625-610:
NUMBER: 211-13 P2

PROJECT GALILEO

SOFTWARE INTERFACE SPECIFICATION

Cover Sheet

REVISION: B, Phase 2

DATE: March 24, 1994

SIS NAME: Standard Sequence Data File (SSDF)

DOMAIN:

System	Subsystem	Program	Make/Use
MSS	All	All	Both

See also Table 1.4.2-1

Computer System: UNISYS 1100

PURPOSE OF INTERFACE (SUMMARY): This interface provides a standard format and syntax for all Galileo MSS sequence files.

The format for the following interfaces is fully defined by this SIS:

- SIS 211-21 Orbit Profile File
- SIS 211-23 Engineering Orbit Request File
- SIS 211-28 Navigation Orbit Request File
- SIS 211-34 POINTER PA1 Request File
- SIS 211-35 POINTER PA2 Request File
- SIS 211-36 Probe Orbit Request File
- SIS 211-46 Tweaked Orbit Profile File
- SIS 211-47 Working Fields and Particles Skeleton Orbit Plan
- SIS 211-48 Working Radio Science Skeleton Orbit Plan
- SIS 211-49 Working Remote Sensing Skeleton Orbit Plan
- SIS 211-50 Working Science Skeleton Orbit Plan
- SIS 211-52 POINTER Orbit Request File
- SIS 211-59 Playback Table
- SIS 211-60 DMS Record Map
- SIS 211-61 Playback Capability File

- SIS 211-62 Link Configuration File
- SIS 211-63 Telemetry Plan File
- SIS 211-64 Real-Time Mode Request File
- SIS 211-65 Telemetry Profile File

INTERFACE MEDIUM:

Disk File: [X]
Magnetic Tape: [ ] Tracks: Density: Data Code:
Other: [ ]: Datafield:

SIS COORDINATOR: A. V. Amador
SIGNATURES:

Approval Position	Name	Date
S/W System Engineer	R. W. Sible ________________________	___________

Concurrence:

System/ Program	Position	Name		Date
MSS	Sys E	A. V. Amador	______________________	___________
SEQGEN	Cog E	V. Wang	______________________	___________
SEQGEN	Cog P	T. Dale	______________________	___________
SEQTRAN	Cog E/P	T. G. Loesch	______________________	___________
CDSSIM	Cog E/P	C. S. Sagoian	______________________	___________
POINTER	Cog E	P. Koskela	______________________	___________
	Cog P	L. Su	______________________	___________
SKOPER	Cog E/P	G. Fryshdorf	______________________	___________
MDCHECK	Cog E	R. Cole	______________________	___________
	Cog P	L. Lee	______________________	___________
TIMELINE	Cog E/P	G. Fryshdorf	______________________	___________
UTILITIES	Cog E/P	G. Fryshdorf	______________________	___________
SCANOPS	Cog E/P	S. Javidnia	______________________	___________
SEG	Cog E	B. Arroyo	______________________	___________
	Cog P	K. Miller	______________________	___________
OES	Sys E	J. Hofman	______________________	___________
G&C FILE	Cog E/P Rep	F. Rosenblatt	______________________	___________
NAV	Sys E	J. Ekelund	______________________	___________
APP	Cog E	R. P. Davis	______________________	___________
	Cog P	W. M. Owen	______________________	___________
OMAS	Cog E	R. P. Davis	______________________	___________
	Cog P	W. M. Owen	______________________	___________

Custodian: A. V. Amador Revision B

625-610

PROJECT GALILEO

SOFTWARE INTERFACE SPECIFICATION (SIS-2)

Standard Sequence Data File (SSDF)

SIS #211-13

March 24, 1994

ABSTRACT: This SIS-2 describes the general form and syntax of all GLL sequence data files. Each such file will contain a header that identifies and describes the scope of the file, plus a body which provides the data. Individual file SIS's will provide further detail.

