

423-RQMT-012, Revision -
Earth Science Data Information Systems (ESDIS), Code
423

NASA Sentinel Gateway (NSG) System Requirements Specification

NASA Sentinel Gateway (NSG) System Requirements Specification Signature/Approval Page

Prepared by:

Signature obtained on file

John Kneisler
EED2 Systems Engineer
GSFC/Code 423.0

05/04/2017

Date

Prepared by:

Signature obtained on file

Chan Yee
EED2 NSG Manager
GSFC/Code 423.0

05/04/2017

Date

Reviewed by:

Signature obtained on file

Evelyn Ho
ESDIS Sentinel Gateway Task Lead
GSFC/Code 423

05/04/2017

Date

Approved by:

Signature obtained on file

Andrew Mitchell
ESDIS Project Manager
GSFC/Code 423.0

05/23/2017

Date

Concurrent by:

Concurred by:

Signature obtained on file

Nettie Labelle-Hamer
ASF DAAC Manager
ASF DAAC

05/11/2017

Date

Signature obtained on file

Gene Feldman
OB.DAAC Manager
GSFC/Code 610.2

05/22/2017

Date

Signature obtained on file

05/05/2017

Date

Signature obtained on file

05/03/2017

Date

David Meyer
GES DISC Manager
GSFC/Code 619

Date

Edward Masuoka
LAADS Manager
GSFC/Code 619

Date

**Signature obtained
on file**

**05/18/2
017**

Robert Toaz
PO.DAAC Manager
JPL

Date

**[Electronic] Signatures available in B32 Room E148
online at: / [https://ops1- cm.ems.eosdis.nasa.gov/cm2/](https://ops1-cm.ems.eosdis.nasa.gov/cm2/)**

NASA Sentinel Gateway (NSG) System Requirements Specification (Task 6)

EED2- TP-004, Revision 01

**Technical Paper
February 2016**

Prepared Under Contract NNG15HZ39C

RESPONSIBLE OFFICE

<i>Signature obtained on file</i>	02/08/2016
Chan Yee, Sentinel Gateway Task Lead EOSDIS Evolution and Development 2 (EED-2) Contract	Date

RESPONSIBLE AUTHORS

<i>Signature obtained on file</i>	02/08/2016
John Kneisler, Sentinel Gateway Systems Engineer EOSDIS Evolution and Development 2 (EED-2) Contract	Date

<i>Signature obtained on file</i>	02/08/2016
Chan Yee, Sentinel Gateway Systems Engineer EOSDIS Evolution and Development 2 (EED-2) Contract	Date

Raytheon Company
Riverdale, Maryland

Preface

This document is under Earth Science Data and Information System (ESDIS) Project configuration control. Once this document is approved, ESDIS approved changes are handled in accordance with Class I and Class II change control requirements described in the ESDIS Configuration Management Procedures, and changes to this document shall be made by document change notice (DCN) or by complete revision.

Any questions should be addressed to:

ESDIS Configuration Management Office
NASA/GSFC
Code 423
Greenbelt, Md. 20771

Abstract

This document provides the NASA Sentinel Gateway (NSG) system requirements presented as a set of user stories following the Agile development approach.

Keywords : *Sentinel, ESA, ASF, ESDIS, NSG, LAADS, OB.DAAC, GES DISC, PO.DAAC*

Table of Contents

1 INTRODUCTION

1.1 Purpose/Scope

The Copernicus Programme is a joint effort between the European Commission (EC) and the European Space Agency (ESA) to provide Earth observation satellite data to improve the management of the environment, understand and mitigate the effects of climate change and ensure civil security. The primary element of the Copernicus Programme is a family of satellite platforms called the Sentinels. Copernicus is openly and freely sharing the Sentinel data via the ESA Sentinels Scientific Data Hub. National Aeronautics and Space Administration's (NASA) goal is to establish a rolling repository for the Sentinel data to ease the distribution load for Copernicus. In addition to the public data hub, ESA will set up a Sentinels International Access Hub providing dedicated high-bandwidth data access to the international agencies that have established formal technical agreement with ESA.

The NASA Sentinel Gateway (NSG) provides a rolling repository to store Sentinel data products retrieved from the ESA Science Hub and makes them available to a set of Earth Observing System Data and Information System (EOSDIS) Distributed Active Archive Centers (DAACs) and US Government Agencies. While the NSG system will be set up to retrieve and ingest Sentinel data from the dedicated data hub during nominal operation support, it will also be able to retrieve Sentinel data from the public, non-dedicated data hub as needed. In the rest of this document, we will use the term "ESA Data Provider" to refer to both the publicly available Sentinels Scientific Data Hub as well as the non-public, dedicated Sentinels International Access Hub.

