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DOCUMENT

NanoSat MO Framework - Software Requirement Specification

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CHANGE RECORD

Issue Number 1	Revision Number 0		
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1 INTRODUCTION

1.1 Purpose

This document defines the software requirements for the development of the NanoSat MO Framework.

1.2 Scope

The software system meeting the requirements defined in this document will be known as NanoSat MO Framework. This document is structured in chapters as follows:

- Chapter 1: contains the introductions and the definition of terms
- Chapter 2: defines the requirements imposed on the NanoSat MO Connector
- Chapter 3: defines the requirements imposed on the MO Ground Adapter

1.2.1 Definition of Terms

This sections defines terms used in this document.

- **NanoSat MO Connector**: The component running on-board composed by several MO services which can be integrated to build more complex systems such as an Experiment for OPS-SAT.
- **Ground MO Adapter**: The component running on Ground that is capable of connecting to any software entity with an NMF provider.

1.2.2 Requirements Format and Conventions

The requirement throughout the document all have a common format, they bear a unique identifier and are structured along the following attributes:

- Requirement Identifier: it provides a unique ID for the requirement. The ID format is described below.
- Need: it qualifies the need for the requirement: Mandatory, Desirable or Deleted
- Stability: it indicates the likelihood of the requirement changing: stable, deferred or TBC = still requires some clarification (the need is not touched)
- Target delivery: it defines the software delivery that will implement the requirement
- Requirement: it provides the requirement formal text
- Explanation (optional): it provides background explanation for the requirement.

1.2.3 Requirement identifier format

<requirement Identifier>	<context mnemonic>-<document type>-<requirement type>-<requirement number>
<context mnemonic>	SYS|DBS|TNC|TCS|PUS|MPS|OBS|EXI|DDS|DAS|NIS|MAS Where: • SYS System Level • DBS Database System • TMS Telemetry Monitoring System • TCS Spacecraft Commanding System

	• PUS Packet Utilisation Standard Services • MPS Mission Planning System • OBS On-Board Software Maintenance System • FTS File Transfer System • EXI Other External Interfaces • DDS Data Disposition System • DAS Data Archive System • NIS Network Interface System • MAS Mission Automation System
<document type>	SR Indicates that the requirement belongs to the SRS
<requirement type>	FU|PE|AV|OP|IN|DE|MA|MD|RE|SA|SE|PR Where: • FU Functional • PE Performance • AV Availability • OP Operational • IN Interface • DE Design • MA Maintainability • MD Multi Domain • RE Resource • SA Safety • SE Security • PR Personnel
<requirement number>	<digit><digit><digit><digit>

2 REFERENCES

2.1 Applicable Documents

Ref.	Title	Code	Issue	Date
[AD1]	OPS-SAT OMCS Architectural Design Document	ESA-OPSAT-GS-DD-0001	i1r0	20/11/15

3 NANOSAT MO CONNECTOR

The NanoSat MO Framework provides a standard software framework that facilitates not only the monitoring and control of the nanosatellite, but also the interaction with its platforms and payload. This is achieved by using the MO services for Monitor and Control services included in the MO service suite and by defining a set of new Platform services, which also follow the MO services architecture.

3.1 System Design

Reference & Source	Stability	Need	Target Delivery
SYS-SR-DE-0000	stable	Mandatory	0
Requirement	NanoSat MO Connector shall be based on Java		

3.2 Functional Requirements

Reference & Source	Stability	Need	Target Delivery
SYS-SR-FU-0000	stable	Mandatory	0
Requirement	It shall be possible to start apps using the NanoSat MO Framework		

Reference & Source	Stability	Need	Target Delivery
SYS-SR-FU-0001	stable	Mandatory	0
Requirement	NanoSat MO Connector shall allow any app to push parameter values		

Reference & Source	Stability	Need	Target Delivery
SYS-SR-FU-0002	stable	Mandatory	0
Requirement	NanoSat MO Connector shall allow any app to push aggregation values		

Reference & Source	Stability	Need	Target Delivery
SYS-SR-FU-0003	stable	Mandatory	0
Requirement	NanoSat MO Connector shall allow any consumer to dynamically reconfigure the aggregations		

Reference & Source	Stability	Need	Target Delivery
SYS-SR-FU-0004	stable	Mandatory	0
Requirement	As a minimum requirement, the NanoSat MO Connector shall		

	allow accessing common nanosatellite's peripherals, respectively GPS, Camera, FineADCS

Reference & Source	Stability	Need	Target Delivery
SYS-SR-FU-0005	stable	Desirable	0
Requirement	NanoSat MO Connector might allow defining statistic reports		

Reference & Source	Stability	Need	Target Delivery
SYS-SR-FU-0006	stable	Desirable	0
Requirement	NanoSat MO Connector might allow creating control checks to verify if the app is operating correctly		

Reference & Source	Stability	Need	Target Delivery
SYS-SR-FU-0007	stable	Mandatory	0
Requirement	NanoSat MO Connector shall allow reporting the progress of action executions		

Reference & Source	Stability	Need	Target Delivery
SYS-SR-FU-0008	stable	Mandatory	0
Requirement	NanoSat MO Connector shall allow publishing alert events		

Reference & Source	Stability	Need	Target Delivery
SYS-SR-FU-0009	stable	Mandatory	0
Requirement	NanoSat MO Connector shall support an abstraction from the MO data types to direct java primitive data types		

4 GROUND MO ADAPTER

The "Ground MO Adapter" is the core of the ground part, it allows connecting to the NanoSat MO Framework provider by exposing all the service interfaces for interacting with the NanoSat MO Framework, therefore bridging any ground software logic to the OBSW app, such as, for example, a Monitor and Control System (MCS) to an OPS-SAT on-board experiment.

4.1 System Design

Reference & Source	Stability	Need	Target Delivery
SYS-SR-DE-0100	stable	Mandatory	0
Requirement	Ground MO Adapter shall be based on Java		

4.2 Functional Requirements

Reference & Source	Stability	Need	Target Delivery
SYS-SR-FU-0100	stable	Mandatory	0
Requirement	Ground MO Adapter shall expose all the NanoSat MO Framework interfaces available to an external software entity		

Reference & Source	Stability	Need	Target Delivery
SYS-SR-FU-0101	stable	Mandatory	0
Requirement	Ground MO Adapter shall allow the Monitor and Control of an app developed using the NanoSat MO Framework		

Reference & Source	Stability	Need	Target Delivery
SYS-SR-FU-0102	stable	Mandatory	0
Requirement	Ground MO Adapter shall allow the invocation of actions		

Reference & Source	Stability	Need	Target Delivery
SYS-SR-FU-0103	stable	Mandatory	0
Requirement	Ground MO Adapter shall allow the setting of Parameter Values		

Reference & Source	Stability	Need	Target Delivery
SYS-SR-FU-0104	stable	Mandatory	0
Requirement	Ground MO Adapter shall support an abstraction from the MO data types to direct java primitive data types		

Reference & Source	Stability	Need	Target Delivery
SYS-SR-FU-0105	stable	Mandatory	0
Requirement	Ground MO Adapter shall expose a simpler API to set/receive parameter values and to send commands other than the one provided by the standardized MO services.		