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DOCUMENT CHANGE LOG

Change Letter	Date	Affected Portions
Phase 1	07/24/81	All
Phase 2	02/18/82	Update for SIS - Phase 2
Change 1	02/16/83	Noted by change bars
Change 2	07/27/83	Noted by change bars
Change 3	06/20/84	Noted by change bars per SCR 402 and 503
Change 4	05/08/85	Noted by change bars per SCR 625 and 669
Change 5	09/12/85	Noted by change bars per SCR 854
Change 6	08/27/86	Noted by change bars per SCR 515 and A085
Revision A	01/31/92	Indicated by change bars per SCR B096
Revision B	03/24/94	Indicated by change bars per SCR B336 and B380 for Phase 2

List of TBD Items

Page	Resolution Date	Item
		None

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SECTION 1

GENERAL DESCRIPTION

1.1 CONTENT OVERVIEW

This omnibus Software Interface Specification (SIS) provides a standard, system-wide form and syntax for transmitting sequence data within the Mission Operations System (MOS) environment. The header section identifies the type of file, its creation data, scope and genealogical ancestry. The body section supplies the sequence data in parameter set format.

1.2 SCOPE

The format and syntax specifications in this document apply to all sequence files (see 1.4.2 for a list) and to all phases of the Galileo Mission. This applies to files which will not become active until later mission phases. For instance, only the Mission Sequence File and Spacecraft Sequence Files are active for the System Test phase.

This document does not apply to files which do not use the parameter set format, except by reference. For example, the Spacecraft Event File (SEF), Desired Memory Words File (DMWF), and Light Time File are not applicable. However, SIS's for files which will use the standard MSS header defined herein (e.g. the Spacecraft Event File) will reference this document.

Pre-processor programs will interpret this standard interface to any inherited software which cannot be adapted to use this interface directly.

Separate SIS's for each individual MSS sequence file will be written. These SIS's may further restrict form and content of each individual file beyond what is covered in this SIS.

1.3 APPLICABLE DOCUMENTS

625-640-211031	SEQGEN SRD
625-645-211031	SEQuence GENeration User's Guide
MOS-GLL-4-211	Functional Requirement, Galileo Mission Sequence System
625-540	Sequence Component Definition Document

625-675-211031	Algorithm Dictionary
GLL-3-290	Command Structure and Assignments
MCCC 1843-1	LIB*CLIB$ Special Feature Library, Sections 3.1 - 3.3
UP 4144.31	Sperry Univac 1100 Series Executive, Volume 3, Section 11.2.3, System Data Formats
UP 8478	Sperry Univac 1100 Series Processor Common Input/OutputSystem (PCIOS), Section 5.2, System Data Format

1.4 SUBSYSTEM SITING

1.4.1 Interface Location, Medium. This interface shall be implemented in an element of a program file in Univac Standard Data File (SDFF) format. The element may be either ASCII or FIELDATA, but is subject to being interpreted as upper case only (i.e. FIELDATA).

1.4.2 Data Source, Destinations and Transfer Method. Standard Sequence Data Files (SSDF) for any general purpose may be manually created, updated and merged using the facilities of the SEQGEN program of the Mission Sequence System. This program provides many conveniences for generating syntactically correct sequence files.

A number of subsystems of the MOS ground software system will read and write SSDF files directly, using the ELT READ and ELT WRITE or similar procedures (refer to MCCC 1843-1 LIB*CLIB$). Text editors on the UNISYS system will conveniently convert back and forth between data files and elements of program files.

Specific sources and destinations for particular kinds of SSDF files will be specified in individual SISs or applicable user's guides or both.

Table 1.4.2-1 lists the sequence level, source, destination, and file name of all MSS sequence files. This list may change based on updates to the Level-4 MSS Functional Requirements document. The "sequence level" can be one of many things. The Profile Activity (PA) Catalog defines the LINK, PA1 and PA2 levels. The Block Dictionary defines the Ground Expanded Block (GEB) and Spacecraft Expanded Block (SEB) levels.

The level of a SSDF specifies generically which sequence components may be represented in a particular file. It also dictates generically which of a certain class of parameters of Profile Activity sequence components are required or optional. This will be discussed further in Section 4 below.

