
[RD2] SDC-TN-PROC002	Investigation Data Blank Book	i2-r0 (or latest version)	SDC
[RD3] SDC-BB-DCMIX4	DCMIX4 Data Blank Book	i1-r1 (or latest version)	SDC
[RD4] SDC-ESA-CHR-002	Utilisation Implementation Board (UIB) Charter	i5-r0	ESA
[RD5] SDC-RP-PROC002	SDC Processes: Data from SDC to users	i0-r2 (or latest version)	SDC

2.3. Acronyms and abbreviations

ERD	Experiment Requirements Document
ESA	European Space Agency
ESR	Experiment Scientific Requirements
EST	Experiment Sequence Test
HRE	ESA Human and Robotic Exploration Directorate
HREDA	ESA HRE Data Archive
ISS	International Space Station
SDC	Science Data Centre
SVT	Science Verification Test
UIB	Utilisation Implementation Board
USOC	User Support and Operations Centre

3. Investigation data lifecycle

Figure 1 shows the data lifecycle of an ISS investigation, from the ESR/ERD review to the final data archival. It also shows different groups of processes that will be detailed in section 4.

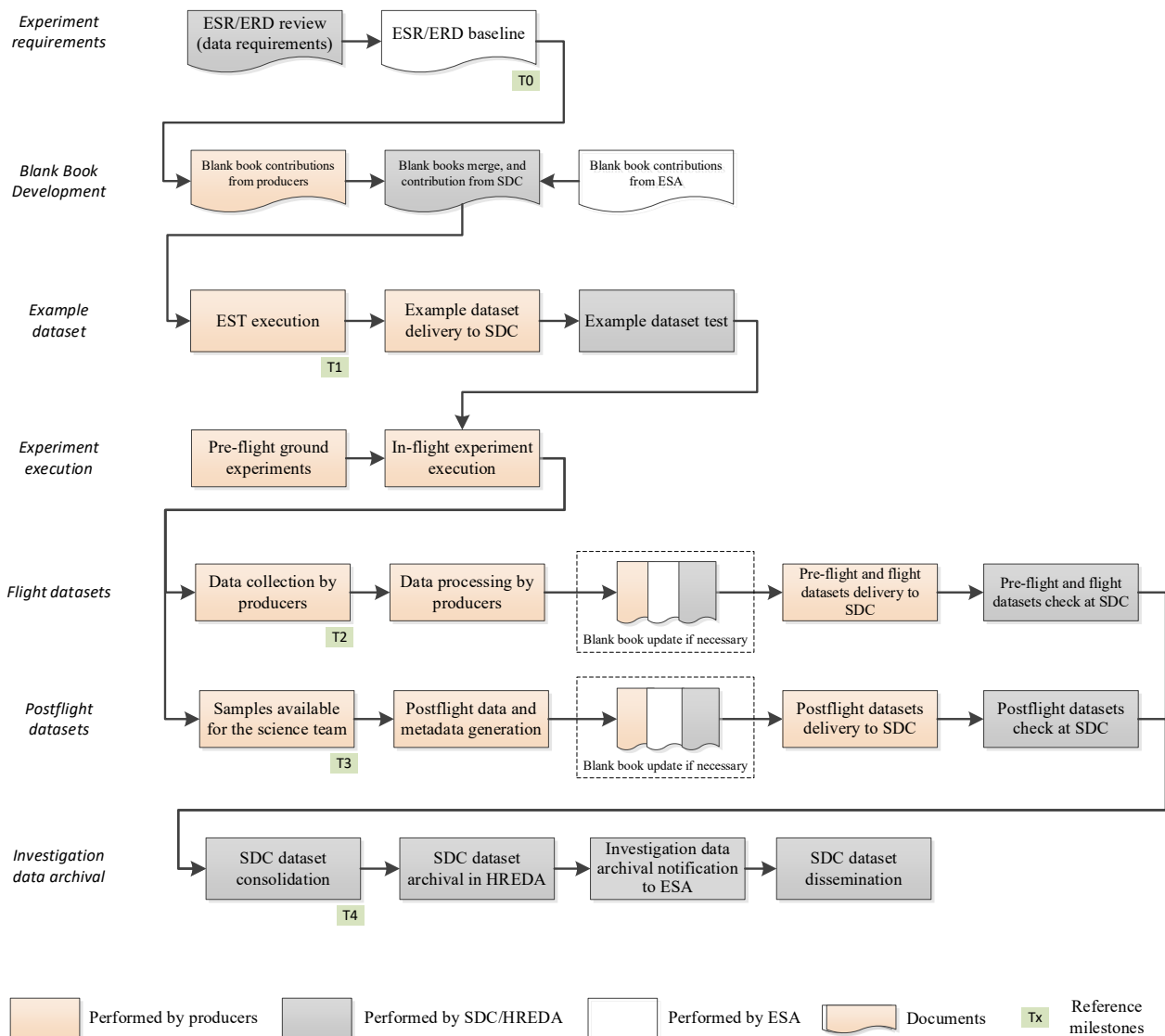
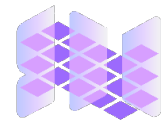


