

SMOS L1 Prototype ADF Set Description

Code : SO-TDD-DME-L1PP-0023
Issue : 2.11
Date : 31/05/10

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Document Information

Contract Data	Classification
Contract Number: DE04/B-434/P	Internal <input checked="" type="checkbox"/>
Contract Issuer: EADS CASA Espacio	Public <input type="checkbox"/>
	Industry <input type="checkbox"/>
	Confidential <input type="checkbox"/>

Internal Distribution		
Name	Unit	Copies

External Distribution		
Name	Organisation	Copies
Michele Zundo	ESA	1
Josep Closa	EADS CASA Espacio	1

Archiving	
Word Processor:	MS Word 2000
File Name:	SO-TDD-DME-L1PP-0023-ADF-set-description.doc
Archive Code:	P/STR/DME/03/013-038

Document Status Log

Issue	Change description	Date	Approved
Draft	First version of the document	12-05-2006	
1.0	Version delivered for the OSAT	05-06-2006	
1.1	Version delivered after the OSAT	29-06-2006	
1.2	Updated Land/Sea Mask Auxiliary Data File. Corrected Total Size of Land/Mask and Galaxy Map ADFs for consistency.	20-07-2006	
1.3	Added ADF headers to ADF Package	26-07-2006	
1.4	Update for L1OP CDR	26-10-2006	
2.0	Update for L1PP V2R	17-11-2006	
2.1	Update for L1PP V3R	09-04-2007	
2.2	Update for L1PP V3.5R	17-07-2007	
2.3	Update for L1PP V4R	26-11-2007	
2.4	Update for L1PP V5R	04-04-2008	
2.5	Update for L1PP V6R	25-07-2008	
2.6	Update for L1PP V6.5R	22-10-2008	
2.7	Update for L1PP v3.1.0	19-05-2009	
2.8	Update for L1PP v2.2.0	24-07-2009	
2.9	Update for L1PP v3.2.0	24-09-2009	
2.10	Update for L1PP v3.3.0	26-03-2010	
2.11	Update for L1PP v3.4.0	31-05-2010	

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1. INTRODUCTION

1.1. Purpose and Scope

This document describes the SMOS Level 1 Processor Prototype (L1PP) Auxiliary Data Files (ADFs). The purpose of the document is not to specify the format of the files but rather to identify the files that are delivered together with the prototype and provide a summary description of their contents¹.

As from the L1PP 2.2.0 release only DPGS V3 ADFs are delivered. Maintenance of the Prototype Format was discontinued since release 1.6.1, so the user is invited to refer to older ADF Packages in case he needs Prototype Format ADF. The only Prototype Format ADF maintained and delivered in this package is the GALAXY ADF, which is used by the SPGF facility.

This document is to be used by L1PP users as a support document and complements the Software User Manual Document [AD.9].

The files described in this document correspond to the baseline ADF Set [3.4](#).

1.2. Acronyms and Abbreviations

For the list of acronyms, please refer to the “Directory of Acronyms and abbreviations” [RD.1].

1.3. Applicable and Reference Documents

1.3.1. Applicable Documents

Ref.	Code	Title	Issue
AD.1	SO-SOW-CASA-PLM-0380	Level 1 Processor Prototype Development Phase 2 and Support Activities. Statement of Work	01
AD.2	ECSS-E-40B	ECSS E-40 Software Engineering Standards	
AD.3	SO-DS-DME-L1PP-0006	SMOS L1PP System Concept	2.8
AD.4	SO-DS-DME-L1PP-0007	SMOS L1PP DPM L1a	2.12
AD.5	SO-DS-DME-L1PP-0008	SMOS L1PP DPM L1b	2.11
AD.6	SO-DS-DME-L1PP-0009	SMOS L1PP DPM L1c	2.7
AD.7	SMOS-DMS-TN-3400	SMOS L1 User/System Requirement Document	1.1

¹ For further information regarding the format of the files, please refer to AD13.

Ref.	Code	Title	Issue
AD.8	SO-TR-DME-L1PP-0018	SMOS L1 Verification and Validation Plan	2.7
AD.9	SO-TR-DME-L1PP-0016	SMOS L1 Processor Prototype User Manual	2.14
AD.10	SO-TR-DME-L1PP-0002	SMOS L1 Product Format Specification	2.3
AD.11	SO-TR-DME-L1PP-0016	SMOS L1 Auxiliary Data Specification Format	2.4
AD.12	PE-TN-ESA-GS-001	Earth Explorer Ground Segment File Format Standard	1.4
AD.13	SO-TN-IDR-GS-0005	SMOS Level 1 and Auxiliary Data Products Specifications	5.16

Table 1: Applicable Documents

1.3.2. Reference Documents

Ref.	Code	Title	Issue
RD.1	SO-LI-CASA-PLM-0094	Directory of Acronyms and abbreviations	

Table 2: Reference Documents

2. OVERVIEW

The document is organized as follows:

- ❑ Section 3 presents a description of the Auxiliary Data Files used by the prototype.
- ❑ Section 4 lists the contents of the ADF Set [3.4](#).