Table 1.4.2-1 MSS Sequence Files

Level	Created By	Used By	Name	Acronym
LINK	STRIPPER	PROMPTER	Engineering Link File	ELF
LINK	PROMPTER	TIMELINE	Engineering Orbit Request	
		File		EORF
PA1/2	STRIPPER	PROMPTER	Engineering PA File	EPAF
PA1	PROMPTER	PROMPTER	Engineering PA1 Request File	EPA1RF
PA2	PROMPTER	PROMPTER	Engineering PA2 Request File	EPA2RF
LINK	STRIPPER	PROMPTER	Fields and Particles	
		Link File		FPLF
PA1/2	STRIPPER	PROMPTER	Fields and Particles PA File	FPPAF
	PROMPTER	PROMPTER	Fields and Particles PA1	
		Request File		FPPARF
	PROMPTER	PROMPTER	Fields and Particles PA2	
		Request File		FPPA2RF
PA2	PROMPTER	TLMGEN	Link Configuration File	LCF
PA1/2	PROMPTER	PROMPTER	Maneuver & Engineering	
		(M&E) File		M&E
GEB	EXPANDER	EXPANDER	Mission Sequence File	MSF
LINK	STRIPPER	PROMPTER	Navigation Link File	NLF
LINK	PROMPTER	TIMELINE	Navigation Orbit Request	
		File		NORF
PA1/2	STRIPPER	PROMPTER	Navigation PA File	NPAF
	PROMPTER	PROMPTER	Navigation PA1 Request File	NPA1RF
	PROMPTER	PROMPTER	Navigation PA2 Request File	NPA2RF
LINK	STRIPPER	PROMPTER	Operations Management	
		Link File		OMLF
PA1/2	STRIPPER	PROMPTER	Operations Management	
		PA File		OMPAF
PA1/2	OMAS (APP)	PROMPTER	OPNAV Imaging Request	
		File		OPNAV
LINK	PROMPTER	TIMELINE	Orbit Plan	OP
		STRIPPER		

Table 1.4.2-1 MSS Sequence Files (Cont'd)

Level	Created By	Used By	Name	Acronym
LINK	PROMPTER	TIMELINE STRIPPER PROMPTER	Cruise Plan	CP
PA1/2	PROMPTER	TIMELINE CHECKER STRIPPER	Orbit Profile	ORPRO
LINK	SKOPER	PROMPTER	Partial Skeleton Orbit Plan	PSOP
SEB	SEQGEN	CHECKER EXPOSURE PBT EDITOR SEQTRAN	Playback Table	PBT
SEB	CHECKER	PBT EDITOR	Playback Capability File	PBCF
LINK	POINTER	PROMPTER	POINTER Orbit Request File	PTORF
PA1	POINTER	PROMPTER	POINTER PA1 Request File	POINTER1
PA2	POINTER	PROMPTER	POINTER PA2 Request File	POINTER2
LINK	PROMPTER	TIMELINE	Probe Orbit Request File	PORF
SEB	CHECKER	CHECKER PBT EDITOR	Record MAP	RECMAP
LINK	STRIPPER	PROMPTER	Radio Science Link File	RSLF
PA1/2	STRIPPER	PROMPTER	Radio Science PA File	RSPAF
PA2	MIRAGE PROMPTER	TLMGEN	Real-Time Mode Request File	RTMRF
LINK	STRIPPER	POINTER	Remote Sensing Link File	REMLF
PA1/2	STRIPPER	POINTER	Remote Sensing PA File	REMPAF
	PROMPTER	PROMPTER	Remote Sensing PA1 Request File	REMPA1RF
	PROMPTER	PROMPTER	Remote Sensing PA2 Request File	REMPA2RF
PA2	PROMPTER	CHECKER EXPANDER	Retargeted Orbit Profile	REPRO
LINK	PROMPTER	TIMELINE	Science Orbit Request File	SORF

Table 1.4.2-1 MSS Sequence Files (Cont'd)

Level	Created By	Used By	Name	Acronym
LINK	STRIPPER	PROMPTER	Sequence Link File	SLF
PA1/2	STRIPPER	PROMPTER	Sequence PA File	SPAF
	PROMPTER	PROMPTER	Sequence PA1 Request File	SPA1RF
	PROMPTER	PROMPTER	Sequence PA2 Request File	SPA2RF
LINK	PROMPTER	TIMELINE	Skeleton Orbit Plan	SOP
SSF	EXPANDER	CHECKER PROMPTER SEQTRAN	Spacecraft Sequence File	SSF
LINK	PROMPTER	TIMELINE	Station Allocation File	STALOC
LINK	PROMPTER	TPAP	Telemetry Capability Request File	TCRF
PA2	TLMGEN	TLMGEN MIRAGE	Telemetry Plan File	TPF
PA2	TLMGEN	TLMGEN SEQGEN	Telemetry Profile File	TLMPRO
PA2	PROMPTER	EXPANDER	Tweaked Orbit Profile	TPRO
LINK	PROMPTER	MDCHECK TIMELINE	Working Fields and Particles Skeleton Orbit Plan	WFP
LINK	PROMPTER	MDCHECK TIMELINE	Working Radio Science Skeleton Orbit Plan	WRS
LINK	PROMPTER	MDCHECK TIMELINE PROMPTER	Mission Design Link File	LOAD
LINK	PROMPTER	MDCHECK TIMELINE	Working Remote Sensing Skeleton Orbit Plan	WREM
LINK	PROMPTER	MDCHECK TIMELINE	Working Science Skeleton Orbit Plan	WSCI