Figure 1: Investigation Data Lifecycle.

The entities participating in the different processes along the data lifecycle are:

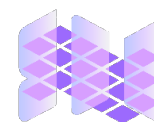
1. Data producers (entities that deliver data collected from the ISS investigations to the SDC):
 - a. Operations entity (i.e.: USOC or centre responsible for the ISS experiment operations).
 - b. Science team (potentially, e.g. for post-flight data).
 - c. Payload developer (potentially) or other entities generating data to be archived.

The term “Producers” is used in this document to generically refer to one or more of these entities.

2. Representatives of ESA and (in specific cases) other Space Agencies or institutions: the positions in charge of, or coordinating on the ESA side, the scientific requirements of the investigation (e.g. the ESA Project Scientist).

The term “ESA” is used in the processes in this document to refer to this entity.

3. SDC and HREDA.



The terms “SDC” and “HREDA” are used in this document to refer to the archive entities.

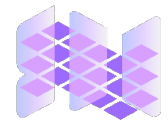
When possible, the SDC will interact directly with these entities. If needed, the interactions will be channelled through ESA interfaces (e.g. Project Scientist).

In the table below, the processes are presented in chronological order.

Process Group	Process name	Description	Performed by	Typical due date(*)
Experiment requirements	ESR/ERD review (data requirements)	The SDC reviews the data requirements in the ESR/ERD and their compliance with the recommendations provided in this document (see section 4.1).	SDC	Per [RD4]
	ESR/ERD baseline	ESR/ERD is baselined by ESA.	ESA	T0
Blank book development	Blank book contributions from producers	Every data producer fills out a data blank book, giving information on the data that they will generate and provide to the SDC.	Producers	T1 - 34 days
	Blank book contributions from ESA	ESA fills out the blank book section related to user interface recommendations.	ESA	T1 - 14 days
	Blank books merge and contribution from SDC	The SDC provides its own inputs and merges the different contributions in a single Investigation Data Blank Book.	SDC	T1 - 7 days
Example dataset	EST execution	The completion of the Experiment Sequence Test (EST) is the milestone to which the example dataset processes are referred.	Operations entity	T1
	Example datasets delivery to SDC	Every data producer provides to the SDC an example dataset containing at least: <ul style="list-style-type: none"> - One file per each product defined in the blank book. - The metadata associated to each delivered product file. 	Producers	T1 + 14 days
	Example dataset test	The SDC processes the example datasets and carries out a test where different aspects are checked:	SDC	T1 + 21 days

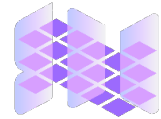


		<ul style="list-style-type: none"> - Data reception. - Data ingestion. - Data naming, structure and content are aligned with blank book definitions. 		
Experiment execution	Execution of the required pre-flight ground experiments and ground data retrieval, when applicable.		Producers	-
	Execution of the on-board experiment operations and flight data retrieval/return.		Producers	-
Pre-flight and flight datasets	Data collection by producers	During and after the experiment execution, the producers collect or receive the investigation data. This milestone is reached when the producer has collected all the pre-flight and flight data.	Producers	T2
	Data processing by producers	The producers process the investigation data by, at least, checking the data and generating the necessary metadata files (for the operations entity: defined in [AD1] and [RD1]). This includes both the flight data and any pre-flight ground experiment data that is required to complete and/or allow the analysis of the flight data.	Producers	T2 + 20 days
	Blank book update	After the experiment execution, the blank book contributors provide updates to the SDC with information about the as-run execution.	Producers, ESA, SDC	T2 + 20 days
	Data and metadata delivery to SDC	The producers send all the pre-flight and flight data and associated metadata to the SDC (more details in section 4.4).	Producers	T2 + 30 days
	Pre-flight and flight datasets check at SDC	SDC receives and checks the pre-flight and flight data.	SDC	T2 + 40 days
Postflight datasets	Experiment samples available for the science team	This milestone indicates when the science team can start generating postflight data (when applicable) because all the needed	Science Team	T3



