SE 4485: Software Engineering Projects

Fall 2024

Requirement Documentation

|  |  |
| --- | --- |
| **Group Number** | **Group 11** |
| **Project Title** | **O.A.S.I.S - Observational Analytics and Space Intelligence System** |
| **Sponsoring Company** | **Raytheon (RTX)** |
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Predictive Analysis Application O.A.S.I.S.

**Observational Analytics and Space Intelligence System**

**Project Requirements**

**Project: O.A.S.I.S.**

*“Perfect is the enemy of good.”*

**-***Montesquieu*

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# Abstract

This Requirements Document outlines the use cases and requirements for the Observational Analytics and Space Intelligence System (O.A.S.I.S.), a predictive analytics application designed to assess and forecast near-Earth space environments for satellite operations and space missions. Developed by Group 11 for Raytheon (RTX), O.A.S.I.S. will integrate data from NASA, NOAA, and other open-source datasets to provide critical insights for space operations planning. The document details the use cases of our project, including diagrams to demonstrate each. The document includes both functional and non-functional requirements, and includes appropriate measurements and testing guidelines for each. We also demonstrate the relationships and associations between the requirements and use cases.

All of the use cases, functional requirements, and non-functional requirements have been documented in detail in order to define our scope and expectations for O.A.S.I.S. We also establish professional standards and configuration management practices to maintain high-quality development processes. This comprehensive document serves as a detailed scope for the functionality of O.A.S.I.S., aiming to deliver a tool that enhances decision-making in space operations and contributes to the advancement of space exploration and satellite technology.

# Revision History

Please ensure that if you make any notable changes to the Requirements Document that you update the Revision History with the Version Number, Publisher Name and Date the changes were made.

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# 1.0 INTRODUCTION

## 1.1 Document Purpose

All of the use cases, functional requirements, and non-functional requirements have been documented in detail in order to define our scope and expectations for O.A.S.I.S. We also establish professional standards and configuration management practices to maintain high-quality development processes. This comprehensive document serves as a detailed scope for the functionality of O.A.S.I.S., aiming to deliver a tool that enhances decision-making in space operations and contributes to the advancement of space exploration and satellite technology. The document details the use cases of our project, including diagrams to demonstrate each. The document includes both functional and non-functional requirements, and includes appropriate measurements and testing guidelines for each. We also demonstrate the relationships and associations between the requirements and use cases. The document concludes with our professional standards and configuration management approach, underlining our commitment to quality and best practices in software development and space systems engineering.

## 1.2 System Description

O.A.S.I.S. is an ambitious predictive analytics application designed to allow for the assessment and forecasting of near-Earth space environments for satellite operations and space missions. By harnessing data from NASA, NOAA, space-track.org, and other open-source datasets, our system aims to provide critical insights that will enhance space operations and mission planning. The core of O.A.S.I.S. lies in its sophisticated data pipeline, which begins with the ingestion of diverse space environment datasets. This data undergoes rigorous processing, including cleaning, normalization, and integration, before being stored in an optimized database schema designed for efficient querying and analysis.

At the heart of O.A.S.I.S. is a powerful space environment rating model. This model takes into account a multitude of factors, including space weather conditions, orbital debris density, radiation levels, and atmospheric drag. By analyzing these elements, O.A.S.I.S. will offer predictive capabilities for space operations. Users of our system will be able to visualize these predictions through interactive 3D representations of near-Earth space environments, complete with rating heatmaps for different orbital regions and time-based visualizations that illustrate changing conditions over time.

The applications of O.A.S.I.S. are far-reaching within the space industry. It will enable more accurate predictions of optimal launch windows, taking into account forecasted space environment conditions. Space mission planners will be able to optimize satellite constellation configurations, enhancing their resilience against adverse space conditions. Furthermore, O.A.S.I.S. will provide valuable risk assessments for specific types of space missions or satellite hardware, contributing to the overall safety and success of space operations.

