

Software Requirements Specification for Radiation Forecasting Server

Author: Nived Narayanan

Change Record

2017.06.21 - Document created

Introduction

Purpose

This document describes the software requirements specification for the Radiation Forecasting Server.

Scope

Describes the scope of this requirements specification.

Reference Documents

- [1] -- [PREDICCS](#).
- [2] -- [CACTUS](#).
- [3] -- [FORSPEF](#).
- [4] -- [Software Engineering Practices Guidelines](#).

Glossary

Overview

General Description

Problem Statement

Radiation is the transmission of energy in the form of waves or sub-atomic particles. In space missions a major concern is the particle radiation. Energetic particle radiation passing through human body could damage the cells or DNA causing an increased risk for cancer. Especially when out of Earth's magnetic field protection, astronauts are exposed to ionizing radiation with doses in the range from 50 to 2,000 mSv (milli Sievert). The evidence of cancer risk from ionizing radiation is extensive for radiation doses that are above about 50 mSv. The module forecasts the radiation events and helps train crew members to tackle the issue of radiation effectively in simulated environments (Mars city project).

Functional Description

The goal of the module is to implement the radiation forecast using a deterministic model using the data provided by sources like FORSPEF, PREDICCS and CACTUS. The model will give a heads up for SEP events and also issues an all-clear signal when the event has settled down.

User objectives

As of now the module has more significance in the MARS CITY project which aims in providing a simulation of the Martian environment for preparing the crew.

Constraints

The module is constrained by the continued availability of functional data from the respective satellites.

Functional Description

The package takes in the continuous data stream from sources and returns the time of arrival as the output. In case if the event has already been recorded by the sources the package alarms when the event has subsided.

Environment

The package currently is intended to run in simulation environments of the marscity project. The package can be used in the V-ERAS project to alert through oculus or other VR gadgets.

User objectives

Crew

The user is the crew in simulated environments and the package is expected to give information of SEP events for preparing the crew for the same.

Interface Requirements

User Interfaces

GUI (Graphical User Interface)

At present a web based GUI is used for representing the streaming data and the alarms. In future the package could be used in VR systems.

API (Application Programming Interface)

The falcon REST API provides the user with data as well as alarms after analysing data from the sources.

Alarms end point:

```
request      : GET
URL          : http://localhost:8000/test
example output : {u'thresholds': {u'SEP probability threshold': 0.25, u'Thin spacesuit
```

Data end point:

```
request      : GET
URL          : http://localhost:8000/test
```

Flask API for web based GUI:

```
request      : GET
URL          : http://0.0.0.0:9999/
```

output : graph generated with plotly.js library and alarm data.

Alarm data description

time of arrival

None :- when the SEP probability threshold(provided by forspef) is below

Time in seconds :- when the probability is above the threshold value

prediccs-alarm

None :- When the radiation dosage is below the threshold

Warning!!! :- When the radiation dosage is below the threshold

all-clear

None :- When there is no event occuring

all-clear :- When the event has passed