

# CASSIS DATA ARCHIVE PLAN

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**DOCUMENT CHANGE RECORD**

Issue	Revision	Date	Pages, Tables, Figures affected	Modification	Initials
0	1	26 Aug 2013	All	New Document	NT
0	2	20 Sep 2013		Title changed	RZ
0	3	26 June 2014		Full revision	NT
1	0	14 Nov 2014		Signatures for CDR	RZ

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## List of documents

Applicable documents		
AD 01	EXM-PL-IRD-ESA-00003 Issue 2 Rev 0 TGO E-IRD (JCCB - Signed)	Experiment Interface Requirements Document

Reference documents		
RD 01	EXM-CA-LIS-UBE-00001	List of Acronyms Iss 1 Rev 0
RD 02		
RD 03		

## Scope of the Document

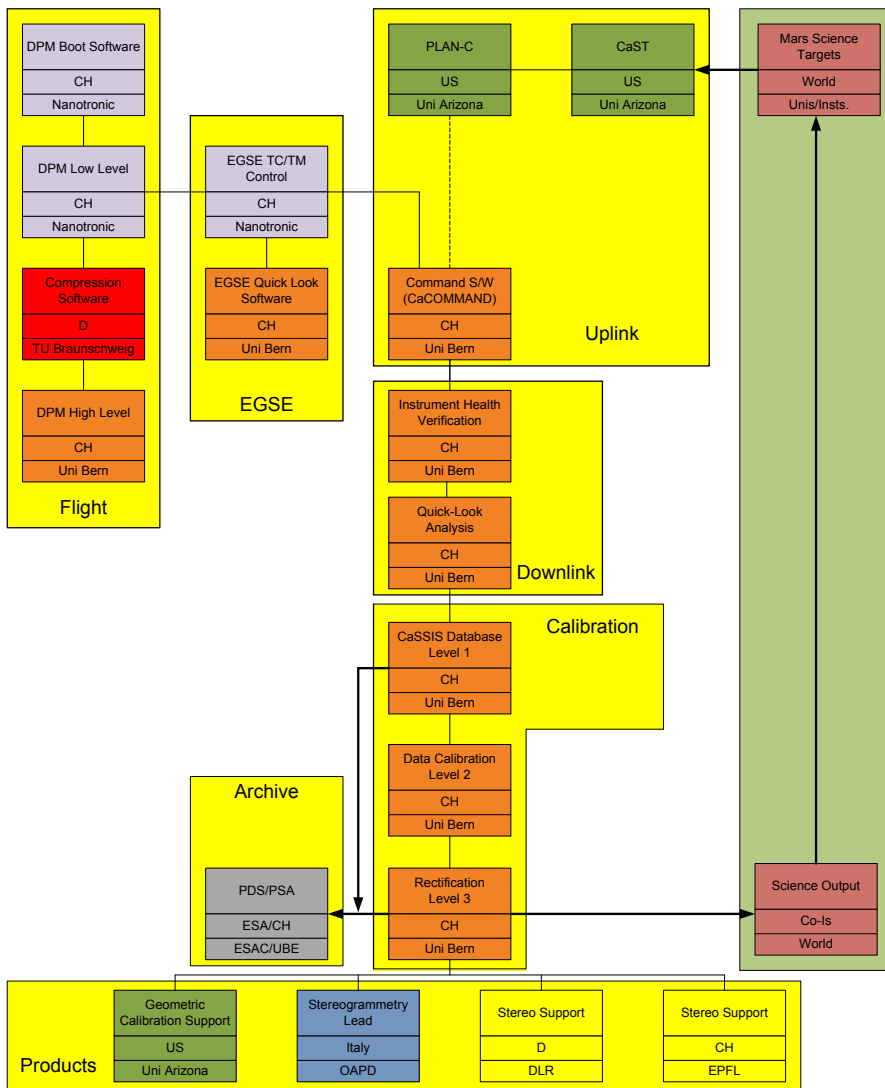
This document describes the data archiving plan for CaSSIS.

## 1 INTRODUCTION

The data archiving plan indicates the various products from the CaSSIS experiment and provides information on the provision of these products to public and experiment-specific databases.

## 2 SOFTWARE DEVELOPMENT

The figure shows the software development plan for CaSSIS.