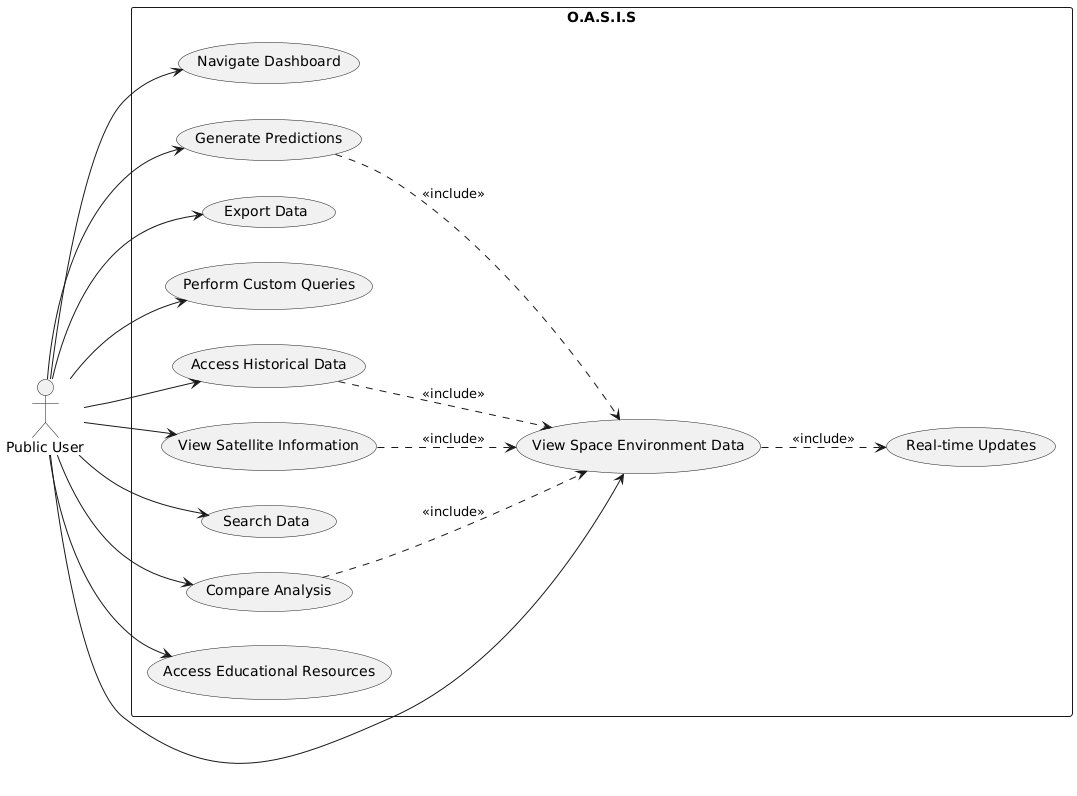
This document outlines the use cases and requirements for the Observational Analytics and Space Intelligence System (O.A.S.I.S.), a predictive analytics application designed to assess and forecast near-Earth space environments for satellite operations and space missions. Developed by Group 11 for Raytheon (RTX), O.A.S.I.S. will integrate data from NASA, NOAA, and other open-source datasets to provide critical insights for space operations planning.

# 2.0 USE CASE MODEL FOR FUNCTIONAL REQUIREMENTS

The O.A.S.I.S. application adheres to several IEEE standards to ensure reliability, consistency, and interoperability. These include IEEE 1012-2016 for software verification and validation, IEEE 12207-2017 for software life cycle processes, and IEEE 1016-2009 for software design descriptions. Additionally, the system follows IEEE 1220-2005 for application and management of the systems engineering process, which is crucial for space environment data systems. For data exchange and formatting, the application implements IEEE 1541-2002 for prefixes for binary multiples, ensuring accurate representation of large datasets common in space environment analysis.

Below are diagrams and their corresponding descriptions which list the anticipated use cases for the O.A.S.I.S. application.

### Figure 2.1 - General - Use Case Diagram



**Use Case Diagrams:**

### Table 2.1 - Use Case Diagrams

| **Use Case ID** | **Use Case Diagram** |
| --- | --- |
| UC-01 | Navigate Dashboard |
| UC-02 | View Space Environment Data |
| UC-03 | Generate Predictions |
| UC-04 | Export Data |
| UC-05 | Perform Custom Queries |
| UC-06 | Access Historical Data |
| UC-07 | View Satellite Information |
| UC-08 | Search Data |
| UC-09 | Compare Analysis |
| UC-10 | Access Educational Resources |