This document describes the NSG requirements as a set of "user stories" following the Agile development approach. To provide requirements traceability, the user stories are also mapped to the high-level requirements specified in the NSG Functional and Performance Requirements Specification (423-RQMT-011, Revision A) referenced in Section 1.2.1.

1.2 Related Documentation

The latest versions of all documents below should be used. The latest ESDIS Project documents can be obtained from Uniform Resource Locator (URL): <https://ops1-cm.ems.eosdis.nasa.gov>. ESDIS documents have a document number starting with either 423 or 505. Other documents are available for reference in the ESDIS project library website at: https://esdisfmp.gsfc.nasa.gov/fmi/xsl/esdis_lib/default.xsl unless indicated otherwise.

1.2.1 Applicable Documents

The following document contains policies or other directive matters that are binding upon the content of this document.

Document Number	Document Title
COPE-GSOP-EOPG-IC-15-0009	ESA-NASA Technical Operating Arrangements
423-RQMT-011	NSG Functional and Performance Requirements Specification, Revision A

1.2.2 Reference Documents

The following documents are not binding on the content but referenced herein and, amplify or clarify the information presented in this document.

Document Number	Document Title
423-ICD-011	NSG-DAACs Interface Control Document (ICD)
423-OPS-003	NSG Prototype Phase-I Ingest, Archive, and Distribution System Operations Concept
423-ICD-002-AA	ICD between EOS Networks and the EOSDIS Subsystems, Appendix AA, NASA Sentinel Gateway
423-41-57	ICD between the EOSDIS Core System (ECS) and the Science Investigator-led Processing Systems (SIPS) Volume 0 Interface Mechanisms

1.3 Agile Programming and Requirements Analysis

The EOSDIS Evolution and Development 2 (EED2) teams are using Agile Programming methodologies throughout the software development lifecycle—including the requirements analysis phase of the software development lifecycle. The process of developing requirements has not changed much from other software programming management methods such as waterfall or iterative methods. The two major differences between Agile and other methods is that:

1. There is a greater emphasis on stakeholder participation
2. Requirements are allowed to evolve throughout the Agile development process to account for changing priorities, new requirements that were left out initially, or changes due to issues encountered during development and testing

These two differences may not seem all that different from other methods; however, requirements managed by Agile processes provide for a much more flexible framework from which to develop software.

In this document, requirements are captured as a set of User Stories written in the form:

"As a <role> I want to <action> so that I can <explanation>".

The requirement is told from the perspective from a user role instead of the generic "The system shall...". Requirements written in this form helps to refine the system requirement by identifying who is the user or consumer of the required functionality, what is the function that the user needs, and the explanation for why this function is needed. The concept of providing value

to the system user is reflected in the explanation of the user story form. This provides the rationale or the benefit of the requirement.

As a side note, requirements that begin “As the NSG System, ...”, does not refer to the older style of “The system shall...” statements. In the context of User Stories, the “NSG System” takes an active role by ensuring that those processes in the workflow that are to be automated will be managed by the system itself. The action describes what needs to be done, not how it needs to be implemented. This allows the developer to choose from “Best Practices” techniques on how to best implement a requirement. The first principle of the Agile Manifesto is:

Our highest priority is to satisfy the customer through early and continuous delivery of valuable software. (<http://agilemanifesto.org/principles.html>)

The NSG requirements and user stories will be tracked and maintained using Atlassian’s Jama Requirements Management tool. The user stories presented in this document are written to NASA’s Level 3 or Systems Requirements level, and will be kept in sync with the user stories maintained in Jama.

1.4 User Roles

The following roles will be used to clarify NSG User Stories by defining system boundaries and those that are responsible for completing the tasks associated with these requirements.

1.4.1 NSG System

The NSG System is responsible for starting, executing, and completing all automated processes for the NSG Production System. These processes include but are not limited to the following:

- Acquiring data from the ESA Data Provider
- Ingesting the data from the ESA Data Provider
- Staging the data for DAAC users to retrieve

1.4.2 NSG Operator

The NSG Operator is responsible for the day to day maintenance and monitoring of the system.

1.4.3 NSG System Administrator

The NSG System Administrator is responsible for managing the system capacity, configuring hardware, configuring software, adding or removing users including the user’s roles. The NSG System Administrator also works with the NSG Operator to ensure the system is functioning optimally and troubleshoot issues when they occur. The NSG System Administrator will also serve as the NSG Database Administrator to keep these high level roles to a minimum.

1.4.4 DAAC System

The DAAC System role is to initiate all automated processes from within its own system to retrieve Sentinel data products from the NSG using the established data distribution mechanism as defined in the NSG-to-DAAC ICD (423-ICD-011).