1.4.4 Pertinent Relationships with Other Interfaces. N/A

1.4.5 Labeling and Identification (Internal/External). The original file name will be written into the header in the form:

Qualifier*File.Element/Version

SECTION 2

INTERFACE CHARACTERISTICS

2.1 HARDWARE CHARACTERISTICS

2.1.1 Special Equipment and Device Interfaces. None.

2.1.2 Special Setup Requirements. None.

2.2 VOLUME AND SIZE

Each Standard Sequence Data File (SSDF) shall be limited to 10000 parameter sets. A parameter set contains all the data necessary to invoke a given sequence component.

Parameter sets shall not directly be defined in the Profile Activity Catalog or Block Dictionary to have more than 20 parameters, not including standard parameters.

Parameter values shall have no more than 32 characters each.

Parameter names shall have no more than 12 characters each.

There shall be no more than 15 EPOCH header records (see 4.2-1).

2.3 INTERFACE MEDIUM CHARACTERISTICS

The file shall be written in Univac Standard Data File Format (SDFF). This is the format described in the Univac Executive manual and used by Univac Fortran V, Athena Fortran and LIB*CLIB$ routines ELT READ and ELT WRITE. It is not the format described in the Univac PCIOS manual and used by Univac FTN and PL/1.

2.4 FAILURE PROTECTION, DETECTION AND RECOVERY FEATURES

2.4.1 File Backup Requirements. This is handled by the individual software systems, e.g. the MSS UTILITIES subsystem.

2.4.2 Security/Integrity Measures. These files have no inherent security because they are directly text editable using system routines. SEQGEN checks syntax in PROMPTER and MERGE operations in order to promote integrity.

2.5 END-OF-FILE (OR MEDIUM) CONVENTIONS

End-of-File conventions shall be in accordance with Univac Standard Data File Format (SDFF).

SECTION 3

ACCESS

3.1 PROGRAMS USING THE INTERFACE

SKOPER	Skeleton Orbit Plan Element Reformatter
MDCHECK	Mission Design Checker
TIMELINE	Timeline Generation
SEQGEN	Sequence Generation
POINTER	Planetary Observation Instrument Targeting and Encounter Reconaissance
EXPOSURE	Imaging Exposure
SEQTRAN	Sequence Translator
SCANOPS	Scan Platform Operations
SEG	Sequence of Events Generator
UTILITIES	MSS Utilities
TLMGEN	Telemetry Generation

3.2 SYNCHRONIZATION CONSIDERATIONS

3.2.1 Timing and Sequencing Characteristics. There shall be a BEGIN and a CUTOFF time in the header section. Each parameter set, or event which occurs as a result of a parameter set, shall have a time which is greater than or equal to BEGIN and less than or equal to CUTOFF.

In this document "time" refers to Spacecraft Event Time, which is Universal Time (UT, also referred to as GMT) of execution on the spacecraft bus. Unless otherwise specified, "time" is expressed in the form "yy-ddd/hh:mm:ss.fff, i.e. years, days of year, hours, minutes, seconds and fractions of a second.

Within the body of the file the parameter sets shall be grouped according to their oldest ancestor. Each group shall have its parameter sets in time order. Each group shall be placed on the file in time order with respect to other groups.

3.2.2 Effective Duration. The effective duration is the difference between the BEGIN and the CUTOFF times of the header section.

