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EECF - NFS
INTERFACE SPECIFICATION

EUROPEAN SPACE AGENCY

ESRIN

ESRIN ERS CENTRAL FACILITY
to
NATIONAL and FOREIGN STATIONS

INTERFACE SPECIFICATION

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AMENDMENT CONTROL

ISSUE	REV.	DATE	PURPOSE	SECTION	ACTION
Draft	0	88/09/05	First Draft	All	New
1	0	88/11/21	First Issue	All	Revised
1	1	88/12/20	Second Issue	All	Revised
1	2	89/10/12	Full Revision of text and data formats. **Major changes:** **Added:** description of all Fixed_Portions, of orbit data reference frame, of TAI-UTC Delta, of Acquisition_Report, of Restituted_Orbit; PREDICTED_MMCC_ORBIT; RESTITUTED_EECF_ORBIT; RESTITUTED_MMCC_ORBIT; **Replaced:** Orbit_Number with Pass Number **Removed:** Section 4, Data Flow and Volumes	All	Revised
1	3	91/01/15	Minor revisions in various sections, all marked by vertical bar on the right. **Predicted Orbit:** two files generated. **Acquisition Report:** clarified the splitting in smaller records. **Extracted Data:** report required monthly. **Orbit Information:** specified the number of records. **Unavailability Report:** clarified the use of the report and of the status flags.	3.1.1 3.2.2 3.4.1 3.4.2 3.5.1	Revised Revised Revised Revised Revised
1	4	91/11/21	**Updated:** Predicted Orbit: one file for 6 days.	3.1.1	Revised
1	5	95/03/06	**Major Changes:** All sections updated for ERS-2 (changes highlighted by a vertical bar).	All	Revised

TABLE OF CONTENTS

ACRONYMS AND ABBREVIATIONS

ASCII	American National Standard Code for Information Interchange
CCT	Computer Compatible Tape
EECF	ESRIN ERS Central Facility
EGS	ESA ERS Ground Station
EPO	Earthnet Program Office
ERS	European Remote Sensing Satellite
ESA	European Space Agency
ESOC	European Space Operations Centre
ESRIN	European Space Research Institute
FD	Fast Delivery
FDP	Fast Delivery Product
FTP	File Transfer Protocol
GS	Ground Station
ISS	Interface Subset
HBR	High Bit Rate
HDDR	High Density Digital Recorder
HDDT	High Density Digital Tape
IP	Intermediate Product
LBR	Low Bit Rate
LUT	Look Up Table
MMCC	Mission Management and Control Centre
NFS	National/Foreign Station
OD	Optical Disk
OS	Operating System
PAF	Processing and Archiving Facility
PCD	Product Confidence Data
PSN	Packet Switching Network
SAR	Synthetic Aperture Radar
TAI	International Atomic Time
TBC	To Be Confirmed
TBD	To Be Determined
TTC	Tracking, Telemetry and Command
UTC	Universal Time Coordinated
VMS	Virtual Memory System (operating system of Digital Equipment Corporation computers)

1 INTRODUCTION

1.1 SCOPE

This document describes and specifies the interfaces between the Earthnet ERS Central Facility (EECF) and the National and Foreign Stations (NFSs) of the ERS Ground Segment. The interface specified covers the nominal case. Ad hoc arrangements should be made to cover the particular operational and organizational aspects of some specific NFSs.

This document does not cover all the aspects concerning the exchange of information between the Agency and the national entity responsible for user interface, related to handling of user requests for products or sensing activities and the consequent product orders and their status.

Section 2 describes the technical aspects of general validity, applicable to specific message groups.

Section 3 describes for each message group the activities and specifies for each associated function the format of the applicable files as well as related operational conditions and constraints.

ANNEX I contains the Interface Data Formats applicable between EECF and NFSs.

1.2 APPLICABLE DOCUMENTS

A-1	ER-IS-ESA-GS-0001	ERS-1 Satellite to Ground Segment Interface Specification
A-2	ER-IS-EPO-GE-0108	EECF File Transfer
A-3	ER-IS-EPO-GU-0101	ERS CUS Data Structures
A-4	ER-IS-ESA-GS-0002	ERS-2 Satellite to Ground Segment Interface Specification

1.3 REFERENCE DOCUMENTS

R-1	ER-LI-EPO-GS-0101	ERS Ground Segment Acronyms, Abbreviations and Glossary of Terminology

2 GENERAL ASPECTS

2.1 DESCRIPTION

Note: This section is provided for information only.

Each NFS is interfaced to EECF via telecommunication links for terminal access or to exchange data files.

EECF and NFS operators can exchange messages on-line or via conventional methods like telex, phone and facsimile as appropriate.

NFSs are also interfaced to EECF for the exchange of information related to the shipment of raw data and products on Agency behalf.