1.4.5 NSG System Provider

The NSG System Provider role is assigned to the organizations that will be delivering the final NSG System to NASA. The NSG System Provider is responsible for managing the entire system lifecycle of the NSG System.

1.4.6 U.S. Government Agency System

The U.S. Government Agency System role is to initiate all automated processes from within its own system to retrieve Sentinel data products from the NSG using the established data distribution mechanism that will be defined in an ICD between NSG and a U.S. Government Agency System.

2 REQUIREMENTS

2.1 Introduction

The NSG requirements are presented in this section as a set of user stories, grouped into the following categories:

1. NSG Rolling Repository
2. Sentinel Data Ingest
3. Sentinel Data Distribution
4. Product Requests
5. Inventory Reconciliation
6. Performance and Availability
7. Operational Support
8. System Monitoring
9. Logging Service
10. Metrics
11. Security

In each of the following subsections, the user stories are identified by the Story IDs maintained in the Jama tool and traced to the appropriate high-level requirement(s) specified in the NSG Functional and Performance Requirements Specification document (423-RQMT-011, Revision A).

2.2 NSG Rolling Repository

The NSG system will provide an up to 60-day rolling repository of Sentinel data products obtained from the ESA Data Provider. The Sentinel data ingested into the NSG system will be made available to the DAACs and other US Government Agencies during the rolling time span, after which the Sentinel data products will be removed from the rolling repository to make room for new Sentinel data products. The NSG system will provide an inventory database to track the Sentinel data products kept in its data holding as well as the data distribution records including Product Delivery Records (PDR), Product Acceptance Notifications (PAN), and Product Delivery Record Discrepancies (PDRD) associated with the data products being distributed to the DAACs.

2.2.1 NSG Rolling Repository User Stories

Story ID	User Story	NSG F&PRS Requirement Traceability
SNT-STORY-226	As the NSG System, I want to provide an up to 60-day rolling repository for storage of Sentinel data products obtained from the ESA Data Provider so that I can provide access to the data while keeping the required storage space to a manageable level.	2.3.7
SNT-STORY-215	As the NSG Operator, I want to configure the maximum number of days to keep Sentinel data files in the Rolling Repository so that I can make adjustments to the rolling time span as needed.	2.3.7
SNT-STORY-227	As the NSG System, I want to provide an Inventory database to track the Sentinel data products stored in the NSG Rolling Repository.	2.3.7
SNT-STORY-194	As the NSG System, I want to delete Sentinel data products with ingest dates older than the NSG Operator configured maximum number of days from the NSG Rolling Repository.	2.3.7
SNT-STORY-228	As the NSG System, I want to track the Sentinel data products deleted from the rolling repository by marking them as deleted in the Inventory database so that I have a record of having stored the data files in the NSG Rolling Repository.	2.3.7
SNT-STORY-238	As the NSG System, I want to have the ability to archive the metadata stored in the NSG inventory database for all Sentinel data products ingested by the NSG system, so that I have a record for these data products even after they have been eventually removed/rolled off.	2.3.7
SNT-STORY-181	As the NSG System, I want to archive all PDRs, PANs, and PDRDs so that I have a record of distributing the Sentinel data products and the corresponding dispositions.	2.3.7

2.3 Sentinel Data Ingest

The NSG data ingest capability consists of a continuously running process that queries and retrieves Sentinel data products made available at the ESA Data Provider and ingests them into the NSG rolling repository. The NSG queries the ESA Data Provider for available Sentinel data products and downloads them using the https protocol. The NSG ensures the integrity of the downloaded data products by validating the checksum values for each data product file prior to storing them into the NSG local repository. As part of ingest processing, the NSG also captures metadata associated with each data product file, and tracks them in the NSG inventory database.

2.3.1 Sentinel Data Ingest User Stories

Story ID	User Story	NSG F&PRS Requirement Traceability
SNT-STORY-236	As the NSG System, I want to query the ESA Data Provider for Sentinel data products that have been subscribed to by the respective DAACs, so that I can download specific data that my end users require.	2.1.4
SNT-STORY-234	As the NSG System, I want to query the ESA Data Provider for Sentinel data products that are available for a specific Sentinel satellite based on a specific date-time or date-time range when the data products were ingested at the ESA Data Provider site.	2.1.4
SNT-STORY-250	As the NSG System, I want to support ad hoc queries to request the ESA Data Provider for Sentinel data products that are available for a specific geographic region and a specific acquisition date time range.	2.1.4
SNT-STORY-235	As the NSG System, I want to ensure that I do not download duplicate Sentinel data files from the ESA Data Provider that had been successfully ingested into the NSG rolling repository.	2.2.1
SNT-STORY-90	As the NSG System, I want to use the Secure Hyper-Text Transfer Protocol (HTTPS) protocol to transfer Sentinel data files from the ESA Data Provider.	2.1.1
SNT-STORY-269	As the NSG Operator, I want to configure a data retrieval prioritization scheme so that the NSG System will retrieve higher priority data products	2.1.4, 2.1.7, 2.1.8