3.2.3 Priority Interrupts. N/A.

3.3 INPUT/OUTPUT PROTOCOLS, CALLING SEQUENCES

N/A

SECTION 4

DETAILED INTERFACE SPECIFICATIONS

4.1 STRUCTURE AND ORGANIZATION OVERVIEW

The SSDF file shall consist of an ASCII or Fielddata element of a program file. There will be exactly one file per element. The element shall consist of 80 character card images. The file shall be organized into a header section and a body section as follows:

```
               Keyword            Data Content

          #    $$GLL              <Descriptive File Name>
         #     *<Acronym>         <Qual*File/Element/Version>
         #     *LEVEL             <Level>
         #     *PREP              <Preparer's name and extension>
         #     *RUNID             <Run ID of job generating file>
         #     *PROGRAM           <Program name and version>
         #     *CREATION          <Time the file was created>
         #     *BEGIN             <Begin time of sequence>
         #     *EPOCH             <EPOCH name>, <EPOCH time>
         #         .
         #         .
         #         .
Header #       *CUTOFF            <Cutoff time of sequence>
Section  #     *TITLE             <Title of sequence>
         #     *<Acronym>         <Q*F.E/V of file used by program generating this file>
         #     *<Acronym>         <Q*F.E/V of ancestor file not directly used by program using
         #                        this file>
         #         .
         #         .
         #         .
          #    $$EoH
          #    <Level>,<Parameter set name>, <Id>,<Processor>,<Time>,list;
         #     <Level>,<Parameter set name>, <Id>,<Processor>,<Time>,list;
Body   #       <Level>,<Parameter set name>, <Id>,<Processor>,<Time>,list;
Section  #         .
          #        .
```

4.2 SUBSTRUCTURE DEFINITION AND FORMAT

4.2.1 Header.

The descriptive name on the $$GLL record shall be a "Name" from table 1.4.2-1 or a name of that nature.

The general format for a header record is:

Col	Contents
1	*
2-12	Key word
13-80	Data

"Acronym" in record 2 is from table 1.4.2-1 and corresponds to the descriptive name in record 1. "Qualifier*File.Element/Version" is standard Univac program file notation. It is abbreviated "Q*F.E/V" below.

"LEVEL" shall be one of: PLAN, LINK, PA1, PA2, GEB or SEB. The implications of level are as follows:

PLAN says that parameter sets of any level may be in the body of the file. See discussion of the first standard parameter under 4.2.2 below.

LINK says that parameter sets of any level except PLAN are allowed.

PA1 says that parameter sets of any level except PLAN and LINK are allowed.

PA2 says that parameter sets of any level except PLAN, LINK, and PA1 are allowed.

MSF (Mission Sequence File) says that LINK and PA parameter sets are not allowed. Only Ground Expanded Blocks (GEB), Spacecraft Expanded Blocks (SEB), Redundant Element Commands (RCMD) and commands will be allowed.

SSF (Spacecraft Sequence File) says that only SEB and commands are allowed.

"PREP" shall provide the name and extension of a person to whom inquiries about the file may be addressed.

"RUNID" shall reflect the Univac Run Identification of the computer run which generated the file. This information is often useful for recognizing the banner of a printout. This should be generated automatically by the program creating the file.

"PROGRAM" shall provide the name and version of the program that wrote the file.

"CREATION" shall set forth the time at which the file was created. This provides a means of more accurately identifying the file and associating it with other activities. This should be generated automatically by the program creating the file.

"BEGIN" shall provide a beginning time limit. All of the parameter set times in the body of the file shall be no earlier than the BEGIN time. The BEGIN time itself shall not be earlier than the CUTOFF time of the preceding sequence. This says that all sequences are serial and shall not overlap one another.

"EPOCH" shall define an acronym of exactly three letters and a correspondling GMT time. There shall be an EPOCH record for each EPOCH referenced in the file. A maximum of 15 EPOCH records shall be defined.

"CUTOFF" shall provide an ending time limit. All of the parameter set times in the body of the file shall be no later than the CUTOFF time. The CUTOFF time shall be later than the BEGIN time.

The remaining records in the header prior to "$$EOH" shall be a complete set of *<acronym> records of all of the sequence files which have been used in the generation of the current file. These records shall be copied from the input file headers, but have the contents indented three spaces in order to show the genealogy of the ancestral files.

The "$$EOH" record shall be the final record of the Header Section.

