



PROGRAMME OF  
THE EUROPEAN UNION



## SPECIFICATIONS

### Sentinels POD Files Definition and Metadata ICD

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# APPROVAL

<b>Title</b> Sentinels POD Files Definition and Metadata ICD	
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# CHANGE LOG

Reason for change	Issue Nr.	Revision Number	Date
First issue	1	0	Jan. 2020
Update in line with GMQ review	1	1	Sep. 2020
Update following “Checkpoint 2020”	1	2	Apr. 2021
Update for “Checkpoint 2022”	1	3	Oct. 2022
Update to include additional distributed POD files and [AD-1] version	1	4	Apr. 2023
Update of products generated by POD and addition of AUX_COMB	1	5	Feb. 2024

# CHANGE RECORD

<b>Issue Number</b> 1	<b>Revision Number</b> 0		
Reason for change	Date	Pages	Paragraph(s)
First issue	Jan. 2020	All	All

Issue Number 1	Revision Number 1		
Reason for change	Date	Pages	Paragraph(s)
GPS Constellation Problem Database Files are applicable to all Sentinel missions	Sep. 2020	<b>Error! Bookmark not defined.</b>	<b>Error! Reference source not found.</b>
Removal of EGP GPS products quality reports	Sep. 2020	<b>Error! Bookmark not defined.</b>	<b>Error! Reference source not found.</b>
GN_1_LSC_AX is ingested as well by S3 POD IPF and is applicable to PR as well	Sep. 2020	<b>Error! Bookmark not defined.</b>	<b>Error! Reference source not found.</b>
Update to the original file name of External Orbit Solutions	Sep. 2020	<b>Error! Bookmark not defined.</b>	<b>Error! Reference source not found.</b>
Removal of GS Element applicability columns	Sep. 2020	Multiple	Table 2-1, Table 2-2

Issue Number 1	Revision Number 2		
Reason for change	Date	Pages	Paragraph(s)
Removal of AUX_GNSRXD GNSS Lib product type (same as AUX_GNSSRD)	Apr. 2021	8	Table 2-1
Removal of GS Element applicability from the Product properties mapping	Apr. 2021	9	Table 3-1

Issue Number 1	Revision Number 3		
Reason for change	Date	Pages	Paragraph(s)
Addition of [AD-1] applicable document	Oct. 2022	6	1.2
Replacement of Data Distribution (DD) with Data Access (DA)	Oct. 2022	7, 11	1.4, Table 4-1
Addition of ADG applicability	Oct. 2022	11	Table 4-1

Issue Number 1	Revision Number 4		
Reason for change	Date	Pages	Paragraph(s)
Update of [AD-1] reference version and date	Apr. 2023	6	1.2
Addition of Sentinel-3 and Sentinel-6A POD product types: SR___MDO_AX SR___POE_AX AX___ROE_AX AX___MOED_AX AX___POE_AX	Apr. 2023	8	Table 2-1
Updated applicability of AUX_POEORB to Sentinel-2	Apr. 2023	8	Table 2-1



Issue Number 1	Revision Number 5		
Reason for change	Date	Pages	Paragraph(s)
Section 2 update of products generated by POD	Feb. 2024	7	2
Addition of AUX_COMB Files	Feb. 2024	8	Table 2-1
Removal of AUX_RESATT (discontinued) and AUX_GNSRXD (not distributed within the ESA GS)	Feb. 2024	8	Table 2-1
Removal of External Auxiliary Data since these are deprecated for POD	Feb. 2024	11	Table 2-2 removed, Table 4-1
Removal of “timeliness” attribute since External Auxiliary Data was removed	Feb. 2024	11	Table 4-1



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## 1 INTRODUCTION

### 1.1 Purpose and Scope

The scope of this document is to be used as an annex for the CSC Common Entity Definition Document [RD-2] in order to describe the POD files packaging, as well as the Product Entity Properties, the Product Attributes and the corresponding metadata elements that shall be catalogued and queryable, in order to support nominal operations, as well as any other kind of activities (e.g. Reprocessing campaigns, Cal/Val, etc.), for all POD files circulating through the Copernicus Space Component (CSC) Ground Segment (GS) [AD-1]. Additionally, the document describes the format of the POD products' packages and the applicability to each Sentinel constellation.