		experiment samples are available.		
	Postflight data and metadata generation	In experiments with physical samples, the scientific data is very often extracted from the samples after their return. In this process the science team produces the postflight data that was defined in the ESR and in the blank book.	Science Team	T3 + 20 days
	Postflight data and metadata delivery to SDC	Same process as “Data and metadata delivery to SDC”.	Science Team	T3 + 20 days
	Postflight datasets check at SDC	SDC receives and checks the postflight data.	SDC	T3 + 30 days
Investigation data archival	SDC datasets consolidation	SDC performs the conditioning of the complete investigation datasets (pre-flight, flight and postflight data) for their archival, dissemination and potential valorisation.	SDC	T4 = T2 + 40 days, or T3 + 30 days (maximum value)
	SDC datasets archival at HREDA	Complete data is transferred to HREDA, following a special procedure in the case of sensitive datasets Data is then available to the relevant users through the HREDA portal.	SDC, HREDA	T4 + 21 days
	Investigation data archival notification to ESA	SDC will report to ESA the completion of the investigation data archival.	SDC	T4 + 22 days
	SDC datasets dissemination	Access to the investigation data is granted through the HREDA portal to the science team and ESA (for non-medical data), for the duration of the Prior Access Period.	SDC, HREDA	T4 + 30 days

(*Typical due dates are illustrative. The specific schedule will be agreed between ESA, the SDC and the data producers for each investigation.



4. Detailed processes

4.1. Experiment requirements

Prior to being baselined, the SDC participates in the ESR/ERD review process by checking and providing inputs to those requirements related to the investigation data outputs. The SDC inputs will follow the guidelines below:

- All the generated experiment data shall be in open and (if possible) standard formats, i.e. not requiring the use of proprietary tools or proprietary format definitions to read the data. This should be stated as a requirement whenever possible.
- The complete set of experiment deliverables shall be clearly defined, including:
 - Deliverables from ESA to the science team, i.e. all the data products and measurements to be generated on ground (when applicable) and on-board ISS during the experiment operations, that the science team requires for their research.
 - Deliverables from the science team to ESA, i.e. data produced by the science team, that is required to complete and allow the analysis of the experiment data. Examples of this would be observations, measurements or imagery that are performed on ground on a returned sample after being subject to microgravity processing.
- The minimum metadata that is required for each data product and measurement shall also be described (e.g. acquisition time, scientific sample or run identifier, ...).
- The requirements on the hardware shall refer to these data outputs requirements as necessary, so that the payload design is compliant with them.

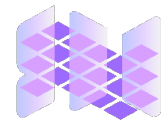
After the ESR/ERD is baselined, the SDC would only participate in subsequent revisions of the document if there were significant changes in the definition of the experiment deliverables.

Process name	Entity	Typical due date
ESR/ERD review	SDC	Per [RD4]
ESR/ERD baseline	ESA	T0

4.2. Blank book development

After the ESR/ERD is baselined, during the operations preparation phase, the SDC collects from the data producers and ESA technical information about the different data products that will be generated and delivered to the SDC. The SDC merges and completes as necessary the inputs from the different contributors into an Investigation Data Blank Book document. The goal of this document is to establish a baseline at the SDC for the development of the investigation data archive.

1. The SDC provides a blank book template ([RD2]) to be filled in by:
 - a. Each producer, with information on the data products and documents they will generate and deliver to the SDC (section 4.1 and section 4.2 of [RD2]). Only producers other than the operations entity will fill the “*Investigation specific metadata format*” in the corresponding tables;
 - b. The assigned ESA representative (e.g. Project Scientist), with information on the documents to be delivered to the SDC for archival with the data (section 4.2, Documents, of [RD2]); and with possible recommendations on how to disseminate or valorise the investigation data in the archive (section 4.5, User Interface, of [RD2]).