4.2.2 Body.

The body of the file shall consist entirely of parameter sets. Each parameter set shall have five required standard parameters, followed by a list unique to its definition in the PA Catalog or Block Dictionary, followed by a semicolon.

The first standard parameter shall be the level of the parameter set. This provides a means of tracking the metamorphosis of a LINK into a PA1 level and into a PA2 level as the required parameters are supplied. It also provides a tidy way of accounting for inconsistencies with respect to the intended level of a file being operated upon.

The PLAN level says that all parameters after the five standard parameters are considered optional. See also "LEVEL" under 4.2.1.

The PA2 level parameter sets are progressively expanded into Ground Expanded Blocks (GEB), Redundant Element Commands (RCMD), Spacecraft Expanded Blocks (SEB), commands and miscellaneous parameter sets until only the latter three levels remain.

The following are the presently identified levels:

PLAN	Says that all parameters after the five standard parameters are considered optional.
LINK	Link level of LINK/PA
PA1	Profile Activity level 1 of LINK/PA
PA2	Profile Activity level 2 of LINK/PA
GEB	Ground expanded block
CEB	Checker expanded block
SEB	Spacecraft expanded block
GEV	Ground event
RCMD	Redundant element command
RCMDI	Redundant element command immediate
CMD	Command
DCMD	Dummy Command - for update of SEQGEN models - ignored by SEQTRAN
CMDI	Immediate command
GS	Group start
GE	Group end
IMMGS	IMMediate Group Start (use CMDI and RCMDI in groups of this level).
IMMGE	IMMediate Group End
SUBPA	Profile activity sublist
SUBGEB	Ground expanded block sublist
SUBSEB	Spacecraft expanded block sublist
SQTR	SEQTRAN directive
SINGLE	WINDOW and SEQEND SEQTRAN directive
MISC	Miscellaneous items such as NOTE

The second standard parameter shall be the name of the sequence component as defined in the PA Catalog or Block Dictionary.

The third standard parameter shall be an identifier (Id) which uniquely identifies this parameter set with respect to other parameter sets of the same name in the same file. The Id shall also provide a genealogical record of a given parameter set's ancestry, back to the PA which sired its group. Each PA or Block shall have a unique two to three digit identification number assigned to it in its definition in the PA Catalog or the Block Dictionary.

The Id of a group (top level) parameter set shall consist of the parameter set number, followed by one or two letters to uniquely set it apart from other parameter sets of the same name. A Profile Activity will eventually be expanded to generate descendant parameter sets. Each descendant's Id shall consist of its parameter set number plus one or two letters concatenated onto its parent's Id. For example PA number 70 might have an Id of "70A". If Block 35 were expanded from PA "70A" it then might have an Id of "70A35A". All parameter sets with levels of other than LINK, PA1 or PA2 must have a multi-segment Id. This means that all blocks, commands, etc. must be either a member of a group or be associated with a link/PA. For parameter sets with levels of CMD and CMDI the last numeric component of the Id shall indicate the type of command as follows:

1	dc	Discrete command
2	cc	Coded command (without d-pps)
3	cc	Coded command (with d-pps)
4	bc	Bus command
5	hbc	Hardware bus command
6	fc	Functional command
7	sfc	Single frame command (must be CMDI)
8	cr	Critical command

The fourth standard parameter shall be a specification for the CDS processor that will execute the SEB or commands that are expanded from the parameter set. "PRI" indicates the primary processor, "SEC" the secondary processor and "BOTH" indicates both processors in parallel. A null processor parameter will be interpreted as "PRI".

The fifth standard parameter shall be a time rounded to the nearest minor frame start. This time shall be used to order parameter sets within a group and to order the groups within the file. A "group" is the set of all parameter sets descended (normally by Expansion) from a root PA. A "root PA" will have a single stage Id such as "70A" in the example above.

A time shall be in one of the following forms:

1) Spacecraft Event Time (also referred to as "UT" and "GMT"):
"yy-ddd/hh:mm:ss.fff", i.e. years, day of year, hours, minutes, seconds and fraction of a second.
2) Spacecraft Clock Time (using syntax identical to frame oriented duration defined below).

Note: Spacecraft Clock Time form is not allowed in the
Spacecraft Sequence File (SSF).

3) EPOCH plus duration:

<three letter epoch name> + <duration>

The <three letter epoch name> shall have been associated with a time in an EPOCH header record.

