# Scandinavian Data Centre
# DS-SDC-UR-0001 User Requirements

Gunnar Holmgren
Swedish Institute of Space Physics
Uppsala Division
S-755 91 Uppsala
Sweden

| Change Record | | | | |
|---|---|---|---|---|
| Date | Issue | Rev. | Section | Description |
| 930128 | Draft | 0 | all | New document |
| 930507 | 1 | 0 | 2.1.2 | Added the text of RFA CSDS-RR-32 |
| 930903 | 1 | 1 | 3.1.3 | Added UR-SDC-117 |
| 930914 | 1 | 2 | Title | Changes due to removal of ISDAT parts |
| 930914 | 1 | 2 | all | Changes due to removal of ISDAT parts |

# Contents

# Chapter 1

# Introduction

## 1.1  Purpose of the document

This document describes *what* the SDC[1] is required to do from the users point of view. and *how well* it is to be done. It does not contain any description on *how* the functions are performed.

It will serve as a basis for the SDC software requirements document [7].

## 1.2  Scope of the software

The scope of the required software is to provide means to provide the services and products of the SDC as defined in the SDC Interface Control Document [5].

## 1.3  Definitions, acronyms, and abbreviations

A complete list of acronyms is given in an appendix.

## 1.4  Documents

### 1.4.1  Applicable documents:

The CSDS[2] Requirements Specifications [8] is considered superior to this document. All requirements listed in [8] explicitly related to the SDC[3] are also listed as specific requirement in this document. General requirements in [8] are listed here in general terms without explicitly repeating all details.

### 1.4.2  Reference documents:

All referenced documents are listed under chapter Bibliography.

## 1.5  Overview

Chapter 2 of this document contains a summary description of the SDC. The general interfaces to the non-EFW community are briefly summarised, as well as the general characteristics of the users.

Chapter 3 lists the detailed user requirements deduced from both EFW users and the Cluster community users. The requirements are divided into capability requirements and constraint requirements. Each requirement is labelled, and for each

---

[1]Scandinavian Data Centre
[2]Cluster Science Data System
[3]Scandinavian Data Centre

requirement the origin of the requirement is given. Each requirement is also classified as essential or having priority 1-3.

The document organisation follows the ESA software engineering standards [4] recommendations for a user requirements document.

# Chapter 2

# General Description

## 2.1 Product perspective

The SDC constitutes one component of the Cluster wide system, CSDS. The proposed CSDS system is described in the CSDS final report [2]. The specific interface to the SDC is described in the SDC Interface Control Document [5].

## 2.2 User characteristics

The data base production will be made at KTH/SDC, but probably by part time non-expert operators. The data base user interface will be taken care of by ESIS. From the SDC point of view, we have two groups of users, the CSDS, mainly the other DC:s, and EFW CoI's acting on behalf of the EFW PI or in their own interest.

## 2.3 General constraints

For the data base production component, SDC is subject to constraints imposed by the CSDS coordination

## 2.4 Assumptions and dependencies

It is assumed that manpower and other resources is supplied by the EFW Co:I institutions. For the database production, it is assumed that ESANET and ESIS is provided by ESA. It is also assumed that data traffic within Scandinavia can utilise the Scandinavian University network SUnet free of traffic charges.

## 2.5 Operational environment

SDC software development and operations shall take place within small research groups of the EFW community, particularly within Scandinavia. There will be interactions between these EFW groups and professional computer departments within the CSDS in all development and operational phases of the project.

# Chapter 3

# Specific Requirements

Each capability requirement is classified as essential or given a priority. Priorities are given in a scale from 1 to 3 with 1 meaning highest priority.

## 3.1 Capability requirements

The SDC should accomodate both functions specific to EFW users and CSDS associated functions. Only requirements specifically derived from CSDS requirements are subject to examination by the CSDS requirements review.

**UR-SDC-001** The EFW obligations related to the CSDS, as described in the CSDS final report [2], shall be organised via a Scandinavian Data Centre. Derives from the AO requirement to make data publicly available [1]. See also the SDC proposal to ESA [3]. Essential.

**UR-SDC-002** The SDC shall, in general, be fully consistent with the CSDS, so as to meet the needs of the Cluster community. See [8]. Essential.

**UR-SDC-003** SDC shall receive one copy of the RDM. Source: Needed for both CSDS and EFW functions within SDC. Essential.

**UR-SDC-004 to 100** Not used

### 3.1.1 SDC CSDS related functions

**UR-SDC-101** EFW parts of the CSDS data bases shall be produced and made available to other CSDS DC:s on a regular basis during the Cluster nominal 2 years lifetime. Derives from CSDS requirement 3.5.1a, [8]. Essential.

**UR-SDC-102** EFW CSDS Summary Plots shall be produced and made available to other CSDS DC:s on a regular basis during the Cluster nominal 2 years lifetime. Derives from CSDS requirement 3.5.1b, [8]. Essential.

