3. The Science Operations Environment

The ECS is a large complex software system, designed to support the needs of many different scientific users. It must serve not only as a flexible data archive and inventory system, but also as a powerful processing system for a number of platforms and instruments. It must support a diverse community with quality product services available both openly and more restricted, and on a variety of different media. The system must operate with a high degree of automation, and yet also provide sufficient flexibility to readily adapt to changing operation and scientific objectives. Above all it must be an evolvable system that can support and incorporate new technologies as they mature.

Figure 3-1 describes some of the wealth of functionality designed into the ECS. It is oriented towards the principle mission objectives of the ECS, i.e. the production, archival, and retrieval of scientific data. As such the scientist is the dominant user in this environment. Later chapters are devoted to how non-science users (i.e. User Services, and System Operations) view the system, but their role, whilst necessary, is in support of the Science Operations Environment. As Science Operations is the principle thrust of the design effort, it is an appropriate vehicle for describing the operational environment.

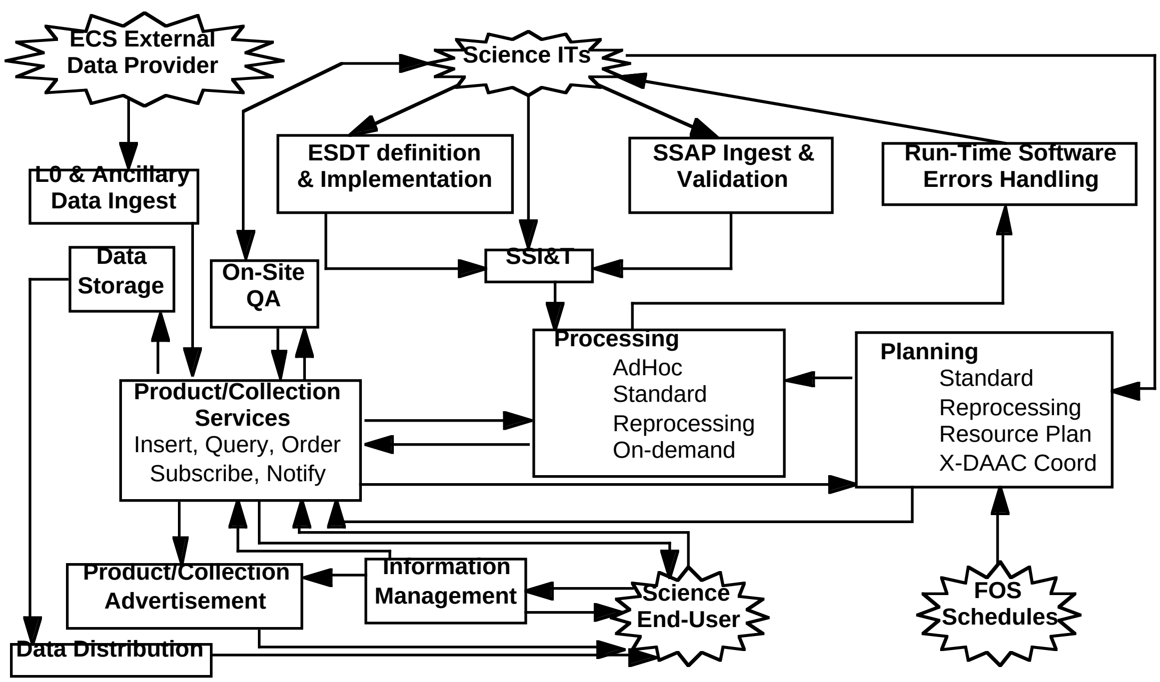


Figure 3-1. Science Operations Environment

Figure 3-1 is dominated by three core functions: Planning, Processing, and Product/Collection Services. These functions together form the central functionality of the ECS. The other functions identified are necessary to the complete operational view, but are not central to the environment. Much of what is discussed below is based on the various ways in which these 3 functions interact.

The approach adopted in this part of the document is to demonstrate how the ECS operates by giving enough examples at each level of detail to cover the problem space.

At the highest level of detail 3 End-to-End scenarios have been developed . End-to-End itself is a phrase that means many different things to many people. The direction taken here is to describe ‘science view’ End-to-End. With the ‘science view’ approach each DAAC can identify those elements provided at the DAAC (305-CD-030-002 to 305-CD-037-002 inc.), and correlate the DAAC activities against DAAC specific activity frequency (604-CD-002-003).

The End-to-End scenarios developed are representative of how the ECS can be used. These are not the only paths through the system, but are sufficient to fully flex the entire functional space. The scenarios follow three major operational modes of the system:

a. Science Algorithm Integration and Test

b. Data Production

c. Distributed User Query

Having described the high-level functionality of the system, the next level is to break-out the detail of the identified functions. This is done in a number of steps as described in Figure 3-2.

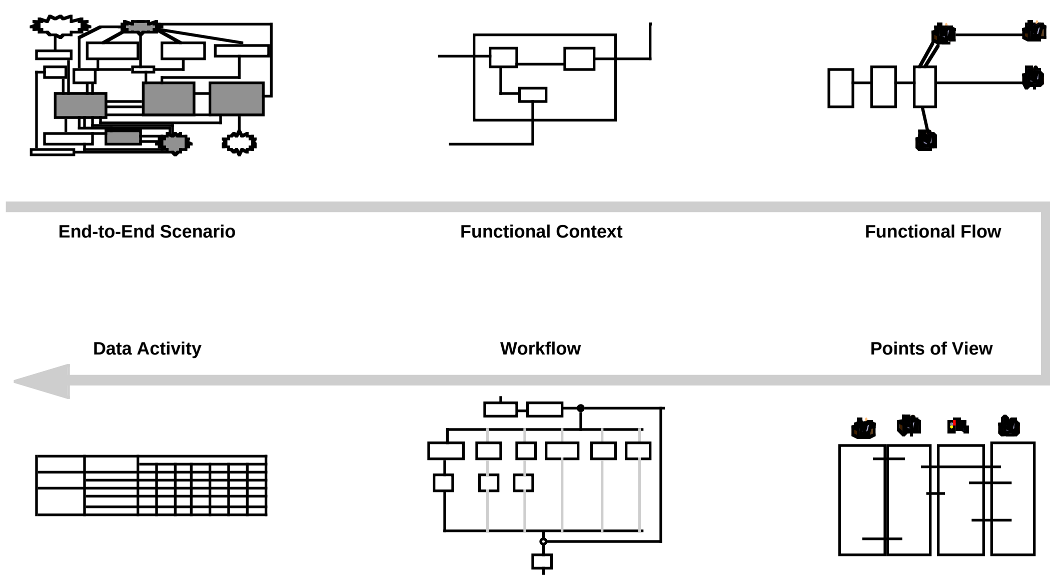


Figure 3-2. Section 3 Scenario Development

First, the Functional Context describes the functional elements, and the data flows. Next, the Functional Flow and the Points of View give the detailed walkthrough of the step-by-step interactions necessary to complete a function. At this point the Operator Roles are identified. The next level of detail is to describe the detailed Workflows for the identified roles. This is supported by detailed Data Activity Tables that relate the Workflow to actual design objects and data elements. The Workflows are a detailed, step-by-step analysis of the operations interaction with ECS that needs to occur during the described scenario. The Data Activities identify the data elements (either COTS or custom) that are available at each step in the workflow. The Data Activities should be read in conjunction with the appropriate Workflow. The identified data elements are related to the appropriate design documents (305-CD-021-002 to 305-CD-029-002) through design objects in the case of custom code, or tools in the case of COTS.

In this way detailed operational workflows can be derived from the high-level system functional description, and related back into the design documentation.

3.1 Science Operations Scenarios

The three End-to-End scenarios described below are typical of the interactions between the various functions within the ECS. There are a number of other ways in which the system could be used, and these are not excluded by the design, as each susbsystem provides a set of public interface class (313-CD-006-002) through which all subsystems communicate.

3.1.1 Science Software Algorithm I&T

To be able to provide user access to new data products created within the ECS environment a number of parts of the system must be properly configured:

- The production environment (both planning and processing) has to be configured to plan and schedule the PGEs.
- The inventory and archives must be configured to recognize the new products and to support services.
- The information management must be configured to know what new products and services are available, and to advertise them to the user community.

These concepts are expressed in Figure 3.1.1-1. This Figure shows the relationship between the various functions within the ECS that support the integration of a new science software algorithm package. There are two parallel processes going through the system. The first is the definition of the product and it's services within the ECS environment, and the second is the integration and validation of the production algorithm. Although product definitions need to be in place prior to the completion of the science algorithm integration process, it is by no means a necessary pre-requisite for the commencement of the process.

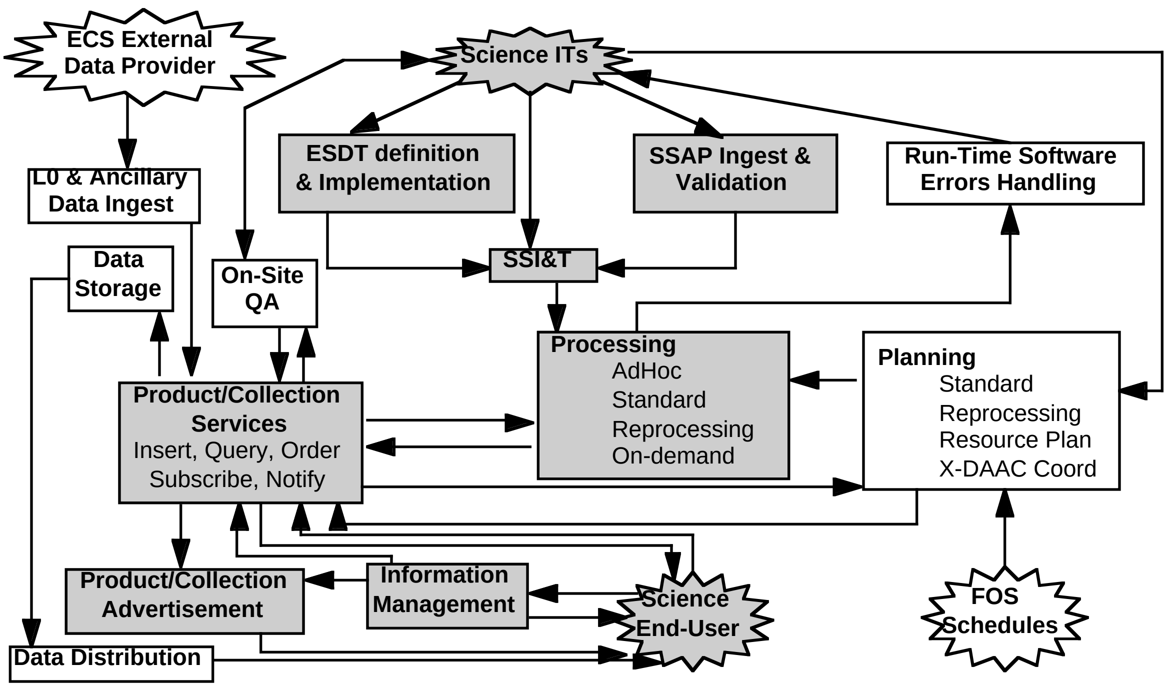


Figure 3.1.1-1. Science Software Algorithm I & T

3.1.1.1 Product & Services Definition

There are two possible options when defining a new product within ECS:

a. define a completely new collection, and then the Earth Science Data Types (ESDTs) and services that are part of that collection, or

b. add new ESDTs and services to an existing collection.

A collection is a broadly defined grouping that contains data relating to a common theme. The pre-defined themes in ECS are instrument based. So, a collection would contain guide information about the instrument, technical papers and science references, as well as a description of the products, acquisition strategy etc. and of course the data granules themselves. At delivery for Release B, the collections for all the Release B supported missions will have been defined in advance, and added to the inventory.

An ESDT is the fundamental definition of a science data granule. An ESDT definition not only includes the base Computer Science Data Types (CSDTs) in which the data is formatted (e.g. swath, grid, or point data structures), but also the services which can be performed on them (search, acquire, subset, etc.), and metadata delimiting the data set (locality, temporal range etc.).

The instantiation of a collection, and the creation of ESDTs are described in detail in Sections 3.2.1, & 3.2.2. After a collection has been created it can be advertised to the user community through the advertising service. Note it is not necessary to have valid product granules in the archive before advertising a collection. Once there exists any valid data with advertisable services (e.g. search, and acquire), then that data can be accessed. Operationally, prior to the launch of an instrument, information about the instrument and its products will be available for the general user to browse. The advertising service is described in Section 3.2.3.

3.1.1.2 Science Software Algorithm I & T

The integration of science software algorithms is a very labor intensive process. The ECS provides a number of tools to support the process, but much of the complexity is an unavoidable part of the nature of software integration.

The process starts long before algorithm code is written, when a prospective algorithm and resultant product formats are designed. At this stage a proper understanding of the elements through which the algorithm is to interface to ECS is important. The PGS Toolkit, the Science Data Model, pre-defined CSDTs and services, the planning & processing system interfaces, and supported resource allocation and production strategies all impact on the design of an efficient algorithm. As this process is highly procedural, it will not be covered in any detail here.

We have chosen to start the science software algorithm I&T at the point where an algorithm package is made available to the ECS. It is unimportant to the ECS whether this is a completely new package, or simply a minor upgrade to existing software, as the validation steps are the same. In the case of minor upgrades an individual DAAC may wish to shorten or skip some of the more manual steps (e.g. forbidden call analysis). It remains important, however, that the algorithm be properly profiled, else it may be incorrectly scheduled and/or resourced.

The first task that has to be performed is the ingestion & validation of the algorithm package. This enables the algorithm to be properly archived within the ECS. This is described in detail in Section 3.2.4. The package is then retrieved by the SSI&T staff and configured, inspected, and tested. This is described more fully in Section 3.2.5. An important difference between the SSI&T environment, and the main production environment is the capability of the SCF staff to remotely access the system to test software. This capability is not described explicitly here, as functionally it looks the same as the DAAC SSI&T team's interaction with the system. However, to better facilitate remote testing in the SSI&T environment, the ECS supports an Ad Hoc processing mode, where production can be designed and triggered independently from the planned production. This is described in detail in Section 3.2.6.

After the SSI&T process has successfully completed then the product availability has to be advertised to the user community. The process for this is very similar to the process for collection advertisement that occurred after the collection & ESDT definition phase, except it apples at the granule level. Again Section 3.2.3 provides the details.

There are a number of aspects of the SSI&T process that have not been described here. For example the use of on-site quality assurance, and the role of PGE error handling. These items are just as applicable to integrated algorithms running in the main environment, and so they will be discussed in that section below.

3.1.2 Data Production

Data production is one of the principle functions of the ECS. The production environment must be capable of accepting a variety of input data sets and efficiently planning the production of higher level products and archiving the results. This process of data ingestion to data archive is more commonly known as the 'Push' side of the system. The data access (discussed in Section 3.1.3) is known as the 'Pull' side of the system. The ECS is expected to be able to run production with the minimum of operator intervention. Manual intervention becomes necessary only in anomalous situations. Normal failures of data processing systems (incomplete data sets, late data arrival, failed algorithm execution) are not necessarily considered anomalous, and are therefore also managed with the minimum of operator interaction. The system, however, does provide a generic production environment for a very heterogeneous set of algorithms, and so whilst recovery after failure is handled automatically, and the system will continue onto its next assigned task (resources permitting), corrective measures resulting from the failed production (data analysis, algorithm updates etc.) may have to be undertaken with operator interaction.

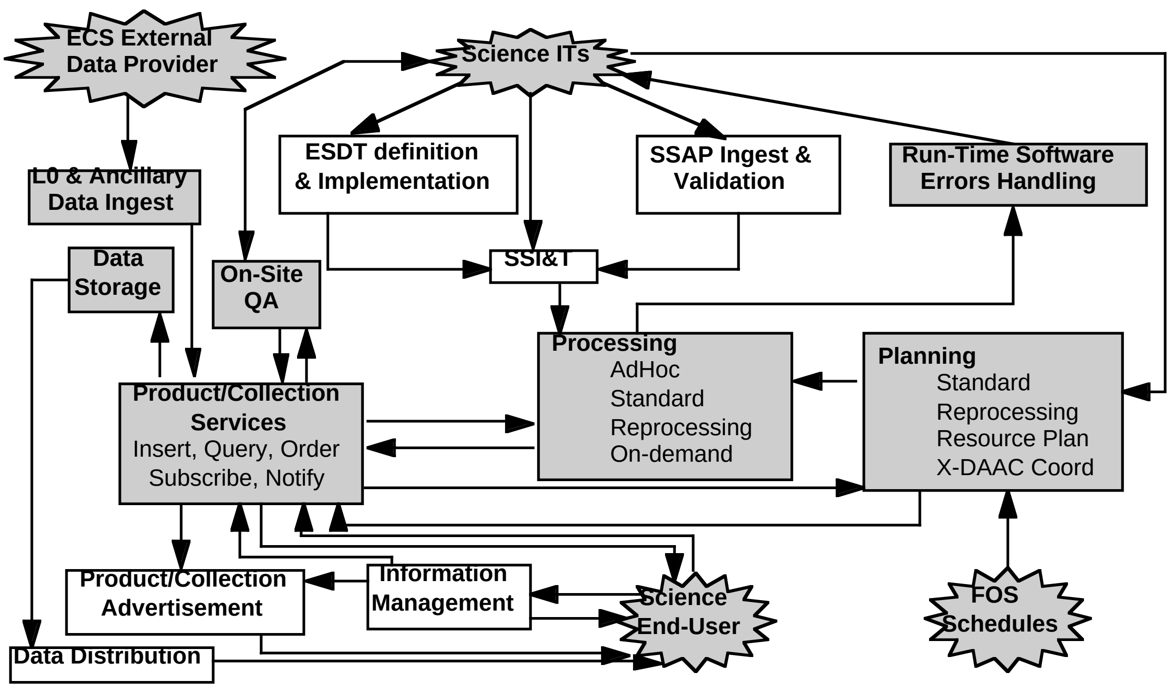


Figure 3.1.2-1. Data Production

The production environment is described in Figure 3.1.2-1. Having provided the initial algorithms the science Instrument Teams are not directly involved in the day-to-day operations of the production system unless problems relating to the science content of the data products or production algorithms arise. Of course, the Instrument Teams are also Science End-Users of the system as well.

There are six principle functions that support Data Production. In sequential order they are listed below, and discussed in detail in succeeding Sections:

- Production Planning
- Data Ingestion
- Production Processing
- Run-Time Error Handling
- Product Archive
- On-Site QA

3.1.2.1 Production Planning

The first step towards successful and efficient data production is planning. Planning within the ECS occurs at a number of levels:

- Strategic - There is the strategic level where the ratio of standard production verses reprocessing verses on-demand is established. This may vary during the mission lifetime as a instrument moves from calibration/validation through full production and finally into degraded operations. Early operations may well be characterized by repeated processing over known calibration sites, followed by a longer period of semi-normal production geared towards validation. Validation may often result in large scale reprocessing of early data whilst maintaining standard production of the newer data sets. Towards the end of the mission, as either the platform and/or the instrument performance degrade, the processing may be re-calibrated to provide lower quality and/or resolution products. The planning system must be capable of implementing many strategies.
- Resource There is also the resource level planning. This is where physical resources are marked for availability. It is within these constraints that strategic planning must operate. Resource planning must be able to plan for hardware downtime, scheduled testing and simulation, and ECS wide software maintenance.
- Production - The main function of planning is to ensure the maximum use of the available resources for production. Much of the Pull side load of the system is stochastic in nature and therefore difficult to predict, but the Push side load is very much more deterministic. The platforms have regular orbits, and the instruments regular or semi-regular observation strategies. There also exists a significant lead time (48 hours) between the on-board observation and the arrival of data at the ECS interface. These factors mean that the accurate planning of the available resources is possible to best achieve the strategic goals set by DAAC policy.

The following Sections concentrate on standard planning (Section 3.2.7). Resource planning, planning for reprocessing, and cross-DAAC planning are dealt with later in this document when how ECS copes with stressed operations is discussed. That is where the loads on the system exceed the design requirements. (See Sections 6.2.1-3.)

The planning subsystem takes the strategic goals and the available resources to accurately plan standard and reprocessing production. It also accepts on-demand requests, but only filters them for resource usage and holds them for future 'standard' planning if necessary. Planning uses instrument scheduling data from the Flight Operations Segment (FOS) to predict not only when data is expected to arrive, but also how much data, and more importantly what processing algorithms and resources will be required to process the data.

3.1.2.2 Data Ingestion

There are principally two types of product data ingested into the ECS from external data sources. They are:

- Level 0 data sets from EDOS, and
- Ancillary data sets from a variety of sources.

N.B. other ECS instrument products can be used as ancillary inputs, but as they are already within the ECS environment, and therefore ‘known’ within the system, they do not need to be ingested (TRMM Mission interface).

There are a number of methods for ingesting data, and these are laid out in detail in the design documentation (305-CD-025-002). From an operators perspective they all fall into one of two categories: tape, or network. Tape ingestion is discussed in detail in Section 3.2.4 when discussing the science software algorithm package ingestion. Network ingestion is discussed in Section 3.2.8. EDOS & TRMM ingestion is by network, as are the majority of the non-ECS ancillary data sets so far identified.

The two types of data are, however, quite distinct from the production environments standpoint. The Level 0 (L0) data availability is predicTable from the FOS schedules and a knowledge of the processing and distribution strategies of EDOS. It is also the primary data input and so drives the whole planning strategy. The availability of non-ECS ancillary data is less certain (in that there is no visibility into data set production environment). It, therefore, does not feature as a plan driver. There is a much better knowledge of the availability of ECS products used a ancillary inputs, and this is discussed in Section 6.2.3.

3.1.2.3 Production Processing

Once all the input data sets are available within the ECS then processing can commence. The ECS supports four distinct production modes:

- Standard Processing - regularly planned production of instrument data from Level 1 through to Level 4.
- Reprocessing - Long duration processing of particular data sets. Reprocessing is usually planned around standard production jobs.
- On-Demand Processing - This is unplanned use of processing resources. On-demand production occurs either when a non-standard product is requested (e.g. a subset of granule), or when product from a non-EOS platform is requested (currently this is limited to ASTER products only)
- Ad-hoc Processing - this is similar to on-demand but involves direct operator intervention and often non-standard PGE sequences. This mode of processing is common during instrument calibration and SSI&T.

Despite the variety of modes, all four are treated in a very similar fashion within the system. The principal differences lie in how the production is planned, not how it is executed. All processing follows the details laid out in Section 3.2.9 which deals with standard processing. On-demand processing is discussed in the context of a user pull request in the next Section, and in detail in Section 3.2.10. Ad-Hoc processing has already been discussed in connection with SSI&T, and is described in Section 3.2.6. Reprocessing is only discussed in regard to its impact on planning (Section 6.2.1). There is no difference between a reprocessing and a standard production job at the processing level.

3.1.2.4 Run-Time Error Handling

An important feature of the production environment, and one in which DAAC operations is likely to be heavily involved, is in the handling of run-time PGE software errors. (N.B. system software and hardware errors are handled in Section 5 - System Operations. Environment) Despite the SSI&T environment, it is unrealistic to expect all potential error conditions to be trapped prior to 'going live' with a PGE. In early mission life in particular, it is expected that the behavior of the software to be less than ideal. This will not normally be due to any inherent fault within the software, but is more likely due to instruments data falling outside expected ranges. As our knowledge about an instrument and its data and the processing algorithms improves, PGEs will fail less often, but it will always be a possibility as the mission progresses.

Run-time error handling must support several goals:

- the processing environment must be cleaned so that the next job can execute;
- the results of the fault (intermediate files, core dumps etc.) must be made available to the Production Monitor and SCF staff;
- if necessary the offending PGE and/or production chain may be removed from the plan.

Run-time software error handling is described in Section 3.2.11.

3.1.2.5 Product Archive

Once a product has been successfully produced it must be archived and inventoried before it is visible to the science community. This is a highly automated process, with operations staff only needing to get involved if validation or hardware errors occur. Data archival has to perform four functions:

- Verify that the metadata associated with the product is valid - i.e. it has all the mandatory fields, and that they are all in range for the product type being inserted.
- Physically insert the product into the archive
- Insert the metadata into the inventory
- Process any subscriptions against the product.

This process is discussed in detail in Section 3.2.13. Subscription event error handling is described in Section 3.2.15.

3.1.2.6 On-Site QA

Product quality assurance occurs in a number of places within the ECS environment:

- In-line QA - performed during processing (either planned or ad-hoc);
- DAAC QA - performed on-site by DAAC staff after the product has been archived. It can be a routine operation, or triggered by in-line QA alarms;
- SCF QA - performed off-site by SCF staff once the product has been archived. This can also be performed routinely or triggered by in-line or DAAC QA alarms.

The nature of the QA activities is likely to change as the mission progresses. In the early calibration phases DAAC QA may not feature heavily in the daily operations as the SCF itself will be concentrating on the product output. As the production settles down into a more relaxed QA monitoring the DAAC may well find itself taking over more of the product-by-product QA tasks, while the SCF concentrates on longer-loop trend analysis. The ECS provides an environment flexible enough to cope with a number of DAAC/SCF QA policies. One scenario for on-site QA operations is described in Section 3.2.12.

3.1.3 Distributed User Query

The servicing of user queries and the distribution of requested data form the second primarily function within the ECS. More commonly known as the Pull side load, data search and distribution is a highly automated activity with DAAC operators only becoming involved when the distribution media is physical (e.g. 8mm tape, CD ROM etc.) or fault conditions occur.

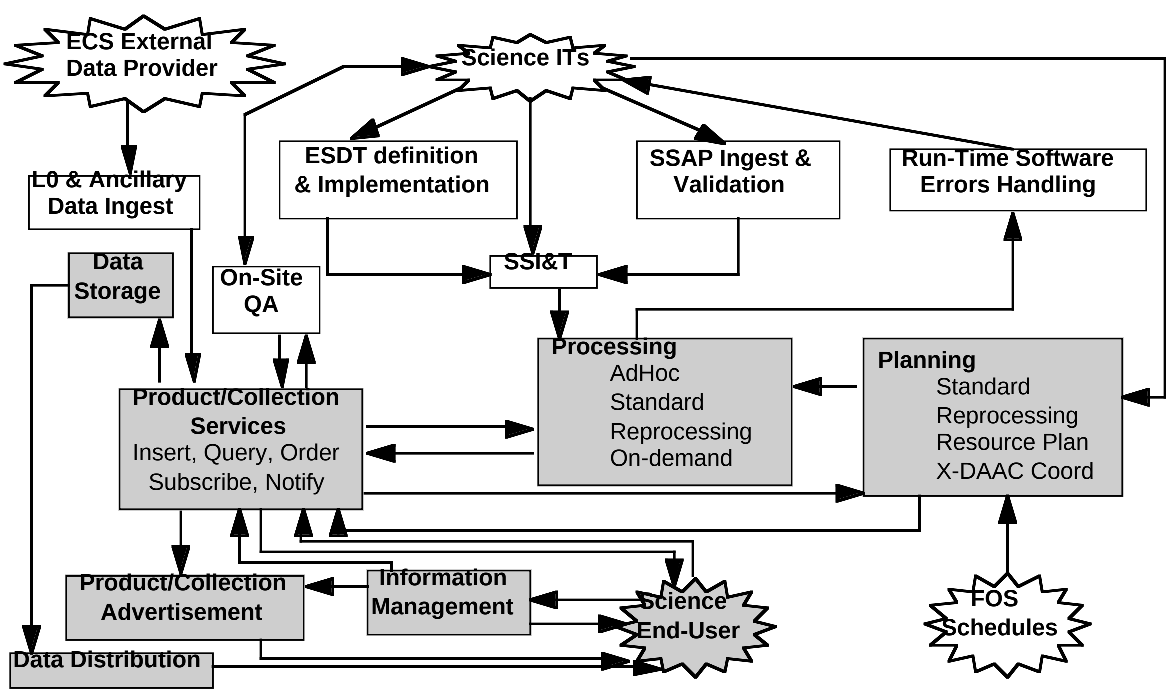


Figure 3.1.3-1. Distributed User Query

Figure 3.1.3-1 shows the functions participating in the pull side services. A key design feature of the pull side is that the user does not have to know where within the ECS particular data can be found. A service is located through the advertisements, and once invoked the ECS automatically handles any distribution of that query to other sites. The same is true if special services are requested (e.g. subsetting). The user does not whether the subsetted product already exists, or whether it is produced "on the fly". Indeed it need not be obvious to the user that the requested data is even a subset of the full product.

The general flow of a typical distributed query is as follows:

- Advertisements - The user locates a desired service through the advertisements, and invokes that service at the local client.
- Information Management - The user places a query to the Distributed Information Manager (DIM). N.B. the user may be unaware that the query is being handled by the DIM as opposed to the Local Information Manager (LIM) or directly with the local inventory.
- Distributed Information Management - The information management system then distributes the query to other information management systems and inventories as appropriate for that query.
- Distribution - Each local inventory receives its portion of the query and services the request, returning granule references, submitting an on-demand request to the production system, and/or distributing data granules as necessary.

3.1.3.1 Advertisements

Advertisements are the mechanism by which ESDTs and their services are made visible to the public. Typical services include search & order. Typical data sets could be Level 1 data, or guide documentation. Both the advertisement service and the information management service described below use a common distributed data dictionary to retain context across the ECS. The submission of advertisements is described in Section 3.2.3.

3.1.3.2 Information Management

Information management within the ECS occurs at both a local level (LIM) and in a wider distributed context (DIM). Like advertisement, information management maintenance is a fully automated activity, with operator intervention only necessary if an error occurs. The most likely error scenario is that of data dictionary update failure. This is described in Section 3.2.16.

3.1.3.3 Distribution

The distribution of data to science users can be facilitated through three mechanisms:

- Hard media distribution by tape or CD ROM.
- By electronic pull - where the user is notified where to find the data and is allowed to pull it from temporary ECS storage.
- By electronic push - where the ECS system pushes the data to a predefined location on the end-user platform.

Of these three mechanisms, only the electronic push is subject errors not associated with system hardware/media or software faults. A push distribution might fail because the remote location was not available, or the disk capacity was insufficient. This type of fault condition together with distribution monitoring activities, is described in Section 3.2.15.

3.2 Science Operations Drill Down Scenarios

This Section provides 16 detailed scenarios focused on the operations and their role in supporting the Science Operations. The scenarios are presented in no particular order. Indeed, most of the scenarios presented can be performed at any stage during the lifetime of the system. There is, however, a general trend from system setup (algorithm I&T, establishing collections, etc.) through to full up production.

3.2.1 Earth Science Data Type Definition & Implementation

An ESDT is a unique description of data and services within the Science Data Server. To the science data server all data are represented as ESDTs. All data types are provided by the ESDT. It is the central mechanism by which user data archival and retrieval requests are handled on a data specific basis, and the mechanism for providing a dynamic, extensible environment for long term data handling.

The Science Data Server makes its data type services known to the ECS community by advertising them to the Advertising Service. The contents of advertisements include the identifier of the specific science data provider, the name of the data type offering that service, and the name of the service being offered, as well as descriptions of the general services being offered for the science products and the required interface definition of the service.

ESDTs have only two components, a descriptor and an implementation dynamic linked library (DLL). The descriptor is an ASCII file, and the implementation DLL is a UNIX library. A template for the descriptor will be provided, and a developer's guide for creating an ESDT will be written. Figure 3.2.1-1 depicts the context of an ESDT definition and implementation.

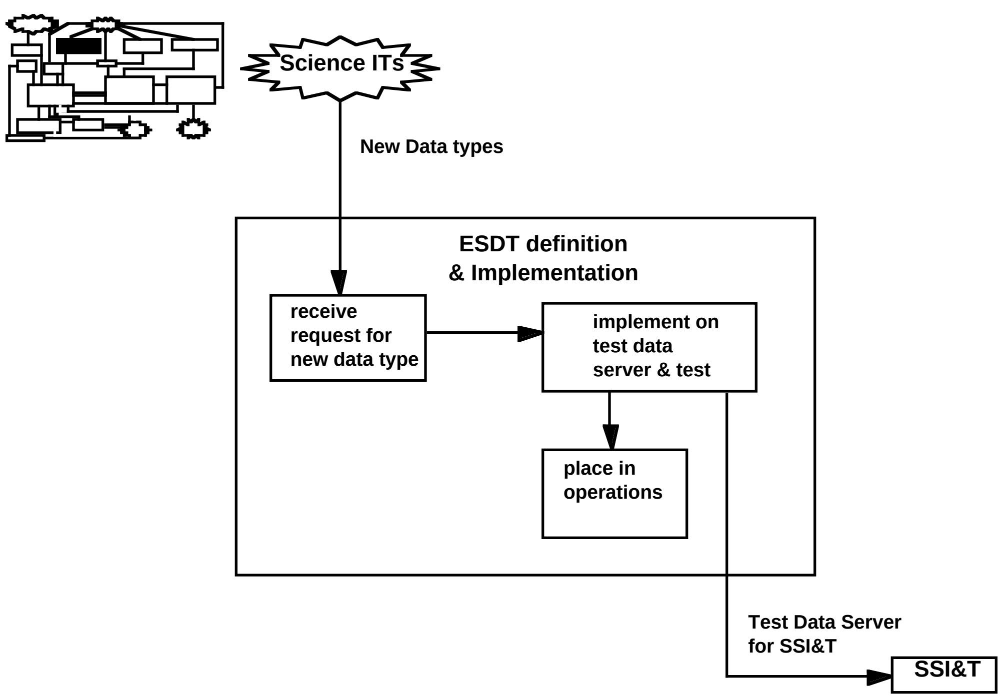


Figure 3.2.1-1. ESDT Definition and Implementation Context Diagram

3.2.1.1 Description

This scenario describes the steps an operator would take when setting up an ESDT definition within the data server. It is assumed that data modeling for adding new data types have been completed. This scenario starts with a request from an external data provider that a new ESDT be created and it end with that ESDT being provided to the Advertising service. Figure 3.2.1.1-1 depicts the functional flow of an ESDT definition and implementation.

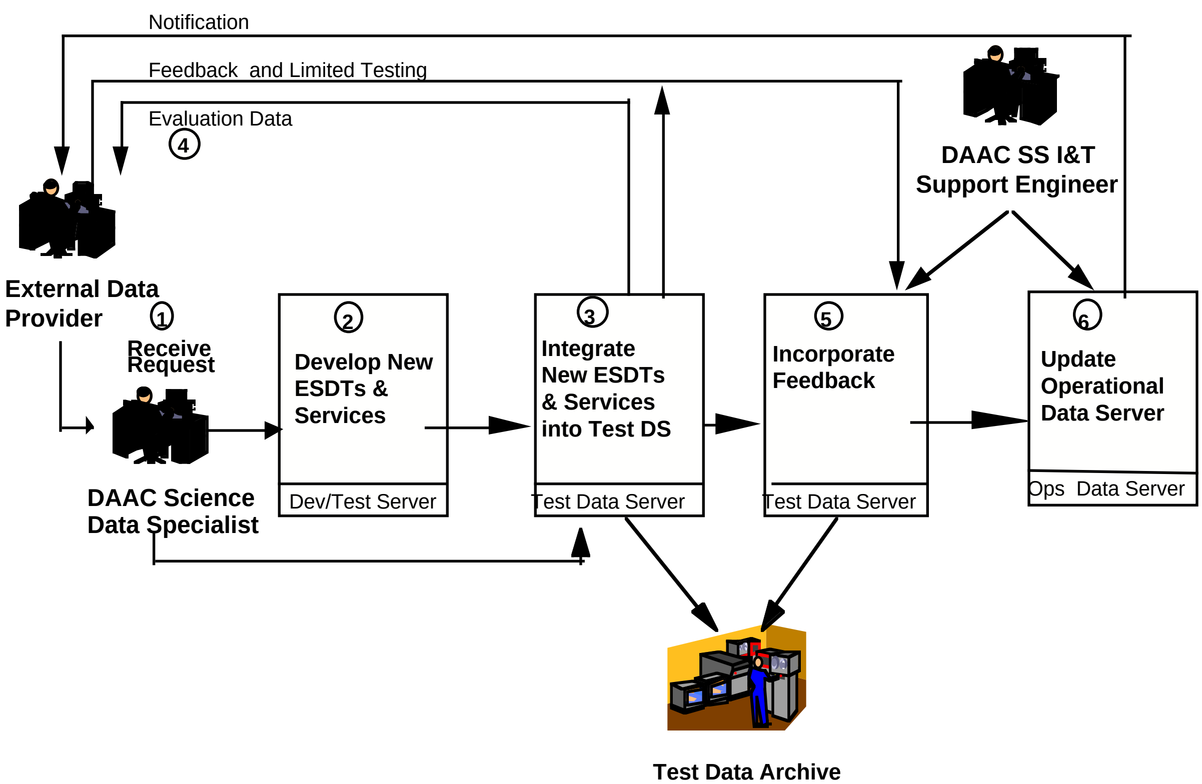


Figure 3.2.1.1-1. ESDT Definition & Implementation Functional Flow

3.2.1.2 Operator Roles

The DAAC Science Data Specialist (DS) is responsible for ESDT testing with limited testing by the external data provider.

The DAAC Science Software (SS) Integration and Test (I&T) Support Engineer will monitor and support the development of a new ESDT.

3.2.1.3 Detailed Points of View

The ESDT Definition and Implementation points of view diagram details the steps that the Science Data Specialist must take in order to implement a new data type request received from the an external data provider. Figure 3.2.1.3-1 depicts the different points of view of an ESDT definition and implementation.

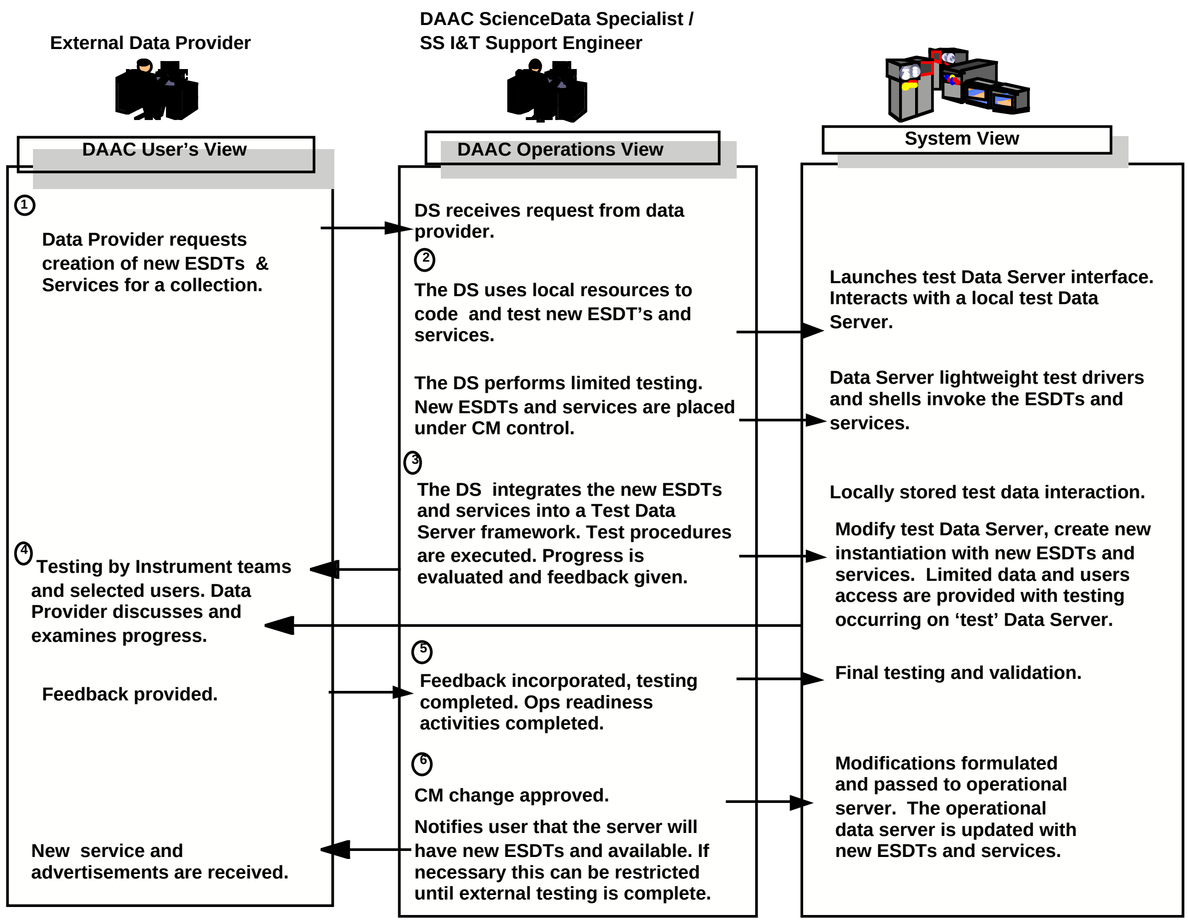


Figure 3.2.1.3-1. ESDT Definition & Implementation Points of View

3.2.1.4 Adding a New Data Type Workflow

This workflow depicted in Figure 3.2.1.4-1 and Table 3.2.1.4-1 show how a new data type is incorporated into the currently executing science data server. The DS initiates this workflow from a data server supplied graphical user interface (GUI). The DS will select the option Add Data Type, and supply the required parameters for this option. The required parameters for adding a new data type are the new data type's name and version number, a file which is the dynamic linked library (DLL) containing its implementation and ASCII file containing the ESDT Descriptor information.