2.2 TELECOMMUNICATION

2.2.1 Telecommunication Infrastructure

Note: This section is provided for information only.

The electronic data exchange occurs over a telecommunication infrastructure based on packet switching networks (PSN), unless otherwise specified. The link protocol is X.25. The nominal line speed is 2.4 Kb/s. The packet size is nominally aligned with the one of the networks involved.

2.2.2 Terminal Access

NFS can access through terminals the information contained in the Global Activity Plan (GAP), which describes planned mission activities, including timed sensor activation periods.

2.2.3 File Transfer

The file structure and the method for file exchange are described in document A-2.

The application data record size for most files is fixed, however, some files with variable application data record size have to be handled as well.

It should be noted that the file name within this document is used to refer to a complete file or to a single Application Data Record. For example a Shipment_Report file is made up of a collection of Shipment_Report records. Annex I (Interface Data Formats) details the content of the Application Data Records only, unless otherwise specified.

2.2.4 Electronic Mailing

Note: This section is provided for information only.

An electronic mailing system, based on X.400, is available at EECF. NFSs equipped with a compatible electronic mailing system, can exchange via this application messages with EECF.

2.3 CONVENTIONAL COMMUNICATION METHODS

Note: This section is provided for information only.

Conventional methods of information exchange, like phone, facsimile and telex, are available to link EECF and NFSs.

ERS-1 related documents are transferred between EECF and NFSs via special courier for urgent or delicate matters and via ordinary mail in the other cases.

2.4 RECORDING MEDIA SHIPMENT

NFSs send to the destination indicated by EECF the physical recording media with the raw data or products generated at Agency request. The formats of the products are defined in an ad hoc technical annex (TBD) to the Memorandum of Understanding.

The term "recording media" includes Computer Compatible Tapes (CCTs), Optical Disks (ODs), Exabyte cassettes or High Density Digital Tapes (HDDTs).

The recording media exchange is monitored via a recording media database centralized at EECF. Sender and recipient provide shipment, reception, and quality information. EECF monitors periodically the status of recording media distribution, and controls it by means of operational messages directed to the appropriate facility.

NFSs store the original HDDTs without reusing them until, after successful reading at the destination, the EECF releases them for reuse.

2.5 AVAILABILITY

Note: This section is provided for information only.

EECF services are nominally available 24 h per day, 7 days a week. The facility is attended around the clock, during satellite life-time, and only during working hours, after satellite life-time.

NFSs must be available for all planned operations agreed with ESA, according to the content of the Memorandum of Understanding.

3 INTERFACES

3.1 SPACECRAFT DATA

3.1.1 Predicted Orbit

EECF transmits once per day to NFSs (except when long windows of no-operation are planned) one Predicted_Orbit file, containing state vectors for 6 days, each state vector defining the Cartesian satellite position and velocity at the ascending node and the corresponding reference time, in Earth fixed coordinate system. The two files will cover 32 contiguous orbits, where the first one is related to ascending node time 22.30 hours UTC. Any state vector, for a given orbit, received earlier shall be overridden by a state vector received later for this orbit, since the later prediction will be more accurate. The file contains:

- Fixed Portion:
  - . File Identifier = 'ORPD_'
  - . Generation Date (YYMMDD)
  - . Originator = 'CF'
  - . Destination = NFS identifier
  - . Cyclic Counter
  - . Separator = '.'
  - . Satellite ID = 'E1' or 'E2'
  - . Generation Time (HH:MM:SS)
- Variable Portion (not used/present):
- Application Data Records (up to 16):
  - . Orbit Number
  - . State Vectors
    - * UTC
    - * Position Vectors (x, y, z) in 1E-2 m
    - * Velocity Vectors (dx/dt, dy/dt, dz/dt) in 1E-5 m/s

The Application Data Record is of fixed size and further detailed in Appendix I. It should be noted that the state vector data are in binary representation.

The Predicted_Orbit information is extracted from the file Predicted_MMCC_Orbit, generated at MMCC after the last of consecutive passes over Kiruna, containing one predicted state vector per orbit, at the ascending node, for the coming 6 days. This file is optionally available for dissemination to the NFSs. The file contains:

- Fixed Portion:
  - . File Identifier = 'ORPM_'
  - . Generation Date (YYMMDD)
  - . Originator = 'CF'
  - . Destination = NFS identifier
  - . Cyclic Counter
  - . Separator = '.'
  - . Satellite ID = 'E1' or 'E2'

. Generation Time (HH:MM:SS)
- Variable Portion:
. Filler (always zero) (6 ASCII digits)
. Filler (always zero) (10 ASCII digits)
. Start time in integer days (MJD) (6 ASCII digits)
. Start time in msec since midnight UTC (10 ASCII digits)
. End time in integer days (MJD) (6 ASCII digits)
. End time in msec since midnight UTC (10 ASCII digits)
. " LAST UPDATE: " string (14 ASCII characters)
. Date and Time of Last Update (19 ASCII characters)
- Application Data Records (up to 90):
. Node crossing time in integer days (MJD)
. Node crossing time in msec since midnight UTC
. Orbit number
. Position Vectors (x, y, z)
. Velocity Vectors (dx/dt, dy/dt, dz/dt)
. TAI-UTC Delta

The remaining paragraphs within this section are provided for information only.