### 1.2 Applicable Documents

ID	Document Reference	Document Title
[AD-1]	ESA-EOPG-EOPGC-TN-58	Copernicus Ground Segment Sentinels Data Flow Configuration

Table 1-1 – Applicable Documents

### 1.3 Reference Documents

ID	Document Reference	Document Title
[RD-1]	GMES-GSEG-EOPG-FS-10-0075	Sentinels POD Service File Format Specifications
[RD-2]	ESA-EOPG-EOPGC-IF-5	Copernicus Space Component Ground Segment - Common Entity Definition Document
[RD-3]	OGC 17-003r0	OGC EO Dataset Metadata GeoJSON(-LD) Encoding Standard
[RD-4]	OGC 10-157r4	OGC Earth Observation Metadata profile of Observations & Measurements

Table 1-2 – Reference Documents

## 1.4 Acronyms, Definitions and Abbreviations

Acronym	Description
ADF	Auxiliary Data Files
ADG	Auxiliary Data Gathering
CSC	Copernicus Space Component
DA	Data Access
GNSS	Global Navigation Satellite System
GPSR	Global Positioning System Receiver
GS	Ground Segment
ICD	Interface Control Document
ILRS	International Laser Ranging Service
IPF	Instrument Processing Facility
JSON	JavaScript Object Notation
LTA	Long Term Archiving
NRT	Near Real Time
OSV	Orbit State Vectors
POD	Precise Orbit Determination
PR	Systematic Production
REP	Reprocessing timeliness (generated every ~4 months)

**Table 1-3 – Acronyms and Abbreviations**

## 2 POD PRODUCTS OVERVIEW

This section presents an overview of the products and auxiliary files used or generated by the Sentinels POD Service with indication on the Sentinel Mission applicability.

The POD Service generates the following products:

1. POD Orbit Files, i.e. orbit state vectors (OSV) from the orbit determination performed by the Copernicus POD Service based on the GPSR input data.
2. Auxiliary Files, i.e. products requested by the Production Service to be used in support to the Mission data processing. These include attitude data files.
3. GNSS L1b files for all Sentinels. These are disseminated via the Data Access (DA) Service.
4. Quaternions Files for all Sentinels. These are disseminated via the Data Access Service.

The file naming convention, the file formats and the specifications for the files used or generated by the POD Service are described in detail in [RD-1].



File Type	Description	Timeliness	Product Type	Format	S-1	S-2	S-3	S-6A
POD Orbit Files	Predicted Orbit File	NRT	AUX_PREORB	.EOF	X	X		
	Restituted Orbit File	NRT	AUX_RESORB	.EOF	X	X		
	Medium Orbit Ephemerides (MOE) Orbit File	STC	AUX_MOEORB	.EOF .SEN3 (for S3)			X	
	Precise Orbit Ephemerides (POE) Orbit File	NTC	AUX_POEORB	.EOF .SEN3 (for S3)	X	X	X	
	NRT Restituted Orbit File	NRT	SR__ROE_AX	.SEN3			X	
	SALP MDO Orbit File	STC	SR__MDO_AX	.TGZ			X	
	SALP POE Orbit File	NTC	SR__POE_AX	.TGZ			X	
	Sentinel-6A NRT Orbit File	NRT	AX__ROE__AX	.SEN6.tar				X
	Sentinel-6A SALP MDO Orbit File	STC	AX__MOED_AX	.SEN6.tar				X
	Sentinel-6A SALP POE Orbit File	NTC	AX__POE__AX	.SEN6.tar				X
	Combined Orbit File	REP	AUX_COMB	.sp3 (plain ASCII file)			X	X
Auxiliary Files for Sentinels	Preliminary Platform Data for Sentinel-3	STC	AUX_PRLPTF	.EOF .SEN3 (for S3)			X	
	Precise Platform Data for Sentinel-3	NTC	AUX_PRCPTF	.EOF .SEN3 (for S3)			X	
	NRT Platform Data for Sentinel-3	NRT	SR_2_NRPPAX	.SEN3			X	
GNSS L1b Files	Daily GNSS L1b RINEX files	STC	AUX_GNSSRD	.TGZ	X	X	X	X
Quaternions Files	Processed Quaternions Files	NTC	AUX_PROQUA	.TGZ	X	X	X	X