3. AUXILIARY DATA FILES

The Auxiliary Data Files (ADFs) ingested by the Level 1 Processor Prototype are defined according to the Earth Explorer Ground Segment File Format Standard [AD.12]. The files are composed by an XML Header and a Binary Data Block, and use “.EEF” extension. The following sections provide a summary description of the file naming convention and of the ADFs.

In the default Prototype Format, header and datablock are concatenated into a single .EEF file, while in the DPGS V3 format a product is inside a directory with its name, containing a separate header (.HDR) and datablock (.DBL) file (AD.13).

3.1. Files Naming Convention for L1 Prototype Format

According to the ESA Earth Explorer File Format Standard, *files shall be named using a fixed set of elements, each of fixed size, separated by underscores “_”*. The maximum size for any given file name shall be smaller than 64 characters.

The Logical File Name is to be of the following structure:

MM_CCCC_TTTTTTTTTT_<Instance ID>

Where each of the elements will be as follows:

Table 3: Meaning of Logical File Name elements

Naming Element	Description	Format
MM	<p>Mission ID.</p> <p>This field will be ‘SM’ for all SMOS products</p>	<p>2 characters</p> <p>Uppercase letters</p>
CCCC	<p>File Class.</p> <p>This element identifies the type of activity for which the file is to be used, namely which phase of the ground segment development or operations cycle (TD00 for Test Dataset, GSOV for GS Validation Test, OPER for Operation, REPR for Reprocessing, COMM for Commissioning Phase, GC00 for Ground Calibration phases...).</p>	<p>4 characters</p> <p>Uppercase letters or digits</p>
TTTTTTTTTT	<p>File Type.</p> <p>This element uniquely defines the file structure and should include:</p> <p style="padding-left: 20px;">File Category</p> <p style="padding-left: 20px;">These are the first 4 characters (3 characters plus underscore) and define the type of file</p>	<p>10 characters</p> <p>Uppercase letters, digits or underscores “_”</p>

Naming Element	Description	Format
	<p>(e.g. TLM for telemetry, MIR for MIRAS products, AUX for Auxiliary files)</p> <hr/> <p>Semantic Description</p> <p>These are also 4 characters in size and provide description of the type of data represented (e.g. SC_D for Science Data at Dual-polarisation)</p> <hr/> <p>Product Level</p> <p>The last 2 characters, it gives information on the level of data represented (e.g. 0_, 1b, 2_,)</p>	
<Instance ID>	<p>Instance ID.</p> <p>The role of this element is to avoid file name duplicates and add extra information that may prove useful for understanding the contents of the file. All files of the same File Category must have the same File Instance ID format and should include one date and time element (Creation or Validity period) separated by a ‘T’ (e.g. 20040526T172800). If the file name still is not unique, a Version number should be added, starting in ‘1’and having as many digits as needed for the expected lifetime of operation of the mission.</p> <p>For the current L1 format, this Instance ID shall be modelled as a string of 41 characters containing the following information:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Validity Start time: YYYYMMDDTHHMMSS (15 char) <input type="checkbox"/> Underscore: _ (1 char) <input type="checkbox"/> Validity Stop time: YYYYMMDDTHHMMSS (15 char) <input type="checkbox"/> Underscore: _ (1 char) <p>Version: %08d (8 char)</p>	<p>Maximum 41 characters</p> <p>Uppercase letters, digits or underscores “_”</p>

It must be clearly stated, that the underscore character “_” shall be used also as separator between naming elements.

3.1. Files Naming Convention for DPGS V3

The filename convention adopted for DPGS V3 products is fully described in [AD.13].

3.2. Auxiliary Data Files Description

The following tables identify the ADFs ingested by L1PP v3.4.0 and provide relevant information about these files. A specific statement is included about the applicability of each file to the Launch Baseline or not, depending on whether the file is ready to be used, or if there is no Launch Baseline yet.

As of post-Launch version v3.3.0 of L1PP, no FTTx are provided in the ADF TDS, as the formal baseline is available from other sources within DPGS (as is the case for other operational products like GMAT, JMAT and ANIR). In addition, IVT and SEPS ADF distribution has been discontinued, only Post-Launch ADF shall be provided during the operations phase.

