Data Management

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System Design Review - 28 June 1994

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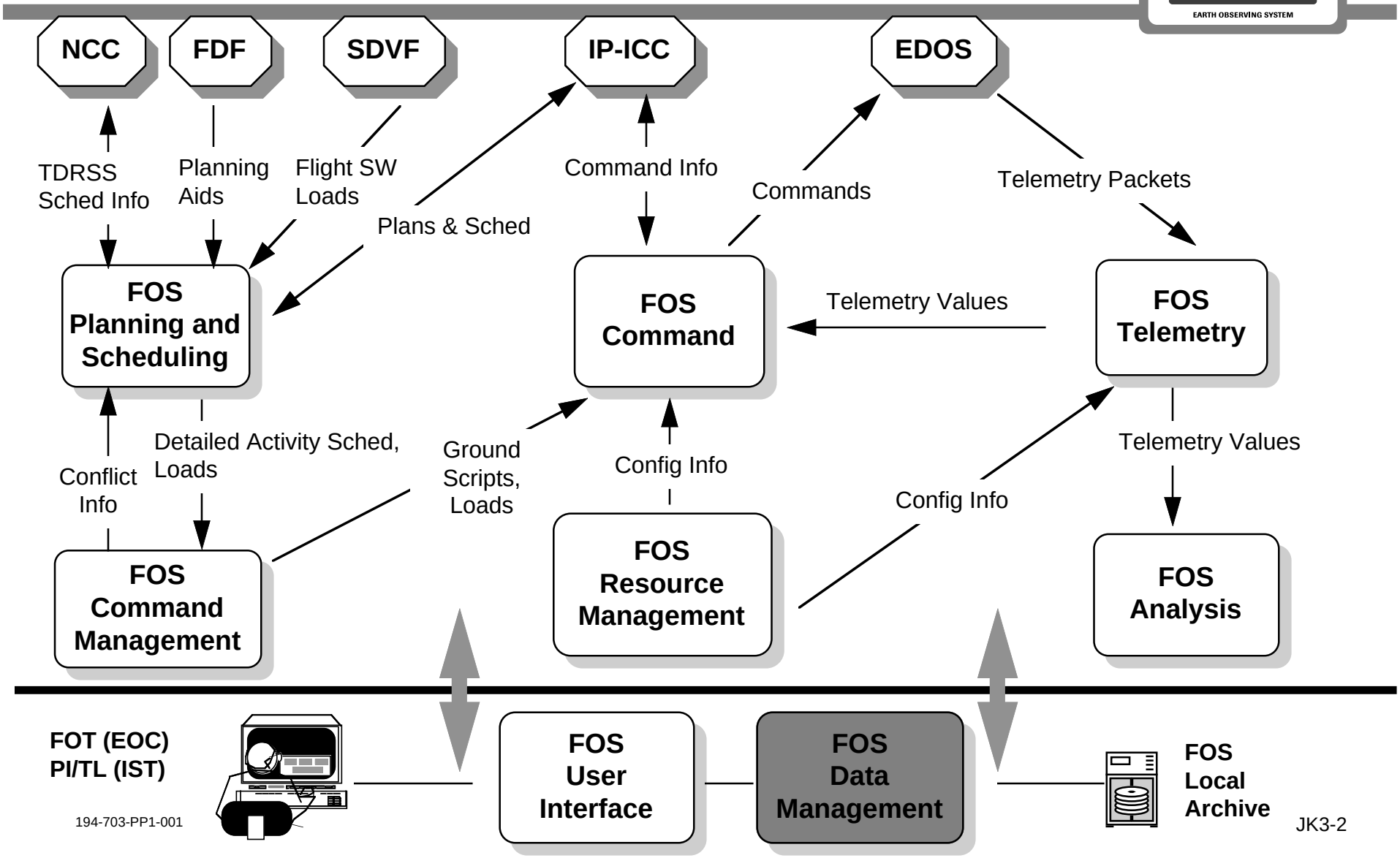
FOS Subsystem Diagram



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Data Management Subsystem Outline

Data Management Overview

- Data Management Functions

Data Management Design Drivers

Data Management Subsystem Context

- Context Diagram
- Description of Critical Interfaces

Data Management Design

- DMS Object Model and Description
- DMS Scenario - Database Generation

Data Management Subsystem Overview

DMS provides 3 types of services

- Database generation
  - Ingests spacecraft, instrument, and operations information
  - Creates operational database
  - Provides Configuration Management
    - Maintains multiple versions of database
    - Restricts access to database modification capability
- Data Storage
  - Maintains an archive of at least 7 days of data
    - Message data
    - Telemetry data
    - Data files
  - Sends archived data to SDPS Ingest for long term storage
  - Provides file management