The latter recommendations may also be provided by the science team using the blank book template.

- c. The entity responsible for the experiment operations (e.g. the USOC), with information on the foreseen experiment execution sequence, e.g. list and order of experiment runs, with their defining parameters (section 4.3, Foreseen Execution Summary of [RD2]).

In case the SDC detects that the information provided in the blank book contributions is not aligned with the ESR/ERD or with the USOCs Data Management Policy ([AD1]), it is notified to the contributor for its update. If a resolution is not achieved with the contributor, the SDC notifies the discrepancy to ESA USOC Management and/or UIB.

2. The SDC sends the consolidated list of investigation documents to ESA for assigning the corresponding protection level according to [AD3] (e.g. ESA Unclassified - Releasable to the Public). This protection level will determine the accessibility of each document on the HREDA portal.
3. The SDC gathers the blank book inputs from the contributors and merges them in an Investigation Data Blank Book document. The SDC also registers in the document the list of producers. An example blank book can be found in [RD3] for the DCMIX4 experiment.
4. The Investigation Data Blank Book document is baselined at this point, being open to updates in the following cases:
 - a. After the experiment operations, to register the as-run execution sequence (see 4.4) and the exact number of per-product files to be delivered to the SDC.
 - b. If new user interface recommendations are defined by ESA or by the science team.
 - c. If there are major changes in the investigation products definitions (e.g. after a major ESR/ERD modification).

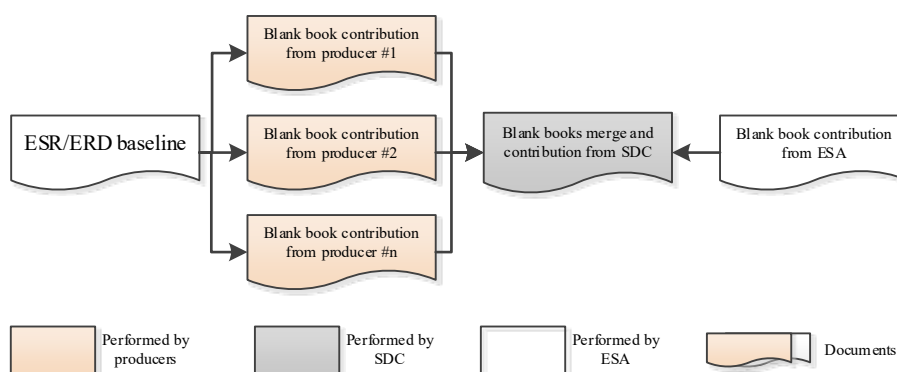
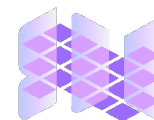


Figure 2: Investigation Data Blank Book document development.

It is noted that the user interface recommendations defined in the blank book are valuable information for the SDC to implement a useful navigation through the investigation dataset, but they are not requirements.



The execution of the Experiment Sequence Test, or other similar test performed by the operations entity to ensure its readiness for operations, is used as a reference milestone for the blank book development. Normally, at the EST the investigation data content and structure are already clearly defined. If no such test is performed, a reference point in time will be agreed with the operations entity, when enough technical information is expected to be available.

The table below summarises the different steps with their typical due date.

Process Name	Entity	Typical due date
Blank book contributions from producers	Producers	T1 - 34 days
Blank book contributions from ESA	ESA	T1 - 14 days
Blank books merge and contribution from SDC	SDC	T1 - 7 days
EST execution (reference milestone)	Operations entity	T1

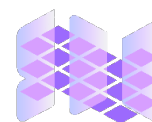
From the information captured in the Investigation Data Blank Book, the SDC develops the investigation archive with HREDA (this process is not covered in this document).

4.3. Example dataset

An example dataset shall be sent by the data producers to the SDC to validate the implementation of the investigation archive. It is expected that representative datasets are produced during the EST, or other similar test performed by the operations entity to ensure its readiness for operations. If there are data producers other than the operations entity, or not taking part in the EST, it is expected that they also produce and send an example dataset to the SDC in the same timeframe.