CaSSIS Software Development  
 Nicolas Thomas  
 4 June 2014  
 Version: 0  
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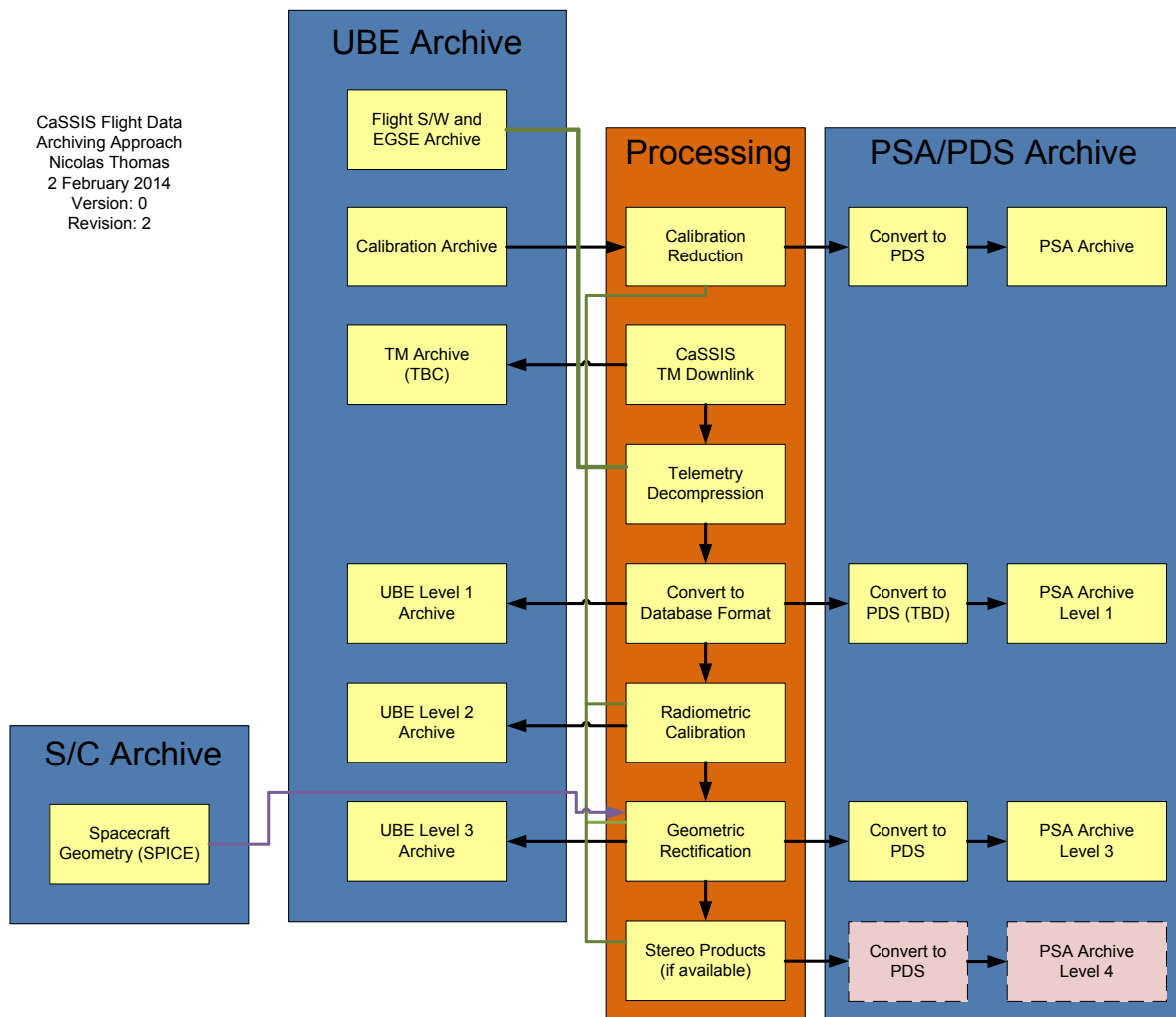
The software will need to acquire the data, reduce it, and convert it to a format that is compatible with the Planetary Science Archive (PSA) and, indirectly, the Planetary Data System (PDS).

CAS-ARC-0010	The CaSSIS project shall develop software that shall allow conversion of CaSSIS data to a PDS/PSA compatible format. Verification: R - Review of documentation
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### 3 DATA ARCHIVING PLAN

#### 3.1 Overview

The figure shows the data archiving plan for CaSSIS and preliminary interfaces to the PSA/PDS system.



### 3.2 Flight software archive

The flight software will be held under configuration control and archived at the University of Bern inside the Alfresco system.

CAS-ARC-0010	The flight software shall be held under configuration control and archived at the University of Bern. Verification: R - Review of documentation
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The software (source code) developed in industry is protected under IPR and requires a licence for further distribution. Contractually, relevant documents must be stored completely as original or in microfiche format for a minimum ten years.

CAS-ARC-0020	Flight software documents and source code shall be stored completely as original or in microfiche format for a minimum ten years Verification: R - Review of documentation
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### 3.3 EGSE software archive

The EGSE software will be held under configuration control and archived at the University of Bern (UBE) inside the Alfresco system. The software (source code) developed in industry is protected under IPR and requires a licence for further distribution. Contractually, relevant documents must be stored completely as original or in microfiche format for a minimum ten years.