Data Management Subsystem Overview

Data Retrieval

- Retrieves archived data
  - Local FOS storage
  - Interfaces with SDPS Data Server for long term data
- Provides data to requestor

Data Management Subsystem Design Drivers

Flexibility

- **Support for ingesting a variety of formats of the Project Database**
  - **Ingres**
  - **Oracle**
  - **Sybase**
  - **ASCII files**

Scalability

- **Data storage can be sized up or down depending on the needs of the mission**

Multiple Database Versions

- **Maintain and provide access to all applicable databases for each mission**
  - **Appropriate database utilized when required**
  - **Transparent to user**

Data Management Subsystem Design Drivers

Multi-Mission Environment

- Provide access to multiple databases concurrently
  - Monitoring and evaluating the same instrument on different spacecraft (e.g. CERES on AM1 and PM1)
  - Monitoring the performance of the same spacecraft subsystem on different spacecraft (e.g. EPS on CHEM and AERO)

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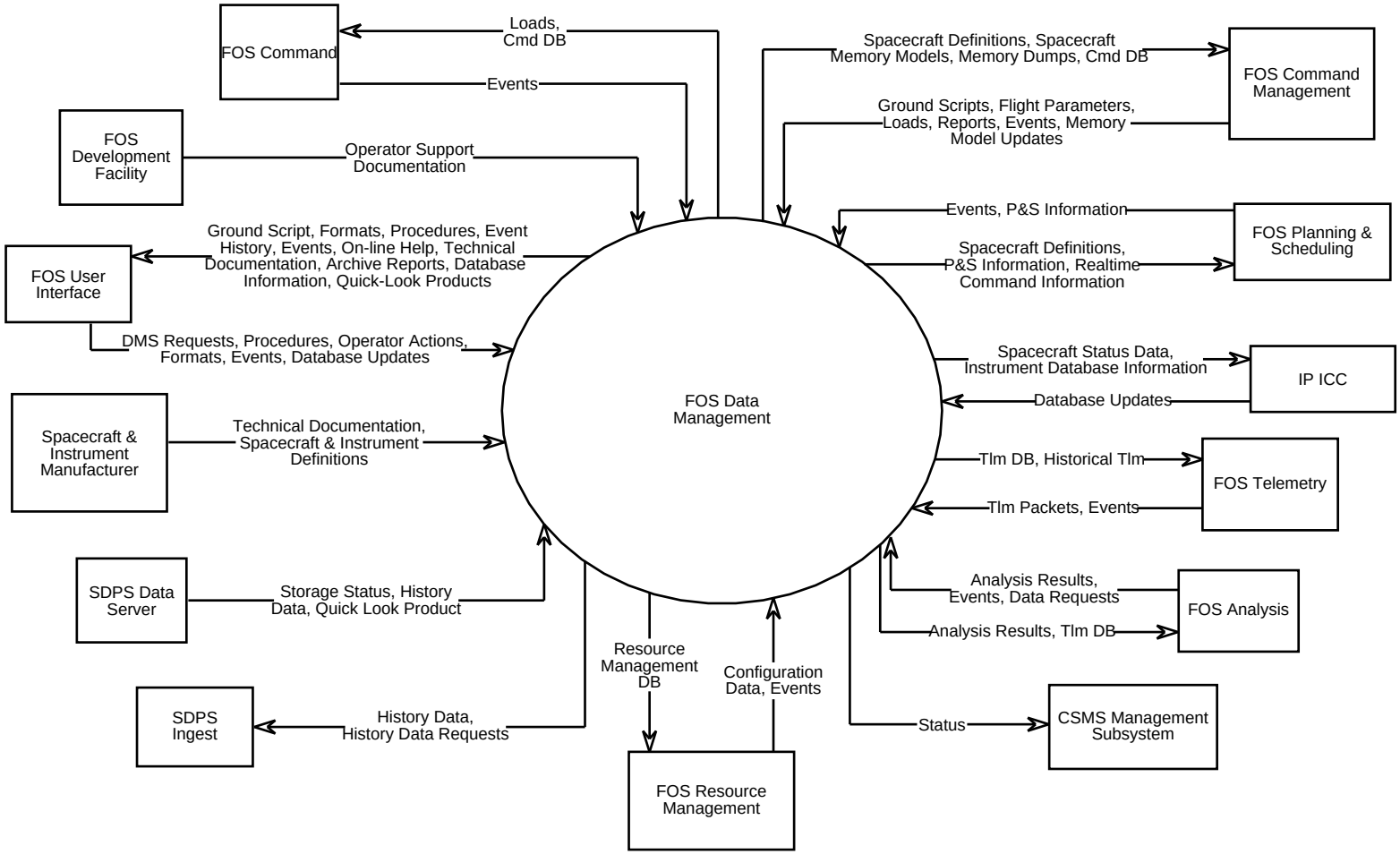
Data Management Subsystem Context Diagram