**Use Case Descriptions:**

### Table 2.2 - Use Case Diagram: Navigate Dashboard

| **UC-01 | Navigate Dashboard** | |
| --- | --- |
| **Participating Actors:** | Public User |
| **Entry Condition(s):** | User accesses the O.A.S.I.S. website. |
| **Normal Flow of Events:** | * System displays the home page with an overview of features * User selects a specific module or page from the navigation menu * System loads the selected page |
| **Exit Condition(s):** | User arrives at desired page. |
| **Exceptions:** | If page fails to load, system displays an error message. |
| **Special Requirements:** | Navigation should be intuitive and accessible. |

### Table 2.3 - Use Case Diagram: View Space Environment Data

| **UC-02 | View Space Environment Data** | |
| --- | --- |
| **Participating Actors:** | Public User |
| **Entry Condition(s):** | User is on a data display page. |
| **Normal Flow of Events:** | * System retrieves current space environment data * System displays relevant statistics and metrics * User interacts with the 2D globe representation * System updates display based on user interaction |
| **Exit Condition(s):** | User finishes viewing data. |
| **Exceptions:** | If data retrieval fails, system displays cached data and notification. |
| **Special Requirements:** | Data should be displayed using color-coded scales for easy interpretation. |

### Table 2.4 - Use Case Diagram: Generate Predictions

| **UC-03 | Generate Predictions** | |
| --- | --- |
| **Participating Actors:** | Public User |
| **Entry Condition(s):** | User accesses prediction feature. |
| **Normal Flow of Events:** | * System presents prediction options * User selects prediction parameters * System generates future predictions for space environments * System displays predictions including factors like space weather, debris density, and radiation levels |
| **Exit Condition(s):** | Predictions are displayed to the user. |
| **Exceptions:** | If prediction generation fails, system notifies the user. |
| **Special Requirements:** | Predictions should be clearly labeled with confidence levels. |

### Table 2.5 - Use Case Diagram: Export Data

| **UC-04 | Export Data** | |
| --- | --- |
| **Participating Actors:** | Public User |
| **Entry Condition(s):** | User is viewing data or analysis results. |
| **Normal Flow of Events:** | * User selects export option * System presents available export formats (CSV, PDF, PNG) * User chooses desired format * System generates and provides download link |
| **Exit Condition(s):** | User receives exported data file. |
| **Exceptions:** | If export fails, system provides error message and suggestions. |
| **Special Requirements:** | Exported data should maintain formatting and include metadata. |

### Table 2.6 - Use Case Diagram: Perform Custom Queries

| **UC-05 | Perform Custom Queries** | |
| --- | --- |
| **Participating Actors:** | Public User |
| **Entry Condition(s):** | User accesses custom query interface. |
| **Normal Flow of Events:** | * System presents query parameters * User inputs custom parameters * System processes query * System displays query results |
| **Exit Condition(s):** | Query results are displayed. |
| **Exceptions:** | If query is invalid, system provides guidance on correct input. |
| **Special Requirements:** | Query interface should be user-friendly and provide parameter suggestions. |

### Table 2.7 - Use Case Diagram: Access Historical Data

| **UC-06 | Access Historical Data** | |
| --- | --- |
| **Participating Actors:** | Public User |
| **Entry Condition(s):** | User selects historical data option. |
| **Normal Flow of Events:** | * System presents options for time period selection * User selects desired time period * System retrieves historical data * System displays historical data and trends |
| **Exit Condition(s):** | Historical data is displayed to the user. |
| **Exceptions:** | If data for selected period is unavailable, system notifies user. |
| **Special Requirements:** | Should provide options for comparing historical data with current conditions. |

### Table 2.08 - Use Case Diagram: View Satellite Information

| **UC-07 | View Satellite Information** | |
| --- | --- |
| **Participating Actors:** | Public User |
| **Entry Condition(s):** | User accesses satellite information feature. |
| **Normal Flow of Events:** | * System displays list or map of trackable satellites * User selects a specific satellite * System shows detailed information and predicted trajectory |
| **Exit Condition(s):** | Satellite information is displayed. |
| **Exceptions:** | If satellite data is temporarily unavailable, system shows last known information. |
| **Special Requirements:** | Should update satellite positions in near real-time. |