1. Each data producer generates an example dataset, including as a minimum one file for each product listed in their blank book inputs. These sample files do not need to contain valuable scientific data but they should present the same properties (naming convention, type of content and specific metadata parameters) as those previously defined in the Investigation Data Blank Book (see 4.2).
2. The specific metadata parameters described for each product in the blank book shall be included by its producer in the example dataset. In particular,
 - a. the operations entity (e.g. the USOC) generates, per [AD1] and [RD1], the files metadata (every data file must be accompanied with its associated metadata file);
 - b. the rest of the data producers as agreed in the blank book.
3. In the case of example datasets that may include sensitive data, the example data and metadata files must be anonymized by the data producer whenever feasible. Those cases where anonymization of the example files is not a viable option will be treated case by case.
4. Once the data and metadata files have been created, each producer delivers them to the SDC following the instructions in the [SDC webpage](#). The SDC will use these files to validate the archive implementation.

These processes are listed in the table below. The EST (or other operational test) end date is used as reference milestone, since it is expected that the example dataset can be obtained from the data generated during the test.



Process Name	Entity	Typical due date
EST (reference milestone)	Operations entity	T1
Example datasets delivery to SDC	Producers	T1 + 14 days
Example dataset test	SDC	T1 + 21 days

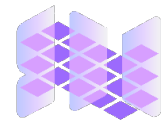
If no EST or operational test is performed, then the reference milestone is the one agreed with the operations entity for the blank book development (see 4.2), and there are different options for the example dataset:

- To use data from development or scientific tests (e.g. breadboard tests, interface tests, ...), or from a previous experiment with the same facility/payload, if it is representative and is available.
- To skip this validation step if no example is available. The SDC notifies ESA in this case.

4.4. Pre-flight and flight datasets

After the execution of the required pre-flight ground experiments (when applicable) and of the on-board experiment, the operations entity (e.g. the USOC) and other possible data producers get the pre-flight and flight investigation data. These data follow different processes before their delivery to the SDC:

1. The operations entity and all other producers defined in the Investigation Data Blank Book collect all the data (pre-flight and flight data) from:
 - a. The ground experiments performed pre-flight or during the flight (e.g. SVT, ground reference data collection, ...). This only applies to investigations that require the collection of data on ground, and for which these ground data are necessary to complete and allow the analysis of the on-board data.
 - b. The on-board experiment execution. This includes raw, calibrated and other types of data collected in real-time, near real-time, or returned to ground and physically shipped to the producer.
 - c. Their own processing of the ground and on-orbit data, in order to generate processed data products, as defined in the blank book.
2. In investigations where physical samples are returned to ground, the operations entity performs the digital characterization of the returned samples (per [AD2]), generating a detailed description in digital format prior to the delivery of the samples to the science team. These digital files, and their format, shall be part of the inputs provided in the blank book (section 4.2).
3. In investigations with sensitive data (e.g. medical data from astronauts), the producers shall separate and bundle the data by subject (i.e. each bundle must not contain data from more than one subject). This aims to process and archive these datasets independently so that any future requests on these sensitive data (e.g. access request from a user or deletion request from a subject) can be properly handled.
4. The producers check the collected pre-flight and flight data. This includes:
 - a. A data completeness check.
 - b. A data integrity check, generating the integrity information later required by the SDC to confirm the successful data delivery.



5. The producers generate the required metadata:
 - a. The operations entity (e.g. the USOC) generates, per [AD1] and [RD1], the files metadata (every data file must be accompanied with its associated metadata file);
 - b. The rest of the data producers as agreed in the blank book.
6. The producers provide to the SDC information about the collected data: number of files, missing files, corrupted files, integrity information, etc., from the checks performed in step 4. Any new products or documents not previously notified to the SDC should be defined by the producer using the blank book template.
7. The operations entity provides to the SDC inputs about the as-run experiment execution sequence, highlighting when possible the discrepancies with respect to the foreseen execution.
8. The SDC updates the Investigation Data Blank Book document [RD2] with the following information:
 - a. The as-run experiment information received from the producers in steps 6 and 7.
 - b. Possible new products or documents defined by the producers.
 - c. Inputs from ESA on the accessibility of new documents (if any).
 - d. Possible new user interface recommendations from ESA or the science team.
9. The producers deliver the data and metadata to the SDC following the instructions in the [SDC webpage](#), which include specific considerations in the case of sensitive data.
10. The SDC checks the integrity of the data and its conformance to the information previously gathered. The producer receives a report from the SDC that provides the following results of the data reception and ingestion checks:
 - Number of total and per-product processed files (data and metadata).
 - Size of total and per-product processed files (data and metadata).
 - List of files.
 - Data files without metadata file.
 - Metadata files without data file.
 - Corrupted files (integrity value in the metadata file does not match with the current integrity value for the file).