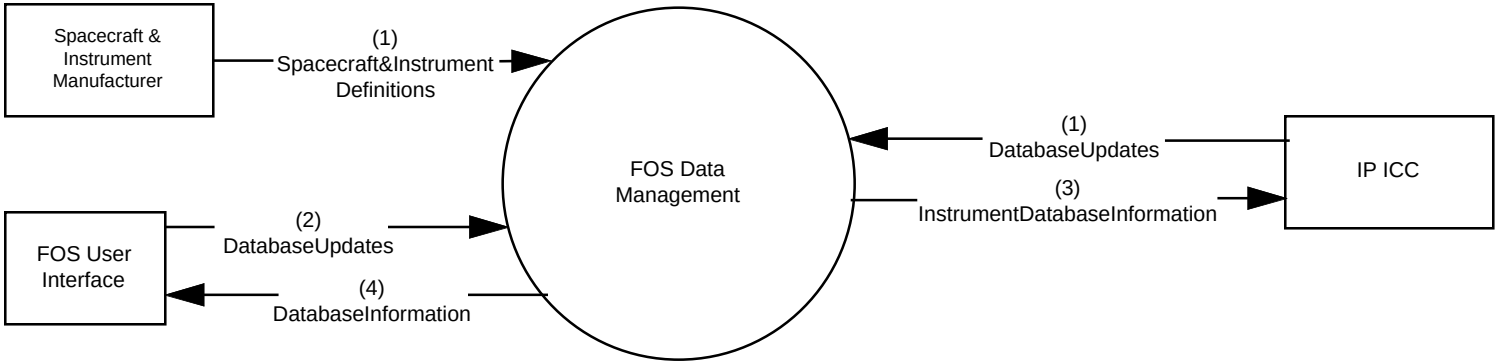


Data Management Subsystem Context Diagram Description

Key Interfaces

- **Database generation**
  - **User Interface subsystem**
    - **FOT**
    - **PI/TL at the IST**
  - **Spacecraft & Instrument builders**
  - **IP-ICC**
- **Data storage**
  - **All FOS subsystems**
    - **Telemetry data**
    - **Message data**
    - **Files**
- **Data retrieval**
  - **SDPS Data Server**
  - **Telemetry subsystem**

Data Management Subsystem Database Generation Scenario



Data Management Subsystem Database Generation Scenario

Telemetry and Command database updates are received from the Spacecraft and Instrument Manufacturers and the IP-ICC (1)

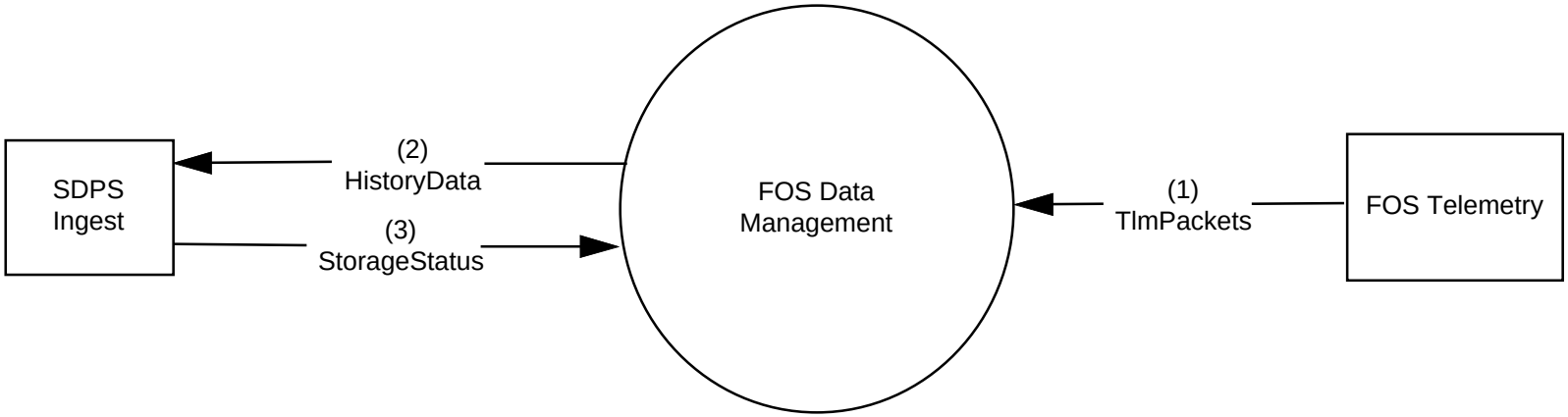
Operational information database updates are received from the User Interface Subsystem (2)