### Table 2.09 - Use Case Diagram: Search Data

| **UC-08 | Search Data** | |
| --- | --- |
| **Participating Actors:** | Public User |
| **Entry Condition(s):** | User accesses search function. |
| **Normal Flow of Events:** | * User enters search keywords or parameters * System processes search query * System displays search results * User selects desired result for more details |
| **Exit Condition(s):** | User views detailed information of selected search result. |
| **Exceptions:** | If no results found, system suggests alternative search terms. |
| **Special Requirements:** | Search should support various parameters (e.g., region, date, event type). |

### Table 2.10 - Use Case Diagram: Compare Analysis

| **UC-09 | Compare Analysis** | |
| --- | --- |
| **Participating Actors:** | Public User |
| **Entry Condition(s):** | User selects comparative analysis tool. |
| **Normal Flow of Events:** | * System presents options for comparison (time periods, regions) * User selects parameters for comparison * System retrieves and processes relevant data * System displays comparison in visual format |
| **Exit Condition(s):** | Comparison results are displayed. |
| **Exceptions:** | If selected parameters are incompatible, system suggests alternatives. |
| **Special Requirements:** | Comparison should be visually clear and easy to interpret. |

### Table 2.11 - Use Case Diagram: Access Educational Resources

| **UC-10 | Access Educational Resources** | |
| --- | --- |
| **Participating Actors:** | Public User |
| **Entry Condition(s):** | User selects educational resources section. |
| **Normal Flow of Events:** | * System displays list of available educational topics * User selects a topic of interest * System presents educational content (text, diagrams, etc.) |
| **Exit Condition(s):** | User finishes viewing educational content. |
| **Exceptions:** | If content fails to load, system offers alternative resources. |
| **Special Requirements:** | Content should be accessible and understandable to users with varying levels of expertise. |

# 3.0 RATIONALE FOR YOUR USE CASE MODEL

The use case model for O.A.S.I.S. is designed to capture the key interactions between the public users and the system. The rationale behind this model includes:

1. **User-Centric Approach:** All use cases are centered around the public user, reflecting the system's purpose as a public-facing dashboard.
2. **Comprehensive Coverage:** The use cases cover all major functionalities described in the functional requirements, ensuring a complete representation of the system's capabilities.
3. **Flexibility:** Use cases like "Perform Custom Queries" and "Compare Analysis" allow for user-driven exploration, enhancing the system's utility for various user needs.
4. **Educational Value:** The inclusion of "Access Educational Resources" supports users in understanding and interpreting the data, increasing the overall value of the system.
5. **Data Transparency:** Use cases for viewing data sources and accessing historical information promote transparency and trust in the system's outputs.
6. **Practical Utility:** Features like data export and satellite tracking cater to practical needs of potential users in the space industry or research fields.
7. **Scalability:** The model allows for easy expansion of features in future iterations of the system.

This use case model provides a clear, user-oriented view of the O.A.S.I.S. system's functionality, serving as a solid foundation for further development and stakeholder communication.

# 4.0 FUNCTIONAL REQUIREMENTS

The functional requirements for O.A.S.I.S. have been developed in accordance with several IEEE standards to ensure comprehensiveness, clarity, and traceability:

* **IEEE 830-1998 (Recommended Practice for Software Requirements Specifications):** This standard provides guidelines for the format and content of software requirements specifications. It ensures that the functional requirements for O.A.S.I.S. are well-structured, unambiguous, and verifiable.
* **IEEE 1233-1998 (Guide for Developing System Requirements Specifications):** This standard offers a systematic approach to developing and organizing system requirements. It has been applied to ensure that O.A.S.I.S. functional requirements are complete and consistent with the overall system goals.
* **IEEE 29148-2018 (Systems and software engineering — Life cycle processes — Requirements engineering):** This more recent standard provides a unified treatment of the processes and products involved in requirements engineering throughout the life cycle of systems and software. It has been used to ensure that the functional requirements for O.A.S.I.S. are well-integrated with the overall systems engineering process.
* **IEEE 1362-1998 (Guide for Information Technology - System Definition - Concept of Operations (ConOps) Document):** While not directly a requirements standard, this guide has been used to ensure that the functional requirements align with the overall concept of operations for O.A.S.I.S., providing a clear link between user needs and system functions.