This section is continued on the next page.

Workflow

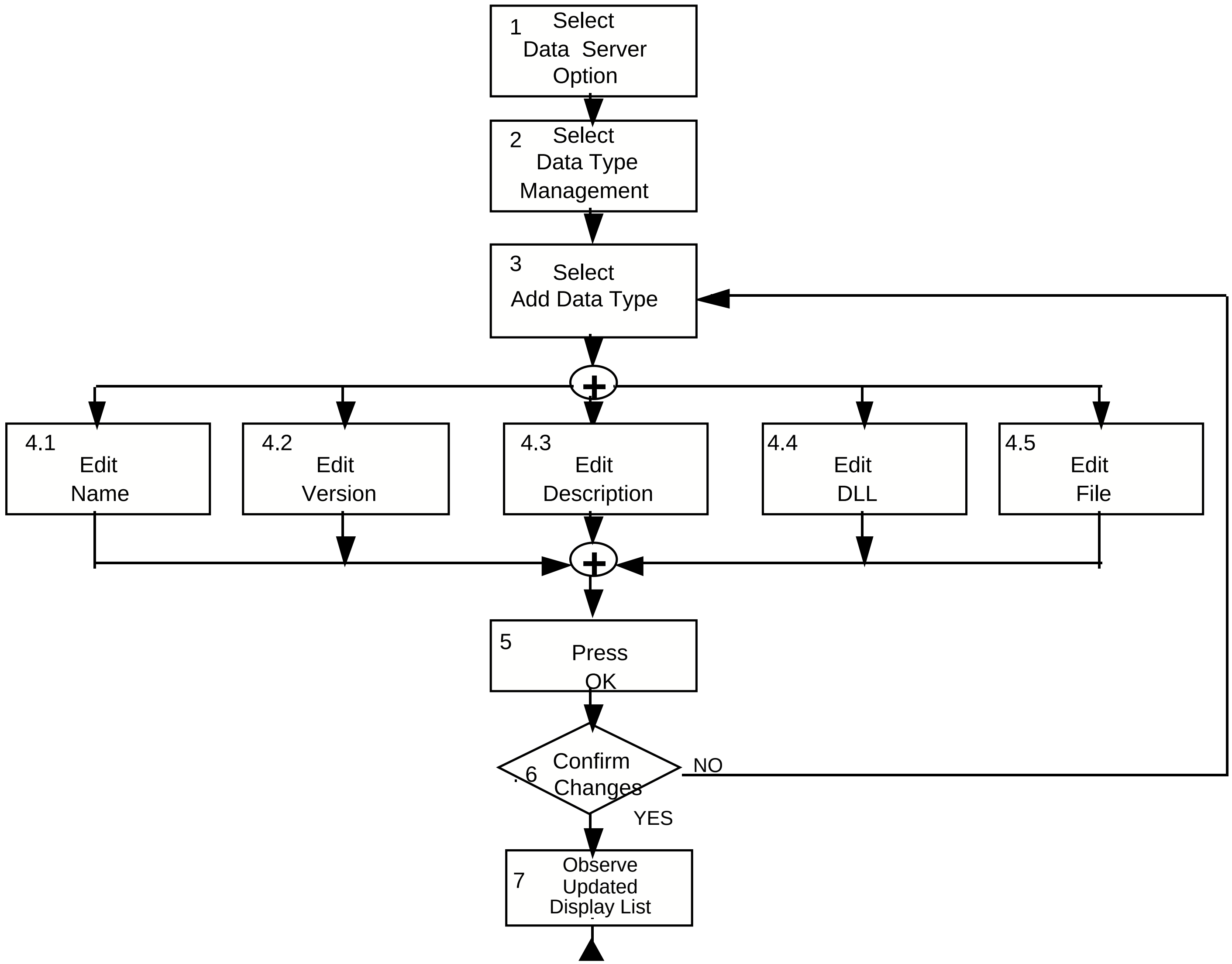


Figure 3.2.1.4-1 Adding a New Data Type Workflow

Data Activity

Table 3.2.1.4-1. Data Activity for Adding a New Data Type

Object Name	Data Element	Activity										
		1	2	3	4.1	4.2	4.3	4.4	4.5	5	6	7
DsGuAdmin	Data Server Option	I										
DsGuDataTypeMgmt	Data type management option		I									
DsAdDataType Collector	List of Data Types (ESDTs)			D								
	Add Data Type			I								
	Descriptor File Name			D	E						D	D
	Descriptor ID			D							D	D
	Descriptor Version			D		E					D	D
	Descriptor Description			D			E				D	D
	Descriptor DLL (Dynamic Linked Library)			D				E			D	D
	Descriptor File			D					E		D	D
	Press OK									I		
	Confirm Changes										I	
	Updated Display List											

3.2.2 Collection Instantiation

In ECS the concept of collection is incorporated into the logical data server. So, the instantiation of a collection is equivalent to the building of a logical data server. This scenario details the steps necessary to build a logical data server.

Having just completed Section 3.2.1 the science data server begins a 3-step process for adding a new data type. First, the new data type is automatically registered as a known data type within the science data server. Verification that the data type is new is performed by the system and a unique identifier is assigned to this type. The information is stored which established this data type's existence.

Second, the given dynamic linked library (DLL) filename is associated with the newly established data type. This association is stored which enables the data type's implementation to be used for performing services of this new type.

Finally, the new ESDT descriptor information is added to the set of descriptors that the science data server knows about. The ESDT descriptor file contains well defined groups of information such as the Core Metadata Group. The file is parsed to extract and store individual groups as separately accessible entities. Once the file has been processed, the ESDT descriptor initialization process is begun. This process advertises the services that this data type provides, registers events that will be reported for triggering subscriptions, and exports the data dictionary information to the data management system. Figure 3.2.2-1 depicts the context in which a collection is archived.

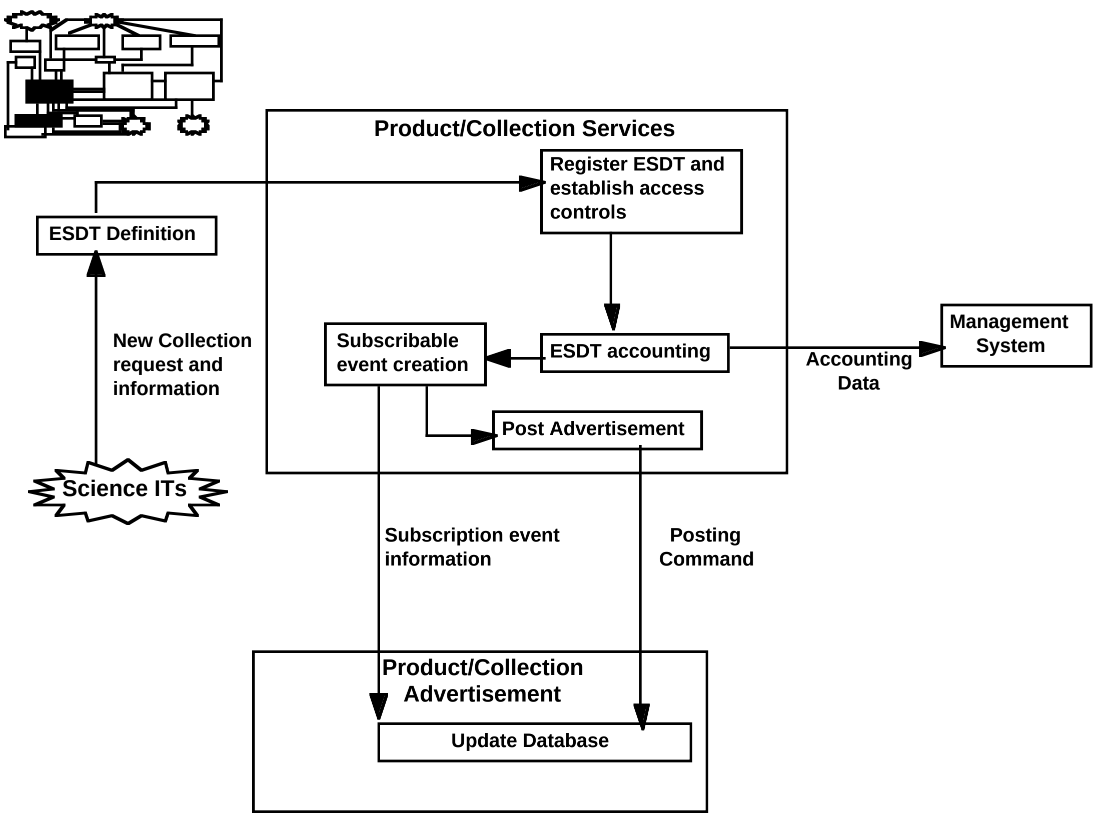


Figure 3.2.2-1. Collection Archive Context Diagram

3.2.2.1 Description

The new data type has been set up in the science data server and is now being made available to the science user community. This is an activity that is expected to happen infrequently within DAAC Operations. Figure 3.2.2.1-1 depicts the functional flow of data types being set up in the data server subsystem.

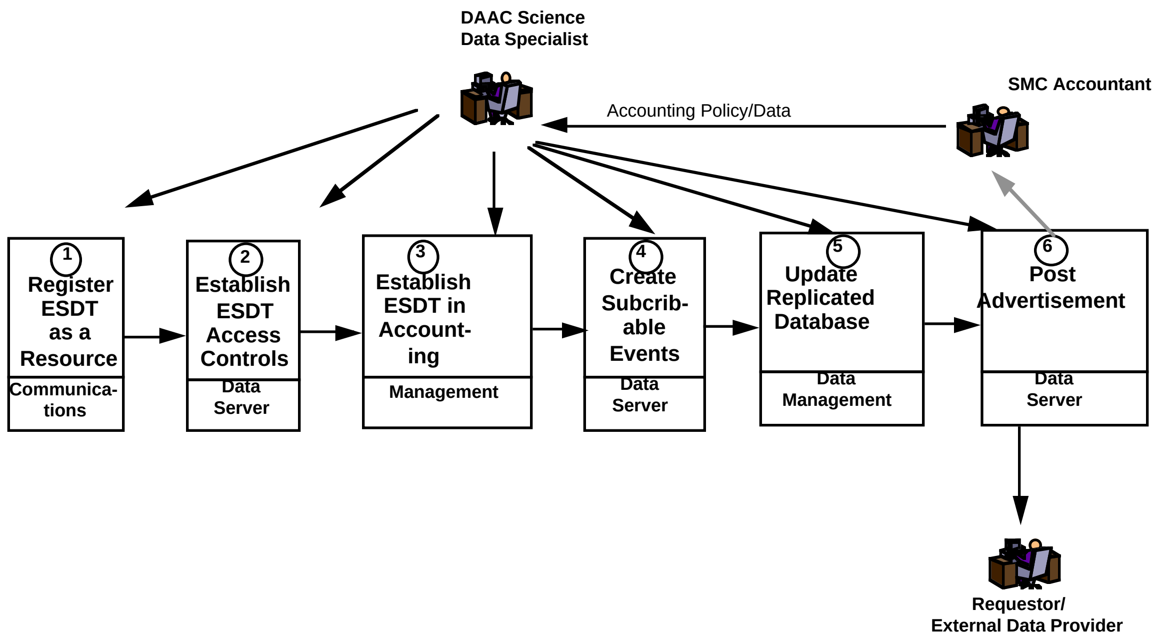


Figure 3.2.2.1-1. Collection Archive Functional Flow

3.2.2.2 Operator Roles

DAAC Science Data Specialist is responsible for setting up ESDT access controls within the data server.

SMC Accountant is responsible for providing system data collection and reporting functions, supporting each centers accounting/accountability activities. In addition to reviewing and supervising billing activities.

3.2.2.3 Detailed Points of View

The detailed points of view diagram shown in Figure 3.2.2.3-1 points out all the interactions involved in creating a collection in the archive.

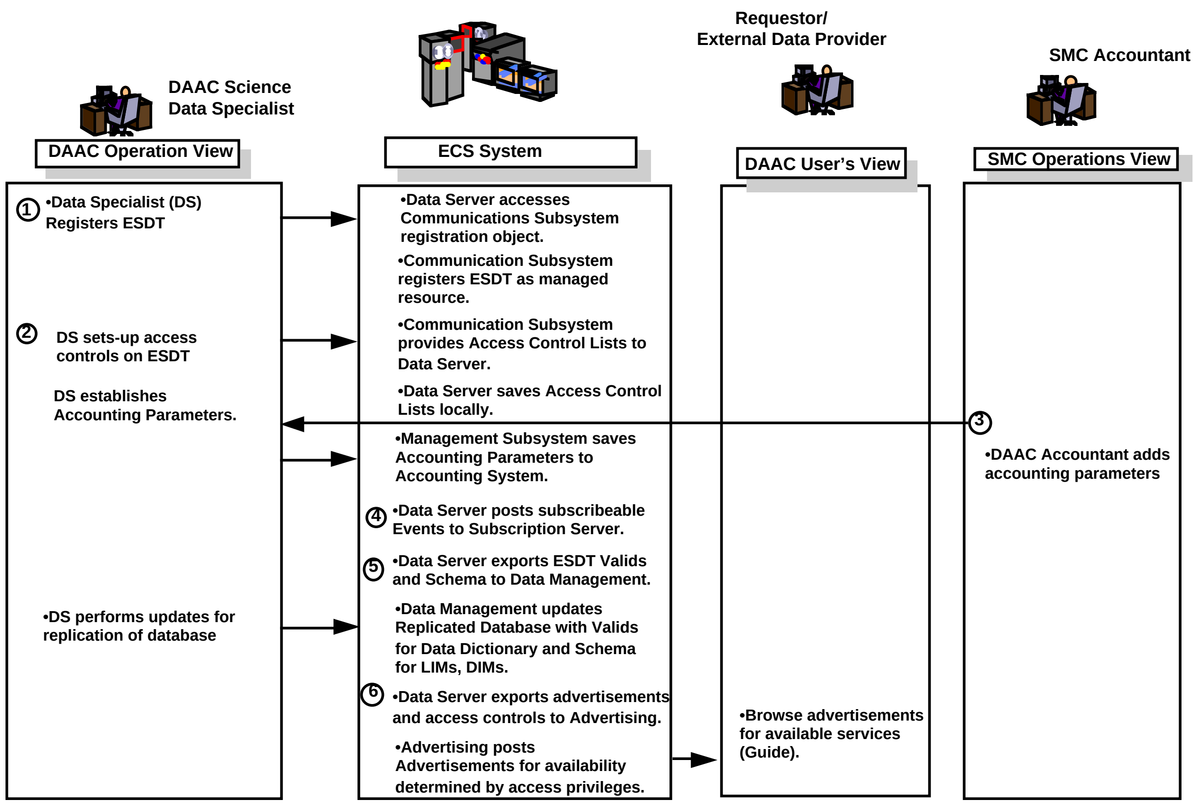


Figure 3.2.2.3-1. Collection Archive Points of View

3.2.2.4 Viewing Data Type Information Workflow

Scenario workflow shows the steps taken when viewing datatype information within the archive.

This section is continued on the next page.

Work Flow

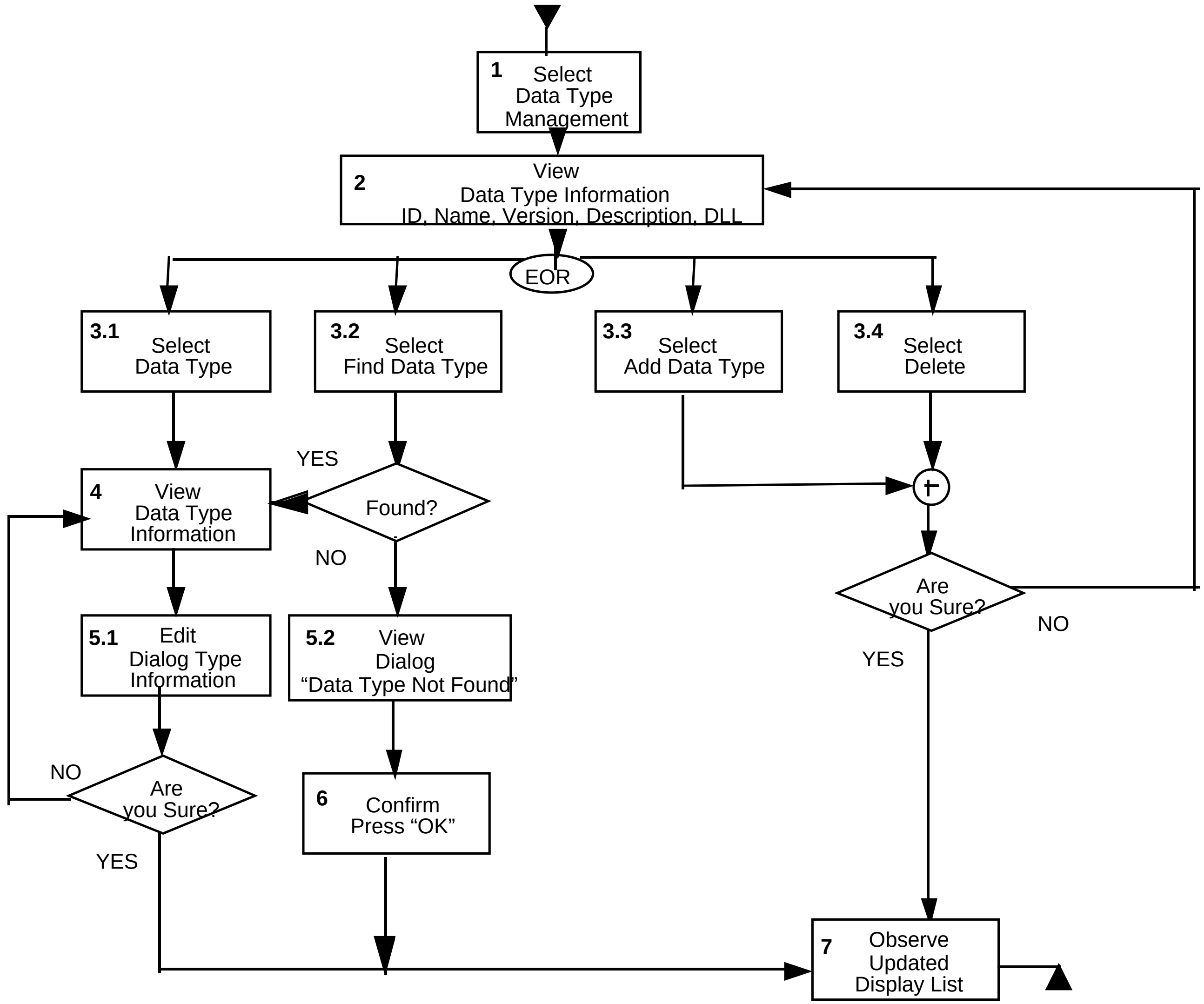


Figure 3.2.2.4-1. Viewing Data Type Information Workflow

Data Activity

Table 3.2.2.4-1. Data Activity for Viewing Data Type Information

Object Name	Data Element	Activity										
		1	2	3.1	3.2	3.3	3.4	4	5.1	5.2	6	7
DsGuAdmin	Data Server Option	I										
DsGuDataTypeMgmt	Data type management option	I										
DsAdDataType Collector	List of Data Types (ESDTs)		D									
	Descriptor File Name		D					D				D
	Descriptor ID		D					D				D
	Descriptor Version		D					D				D
	Descriptor Description		D					D				D
	Descriptor DLL (Dynamic Linked Library)		D					D				D
	Descriptor File		D					D				D
	Data Type			I								
	Find Data Type				I							
	Add Data Type					I						
	Delete Data Type						I					
	Dialog									D		
	Confirmation										I	
	Dialog Type Information								E			

3.2.2.5 Viewing Events Workflow

Scenario workflow shows the steps taken when viewing events in the archive.

Work Flow

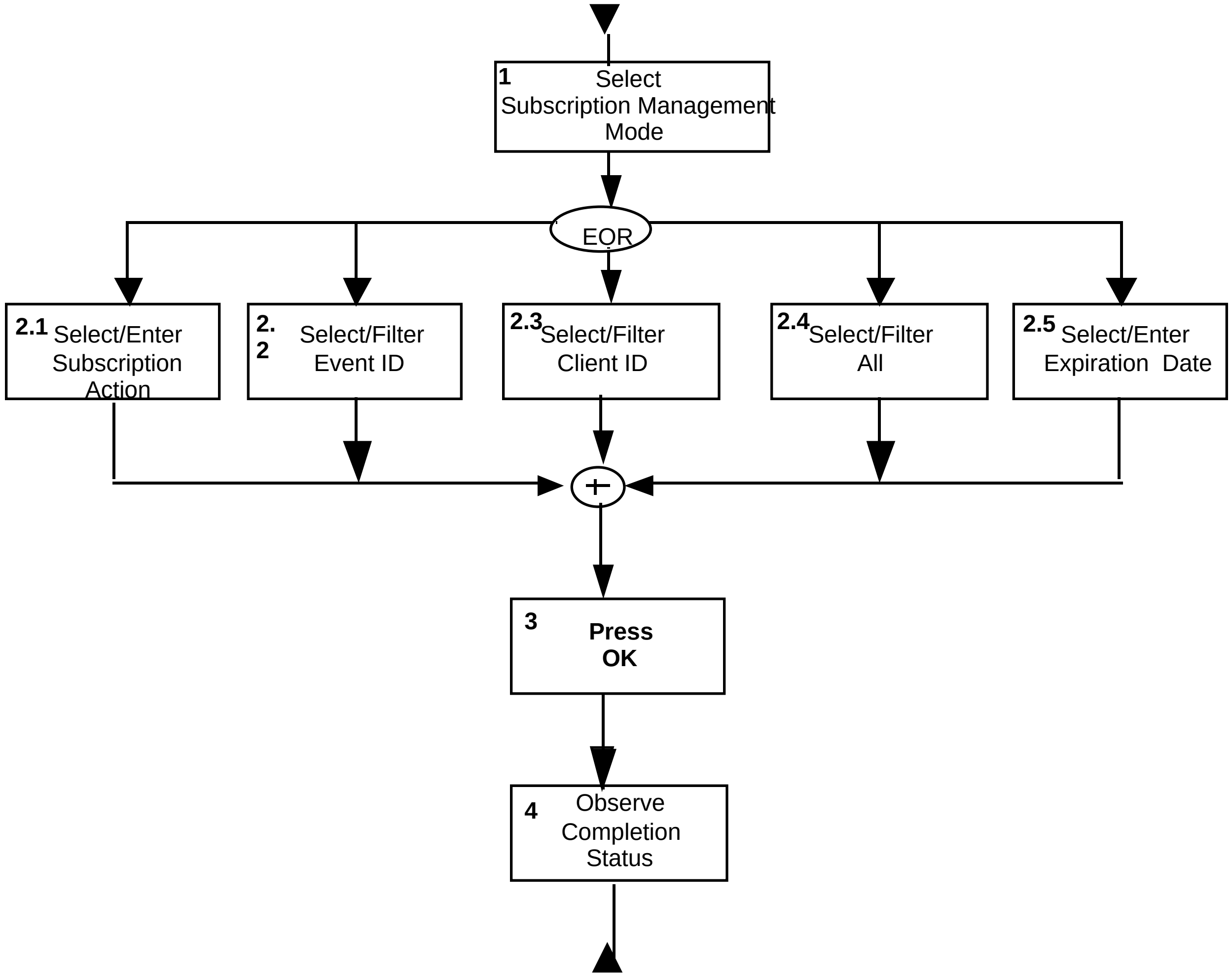


Figure 3.2.2.5-1. Viewing Events Workflow

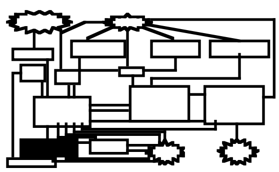
Data Activity

Table 3.2.2.5-1. Data Activity for Viewing Events

Object Name	Data Element	Activity							
		1	2.1	2.2	2.3	2.4	2.5	3	4
DsGuAdmin	Data Server Option	I							
	Subscription Management option	I							
DsSbEvent_C	Event ID			I					D
	Subscription Action		E						
	Expiration Date						E		
	Client ID				E	E			
	Event Description								D
	Subscriptions on Event								D
	Press OK							I	

3.2.3 Advertising Service Scenario

This function of this drill down scenario is to show what a Data Provider (non-ECS) would do to submit an advertisement. The advertising service provides the interfaces needed to support Client defined interactive browsing and searching of advertisements. Although there will be a single format for submitting advertisements to the service, advertisements should be accessable via several different interfaces to support database searching, text searching, and hyper-linked access and retrieval according to several different viewing styles (e.g. plain ASCII text, interactive form, or HTML document). The Scenario Context Diagram Figure 3.2.3-1 shows the steps that would be involved in this scenario.



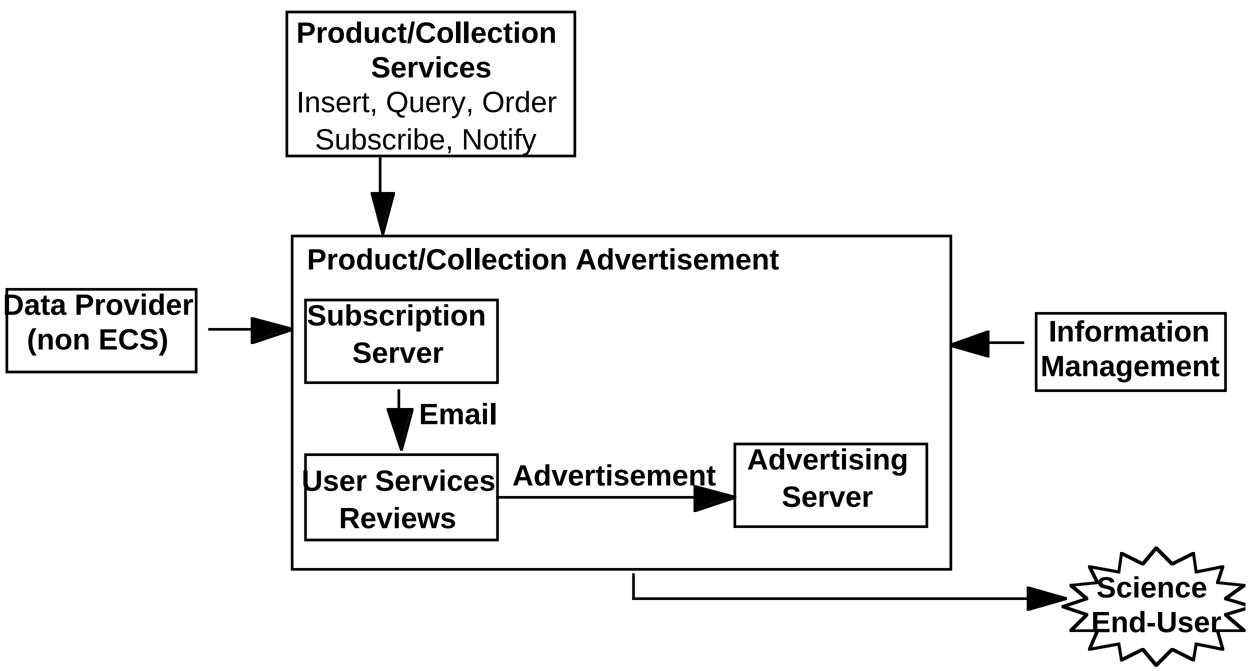


Figure 3.2.3-1. Submit Advertisement Context Diagram

3.2.3.1 Description

This scenario begins with submission of advertisement by a Data Provider (non-ECS). The ad is reviewed by the DAAC Science Data Specialist. The assumptions for this scenario is as follows; the external Data Provider has access to a Hypertext viewer and knows how to use the Advertising

Service to submit an advertisement. The user has already installed the ECS Desktop and Workbench tools appropriate to his/her users, e.g., Advertising Installer. The scenario breaks out has follows:

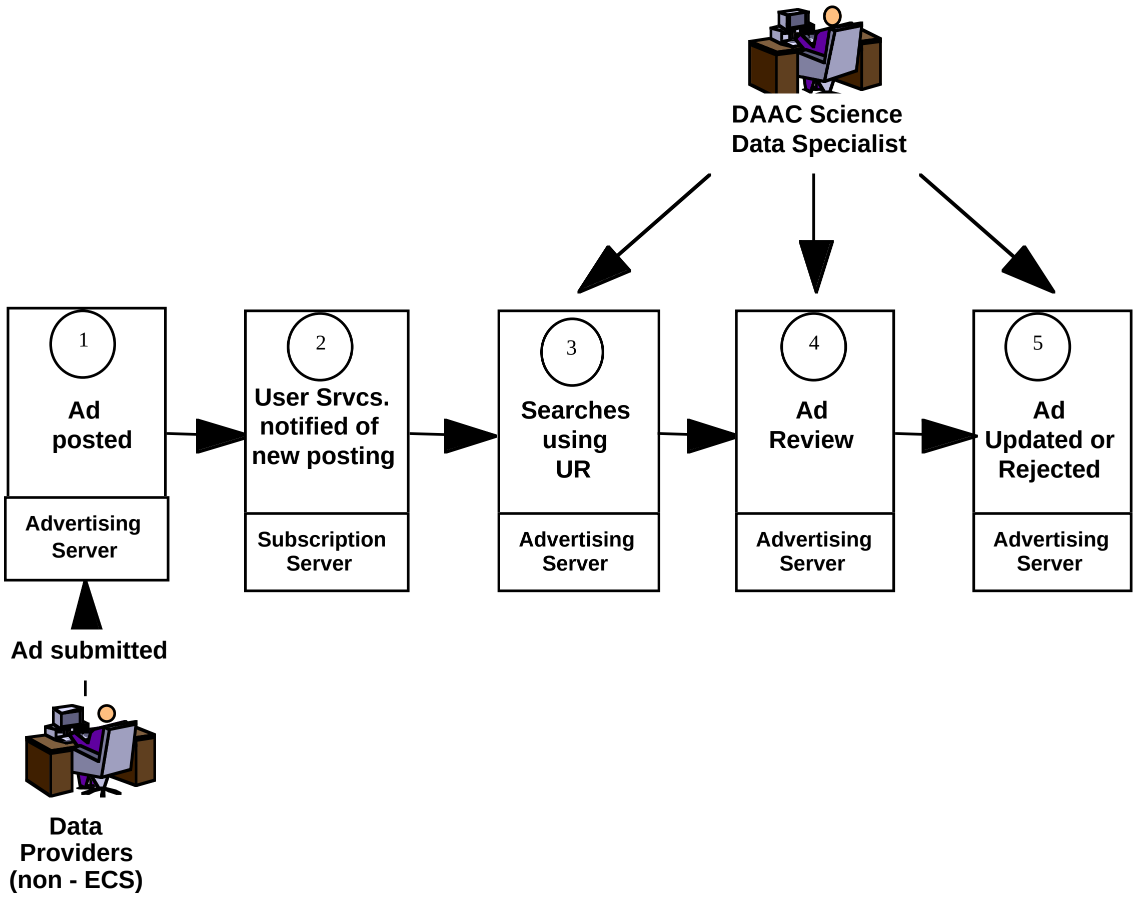


Figure 3.2.3.1-1. Submit Advertisement Functional Flow

3.2.3.2 Operator Roles

DAAC Science Data Specialist - Reviews Advertisements for completeness and complaince. Updates the Advertisements as complaint or rejects according to guidelines.

Data Provider - Creates and Submits Advertisement

3.2.3.3 Detailed Points of View

Detail PoV Chart stepping through all the scenario and showing all relevant roles interact.

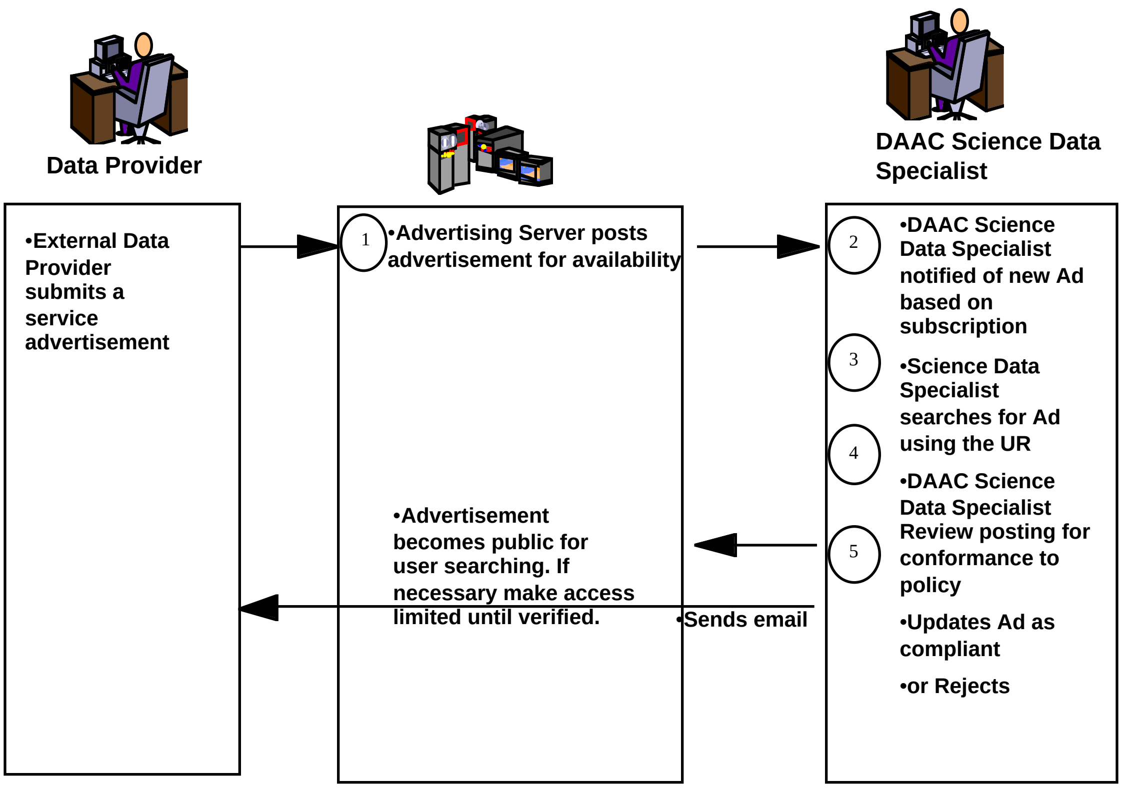


Figure 3.2.3.3-1. Submit Advertisement Points of View

3.2.3.4 Workflow I- DAAC Data Specialist

Scenario Workflow 'A' Figure 3.2.3.4-1 shows the steps taken by DAAC staff to approve an Advertisement. Table 3.2.3.4-1 shows the data activities associated with this workflow.

This section is continued on the next page.

Workflow

Activity - Submit Advertisement
Role - DAAC Science Data Specialist

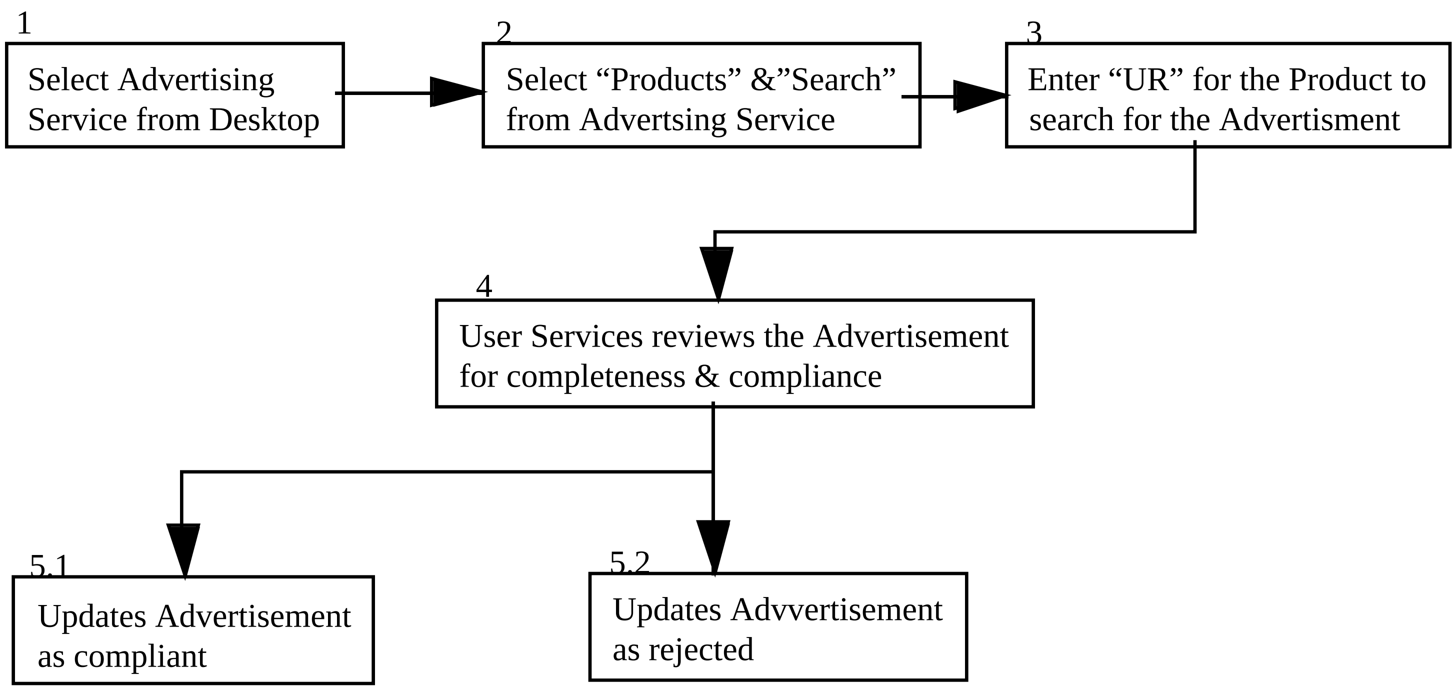


Figure 3.2.3.4-1. DAAC Data Specialist Workflow

Data Activity

Table 3.2.3.4-1. Data Activity for DAAC Data Specialist

Object Name	Data Element	Activity					
		1	2	3	4	5.1	5.2
HTML	Advertising Service	I					
	Product		I				
	Search		I				
IoAdProductAdv	AdvId			I			
	AdvType				D		
	Contact				D		
	StartDate				D		
	ExpirationDate				D		
	DocumentationURL				D		
	Title				D		
	CopyRight				D		
	Description				D		
	Approved					E	E

3.2.3.4 Workflow II - Data Provider

Scenario Workflow 'A' Figure 3.2.3.5-1 shows the steps taken by a Data Provider to submit an Advertisement.. Table 3.2.3.5-1 shows the data activities associated with this workflow.

Workflow

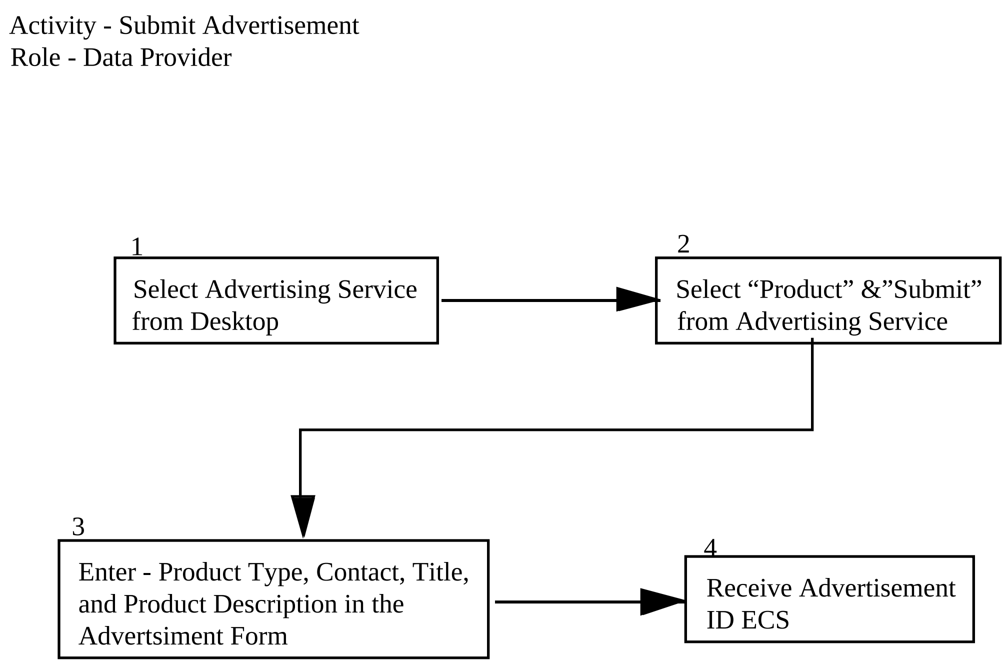


Figure 3.2.3.5 -1. Data Provider Workflow

Data Activity

Table 3.2.3.5-1. Data Activity for Data Provider

Object Name	Data Element	Activity			
		1	2	3	4
HTML	Advertising Service	I			
	Product		I		
	Submit		I		
IoAdProductAdv	AdvId				D
	AdvType			I	
	Contact			I	
	StartDate			I	
	ExpirationDate			I	
	DocumentationURL			I	
	Title			I	
	CopyRight			I	
	Description			I	

3.2.4 Science Software Archive Package Ingest & Validation

The Science Software Archive Package (SSAP) encompasses all information relevant to a logical grouping of product processing software, i.e., source files, header files, makefiles, binary execuTables, and object libraries. It represents the full content of data and information delivered by data producer standard product Algorithm Integration and Test. The SSAP is a type of earth science data type (ESDT).