The reference frame for the state vectors (position and velocity) is the Conventional Terrestrial System (CTS), defined as:

-Z axis from the Earth centre to the pole, coinciding with the Earth rotation axis as defined in the latest annual report of the International Earth Rotation Service;
-X axis in the equatorial plane from the Earth centre to the zero longitude meridian (Greenwich);
-Y axis completing the left handed reference frame.

The accuracy of the state vector is defined in document A-1.

The TAI-UTC Delta is the value of the difference between the International Atomic Time (TAI) and the Universal Time Coordinated (UTC) in seconds. Normally this value is zero. Only when the two clocks are not in synchronism, this value can be different from zero. In this case it is foreseen that it will normally be +1 second and exceptionally +2 seconds.

3.1.2 Time Correlation

EECF transmits per orbit (when available) to NFS, except when long windows of no-operation are planned, one file containing one Time Correlation element, which permits to correlate the satellite's on board time with the UTC one. The format of the file is:

- Fixed Portion:
. File identifier = 'PATC '
. Generation Date (YYMMDD)
. Originator = 'CF'
. Destination = NFS identifier

  . Cyclic Counter
  . Separator = '.'
  . Satellite ID = 'E1' or 'E2'
  . Generation Time (HH:MM:SS)
- Variable Portion (not used/present):
- Application Data Records (1 only per file):
  . Orbit Number
  . UTC
  . Satellite Binary Time
  . Clock Period of Satellite Time Counter

The Application Data Record is of fixed size and further detailed in Appendix I. It should be noted that UTC is in binary representation. Satellite Binary Time specifies a state of the satellite 32-bit binary time counter, which therefore is an unsigned integer. The counter period is specified in ns (I*4). It should be noted that a time correlation element is not available for each of the orbits.

3.2 RAW DATA ACQUISITION

3.2.1 Acquisition Schedule

When acquisitions are planned, EECF transmits daily to NFSs one file of Acquisition_Schedules. This file covers the next 24h and includes:

- Fixed Portion:
  - . File identifier = 'SHAQ_'
  - . Generation Date (YYMMDD)
  - . Originator = 'EC'
  - . Destination = NFS identifier
  - . Cyclic Counter
  - . Separator = '.'
  - . Satellite ID = 'E1' or 'E2'
  - . Generation Time (HH:MM:SS)
- Variable Portion:
  - . Template Identifier:
    - * Template Name = 'SA'
    - * Template Version Number = '0'|...|'9'
    - * Schedule Level = 'H'
- Application Data Record (no_of_passes times):
  - . Acquisition Schedule Identifier:
    - * Pass Number (number of the orbit when the satellite ground track crosses the ground station latitude line)
    - * Station Identifier = NFS identifier
    - * Schedule Originator
  - . AOS Date and Time
  - . LOS Date and Time
  - . Link Segment:
    - * Link I Activation Date and Time Range
    - * Link II Real-time Activation Date and Time Range
    - * Link II Playback Activation Date and Time Range
  - . Occultation Date and Time Range

The Template Identifier is for use at ESA stations only: it should be ignored by NFSs. The Application Data Record is of fixed size and further detailed in Appendix I.

3.2.2 Acquisition Report

After acquisition, each NFS transmits to EECF, within 24 hours(*) after each satellite pass, an Acquisition_Report file, describing all the acquisitions performed during that pass and including:

- Fixed Portion:
  - . File identifier = 'REAQ_'
  - . Generation Date (YYMMDD)
  - . Originator = NFS identifier
  - . Destination = 'CF'
  - . Cyclic Counter
  - . Separator = '.'

. Satellite ID = 'E1' or 'E2'

. Generation Time (HH:MM:SS)
- Variable Portion:
  . Message Header
    * Message Type = 251 binary (2 bytes)
    * Message Identifier (4 bytes, binary sequential counter)
- Application Data Record (1 only):
  . Report Header
  . Number of Acquisition PCD Records
  . Number of Tape Label Records
  . Acquisition PCD Summary Records
  . HDDT Labels

The Application Data Record is of variable size and further detailed in Appendix I. The format specified in Appendix I represents the maximum size. The actual size depends on the number times the following fields are repeated:

-PCD record (up to 600 within one Acquisition PCD summary field)
-Acquisition PCD summary (up to 8 times; note that the size of this field is variable since the number of PCD records within this field is variable)
-Tape label record (up to 4 times)

As can be seen from Appendix I, the maximum size application data record consists of 48,407 bytes which exceeds the maximum record size supported by VMS. In case the record size exceeds 16384 bytes, the application data record shall be split into the required number of 16,384 bytes fixed size records, where all records but the last one are fully filled. The last record is padded as required.