**Table 2-1 – POD Service Products and Auxiliary Data Files Overview vs. Sentinels mission**





### 3 POD FILE ENTITY PROPERTIES MAPPING

[RD-2] defines the Generic CSC Common Entity Properties. **Error! Reference source not found.**, below, provides the mapping between these Generic Product Entity Properties and the Sentinels POD products metadata. Most of the Product Entity Properties do not map directly to the POD File metadata as they are generated by the CSC services.

OData Product Entity Properties	Type	Description	Cardinality	Corresponding POD Files Metadata	Example
<b>Name</b>	String	Data file name (according to the Sentinel file naming conventions) plus the file extension	1	n/a Based on file name	S1B_OPER_AUX_GNSSRD_POD__20191124T021044_V20191116T235950_20191117T235940.TGZ
<b>ContentDate</b>	TimeRange	The sensing range period. Compound property with start and end times in UTC in the format YYYY-MM-DDThh:mm:ss	1	Validity_Period / <b>Validity_Start</b>  Validity_Period / <b>Validity_Stop</b>	"ContentDate": { "Start": "2019-11-16T23:59:50", "End": "2019-11-17T23:59:40" }

**Table 3-1 – POD File Entity Properties mapping**



## 4 POD FILES ATTRIBUTES MAPPING

All relevant metadata elements of the POD Files shall be indexed in the Product Attributes, additional metadata elements may also be identified if appropriate. In order to provide a harmonised model across the Sentinel missions the JSON property naming from [RD-3] is preferred for the Attributes Names. In case an attribute is not defined in [RD-3] the native naming used in the metadata is preferred. The Product Attributes mapping for the relevant POD Files is described in the Excel file “POD Product Attributes Mapping\_v1.0”, which is packaged together with this document. A summary of the POD Product Attributes mapping is presented in Table 4-1 below. It should be highlighted that, in order to harmonise the metadata model across the Sentinel missions, in some cases an “alias” for the value defined in the POD Files metadata is mapped to a standardised value to be used by the CSC GS elements, in other cases a standard value is defined where it is otherwise unavailable from the product.

The External Auxiliary Data follow the data structure presented in section 3.2 of [RD-1]. The attributes for these files are mapped to the xfdumanifest.xml metadata file that is generated when these files are converted to the Sentinel-3 format. Therefore, they follow the structure and metadata of the Sentinel-3 Auxiliary data.

OData Attribute Name	POD File Attributes Mapping				Applicability				
	POD Orbit Files	Auxiliary Files for Sentinels	GNSS L1b Files	Quaternions Files	POD	ADG	PR	LTA	DA
beginningDateTime	x	x	x	x	x	x	x	x	x
endingDateTime	x	x	x	x	x	x	x	x	x
platformShortName	x	x	x	x	x	x	x	x	x
platformSerialIdentifier	x	x	x	x	x	x	x	x	x
productType	x	x	x	x	x	x	x	x	x
processingDate	x	x	x	x	x	x	x	x	x
processingCenter	x	x	x	x	x	x	x	x	x
processorVersion	x	x	x	x	x	x	x	x	x

**Table 4-1 – POD File Attributes Mapping Summary**