The SSAP includes the following information:

- a list of all the granules that were generated using the science software delivery
- a list of hosts that the execuTable software will run on
- a list of the source code of the delivered algorithm package

Figure 3.2.4-1 depicts the context in which SSAP ingestion and validation occur within the ECS system.

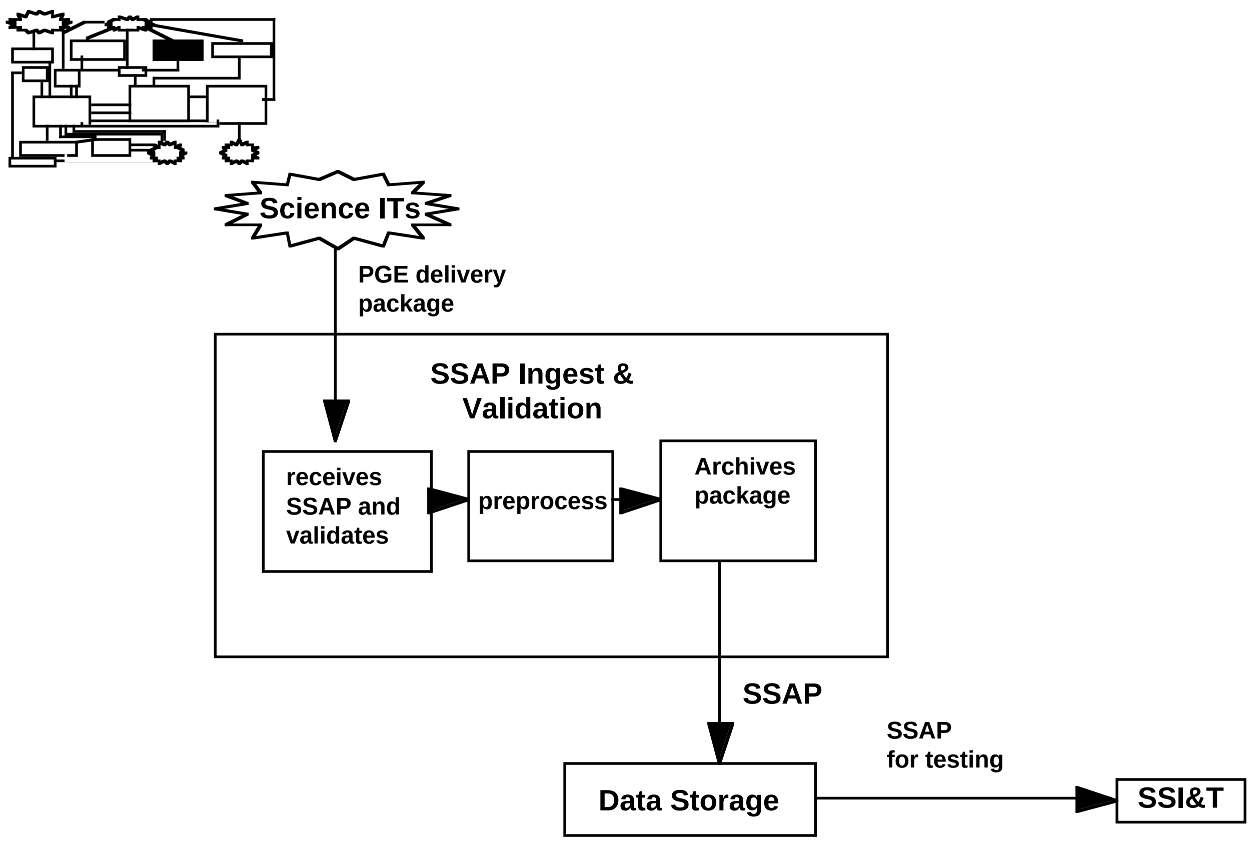


Figure 3.2.4-1. SSAP Ingest & Validation Context Diagram

3.2.4.1 Description

In this scenario the Science Instrument Teams (ITs) at a Science Computing Facility (SCF) ships the SSAP to the DAAC on an 8mm tape media, although the user network graphical user interface is also available. Prior to the receipt of the tape the Ingest software is set up to receive the SSAP and the DAAC Science Software (SS) Integration & Test (I&T) Engineer has submitted a subscription for the SSAP storage. In this scenario the Ingest subsystem performs no checking of the contents of the SSAP (initial receipt from ITs.) Once the SSAP is successfully stored in the Data Server, the subscription will trigger, and the SS I&T will be notified of the SSAP availability for validation. Validation in which the Ingest subsystem does some level of checking to make sure that certain required files are present plus required metadata parameters happens is discussed in Section 3.2.5. Figure 3.2.4.1-1 depicts the functional flow of SSAP ingestion and validation.

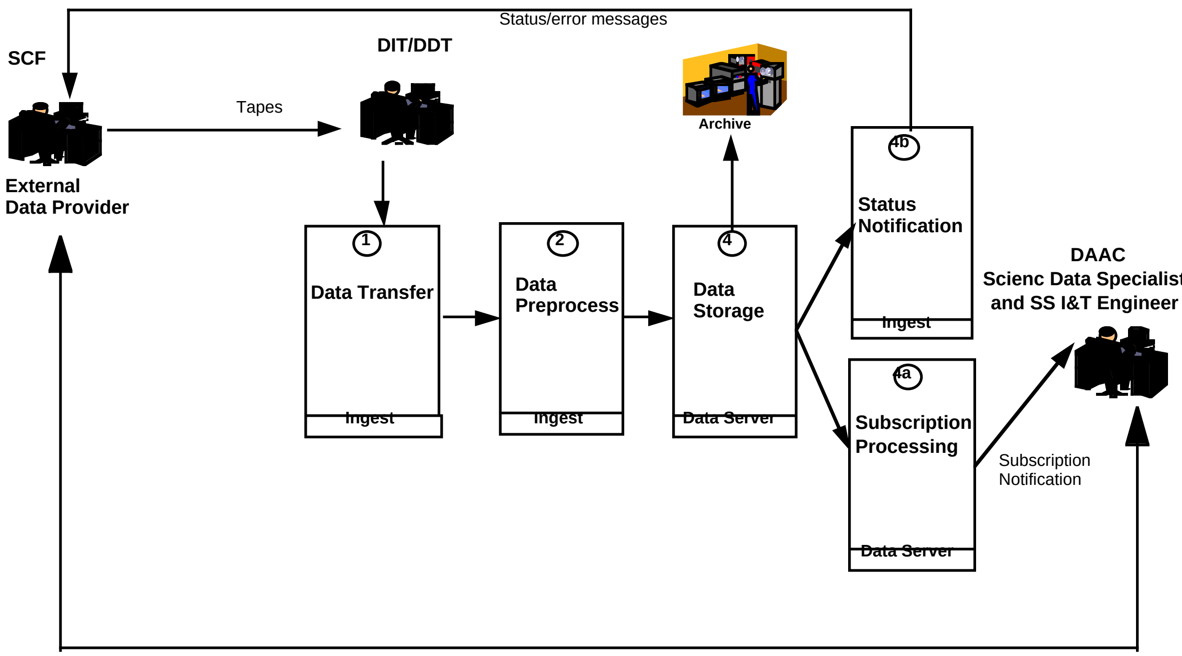


Figure 3.2.4.1-1 SSAP Ingest & Validation Functional Flow

3.2.4.2 Operator Roles

The DAAC Ingest / Distribution Technician (DIT/DDT) receives an 8mm tape containing the SSAP from the SCF and notifies both the DAAC Science Data Specialist and SS I& T Engineer. When confirmation to load the tape is received the technician will check in the tape without starting the ingest process by using a bar-code reader. The technician will then use the Ingest Media GUI to enter the tape data into the system. The technician will monitor the ingestion of the SSAP.

The DAAC SS I&T Engineer informs the DIT/DDT to enter the tape for processing. The DAAC Science Data Specialist and DAAC SS I&T Engineer supports the external data provider in the test and integration of the SSAP into the ECS system. The engineer will use the Data Server

Subscription Management GUI to enter and view the subscription of the SSAP. The engineer will monitor the validation of the SSAP.

3.2.4.3 Detailed Points of View

Figure 3.2.4.3-1 depicts the detailed points of view of SSAP ingestion and validation.

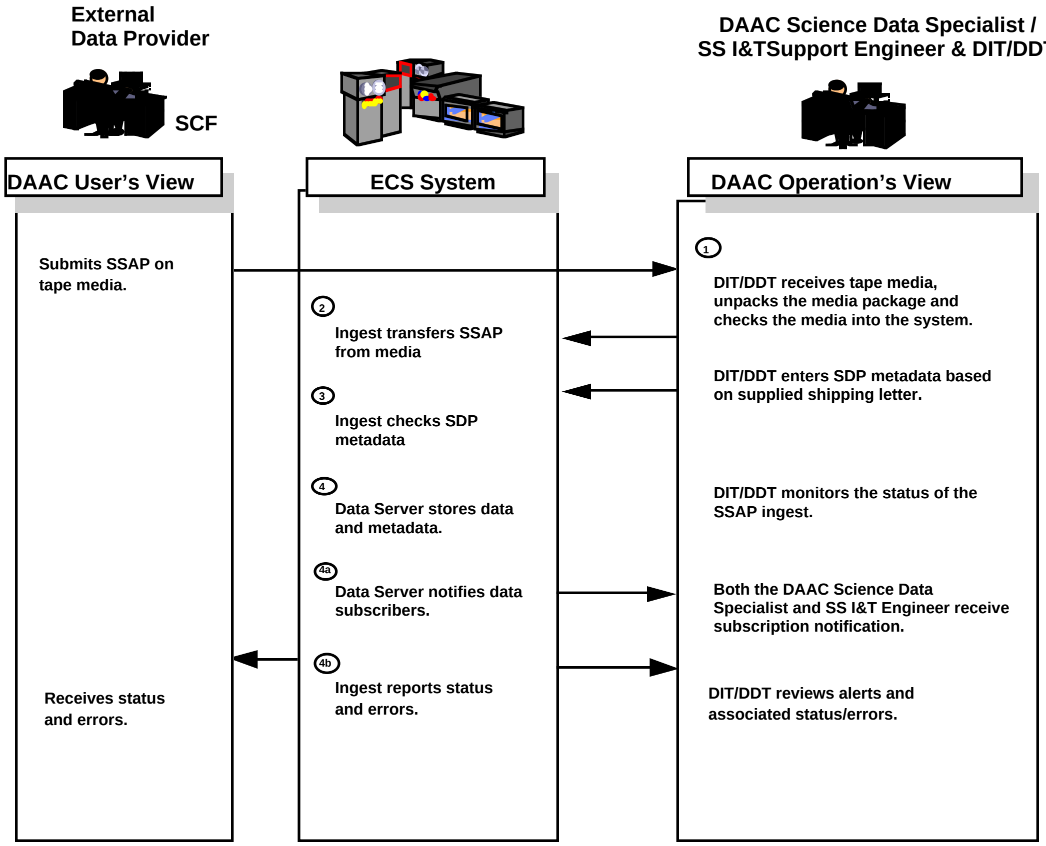


Figure 3.2.4.3-1. SSAP Ingest & Validation Points of View

3.2.4.4 Media Ingest Workflow

This workflow shows the steps that an operator would take when accessing the media ingest GUI to ingest hard media. A media ingest session will be configured on the operator's GUI interface to accept the request from the operator and submit the request to the ECS system for processing. Figure 3.2.4.4-1 depicts the steps that an operator takes to ingest an 8mm tape.

This section is continued on the next page.

Workflow

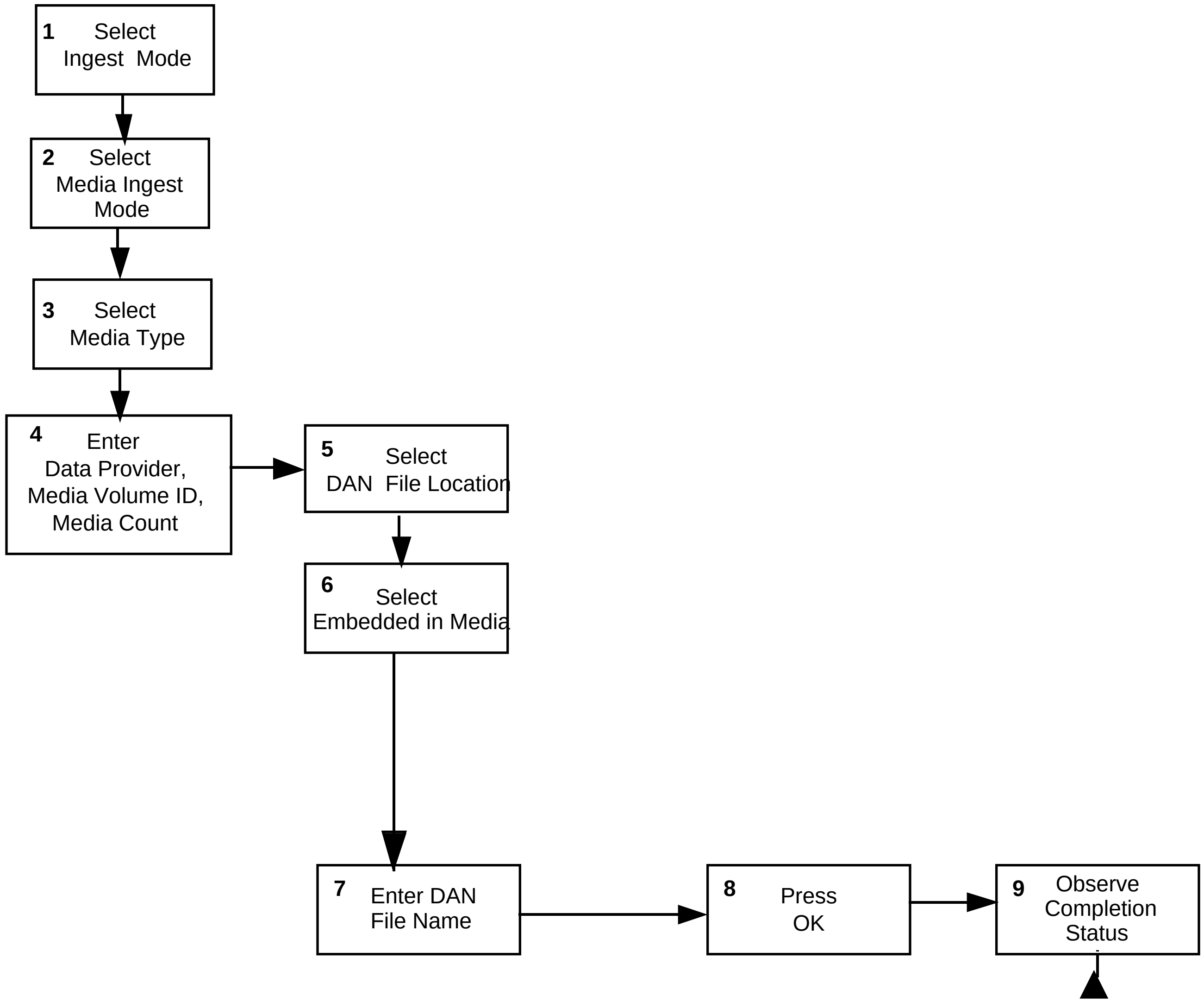


Figure 3.2.4.4-1. Media Ingest Workflow

Data Activity

Table 3.2.4.4-1. Data Activity for Media Ingest

Object Name	Data Element	Activity								
		1	2	3	4	5	6	7	8	9
InMediaIngest	Media Ingest	I	I							
	Media Type			I						
	Media Data Provider				I					
	Media Volume ID				I					
	Total Media Count				I					
	Delivery Record File Directory					I				
	Location of DAN file						I			
	Delivery Record File Name							I		
	Submit Request								I	
	Completion Status									D

3.2.4.5 Subscription Viewing Workflow

This workflow shows the steps that the Science Software I&T Engineer would take to view and enter subscriptions. Figure 3.2.4.5-1 depicts the steps and Table 3.2.4.5-1 shows the data activities associated with an operator viewing and entering subscriptions.

Workflow

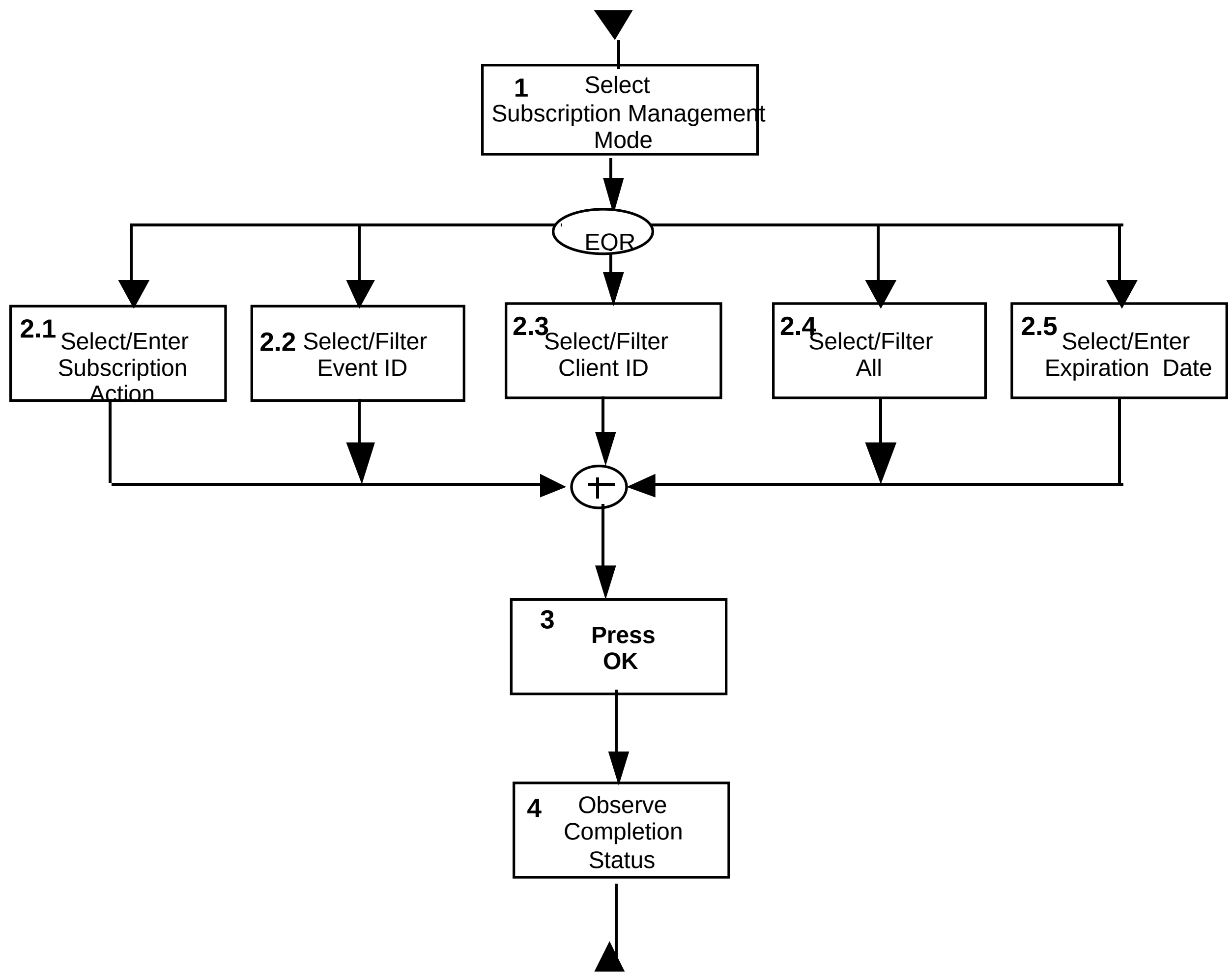


Figure 3.2.4.5-1. Subscription Viewing Workflow

Data Activity

Table 3.2.4.5-1. Data Activity for Subscription Viewing

Object Name	Data Element	Activity			
		1	2	3	4
DsGuAdmin	Data Server Subscription Management Option	I			
DsClSubscription					
	Subscription Action	D	I		
	Event ID	D	I		D
	Client ID	D	I		D
	Subscription Type	D	I		D
	Expiration Date	D	E		D
	Confirmation			I	
	Completion Status				

3.2.5 Science Software and Integration Testing (SSI&T)

All versions of a new PGE, revisions to existing PGEs, changes in coefficients, control files and data dependencies that were included in the PGE delivery package will undergo an SSI&T process. Regardless of SSI&T Model, however, the SSI&T process involves five broad phases:

- ConFigure - the delivery package is received and controlled in the Configuration Management system using Clearcase
- Inspection - the Delivery Package is examined
- Integration - source code is compiled and linked in the Planning and Data Processing (P&DP) environment.
- Testing - the software is tested in the production environment.

If modifications have been made to a PGE during the SSI&T process, the PGE will be reingested into the system by generation of a new Science Software Archive Package.

There will be access to the SSI&T process and tools by local (DAAC) and remote (SCF) access. The purpose of remote access is to add efficiency to the I&T process, for example to prepare a delivery package, or to reduce travel time.

This Section will detail the general view of what happens during SSI&T. Other processes that support SSI&T that are referred to in this Section are detailed in other Sections. Those processes include Production Planning, Ad Hoc Production Planning, and Ingest of the SSAP.

The SSI&T process is very important to the Science Operations Scenario because it verifies the correctness, completeness, and characterization of the science software that will be used to process the science data

Although the process for a typical SSI&T process is presented here, the procedures will vary by DAAC and (to some extent) by PGE.

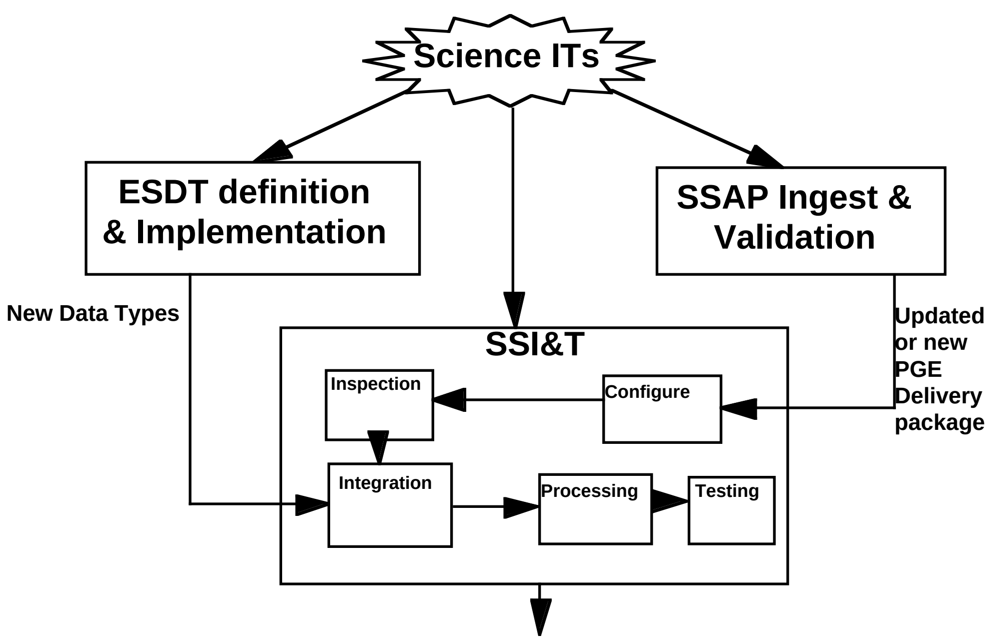


Figure 3.2.5.-1. SSI&T Context Diagram

3.2.5.1 Description of SSI&T Scenario

A New version of an existing PGE is ingested into the DAAC and placed under DAAC CM. It is compiled, verified, and tested by the SSI&T Team utilizing mode management to partition resources. The Profile of the new PGE version is defined in the PDPS database so that it can be run as a test on the production system. The PGE is executed successfully on the production system, and declared "production ready" by DAAC and SCF personnel. If changes occured to the original delivery package during testing, a new Science Software Archive Package is created by the Science Data Specialist to group the new version of the PGE with the rest of its delivery package that contains such items as documentation, test data, and execution scripts.

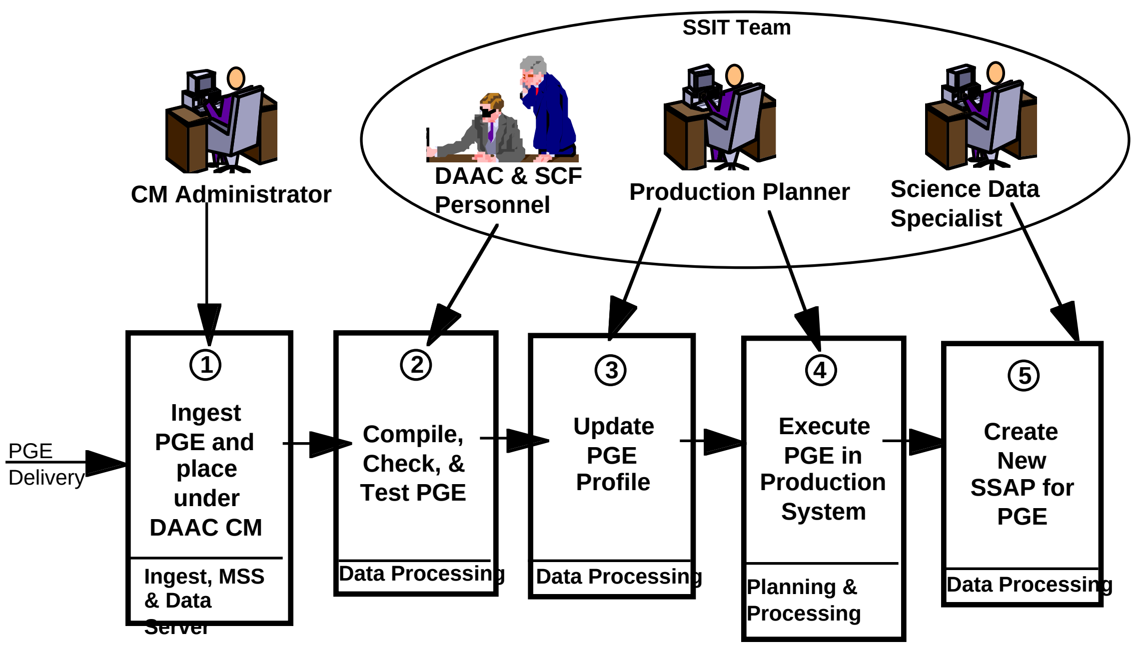


Figure 3.2.5.1-1. SSI&T Functional Flow Diagram

3.2.5.2 Operator Roles

DAAC CM Administrator - The CM Administrator is responsible for taking the PGE delivery and creating a new version of the PGE package using the CM tool ClearCase.

DAAC Production Planner - Updates the PGE profile so that the PGE test jobs can be scheduled on the operational system using mode management. The Planner along with the Science Data Specialist are responsible for planning the test runs and then converting the PGE profile when the PGE becomes operational.

DAAC Science Data Specialist - Is the DAAC lead/coordinator of the DAAC SSI&T Team. Their responsibility is to plan SSI&T, update any metadata needed for testing and to characterize PGE performance during testing. They also request operations approval from DAAC management of successful completion of testing.

DAAC Science Software Integration and Test (SSI&T) Engineer - Supports of SSI&T activities and problem resolution. The SSI&T Engineer is not depicted in this scenario because his effort has been completed by the time the software package has been delivered. However, the Engineer monitors the process and provides assistence in case of problems.

3.2.5.3 Detailed Points of View

This Point of View depicts the typical SSI&T process from the prespective of the DAAC operations staff. Some of the processes mentioned in this diagram are explained in more detail in other scenarios.

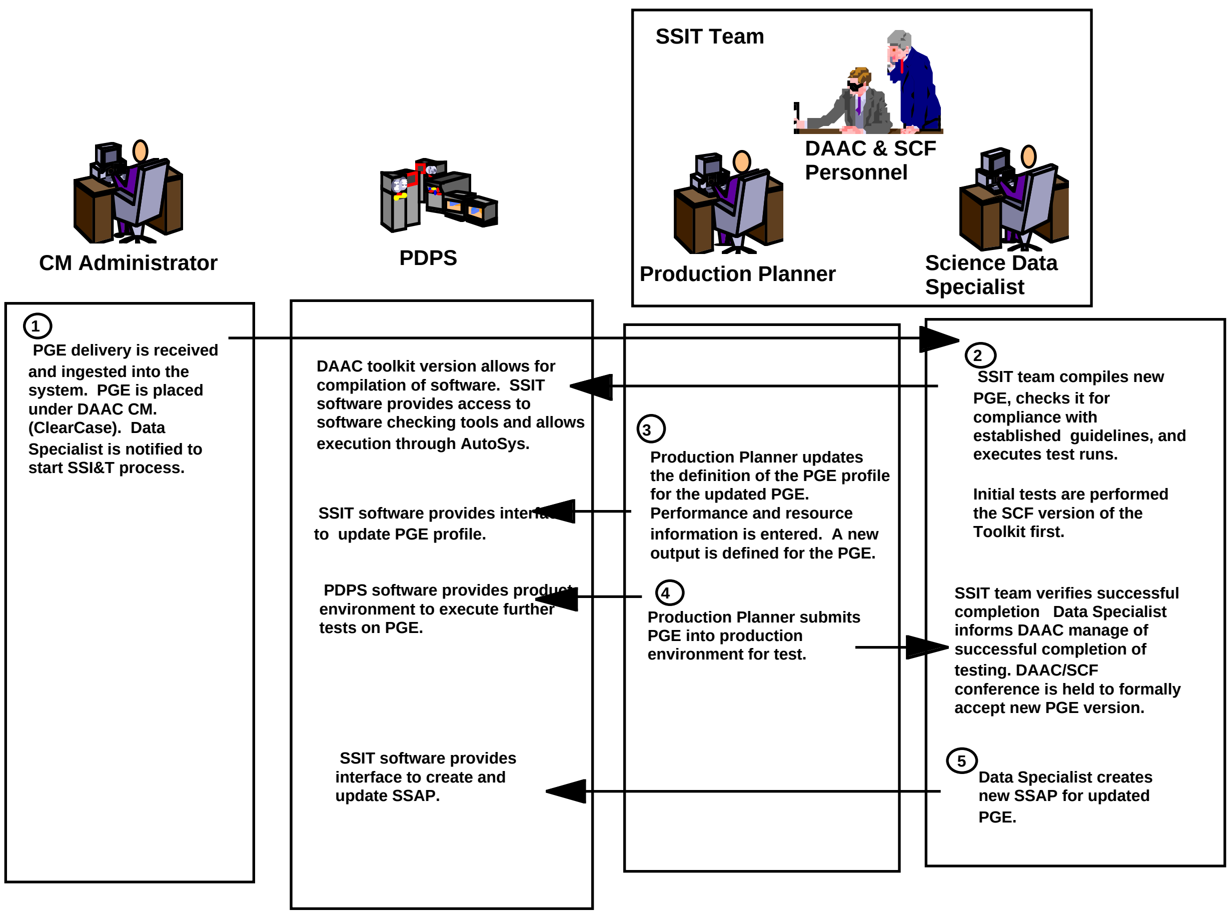


Figure 3.2.5.3-1. SSI&T Points of View

3.2.5.4 Science Data Specialist Workflow and Data Activity Table

The purpose of this workflow is to provide an overview of how the Science Data Specialist creates a new SSAP for ingest into the system. This workflow would be followed only if a PGE, or any part of the PGE delivery package are updated.

This section is continued on the next page.

Workflow

Activity -Create SSAP

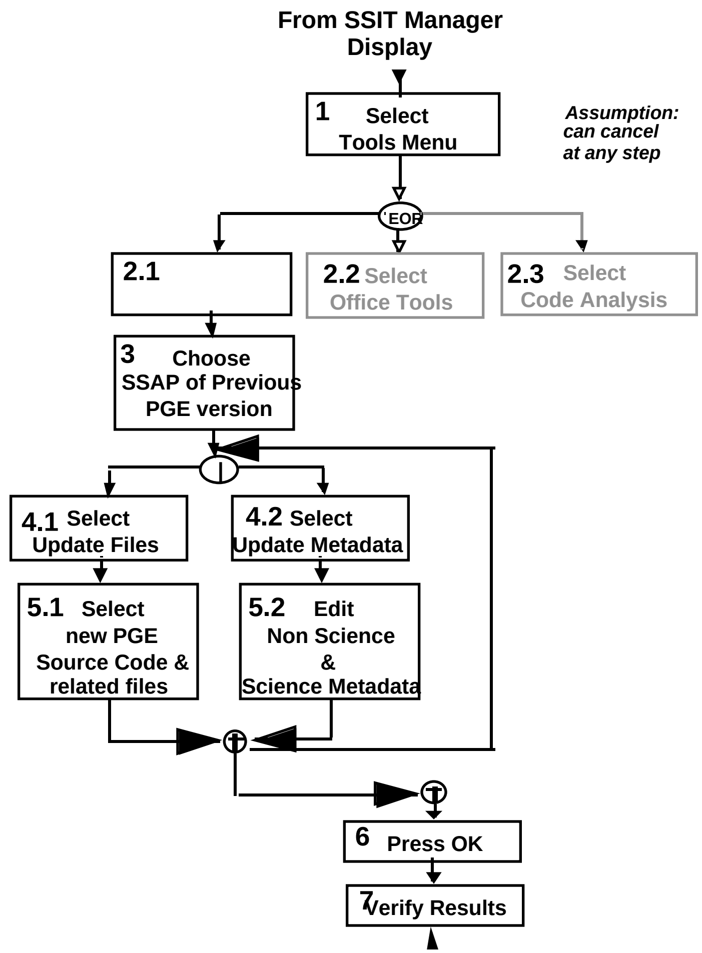


Figure 3.2.5.4-1. Science Data Specialist Workflow

Data Activity

Table 3.2.5.4-1. Data Activity for Science Data Specialist

Object Name	**Data Element**	**Activity**										
		1	2.1	2.2	2.3	3	4.1	4.2	5.1	5.2	6	7
DsNsScienceSoftwareArchive Package	Science Software Archive Package Name		E			D	D	D	D	D	D	
	Science Software Archive Package Version					E	D	D	D	D	D	
	Source Code Files						D		E			
	Related Files						D		E			
	Compile Script Files						D		E			
	Documentation Files						D		E			
	Test Plan Files						D		E			
	Test Data Files						D		E			
	Coefficent Files						D		E			
	PCF						D		E			
	Metadata Config File						D		E			
	Non-Science Metadata							D		E		
	Science Metadata							D		E		

3.2.5.5 Production Planner Workflow and Data Activity Table

The purpose of this workflow is to provide an overview of how the Production Planner updates the PGE profile for the new version of the PGE.

Workflow

Activity -Update PGE Profile

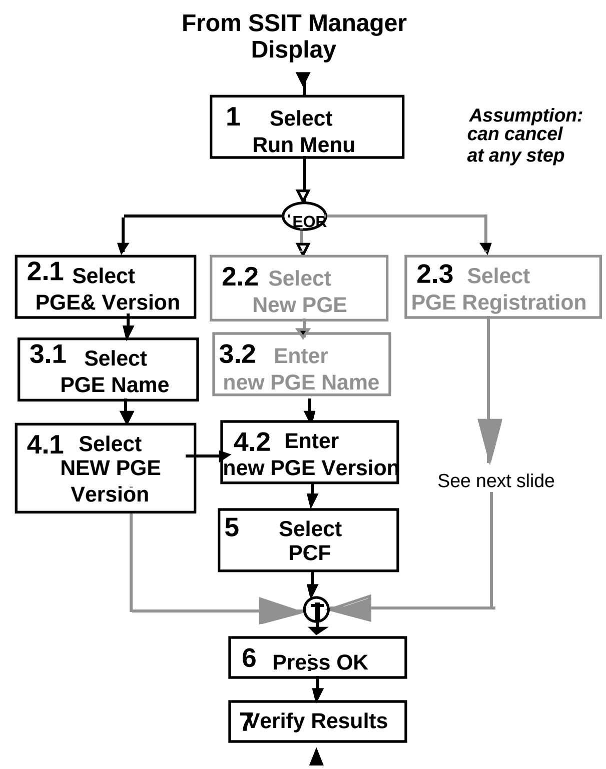


Figure 3.2.5.5-1. Production Planner New PGE Workflow

Data Activity

Table 3.2.5.5-1. Data Activity for Production Planner New PGE

Object Name	Data Element	Activity										
		1	2.1	2.2	2.3	3.1	3.2	4.1	4.2	5	6	7
PlPGE	PGE Name					E		D	D	D	D	
	PGE Version					E		D	E	D	D	

3.2.5.6 Production Planner Workflow and Data Activity Table

The purpose of this workflow is to provide an overview of how the Production Planner updates the PGE profile for new or changing inputs, outputs, resource requirements, and performance statistics.

Workflow

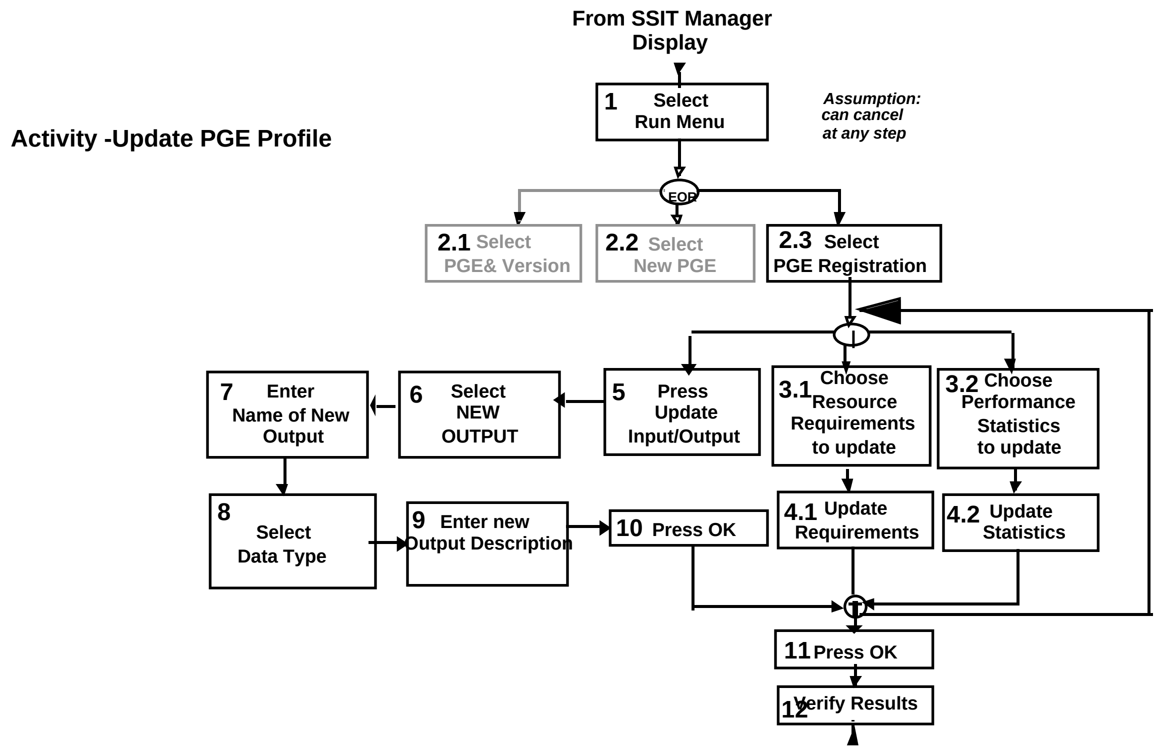


Figure 3.2.5.6-1. Production Planner PGE Resource Update Workflow

Data Activity

Table 3.2.5.6-1. Data Activity for Production Planner PGE Resource Update

Object Name	Data Element	Activity															
		1	2.1	2.2	2.3	3.1	3.2	4.1	4.2	5	6	7	8	9	10	11	12
PlDataType	Output Name											E	D	D	D	D	
	Output Description													E	D		
	Text Description													E	D		
	Catalogue Catagory													E	D		
	Instrument Name													E	D		
	Satillite Name													E	D		
	Processing Center													E	D		
	Archived Center													E	D		
	Dependant Centers													E	D		
PlResourceRequirement	Resource Requirements					D	E										
	Computer					D	E										
	Operating System					D	E										
	Number CPUs					D	E										
	Disk Space					D	E										
PlPerformance	Performance Statistics							D	E								
	CPU Time							D	E								
	Elapsed Time							D	E								
	Shared Memory							D	E								
	Max Memory Use							D	E								
	Page Faults							D	E								
	Swaps							D	E								
	Block Input Operations							D	E								
	Block Output Operations							D	E								

3.2.6 Ad Hoc Production

Production processing job modifications are expected to be non routine events. It is expected that a majority of PGEs will not require changes. However the ECS allows the Production Monitor to modify job parameters, such as priority, any time prior to PGE execution. This allows flexibility in unforeseen and unusual circumstances. These circumstances include but are not limited to: equipment failures, emergency or high priority processing, delayed input data, PGEs with data product dependent components that effect PGE run time (e.g., the PGE runs long or short when clouds are encountered, PGEs with geolocation dependent processing, unexpectedly high On-Demand processing loads). The job modification rate is expected to be very low, well under 5%.