PCD refer to:

- performance of down-link and X-band acquisition chains,
- HDDR formatter lock indication.

(*) In case of suspected/detected anomaly in the spacecraft performance, faster turn around would be highly desirable.

3.3 RAW DATA ARCHIVING

3.3.1 Description of Activities

After acquisition, the raw data are archived. NFSs transfer to the PAFs the raw data acquired at Agency request, according to a fixed shipment plan, defined on the basis of the responsibility of each PAF.

After shipment, NFSs generate Shipment_Reports and transmit them to EECF.

At NFSs the original data is temporarily stored, to permit the generation of a new copy for the PAF, when the shipped one is defective. EECF requests a new copy to NFSs via a Medium_Copy_Order and releases the original medium for reuse through a Medium_Release_Order.

3.3.2 Shipment Report

NFSs transmit on a weekly basis to EECF a file of Shipment_Reports, including:

- Fixed Portion:
  - . File identifier = 'RESM_'
  - . Generation Date (YYMMDD)
  - . Originator = NFS identifier
  - . Destination = 'EC'
  - . Cyclic Counter
  - . Separator = '.'
  - . Satellite ID = 'E1' or 'E2'
  - . Generation Time (HH:MM:SS)
- Variable Portion (not used/present):
- Application Data Records (no_of_media*no_of_data_sets times):
  - . Shipment Details:
    - * Shipment Identifier
    - * Shipment Date
    - * Destination Facility Identifier
  - . Recording Medium Information:
    - * Recording Medium Identifier
    - * Recording Medium Type
    - * Original Recording Medium Identifier
    - * Original Recording Medium Type
  - . Data Set Identifier
  - . Remarks

The Application Data Record is of fixed size and further detailed in Appendix I. Data Set Identifier and Remarks are fields containing free ASCII strings.

A Data Set is a file, which can be either a single product or a collection of products.

There can be several media in a shipment and several data sets per medium. The Shipment_Report record (i.e. each Application Data Record) must therefore be repeated for each data set and recording medium.

This structure is intended to cover all possible cases, that is: several data sets sharing the same recording medium, one data set contained in a single recording medium, and one data set spanning over several recording media.

Both the Recording Medium Identifier (the medium sent with the shipment) and the Original Recording Medium Identifier (the medium stored at the originating facility) must be filled in, in order to permit correlation of the two media.

3.3.3 Medium Copy Order

When the necessity arises, EECF transmits to the concerned NFS a file of Medium_Copy_Orders, including:

- Fixed Portion:
  - . File identifier = 'ODMC_'
  - . Generation Date (YYMMDD)
  - . Originator ='EC'
  - . Destination = NFS identifier
  - . Cyclic Counter
  - . Separator = '.'
  - . Satellite ID = 'E1' or 'E2'
  - . Generation Time (HH:MM:SS)
- Variable Portion (not used/present):
- Application Data Records (no_of_media*no_of_data_sets times):
  - . Destination Facility Identifier
  - . Shipment Identifier
  - . Shipment Date
  - . Recording Medium Identifier
  - . Original Recording Medium Identifier
  - . Data Set Identifier

The Application Data Record is of fixed size and further detailed in Appendix I. The Data Set Identifier is a field containing a free ASCII string.

3.3.4 Medium Release Order

Weekly, after having received from the PAFs evidence on readability of the media shipped from the stations, EECF transmits to NFS a file of Medium_Release_Order records, including:

- Fixed Portion:
  - . File identifier = 'ODMR_'
  - . Generation Date (YYMMDD)
  - . Originator ='EC'

  - Destination = NFS identifier
  - Cyclic Counter
  - Separator = '.'
  - Satellite ID = 'E1' or 'E2'
  - Generation Time (HH:MM:SS)
- Variable Portion (not used/present):
- Application Data Records:
  - Original Recording Medium Identifier
  - Shipment Identifier
  - Shipment Date

The Application Data Record is of fixed size and further detailed in Appendix I.

3.4 OFF-LINE PROCESSING

3.4.1 Extracted Data

NFSs send monthly to EECF a file of Extracted_Data records, listing all the ERS raw data (per frame) extracted from the station local archive during the reporting period, including:

- Fixed Portion:
  - . File identifier = 'REEX_'
  - . Generation Date (YYMMDD)
  - . Originator = NFS identifier
  - . Destination = 'CF'
  - . Cyclic Counter
  - . Separator = '.'
  - . Satellite ID = 'E1' or 'E2'
  - . Generation Time (HH:MM:SS)
- Variable Portion (not used):
- Application Data Records:
  - . Raw Data Identifier
  - . Acquisition Schedule Reference
  - . Raw data extraction Date and Time
  - . Raw data extraction purpose:
    - * NFS internal use
    - * NFS external use
    - * ESA requests for campaigns, national or pilot projects, calibration, etc.
    - * ESA requests for end users

The Application Data Record is of fixed size and further detailed in Appendix I.