- **Display and event definitions**
- **Analysis processing algorithms**
- **Procedures**

DMS sends Instrument Database Information to the IP-ICC (3)

DMS sends database information to User Interface subsystem to be used for generating database reports (4)

Data Management Subsystem Data Storage Scenario



Data Management Subsystem Data Storage Scenario

DMS receives telemetry data from Telemetry subsystem (1)

- **Housekeeping**
- **Spacecraft recorder**
- **Health and safety**
- **Quicklook**

DMS sends archived data to SDPS Ingest for long term storage (2)

SDPS provides storage status to DMS (3)

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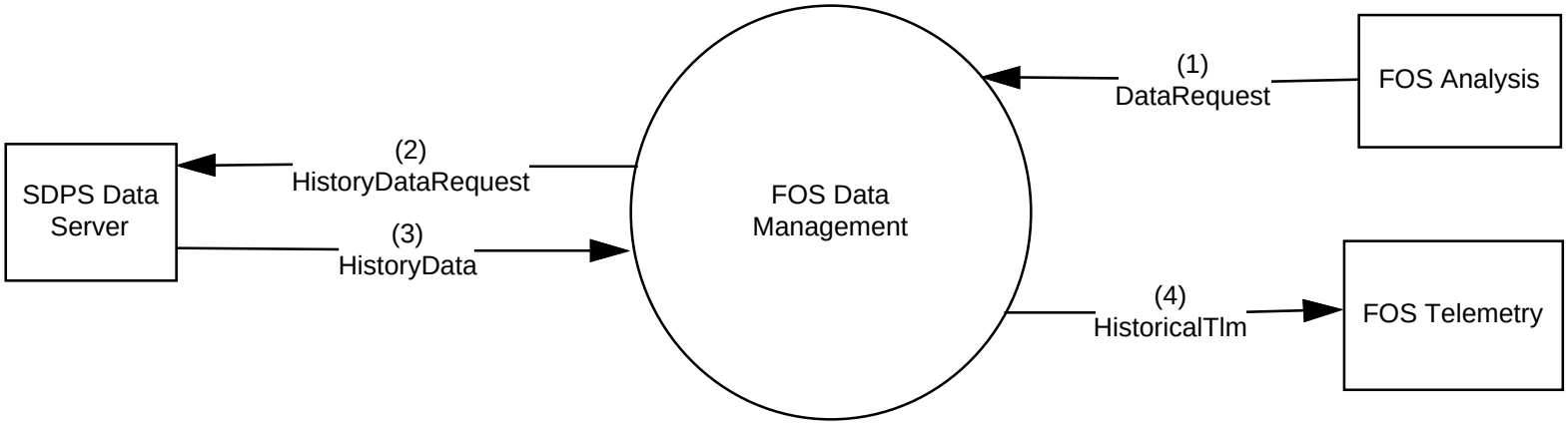
Data Management Subsystem Data Retrieval Scenario