Despite the fact that all the files have “.EEF” extension, some of them are pure XML files instead of “Hybrid” composed of an XML Header and a Binary Data Block. Tables 4 and 5 contain a column describing the internal format of the file, which can be:

EEF – Hybrid Files containing an XML Header and a Binary Data Block;

XML - Pure XML Files, following the Earth Explorer File Format Standard.

Table 4: List of Auxiliary Data Files (Except Antenna Patterns)

Type of Data	Description	File Name	Size	Format
Apodisation Window Coefficients	Defines the apodisation function coefficients over the frequency domain coordinates (U,V) for the Blackman Window. Launch Baseline	SM_TEST_AUX_APDL___20070101T000000_20500101T000000_300_001_0.EEF	216 027	XML
		SM_TEST_AUX_APDS___20070101T000000_20500101T000000_300_001_0.EEF	216 026	

Type of Data	Description	File Name	Size	Format
Best Fit Plane	Euler Rotation Angles between Antenna Reference Frame and Best-Fit Plane. Filled with on-ground calibrated BFP and first in-orbit calibrated BFP. Post-Launch (KP2) Baseline	<code>SM_TEST_AUX_BFP____20070101T000000_20500101T000000_330_001_0.EEF</code>	2 508	XML
Bistatic Scattering Coefficients	Bistatic Scattering Coefficients used for removing Sun Glint effects. Look-Up-Table provided by IFREMER. Launch Baseline	<code>SM_TEST_AUX_BSCAT__20070101T000000_20500101T000000_300_001_0</code>	832 352	EEF
Baseline Weights	Baseline weights used during Image Reconstruction to alter the relative weight of certain baselines First in-orbit characterisation of NIR-LICEF weights, plus hinge baselines and NIR-NIR baselines across arms are suppressed (weight set to 0) Post-Launch (KP3) Baseline	SM_TEST_AUX_BWGHT_20070101T000000_20500101T000000_340_002_0.EEF	337 023	XML
Discrete Global Grid	ISEA aperture 4, resolution 9 global hexagonal grid, containing geodetic coordinates (lat-lon-alt) of all pixels. Launch Baseline	<code>SM_TEST_AUX_DGG____20070101T000000_20500101T000000_300_001_0</code>	41 943 320	EEF

Type of Data	Description	File Name	Size	Format
Failing Components Table	Failing components table set to no failures in any element. Launch Baseline	<code>SM_TEST_AUX_FAIL___20070101T000000_20500101T000000_300_001_0.EEF</code>	51 222	XML
Galaxy L-band Map	Map of the Galaxy Brightness Temperatures containing 6 layers of 721x1441 elements. Values of the first 4 layers have been taken directly from the map produced by ESA (N. Flourey), plus two additional layers representing the NIR expected measurements and RMS values that are used in NIR calibration and FTT. All values contain the latest baseline available from ESA, including cross-polar measurements above -20° declination. Launch Baseline	<code>SM_TEST_AUX_GLXY___20070101T000000_20781231T235959_000000008.EEF</code>	24 938 293	EEF
		<code>SM_TEST_AUX_GALAXY_20070101T000000_20500101T000000_300_002_0</code> <code>SM_TEST_AUX_GALNIR_20070101T000000_20500101T000000_300_001_0</code>	16 623 376 8 311 688	

Type of Data	Description	File Name	Size	Format
Receivers Characterisation	Receivers characterisation (ohmic efficiency and absolute phase). First in-orbit characterised antenna efficiency values. Post-Launch (KP3) Baseline	SM_TEST_AUX_LCF____20050101T000000_20500101T000000_340_001_0.EEF	86 823	XML
Land/Sea Mask	ADF extracted from combining the USGS Land-Sea mask and ISEA grid. Launch Baseline	SM_TEST_AUX_LSMASK_20070101T000000_20500101T000000_300_002_0	15 728 820	EEF
L1C Pixel Mask	ADF extracted from combination of Land-Sea Mask flags. This mask contains the latest baseline agreed with L2 teams, including the 200km overlap over coastlines. Launch Baseline	SM_TEST_AUX_MASK____20070101T000000_20500101T000000_300_001_0	13 107 370	EEF
Mispointing Angles	ADF containing measured or estimated mispointing angles between the Star Tracker unit and the PLM Launch Baseline	SM_TEST_AUX_MISP____20070101T000000_20500101T000000_300_002_0.EEF	2 744	XML