3.4.2 Orbit Information

For local processing of ERS data, EECF provides daily to NFS the Restituted_Orbit, covering orbits of previous days and containing 100 state vectors for each described orbit.

The Restituted_Orbit for 24 hours is generated with a delay of 3 days during the "off-time" (that is after last pass over Kiruna), manipulating the data of the previous 3 days. It contains 100 state vectors per orbit (1 minute interval), determined using S-band/Doppler ranging data or S-band/Doppler ranging data and Radar Altimeter data. The file contains:

- Fixed Portion:
  - . File identifier = 'ORRS_'
  - . Generation Date (YYMMDD)
  - . Originator = 'CF'
  - . Destination = NFS identifier
  - . Cyclic Counter
  - . Separator = '.'
  - . Satellite ID = 'E1' or 'E2'
  - . Generation Time (HH:MM:SS)

- Variable Portion (not used):
- Application Data Records (1440):
  . Universal Time Coordinated (UTC):
    * Modified Julian Date (days since 1st January 1950)
    * Time (milliseconds in current day)
  . X, Y, Z Coordinates (in 1 E-2 m)
  . X, Y, Z Velocities (in 1 E-5 m/s)

Another file, called Restituted_EECF_Orbit, is available at EECF for distribution on request, with the same availability and temporal coverage of the Restituted_Orbit. It contains:

- Fixed Portion:
  . File Identifier = 'ORRE_'
  . Generation Date (YYMMDD)
  . Originator = 'CF'
  . Destination = NFS identifier
  . Cyclic Counter
  . Separator = '.'
  . Satellite ID = 'E1' or 'E2'
  . Generation Time (HH:MM:SS)
- Variable Portion (not used):
- Application Data Records (1440):
  . Orbit Number
  . TAI-UTC Delta (see note for Predicted Orbit)
  . Universal Time Coordinated (UTC):
    * Modified Julian Date (days since 1st January 1950)
    * Time (milliseconds in current day)
  . X, Y, Z Coordinates (in 1 E-2 m)
  . X, Y, Z Velocities (in 1 E-5 m/s)

The Restituted_Orbit is extracted from a file generated at MMCC called Restituted_MMCC_Orbit, containing 1 state vector per minute, for one day with a delay of 3 days. The file is generated after the last of consecutive passes over Kiruna and is optionally available for dissemination to the NFSs. It contains:

- Fixed Portion:
  . File Identifier = 'ORRM_'
  . Generation Date (YYMMDD)
  . Originator = 'CF'
  . Destination = NFS identifier
  . Cyclic Counter
  . Separator = '.'
  . Satellite ID = 'E1' or 'E2'
  . Generation Time (HH:MM:SS)
- Variable Portion:
  . Filler (always zero) (6 ASCII digits)
  . Filler (always zero) (10 ASCII digits)
  . Start time in integer days (MJD) (6 ASCII digits)
  . Start time in msec since midnight UTC (10 ASCII digits)
  . End time in integer days (MJD) (6 ASCII digits)

. End time in msec since midnight UTC (10 ASCII digits)
. " LAST UPDATE: " string (14 ASCII characters)
. Date and Time of Last Update (19 ASCII characters)

- Application Data Records (1440):
  . Time in integer days (MJD)
  . Time in msec since midnight UTC
  . Orbit number
  . Position Vectors (x, y, z)
  . Velocity Vectors (dx/dt, dy/dt, dz/dt)
  . TAI-UTC Delta (see note for Predicted Orbit)

For state vector reference frame see section 3.1.1, Predicted Orbit.

The accuracy of the data is specified in doc. A-1 and A-4.

The Application Data Records of all these files are of fixed size and are further detailed in Appendix I.

3.5 OPERATIONS AND AVAILABILITY

3.5.1 Unavailability Report

NFSs transmit to EECF, as soon as available, information on planned or unintended unavailability of the full facility or of major sub-units, through an Unavailability_Report file, including:

- Fixed Portion:
  - . File identifier = 'REUG_'
  - . Generation Date (YYMMDD)
  - . Originator = NFS identifier
  - . Destination = 'EC'
  - . Cyclic Counter
  - . Separator = '.'
  - . Satellite ID = 'E1' or 'E2'
  - . Generation Time (HH:MM:SS)
- Variable Portion (not used/present):
- Application Data Records:
  - . Facility Identifier
  - . Involved System/Subsystem Identifier
    - - High Rate Recorder Status
    - - Other Facilities' Status (ignored by NFS)
  - . Unavailability Type
  - . Unavailability Reason
  - . Non-ESA Station Priority (only for LBR stations)
  - . Unavailability Start Date and Time
  - . Unavailability Stop Date and Time
  - . Remarks

The Application Data Record is of fixed size and further detailed in Appendix I. The file including all the Unavailability_Reports must be re-transmitted at each change. An empty Unavailability_Report file clears the CUS data base.