The <duration> shall have one of the following two forms:

a) Time oriented:

"[[[d/] h:] m]: s [. [f]]", i.e., day of year, hours, minutes, seconds and fraction of second. The brackets indicate optionality. Except for the leading field, the hours field may not exceed 23, and the minutes and seconds fields may not exceed 59.

Good	Bad
2:00.32	1:60.32
142:21.99	1:82:21.99
1/2:22:21.99	

b) Frame oriented:

"CDS [M:] m: [r] " where:

"M" is major frames (60-2/3 seconds or 91 minor frames or 910 real time interrupts (RTI's)).

"m" is minor frames (2/3 second or 10 RTI's).

"r" is RTI (1/15 second).

No number in the sequence shall have a value larger than the unit value of the number appearing before it:

Good	Bad
CDS 2:00:0	CDS 1:91:0
CDS 2:89:9	CDS 1:180:9
CDS 271:9	CDS 270:92
CDS 2719:	2719
CDS :9	
CDS :	
CDS 12345::	
CDS 1234567:90:9	

The syntax of the "list" which follows the five standard parameters is uniquely defined for the parameter set of each sequence component in the PA Catalog and Block Dictionary. In these documents each item in a list will be of a prescribed type. A size may be specified to create an array. A range will be provided if it makes sense. A description and short name will also be provided.

The choice of types is as follows:

REAL — A consecutive collection of up to 31 digits containing exactly one decimal point, and perhaps a negative sign, representing numbers of up to 8 significant digits.

INT — Consecutive digits representing numbers from-34,359,738,367 to 34,359,738,367.

CHAR — Up to 32 characters not including the comma, semicolon, or equal sign. The first character may not be a left parenthesis or asterisk.

HEX — Any combination of numerals 0 through 9 and letters A through F up to 32 characters in length.

OCTAL — Any combination of numberals 0 through 7 up to 32 characters in length.

LOGICAL — TRUE or FALSE

TIME, DURD — escribed above.

SYMBOL — A SEQTRAN symbol of up to 6 characters, the first of which must be A-Z.

SUBLIST

The value of a sublist type parameter will be the Id of the target parameter set enclosed within parentheses. Empty parentheses are required for null values. Nested sublists are allowed in all sequence files above the SEB level. Thus, nested sublists are not allowed in the SSF.

No parameter value may consist of more than 32 characters.

No parameter set name may have more than 11 characters.

Sublist pointers will appear within parentheses in theparameter list.

Unless otherwise specified, null values will be interpreted as follows:

Real and integer: zero.

Time: January 1, 1950, i.e.
50-001/00:00:00.000

Duration: zero seconds.

Characters: Blank.

Sublist pointer: Identical to Id of the parameter set it is contained in.

Commas for all the null values immediately preceding the semicolon may be omitted. Likewise, null (empty) parentheses for a null value of type sublist may be omitted when its corresponding comma is omitted.

Leading spaces in each line of the body of the file shall be ignored.

APPENDIX A

GLOSSARY

Block	An operational activity specified in the Block Dictionary, Volume III of the Sequence Component Definition Document.
CDS	Command Data System - The spacecraft computer.
CMD	Command.
CMDI	Immediate Command
DMWF	Desired Memory Words File - An output of the SEQTRAN Subsystem.
EXPANDER	SEQGEN function which expands the working file produced by MERGE and/or PROMPTER using algorithms specified in the PA Catalog and the Block Dictionary.
F&P	Fields and particles science
genealogy	A tree structured index to parameter set 'groups' on the 'Working File'. Genealogical data is carried in the 'Id' parameter.
group	A profile activity parameter set and all of the parameter sets expanded from such a parameter set. The said profile activity can not have been a product of expansion from some other profile activity.
group order	A sequential ordering of a sequence file or the Working File such that all of the parameter sets in each 'group' are contiguous and in time order, and the groups themselves are time ordered by group start time. See also 'individual order'.
Id	The third parameter of each parameter set has an 'Id' which uniquely identifies it apart from all of the other parameter sets in the associated sequence file or Working File. It also carries a 'genealogy' trace.
individual order	A sequential ordering of a sequence file or the Working File such that all of the parameter sets are in time order, regardless of 'group' membership. See also 'group order'.