Type of Data	Description	File Name	Size	Format
Moon Brightness Temperature Map Model	Moon Brightness Temperature measurements, to be used only for reprocessing. ADF currently incomplete. Launch Baseline	<code>SM_TEST_AUX_MOONT__20070101T000000_20500101T000000_300_001_0</code>	2 617	EEF
NIR Characterisation tables	NIR characterisation table. Computed with estimated data from NIR technical note. All values measured on-ground have been incorporated into this baseline <u>First in-orbit characterised sensitivity values.</u> <u>Post-Launch (KP3) Baseline</u>	<code>SM_TEST_AUX_NIR__20070101T000000_20500101T000000_340_001_0.EEF</code>	13 760	XML
PLM Characterisation Table	Parameters calibrated on-ground referent to elements of the PLM. Version 2 <u>must be used with SEPS-GS data, version 6 must be used when processing IVT data, and version 5</u> must be used with in-orbit data due to the differences in central frequency Launch Baseline	<code>SM_TEST_AUX_PLM__20070101T000000_20500101T000000_300_005_0.EEF</code>	25 651	XML

Type of Data	Description	File Name	Size	Format
PMS Characterisation tables	<p>PMS characterisation table, computed on-ground.</p> <p>Sensitivities must be refined in-orbit after the commissioning phase.</p> <p>Second Order Sensitivities have been set to zero according to KP2 recommendation.</p> <p>First-Second in-orbit characterisation of PMS Heater delays.</p> <p>First in-orbit characterisation of PMS Sensitivities</p> <p>Post-Launch (KP3) Baseline</p>	<p>SM_TEST_AUX_PMS_20050101T000000_20500101T000000_340_003_0.EEF</p>	<p>125 322</p>	XML
RFI sources Map	<p>ADF containing TRUE values for those pixels that are expected to be affected by RFI. Issue 1 is filled with all zeros except for a few demonstration pixels, whereas issue 2 is filled completely with zeros.</p> <p>Launch Baseline</p>	<p>SM_TEST_AUX_RFI_20070101T000000_20500101T000000_300_001_0</p> <p>SM_TEST_AUX_RFI_20070101T000000_20500101T000000_300_002_0</p>	<p>13 107 370</p>	EEF

Type of Data	Description	File Name	Size	Format
Relevant S-parameters of MIRAS	Noise distribution networks and switch S-parameters characterisation. NDN data has been filled with complete data from EADS CASA Espacio with the full S-parameters and corrections from UPC. Switch data has been filled using EADS CASA Espacio measurements. First in-orbit characterisation of CAS correction factors. Post-Launch (KP3) Baseline	SM_TEST_AUX_SPAR_20050101T000000_20500101T000000_340_003_0.EEF	1 451 146	XML
Sun Brightness Temperature Map Model	Sun Brightness Temperature measurements, to be used only for reprocessing. ADF currently incomplete. Launch Baseline	SM_TEST_AUX_SUNT_20070101T000000_20500101T000000_300_001_0	2 616	EEF
Reference Orbit Scenario File	Reference orbit description, linking UTC time to orbit time. Generated using EE CFI Function. Post-Launch (KP2) Baseline	SM_TEST_MPL_ORBSCT_20091102T031142_20251231T000000_331_008_1.EEF	6 547	XML

Type of Data	Description	File Name	Size	Format
Average Antenna Patterns	Launch baseline for Antenna Patterns, including latest averaging and normalization algorithm. Launch Baseline	SM_TEST_AUX_PATT____20070101T000000_20500101T000000_320_001_0	457 613 144	EEF

