User and Software Requirements Document

Study of Plasma and Energetic Electron Environment and Effects

Work package 330: Development of space weather information server

ESTEC contract 11974/96/NL/JG(SC)*

Ari Viljanen
Finnish Meteorological Institute
Geophysical Research Division

ESA Technical Officer: A. Hilgers, D/TOS Space Environments and Effects Analysis Section (TOS-EMA)

*ESA Technological Research Programme
Space Environments and Effects Major Axis

DOCUMENT STATUS SHEET

1. DOCUMENT TITLE: User and Software Requirements Document for the Study of Plasma and Energetic Electron Environment and Effects
Work package 330: Development of space weather information server
ESTEC contract 11974/96/NL/JG(SC)

2. ISSUE: 1

3. REVISION: 1

4. DATE: December 28, 1998

5. REASON FOR CHANGE: First issue

DOCUMENT CHANGE RECORDS MADE SINCE LAST ISSUE

ABSTRACT

Work package 330 (Development of space weather information server) of the SPEE project (Study of Plasma and Energetic Electron Environment and Effects) provides a World Wide Web server, which contains detailed descriptions of existing European space weather resources in Internet, and link collections to world–wide space weather servers. As a special input of the SPEE project, technical notes and other documentation of the study are included, as well as access to the data bases developed during this and other studies concerning the estimation of satellite anomaly risks.

TABLE OF CONTENTS

CHAPTER 1 INTRODUCTION

1.1 PURPOSE

This is the combined User Requirements Document and Software Requirements Document for the Work Package 330 of the project “Study of Plasma and Energetic Electron Environment and Effects“ performed under the ESTEC contract 11974/96/NL/JG(SC) in 1996–98. This document should be read by all active participants of the project.

1.2 SCOPE OF THE SOFTWARE

WP 330 of the SPEE project produces a World Wide Web (WWW) server whose contents is as follows:

– Description of the existing European space weather resources
– Links to other space weather servers
– Access to data bases necessary for estimation of satellite anomaly risks
– Technical notes and other documentation of the SPEE study

The server will be run at FMI until the end of the project (August 1998) when it will be transferred to ESTEC. FMI will update the contents during two years after the end of the project. In that period, identical copies will be kept at FMI and ESTEC.

1.3 DEFINITIONS, ACRONYMS AND ABBREVIATIONS

See Appendix A.

1.4 REFERENCES

Not applicable.

1.5 OVERVIEW

In the following we give the details of the user and software requirements combined by mainly following the outline of a standard User Requirements Document. Chapter 2 includes the general description, and chapter 3 detailed requirements.

CHAPTER 2 GENERAL DESCRIPTION

2.1 PRODUCT PERSPECTIVE

Space weather related information is available on WWW on hundreds of sites mainly in North America, Europe, Australia and Japan. Both the number of pages and server providers is largest in the United States. Pages are usually maintained by governmental research institutes performing near–earth–space studies, and topics are related to the interests of each group.

The SPEE WWW server has two main lines in structure:

– collection of relevant space weather links

– results of the study of satellite anomalies performed during SPEE

Concerning the link collection, a new point is that emphasis is focused on European space weather information available on Internet, so a detailed description of existing European resources on WWW is given.

Results of the satellite anomaly study by IRF will be included in the WWW server. Additionally, access to other data bases necessary for estimation of anomaly risks will be added.

2.2 USER CHARACTERISTICS

Users of the WWW server will mainly be scientists and engineers who may have a general interest in space weather problems, space weather data, and derived models, or who especially search for information of satellite anomalies. Interest by non–scientific audience can also be expected, for example by radio amateurs. The wide coverage of space weather phenomena from the interplanetary medium to the earth’s surface makes the generally interested user population heterogeneous.

2.3 GENERAL CONSTRAINTS

No specific constraints are expected.

2.4 ASSUMPTIONS AND DEPENDENCIES

Not applicable.