Data Management Subsystem Data Retrieval Scenario

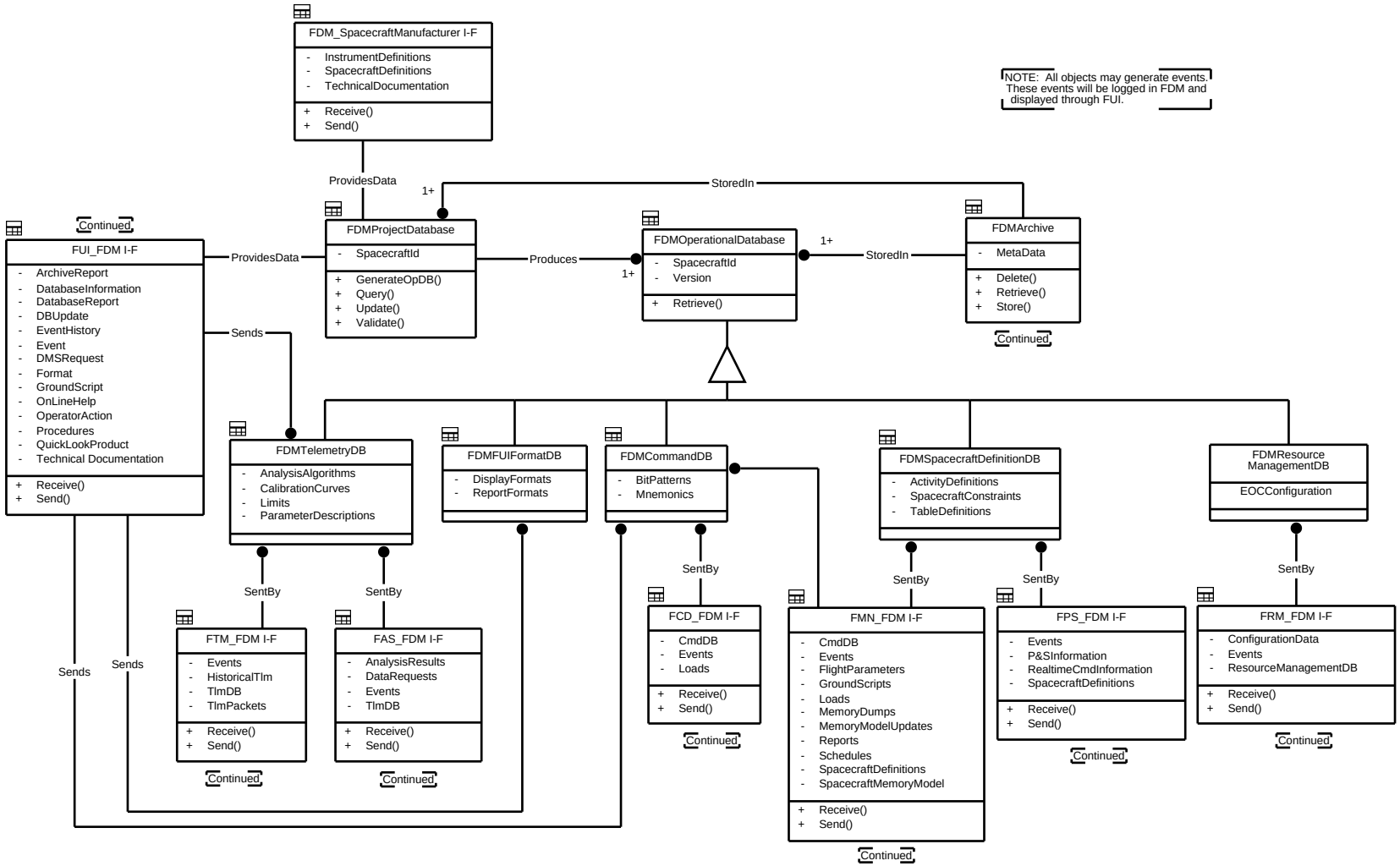
DMS receives data request from Analysis subsystem (1)

DMS sends request for data stored in the long term archive to SDPS Data Server (2)

DMS receives requested data from SDPS Data Server (3)

DMS provides requested data to Telemetry subsystem (4)

Data Management Subsystem Object Model



Data Management Subsystem Object Model Description

FDMProjectDatabase Class

- Receives spacecraft, instrument, and operational information updates
- Performs validation on database updates
- Produces database information to be used by User Interface subsystem for generating database reports
- Produces operational database

FDM_SpacecraftManufacturer I-F Class

- Interface for receipt of spacecraft and instrument definitions by the spacecraft and instrument providers
- Provides encapsulation for ingesting databases in different formats

Data Management Subsystem Object Model Description

FDMOperationalDatabase Class Hierarchy

- **Superclass which contains all the databases required for FOS processing**
  - **Telemetry database**
  - **User Interface database**
  - **Command database**
  - **Spacecraft Definition database**
  - **Resource Management database**
- **New database can be added to the hierarchy without impacting the superclass**

