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ESA Space Weather Study (ESWS)
WP432. Space Weather Service.

Interface between spacecraft ground segment and space weather service

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Authors: Mike Hapgood, CLRC Rutherford Appleton Laboratory

ESA technical Officer: A Hilgers D/TOS, TOS-EMA

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1 Preface

1.1 Document change record

Issue	Date	Notes/remarks
1.0	26 Jul 2001	First version
1.1	26 Nov 2001	Added conclusion

1.2 Purpose of the document

This document is part of the output from the ESWS workpackage on ground segment definition (WP430). It provides a description of the interface between the two components of the ground segment the spacecraft interface described in WP431 and the space weather service described in WP432.

1.3 Definitions, acronyms and abbreviations

ESWS	ESA Space Weather programme Study
FTP	File transfer protocol
GIC	Geomagnetically induced current
HTTP	Hypertext transfer protocol
L1	Lagrangian point 1 - 1.5 million km sunward of Earth
URL	Uniform Resource Locator

1.4 Important Documents

We list here the various documents used as source material for this report. These include both hardcopy and web sources. Documents may be referenced in the test and this is indicated by a series of characters enclosed in square brackets, e.g. [XYZ].

[PROPOSAL] Study for an ESA Space Weather programme, RAL/RRS/116/99, Proposal in Response to ESA ITT AO/1-3533/99/NL/SB.

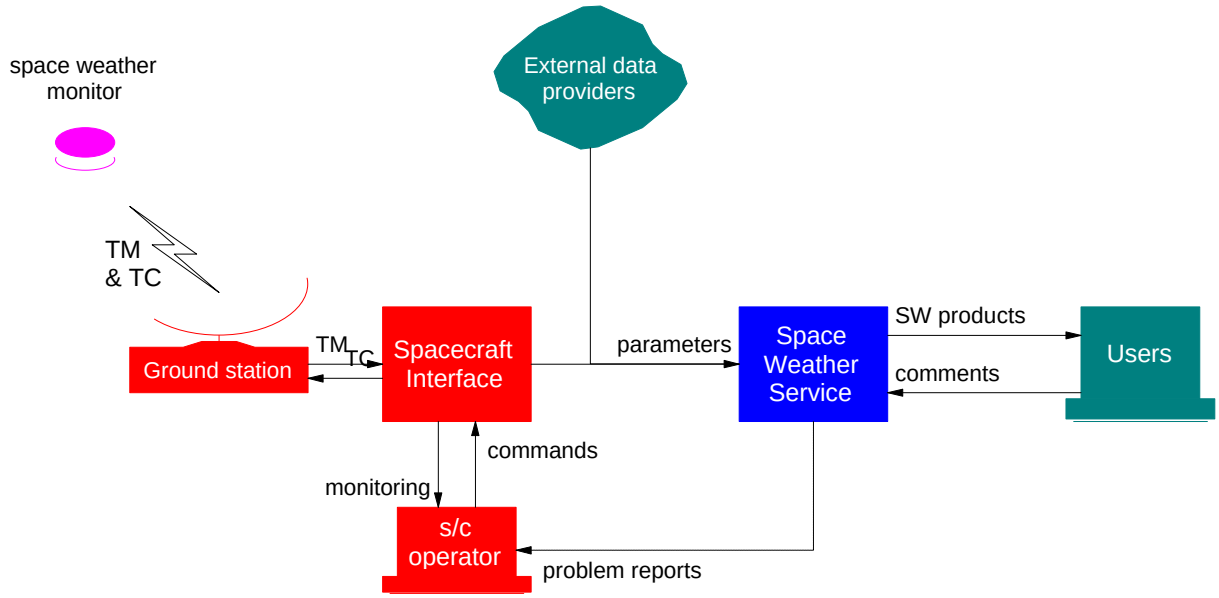
[URL] RFC 1738: Uniform Resource Locators (URL) http://www.w3.org/Addressing/rfc1738.txt

2 Introduction

The aim of this document is to specify the interface between the two parts of the space weather ground segment, as identified in the study proposal [PROPOSAL], namely:

1. Spacecraft Interface. This is the classical ground segment required to operate space-based instruments and convert their output into calibrated physical parameters (e.g. the conversion of particle counts to solar wind density and velocity). It is described in WP431.
2. Space Weather Service. This service uses the physical parameters from the Spacecraft Interface (and other data sources as appropriate) to provide an added-value service for end users. Typically, this service will involve running those environmental parameters through a model or models to generate data relevant to the needs of users. For example, measurements of the interplanetary medium at L1 can run through models to predict GIC risk 30 minutes ahead. This part of the ground segment is described in WP432.

This structure is illustrated in the following figure.



Space Weather Ground Segment

This document is concerned with the interface required to pass physical parameters, and their supporting metadata, from the spacecraft interface to the space weather service.

3 Interface requirements

This interface must satisfy a number of requirements:

1. It shall be capable of delivering data with minimum delay so that they can be used in predictions of future conditions. This implies the use of a network interface – and excludes the use of physical media.
2. It shall be reliable in order to support a reliable space weather service. This implies that it should be based on a well-established network technology for data delivery.
3. It should be capable of also handling the interface between many (if not all) of the external data providers and the space weather service. This requirement allows broader use of the interface with consequent advantages in terms of implementation and costs. This implies that the interface should be based on a widely-used network technology.

4 Interface specification

To satisfy these requirements it is proposed that the interface to pass physical parameters, and their supporting metadata, from the spacecraft interface to the space weather service should be based on delivery of files over the network using any of protocols that can be specified in a Uniform Resource Locator [URL].

The URL is a string that specifies the network location of files in the form:

<protocol>://<computer name>/filepath/filename

where:

- protocol is the acronym for the network protocol, e.g. ftp, http, etc.
- computer name is the internet address of the computer from which the file should be retrieved
- filepath is the path to the directory containing the file – specified relative to a protocol-specific root point on the remote computer
- filename is the name of the file to retrieved

This approach readily meets all the requirements above. The URL approach has become very well-established and very widely used in the past decade – especially with the development of the World-Wide Web. It is therefore a robust and inexpensive method of providing the interface that is required here.

Note also that the use of URLs for this interface does not constrain data formats. In principle, this approach can handle files in any format. This is important as external data providers are likely to deliver data in a variety of formats for some years to come. The issue of formats will be discussed in detail in the report on the Space Weather Service and is not pursued further here.

5 Conclusions

We recommend use of Uniform Resource Locators as a means of specifying files to be transferred within a space weather programme. It will provide a uniform interface through which the space weather service can retrieve data from a variety of sources – from both dedicated space weather measurements and from measurements carried out by other programmes.