The proper High Rate Recorder Status (blank for "active" or upper case O for "off") must be provided.

It should be noted that, in the data structure defined in Appendix I, field 2.0 can take two alternative forms:

-Status Flag — applicable to EGS only
-PRARE STATION IDENTIFIER — to be used by PRARE stations

Status information describing NFS unavailability will be reflected in acquisition planning, only if received at EECF 10 days ahead of operations, or at least in accounting only, if received at EECF 72 hours before operations.

When filling the report, the following guideline shall apply:

-the time windows specified in the records of one Unavailability_Report must be non-overlapping (should this happen, the second record would be ignored);

-all devices which are not explicitly marked as unavailable in the Unavailability_Report are considered by CUS as available (even if the station does not have the device, e.g. SAR 2 processor).

3.5.2 Special Operations

All the operations not mentioned in any of the previous paragraphs, are agreed and set-up via an exchange of messages between the responsible persons of the facilities concerned.

ANNEX I: INTERFACE DATA FORMATS

1 ACQUISITION_REPORT

NO.	NAME	OFFST	LENGTH	TIMES	T	DESCRIPTION
			48407			*** TOTAL BYTES (maximum)
1.0	X_REPORT_HEADER	0	39			Report Header
2.0		39	4		B	Number of Acquisition PCD Records
3.0		43	4		B	Number of Tape Label Records
4.0		47	6013	8		Acquisition PCD Summary (max. 8 times)
4.1		47	1		B	Physical HDDR
4.2	X_UTC	48	8			Time of first PCD sample
4.3		56	4		B	Number of PCD records to follow
4.4		60	10	600		PCD records (max. 600), ACQ PCD Data each 2 seconds
4.41		60	9			Formatted Demod PCD
4.411		60	1		B	PCD valid = 0 invalid = 1
4.412		61	6			Demodulator TCR PCD
4.4121		61	1		B	HR or LR carrier lock
4.4122		62	1		B	AGC level
4.4123		63	1		B	Real time bit error rate
4.4124		64	1		B	Playback bit error rate
4.4125		65	1		B	HR or LR Q bit clock lock
4.4126		66	1		B	HR or LR I bit clock lock
4.413		67	2			HDDR Lock Signals
4.4131		67	1		B	Real Time lock
4.4132		68	1		B	Playback lock
4.42		69	1		B	PCD Summary Byte
5.0	X_HDDT_LABEL	48151	64	4		HDDT Label record (max. 4)

2 ACQUISITION_SCHEDULE

NO.	NAME	OFFST	LENGTH	TIMES	T	DESCRIPTION
			248			*** TOTAL BYTES
1.0		0	8			ACQUISITION SCHEDULE IDENTIFIER:
1.1	X_PASS_NO	0	5			Pass Number
1.2	X_FACILITY_ID	5	2			Station Identifier
1.3	X_SCHEDULE_ORIGINATOR	7	1			Schedule Originator
2.0	X_DAY_TIME	8	24			AOS Date and Time
3.0	X_DAY_TIME	32	24			LOS Date and Time
4.0		56	144			LINK SEGMENT:
4.1	X_DAY_TIME	56	24			Link I Activation Start Date and Time
4.2	X_DAY_TIME	80	24			Link I Activation End Date and Time
4.3	X_DAY_TIME	104	24			Link II Real-Time Activation Start Date and Time
4.4	X_DAY_TIME	128	24			Link II Real-Time Activation End Date and Time
4.5	X_DAY_TIME	152	24			Link II Playback Activation Start Date and Time
4.6	X_DAY_TIME	176	24			Link II Playback Activation End Date and Time
5.0	X_DAY_TIME	200	24			X-Band Occultation Start Date and Time
6.0	X_DAY_TIME	224	24			X-Band Occultation End Date and Time

3 EXTRACTED_DATA

NO.	NAME	OFFST	LENGTH	TIMES	T	DESCRIPTION
			48			*** TOTAL BYTES
1.0	X_UNP_ENTRY_ID	0	16			Raw Data Identifier
2.0		16	8			ACQUISITION SCHEDULE REFERENCE:
2.1	X_ORBIT_NO	16	5			Orbit Number
2.2	X_FACILITY_ID	21	2			Station Identifier
2.3		23	1		A	Scedule Originator (U = CUS)
3.0	X_DATE_TIME	24	14			Raw data extraction Date and Time
4.0		38	1		A	RAW DATA EXTRACTION PURPOSE: I = NFS internal use X = NFS external use C = ESA requests for campaigns, pilot projects, calibration,... E = ESA requests for end users
5.0		39	9			Reserved