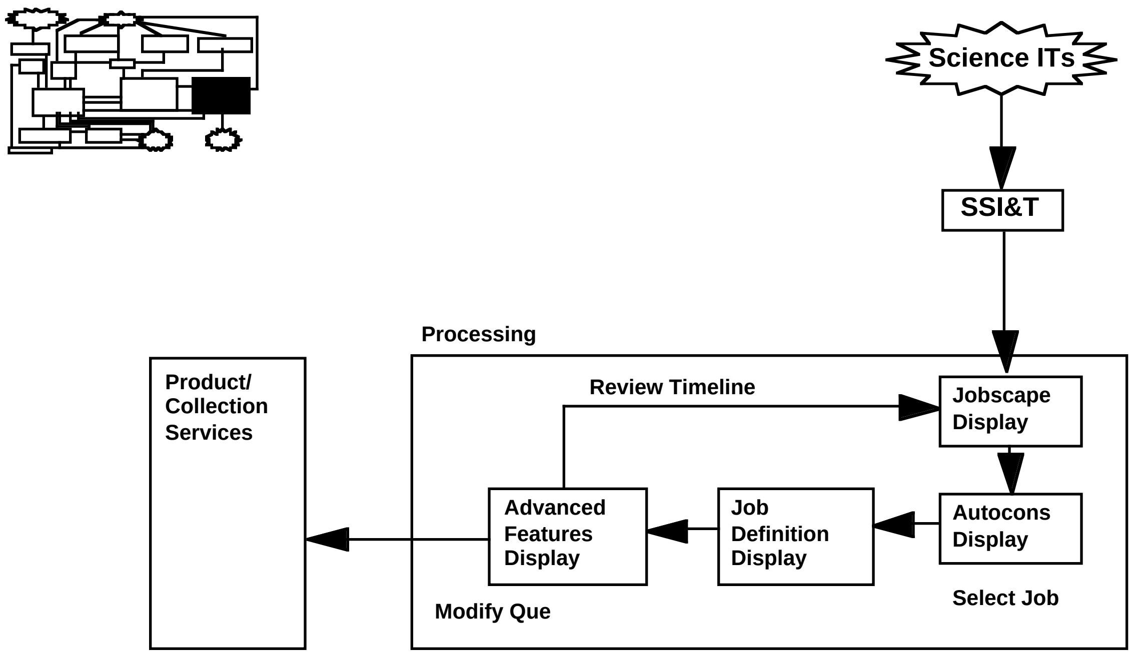


Figure 3.2.6-1. Ad Hoc Production Context Diagram

3.2.6.1 Ad Hoc Production Description

The daily production schedule, active plan, has been loaded and PGE execution is in progress although the PGE to be modified has not begun execution. The Data Processing Subsystem (as managed by the Autosys Job Scheduling engine) executes the PGEs and associated jobs as the resources required for the tasks become available. This scenario follows the steps the Production Monitor takes to change the priority of a PGE. The scenario follows the PGE from selection to priority change.

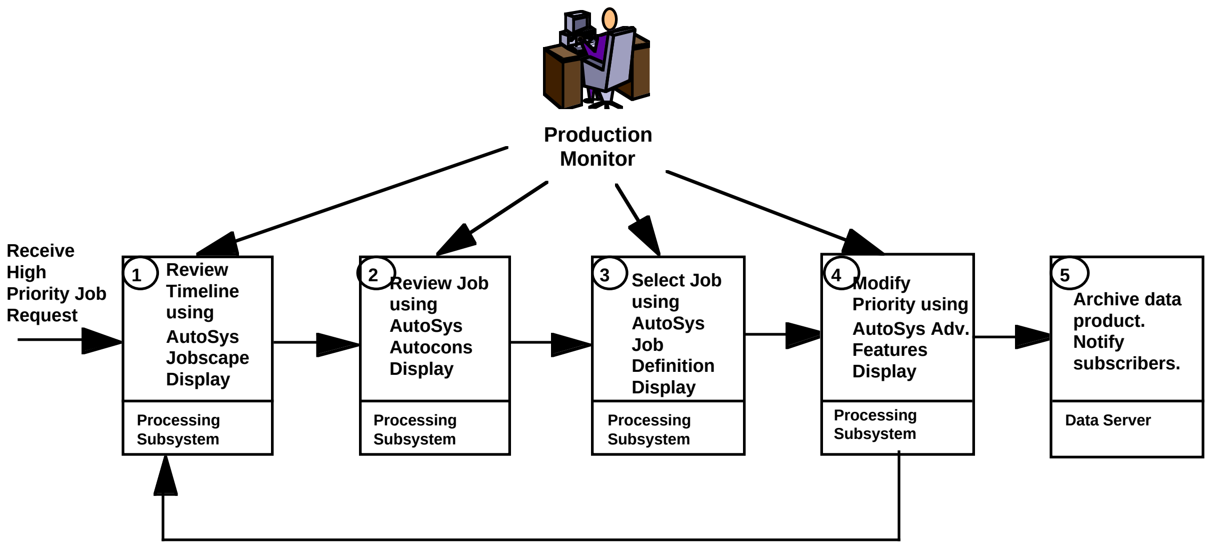


Figure 3.2.6.1-1. Ad Hoc Production Functional Flow

3.2.6.2 Ad Hoc Production Operator Roles

Production Monitor - Monitor science algorithm program execution via automated tools. Monitor quality and completeness of input and output. Modifies job queue priorities.

3.2.6.3 Ad Hoc Production Points of View

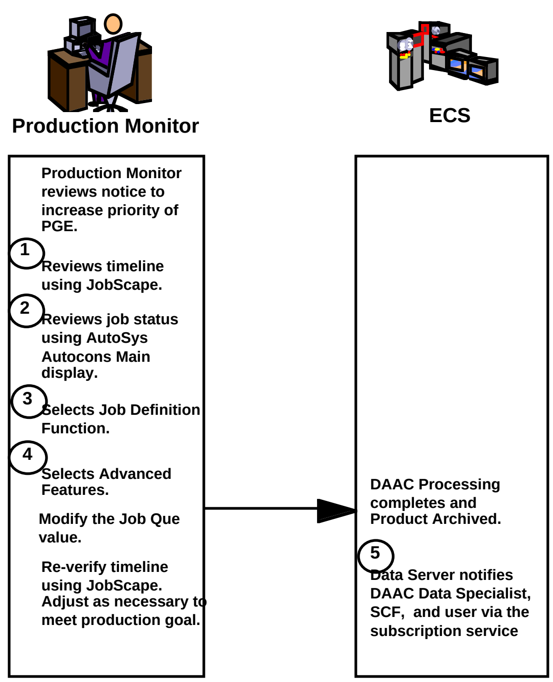


Figure 3.2.6.3-1. Ad Hoc Production Points of View

3.2.6.4 Work Flow Diagrams for “Ad Hoc Production”

The purpose of this workflow is to Refer to show the functional steps required to change the priority of a PGE in the Processing system using AutoSys tools. Detailed workflows are provided in Scenario 3.2.9.

Workflow

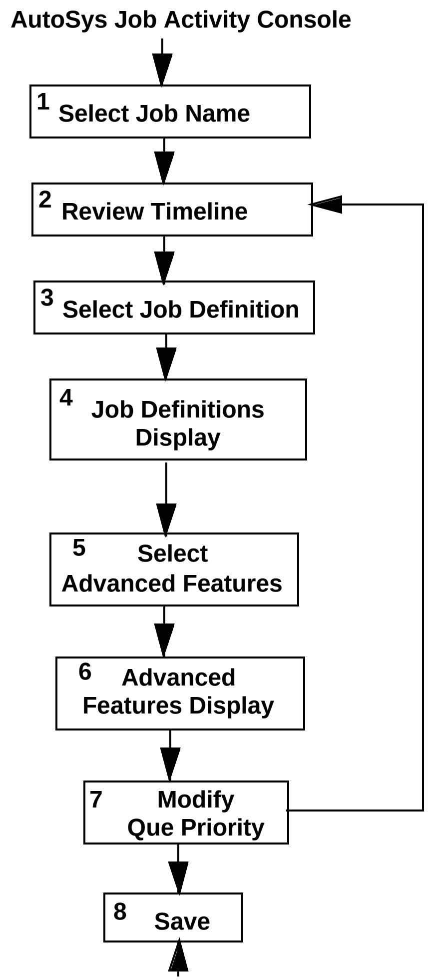


Figure 3.2.6.4-1. Ad Hoc Production Workflow

Data Activity Table

Table 3.2.6.4-1. Data Activity Table for Ad Hoc Production

Object Name	Data Element	Activity							
		1	2	3	4	5	6	7	8
AutoSys	Select Job Name	E							
	Job Display		D						
	Job Definition			I	D				
	Advanced Features					E			
	Change Priority							E	
	Save								I

3.2.7 Standard Planning

The Production Planner prepares a monthly and weekly production plan. The Production Planner also develops a daily production schedule from the most current weekly plan.

Planning provides the DAAC with the ability to create, modify, and implement a production plan. The production plan is generated by expanding production requests into individual data processing requests, using data dependencies, predicted resource availability, and predicted input data availability. In particular, the arrival time of L0 data are predicted based on the Detailed Activity Schedulers from FOS. Multiple candidate plans can be created for consideration, but only one plan is activated. Planning implements the selected production plan by submitting the data processing requests in the plan to the Data Processing Subsystem, as required inputs become available. PGE execution status is recorded against the plan to assess the progress of data processing.

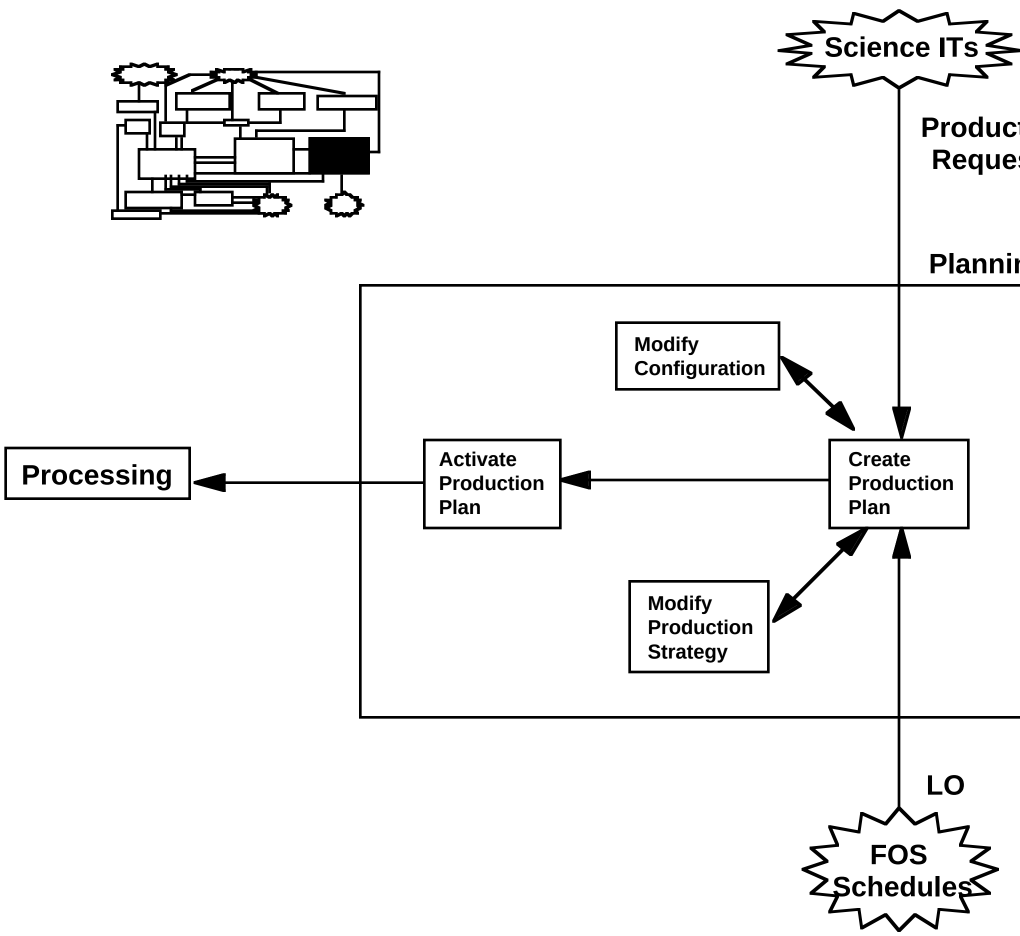


Figure 3.2.7-1. Production Planning Context Diagram

3.2.7.1 Standard Planning Description

Production requests are entered by DAAC operations personnel to handle routine processing and reprocessing (See scenario 2.2.7). These requests are maintained in a planning database and are included in the next candidate plan when it is generated.

On-demand requests (See scenario 2.2.10) are accepted by Planning from the Data Server Subsystem. On-demand requests are either submitted immediately for processing or added to the planning database for inclusion in the next candidate plan, depending on whether certain predetermined criteria are satisfied.

Data processing requests are automatically submitted by Planning for processing when the required input data are available. For standard processing, input data may not be available when a plan is activated. Data is expected to arrive from EDOS or the TRMM Sensor Data Processing Facility (SDPF) during the plan's time frame. Planning is informed of the data availability via subscription modifications from the data server.

Planning tracks the status of all production requests entered and all data processing requests generated. Management reports are generated upon request that provide information concerning the planning workload and the status of requests processed.

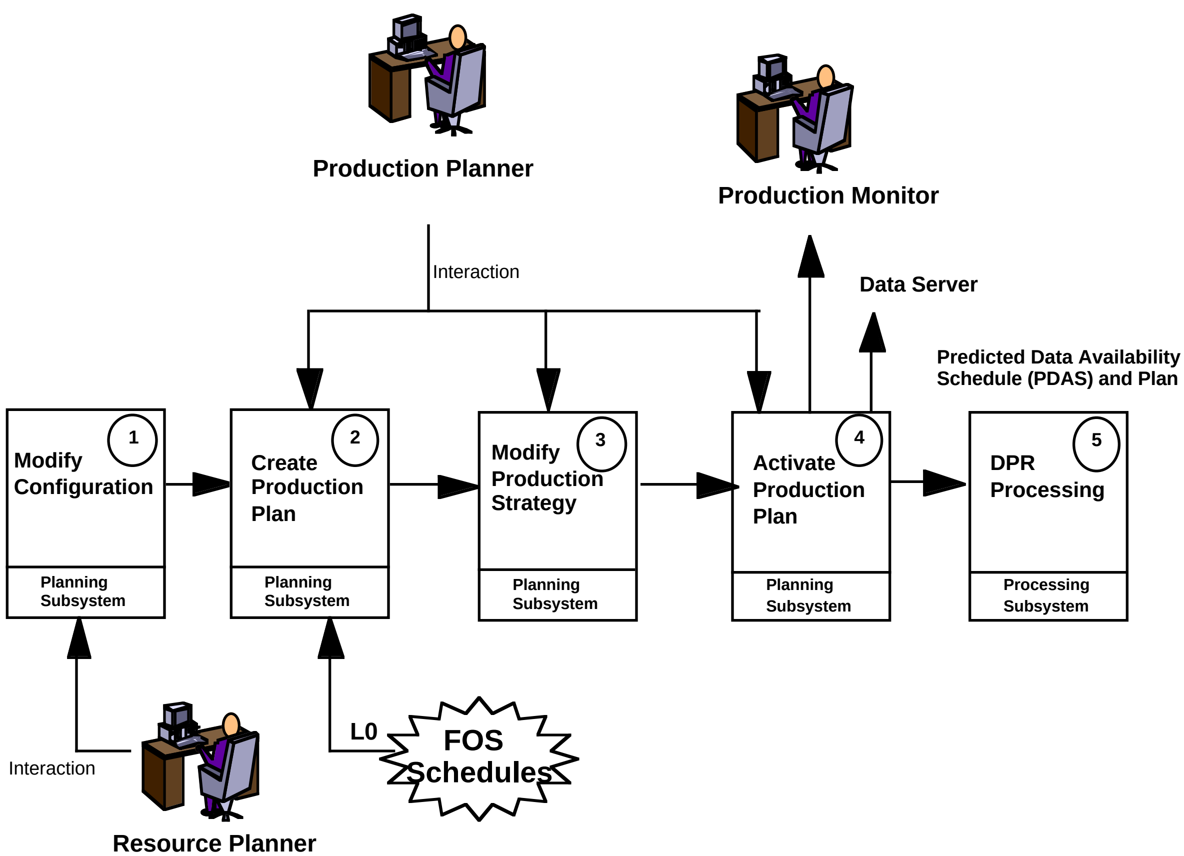


Figure 3.2.7.1-1. Production Planning Functional Flow

3.2.7.2 Production Planning Operational Roles

Resource Planner - Maintain and modify hardware and software system configurations, and support system anomaly tracking and analysis. Monitor local system performance and participate with the SMC Performance Analyst in monitoring overall ECS system-wide performance. Alert DAAC, M&O Office, SMC and/or Project management to circumstances that may require coordination between DAACs, possibly with Project participation.

Production Planner - Perform generation of system production schedules and coordinates user requests.

Production Monitor - Plan activation, replanning, and review of management reports and status of requests processed.

3.2.7.3 Production Planning Points of View

This point of view is presents the steps to create a monthly and weekly production plan.

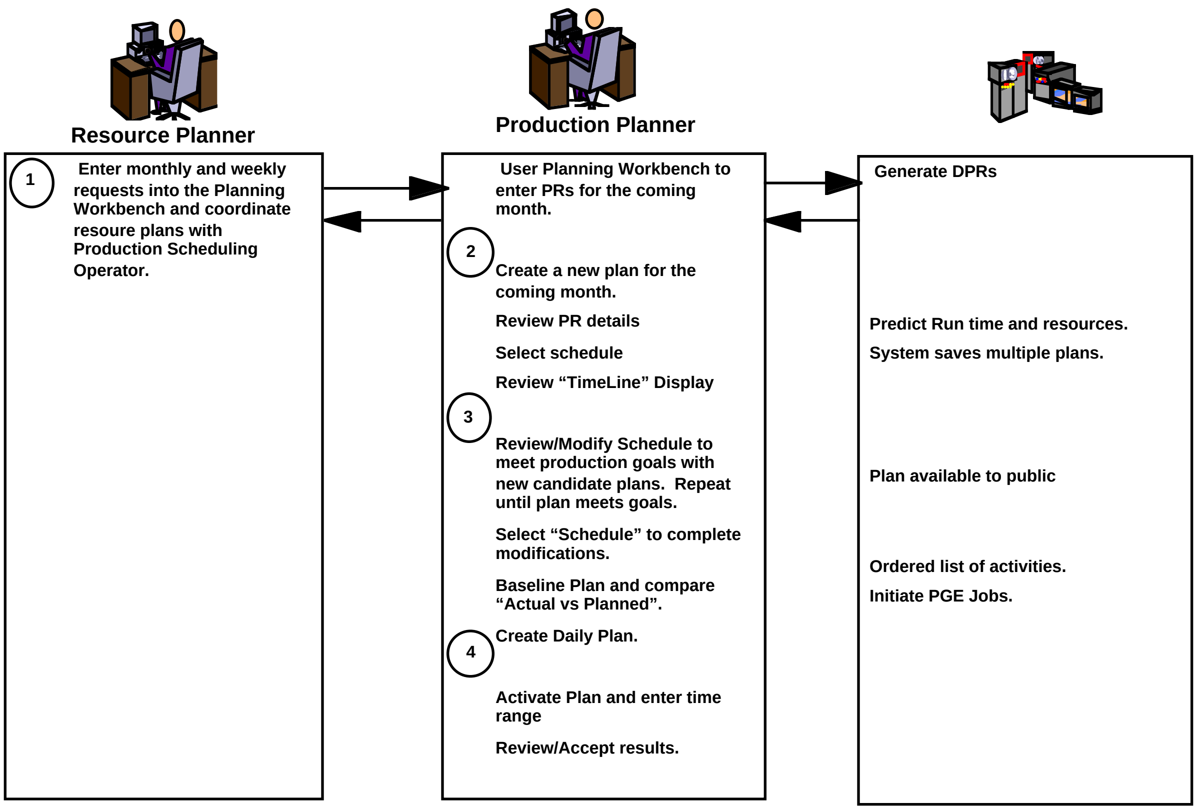


Figure 3.2.7.3-1. Production Planning Monthly/Weekly Points of View

This point of view is presents the steps to create a daily production plan from the most current weekly plan.

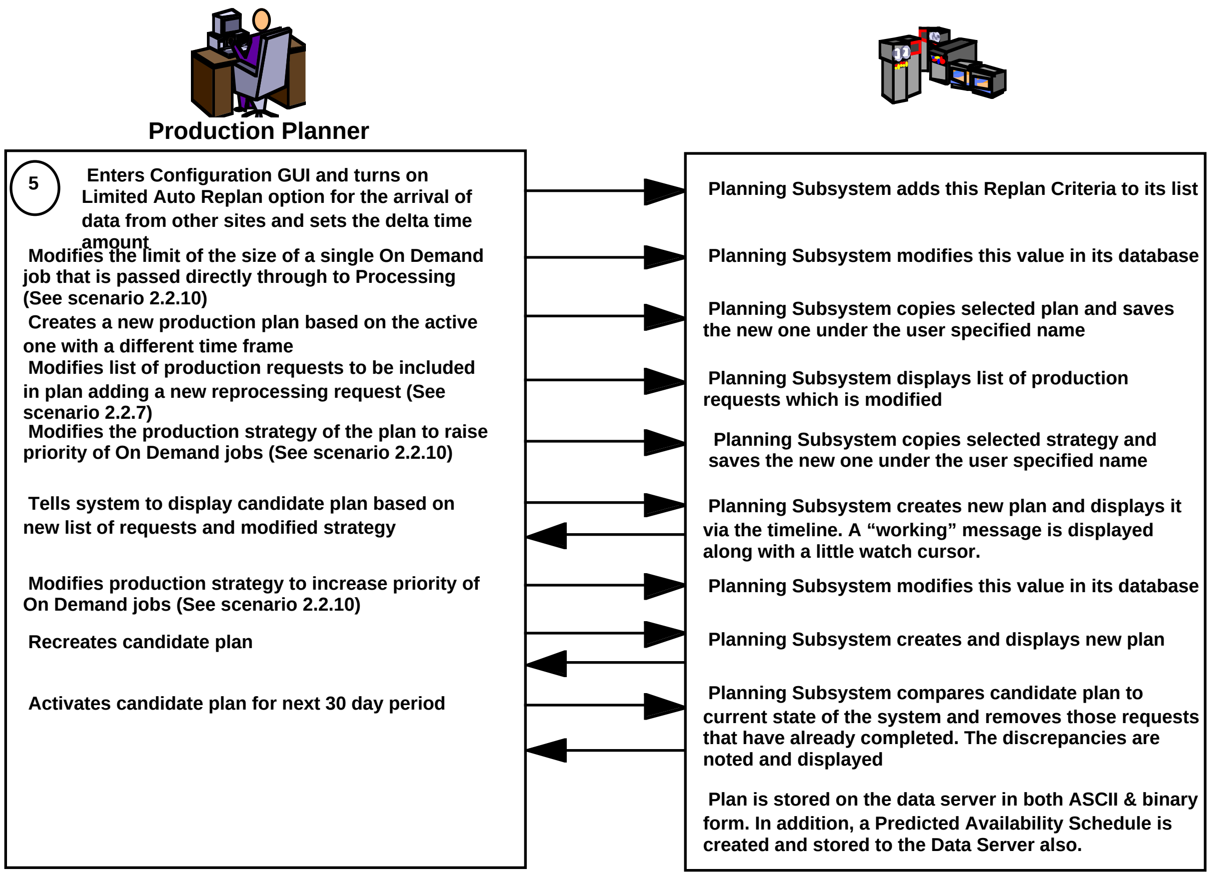


Figure 3.2.7.3-2. Production Planning Daily Configuration Points of View

3.2.7.4 Scenario Workflow 'Define/Edit Production Requests'

The workflow that follows provides an example of Defining a Production Request. The Production Planner enter the Production Request name and defines the request definition, duration, and PGE Parameter Mapping.

Workflow

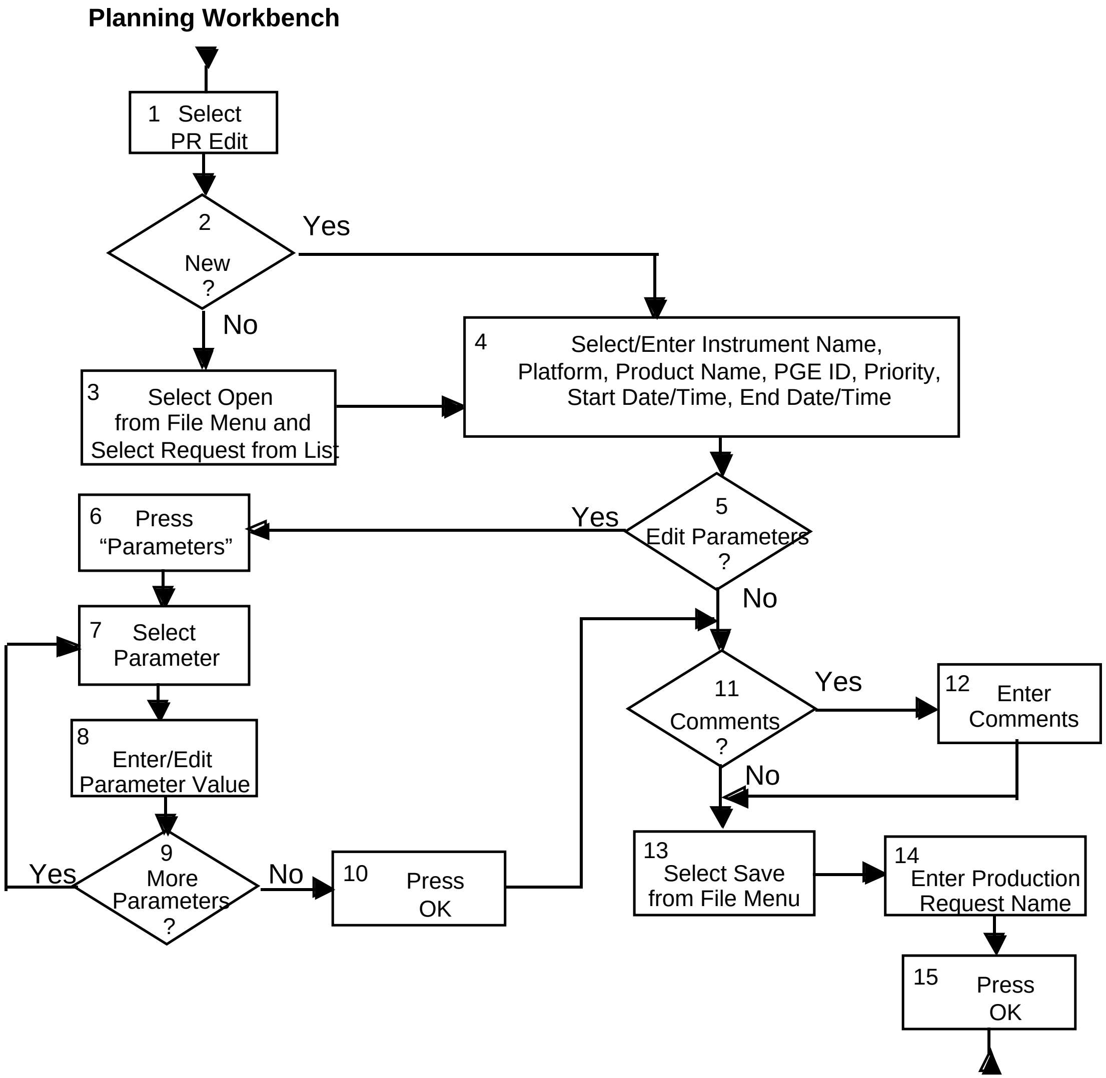


Figure 3.2.7.4-1. Edit/Define Production Requests Workflow

Data Activity

Table 3.2.7.4-1. Data Activity for Edit/Define Production Requests

Object Name	Data Element	Activity														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
PlProductionRequest	PR Name			E											D/I	
	Origination Date	D														
	Originator	D														
PlPGE	Instrument Name				E											
	Product Name				E											
	Platform				E											
	PGE ID				E											
PlProductionRequest	Priority				E											
	Start Date/Time				E											
	End Date/Time				E											
	Comment												E			
	Status	D														
	Parameter							E								
	Value								E							
	Production Request Name														E	
None	Filter	E														
PlPlan	Production Requests	D														

3.2.7.5 Scenario Workflow 'Review/Select/Modify Production Request List'

The workflow that follows provides an example of Reviewing a Production Request. A list of Production Requests is displayed. The Production Planner may delete requests or edit requests returning to the Edit/Define Production Request workflow.

Workflow

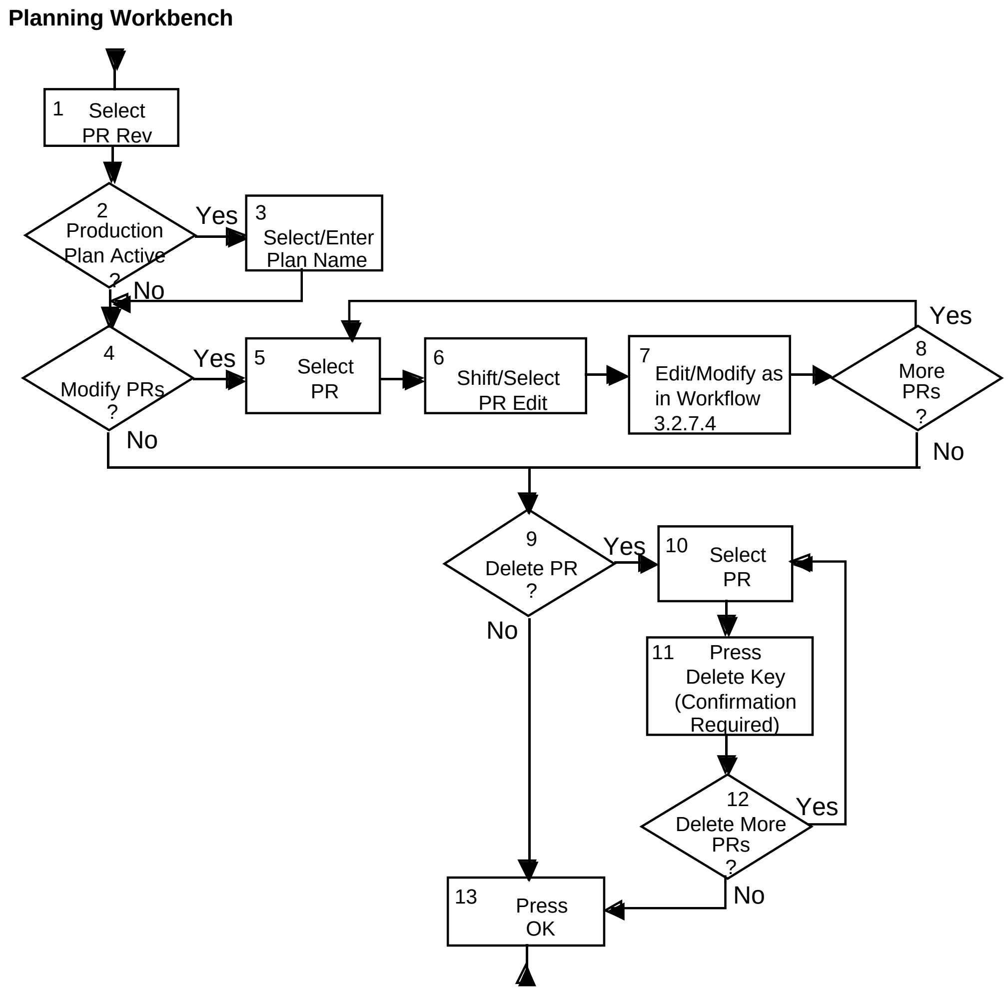


Figure 3.2.7.5-1. Review/Select/Modify Production Request Workflow

Data Activity

Table 3.2.7.5-1. Data Activity for Review/Select/Modify Production Request

Object Name	Data Element	Activity													
		1	2	3	4	5	6	7	8	9	10	11	12	13	14
None	Find					I					E				D

3.2.7.6. Scenario Workflow ‘Define/Edit Data Processing Requests’

The workflow that follows provides an example of Defining a Data Production Request. The Production Planner enters the Data Processing Request Identification, request definitions, request date and priority, and PGE Parameter mapping.

Workflow

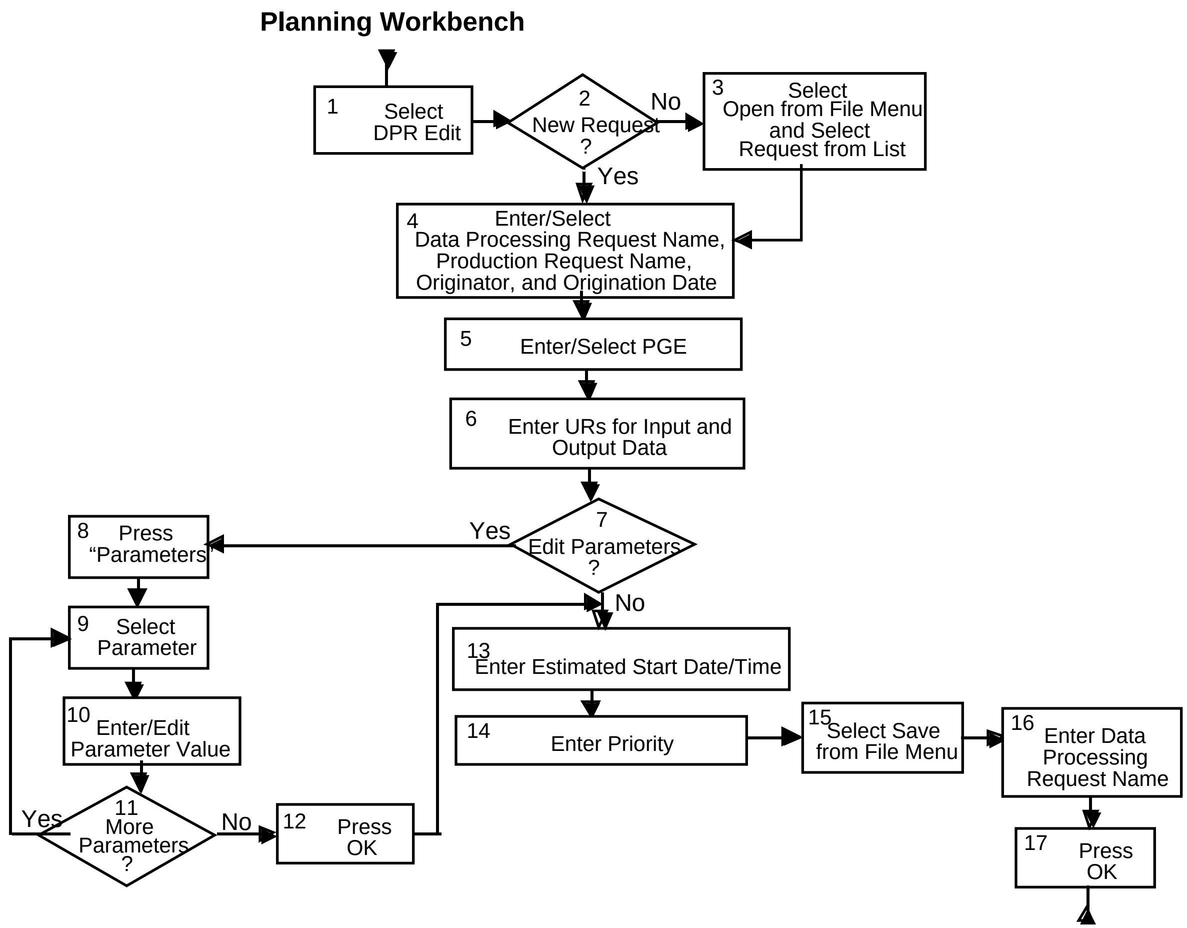


Figure 3.2.7.6-1. Define/Edit Data Production Request Workflow

Data Activity

Table 3.2.7.6-1. Data Activities for Define/Edit Data Production Request

Object Name	Data Element	Activity																
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
PIDPR	DPR Name			E	I/D												D/E	
	Start Date/Time													E				
	Priority														E			
	PR Name				E/I													
	PGE ID					E												
PIGranule	Input Data UR						D											
	Output Data UR						D											
PIUsersParameters	Parameter									E								
	Value										E							
None	Status					D												
	Origination Date				D													
	Originator				D													
	Filter				E													

3.2.7.7 Scenario Workflow ‘Review/Select/Modify Data Processing Request List’

The workflow that follows provides an example of Reviewing a Data Production Request. A list of Data Production Request is displayed. The Production Planner may delete requests or edit requests returning to the Edit/Define Data Production Request workflow.

Workflow

Planning Workbench

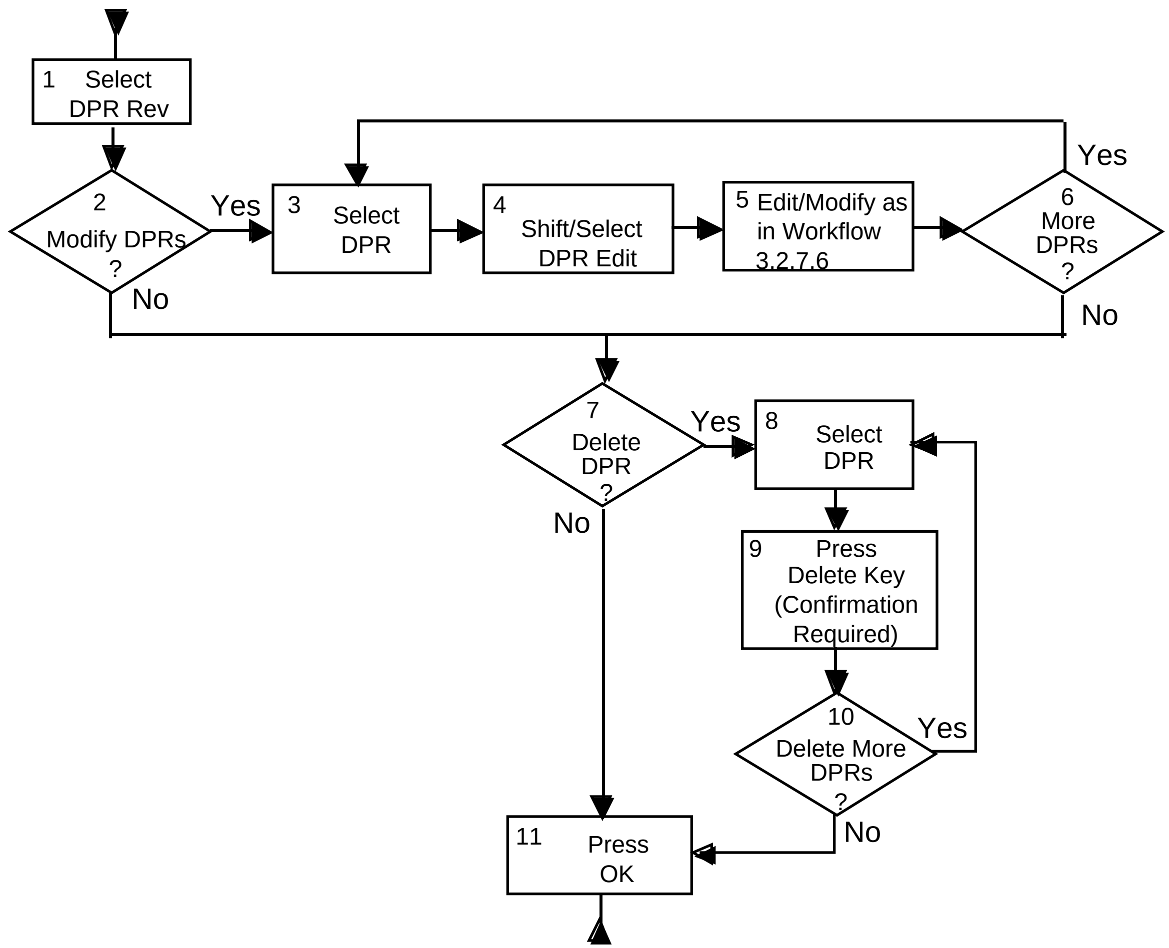


Figure 3.2.7.7-1. Review/Select/Modify Processing Request List Workflow

Data Activity

Table 3.2.7.7-1. Data Activity for Review/Select/Modify Processing Request List

Object Name	Data Element	Activity													
		1	2	3	4	5	6	7	8	9	10	11	12	13	14
None	Find			I					E						

3.2.7.8 Scenario Workflow ‘Generate/Validate Production Plan'

The workflow that follows provides an example of generating a Production Plan. The plan name, start/end times, Log, and Productions requests are entered. The Planner may generate, baseline, and activate plans.