Story ID	User Story	NSG F&PRS Requirement Traceability
	before lower priority data products.	
SNT-STORY-251	As the NSG System, I want to prioritize data retrieval from the ESA provider based on a NSG Operator configurable prioritization scheme so that I can retrieve higher priority data products before lower priority data products.	2.1.4, 2.1.7, 2.1.8
SNT-STORY-91	As the NSG system, I want to track the transfer status of Sentinel data files from the ESA Data Provider so that I know whether the files got successfully downloaded or had errors.	2.4.2
SNT-STORY-92	As the NSG system, I want to retry failed downloads of Sentinel data files from the ESA Data Provider.	2.1.5
SNT-STORY-93	As the NSG Systems Administrator, I want to be able to configure the number of retry attempts the NSG system must make in order to download a Sentinel data file that had previously failed to be downloaded.	2.1.5
SNT-STORY-94	As the NSG Operator, I want to get notified about the specific Sentinel data files that failed to download from the ESA Data Provider after the NSG had retried for a configured number of attempts so that I can troubleshoot the issues.	2.1.5
SNT-STORY-97	As the NSG System, I want to perform checksum verification on Sentinel data files by computing Message Digest Algorithm (MD5) checksums and comparing them with the corresponding checksum values obtained from the ESA Data Provider.	2.2.1
SNT-STORY-98	As the NSG System, I want to track the MD5 checksum values (computed by the NSG system as well as the value obtained from the ESA Data Provider) along with the checksum validation status for each Sentinel data file downloaded from the ESA Data Provider.	2.2.1
SNT-STORY-99	As the NSG system, I want to retry downloading Sentinel data files from the ESA Data Provider that	2.1.5

Story ID	User Story	NSG F&PRS Requirement Traceability
	failed checksum validation.	
SNT-STORY-100	As the NSG Systems Administrator, I want to configure the number of retry attempts the NSG System must make in downloading Sentinel data files that failed the checksum validation.	2.1.5
SNT-STORY-101	As the NSG Operator, I want to get notified about the specific Sentinel data files that failed the checksum validation after the NSG System had retried for a configured number of times from the ESA Data Provider.	2.1.5, 2.1.6
SNT-STORY-102	As the NSG System, I want to ensure that the Sentinel data files are validated for integrity prior to moving them into the NSG rolling repository so that only valid data is made available on the NSG system.	2.2.1, 2.2.2
SNT-STORY-103	As the NSG System, I want to extract the metadata attributes from each of the Sentinel data file names and capture them in the NSG Inventory database	2.2.5
SNT-STORY-104	As the NSG System, I want to capture specific metadata attributes for Sentinel-1A data products in the NSG inventory database.	2.1.3, 2.2.5
SNT-STORY-223	As the NSG System, I want to capture specific metadata attributes for Sentinel-1B data products in the NSG inventory database.	2.1.3, 2.2.5
SNT-STORY-105	As the NSG System, I want to capture specific metadata attributes for Sentinel-3A data products in the NSG inventory database.	2.1.3, 2.2.5
SNT-STORY-224	As the NSG System, I want to capture specific metadata attributes for Sentinel-3B data products in the NSG inventory database.	2.1.3, 2.2.5
SNT-STORY-225	As the NSG System, I want to capture specific metadata attributes for the combined Sentinel-3A and 3B data products in the NSG inventory database.	2.1.3, 2.2.5
SNT-STORY-239	As the NSG System, I want to capture specific metadata attributes for Sentinel-5P data products in the NSG Inventory database.	2.1.3, 2.2.5
SNT-STORY-	As the NSG System, I want to track the state of each	2.4.2

Story ID	User Story	NSG F&PRS Requirement Traceability
211	Sentinel data product files as it progresses through ingest processing.	

2.4 Sentinel Data Distribution

The NSG provides the capability to distribute Sentinel data products to the DAACs using the Polling with Delivery Record (PDR) mechanism as defined in the NSG-to-DAAC ICD (423-ICD-011). This data will also be made available to other US Government Agencies. The distribution workflow is summarized below.