4 MEDIUM_COPY_ORDER

NO.	NAME	OFFST	LENGTH	TIMES	T	DESCRIPTION
			84			*** TOTAL BYTES
1.0	X_FACILITY_ID	0	2			Addressee Identifier
2.0	X_SHIPMENT_ID	2	4			Shipment Identifier
3.0	X_DAY_TIME	6	24			Shipment Date (only date used)
4.0	X_MEDIUM_ID	30	8			Recording Medium Identifier
5.0	X_MEDIUM_ID	38	8			Original Recording Medium Identifier
6.0		46	38		A	Data Set Identifier

5 MEDIUM_RELEASE_ORDER

NO.	NAME	OFFST	LENGTH	TIMES	T	DESCRIPTION
			36			*** TOTAL BYTES
1.0	X_MEDIUM_ID	0	8			Original Recording Medium Identifier
2.0	X_SHIPMENT_ID	8	4			Shipment Identifier
3.0	X_DAY_TIME	12	24			Shipment Date (only date used)

6 PREDICTED_MMCC_ORBIT

NO.	NAME	OFFST	LENGTH	TIMES	T	DESCRIPTION
			115			*** TOTAL BYTES (application data record only)
			81			VARIABLE PORTION:
1.0		0	6		N	Reserved
2.0		6	10		N	Reserved
3.0		16	6		N	Start Time in integer days (MJD)
4.0		22	10		N	Start Time in msec since midnight UTC
5.0		32	6		N	End Time in integer days (MJD)
6.0		38	10		N	End Time in msec since midnight UTC
7.0		48	14		A	Information string = " LAST UPDATE: "
8.0		62	19		N	Date and time of Last Update (YYYY/MM/DD hh:mm:ss)
			115			APPLICATION DATA RECORD:
1.0		0	6		N	Node crossing time in integer days (MJD)
2.0		6	10		N	Node crossing time in msec since midnight UTC
3.0		16	7		N	Orbit Number (orbit 1 at first ascending node crossing)
4.0		23	15		N	Spacecraft CTS X-coordinate (Km in F15.6 FORTRAN format)
5.0		38	15		N	Spacecraft CTS Y-coordinate (Km in F15.6 FORTRAN format)
6.0		53	15		N	Spacecraft CTS Z-coordinate (Km in F15.6 FORTRAN format)
7.0		68	15		N	Spacecraft CTS X-velocity (Km/s in F15.9 FORTRAN format)
8.0		83	15		N	Spacecraft CTS Y-velocity (Km/s in F15.9 FORTRAN format)
9.0		98	15		N	Spacecraft CTS Z-velocity (Km/s in F15.9 FORTRAN format)
10.0		113	2		N	TAI-UTC Change (s)

7 PREDICTED_ORBIT

NO.	NAME	OFFST	LENGTH	TIMES	T	DESCRIPTION
			40			*** TOTAL BYTES
1.0	X_ORBIT_NO	0	5			Orbit Number
2.0		5	3			Reserved
3.0	X_STATE_VECTOR	8	32			Orbit State Vector (at ascending node)

8 RESTITUTED_EECF_ORBIT

NO.	NAME	OFFST	LENGTH	TIMES	T	DESCRIPTION
			40			*** TOTAL BYTES
1.0	X_ORBIT_NO	0	5			Absolute Orbit Number
2.0		5	2		N	TAI-UTC Delta (s)
3.0		7	1			Reserved
4.0	X_STATE_VECTOR	8	32			Orbit State Vector

9 RESTITUTED_MACC_ORBIT

NO.	NAME	OFFST	LENGTH	TIMES	T	DESCRIPTION
			115			*** TOTAL BYTES (application data record only)
			81			VARIABLE PORTION:
1.0		0	6		N	Reserved
2.0		6	10		N	Reserved
3.0		16	6		N	Start Time in integer days (MJD)
4.0		22	10		N	Start Time in msec since midnight UTC
5.0		32	6		N	End Time in integer days (MJD)
6.0		38	10		N	End Time in msec since midnight UTC
7.0		48	14		A	Information string = " LAST UPDATE: "
8.0		62	19		N	Date and time of Last Update (YYYY/MM/DD hh:mm:ss)
			115			APPLICATION DATA RECORD:
1.0		0	6		N	Time in integer days (MJD)
2.0		6	10		N	Time in msec since midnight UTC
3.0		16	7		N	Orbit Number (orbit 1 at first ascending node crossing)
4.0		23	15		N	Spacecraft CTS X-coordinate (Km in F15.6 FORTRAN format)
5.0		38	15		N	Spacecraft CTS Y-coordinate (Km in F15.6 FORTRAN format)
6.0		53	15		N	Spacecraft CTS Z-coordinate (Km in F15.6 FORTRAN format)
7.0		68	15		N	Spacecraft CTS X-velocity (Km/s in F15.9 FORTRAN format)
8.0		83	15		N	Spacecraft CTS Y-velocity (Km/s in F15.9 FORTRAN format)
9.0		98	15		N	Spacecraft CTS Z-velocity (Km/s in F15.9 FORTRAN format)
10.0		113	2		N	TAI-UTC Change (s)