CAS-ARC-0030	Ground support equipment software documents and source code shall be stored completely as original or in microfiche format for a minimum ten years Verification: R - Review of documentation
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### 3.4 Verification data archiving

Data acquired by UBE during CaSSIS instrument integration, verification and test will be archived at UBE in a database system using Planetary Data System (PDS) Version 4 format (TBC) (hereafter PDSV4). This archive will be common with the calibration data archive (see below).

### 3.5 Calibration data archive

Following integration and test, a calibration campaign will be initiated. The data from the calibration campaign will be archived at UBE. Products from the analysis of the calibration data will be provided to the PSA. These products will include as a minimum

- System level responsivity matrices
- Instrumental spectral response in the four wavelength bands



- Absolute calibration results
- Distortion maps

The products will be provided in a PSA/PDS compatible format and delivered to the PSA for public archiving.

### 3.6 Flight data archive and EDR data

All flight data will be decompressed from the raw telemetry and stored at the University of Bern in a primary archive as UBE Level 1 data. The format of the primary archive will be PDSV4 (TBC). As the definition of PDSV4 is still incomplete, if PDSV4 is not available, UBE commits to deliver data to the PSA in a PDS/PSA compatible format and delivered to the PSA. A first draft of the header for a PDS data product is available. This should be considered as equivalent to the Experiment Data Record (EDR).

CAS-ARC-0040	The CaSSIS project shall deliver EDRs to the PSA in a PDS/PSA compatible format. Verification: R - Review of documentation
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### 3.7 UBE Level 2 archive

The individual images returned by the CaSSIS experiment will be radiometrically calibrated using the calibration data derived from the archive. These data will be stored at the University of Bern in the UBE Level 2 archive. This is an intermediate step before geometric correction and will not be delivered to the PSA.

### 3.8 UBE Level 3 archive and RDR data

The images will be geometrically rectified and combined to produce image strips – one in each colour. The strip will contain geometric/mapping information. These image strips will be stored in the UBE Level 3 archive, which will be in a PDS/PSA compatible format. This should be considered as equivalent to the Reduced Data Record (RDR). It should be noted that to generate RDR data, the spacecraft orientation and position at the time of imaging will be necessary and it is assumed that SPICE data (or similar) will be made available to the CaSSIS project by ESA.

CAS-ARC-0050	ESA shall provide spacecraft position and orientation information (preferably in the form of SPICE kernels) to the CaSSIS project. Verification: R - Review of documentation
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CAS-ARC-0060	The CaSSIS project shall deliver RDRs to the PSA in a PDS/PSA compatible format. Verification: R - Review of documentation
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### 3.9 Higher level products

The CaSSIS project intends to generate higher level products. At present there can be no commitment to provision of these products to public archives. These products will be generated by external partners with no contractual relationship to the CaSSIS project and will be subject to national funding agreements over which the CaSSIS project has no control. The CaSSIS team is, however, committed to providing higher level products on a best effort basis.

## 4 APPLICABLE STANDARDS

The CaSSIS public archive deliveries will adhere to PDS/PSA standards following version 3.8 of the PDS Standards Reference, dated February 27, 2009 and including any updates/modifications to be negotiated with the PSA.

CaSSIS commits to supporting data provision according to the new PDSV4 standard when that standard becomes available.

## 5 UBE ARCHIVE

UBE has recently been awarded funding through the National Centre for Competence in Research (NCCR) programme of the Swiss National Science Foundation (SNSF) for the development of a Laboratory for Analysis of Planetary and Interplanetary Data Sets (LAPIS).

Our aim is to set up a laboratory for the exploitation of large data sets from interplanetary missions by providing: 1) Fast access, 2) Generic tools for analysis of data, 3) Computer-aided modelling tools for scientific interpretation, 4) Guidance to local students and the community on specific data sets and their exploitation. A major objective will be to excite students about planetary research and give them special skills. These facilities will support BSc. and MSc. students working on projects in planetary remote sensing. We envisage a distributed network to spread the load and exploit specific capabilities in each institution. Similar needs have been identified both in the solar system and in the exoplanet communities.

The UBE facility will be the primary storage in Switzerland for OSIRIS, BELA, and CaSSIS data products as well as future missions to the Jupiter system (JUICE and IVO). It will provide calibration and archiving support. A postdoc, and a computer technician are requested to set-up and initiate the activities. The planetary image processing facilities will use standard software packages such as ISIS3 and SPICE (freeware) and ArcGIS and IDL (commercial software). Commercial software and hardware (specifically workstations with large multiple screens) are requested in the NCCR application.

The facilities will be used to support analysis of:

1. Rosetta/OSIRIS imaging data.
2. MRO/HiRISE and EMTGO/CaSSIS data.

3. BepiColombo/BELA altimeter data.
4. JUICE/IVO preparation.

It should be noted that scientific exploitation of data acquired by Swiss-led experiments (including infra-structure) is NOT funded via ESA PRODEX and hence the SNSF has a massive role in ensuring the maximum scientific return for the (very large) investment. UBE has also requested staffing to support the infrastructure.