### Table 4.1 - Functional Requirements with Use Case Mapping

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement ID** | **Functional Requirement** | **Use Case ID** | **Use Case Description** |
| FR-001 | User Interaction | UC-01 | The system shall provide a navigation menu allowing users to switch between different pages or modules of the application. |
| FR-002 | Data Display | UC-02 | The system shall display relevant space environment statistics and metrics on each page, updating dynamically based on user selection and current data. |
| FR-003 | Predictive Analysis - Future Predictions | UC-03 | The system shall generate and display future predictions for spatial environments, including factors such as space weather conditions, orbital debris density, and radiation levels. |
| FR-004 | Predictive Analysis - Environment Ratings | UC-02 | The system shall calculate and display spatial environment ratings for different regions on a 2D globe representation, using a color-coded scale for easy interpretation. |
| FR-005 | User Interaction - Home Page | UC-01 | The system shall provide a home page that clearly describes the purpose and capabilities of the O.A.S.I.S. system, including an overview of available features. |
| FR-006 | Predictive Analysis - Satellite Dispatch Windows | UC-03 | The system shall analyze data to determine and display optimal time windows for satellite dispatches, taking into account predicted space environment conditions. |
| FR-007 | User Interaction - Notifications | UC-01 | The system shall display appropriate warning and error messages to users when system errors occur or when potentially hazardous space conditions are detected. |
| FR-008 | Data Ingestion | UC-02 | The system shall automatically ingest and process data from specified NASA, NOAA, and other open-source datasets at regular intervals to ensure up-to-date analysis |
| FR-009 | Data Export | UC-04 | The system shall allow users to download or export displayed data, analysis results, and visualizations in common file formats (e.g., CSV, PDF, PNG) for offline use. |
| FR-010 | Custom Queries | UC-05 | The system shall provide an interface for users to input custom parameters for specific space environment queries and predictions, without requiring user accounts. |
| FR-011 | Real-time Updates | UC-02 | The system shall automatically update displayed data and predictions at regular intervals to ensure users are viewing the most current information available. |
| FR-012 | Historical Data Access | UC-06 | The system shall enable users to access and view historical space environment data, allowing for trend analysis and comparison with current conditions. |
| FR-013 | Satellite Information | UC-07 | The system shall display information about current satellite positions and predicted trajectories within the space environment visualizations, using publicly available data. |
| FR-014 | Performance Optimization | UC-02 | The system shall implement data caching mechanisms to ensure fast loading of frequently accessed information. |
| FR-015 | Search Functionality | UC-08 | The system shall provide a search feature allowing users to quickly find specific space environment data, regions, or predicted events using keywords or parameters. |
| FR-016 | Comparative Analysis Tool | UC-09 | The system shall offer a tool for users to compare space environment conditions across different time periods or orbital regions, displaying the results in an easy-to-understand visual format. |
| FR-017 | Educational Resources | UC-10 | The system shall include an accessible section with educational resources explaining key concepts of space environments, satellite operations, and the metrics used in the dashboard, to assist users in interpreting the data. |
| FR-018 | Data Source Transparency | UC-02 | The system shall clearly display the sources and last update times for all data presented, ensuring users understand the origin and timeliness of the information they are viewing. |

# 5.0 NON-FUNCTIONAL REQUIREMENTS

The non-functional requirements for O.A.S.I.S. have been developed in accordance with several IEEE standards to ensure comprehensiveness, clarity, and alignment with industry best practices:

1. **IEEE 830-1998 (Recommended Practice for Software Requirements Specifications):** This standard provides guidelines for specifying both functional and non-functional requirements, ensuring they are well-structured, unambiguous, and verifiable.
2. **IEEE 1061-1998 (Standard for Software Quality Metrics):** This standard offers a methodology for establishing quality requirements and identifying, implementing, and validating software quality metrics. It has been used to define measurable quality attributes for O.A.S.I.S.
3. **IEEE 15288-2015 (Systems and software engineering — System life cycle processes):** This standard addresses system-level non-functional requirements, ensuring that O.A.S.I.S. meets overarching system quality and performance needs.
4. **ISO/IEC 25010:2011 (Systems and software engineering — Systems and software Quality Requirements and Evaluation (SQuaRE) — System and software quality models):** While not an IEEE standard, this international standard provides a comprehensive model for software quality, which has been used to ensure all relevant quality attributes are considered for O.A.S.I.S.

