6. THE CDS SCIENTIFIC PROGRAMME

"It is pleasant for the eyes to behold the Sun" - Ecclesiastes 11,7.

6.1 Study Summary

A set of CDS operations defined to make a particular scientific observation is called a *Study*. A Study may involve a simple raster of an area of the Sun, collecting data from a selection of emission lines; it may involve a complex system of repointing exercises and rasters to scan a large area of the disc. CDS Studies will form the backbone of the operation of the instrument. They fall into four categories, (i) Synoptic Studies, (ii) Calibration Studies, (iii) Observational (scientific) Studies and (iv) Test (Engineering) Studies.

The CDS Synoptic Studies include regular spectral measurements and imaging designed to produce a uniform view of solar activity over time, particularly for structure and evolution studies, but will also provide a measure of the instrument performance through the monitoring of quiet Sun intensities. The Observational Studies will provide schemes for the pursuit of specific scientific questions, e.g. mass ejection onset, bright point evolution etc... The Calibration Studies include schemes for testing the alignment and monitoring intensities between CDS-GIS and CDS-NIS, as well as between SOHO experiments, and include schemes for monitoring the solar output. The Engineering Studies include test activities such as basic switch on and performance testing.

The Studies which have been developed to date, are listed in Table 6.1. The list should not be considered to be complete; it will evolve continually. The duration for a complete cycle of each study is given in the table. The category of each Study is given. Some Studies may be appropriate to more than one of the defined categories, in which case both are listed. The details of each Study are given in the Appendix. They all have the same format and anyone wishing to suggest an observation using CDS is asked to submit a Study in this format. A blank Study form is given at the end of the Appendix. The form is self explanatory, but it may be useful to look at the other completed forms in the Appendix.

It should be noted that count-rate estimates are based on interpretations of previously taken solar data and the March 1994 calibration run. Experience tells us that the actual intensities may well be lower than those estimated here, in which case the Study durations will tend to be significantly longer.

Table 6.1: The CDS Studies Developed to Date (see Appendix for details on each).

Study ID	Title	Spectrometer	Duration	Category
ABSTR	Mg Abundance in Streamers	NIS	223 min	Observational
ABVAR	Abundance Variations in Different Regions	GIS	190 min	Observational
AERON	Aeronomy - Calibration Study	NIS	19.5 min	Calibration Synoptic
ALIGN	SUMER/CDS Alignment Calibration	NIS/GIS	180 min	Calibration
ATOMI	Testing Atomic Physics	NIS/GIS	2.9hrs NIS + 5.5hrs GIS	Observational
ATRIC	Elemental Abundances	NIS/GIS	35.3 min	Observational
BOUND	Coronal Hole Boundary Study	NIS	132 min	Observational
BROAD	Enhanced Line Broadening with Altitude	GIS	184 min	Observational
BRPNT	Bright Points	NIS/GIS	64+28 min	Observational
CHOLE	Coronal Hole Study	NIS	n x 63 min	Observational
CHROM	Chromospheric Oscillations	NIS	90 min	Observational
CHSTR	Coronal Hole Structure	NIS	n x 50 min	Observational
COSAR	Coronal Structure Above an Active Region	NIS	nx15.3 min	Observational
DYNAC	Dynamics of AR Structures	NIS	30.3 min	Observational
EDCME	Earth-Directed CME	NIS	nx3.18min	Observational
EJECT	Mass Ejection Study	NIS	nx3.18 min	Observational
EMSQS	Emission Measure Study of the Quiet Sun	NIS/GIS	7.6 hours	Observational
FEINT	Fe XIV Intercomb. Lines	GIS	114 min	Observational
FFLOW	Study of Filament Flows	NIS	n x 8 min	Observational
FILLF	Filling Factor of Coronal Loops	NIS	50 min	Observational
FLARE	Elementary Coronal Heating Events	NIS	n x 27 min	Observational
FLOWS	Flow Distribution Study	NIS	n x 4.3 sec	Observational