The NSG system first stages the newly ingested Sentinel data products subscribed by each DAAC into a predetermined location accessible by the DAACs, via soft links. The NSG System then generates PDRs for the data products and places them in the PDR directory accessible by the DAACs. Polling the PDR directory at an agreed-upon interval, the DAAC detects the newly inserted PDRs, and acquires them using the Secure File Transfer Protocol (SFTP) protocol. The PDRs acquired are first validated by the DAAC. In the event that a PDR is invalid, the DAAC will automatically return a Product Delivery Record Discrepancy (PDRD) message, via SFTP, to a predetermined location. The DAAC will not download the Sentinel data file specified in the PDR until a corrected PDR is received and successfully processed. If the PDR is valid, the DAAC will pull the data file specified in the PDR using the SFTP or GridFTP protocol. The DAAC will then send a Product Acceptance Notification (PAN) to the NSG via SFTP to a predetermined location. The PAN reports either success or error found for the specified data file in the PDR. Upon determining that no further action can or should be taken with respect to the PDR, the NSG will archive the PDR, PAN and/or the PDRD.

2.4.1 Sentinel Data Distribution User Stories

Story ID	User Story	NSG F&PRS Requirement Traceability
SNT-STORY-	As the NSG System, I want to be able to distribute	2.1.2, 2.1.3,

Story ID	User Story	NSG F&PRS Requirement Traceability
240	the Level 0 through Level 2 data products from the Sentinel 1A and Sentinel 1B missions to the Alaska Satellite Facility DAAC (ASF DAAC).	2.3.3
SNT-STORY-241	As the NSG System, I want to be able to distribute the Sea and Land Surface Temperature Radiometer (SLSTR) Level 1 data products from the Sentinel 3A and Sentinel 3B missions to the Level 1 and Atmosphere Archive and Distribution System (LAADS).	2.1.2, 2.1.3, 2.3.3
SNT-STORY-266	As the NSG System, I want to be able to distribute the Ocean and Land Color Instrument (OLCI) Level 1 data products from the Sentinel 3A and Sentinel 3B missions to the LAADS.	2.1.2, 2.1.3, 2.3.3
SNT-STORY-242	As the NSG System, I want to be able to distribute the OLCI Level 1 data products from the Sentinel 3A and Sentinel 3B missions to the Ocean Biology Distributed Active Archive Center (OB.DAAC).	2.1.2, 2.1.3, 2.3.3
SNT-STORY-267	As the NSG System, I want to be able to distribute the Surface Topography Mission (STM) Level 2 products from Sentinel 3A and Sentinel 3B missions to the Physical Oceanography Distributed Active Archive Center (PO.DAAC).	2.1.2, 2.1.3, 2.3.3
SNT-STORY-268	As the NSG System, I want to be able to distribute the SLSTR Level 2 products from Sentinel 3A and Sentinel 3B to PO.DAAC.	2.1.2, 2.1.3, 2.3.3
SNT-STORY-243	As the NSG System, I want to be able to distribute the Level 1 data products from the Sentinel 5P mission to the Goddard Earth Sciences Data and Information Services Center (GES DISC).	2.1.2, 2.1.3, 2.3.3
SNT-STORY-109	As the NSG System, I want to provide the DAAC-accessible file directory structure logically organized to store Sentinel data files, PDRs, and PANs specific to each DAAC.	2.3.1
SNT-STORY-110	As the NSG System, I want to stage the Sentinel data files that have been successfully ingested (via softlinks) in the directory path accessible by the specific DAAC.	2.3.3
SNT-STORY-	As the NSG System, I want to generate PDRs for	2.3.3, 2.2.2,

Story ID	User Story	NSG F&PRS Requirement Traceability
111	the Sentinel data files subscribed by the DAACs as they are successfully ingested in the NSG System.	2.3.1
SNT-STORY-112	As the NSG System, I want to stage the PDRs in the directory path accessible by the specific DAAC.	2.3.1,2.2.2, 2.3.1
SNT-STORY-113	As the NSG System, I want to make the PDR files available to the DAACs for download using the Secure File Transfer Protocol (SFTP).	2.3.4, 2.3.1
SNT-STORY-114	As the NSG System, I want to accept and process PDRD files from the DAACs using the SFTP protocol.	2.3.4, 2.3.1
SNT-STORY-115	As the NSG System, I want to accept and process PAN files from the DAACs using the SFTP protocol.	2.3.4, 2.3.1
SNT-STORY-216	As the NSG System, I want to allow the DAACs to download Sentinel data files from the NSG System using the SFTP protocol.	2.3.4, 2.3.1
SNT-STORY-116	As the NSG System, I want to allow the DAACs to download Sentinel data files from the NSG System using the GridFTPLite protocol to achieve better transfer throughput.	2.3.4, 2.3.1
SNT-STORY-195	As a NSG Operator, I want to re-generate PDRs for a specific set of Sentinel data products to correct issues found in previously generated PDRs or to support data distribution to newly added DAACs to obtain Sentinel data products from the NSG system.	2.2.4
SNT-STORY-196	As the NSG System, I want to track the state of each Sentinel data file as it progresses through the data distribution process so that I can determine whether data files are distributed correctly or any problem occurs in the workflow.	2.4.2
SNT-STORY-217	As the NSG System, I want to accept and process the PANs received from the DAACs to track the Sentinel data file disposition status.	2.2.3
SNT-STORY-218	As the NSG System, I want to accept and process the PDRDs received from the DAACs to track the PDR disposition status.	2.2.3, 2.3.1
SNT-STORY-219	As the NSG System, I want to save the PDRs and PANs with success disposition in an appropriate	2.4.2, 2.3.1

