SAAPS

Satellite Anomaly Analysis and Prediction System

Software Requirements Document

Version 0.1

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1. Introduction

1.1. Purpose

The Satellite Anomaly Analysis and Prediction System (SAAPS) contain 3 subsystems: the database and database tool (DB&T), the satellite anomaly analysis module (SAAM), and the satellite anomaly prediction module (SAPM). The user requirements for each subsystem are described in the URD-WP110 (DB&T) [1], URD-WP210 (SAAM) [2], and the URD-WP310 (SAPM) [3]. The purpose of this document is to specify the requirements of the software system from the developers point of view. The SRD incorporates the user requirements described in the URD's.

1.2. Scope

1.3. Definitions, acronyms and abbreviations

1.4. References

1. URD-WP110
2. URD-WP210
3. URD-WP310
4. ESA software engineering standards, ESA PSS-05-0 Issue 2, February 1991.
5. Guide to the user requirements definition phase, ESA PSS-05-02 Issue 1, October 1991.

1.5. Overview

The structure of this document follows the document template as described in the ESA software engineering standards [4] and user requirements guide [5].

Section 2 describes, in general terms, the software requirements of SAAPS. In Section 3 the specific requirements are given.

2. General description

2.1. Relation to current projects

Lund Space Weather Model

2.2. Relation to predecessor and successor projects

Lund Space Weather Model and SPEE

2.3. Function and purpose of SAAPS

The SAAPS user requirements are specified in three separate URDs ([1],[2],[3]), each capturing the requirements of the three subsystems: database and database tools (DB&T), satellite anomaly analysis module (SAAM), and satellite anomaly prediction module (SAPM).

The purpose of SAAPS is to provide a tool for the analysis and prediction of satellite anomalies. As the users of SAAPS will work in many different geographical regions, and at the same time they share a common database, it is decided that SAAPS shall be operated over the Internet.

2.3.1 Database and database tools

The purpose of the DB&T is to maintain a database of space weather and anomaly data, and to provide this data to the SAAM and SAPM. The DB&T shall therefore have functions to build the database from existing databases. To keep the SAAPS database up to date with real time data the DB&T shall also have functions to automatically retrieve and store new data into the database. This updating ranges from once every 10 minutes to once every day.

2.3.2 Satellite Anomaly Analysis Module

[WP 220]

2.3.3 Satellite Anomaly Prediction Module

[WP 320]

2.4. Model description

The SAAPS model is naturally divided into the three subsystems defining the function of SAAPS, namely the database and database tools (DB&T), the satellite anomaly analysis module (SAAM), and the satellite anomaly prediction module (SAPM). The DB&T can work by itself and do not depend on SAAM or SAPM.

From a users point of view the entrance point to SAAPS will be a web page where he can select whether to run the real time predictions module or the analysis module. In addition to this there shall be links to help pages. The regular user shall thus never be able to directly run the DB&T.

2.4.1 Database and database tools

The access to the database is via the database tools (DBT). The DBT can be run by the system manager, automatically, and by the SAAM and SAPM.

Initially the database does not exist, but must be built. To perform this the data source must be selected, which e.g. can be a URL. Then the data format and the relevant parameters must be identified. This information is provided to the DBT and an object in the database is created. At this stage only the metadata for the database object has been created.

Data can now be stored in the database object. In the process of building the database the system manager must manually run the DBT to add new data for an existing database object.

Existing database objects can also be updated automatically by the DBT at an interval specified by a scheduling program.

The DBT shall provide interfaces to the SAAM and the SAPM. The interfaces are of the type that a request for data comes from SAAM/SAPM and the DBT then returns the data. The SAAM/SAPM can thus only retrieve data from the database and never alter the database.

The database objects can generally by of one of two types: contiguous data or non-contiguous data. As a major part of the database will contain contiguous data the model will be optimized for this. One database object might e.g. contain several years of 1 minute resolution data and it must be ensured that any given time period can be uploaded quickly.

The satellite anomaly data in the database shall have a special status due to the confidentiality issues. The system manager shall always have full access to the database. A user, who always

enters via the SAAM or SAPM, shall only retrieve summary information about the anomalies in a way so that the source will never be disclosed.

2.4.2 Satellite Anomaly Analysis Module

[WP 220]

2.4.3 Satellite Anomaly Prediction Module

[WP 320]

3. Specific requirements

3.1. Functional requirements

The functional requirements are given below.

4. User requirements vs. software requirements traceability matrix