### Table 5.1 - Non-Functional Requirements with Use Case Mapping

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement ID** | **Non-Functional Requirement** | **Use Case ID** | **Use Case Description** |
| NFR-001 | Accessibility | All UC | The system shall comply with WCAG 2.1 Level AA accessibility guidelines, including proper color contrast, keyboard navigation, and screen reader compatibility. |
| NFR-002 | Responsive Design | UC-01, UC-02, UC-03, UC-04, UC-05 | The system shall be responsive, adapting its layout and functionality to various screen sizes from mobile devices to large desktop monitors. |
| NFR-003 | Performance | UC-03, UC-02, UC-05, UC-08 | The system shall react to user inputs within 3 seconds and load initial content within 5 seconds on a standard broadband connection. |
| NFR-004 | Usability | UC-01, UC-02, UC-03, UC-09 | The system’s UI shall intuitively and clearly convey statuses and predictions. |
| NFR-005 | Reliability | UC-02, UC-03, UC-06 | The system shall maintain 99.9% uptime during operational hours, with scheduled maintenance performed during off-peak hours. |
| NFR-006 | Interoperability | All UC | The system shall be fully functional on the latest versions of major web browsers including Chrome, Firefox, Safari, and Edge |
| NFR-007 | Scalability | UC-02, UC-03, UC-05, UC-08 | The system shall be capable of handling up to 5 concurrent users without degradation in performance. |
| NFR-008 | Security | UC-04, UC-05 | The system shall implement HTTPS protocol and follow TLS 1.3 Standards. |
| NFR-009 | Data integrity | UC-02, UC-03, UC-06, UC-07 | The system shall validate all input data and maintain data consistency across all components and visualizations. |
| NFR-010 | Maintainability | All UC | The system's codebase shall adhere to agreed-upon coding standards and be thoroughly documented to facilitate future updates and maintenance. |

# 6.0 EVIDENCE THE DOCUMENT HAS BEEN PLACED UNDER CONFIGURATION MANAGEMENT

## 6.1 Configuration Management Tool

The O.A.S.I.S. project utilizes Google Docs as its Configuration Management (CM) tool. Google Docs provides integrated version control, collaborative editing, and change tracking for all project documents.

## 6.2 Version Control Information

Google Docs automatically maintains a detailed revision history for each document, tracking changes by version number, date, and publishing author. This system allows for comprehensive tracking of document evolution over time.

## 6.3 Version Control Process

For each project document:

1. **Check-out Process**:
   * Team members access the document through the shared Google Drive.
   * The current version number is noted before making any changes.
2. **Making Changes**:
   * Team members make changes directly in the document.
   * Google Docs automatically saves changes and updates the revision history.
3. **Check-in Process**:
   * After completing changes, the team member notifies the group.
   * The version number is incremented according to our tiered system (1 to 9 before advancing to the next tier).
4. **Review Process**:
   * At least two team members, excluding the author, must review the changes.
   * Reviewers use Google Docs' commenting feature to provide feedback or approval.
5. **Finalization**:
   * Once approved, the document is marked as the latest version in the revision history.

## 6.4 Difference Tracking

* Google Docs' built-in "See version history" feature is used to view and compare different versions of the document.
* For significant changes, a summary is added to the document's change log section.

## 6.5 Review Documentation

* All reviews are documented using Google Docs' commenting feature.
* A minimum of two approvals are required before a new version is finalized.
* Review comments are preserved in the document's comment history.

## 6.6 Additional Change Information

* A change log section is maintained at the end of each document, summarizing major changes between versions.
* The change log includes:
  + Version number
  + Date of change
  + Author of change

## 6.7 Storage and Access

* All project documentation is stored on a shared Google Drive, accessible only to team members.
* Access is controlled through Google's sharing settings, ensuring only authorized team members can view and edit documents.

## 6.8 Approval Process

Document approval is based on group and sponsor consensus. Our versioning uses a tiered system, incrementing from 1 to 9 before advancing to the next tier (e.g., 1.1, 1.2, ..., 1.9, 2.0).

## 6.9 Backup and Recovery

* Google Drive's cloud storage serves as the primary backup, providing reliable access and automatic saving.
* For additional security, hard copies of finalized versions are created intermittently and stored securely.