More information on the procedures to get the ingestion report can be found in the [SDC webpage](#).

Deviations with respect to the expected data are notified by the SDC to the affected producer(s) and to ESA, but it is the responsibility of the producers to ensure the completeness and validity of the delivered data. Unless otherwise directed by ESA, the data is taken as-is by the SDC for dissemination. As a general rule, corrupted data will not be stored or published.

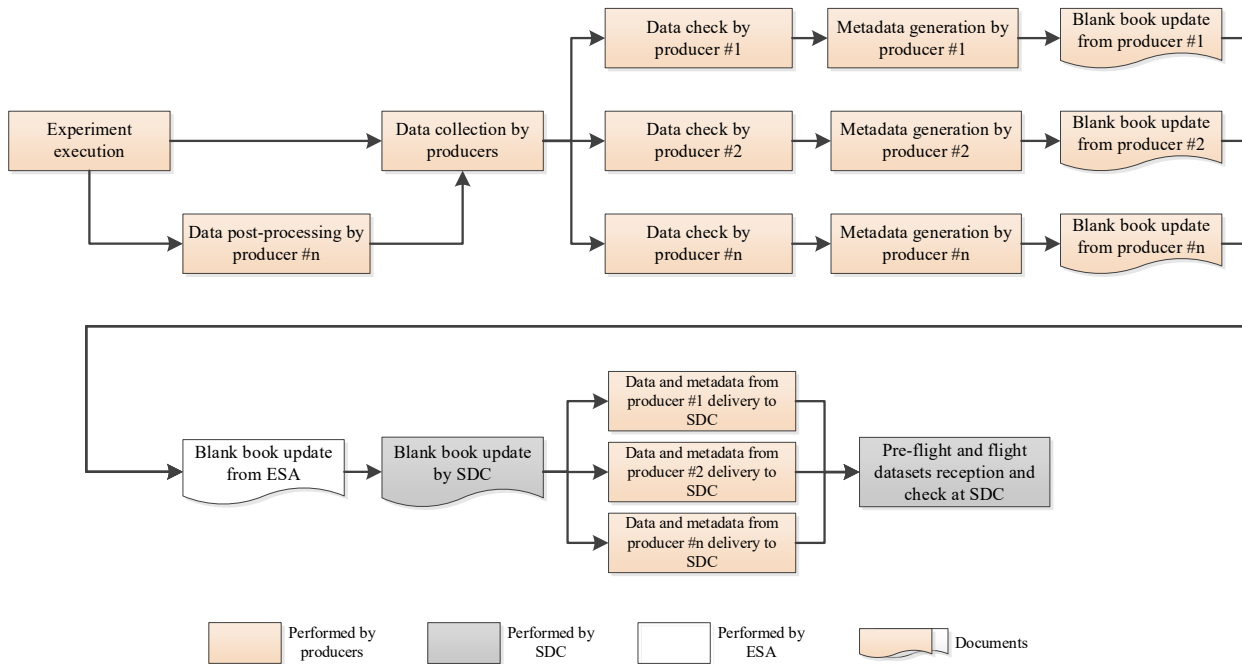
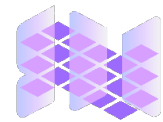


Figure 3: Pre-flight and flight datasets processes.

The reference milestone for these processes is the data collection by the producers (see the table below).

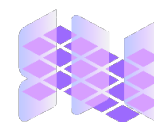
Process Name	Entity	Typical due date
Data collection by producers (reference milestone)	Producers	T2
Data processing by producers	Producers	T2 + 20 days
Blank book update	Producers, ESA, SDC	T2 + 20 days
Data and metadata delivery to SDC	Producers	T2 + 30 days
Pre-flight and flight datasets reception at SDC	SDC	T2 + 40 days

4.5. Postflight data

In some investigations, the science team or other entity must perform measurements, observations, imagery or other types of scientific data collection on flown experimental samples after their return to ground. These data may be required to complete and allow the analysis of the investigation data. This data (hereinafter called postflight data) is to be archived by the SDC and shall be part of the data products described in the science team inputs (as producer of the data) to the Investigation Data Blank Book (section 4.2).