Workflow

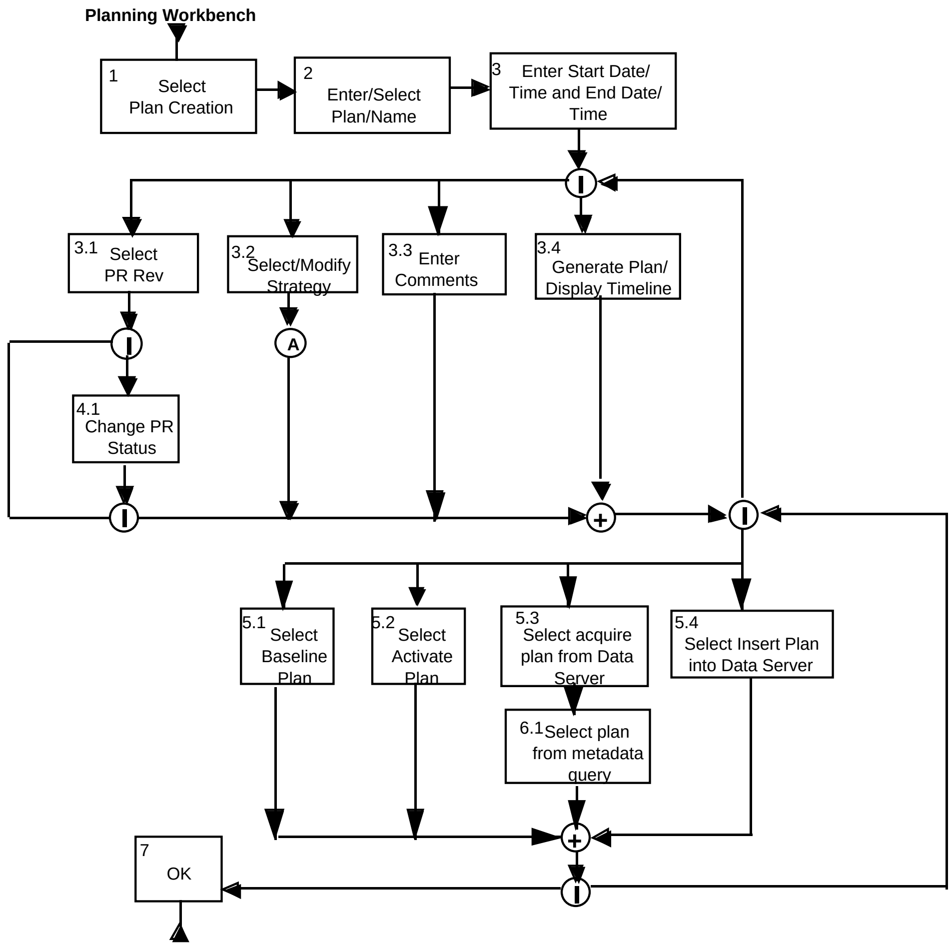


Figure 3.2.7.8-1. Generate/Validate Production Plan Workflow

Data Activity

Table 3.2.7.8-1. Data Activity for Generate/Validate Production Plan

Object Name	Data Element	Activity													
		1	2	3	3.1	3.2	3.3	3.4	4.1	5.1	5.2	5.3	5.4	6.1	7
PlPlan	Plan Name		E/I												D
	Start Date/Time			E											
	End Date/Time			E											
	Comment						E	E							
	Log									D				D	
	Directory Path														
	Start Date/Time Insert Subset												E/D		
	End Date/Time Insert Subset												E/D		
None	Find		I									I			
	Filter											D			
	Directories											I			
	Status	D							E						

3.2.7.9 Scenario Workflow ‘Production Planning Strategy’

The workflow that follows provides an example of Production Planning Strategy. The Production Planner may modify the priority/weight of request types, user groups, or PGE.

Workflow

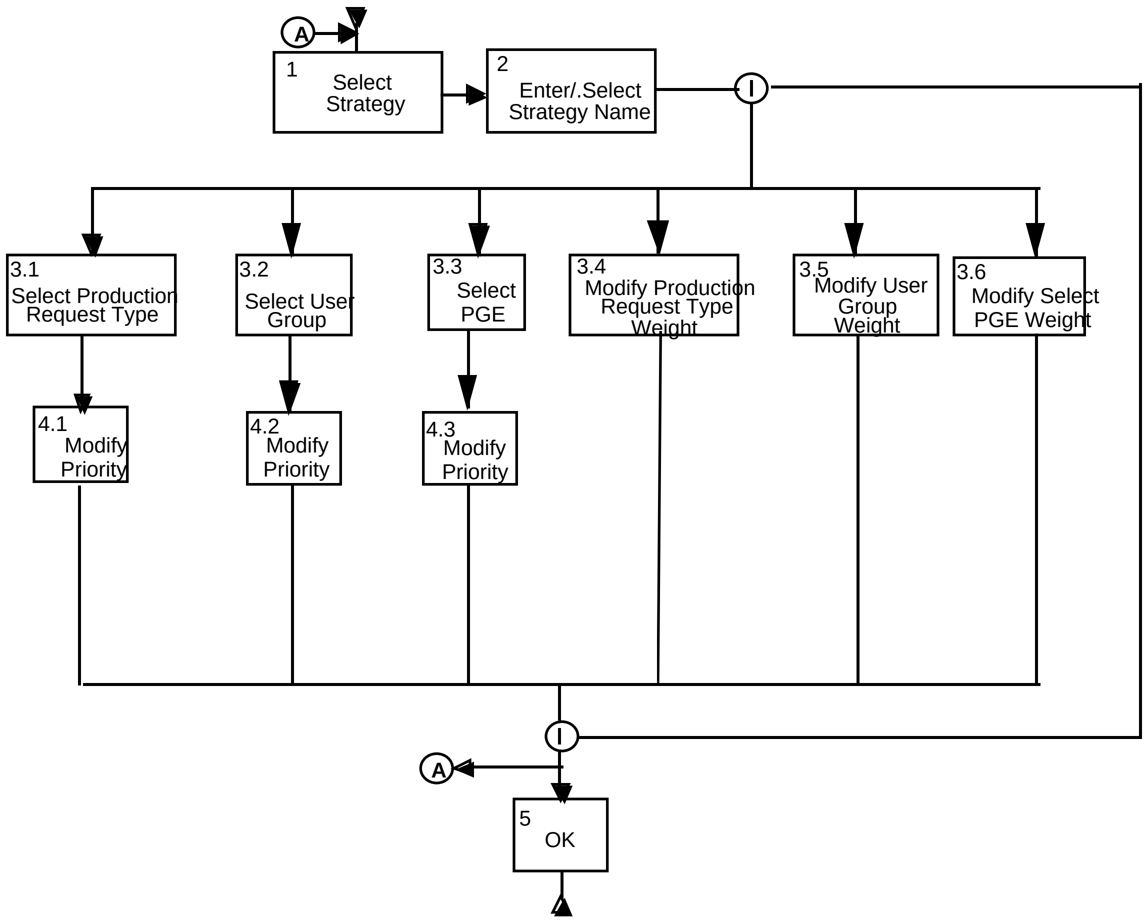


Figure 3.2.7.9-1. Production Planning Strategy Workflow

Data Activity

Table 3.2.7.9-1. Data Activity for Production Planning Strategy

Object Name	Data Element	Activity											
		1	2	3.1	3.2	3.3	3.4	3.5	3.6	4.1	4.2	4.3	5
PlPRPriority	PR Type Priority									E			
PlUserPriority	User Group Priority										E		
PlPGEPriority	PGE Priority											E	
PlProdStrat	PR Type Weight						E						
	User Group Weight							E					
	PGE Weight								E				
	Strategy Name		E/I										
PlProdStratUI	PR Type List			E									
	PGE List					E							
	User List				E								

3.2.7.10 Scenario Workflow 'Configuring Production Plan'

The workflow that follows provides an example of Configuring a Production Plan. Thresholds/toggles may be set for cumulative/ single On Demand requests.

Workflow

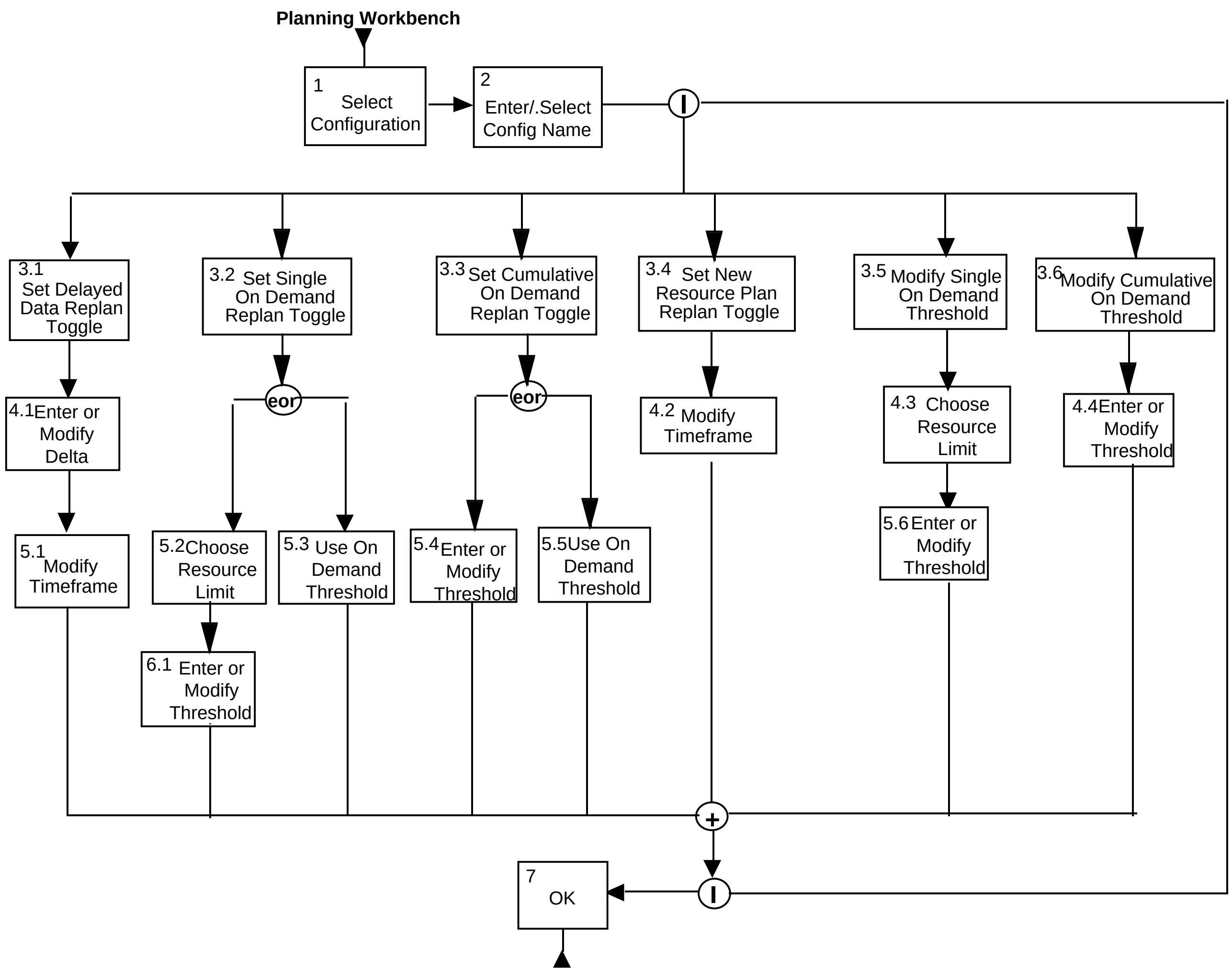


Figure 3.2.7.10-1. Configuring Production Plan Workflow

Data Activity

Table 3.2.7.10-1. Data Activity for Configuring Production Plan

Object Name	Data Element	Activity																			
		1	2	3.1	3.2	3.3	3.4	3.5	3.6	4.1	4.2	4.3	4.4	5.1	5.2	5.3	5.4	5.5	5.6	6.1	7
PlReplanCriteria	External Data AutoReplan Toggle			E																	
	Cumulative On-Demand AutoReplan Toggle					E															
	AutoReplan for Resource Plan Change Toggle						E														
	Single On-Demand AutoReplanToggle				E																
	Configuration Name		E																		
PlDASDelta	Data Type ID									E											
	AutoReplan Delta									E											
PlDASDifferent	External Data AutoReplan Timeframe													E							
PlOnDemandReplanValues	Single AutoReplan CPU Limit																			E	
	Single AutoReplan Disk Limit																			E	
	Single AutoReplan RAM Limit																			E	
	Cumulative AutoReplan CPU Limit																E				
	Cumulative AutoReplan Disk Limit																E				
	Cumulative AutoReplan RAM Limit																E				
PlResourceCharge	Resource Change AutoReplan Timeframe										E										
PlRescUseThresh	Individual On-Demand CPU Limit																		E		
	Individual On-Demand Disk Limit																		E		
	Individual On-Demand RAM limit																		E		
	Cumulative On-Demand CPU Limit												E								
	Cumulative On-Demand Disk Limit												E								
	Cumulative On-Demand RAM limit												E								

3.2.8 L0 & Ancillary Data Ingest

L0 data is received via the Earth Observing System (EOS) Data and Operations System (EDOS) from the EOS spacecraft, via the Sensor Data Processing Facility (SDPF), TRMM Science and Information System (TSDIS), and via the Landsat Processing System (LPS) for Landsat-7 (L0R) data. L0 data is also received from ACRIM, SAGE III, and SeaWinds. The SDPF and Landsat-7 interfaces are designed to provide data for ECS pick-up within a specified time window after notification of data availability. ECS coordinates data transfer, and performs file transfers when ECS resources are available. EDOS will initiate a communications protocol to ECS to start transfer of files.

Ancillary data includes data from sources other than the Mission to Planet Earth (MTPE) instruments used in the processing of science products (e.g. platform ancillary data, digital elevation models, meteorological forecast data, etc.). The ancillary data will be acquired from several sources and will in general require quality assurance (QA) checks and in some cases preprocessing before archiving. Figure 3.2.8-1 depicts the context in which L0 and ancillary data are ingested.

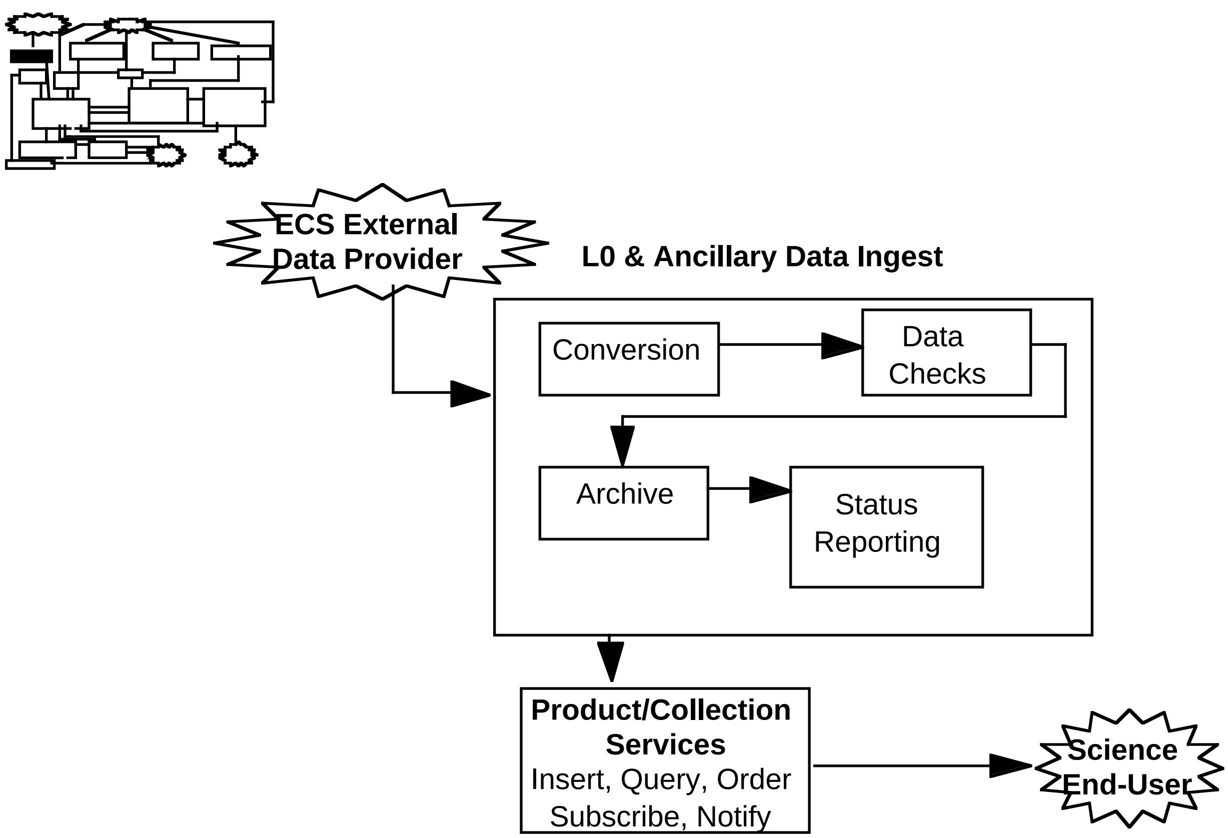


Figure 3.2.8-1. L0 & Ancillary Data Ingest Context Diagram

3.2.8.1 Description

This L0 and ancillary data ingest scenario describes the automated ingest of data to ECS from external data providers which will be accomplished without direct operator interaction. This scenario includes data transfer to the Ingest subsystem, preprocessing, and storage in the appropriate data server where it will be accessible by the Processing subsystem for data which must be processed to higher levels. Data transfer is accomplished by one of three means-- file transfer protocol (ftp) "get", ftp "put", or hard media data transfer. Ftp get involves ECS getting data from an external data provider. Ftp put involves an external data provider putting data into ECS. Hard media data transfer involves data transfer from one of several ingest peripheral types found at a DAAC. Preprocessing includes extraction of metadata, conversion of metadata into a standard ECS format, metadata range/field checking, and converting/reformatting L0 and ancillary data. Figure 3.2.8.1-1 depicts the functional flow of L0 and ancillary data ingest.

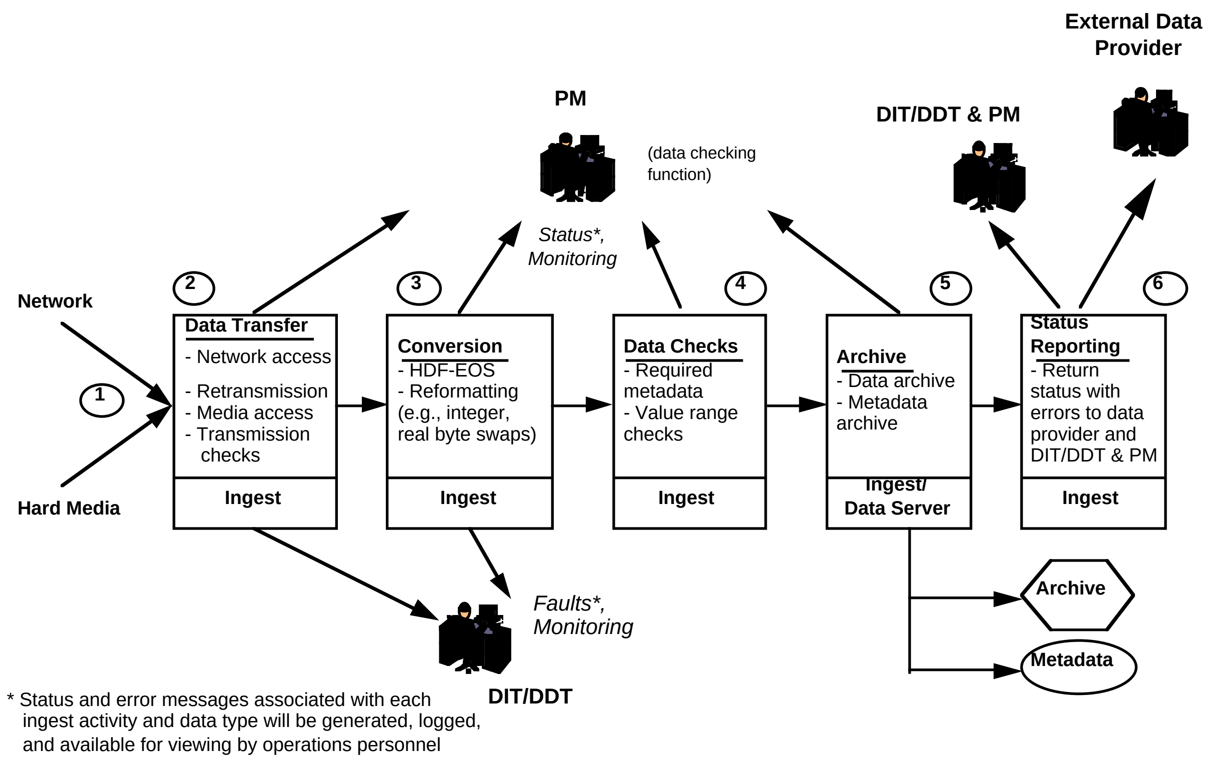


Figure 3.2.8.1-1. L0 & Ancillary Data Ingest Functional Flow

3.2.8.2 Operator Roles

The DAAC Ingest/Distribution Technician (DIT/DDT) and the DAAC Production Monitor(PM) will monitor the ingestion, preprocessing, and storage of L0 and ancillary data via a graphical user interface (GUI) provided by the Ingest subsystem.

The PM will use the MSS Event Log Browser GUI to monitor the quality and completeness of the L0 and ancillary data input.

The DIT/DDT will use the Ingest Status Monitor/Request Control GUI to control ongoing Ingest request processing and to monitor ingest problems. The DIT/DDT will receive, log, and mark all physical media for processing and storage, and coordinate with the sender to resolve any ingest problems.

Reporting of the receipt and status of ingest processing will be obtained via the Ingest Status Monitor/Request Control GUI.

3.2.8.3 Detailed Points of View

The L0 & Ancillary Data Ingest points of view diagram shown in Figure 3.2.8.3-1 detail the steps that are taken when ingested L0 and ancillary data from an electronic media.

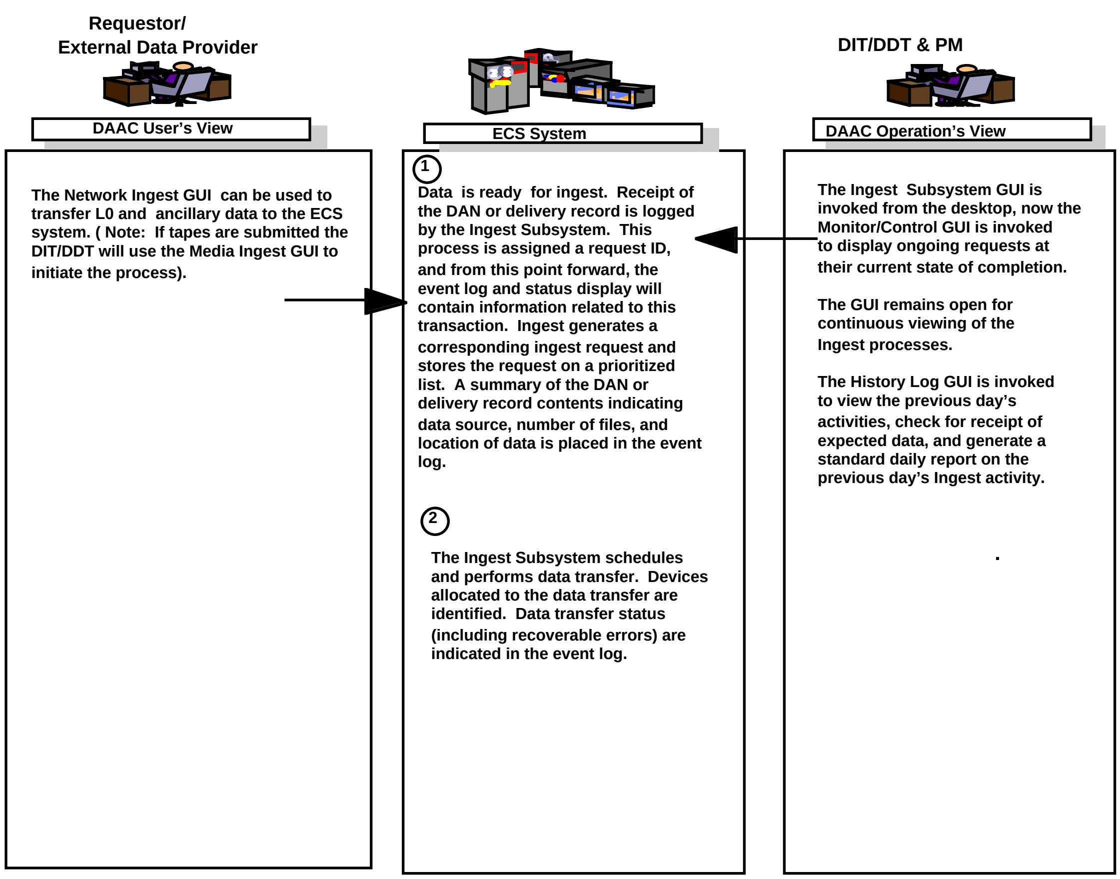


Figure 3.2.8.3-1. L0 & Ancillary Data Ingest Points of View (1 of 2)

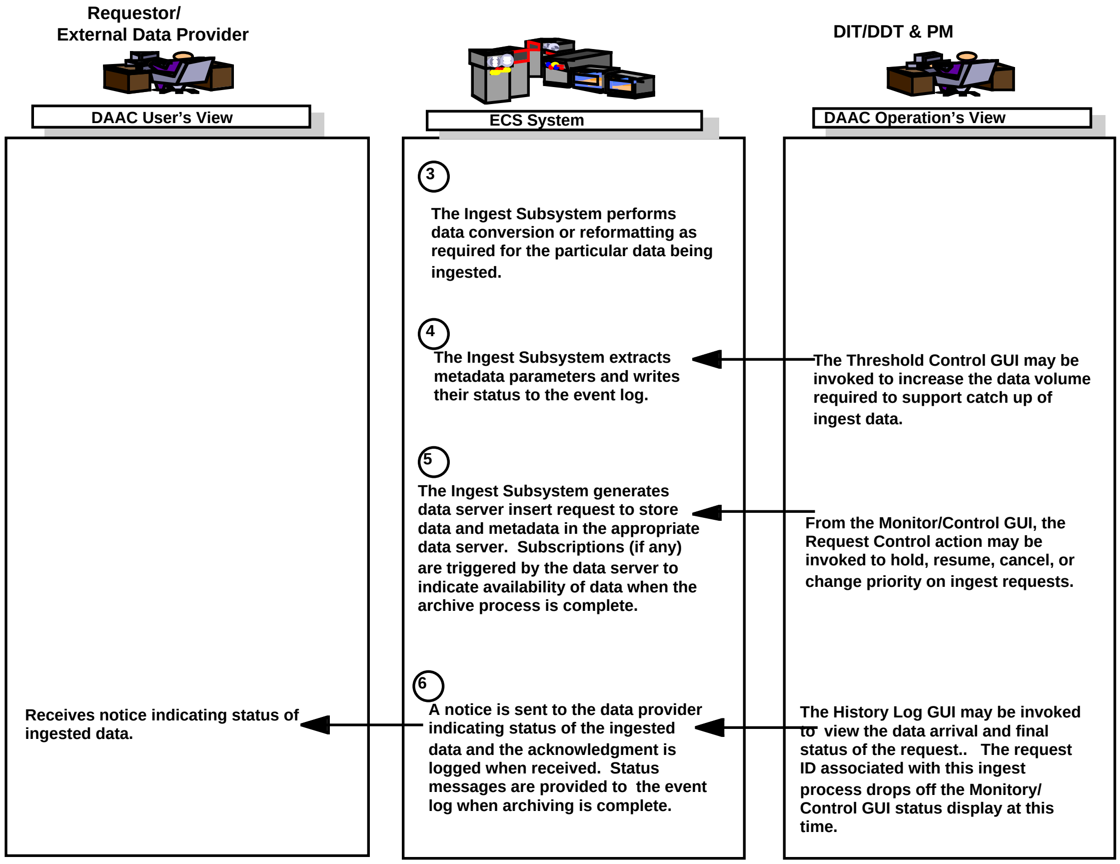


Figure 3.2.8.3-1. L0 & Ancillary Data Ingest Points of View (2 of 2)

3.2.8.4 User Network Ingest Workflow

The User Network Ingest GUI provides authorized science users the capability to ingest data electronically. This workflow shows the steps that an external data provider would take when accessing the user network ingest GUI. A user session will be configured on the User's GUI interface to accept the request from the user via the GUI and submit the request to the ECS system for data ingest. Figure 3.2.8.4-1 depicts the steps involved in the user network ingest interface.

Workflow

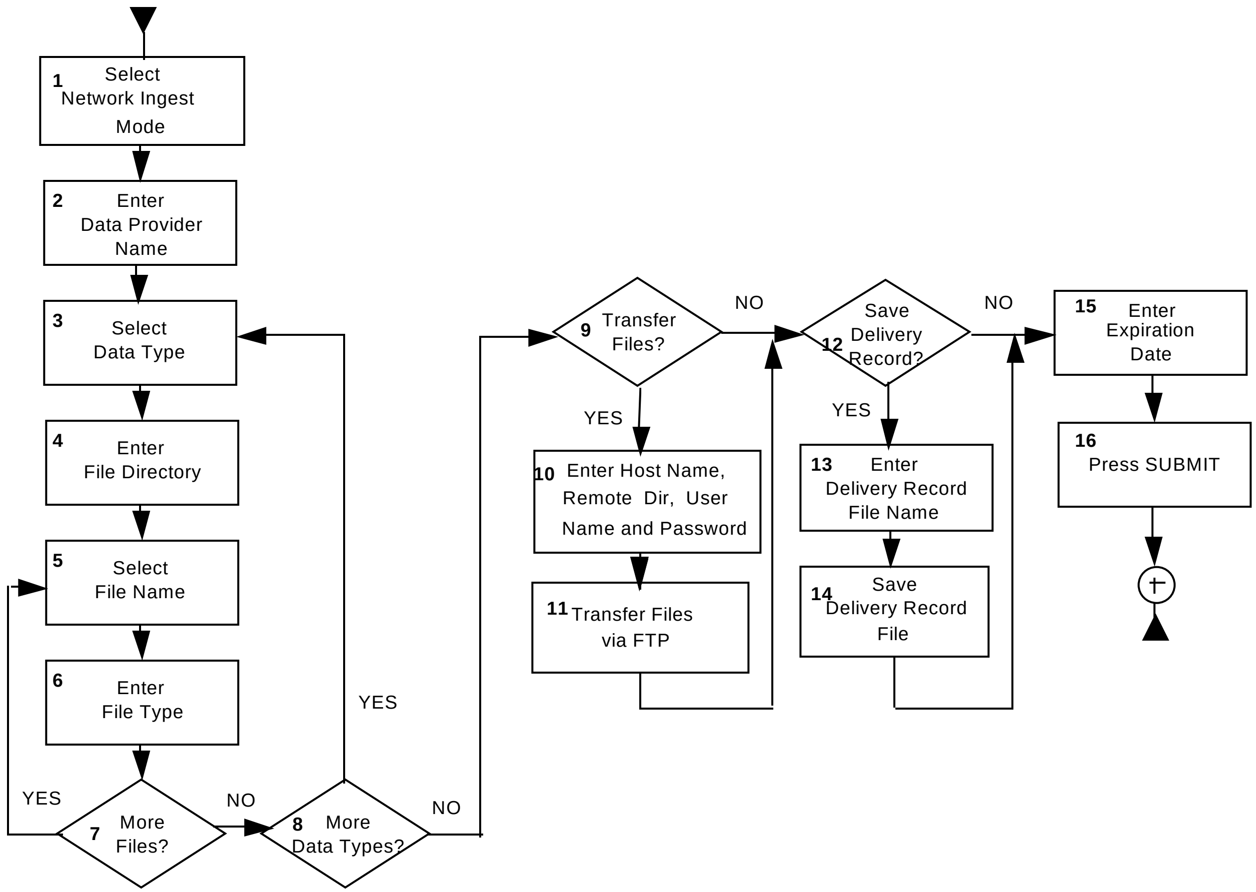


Figure 3.2.8.4-1. User Network Ingest Workflow

Data Activity

Table 3.2.8.4-1. Data Activity for User Network Ingest

Object Name	Data Element	Activity															
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
InGUISession	Network Ingest Option	I															
InNetworkIngest	Data Provider Name		I														
	Data Type			I													
	File Directory				I												
	File Name					I											
	File Type						I										
	More Files							I									
	More Data Types								I								
	Transfer Files									I							
	ECS Directory										I						
	Transfer Files Via FTP											I					
	Save Delivery Record												I				
	Delivery Record File Name													I			
	Save Delivery Record File														I		
	Expiration Date															E	
InRequest	Submit Request																I

3.2.8.5 Ingest Status Monitoring Workflow

The Ingest Status Monitoring GUI provides operations personnel with the capability to monitor the status of the ingest requests that are in progress. This workflow shows the steps that an operator would take to monitor the status of the ingest requests that are in progress. The operator has the capability to look at the status of all requests or at only specific requests based on request ID or external data provider. Figure 3.2.8.5-1 depicts the steps involved in the monitoring of ingest status.

Workflow

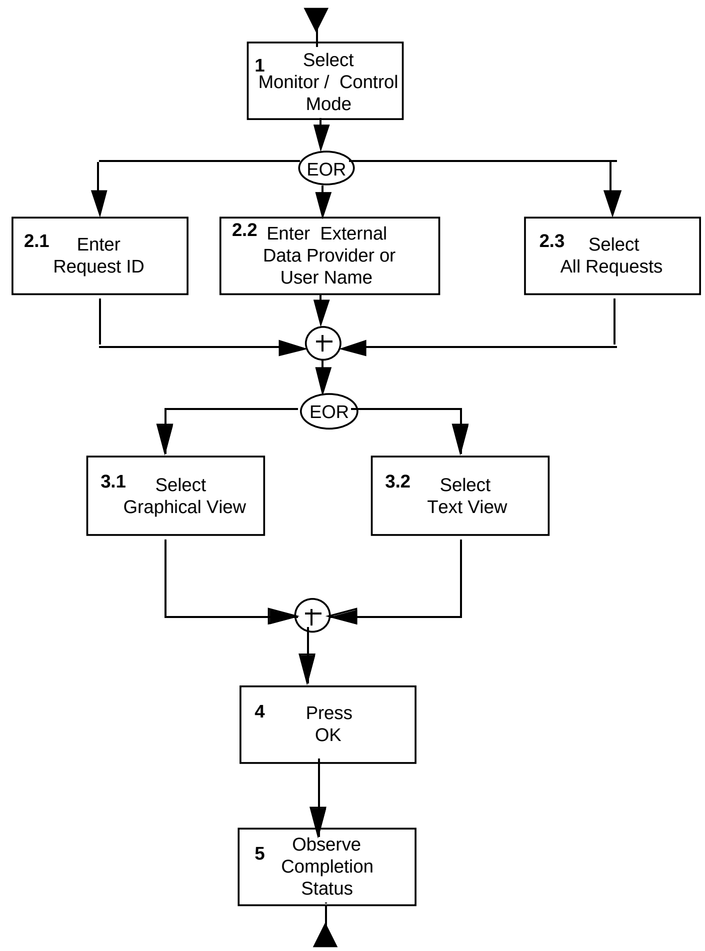


Figure 3.2.8.5-1. Ingest Status Monitoring Workflow

Data Activity

Table 3.2.8.5-1. Data Activity for Ingest Status Monitoring

Object Name	Data Element	Activity							
		1	2.1	2.2	2.3	3.1	3.2	4	5
InGUISession	Monitor/Control Option	I							
InStatusMonitor	All Request				I				
	Text View						I		
	External Data Provider/User Name			E					
	Graphical View					I			
	Press OK							I	
InRequest	Request ID		I						D
	Processing Since								D
	Percent Complete								D

3.2.8.6 Ingest History Log Viewing Workflow

The Ingest History Log Viewing GUI provides operations personnel with the capability to view the Ingest history log, a log that contains the results of all the past ECS ingest requests. This workflow shows the steps that an operator would take to view the ingest history log. The operations personnel have the capability to specify the search criteria, the data provider name, data type, and final request status of the ingest history log for display. Figure 3.2.8.6-1 depicts the steps for ingest history log viewing.

Workflow

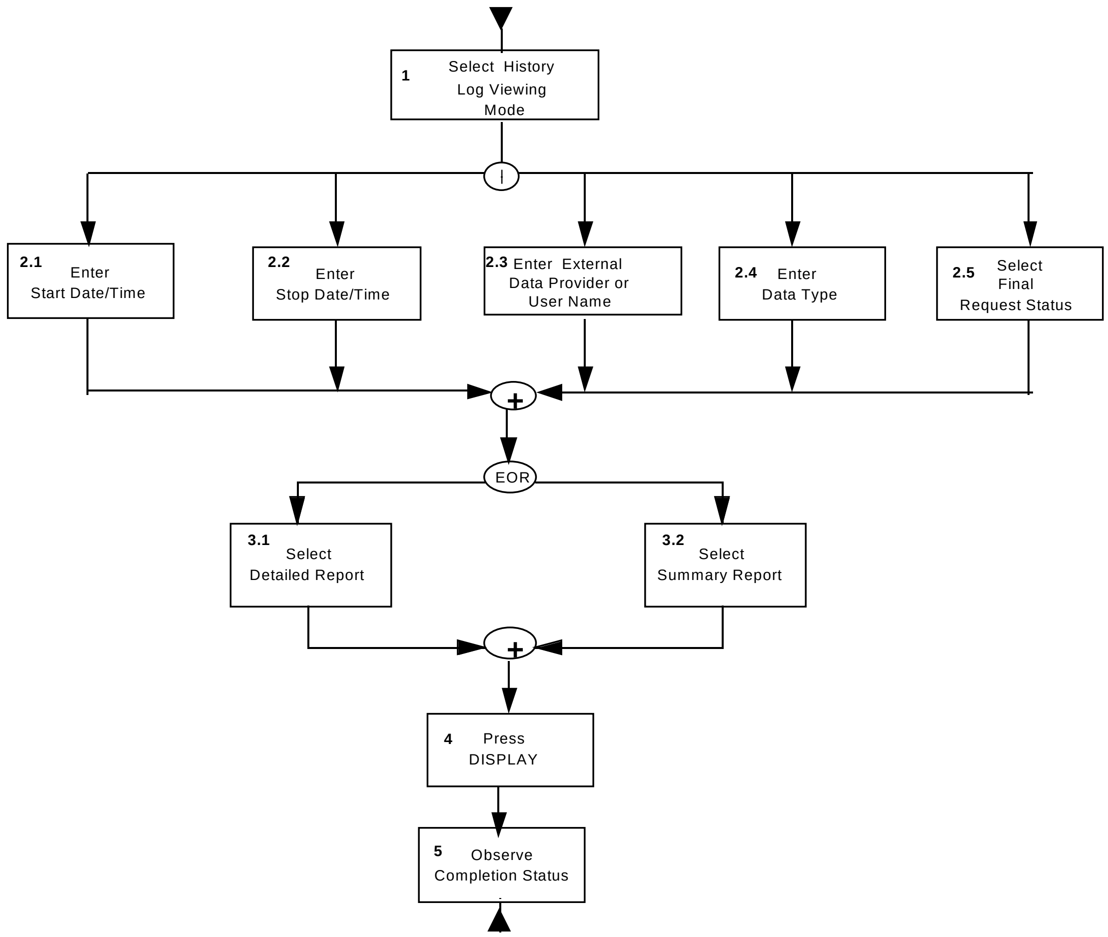


Figure 3.2.8.6-1. Ingest History Log Viewing Workflow

Data Activity

Table 3.2.8.6-1. Data Activity for Ingest History Log Viewing

Object Name	Data Element	Activity									
		1	2.1	2.2	2.3	2.4	2.5	3.1	3.2	4	5
InGUISession	History Log Option	I									
InLogMonitor	Start Date/Time		E								
	Stop Date/Time			E							
	External Data Provider				E						
	Data Type					I					
	Final Request Status						I				
	Detailed Report							I			
	Summary Report								I		
	Press DISPLAY									I	
InHistoryLog	Request ID										D
	External Data Provider										D
	Processing Start Date/Time										D
	Processing End Date/Time										D
	Number of Data Volume Ingested										D
	Number of Granules/ Datasets Ingested										D
	Number of Files Ingested										D

3.2.8.7 Ingest Threshold Control Workflow

The Ingest Threshold Control GUI provides operations personnel with the capability to view and update the values of ingest thresholds. The ingest threshold consist of the number of ingest requests to be processed concurrently, maximum data volume to be ingested concurrently, and the number of data transfer retry attempts. This workflow shows the steps that an operator would take to change the data volume for the system or for an external data provider. Figure 3.2.8.7-1 depicts the steps for ingest threshold control.