**UR-SDC-103** SDC shall store SPDB data for the whole Cluster during the lifetime of the mission to provide Scandinavian scientists with access to SPDB data. Derives from CSDS requirement 3.5.1c [8]. (see also CEDAS meeting 920513) Essential.

**UR-SDC-104** SDC shall store at least four months of PPDB data on line for the whole Cluster to provide Scandinavian Cluster scientists with access to PPDB data. Derives from CSDS requirement 3.5.1d [8]. (see also CEDAS meeting 920513) Essential.

**UR-SDC-105** SDC shall provide software tools to access the CDDS file (formerly named short history file). Derives from:

- CSDS requirement 3.5.1e [8].
- CSDS requirement 3.5.1f [8].
- EFW requirement to do quick scientific analysis

Essential.

**UR-SDC-106** SDC shall provide tools to do health and safety check of the EFW instrument and do quick scientific analysis of EFW data based on the CDDS file.

- Derives from CSDS requirement 3.5.1f [8].
- Derives from a EFW desire to get quick feedback for determination of measuring modes etc.

Essential.

**UR-SDC-107** SDC shall provide s/w tools to update the EFW calibration file, and keep the EFW calibration file(s) available to the other CSDS data centres. Derives from CSDS requirement 3.5.1g [8]. Essential.

**UR-SDC-108** SDC shall provide access to JSOC services for the Scandinavian Cluster experimentalists. Derives from CSDS requirement 3.5.1h [8]. Essential.

**UR-SDC-109** SDC shall provide a mechanism to communicate EFW command sequences to JSOC. Derives from CSDS requirement 3.5.1i [8]. Essential.

**UR-SDC-110** Summary plots (SPlots) shall be available at the SDC to provide the Scandinavian Cluster community with access to SPlots. Derives from CSDS requirement 3.5.1j [8]. (see also CEDAS meeting 920513) Essential.

**UR-SDC-111** SDC shall make available to other DC:s software for EFW data base production. CSDS requirement 4.5 [8]. Essential.

**UR-SDC-112** SDC shall provide a mechanism to keep all CSDS DB:s stored at the SDC up to date. A CSDS requirement. [8] Essential.

**UR-SDC-113** SDC shall provide access control for access points that are not controlled by ESIS. This is both a CSDS and EFW requirement. Essential.

**UR-SDC-114** SDC shall provide EFW data to other CSDS DC:s during the initial data taking phase for intercalibration with other instruments. Derives from CSDS requirements [5]. Essential.

**UR-SDC-115** SDC shall provide a mechanism to trace software and calibration file versions used in data base production. Source: EFW team meeting [6]. Need: priority 1.

**UR-SDC-116** Prime and summary parameters shall be validated by the EFW PI before release. Source: PI requirement Need: essential

**UR-SDC-117** SDC shall provide a mechanism to reprocess all EFW CSDS files after the initial routine processing. This requirement derives from the PI and SWT desire to maintain a high quality of the CSDS databases. Need: priority 1.

**UR-SDC-118 to 119** Not used

### 3.1.2 SDC EFW related functions

Requirements under this heading are not subject to examination by the CSDS requirements review.

**UR-SDC-120** SDC shall provide for storage and update of EFW predefined[1] instrument commanding files. Essential.

**UR-SDC-121** SDC shall contain tools to review and select predefined instrument command sequences, for eventual communication of to JSOC. See [6]. Essential.

**UR-SDC-122** SDC shall contain an operator interface, TBD. Derives from a desire to minimise the training requirements for the operator. Priority: 2.

**UR-SDC-123** SDC shall contain an experimentalist user interface, for access outside ESIS for EFW CoI's, TBD. Derives from a desire to service many individuals. Priority: 3.

**UR-SDC-124** SDC shall provide quality check and cataloguing of RDM:s. Derives from an EFW service request. Priority: 3.

**UR-SDC-125** SDC shall maintain an EFW command log. Derives from an EFW desire to trace the instrument history, and it may be used in the health check procedure, Priority: 1.

**UR-SDC-126** SDC shall provide and maintain necessary software to include EFW data in CFC Level 1 format, if requested by the WEC. Derives from a desire to facilitate joint WEC data analysis. Essential.

**UR-SDC-127** SDC shall provide direct network access to EFW related tools by the EFW PI or his representatives. Derives from a desire to share the tasks of instrument health and safety check, commanding, quick science etc. within the EFW team. Essential

**UR-SDC-128 to 500** Not used

## 3.2 Constraint requirements

**UR-CEDAS-501** All CEDAS documents shall be written in the English language. Derives from the multilingual user community. Essential.

**UR-CEDAS-502** The CEDAS implementation and operations shall be done as a joint responsibility by the Scandinavian EFW institutions with contributions from all other EFW institutions. Derives from a lack of a central funding and governing body for the EFW experiment.

**UR-CEDAS-503** Not used

**UR-CEDAS-504** The choice of data base management system (if used at all) must be coordinated with the other CSDS DC:s. An ESIS requirement. Desirable.