Story ID	User Story	NSG F&PRS Requirement Traceability
	area so that I know the corresponding Sentinel data files have been successfully distributed to the DAACs.	
SNT-STORY-220	As the NSG System, I want to save the PDRs and PANs with error dispositions into an appropriate area so that the NSG operator can investigate.	2.4.2
SNT-STORY-252	As the NSG System, I want to make TBD Sentinel data products available for download by the U.S. Government agencies using a PDR distribution mechanism.	2.3.2

2.5 Product Subscription

The NSG system will allow the NSG Operator to subscribe for specific Sentinel data products to be distributed to the DAACs and other US Government Agencies. The products being subscribed by the DAACs are documented in the NSG-to-DAAC ICD. The NSG system will fulfill the product subscription by retrieving Sentinel data products of interest from the ESA Data Provider and make them available to the specific DAACs.

2.5.1 Product Subscription User Stories

Story ID	User Story	NSG F&PRS Requirement Traceability
SNT-STORY-145	As the NSG System, I want to provide the capability for a NSG Operator to set up a subscription on behalf of the DAACs to distribute data based on either specific Sentinel satellite or specific Sentinel satellite and specific product metadata attributes.	2.3.1, 2.3.2, 2.3.3

2.6 Inventory Reconciliation

The NSG system will provide the capability to periodically check and identify missing data gaps in its data holdings and retrieve the missing data products from the ESA Data Provider. The NSG system will also provide the capability allowing the NSG operator to search for and obtain a listing of Sentinel data products of interest as requested by the DAAC users to help them reconcile their data holdings with the NSG data holdings.

2.6.1 Inventory Reconciliation User Stories

Story ID	User Story	NSG F&PRS Requirement Traceability
SNT-STORY-213	As the NSG System, I want to periodically check and identify missing time gaps in the Sentinel data stored in the NSG data holding so that I can ensure that the system has all the data that my	2.1.6

Story ID	User Story	NSG F&PRS Requirement Traceability
	end users require.	
SNT-STORY-230	As a NSG Operator, I want to configure the time frequency at which to check and identify missing time gaps in the NSG data holdings.	2.1.6
SNT-STORY-123	As a NSG Operator, I want to be notified of the data gaps found in the NSG data holdings.	2.1.6
SNT-STORY-214	As the NSG System, I want to retrieve and ingest the missing Sentinel data files from the ESA Data Provider to fill the identified data gaps in the NSG data holdings.	2.1.6
SNT-STORY-88	As the NSG System, I want to query the ESA Data Provider for Sentinel data products that are available for download by Sentinel satellite using a specific data acquisition start date-time.	2.1.6, 2.1.1
SNT-STORY-89	As the NSG System, I want to query ESA Data Provider for Sentinel data products that are available for download by Sentinel satellite using a specific data acquisition date-time range.	2.1.6, 2.1.1
SNT-STORY-124	As a NSG Operator, I want to search and display the list of Sentinel data files in the NSG Rolling Repository based on Sentinel satellite and data acquisition time or time range so that I can assist the DAAC user to reconcile with their data holdings.	2.2.4
SNT-STORY-229	As a NSG Operator, I want to search and display a list of Sentinel data files in the NSG Rolling Repository based on Sentinel satellite and the NSG ingest time or time range so that I can assist the DAAC user to reconcile with their data holdings.	2.2.4

2.7 Performance and Availability

The NSG system will provide the capability to acquire the estimated amount of data for each Sentinel data product. The NSG system will also be capable of processing the acquired data and then make this data available to the DAAC Users on a daily basis. The following requirements reflect the latest download and processing estimates.