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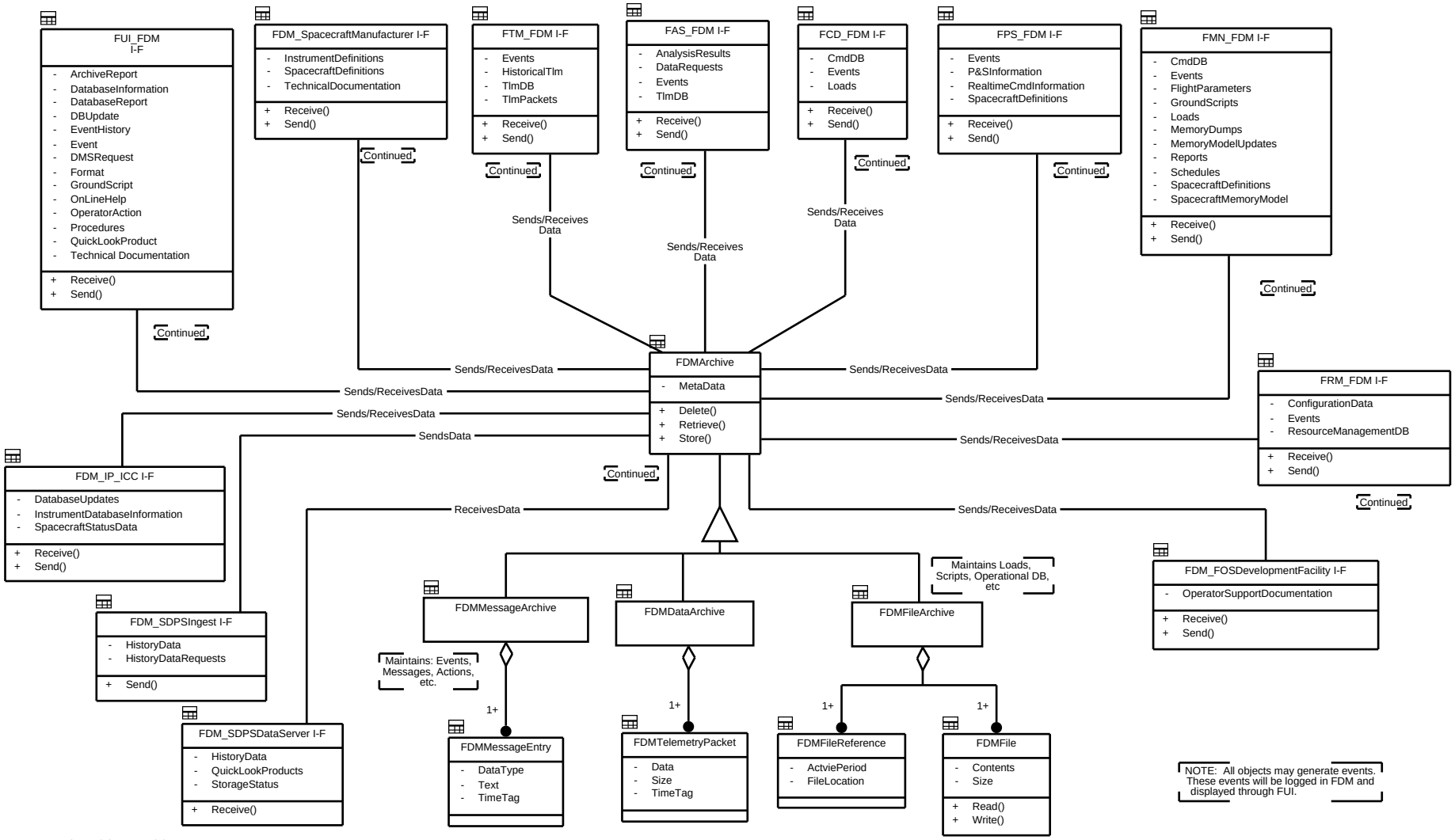
Data Management Subsystem Object Model



Data Management Subsystem Object Model Description

FDMArchive Class Hierarchy

- **Superclass which manages the FOS archive**
- **FDMMessageArchive Class**
  - **Events**
  - **Operator requests**
- **FDMDataArchive Class**
  - **Merged telemetry**
  - **Spacecraft recorder data**
- **FDMFileArchive Class**
  - **Loads**
  - **Dumps**
  - **Schedules**