**UR-SDC-501** The SDC shall be located at KTH. Derives from the decision to include an SDC in the CSDS agreed upon at the CEDAS meeting 891214, and the agreed split of responsibilities discussed during many CEDAS meetings.

**UR-SDC-502** CSDS related parts of the SDC shall in general comply to the CSDS software standards. CSDS requirement 4.8.1 [8].

**UR-SDC-503** CSDS related parts of the SDC shall in general comply to the CSDS hardware standards. CSDS requirement 4.8.2 [8].

---

[1] These files are to be created and tested by Peter Harvey, SSL, and provided to the SDC according to discussions at the EFW meeting in Berkeley [6]

**UR-SDC-504** The SDC development shall be synchronised with the CSDS time schedule. Derives from the necessity of CSDS coordination [5]. Desirable.

# Bibliography

[1] STSP Cluster and Soho announcement of opportunity, 1987. AO-OSSA-1-87.

[2] *Cluster Science Data System*, 1990. Final report of the CSDS working group.

[3] A proposal for a Scandinavian Data Centre for the Cluster mission, December 12 1990.

[4] ESA software engineering standards. Technical report, European Space Agency, February 1991. ESA PSS-05-0.

[5] G. Holmgren. Interface control document for the Scandinavian Data Centre. Technical report, Swedish Institute of Space Physics, Uppsala Division, 3 April 1992. DS-SDC-ID-0001.

[6] G. Holmgren. Minutes of the EFW meeting in Berkeley, December 1992. Data handling part.

[7] G. Holmgren, P.-A. Lindqvist, and B. H. Nilsson. SDC software requirements. Technical report, IRF-U, Draft Rev. 0, January 1993. DS-SDC-SR-0001.

[8] Cluster science data system requirements specification. Technical report, ESA-ESTEC, 20 Nov 1992. DS-EST-RS-0001.

# Appendix A

# Acronyms

| Acronym | Meaning |
|---------|---------|
| AC | Alternating Current |
| AFGL | Air Force Geophysics Laboratory |
| AI | Artificial Intelligence |
| AO | Announcement of Opportunity |
| APX | Alpha APX is a computer architecture |
| ASPOC | Active Spacecraft Potential Control |
| C | A programming language |
| CD-ROM | Compact Disc Read Only Memory |
| CDAW | Coordinated Data Analysis Workshop |
| CEDAS | Cluster EFW Data Analysis System |
| CFC | Centre Français Cluster |
| CoI | Co-investigator |
| CDDS | Cluster Data Disposition System |
| CSDS | Cluster Science data System, replaces CSDC |
| DB | Data Base |
| DC | Data Centre |
| DC | Direct Current |
| DD | Data Distribution |
| EFW | Electric Field and Wave Experiment |
| ESA | European Space Agency |
| ESANET | European Space Agency Network |
| ESIS | European Space Information System |
| ESTEC | European Space Technology Centre |
| FFT | Fast Fourier Transform |
| FORTRAN | FORmula TRANslator |
| GSFC | Goddard Space Flight Center |
| HP | Hewlett Packard |
| IDL | Interactive Data Language |
| IRF-U | Institutet för Rymdfysik, Uppsalaavdelningen Swedish Inst. of Space Phys., Uppsala Division |
| ISDAT | Interactive Science Data Analysis Tool |
| ISEE | International Sun-Earth Explorer |
| IMF | Interplanetary Magnetic Field |

Table A.1: Acronyms part 1

| Acronym | Meaning |
| --- | --- |
| ISDAT | Interactive Science Data Analysis Tool |
| JSOC | Joint Science Operations Centre |
| KHOROS | Graphics software package |
| KTH | Kungliga Tekniska Högskolan |
| | Royal Institute of Technology |
| Matlab | Matrix Laboratory |
| MB | Mega-byte |
| MHD | Magnetohydrodynamics |
| PC | Personal Computer |
| PEX | Phigs Extended to X |
| PHIGS | Programmers Hierarchical Interactive Graphics System |
| PI | Principal Investigator |
| POSIX | Operating system |
| PPDB | Prime Parameter Data base |
| RDM | Raw Data Medium |
| SDC | Scandinavian Data Centre |
| SPDB | Summary Parameter Data Base |
| SPlots | Summary Plots |
| SSL | Space Sciences Laboratory |
| SWT | Science Working Team |
| TBD | To be defined |
| TM | Telemetry |
| UCB | University of California at Berkeley |
| Unix | Operating system |
| UR | User Requirement |
| VAX | A Computer architecture |
| WBD | Wide Band Data |
| WEC | Wave Experiment Consortium |
| WHISPER | Waves of High Frequency and Sounder for Probing of the Electron Density by Relaxation |
| X11R5 | X-Windows, revision 5 |
| s/w | software |
| 2D | Two dimensional |
| 3D | Three dimensional |

Table A.2: Acronyms part 2