Workflow

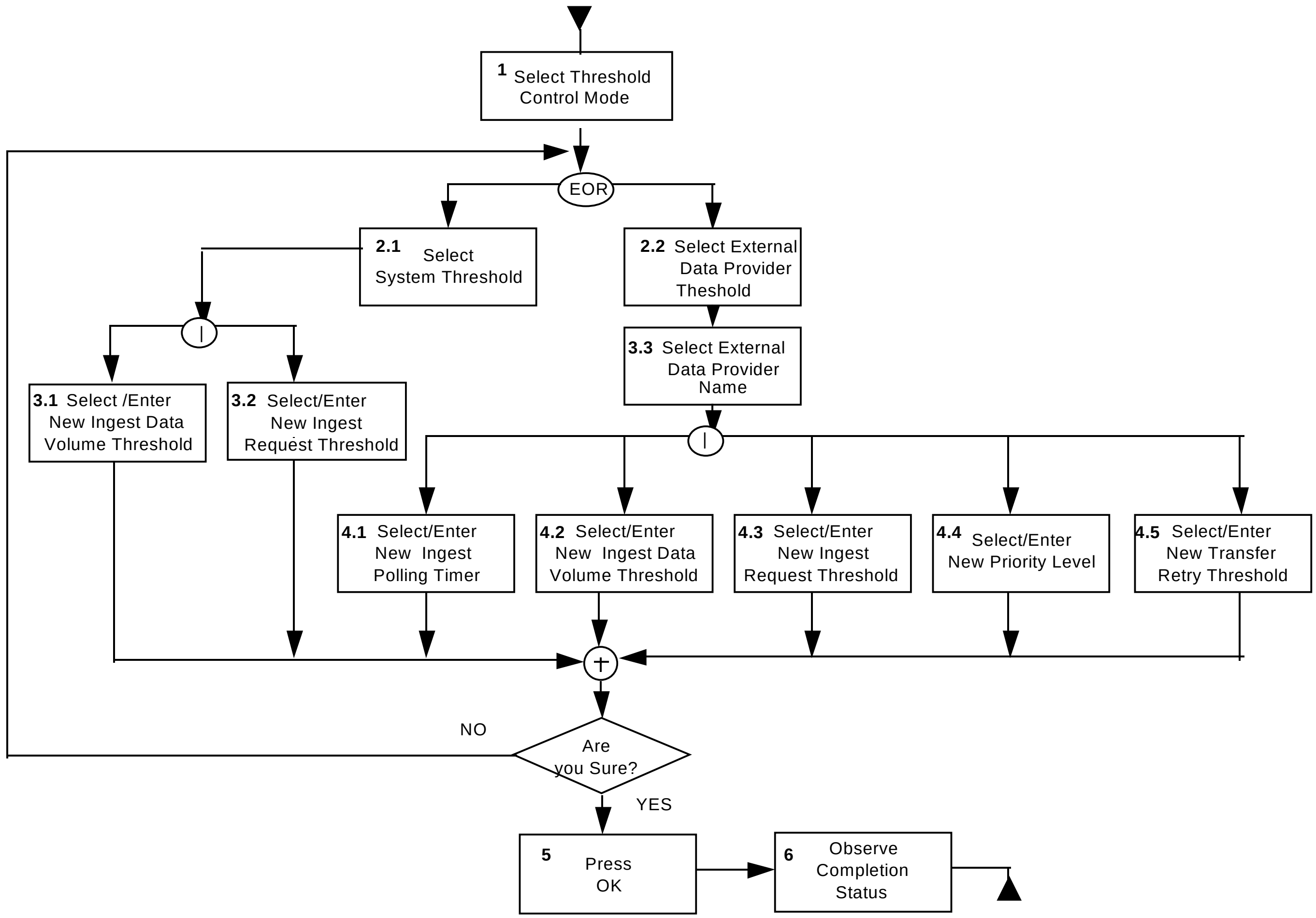


Figure 3.2.8.7-1. Ingest Threshold Control Workflow

Data Activity

Table 3.2.8.7-1. Data Activity for Ingest Threshold Control

Object Name	Data Element	Activity												
		1	2.1	2.2	3.1	3.2	3.3	4.1	4.2	4.3	4.4	4.5	5	6
InGUISession	Threshold Control Option	I												
InSystemThreshold	System Threshold		I											
	External Data Provider Threshold			I										
	Ingest Data Volume Threshold				E									
	Ingest Request Threshold					I								
	External Data Provider Name						I							
	Ingest Polling Timer							I						
	Ingest Data Volume Threshold								I					
	Ingest Request Threshold									I				
	Priority Level										I			
	Transfer Retry Threshold											I		
	Press OK												I	
	Completion Status													D

3.2.8.8 Ingest Request Control Workflow

The Ingest Request Control GUI provides operations personnel with the capability to update an on-going ingest request. The update includes hold, resume, cancel, an change priority. This workflow shows the steps that an operator would take to change the priority on an on-going request. Figure 3.2.8.8-1 depicts the steps for control of ingest requests.

Workflow

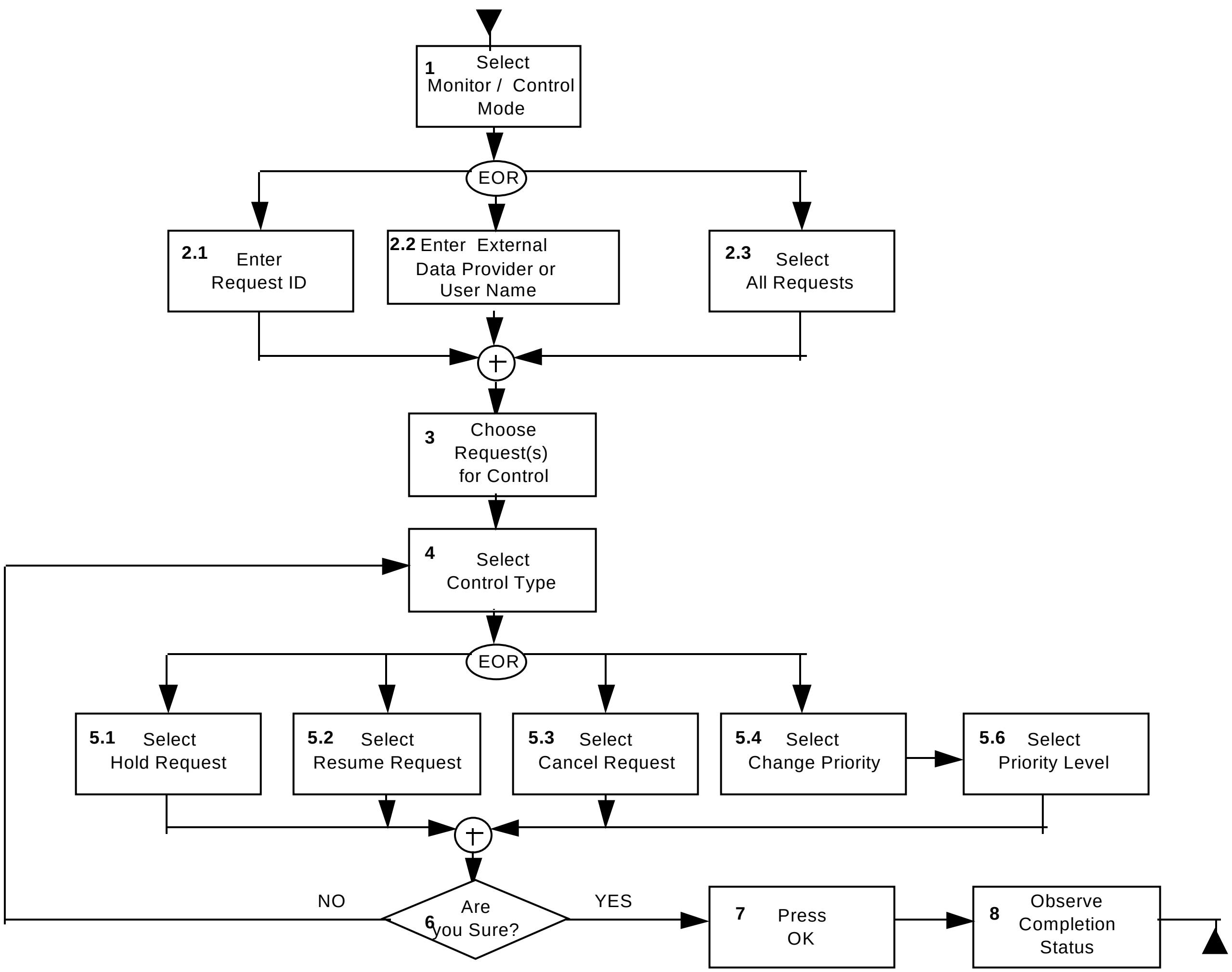


Figure 3.2.8.8-1. Ingest Request Control Workflow

Data Activity

Table 3.2.8.8-1. Data Activity for Ingest Request Control

Object Name	Data Element	Activity														
		1	2.1	2.2	2.3	3	4	5.1	5.2	5.3	5.4	5.5	5.6	6	7	8
InGUISession	Monitor/Control Option	I														
InRequestController	Request ID		I			D										
	External Data Provider			E												
	All Request				I											
	Control Type List						I									
	Hold Request							E								
	Resume Request								E							
	Cancel Request									E						
	Change Priority										E					
	Priority Level											E				
	Priority Level												I			
	Confirmation													I		
	Press OK														I	
	Completion Status															D

3.2.9 Standard Processing

Processing is responsible for initiating, managing, and monitoring of the generation of data products. A data product is generated through the execution of PGEs which are provided by the instrument teams. Processing supports the execution of a PGE by performing the following activities :

- Supports operations staff interfaces to monitor the processing environment.
- Interfaces with the Data Server Subsystem to stage data required by a PGE for execution.
- Allocates hardware resources, i.e. CPU, memory, and disk space, required by the PGE for execution.
- Interfaces with the Data Server Subsystem to destage the data generated by the execution of the PGE.

A request to generate an ECS data product is received from Planning in the form of a data processing request. A data processing request contains the information, such as input data identification, output data identification, priority, hardware resources, and so on, that Processing needs to execute the PGE. Generally, a processing job is related to the generation of Data Products, but these jobs may include other types of processing, such as pre-processing of input data, quality assurance processing of generated Data Products, and possibly resource maintenance.

During PGE execution, Processing monitors the execution of the PGE and informs the operations staff and Planning of current status. Status may include current processing event history (what is happening, i. e. data staging, execution). Also, monitoring will be needed to make sure that the processing activity is executing properly. Upon completion of the execution of a PGE, Processing informs Planning and initiates the transfer of the generated data product (if necessary) to the Data Server Subsystem.

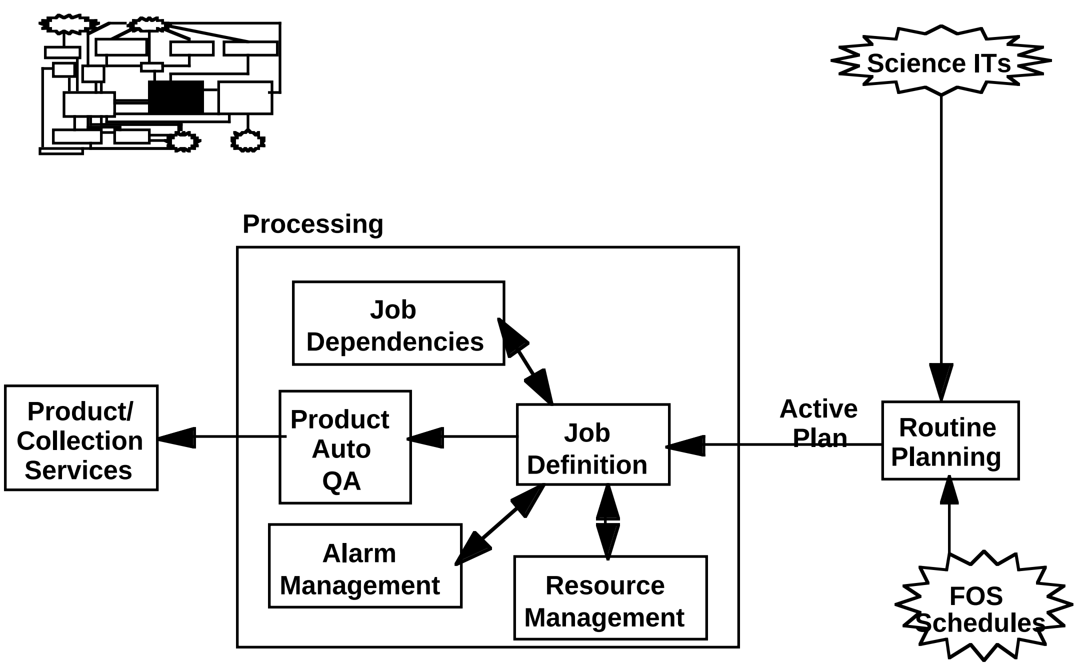


Figure 3.2.9-1. Standard Processing Context Diagram

3.2.9.1 Standard Processing Description

For this scenario, production processing is expected to be a routine event. The actors in this scenario are the Production Monitor and ECS System. The Production Monitor will monitor the daily production schedule at the beginning of each shift and periodically throughout the day. In the normal case, the Production Monitor only interacts with the system at the beginning of the day and when jobs fail. The loading of a days jobs will occur once in each twenty seven hour period. The activation of the daily production schedule is performed by the Production Monitor and submitted to Autosys.

The Autosys software is a production scheduling tool intended to support the operational activities surrounding production processing. It provides job monitoring, scheduling, fault notification and restart capabilities. It does not perform any planning activities, however it assists the Monitor in determining the effects of failure of a DPR and in determining the cause and actions to be taken due to the failure.

Production processing job modifications are expected to be non routine events. It is expected that a majority of PGEs will not require changes. However the ECS allows the Production Monitor to modify job parameters, such as priority, any time prior to PGE execution. This allows flexibility in unforeseen and unusual circumstances. These circumstances included but are not limited to: equipment failures, emergency or high priority processing, delayed input data, PGEs with data product dependent components that effect PGE run time (e.g., the PGE runs long or short when clouds are encountered, PGEs with geolocation dependent processing, unexpectedly high On-Demand processing loads. The job modification rate is expected to be very low, well under 5%. The On-Demand scenario is covered in Section 3.2.10 and Ad Hoc Production is covered in Section 3.2.6.

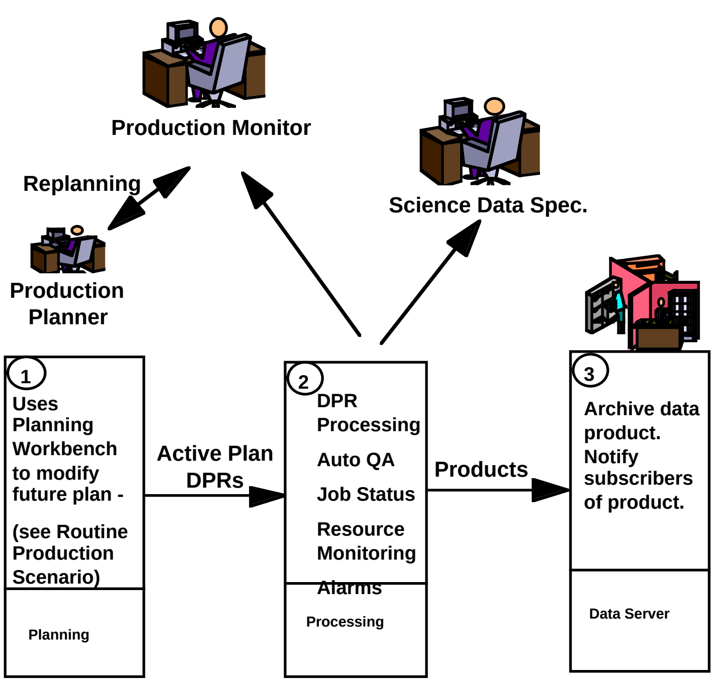


Figure 3.2.9.1-1. Standard Processing Functional Flow

3.2.9.2 Standard Processing Operator Roles

Production Planner - "Downloads" the daily schedule of jobs to the Autosys scheduling tool.

Production Monitor - Monitor the daily production schedule at the beginning of each shift and periodically throughout the day. Reviews "actual" vs "planned" objectives and coordinates the replanning of jobs.

Science Data Specialist - Uses ECS Visualization tools to perform an operational QA of the products in consultation with the Instrument Teams.

3.2.9.3 Detailed Points of View

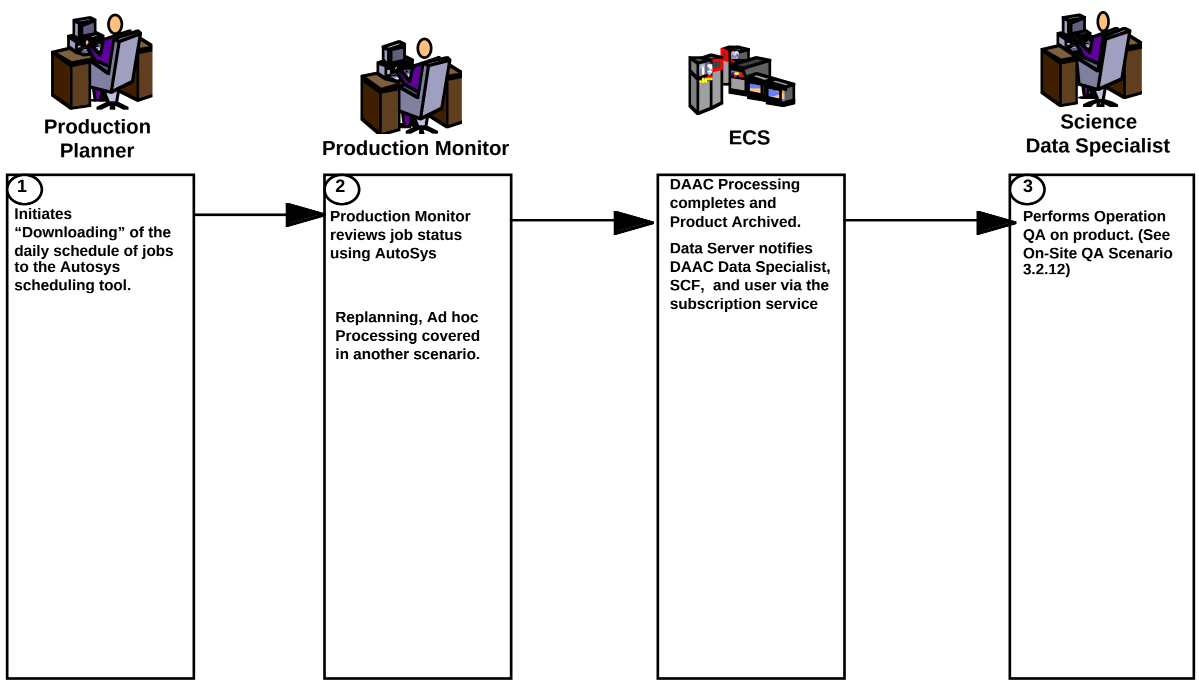


Figure 3.2.9.3-1. Detailed Points of View

3.2.9.4 Standard Processing Work Flow "Change Job States"

The purpose of this workflow is to show the operator actions at the Job Activity Console used to change job the state of a specific job. The operator has the ability to start, kill, place the job "on ice" or on hold, or change the priority.

This section is continued on the next page.

Workflow

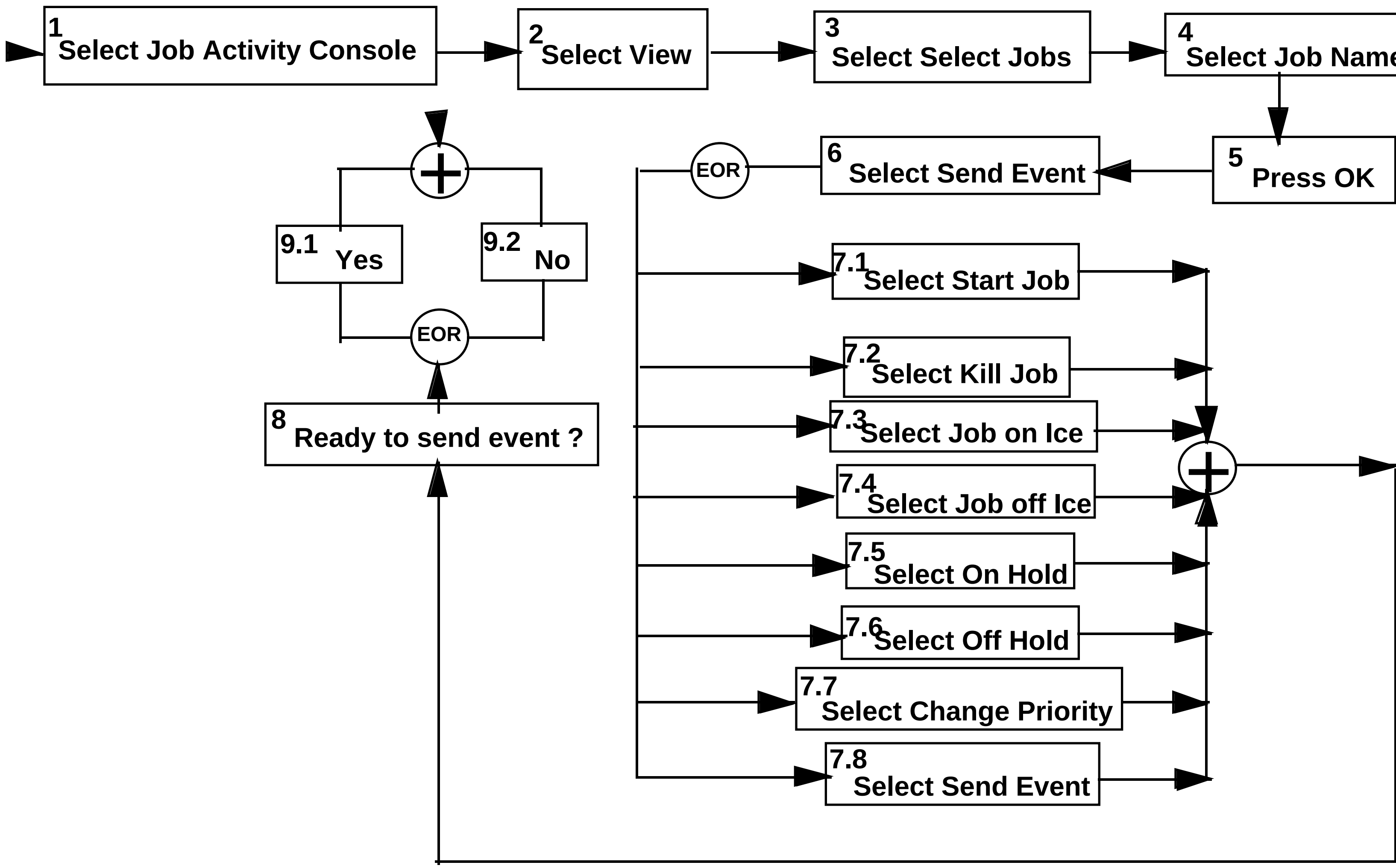


Figure 3.2.9.4-1. Change Job States Workflow

Data Activity

Table 3.2.9.4-1. Data Activity for Change Job States

Object Name	Data Element	Activity																
		1	2	3	4	5	6	7.1	7.2	7.3	7.4	7.5	7.6	7.7	7.8	8	9.1	9.2
AutoSys	Select View		D															
	Select Jobs			D														
	Select Job Name				I													
	OK																	
	Start Job							I										
	Kill Job								I									
	Job on Ice									I								
	Job off Ice										I							
	Job on Hold											I						
	Job off Hold												I					
	Change Priority													I				
	Send Event														I			

3.2.9.5 Standard Processing Work Flow "Delete Job"

The purpose of this workflow is to describe the AutoSys Job Definition display and the Job Definition Advanced Features displays.

Workflow

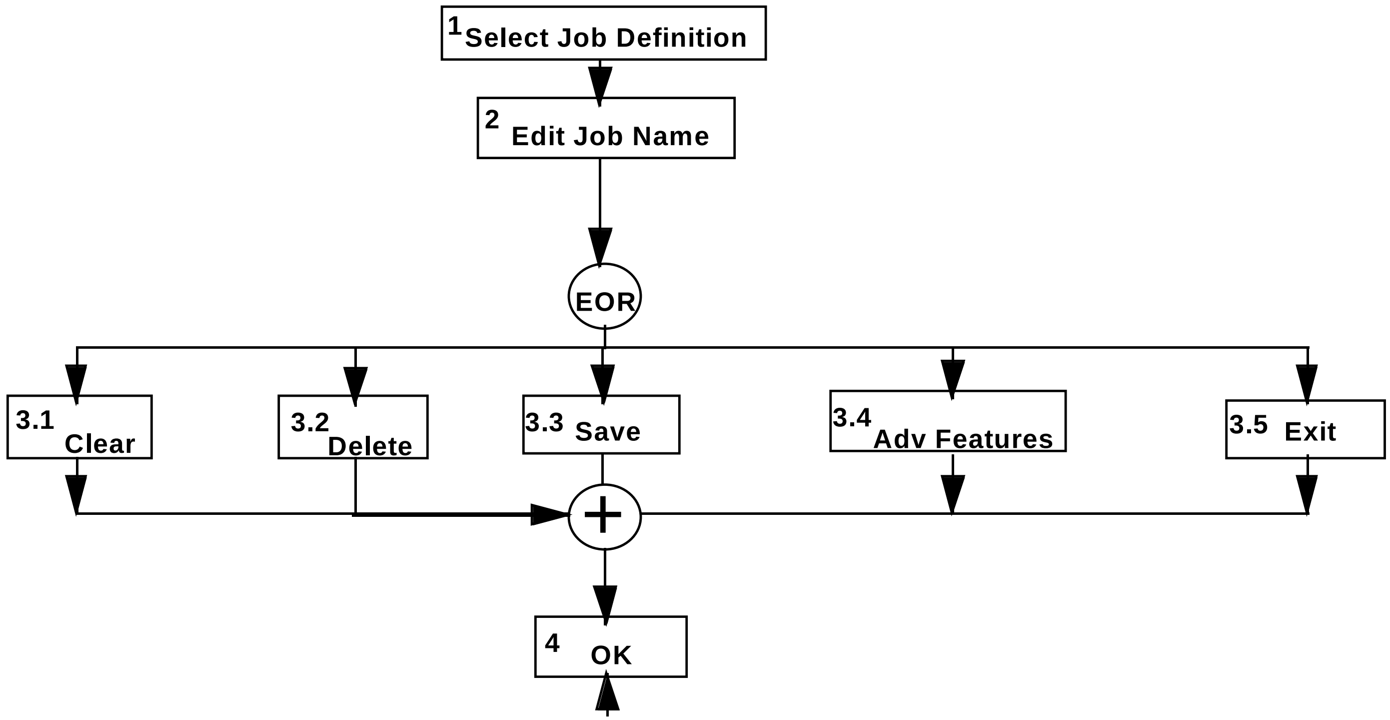


Figure 3.2.9.5-1. Delete Job Workflow

Data Activity

Table 3.2.9.5-1. Data Activity for Delete Job

Object Name	**Data Element**	**Activity**						
		1	2	3.1	3.2	3.4	3.5	4
AutoSys	Job Definition	I						
	Job Name		I					
	Clear			I				
	Delete				I			
	Save					I		
	Advanced Features						I	
	Exit							I

3.2.9.6 Standard Processing Work Flow "Alarm Status"

The purpose of this workflow is to describe the AutoSys Alarm Manager display features.

Workflow

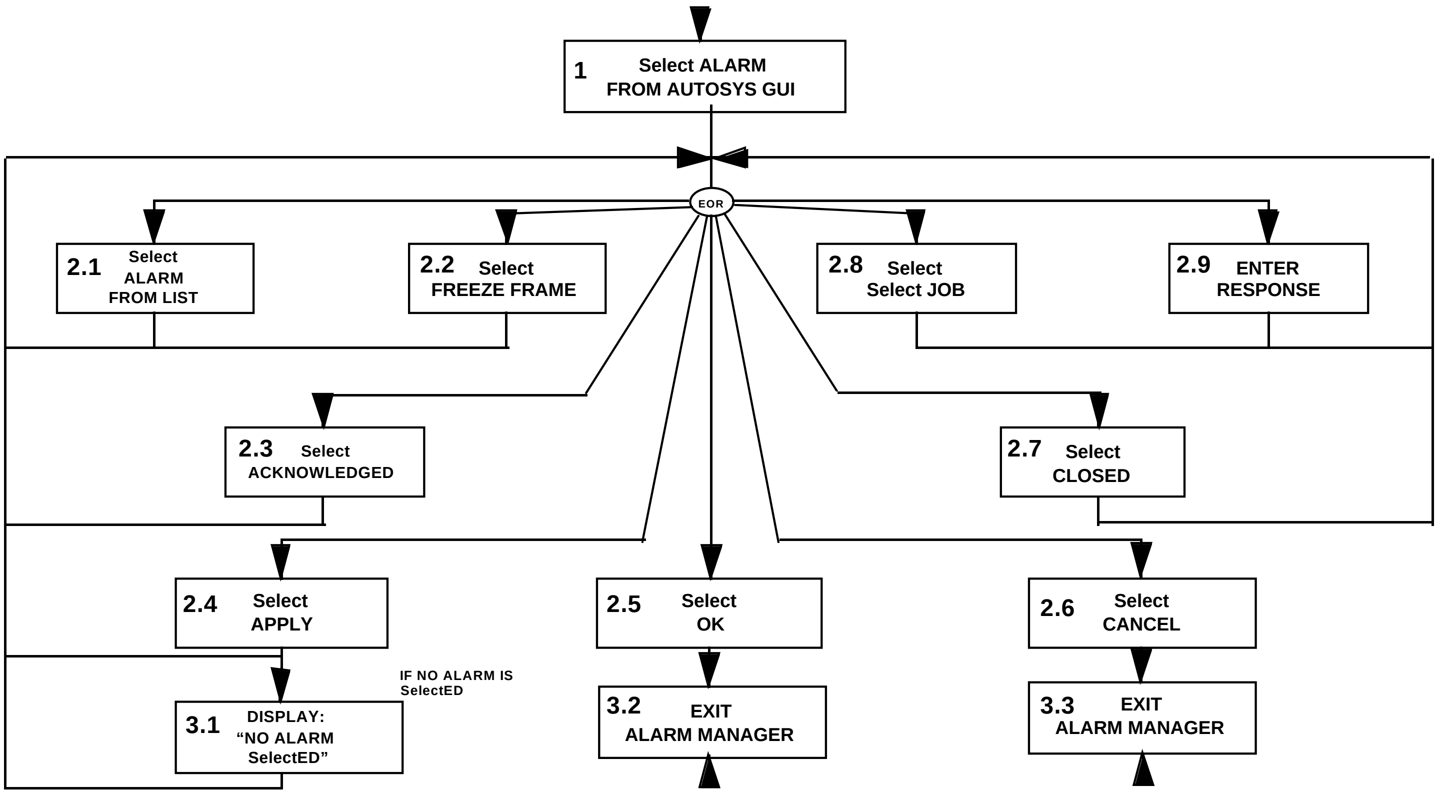


Figure 3.2.9.6-1. Alarm Status Workflow

Data Activity

Table 3.2.9.6-1. Data Activity for Alarm Status

Object Name	Data Element	Activity												
		1	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.1	3.2	3.3
AutoSys	Alarm list		D											
	Freeze Frame			I										
	Acknowledged				I									
	Apply					I								
	OK						I							
	Cancel							I						
	Closed								I					
	Select Job									I				
	Response										I			
	No Alarm											D		
	Exit												I	I

3.2.10 On-Demand Production

On-Demand Product Requests (OPR) begin when an OPR is received by planning from the Data Server. The OPR is broken up into individual runs of the PGE (Data Processing Requests or DPRs). The DPRs are compared to single/cumulative resource usage thresholds and single/cumulative replan thresholds. If the resources used by all the DPRs for the OPR are less than the threshold, these DPRs are sent directly to Processing. Otherwise the DPRs are deferred - that is, they wait in the Planning Database until an operator specifically adds them to a candidate plan and activates that plan. If the DPRs exceed the replan thresholds, the Production Planner is notified and is given the option to replan for the new DPRs.

The output data product(s) are then sent to the Data Server. OPRs would require no operator activity in the routine case when resource usage thresholds are not exceeded.

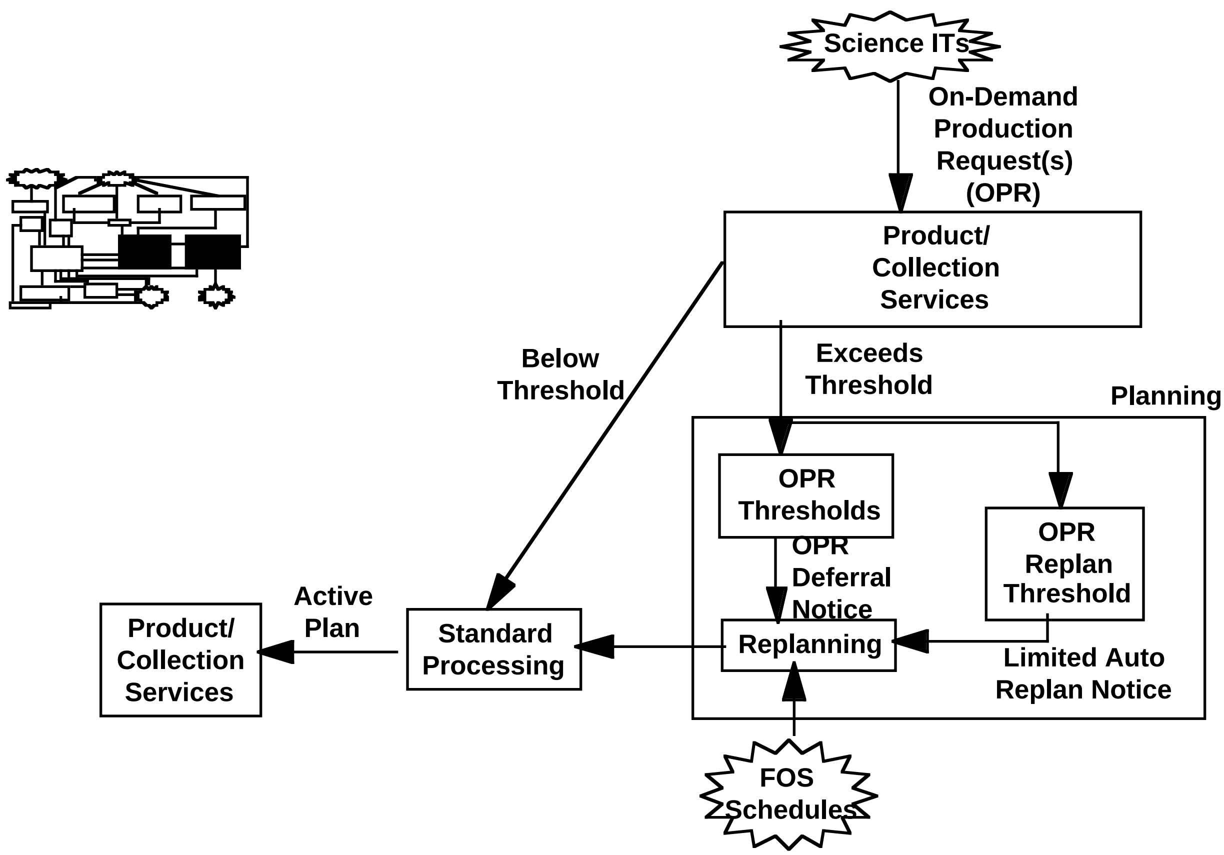


Figure 3.2.10-1. On-Demand Production Request Context Diagram

3.2.10.1 On-Demand Production Description

This scenario describes the processing of an OPR. The scenario begins when an OPR is received by planning from the Data Server. Internally, the OPR is automatically compared to resource usage/replanning thresholds.

In the case where an OPR(s) exceeds the current On-Demand thresholds, single or cumulative, the OPR(s) is automatically deferred, and is sent to planning for inclusion in subsequent plans. The operations staff is notified on the deferral and checks the status and resource usage information about the OPR(s). The operations staff also receives a Replan notice when the On-Demand Replan threshold is reached. The operations staff determines that a Replan is necessary to re-syncronize the plan. Replanning is performed and the plan activated. After activation, one job is determined to be a high priority job. The Production Monitor has the capability to modify the priority of a job and monitor the impact.

Where the OPR does not exceed thresholds, it will be automatically submitted to the Processing System. If it is determined that the OPR should be run immediately, i.e. "Hot Job", the Production Monitor is required to increase the priority of the job. The job is then executed on a priority basis. The output data product(s) are then sent to the Data Server.

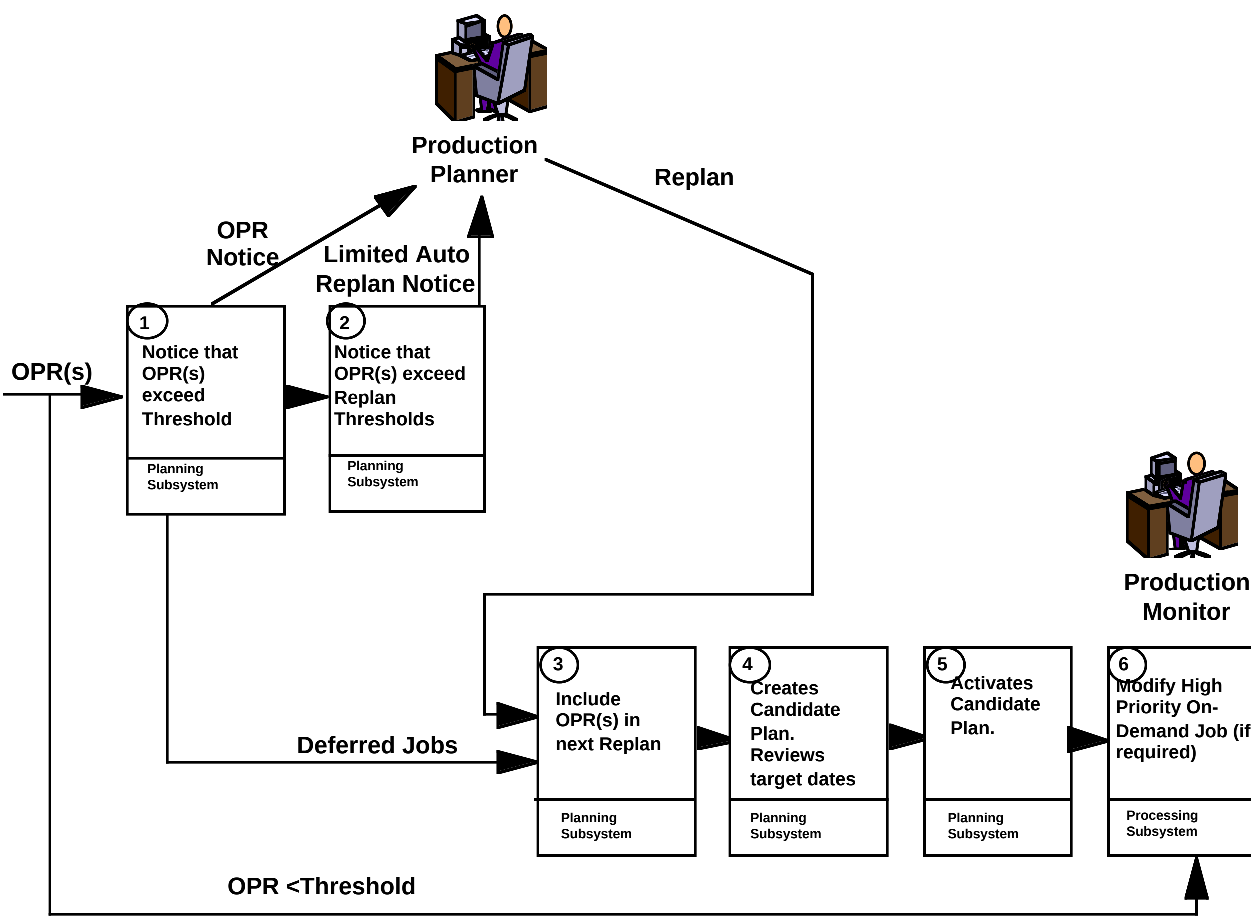


Figure 3.2.10.1-1. On-Demand Processing Functional Flow

3.2.10.2On-Demand Processing Operator Roles

Production Planner - Receives notification of OPR(s) that exceeds the acceptance criteria. Performs generation of system production schedules.