10 RESTITUTED_ORBIT

NO.	NAME	OFFST	LENGTH	TIMES	T	DESCRIPTION
			32			*** TOTAL BYTES
1.0	X_STATE_VECTOR	0	32			Orbit State Vector

11 SHIPMENT_REPORT

NO.	NAME	OFFST	LENGTH	TIMES	T	DESCRIPTION
			148			*** TOTAL BYTES
1.0		0	30			SHIPMENT DETAILS:
1.1	X_SHIPMENT_ID	0	4			Shipment Identifier
1.2	X_DAY_TIME	4	24			Shipment Date (only date used)
1.3	X_FACILITY_ID	28	2			Destination Facility Identifier
2.0		30	20			RECORDING MEDIUM INFORMATION (MEDIA GROUPED IN MEDIA-SETS):
2.1	X_MEDIUM_ID	30	8			Recording Medium Identifier
2.2	X_MEDIUM_TYPE	38	2			Recording Medium Type
2.3	X_MEDIUM_ID	40	8			Original Recording Medium Identifier
2.4	X_MEDIUM_TYPE	48	2			Original Recording Medium Type
3.0		50	38		A	Data Set Identifier
4.0		88	60		A	Remarks

12 TIME_CORRELATION

NO.	NAME	OFFST	LENGTH	TIMES	T	DESCRIPTION
			24			*** TOTAL BYTES
1.0	X_ORBIT_NO	0	5			Orbit Number
2.0		5	3			Reserved
3.0	X_UTC	8	8			Reference UTC Time
4.0		16	4		B	Satellite Time Binary Counter Value
5.0		20	4		B	Clock Period of Satellite Time Counter (ns)

13 UNAVAILABILITY_REPORT

NO.	NAME	OFFST	LENGTH	TIMES	T	DESCRIPTION
			132			*** TOTAL BYTES
1.0	X_FACILITY_ID	0	2			Facility Identifier
2.0		2	11			PRARE STATION IDENTIFIER:
2.1		2	5		N	Site Number (leading digit always zero: only 4 digits used)
2.2		7	2		A	Instrument Acronym
2.3		9	4		N	Occupation Number
3.0		2	11			Status Flag (ESA stations only)
3.1		2	1		A	DPS Status (blank = "active"; "0" = "Off")
3.2		3	1		A	HR Demod. Status (blank = "both active"; "0" = "both Off"; "1" = "HR Demod. 1 Off"; "2" = "HR Demod. 2 Off")
3.3		4	1		A	LR Demod. Status (blank = "both active"; "0" = "both Off"; "1" = "LR Demod. 1 Off"; "2" = "LR Demod. 2 Off")
3.4		5	1		A	Antenna Status (blank = "active"; "0" = "Off")
3.5		6	1		A	LR FS Status (blank = "active"; "0" = "Off")
3.6		7	1		A	HR FS Status (blank = "active"; "0" = "Off")
3.7		8	1		A	BERT Status (blank = "active"; "0" = "Off")
3.8		9	4		A	Reserved
4.0		13	6			System/Sub-system Status (ESA stations only)
4.1		13	1		A	High Rate Recorder Status (blank = "active"; "0" = "Off"; must be "0" for non ESA stations when unavailable)
4.2		14	1		A	Low Rate Recorder Status (blank = "active"; "0" = "Off")
4.3		15	1		A	SAR 1 Processor Status (blank = "active"; "0" = "Off")
4.4		16	1		A	SAR 2 Processor Status (blank = "active"; "0" = "Off")
4.5		17	1		A	LRDPF Status (blank = "active"; "0" = "Off")
4.6		18	1		A	DPMS/CMS Status (blank = "active"; "0" = "Off")
5.0		19	1		A	Unavailability Type P = Planned U = Unplanned
6.0		20	1		A	Unavailability Reason C = Conflict (with other operations) M = Maintenance R = Repair U = Upgrade
7.0		21	1		N	Non-ESA Station Priority (1= highest, 9 = lowest, or blank)
8.0		22	2			Reserved
9.0	X_DAY_TIME	24	24			Unavailability Start Date and Time (used up to seconds)
10.0	X_DAY_TIME	48	24			Unavailability Stop Date and Time (used up to seconds)
11.0		72	60		A	Remarks