2.7.1 Performance and Availability User Stories

Story ID	User Story	NSG F&PRS Requirement Traceability
SNT-STORY-174	As the NSG System, I want to be able to ingest Sentinel 1A data products at a nominal data volume of 1.8 TB per day as defined in the NSG to DAAC ICD.	2.1.2, 2.1.3, 2.1.9, 2.3.1
SNT-STORY-175	As the NSG System, I want to be able to ingest Sentinel 1B data products at a nominal data volume of 1.8 TB per day as defined in the NSG to DAAC ICD.	2.1.2, 2.1.3, 2.1.9, 2.3.1
SNT-STORY-176	As the NSG System, I want to be able to ingest Sentinel 3A data products at a nominal data volume of 1.3 TB per day as defined in the NSG to DAAC ICD.	2.1.2, 2.1.3, 2.1.9, 2.3.1
SNT-STORY-244	As the NSG System, I want to be able to ingest Sentinel 3B data products at a nominal data volume of 1.3 TB per day as defined in the NSG to DAAC ICD.	2.1.2, 2.1.3, 2.1.9, 2.3.1
SNT-STORY-245	As the NSG System, I want to be able to ingest Sentinel 5P data products at a nominal data volume of 560 GB per day as defined in the NSG to DAAC ICD.	2.1.2, 2.1.3, 2.1.9, 2.3.1
SNT-STORY-248	As the NSG System, I want to have the capability of ingesting newly acquired Sentinel data products at a combined data volume of 6.77 TB/day.	2.1.9, 2.3.1
SNT-STORY-246	As the NSG System, I want to provide the daily Sentinel data distribution capability to support 2.5 times the nominal daily ingest volume.	2.3.5, 2.3.8
SNT-STORY-249	As the NSG System, I want to make Sentinel data products available to the DAACs within 15 minutes after the time of ingesting the data into the NSG system.	2.3.5, 2.3.6

2.8 Operational Support

The NSG System will provide the capability for NSG Operators to monitor the workflow processes at key points to check whether the application is functioning as expected.

2.8.1 Operational Support User Stories

Story ID	User Story	NSG F&PRS Requirement Traceability
SNT-STORY-140	As the NSG System, I want to provide the capability to monitor the heartbeat of ingest and distribution processes so that I know whether the processes are alive and running.	2.4.2
SNT-STORY-255	As the NSG Operator, I want to be notified as soon as the NSG system detects that one or more ingest or distribution processes have stopped running so that I can investigate and correct the issue.	2.4.2
SNT-STORY-141	As a NSG Operator, I want to provide general NSG information and operations/maintenance status on a NASA Earthdata web page so that the user community is kept informed of relevant NSG operations and maintenance status.	2.4.1
SNT-STORY-237	As the NSG System, I want the system to be able to support operations 24 hours per day, 7 days per week on a continuous basis with 8 hours/day, five days per week operator attendance.	2.4.3

2.9 System Monitoring

The NSG System will provide the capability for NSG Operators to monitor the system processes to check whether the system is functioning within expected parameters.

2.9.1 System Monitoring User Stories

Story ID	User Story	NSG F&PRS Requirement Traceability
SNT-STORY-256	As the NSG Operator, I want to get notified immediately on critical NSG System events that require operator intervention.	2.4.2
SNT-STORY-257	As the NSG Operator, I want to receive periodic notification of NSG system status and non-critical events at a configurable time interval.	2.4.2

2.10 Logging Service

The NSG system will log critical system parameters that are useful for troubleshooting issues that occur for processes that are running within the NSG System.

2.10.1 Logging Service User Stories

Story ID	User Story	NSG F&PRS Requirement Traceability
SNT-STORY-187	As the NSG System, I want to log the NSG application startup time and job configuration parameters so that I can better troubleshoot possible system process issues.	2.4.2
SNT-STORY-186	As the NSG System, I want to log the processing status including time stamp, job ids, and thread ids during system processing.	2.4.2
SNT-STORY-188	As the NSG System, I want to log the errors and warnings encountered during system processing.	2.4.2

Story ID	User Story	NSG F&PRS Requirement Traceability
SNT-STORY-189	As the NSG System, I want to be able to control the logging level to provide more or less logging messages.	2.4.2

2.11 Metrics Requirements

The NSG system will provide metrics that can be used for providing reports to management as well as troubleshooting issues for processes that cross system boundaries such a retrieving files from the ESA Data Provider.