2.5 OPERATIONAL ENVIRONMENT

2.5.1 Maintainer

See Sect. 3.2.1.

2.5.2 Other users

See Sect. 3.2.2.

CHAPTER 3 SPECIFIC REQUIREMENTS

3.1 CAPABILITY REQUIREMENTS

3.1.1 Capacity

The disk space needed in the host computer for the HTML files, satellite anomaly data files, and PDF files (of public documents) is in minimum 200 Mb. The number of users is unlimited, i.e. concurrent access to all files is possible.

3.1.2 Speed

For users browsing the WWW pages, standard personal computers are fast enough. The size of WWW pages including associated graphics is to be kept small (preferably under 30 Kb) to ensure short loading times. An exception are PDF files of technical documents, which may be some 100 Kb. The users must be informed about such large files before downloading.

Exact transfer times depend on the individual users' network connections, but on a local network the response time should be at most 2 seconds. Possibly longer execution times for interactive operations should be informed on WWW pages.

3.1.3 Accuracy

Not applicable concerning the maintainer of WWW server. Provider of the satellite anomaly analysis results is responsible for them.

3.2 CONSTRAINT REQUIREMENTS

3.2.1 Hardware, software and communication interfaces

All developed software shall conform to ESA Software Engineering Standards. Programming shall be performed either in ANSI Fortran–77 or Fortran–90 or in C. The target computer system shall be either a DEC–Alpha running the VMS operating system, a HP station running HP–UX operating system or a SUN station running Solaris system, linked to Internet. The PV–Wave or IDL analysis and graphics packages may be used in parts of this work agreed with ESA.

3.2.2 User interfaces

Standard HTML (version 3.0) is to be used to make the WWW pages readable by the most well–known browsers (for example, Netscape Navigator 4.0 or Microsoft Explorer 4.0). All images will have a suitable ALT text for browsing without loading images.

3.2.3 Adaptability

It is possible to add and change WWW pages without modifying the main structure of the server. The page layout shall be comfortable and logical, and shall be easily modified throughout the whole system.

3.2.4 Availability

The WWW server will operate continuously.

3.2.5 Portability

The prototype will be developed in UNIX operating system in an Silicon Graphics Power Challenge work station. PERL scripts will be used for accessing the anomaly databases, and for searching in the internal link database.

HTML and PDF files and standard format graphic files (e.g. gif and jpeg) have no portability restrictions. Names of files will be in lowercase to avoid problems with different operating systems. Internal referencing will be relative.

Using HTML 3.0 ensures the upward compatibility to HTML 4 and later versions. The reason for not to use the latest HTML version is to ensure that older versions of WWW browsers work properly.

3.2.6 Security

WWW pages are public except the internal pages of the SPEE project. The access to the internal pages will be restricted to specified computers by a standard method (.htaccess files).

3.2.7 Safety

Not applicable.

3.2.8 Standards

See 3.2.1 for general ESA requirements. Concerning HTML, version 3.0 will be used.

3.2.9 Resources

See Sect. 3.2.1 and 3.2.2

3.2.10 Timescales

The general schedule of WP 330 is illustrated in Appendix A.2.

Final versions of all developed software of the WWW server shall be installed at ESTEC by FMI at the time of the final presentation when a detailed course of one day duration shall also be performed.

The WWW server and the HTML pages shall be kept operational for two years after the end of the SPEE contract, i.e. until August 2000. During this period all changes of the HTML pages on the server shall be made in agreement with ESA.

APPENDIX A

A.1 GLOSSARY

ESTEC = European Space Research and Technology Centre
FMI = Finnish Meteorological Institute
HTML = HyperText Markup Language
IRF = Institutet för rymdfysik (Swedish Institute of Space Physics)
SPEE = Study of Plasma and Energetic Electron Environment and Effects“ (ESTEC contract 11974/96/NL/JG(SC))
WP = work package
WWW = World Wide Web

A.2 SCHEDULE OF WP 330