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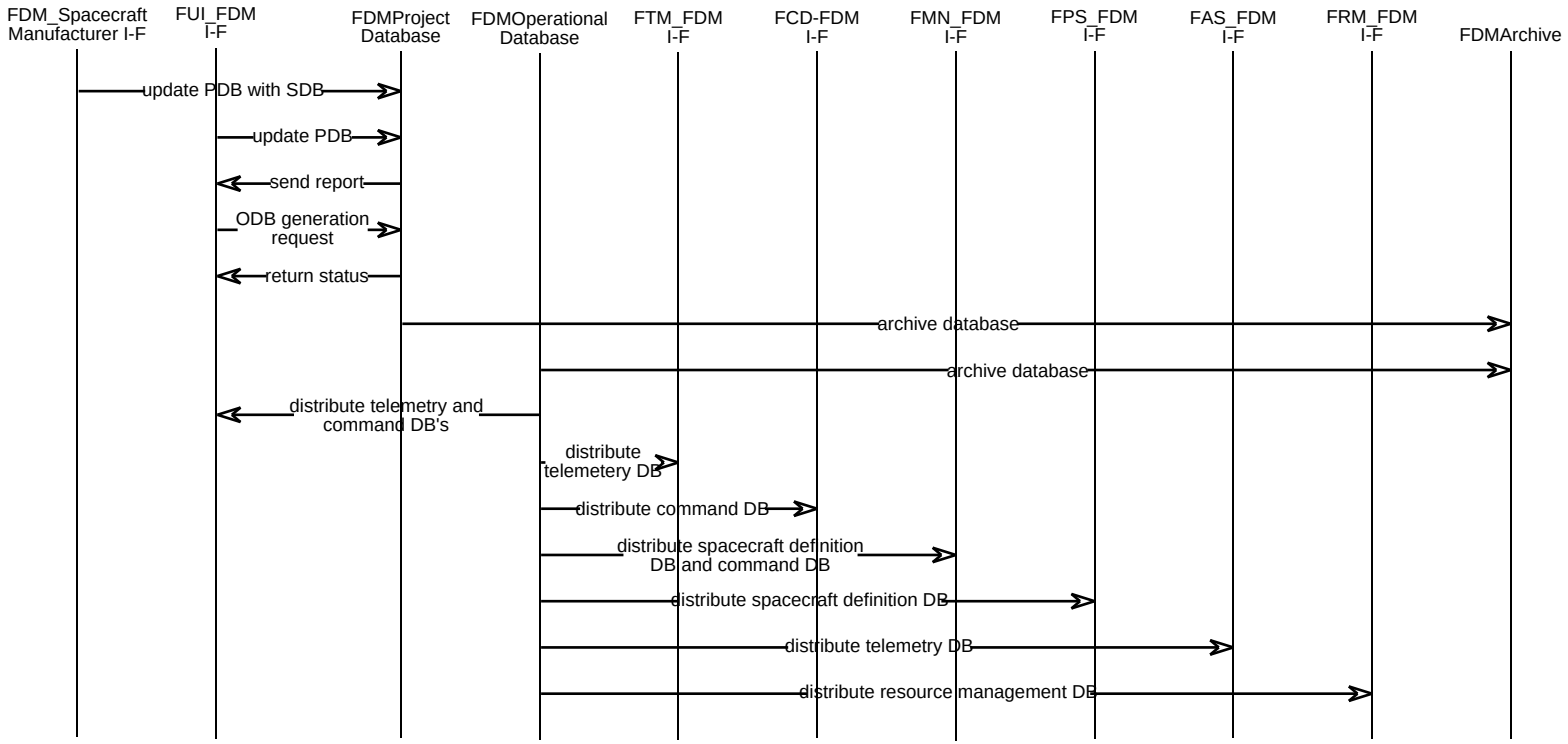
Data Management Subsystem Database Update Scenario



Data Management Subsystem Database Update Scenario

DMS receives database updates from the manufacturer

IST provides requests for database updates to the FOT

- Approved database updates are submitted to DMS

DMS receives operational information updates from the User Interface Subsystem

- Display and event descriptions
- Analysis processing algorithms
- Procedures

Database changes are validated and database information is sent to the User Interface subsystem

Operational Database is generated from Project Database

Project Database and Operational Database are maintained in archive

Operational Database is distributed to other subsystems