Although the times may be highly dependent on each investigation and the type of measurements to be performed, the following table shows a typical expected timeframe for the production and delivery to the SDC of the postflight data:

Process Name	Entity	Typical due date
Experiment samples available for the science team (reference milestone)	Science Team	T3



Postflight data and metadata generation	Science Team	T3 + 20 days
Postflight data and metadata delivery to SDC (as for flight data, see 4.4)	Science Team	T3 + 20 days
Postflight data and metadata reception and check at the SDC (as for flight data, see 4.4)	SDC	T3 + 30 days

Specific due dates can be discussed between the science team, SDC and ESA.

Postflight data and metadata is delivered to the SDC following the same steps as for pre-flight and flight data described in section 4.4.

4.6. Investigation data archival

Although the processes relevant to the data after their reception at the SDC are detailed in other documents (as they do not require interaction between the data producers and the SDC), a general layout of the data archival and publication process, and some important remarks, are given hereafter:

1. After the reception and check of all the investigation datasets (from required ground experiments, from the on-board experiment execution, and from postflight data collection), the SDC performs their conditioning for archival, dissemination and potential valorisation. The resulting consolidated datasets are here called SDC datasets. Special procedures are followed for the handling and processing of sensitive datasets (as per [AD5]).
2. The SDC datasets are transferred to the HREDA archive and made available through the HREDA portal to the relevant users (e.g. the science team for experiments entering the Prior Access Period). Special procedures are followed in the case of sensitive datasets.
3. The SDC notifies ESA once the investigation data is available to the users in the HREDA portal.

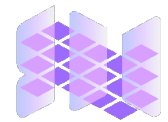
These processes use as reference milestone the reception of all the investigation data (pre-flight, flight and postflight) at the SDC.

Process Name	Entity	Typical due date
SDC datasets consolidation	SDC	T4 = T2 + 40 days, or T3 + 30 days (maximum value)
SDC datasets archival at HREDA	SDC, HREDA	T4 + 21 days
Investigation data archival notification to ESA	SDC	T4 + 22 days
SDC datasets dissemination	SDC, HREDA	T4 + 30 days

5. Particular cases

5.1. Datasets added during preservation/valorisation

During the data preservation/valorisation phase (i.e. after the data have been successfully archived at HREDA and made available to the users), additional (generally post-processed) datasets may be provided to be included in the investigation data archive. In this case:



1. The producer of the new data can make a request to the SDC via email (contact is provided in the HREDA portal).
2. The SDC provides the data blank book template [RD2] to the requesting entity, so that they specify the products to be delivered as per section 4.2, step 1.
3. Once the blank book inputs are received, the SDC informs ESA UIB of the request.
4. If the request is approved by ESA UIB, the SDC integrates the blank book inputs into the Investigation Data Blank Book, and contacts the producer to perform the processes in sections 4.4 and 4.6 for the new data.

5.2. Investigations with multiple on-board experiments

For investigations with multiple on-board experiments or continuous operations throughout long periods of time, several iterations of the processes in sections 4.4 - 4.6 will be required. The SDC will agree case by case with ESA and the data producers a particular timeframe for those iterations (e.g. per on-board experiment, per given timeframe, etc).

5.3. Investigations with sensitive data

For investigations with sensitive data (e.g. human physiology investigations with personal data from an astronaut), there are special considerations for delivering data to the SDC. They can be summarized as follows:

1. Producers shall separate and bundle the investigation datasets by data subject (i.e. each bundle must not contain data from more than one subject/person).
2. Data must be encrypted before delivering to the SDC. Normally, this encryption will be done using the SDC PGP public key, which can be retrieved at the [SDC website](#). Alternative options, in line with recommendations in [AD5], can be assessed when necessary (e.g. delivery of encrypted disks).

Details can be found in the corresponding sections of this document (cf sections 4.3, 4.4 and 4.5).