Production Monitor also receives notices of OPR's exceeding thresholds. The Production Monitor also has the ability to modify the thresholds to meet current processing needs, modify the prority of a OPR already submitted to production, or submit a job directly to production.

3.2.10.3On-Demand Production Points of View

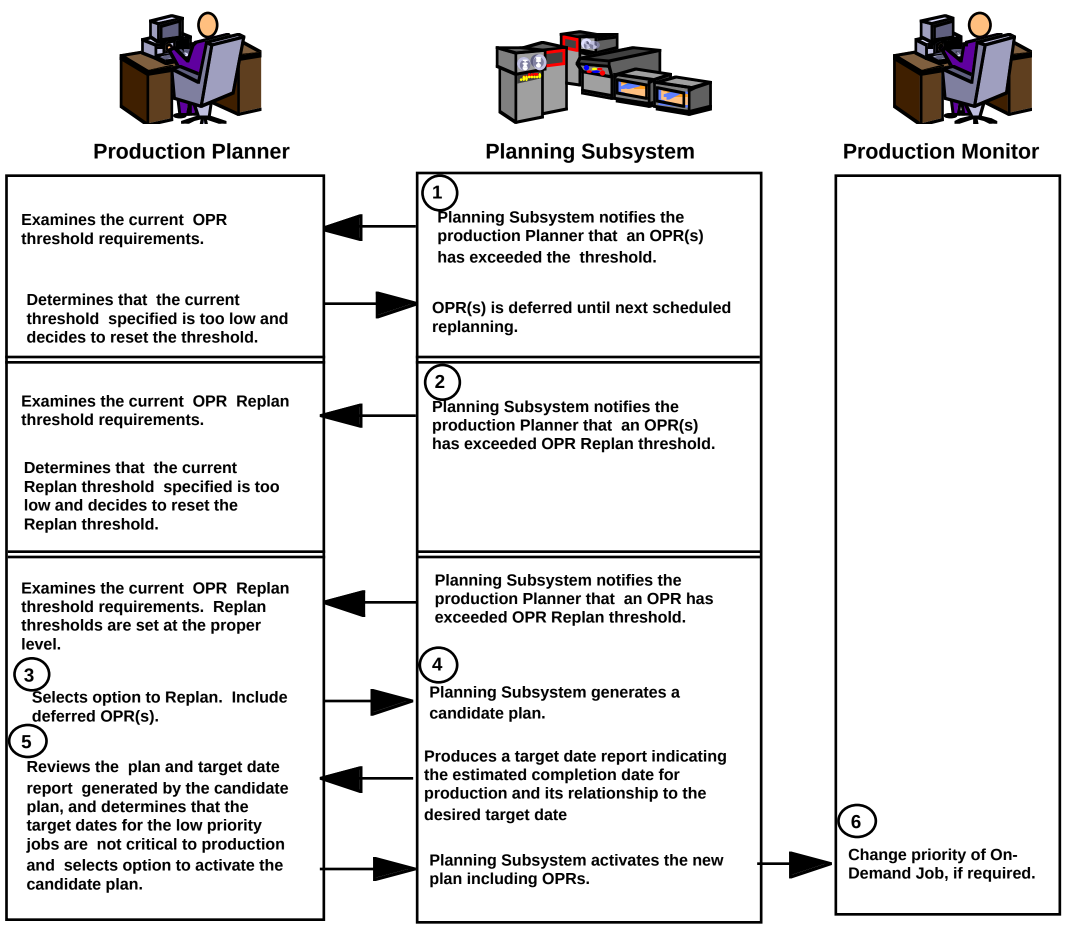


Figure 3.2.10.3-1. On-Demand Processing Points of View

3.2.10.4Work Flow Diagrams for On-Demand Processing

The purpose of this workflow is to provide an overview of the production planning steps required for On-Demand processing. This workflow only contains the flow for setting OPR thresholds. A complete detailed workflow is provided in Scenario 3.2.7 10 of Standard Planning.

This section is continued on the next page.

Workflow

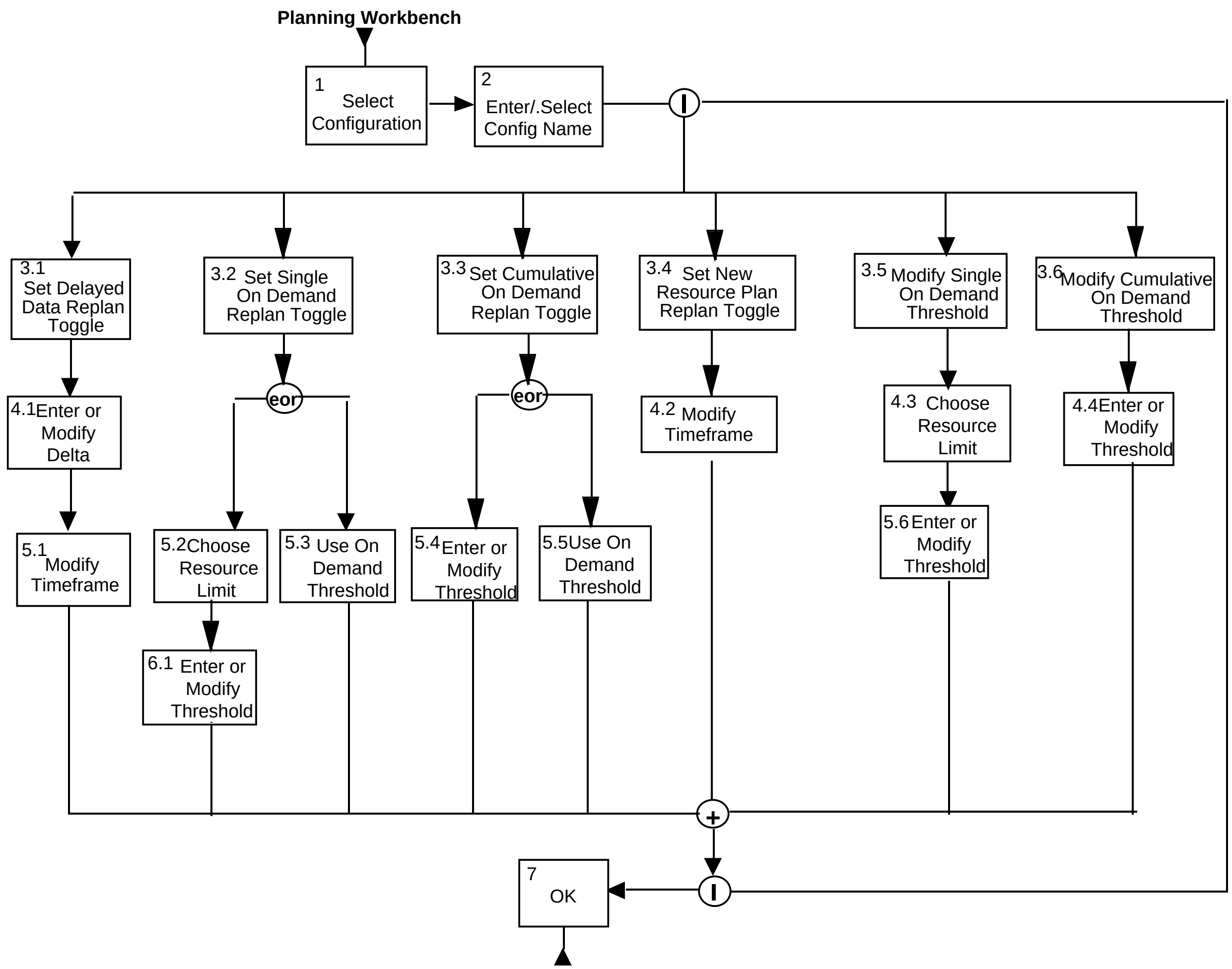


Figure 3.2.10.4-1. On-Demand Planning Workflow

Data Activity

Table 3.2.10.4-1. Data Activity for On-Demand Planning

Object Name	Data Element	Activity																			
		1	2	3.1	3.2	3.3	3.4	3.5	3.6	4.1	4.2	4.3	4.4	5.1	5.2	5.3	5.4	5.5	5.6	6.1	7
PlReplanCriteria	External Data AutoReplan Toggle			E																	
	Single On-Demand AutoReplanToggle				E																
	Cumulative On-Demand AutoReplan Toggle					E															
	AutoReplan for Resource Plan Change Toggle						E														
	Configuration Name		E																		
PlDASDelta	Data Type ID									E											
	AutoReplan Delta									E											
PlDASDifferent	External Data AutoReplan Timeframe													E							
PlOnDemandReplanValues	Single AutoReplan CPU Limit																			E	
	Single AutoReplan Disk Limit																			E	
	Single AutoReplan RAM Limit																			E	
	Cumulative AutoReplan CPU Limit																E				
	Cumulative AutoReplan Disk Limit																E				
	Cumulative AutoReplan RAM Limit																E				
PlResourceCharge	Resource Change AutoReplan Timeframe										E										
PlRescUseThresh	Individual On-Demand CPU Limit																		E		
	Individual On-Demand Disk Limit																		E		
	Individual On-Demand RAM limit																		E		
	Cumulative On-Demand CPU Limit												E								
	Cumulative On-Demand Disk Limit												E								
	Cumulative On-Demand RAM limit												E								

3.2.11 Software Run-time Error

This scenario describes the software capabilities that the Processing Subsystem will provide to enable the DAAC Production Monitor to respond to PGE errors. It also addresses the operational procedures and tools that DAAC personnel will use to respond to a PGE failure.

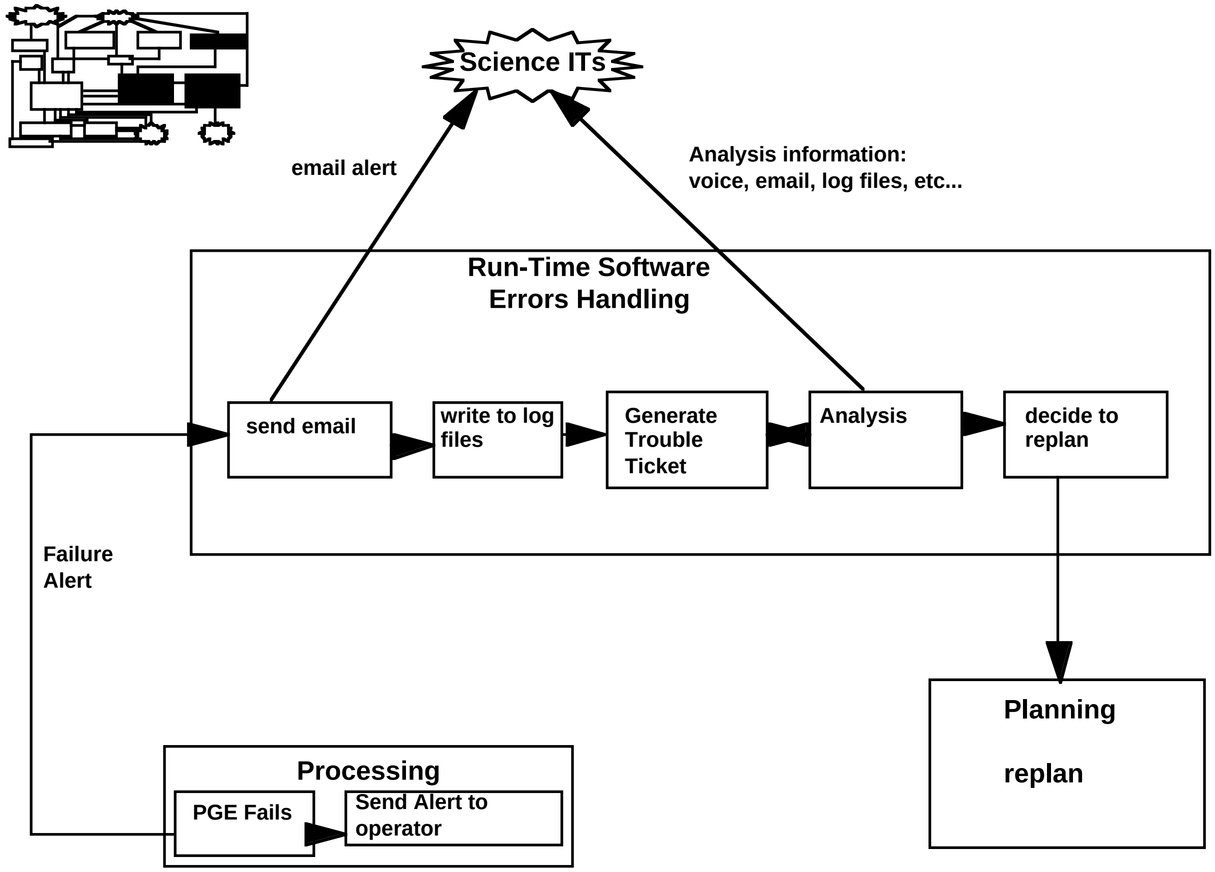


Figure 3.2.11-1. Software Run-time Error Context diagram

3.2.11.1Description

DAAC Production Monitor (PM) sees/hears AutoSys alarm. The PM uses the AutoSys alarm GUI to review the cause of the alarm by reading the message on the console and evaluates the nature of the problem. PM would then use the browser tool to get detailed information and once the problem is determined, the Data Specialist is consulted and may recommend (depending on the severity level) that the PGE be killed using a send event command if the job is still running. Once the alarm is acknowledged and attended to, the PM fills out a trouble ticket to record the event, cause and method of resolution. After the trouble ticket is completed, the alarm would be marked as Acknowledged. The Data Specialist would receive a copy of the trouble ticket review the situation and may contact the IT to follow up on PGE-generated Email and subscribed-to log files. Depending on the severity level, the Operations Supervisor may direct the Production Planner and PM to remove or put jobs on hold or on ice (won't run until starting conditions are reset).

- **Assumptions:**
  –The PGE has failed due to a problem within the PGE itself or because of a missing or faulty input file or because of a faulty Process Control File.
  –The PGE has not failed because of a DAAC resource or DAAC software problem. These scenarios involve MSS and Sustaining Engineer interventions outside of Production Processing.
  –An error log browsing tool will assist the Production Monitor (PM) to rapidly locate PGE-created error information written to the status, use and report log files.

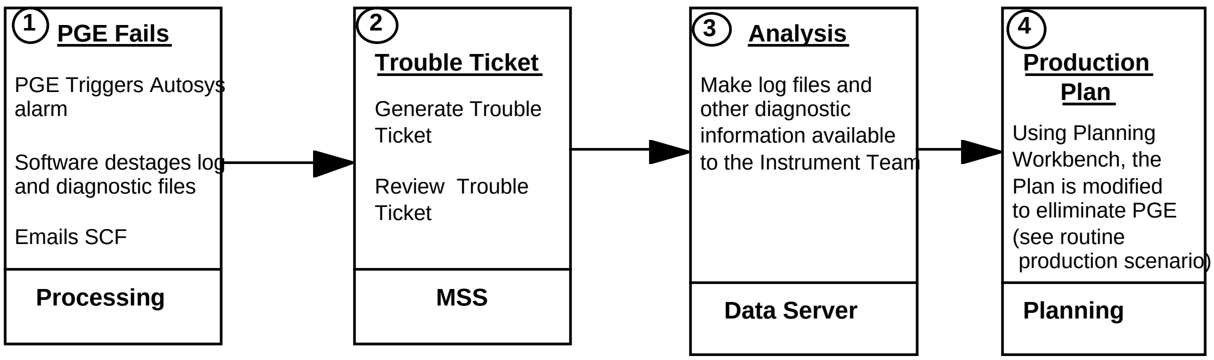


Figure 3.2.11.1-1. Software Run-time Error Function Flow Diagram

3.2.11.2Software Run-time Error Operator Roles

The Production Monitor operator monitors PGE operation via automated tools such as AutoSys and monitors quality and completeness of input and output. If the alarm was triggered, the PM is responsible for reviewing job status, investigation and filling out trouble tickets. Once the alarm is acknowledged, the Data Specialist is usually consulted.

The Data Specialist possess an intimate knowledge of the PGE program at their particular DAAC, and are expert users of the ECS suite of software tools such as the AutoSys. They are responsible for answering detailed questions concerning the PGE functions and operations, and provide an interface between the users and the EOS for more specific inquiries. The Data Specialist reviews the trouble ticket and depending on the severity level of the event, they may follow up with the Instrument Team(IT) to resolve the PGE problems.

The Operations Supervisor provides first line supervision of DAAC ECS operations including conflict resolution, policy enforcement, staff supervision, productivity monitoring and shift worker scheduling. The Operations Supervisor is also responsible for reviewing trouble tickets and depending on the severity level, may authorize Production Planner and PM to remove or put jobs on hold or ice (won’t run until starting conditions are reset).

The Production Planner is responsible for using the planning workbench to modify the future plan in reference to PGE functions. The Production Planner can modify the configuration, create a production plan, modify a production strategy and activate a production plan.

3.2.11.3Detailed Points of View

The following chart depicts the scenario from the point of view all relevant roles.

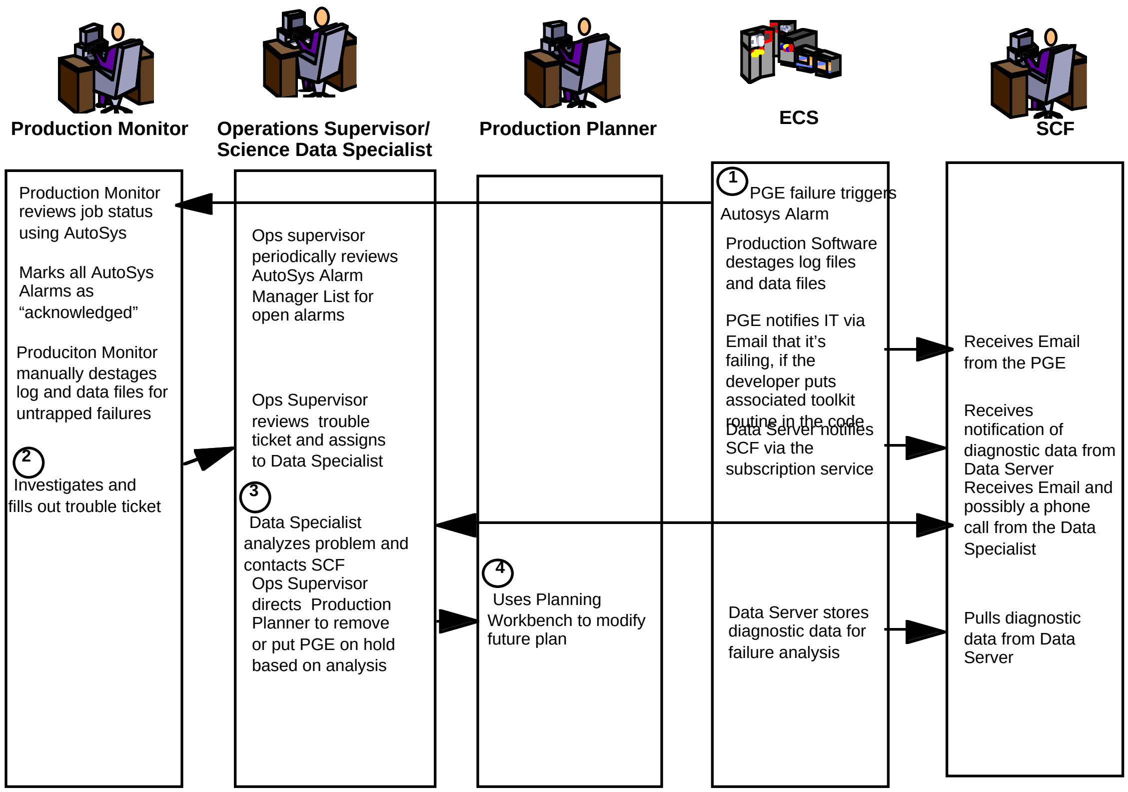


Figure 3.2.11.3-1. Software Run-time Error Points of View Diagram

3.2.11.4Change Job States Workflow

The purpose of this scenario is to go through the steps involved when changing job states through use of the job activity console. This task will be performed by Production Manager.

This section is continued on the next page.

Workflow

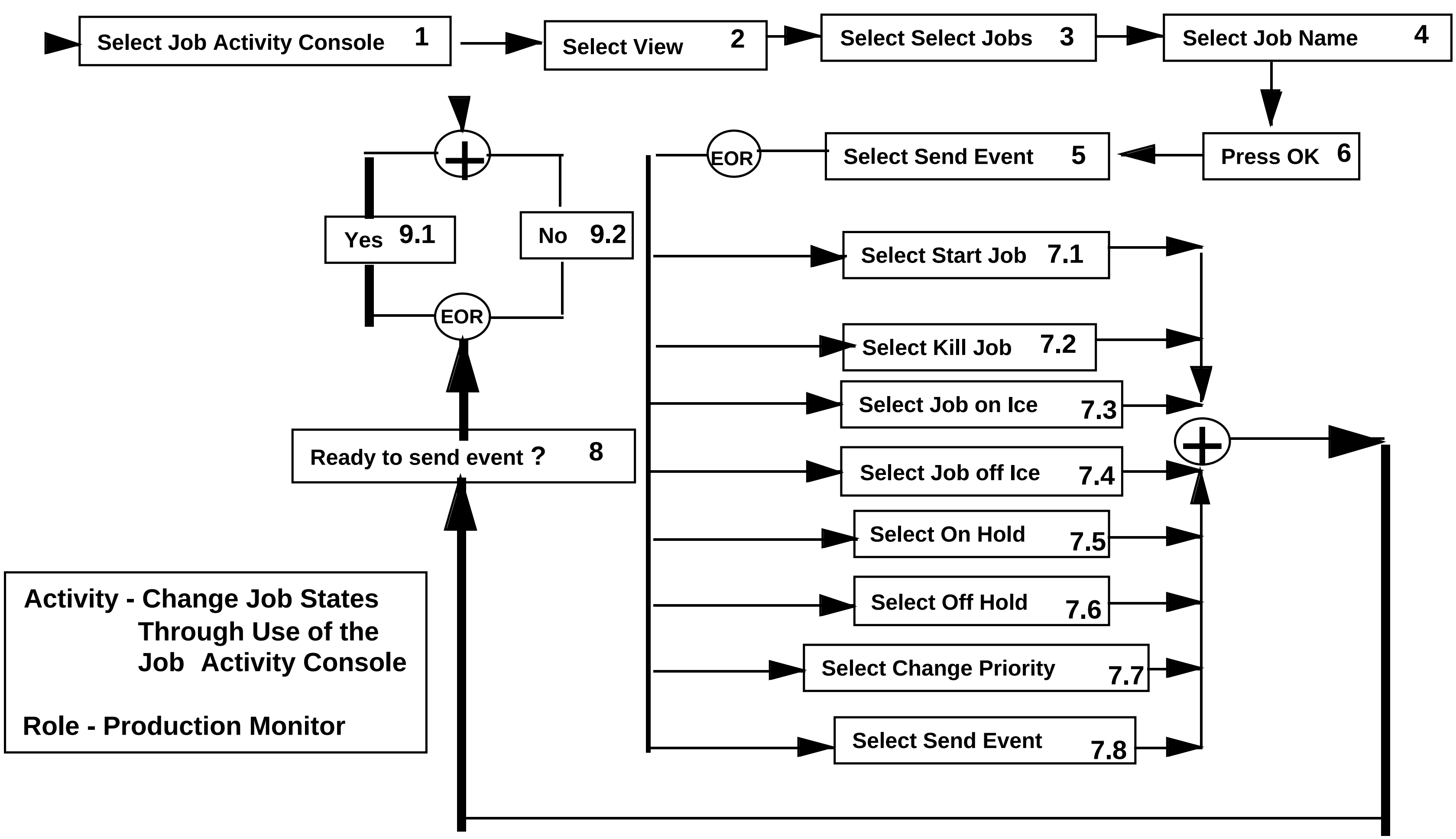


Figure 3.2.11.4-1. Change Job States Workflow

Data Activity

Table 3.2.11.4-1. Data Activity for Change Job States

Object Name	Data Element	Activity																
		1	2	3	4	5	6	7.1	7.2	7.3	7.4	7.5	7.6	7.7	7.8	8	9.1	9.2
Autosys	Select Job Activity & View	I	I															
Autosys	Select Jobs			I														
Autosys	Job Name				E													
Autosys	Job Actions					I												
Autosys	Start Job, Kill Job, Force Start Job, On Hold, Off Hold, Send Event							I	I	I	I	I	I	I	I	I		
Autosys	Confirmation						I										I	I

3.2.11.5Review and Change Alarm Status Workflow

The purpose of this scenario is to go through the steps involved when reviewing and changing alarm status through use of the alarm manager. This task will be performed by Production Manager.

Workflow

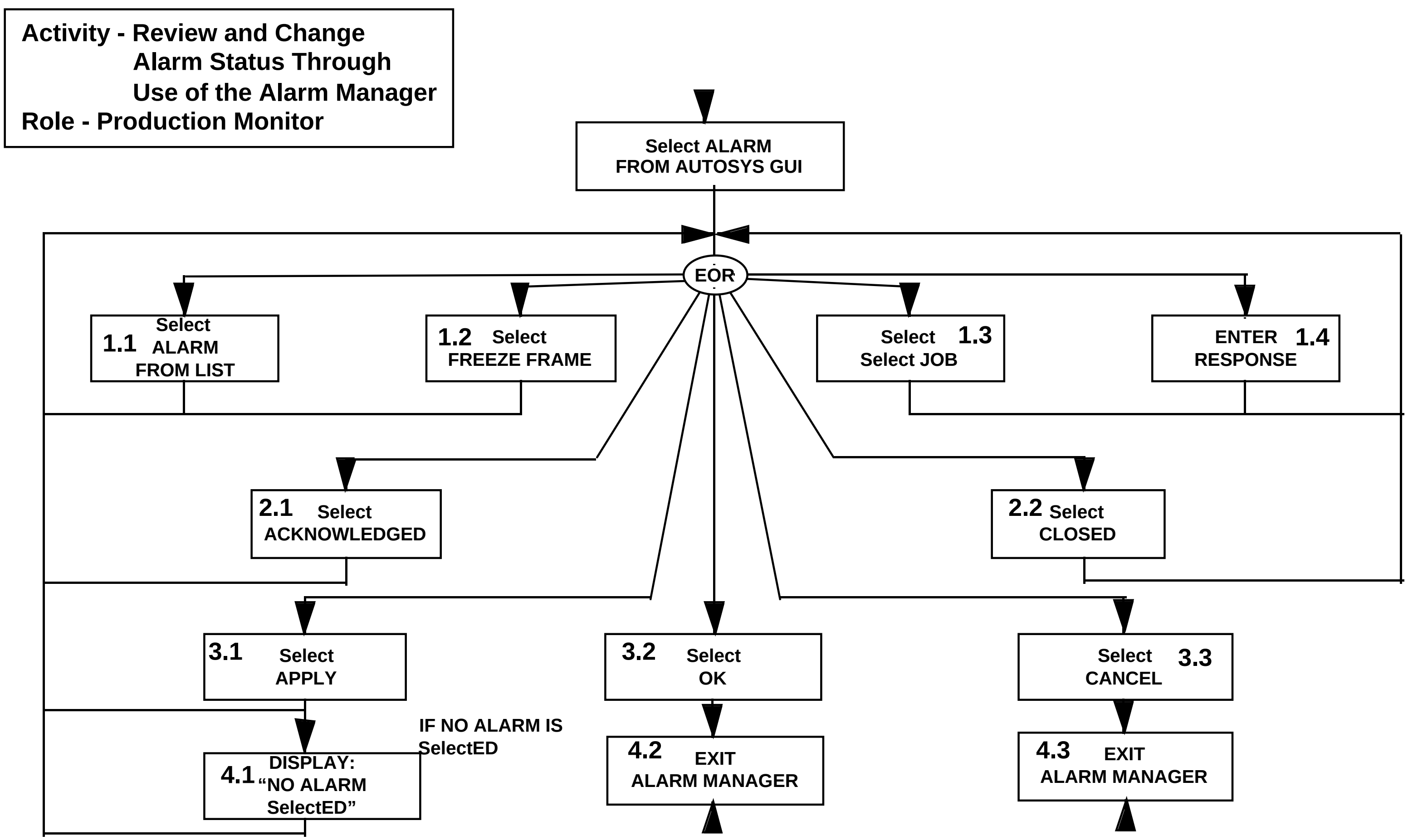


Figure 3.2.11.5-1. Review and Change Alarm Status Workflow

Data Activity

Table 3.2.11.5-1. Data Activity for Review and Change Alarm Status

Object Name	Data Element	Activity											
		1.1	1.2	1.3	1.4	2.1	2.2	3.1	3.2	3.3	4.1	4.2	4.3
Autosys	Alarm list	I											
	Freeze Frame		I										
	Select Job			I									
	Acknowledge					I							
	OK, Apply or Cancel							I	I	I			

3.2.11.6 Delete an Autosys Job Definition

The purpose of this scenario is to go through the steps involved when deleting an AutoSys job definition. This task will be performed by Production Manager.

Workflow

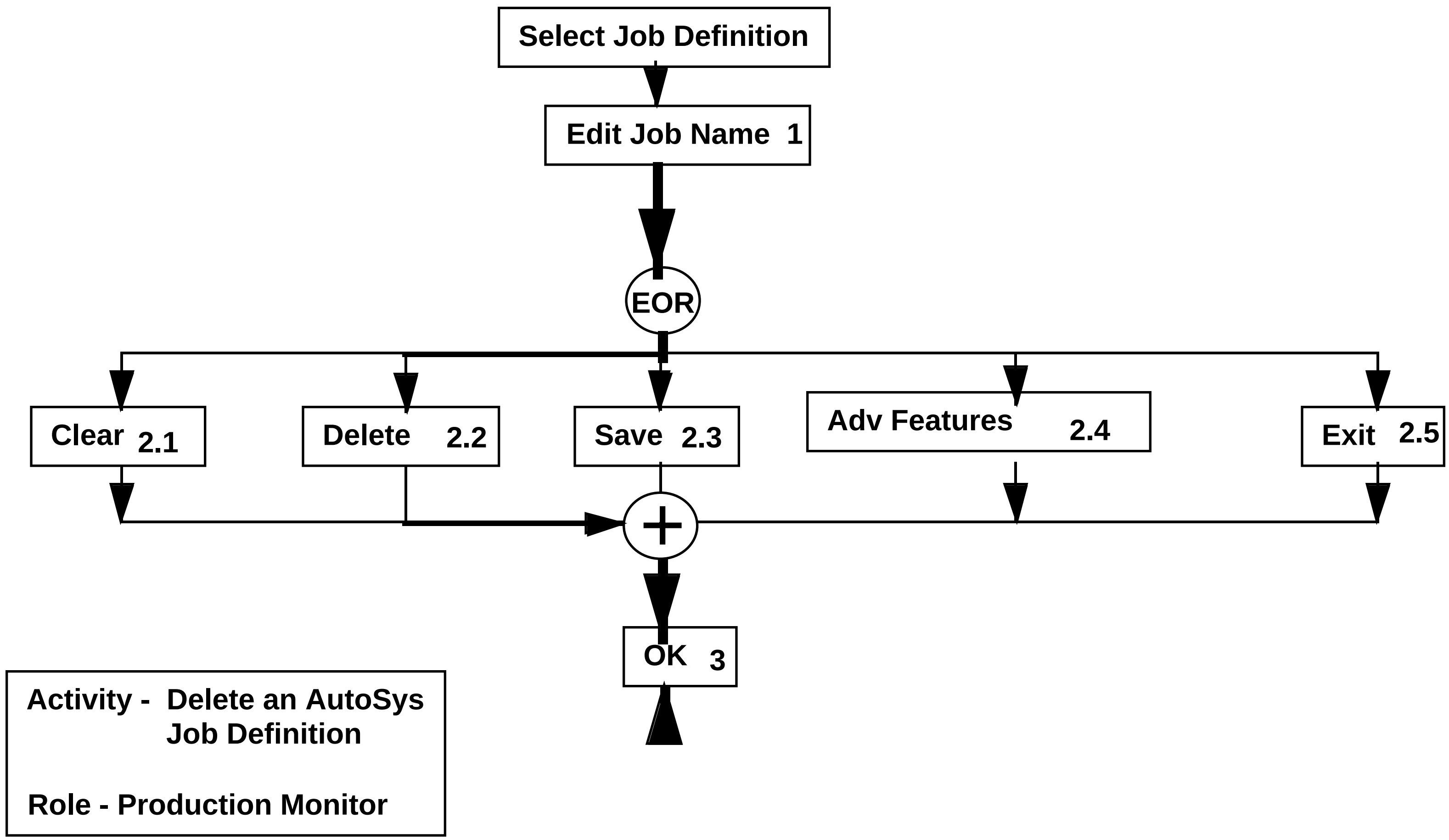


Figure 3.2.11.6-1. Delete an Autosys Job Definition Workflow

Data Activity

Table 3.2.11.6-1. Data Activity for Delete an Autosys Job Definition

Object Name	Data Element	Activity						
		1	2.1	2.2	2.3	2.4	2.5	3
Autosys	Job Name	E						
	Clear, Delete, Save, Adv. Features, Exit		I	I	I	I	I	
	OK							I

3.2.12 On-Site QA

The assessment of product quality is likely to occur at several stages. First, there may be automated assessments that are made during the PGE execution at the DAAC or by means of a QAE. Manual QA assessment at the DAAC is performed by the Science Data Specialist. QA at the SCF may be either manual or automatic.

The capability for QA is provided for every standard product PGE. If available, an automated QAE is run as part of the processing chain, normally following execution of the corresponding PGE. The QA production flag is automatically set by the production software.

Manual QA is controlled via subscriptions, i.e., the QA personnel at the SCF or DAAC register a subscription to receive the output product to be examined, specifying under what conditions they wish to QA the data. User access/subscription to the data is based on SCF/DAAC rules/thresholds, i.e user access and subscription fulfillment can be controlled by QA Flag thresholds. Once the subscription is triggered, the QA user is notified and may retrieve the data. It is recommended that manual checks include data that are randomly distributed over time and geographical areas in order to detect unanticipated anomalies. The SCF likely will also QA data which fail preliminary QA checks at the DAAC for unknown reasons.

Any product requiring manual QA, at either the SCF or the DAAC, is tagged as unvalidated, but is stored immediately and made available for distribution per existing SCF/DAAC subscription rules/thresholds and subsequent requests. (Subscribers can specify whether or not they want to wait for product validation if the SCF/DAAC allows release of unvaladated products.)

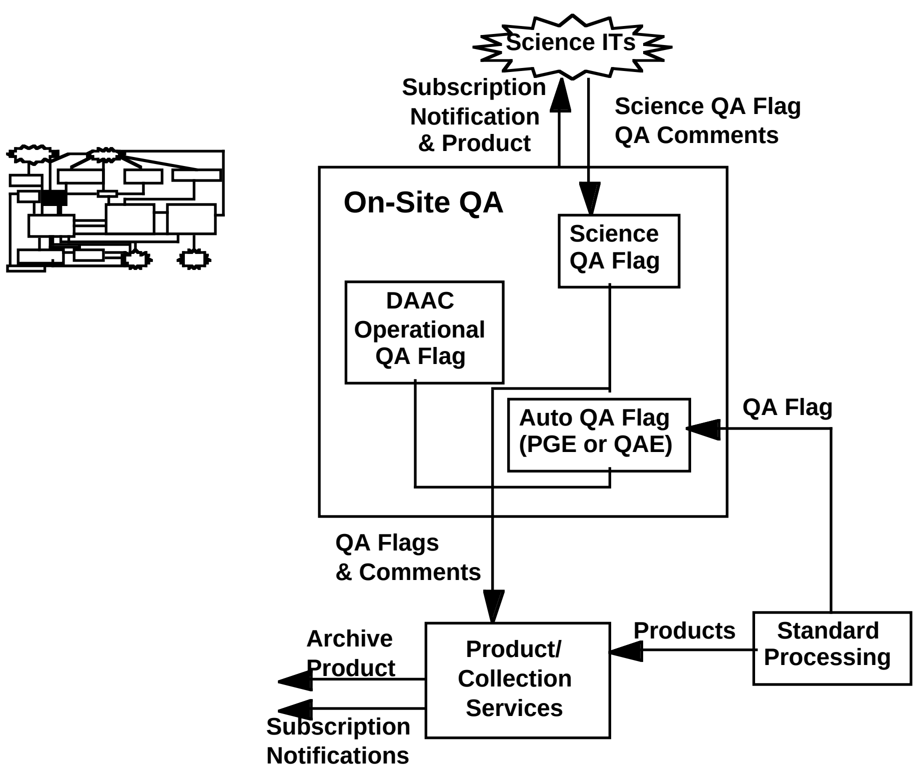


Figure 3.2.12-1. On-Site QA Context Diagram

3.2.12.1 On-Site QA Description

This scenario describes how the Data Processing Subsystem supports QA of a product at a DAAC.

The need for DAAC QA of a product has been established based upon inline QA results. A subscription request for the product has been submitted at the DAAC.

At the DAAC, the Science Data Specialist retrieves the product from the Data Server for visual analysis. The Science Data Specialist sets a flag in the metadata indicating the status of the review and stores the product metadata back to the Data Server. The Science Data Specialist also receives the quality assessment of the SCF Scientist and inputs the SCF QA assessment.

SCF Scientist retrieves the product and metadata from the Data Server and performs QA on the product. The SCF Scientist sends the results to the Science Data Specialist.

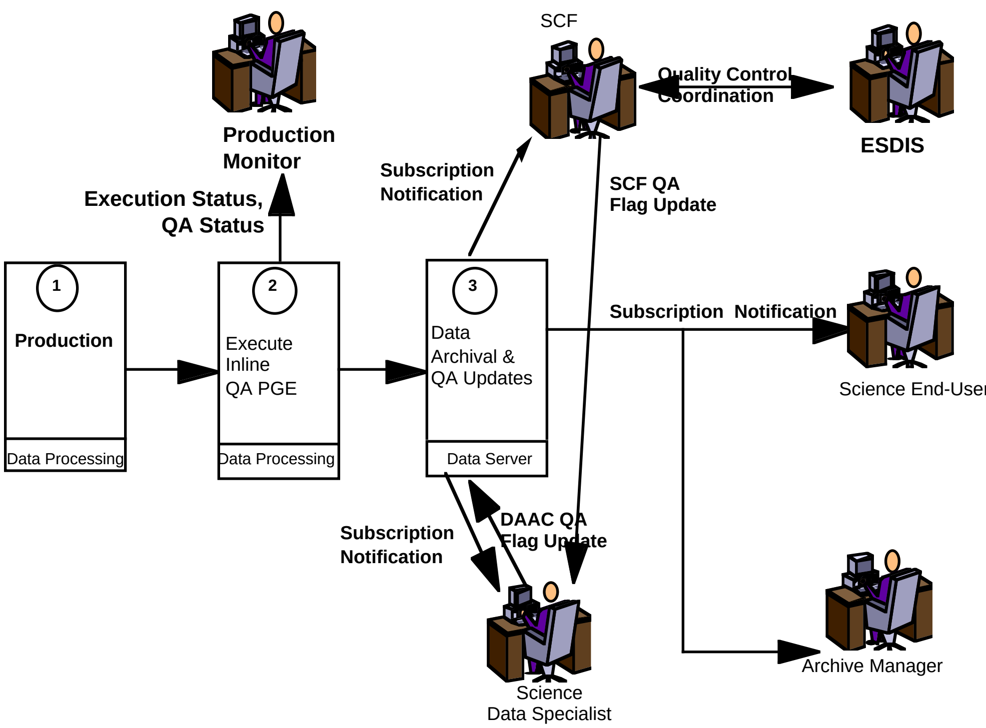


Figure 3.2.12.1-1. On-Site QA Functional Flow

3.2.12.2 On-Site QA Operator Roles

Science Data Specialist uses ECS Visualization tools to perform operational QA of the product. The Science Data Specialist enters the data for both operational and science QA.

Production Monitor monitors production execution status and automatic QA status.

SCF Scientist uses SCF tools to perform science QA of the product.