# 7.0 ENGINEERING STANDARDS AND MULTIPLE CONSTRAINTS

The O.A.S.I.S. project adheres to the following IEEE standards and guidelines to ensure quality, consistency, and best practices in software development and systems engineering:

* IEEE 830-1998: Recommended Practice for Software Requirements Specifications

This standard provides guidelines for the format and content of software requirements specifications, ensuring that the functional and non-functional requirements for O.A.S.I.S. are well-structured, unambiguous, and verifiable. [[pdf](https://personal.utdallas.edu/~chung/RE/IEEE830-1993.pdf)]

* IEEE 1012-2016: Standard for System, Software, and Hardware Verification and Validation

This standard is applied to ensure reliability and consistency in the verification and validation processes throughout the development of O.A.S.I.S. [[pdf](https://img.antpedia.com/standard/files/pdfs_ora/20230616-ieee/IEEE/Std/IEEE%20Std%201012-2016.pdf)]

* IEEE 12207-2017: Systems and software engineering — Software life cycle processes

This standard is used to guide the overall software development process for O.A.S.I.S., from conceptualization through retirement. [[pdf](https://cdn.standards.iteh.ai/samples/63712/0bc6d9107eeb46d88dbc7b628b12cf4b/ISO-IEC-IEEE-12207-2017.pdf)]

* IEEE 1016-2009: Standard for Information Technology—Systems Design—Software Design Descriptions

This standard provides guidelines for the content and organization of software design descriptions, crucial for maintaining clear and comprehensive documentation of the O.A.S.I.S. system design. [[pdf](https://cengproject.cankaya.edu.tr/wp-content/uploads/sites/10/2017/12/SDD-ieee-1016-2009.pdf)]

* IEEE 1220-2005: Standard for Application and Management of the Systems Engineering Process

This standard is followed to ensure proper application and management of the systems engineering process, which is crucial for space environment data systems like O.A.S.I.S. [[pdf](https://www.saiglobal.com/PDFTemp/Previews/OSH/iso/updates2007/wk28/ISO-IEC_26702-2007.PDF)]

* IEEE 1541-2002: Standard for Prefixes for Binary Multiples

This standard is implemented for data exchange and formatting, ensuring accurate representation of large datasets common in space environment analysis. [[pdf](https://www.ieee802.org/secmail/pdf00106.pdf)]

* IEEE 1233-1998: Guide for Developing System Requirements Specifications

This standard offers a systematic approach to developing and organizing system requirements, ensuring that O.A.S.I.S. requirements are complete and consistent with overall system goals. [[pdf](https://ranger.uta.edu/~huber/cse4316/Docs/IEEEStd1233-1998.pdf)]

* IEEE 29148-2018: Systems and software engineering — Life cycle processes — Requirements engineering

This more recent standard provides a unified treatment of the processes and products involved in requirements engineering throughout the life cycle of systems and software. [[pdf](https://cdn.standards.iteh.ai/samples/72089/62bb2ea1ef8b4f33a80d984f826267c1/ISO-IEC-IEEE-29148-2018.pdf)]

* IEEE 1362-1998: Guide for Information Technology - System Definition - Concept of Operations (ConOps) Document

While not directly a requirements standard, this guide is used to ensure that the functional requirements align with the overall concept of operations for O.A.S.I.S. [[pdf](https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=761853)]

* IEEE 1061-1998: Standard for Software Quality Metrics

This standard provides a methodology for establishing quality requirements and identifying, implementing, and validating the process and product software quality metrics. [[pdf](https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=749159)]

* IEEE 15288-2015: Systems and software engineering — System life cycle processes

This standard addresses system-level non-functional requirements, ensuring that O.A.S.I.S. meets overarching system quality and performance needs. [[pdf](https://ieeexplore.ieee.org/stamp/stamp.jsp?arnumber=7106435)]

# 8.0 ADDITIONAL REFERENCES

Lamsweerde, A.V., 2009. Requirements Engineering: From System Goals to UML Models to Software Specifications. John Wiley

Rescorla, E. (2018, August). The Transport Layer Security (TLS) Protocol Version 1.3. Internet Engineering Task Force.<https://datatracker.ietf.org/doc/html/rfc8446>