GIMCP	GIS MCP Decay Monitoring	GIS	4 min	Calibration
HELEN	Helium Enhancement in the Quiet Sun	GIS	5.7 hours	Observational
HIVEL	High Velocity Events	NIS	n x 37 sec	Observational
ICAL1	Intercalibration 1	NIS/GIS	204 min	Calibration
ICAL2	Intercalibration 2	GIS	48.3 min	Calibration
ICCAL	SUMER/CDS Intensity Cross Calibration	NIS/GIS	130 min	Calibration
INHOM	Inhomogeneities in Coronal Emission	NIS	n x 26 min	Observational
IRRAD	Total Solar Irradiance	NIS	7 hrs 50 min	Observational
MICRO	Microflare Study	GIS	n x 375 sec	Observational
NANOF	Coronal Heating via Nanoflares	NIS	n x 1 sec	Observational
NFCTR	Evidence for Nanoflares	NIS	101 min	Observational
NIMCP	NIS MCP Decay Monitoring	NIS	18 min	Calibration
NISAT	NI Spectral Atlas	NIS	37 min	Synoptic Calibration
NONEQ	Non-Equilibrium Ionization	NIS/GIS	22.2 min	Observational
O5DEN	Electron Densities from O V	GIS	171 min	Observational
OPAC1	Opacity in Spectral Lines	NIS	n x 75 min	Observational
OPAC2	Line Opacity	GIS/NIS	n x 96 min	Observational
PLUME	Coronal Plumes	NIS	1 - 18 hrs + 2 - 80 min	Observational
POBS1	Prominence Observing Programme 1	NIS	53.6 min minimum	Observational
POLAR	CDS Polarisation Study	NIS/GIS	TBD	Test
PTCOR	Peak Temperature in the Corona	GIS	10.01 hours	Observational
S11DE	Electron Densities from S XI	GIS	57 min	Observational
SPECT	Spectral Atlas	GIS	188.2 min	Synoptic Calibration
SPOTV	Sunspot Velocity Fields	NIS	n x 454 sec	Observational
STREM	Streamer Study	NIS	4hr 15m	Observational

SYNOP	Synoptic Study	NIS	4.5 hours	Synoptic
TEST1	GI Switch on Study	GIS	1 hour	Test
TEST2	NI Switch on Study	NIS	30 min	Test
TEST3	CDS Coarse Pointing Calibration	GIS	100 min	Test Calibration
TEST4	CDS Fine Pointing Calibration	GIS	8.33 hours	Test Calibration
TEST5	GI Test Study	GIS	148 min	Test
TEST6	NI Test Study 1	NIS	105 min	Test
TEST7	NI Test Study 2	NIS	22.2 min	Test
TGRAD	Temperature Gradient in a Coronal Hole	GIS	16.8 hours	Observational
TRACE	Abundances of Trace Elements	GIS	57 min	Observational
WAVE	Observing Wave Activity with SOHO	NIS	n x 46 min	Observational

6.2 Data Rights and Access

We must plan for the most efficient exploitation of CDS data whilst protecting the investment of the science team. There must be a strict data access policy which allows a controlled access to data to anyone. The scheme is outlined in table 6.3.

Table 6.3: The CDS Data Access Policy

Who	*Access To*	*Limitations*
Principal Investigator and Co-Investigators	Full CDS data-set	Subject only to data co-ordination scheme
Associated Scientists	Limited data-set: CDS data for observations with which they are involved	Subject only to data co-ordination scheme
Associated Scientists	Full CDS data-set	≥6 months after data taken. Subject to data co-ordination scheme
Guest Investigators	Limited data-set: CDS data for observations with which they are involved	Subject only to data co-ordination scheme
All	Full CDS data-set	Each year of data released 2 years from start of year. Subject to data co-ordination scheme

All	Summary and Catalogue data	None
EOF Teams	Planning data	Not for publication

In all disputes the Principal Investigator arbitrates and his decision is final.

6.3 Data Co-ordination Scheme

The CDS data co-ordination scheme will be run through the SPEC. At the time that a successful application for CDS observations is made, the observation is assigned to a responsible researcher. A reporting date will be fixed when the responsible researcher must submit a written report on progress in analysing the data taken. Until that date, the researcher and his/her collaborators have exclusive access to that data-set for the purposes stated in the application (someone else may use the same data-set to study an entirely different phenomenon). Any extension of this period of exclusive rights may be considered at the time when the report is submitted.

6.4 Publication Policy

All publications must be submited to the SPEC **before they are submitted to a journal or conference proceedings.** They must be approved by the SPEC before submission.

Reprints must be sent to the SPEC to enable the CDS team to keep a full list and library of CDS publications.

No publications may be submitted to journals prior to the publication of the first results papers by the CDS core team. These will consist of a first results paper followed by a selection of papers on key areas. These will be written in the first months after SOHO's arrival at L1.

6.5 How to Apply to Use CDS or CDS Data?

The CDS Science Planning and Exploitation Committee (SPEC) (section 5.2) provides a formal interface between the scientific community and the CDS operations team at the EOF (section 5.3). Requests for visits, observations and data should be made in writing through the CDS SPEC c/o:

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- At the time of the request an observation plan should be presented (fill out the study sheet given at the end of the Appendix 3)

- Participation in the operations at the EOF/EAF at the time of implementation of the plan would be preferred, but it is recognised that this may not be possible.