4. ANNEX: ADF SET PACKAGE CONTENTS

```
├── adf-dpgs  
└── adf-eef
```

```
data/  
adf-dpgs  
adf-eef
```

```
data/adf-dpgs:  
SM_TEST_AUX_APDL____20070101T000000_20500101T000000_300_001_0.EEF  
SM_TEST_AUX_APDS____20070101T000000_20500101T000000_300_001_0.EEF  
SM_TEST_AUX_BFP____20070101T000000_20500101T000000_330_001_0.EEF  
SM_TEST_AUX_BSCAT____20070101T000000_20500101T000000_300_001_0  
SM_TEST_AUX_BWGHT____20070101T000000_20500101T000000_340_002_0.EEF  
SM_TEST_AUX_DGG____20070101T000000_20500101T000000_300_001_0  
SM_TEST_AUX_FAIL____20070101T000000_20500101T000000_300_001_0.EEF  
SM_TEST_AUX_GALAXY____20070101T000000_20500101T000000_300_002_0  
SM_TEST_AUX_GALNIR____20070101T000000_20500101T000000_300_001_0  
SM_TEST_AUX_LCF____20050101T000000_20500101T000000_340_001_0.EEF  
SM_TEST_AUX_LSMASK____20070101T000000_20500101T000000_300_002_0  
SM_TEST_AUX_MASK____20070101T000000_20500101T000000_300_001_0  
SM_TEST_AUX_MISP____20070101T000000_20500101T000000_300_002_0.EEF  
SM_TEST_AUX_MOONT____20070101T000000_20500101T000000_300_001_0  
SM_TEST_AUX_NIR____20070101T000000_20500101T000000_340_001_0.EEF  
SM_TEST_AUX_PATT____20070101T000000_20500101T000000_320_001_0  
SM_TEST_AUX_PLM____20070101T000000_20500101T000000_300_002_0.EEF  
SM_TEST_AUX_PMS____20050101T000000_20500101T000000_340_003_0.EEF  
SM_TEST_AUX_RFI____20070101T000000_20500101T000000_300_001_0  
SM_TEST_AUX_RFI____20070101T000000_20500101T000000_300_002_0  
SM_TEST_AUX_SPAR____20050101T000000_20500101T000000_340_003_0.EEF  
SM_TEST_AUX_SUNT____20070101T000000_20500101T000000_300_001_0  
SM_TEST_MPL_ORBSCT____20091102T031142_20251231T000000_331_008_1.EEF
```

```
data/adf-dpgs/SM_TEST_AUX_DGG____20070101T000000_20500101T000000_300_001_0:  
SM_TEST_AUX_DGG____20070101T000000_20500101T000000_300_001_0.DBL  
SM_TEST_AUX_DGG____20070101T000000_20500101T000000_300_001_0.HDR
```

```
data/adf-dpgs/SM_TEST_AUX_GALAXY____20070101T000000_20500101T000000_300_002_0:  
SM_TEST_AUX_GALAXY____20070101T000000_20500101T000000_300_002_0.DBL  
SM_TEST_AUX_GALAXY____20070101T000000_20500101T000000_300_002_0.HDR
```

```
data/adf-dpgs/SM_TEST_AUX_GALNIR____20070101T000000_20500101T000000_300_001_0:  
SM_TEST_AUX_GALNIR____20070101T000000_20500101T000000_300_001_0.DBL  
SM_TEST_AUX_GALNIR____20070101T000000_20500101T000000_300_001_0.HDR
```

```
data/adf-dpgs/SM_TEST_AUX_LSMASK____20070101T000000_20500101T000000_300_002_0:  
SM_TEST_AUX_LSMASK____20070101T000000_20500101T000000_300_002_0.DBL  
SM_TEST_AUX_LSMASK____20070101T000000_20500101T000000_300_002_0.HDR
```

```
data/adf-dpgs/SM_TEST_AUX_MASK____20070101T000000_20500101T000000_300_001_0:  
SM_TEST_AUX_MASK____20070101T000000_20500101T000000_300_001_0.DBL  
SM_TEST_AUX_MASK____20070101T000000_20500101T000000_300_001_0.HDR
```

```
data/adf-dpgs/SM_TEST_AUX_MOONT____20070101T000000_20500101T000000_300_001_0:  
SM_TEST_AUX_MOONT____20070101T000000_20500101T000000_300_001_0.DBL  
SM_TEST_AUX_MOONT____20070101T000000_20500101T000000_300_001_0.HDR
```

```
data/adf-dpgs/SM_TEST_AUX_PATT____20070101T000000_20500101T000000_300_002_0:  
SM_TEST_AUX_PATT____20070101T000000_20500101T000000_300_002_0.DBL
```

SM_TEST_AUX_PATT____20070101T000000_20500101T000000_300_002_0.HDR

data/adf-dpgs/SM_TEST_AUX_RFI____20070101T000000_20500101T000000_300_001_0:
SM_TEST_AUX_RFI____20070101T000000_20500101T000000_300_001_0.DBL
SM_TEST_AUX_RFI____20070101T000000_20500101T000000_300_001_0.HDR

data/adf-dpgs/SM_TEST_AUX_RFI____20070101T000000_20500101T000000_300_002_0:
SM_TEST_AUX_RFI____20070101T000000_20500101T000000_300_002_0.DBL
SM_TEST_AUX_RFI____20070101T000000_20500101T000000_300_002_0.HDR

data/adf-dpgs/SM_TEST_AUX_SUNT____20070101T000000_20500101T000000_300_001_0:
SM_TEST_AUX_SUNT____20070101T000000_20500101T000000_300_001_0.DBL
SM_TEST_AUX_SUNT____20070101T000000_20500101T000000_300_001_0.HDR

data/adf-eef:
SM_TEST_AUX_GLXY____20070101T000000_20781231T235959_00000008.EEF