2.11.1 Metrics Requirements User Stories

Story ID	User Story	NSG F&PRS Requirement Traceability
SNT-STORY-197	As a NSG Operator, I want to determine the number of Sentinel data files and total size in TB downloaded from the ESA Data Provider per day.	2.7.1
SNT-STORY-200	As a NSG Operator, I want to determine the number of failed Sentinel data file downloads each day.	2.7.1
SNT-STORY-221	As a NSG Operator, I want to determine the number of files successfully ingested each day.	2.7.1
SNT-STORY-222	As a NSG Operator, I want to determine the number of Sentinel data files that failed checksum validation each day.	2.7.1
SNT-STORY-203	As a NSG Operator, I want to determine the number of Sentinel data product files, and total size in TB distributed from the NSG System per day for each type of data products.	2.7.1
SNT-STORY-204	As a NSG Operator, I want to determine the number of PDRs generated each day.	2.7.1
SNT-STORY-205	As a NSG Operator, I want to determine the number and types of errors that occurred from the generated PDRDs each day so that I can effectively monitor whether anomalies need to be escalated.	2.7.1
SNT-STORY-206	As a NSG Operator, I want to determine the number of PANs that indicated a successful pull of the data products for each day.	2.7.1
SNT-STORY-207	As a NSG Operator, I want to determine the number of PANs that indicated a failure status for each day.	2.7.1
SNT-STORY-208	As a NSG Operator, I want to determine the types of errors reported by the failed PAN files each day.	2.7.1

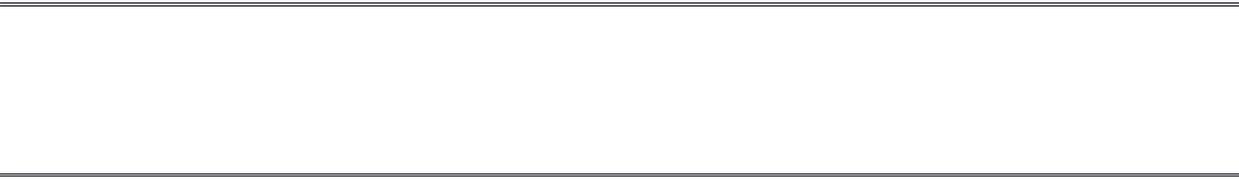
Story ID	User Story	NSG F&PRS Requirement Traceability
SNT-STORY-210	As the NSG Operator, I want to keep the daily metrics on-line for a configured time period and archive the metrics after the expiration of the period	2.7.1

2.12 Security

The NSG Sentinel System will establish security policies and requirements to be consistent with NASA's *Security of Information Technology* document (NPR 2810.1A).

2.12.1 Security User Stories

Story ID	User Story	NSG F&PRS Requirement Traceability
SNT-STORY-258	As the NSG System Provider, I want to maintain the NASA System Security Plan (SSP) for the NSG System.	2.6.1
SNT-STORY-259	As the NSG System Provider, I want to provide a Contingency Plan that is consistent with NASA Continuity of Operations Planning (COOP) procedures and guidelines.	2.6.1
SNT-STORY-260	As the NSG System Provider, I want to maintain the NSG System Configuration Management (CM) baseline that conforms to the applicable NASA's configuration baseline.	2.6.1, 2.5.1
SNT-STORY-261	As the NSG System Provider, I want to conduct a complete system security assessment prior to Authorization to Operate (ATO).	2.6.1
SNT-STORY-262	As the NSG System Provider, I want to support the periodic system security assessments and system audits as required.	2.6.1
SNT-STORY-263	As the NSG System Provider, I want to provide system patches as required to mitigate critical security risks identified during security assessments and during routine testing of security controls.	2.6.1
SNT-STORY-264	As the NSG System Provider, I want to apply access controls based on user role and least privilege as necessary to execute their respective duties.	2.6.1
SNT-STORY-265	As the NSG System Provider, I want to provide an identification and authentication capability for the NSG system users.	2.6.1



Appendix 12.1.1.1.1.A Abbreviations and Acronyms

ASF	Alaska Satellite Facility
ATO	Authorization to Operate
CCB	Configuration Change Board
CCR	Configuration Change Request
COOP	Continuity of Operations Planning
CM	Configuration Management
DAAC	Distributed Active Archive Center
EC	European Commission
ECS	EOSDIS Core System
EED2	EOSDIS Evolution and Development 2
EOSDIS	Earth Observing System Data and Information System
ESA	European Space Agency
ESDIS	Earth Science Data and Information System
FTP	File Transfer Protocol
GES DISC	Goddard Earth Sciences Data and Information Services Center
GSFC	Goddard Space Flight Center
HTTPS	Hyper-Text Transfer Protocol
ICD	Interface Control Document
LAADS	Level 1 and Atmosphere Archive and Distribution System
MD5	Message Digest Algorithm
NASA	National Aeronautics and Space Administration
NPR	NASA Procedural Requirements
NSG	NASA Sentinel Gateway
OB.DAAC	Ocean Biology DAAC
OLCI	Ocean and Land Color Instrument
PAN	Product Acceptance Notification
PDR	Product Delivery Record
PDRD	Product Delivery Record Discrepancy
PO.DAAC	Physical Oceanography DAAC
SFTP	Secure File Transfer Protocol
SLSTR	Sea and Land Surface Temperature Radiometer
STM	Surface Topography Mission
TBD	To Be Determined
URL	Uniform Resource Locator