level	The first parameter of a parameter set classifies the parameter set as being either a LINK, PA1, PA2, GEB, SEB, or etc. Not all levels of parameter set are allowed in all types of sequence files.
LINK	A sequence component defining an operational activity as specified in the PA Catalog, Volume II of the Sequence Component Definition Document.
LINK level	A level of completeness of the parameter sets in a sequence file. At the LINK level PA1 and PA2 parameters are optional.
list format	A list consists of a set of values separated by commas. In the case of a parameter set the parameters are specified in list format and must each conform to a prescribed type, range, etc. The list is terminated by a semi-colon.
MERGE	Module of SEQGEN program which merges sequence files to produce a working file.
MOS	Mission Operations System
MSS	Mission Sequence System
NAV	Navigation
ORB	Orbiter
parameter set	A sequencing component invocation consisting of a type, name, unique identification within the "name" class, time, and parameter list.
PA	Profile Activity - A sequence component defining an operational activity as specified in the PA Catalog, Volume II of the Sequence Component Definition Document.
PA1, PA2 level	A level of completeness of the parameter sets in a sequence file, which generally requires more parameters for a PA1 than for a LINK, and more parameters for a PA2 than for a PA1.
PROMPTER	SEQGEN module which creates and/or edits the working file.
RMT SENS	Remote sensing science.
SEB	Spacecraft Expanded Block.
SDF	Standard Data File (SDF) format - The format used by Univac FTN and PL/1.
SDFF	Standard Data File Format (SDFF) - The format used by Univac Fortran V, Athena Fortran, ELT READ and ELT WRITE, and SIS 211-13.
SCET	Spacecraft Event Time - Universal Time (UT or GMT) at the spacecraft, i.e. without making any allowance for signals traveling between earth and the spacecraft at the speed of light.

SEQ — Sequence Team.

SEQGEN — SEQuence GENerator program.

sequence component — A Profile Activity, Block or a parameter set which invokes a specific application of a sequencing component.

sequence file — An element of a program file containing a header and parameter sets as defined by SIS 211-13.

sequencing level — A control function of SEQGEN which impacts the level of operation of the PROMPTER and CHECKER modules, e.g., Preliminary Orbit Profile.

SIS — Software Interface Specification.

SSF — Spacecraft Sequence File.

sub list — A special type of parameter set that is referenced by a pointer from a sequence component parameter set. It is created and merged independently from its parent parameter set.

time — See SCET.

TLMGEN — Telemetry Generation

UT — Universal Time - See SCET.

APPENDIX B

EXAMPLE SEQUENCE FILE

```
$$GLL          S/C SEQUENCE FILE
*SSF            PGLL*PSDT.SSF/TEST21A
*LEVEL         SEB
*PREP          R. C. COLE    X-2541
*RUNID         RCC
*PROGRAM       SEQGEN 81-003/09:18:27.00
*CREATION      81-011/20:53:38.00
*BEGIN         81-015/12:00:00.00
*CUTOFF        81-015/16:00:00.00
*TITLE         EXAMPLE FOR DESCRIBING USER'S GUIDE
*OWLT          OPSDATA.OWLT/REVC
*SCTF          OPSDATA.SCTF/REVE
*MSF           PSDT.MSF/TEST21A
$$EOH
GS,SSI_MOSAIC,78A,,81-015/12:30:00.00,
CMD,07SLEW,78A1A,,81-015/12:40:00.00,11.2,32.3,.015;
SEB,SSI,78A35A,,81-015/14:00:00.00,HIM,(78A35A36A),(78A35A37A);
SUBSEB,FILTER,78A35A36A,,81-015/14:00:00.00,RED;
SUBSEB,EXPOSURE,78A35A37A,,81-015/14:00:00.00,10,11,12,13,14,15,16,    17,18;
CMD,07SLEW,78A52A1A,,81-015/14:00:02.00,12.0,32.8,.2;
CMD,07SLEW,78A52A1B,,81-015/14:01:02.67,12.1,32.7,.2;
GE,SSI_MOSAIC,78A,,81-015/16:00:00.00;
GS,SAM,73A,,81-015/15:00.00;
CMD,35IC,73A1A,,BOTH,81-015/15:00:00.00;
CMD,35ISH,73A1B,,SEC,81-015/15:30:00.00;
GE,SAM,73A,81-015/16:00:00.00;
$$EOF
```