3.2.12.3QA Points of View

DAAC Product QA Point of View

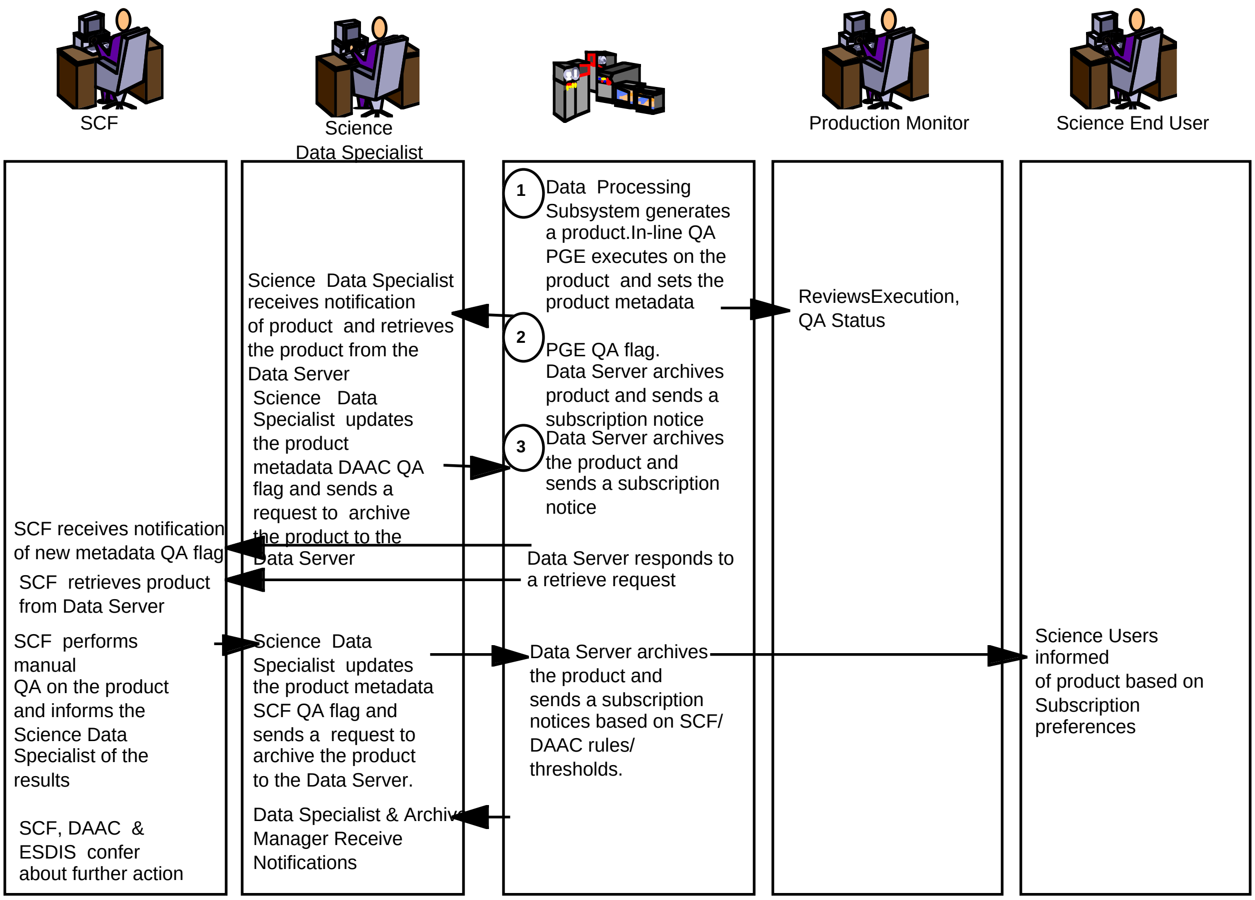


Figure 3.2.12.3-1. DAAC Product QA Points of View

3.2.12.4Work Flow Diagrams for On-Site QA

The purpose of this workflow is to show how the Science Data Specialist can query, retrieve, and updata products for QA.

This section is continued on the next page.

Workflow

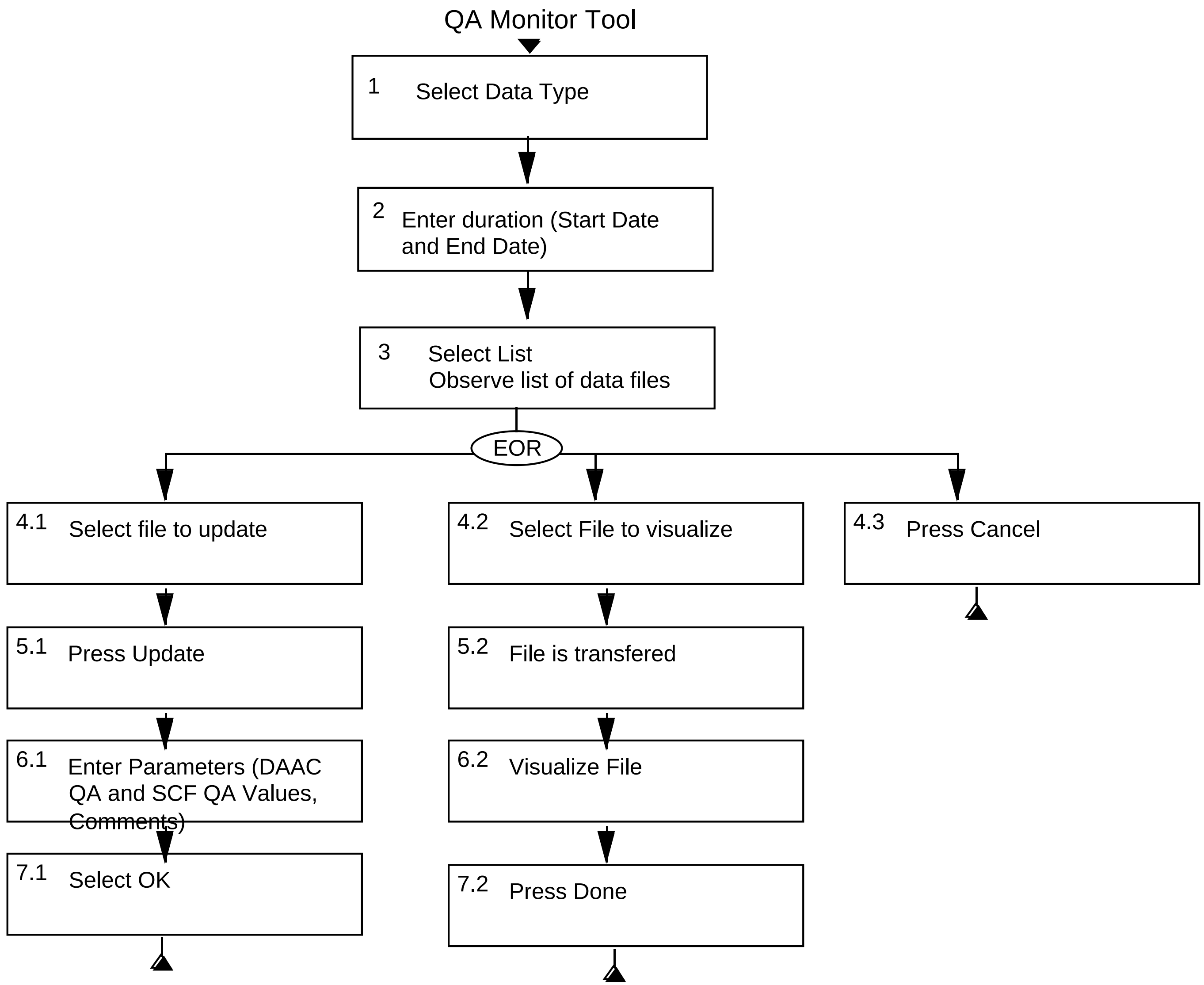


Figure 3.2.12.4-1. On-Site Product QA Workflow

Data Activity

Table 3.2.12.4-1. Data Activity for Workflow On-Site Product QA

Object Name	Data Element	Activity											
		1	2	3	4.1	4.2	4.3	5.1	5.2	6.1	6.2	7.1	7.2
DpPrQaMonitor	Data Type	D											
	Start/End Date		I										
	List			D									
	Update				I								
	EOSView										D		
	DAAC QA Value									I			
	SCF QA Value									I			
	Comments									I			

3.2.13 Product Insertion and Archive

Product archive is the insertion of data into the data server via data requests. These archived products can then be requested by the science end user. Data and associated metadata can be received from numerous sources including the ingest, planning, processing, management, and client subsystems. Figure 3.2.13-1 depicts the context in which products are inserted into the archive for storage.

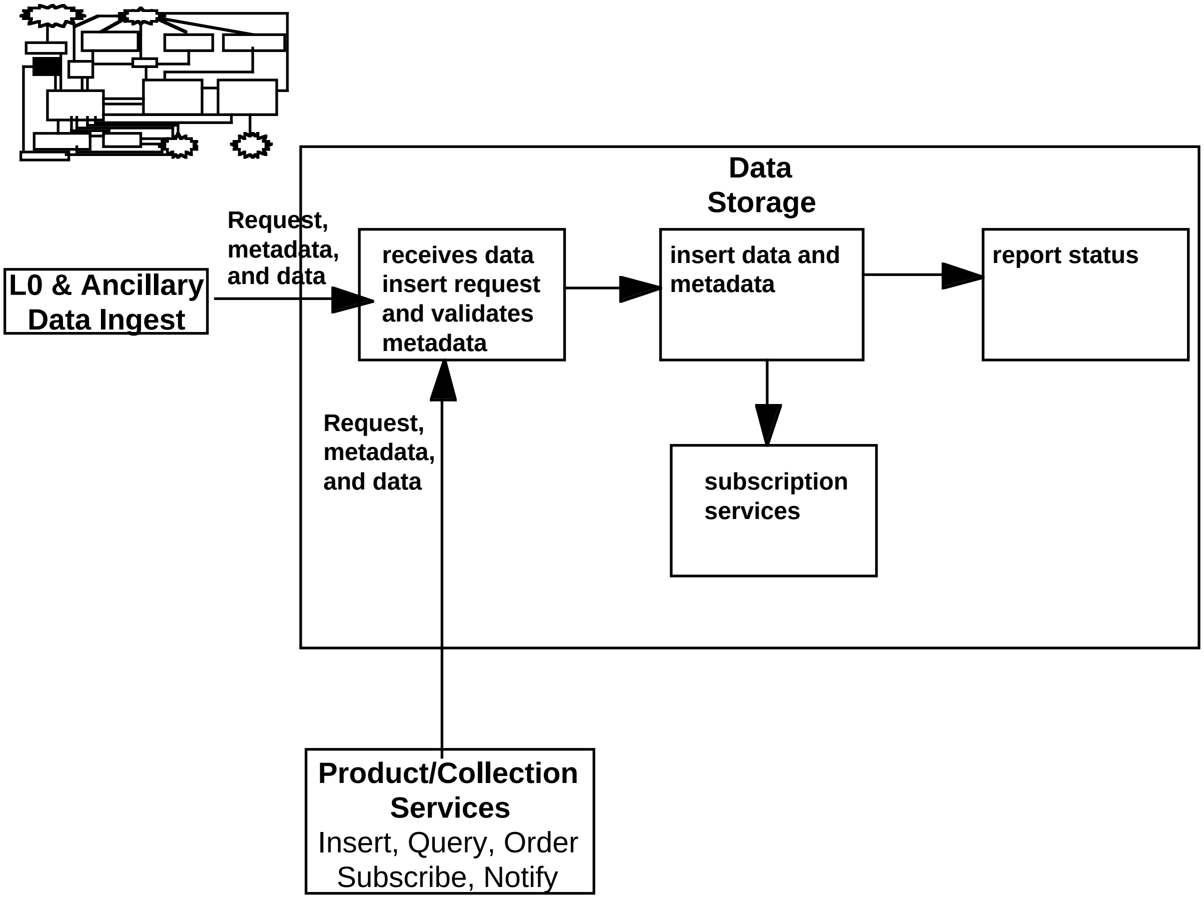


Figure 3.2.13-1. Product Insertion and Archive Context Diagram

3.2.13.1Description

This product archive scenario describes the insertion of data into a data server and the sequence of events that occur during. This process is largely automated with validation errors being manually processed by the Science Data Specialist. Figure 3.2.13.1-1 depicts the functional flow of product archive data insertion.

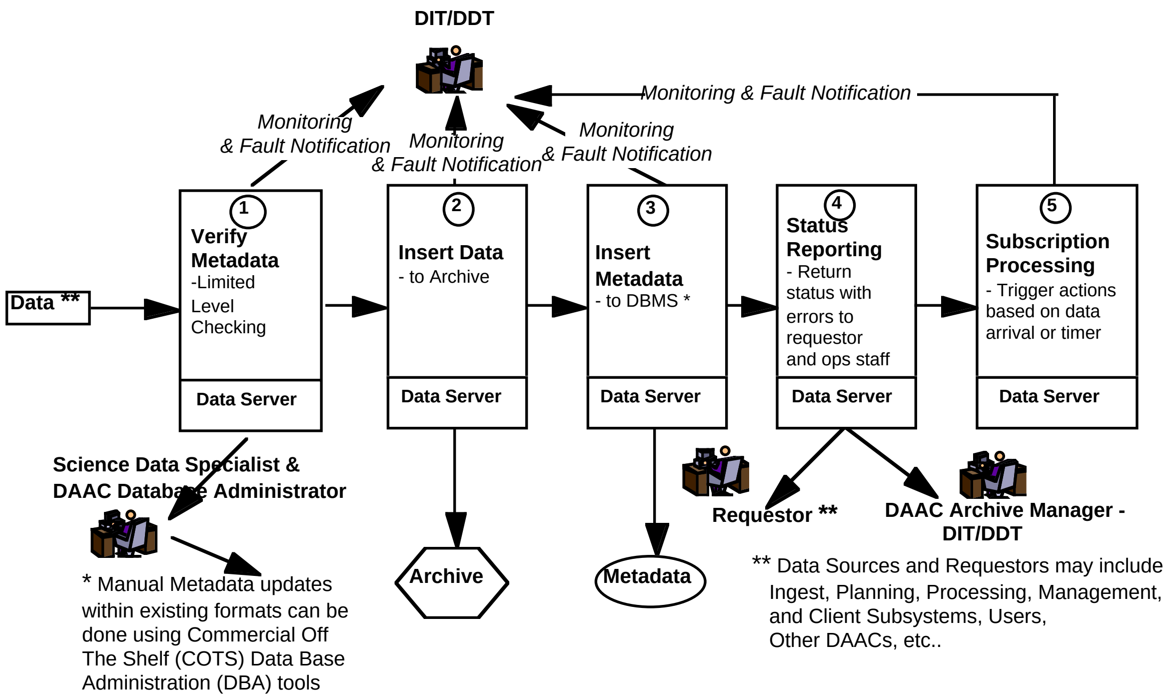


Figure 3.2.13.1-1. Product Insertion and Archive Functional Flow

3.2.13.2Operator Roles

The Science Data Specialist (DS) is an expert user of the ECS suite of software tools. He answers detailed questions concerning the structure of the data stored at his DAAC, and provides the interface between the users and the ECS system for more specific inquires. The Science Data Specialist works with the DAAC Database Administrator in structuring data sets and metadata.

The DAAC Ingest/ Distribution Technician (DIT/DDT) is responsible for monitoring the status of all ongoing requests. They respond to alerts that are automatically generated by archive processing, using data server monitoring tools and MSS event log browsing tools.

The DAAC Archive Manager documents and supports investigation of archive errors and faults.

3.2.13.3Detailed Points of View

The detailed points of view diagram shown in Figure 3.2.13.3-1 details the interaction of the DAAC Archive Manager and DAAC Ingest/Distribution Technician with the data server subsystem.

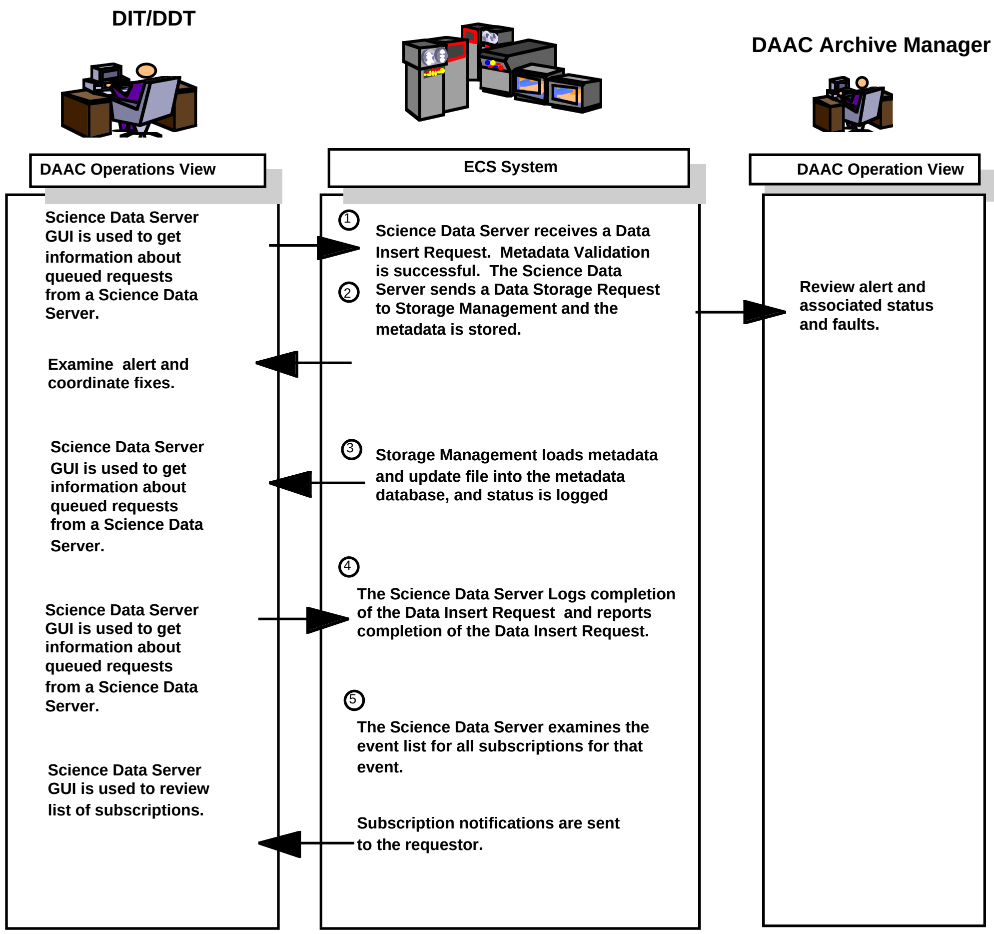


Figure 3.2.13.3-1. Product Insertion and Archive Points of View

3.2.13.4Generic Request Tracking Workflow

The data server provides a GUI to track generic requests. The workflow in Figure 3.2.13.4-1 shows the steps that an operator would take to track data request coming into and going out of the system.

This section is continued on the next page.

Workflow

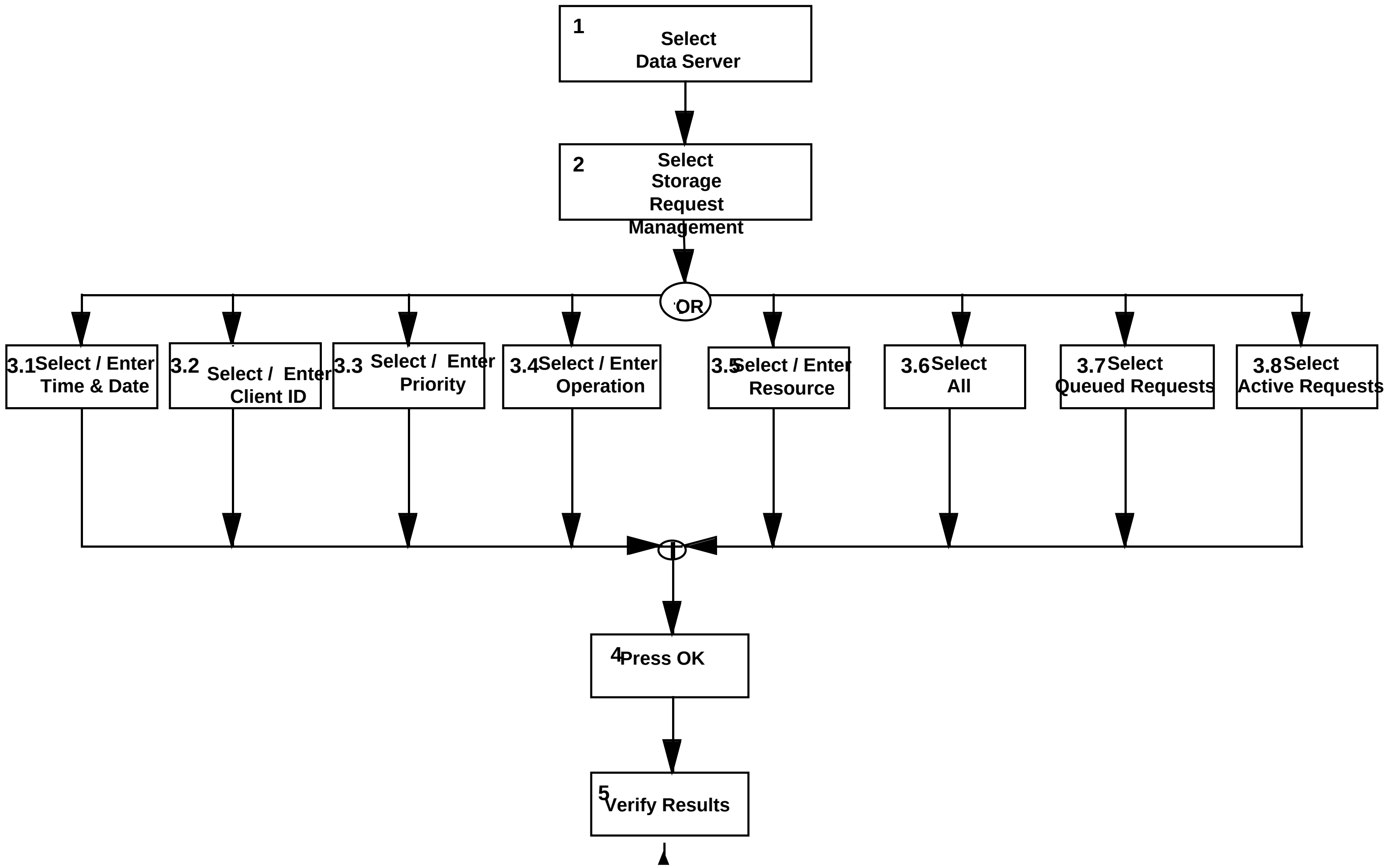


Figure 3.2.13.4-1. Generic Request Tracking Workflow

Data Activity

Table 3.2.13.4-1. Data Activity for Generic Request Tracking

Object Name	**Data Element**	**Activity**											
		1	2	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	4	5
DsGuAdmin	Data Server Option	I											
	Storage Management Request Management Option		I										
DsAdRequestInterface													
	All requests								I				
	Press OK											I	
	Time & Date Received			E									D
	Request ID												D
	Client ID				E								D
	Operation Requested						E						D
	Current Status												D
	Resource							E					
	Priority					E							D
	Active Requests										E		
	Queued Requests									E			

3.2.13.5Archive Log Analysis Workflow

The data server storage management resource management GUI allows operations personnel to view the archive log to analyze errors based on time and date, device name, error number, or request ID. The archive log contains operations errors and archive media failures. This workflow shows the steps that an on operator would take to display archive device alarms and print the report to allow more detailed analysis to take place off line. Figure 3.2.13.5-1 depicts the steps involved in the operator archive log analysis.

Workflow

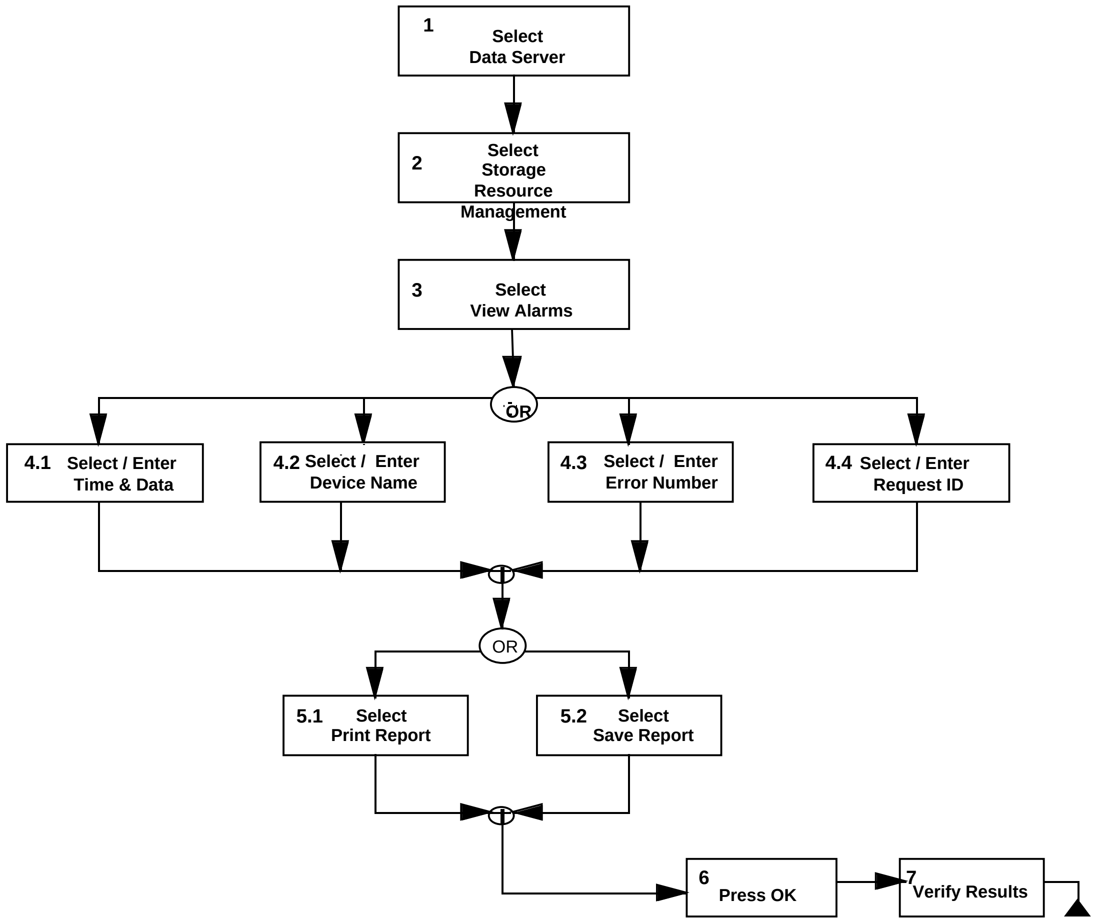


Figure 3.2.13.5-1. Archive Log Analysis Workflow

Data Activity

Table 3.2.13.5-1. Data Activity for Archive Log Analysis

Object Name	Data Element	Activity										
		1	2	3	4.1	4.2	4.3	4.4	5.1	5.2	6	7
DsGuAdmin	Data Server Option	I										
	Storage Management Request Management Option		I									
DsStArchive												
	View Alarms			I								
	Time & Date			D	E							
	Request ID			D								
	Client ID			D								
	Operations			D								
	File Name			D								
	Archive Name			D								
	Volume Name			D								
	Archive Operations Errors --Device Name					I						
	Archive Operations Errors --Error Number						E					
	Print Report							E	I			
	Save Report									E		
	Request ID											
	Press OK										I	
	Verify Results											D

3.2.14 Subscription Event Error

The Ingest/Distribution Technician is responsible for reviewing and analyzing a subscription errors and determining the approach to resolve the error.

The Data Server subsystem provides access to stored data. The Data Server accepts data search and access requests from any subsystem or other segment. The Data Management Subsystem validates the authorization of each user subscription request. Once access is approved the data is retrieved and distributed. If user validation fails for any reason, the request is denied and an error is recorded and distributed to the Ingest/Distribution Technician.

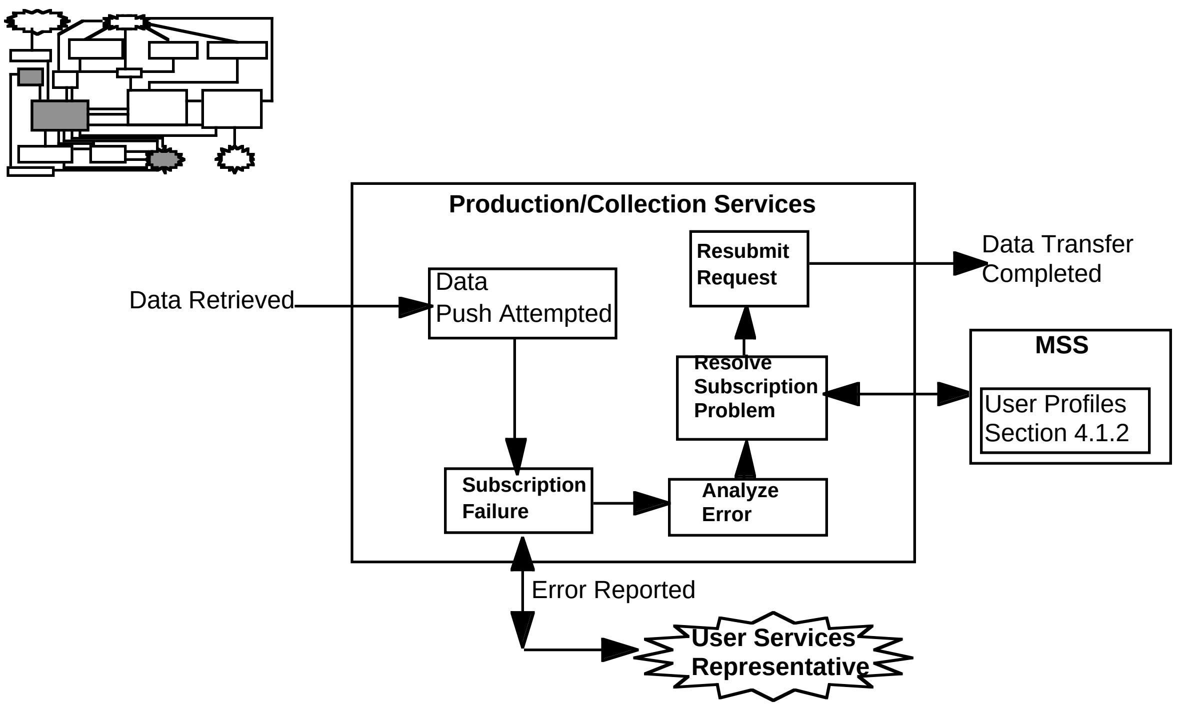


Figure 3.2.14-1. Subscription Event Error Context Diagram

3.2.14.1Description

This scenario describes the activities of the Ingest/Distribution Technician and User Services Representative in the event of error notification when the Data Server fails to execute a subscription.

A user requires data that exists on the server and sends a request to receive this data. The Data Server subsystem successfully receives and processes the request. Distribution Management sends a data retrieval request and Storage Management successfully retrieves the granules.

Data Management attempts to push data to the user's system and fails to accomplish the transfer. A number of attempts to push data is made and once a specified limit is observed, an error is generated.

Once the Ingest/Distribution Technician receives the subscription error notification, an analyses of the error is made and the DAAC User Services Representative is informed via e-mail. The User Services Representative accesses the user profile data to review all user information. Once the information is obtained, the User Services Representative will inform (via e-mail) the subscriber of the problem and provide appropriate methods to resolve the problem. Once the subscriber corrects the problem, the User Services Representative will resubmit the data transfer request to the Data Server.

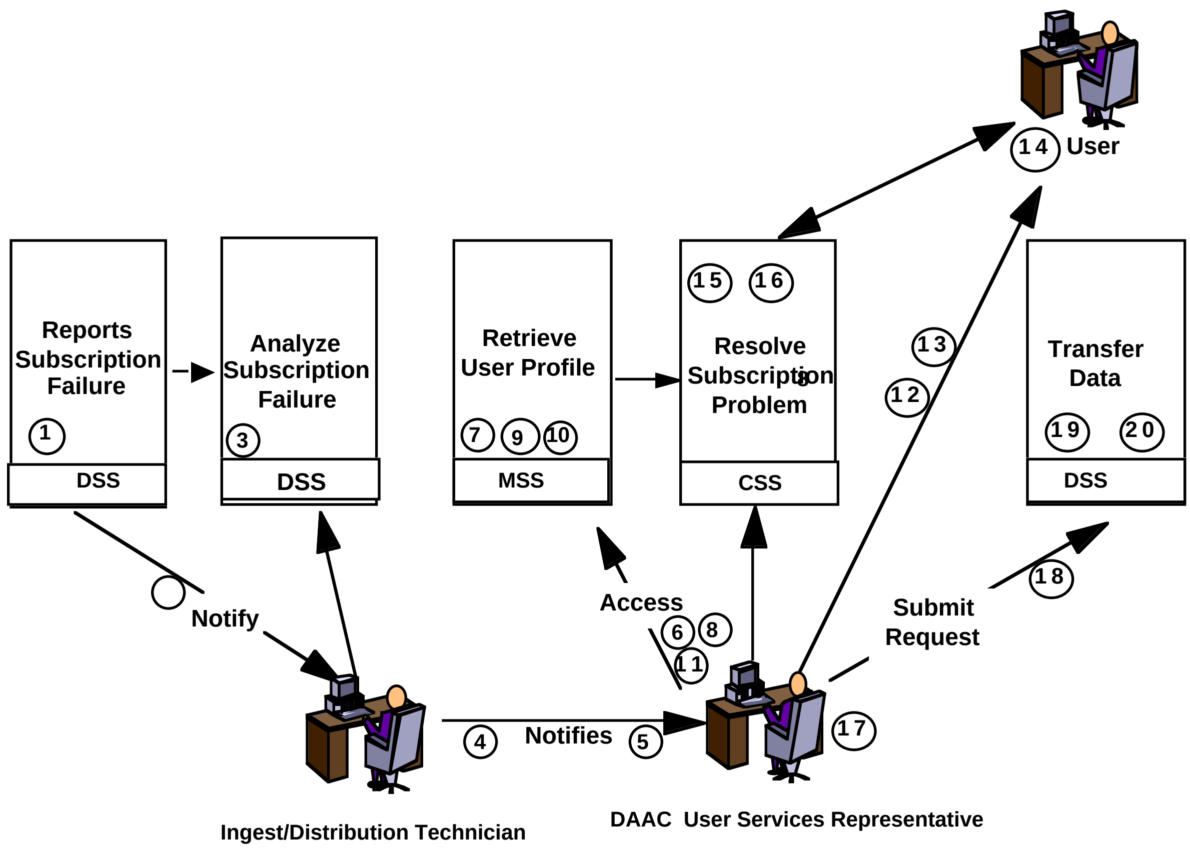


Figure 3.2.14.1-1. Subscription Event Error Resolution Functional Flow

3.2.14.2Operator Roles

Ingest/Distribution Technician - Receives, logs, and marks all non electronic media for processing and storage. Return original media to sender, file, or store. Coordinate with sender to resolve any ingest problems. Receives, opens, and routes incoming mail to appropriate action department. Packages, labels, and ships output to science users. Follow up and trace undelivered outputs.

DAAC User Services Representative - Provides services and expertise necessary to facilitate access to and use of EOSDIS - related systems, data, software, tools, services and products by the user community. The majority of the tasks performed by the User Services Representative will involve using one of the following system tools; the User Contact Log, the User Registration Service, the Data Search and Order Services, and/or the Order Tracking Service.

3.2.14.3 Subscription Event Error Resolution Points of View

This point of view presents the steps required to resolve an error which prevents successful transfer of requested data.

Figure 3.2.14.3-1

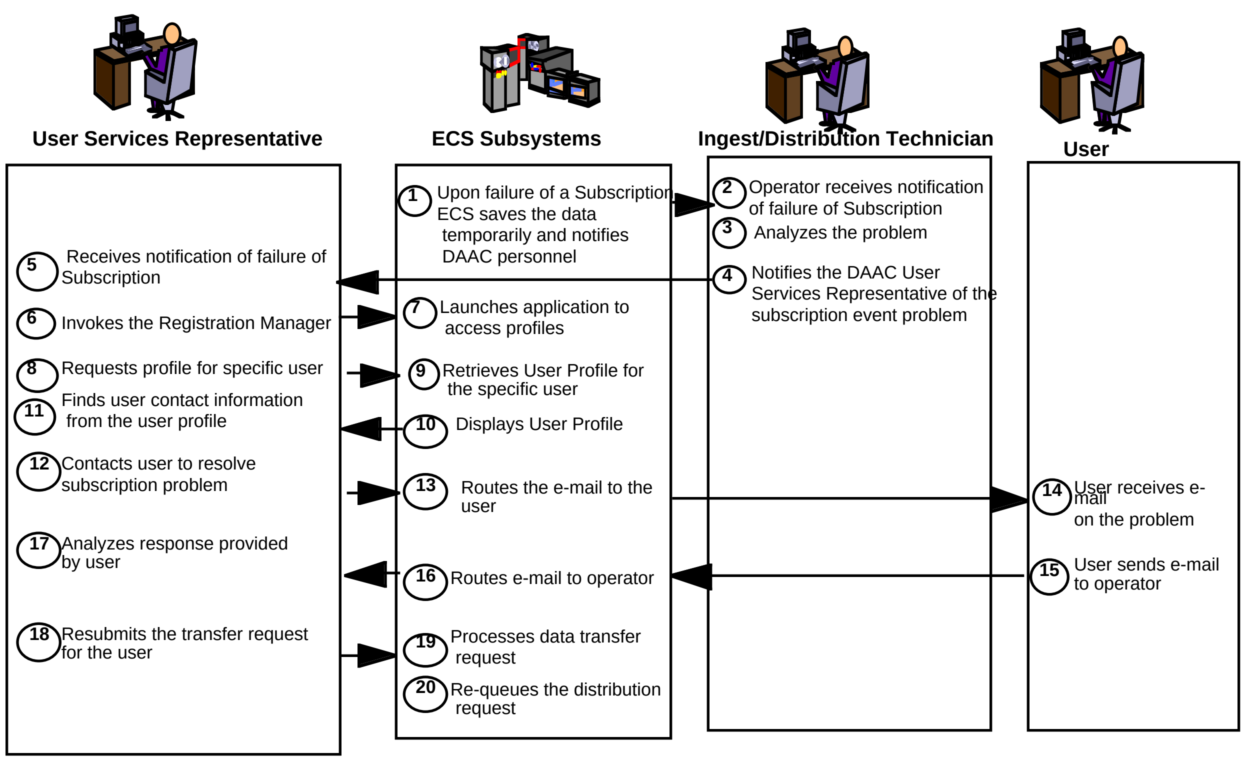


Figure 3.2.14.3-1. Subscription Event Error Resolution Points of View

3.2.14.4 Scenario Workflow 'Ingest/Distribution Technician Subscription Event Error Resolution'

The work flow that follows, provides a process for resolving a subscription request failure. The Ingest/Distribution Technician analyzes the problem and informs the User Services Representative of the problem via e-mail.

This section is continued on the next page.

Workflow

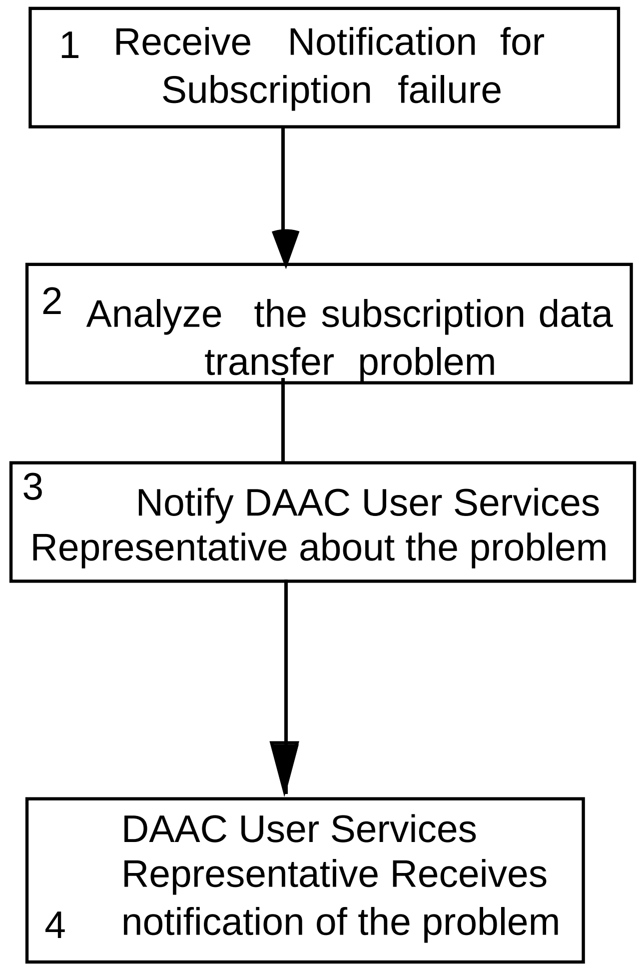


Figure 3.2.14.4-1. Ingest/Distribution Technician Subscription Event Error Resolution Workflow

Data Activity

Table 3.2.14.4-1. Data Activity for Ingest/Destribution Technician Subscription Event Error Resolution

Object Name	Data Element	Activity			
		1	2	3	4
DSSClsubscription	Subscription Alarm	D			
	Display Alarm		D		
Touble Ticketing	addressee			I	D
	originator			I	D
	messageText			I	D
	messageId			I	D

This section is continued on the next page.

3.2.14.5Scenario Workflow 'User Services Representative Subscription Event Error Resolution'

The work flow that follows, provides a process for resolving a subscription request failure. The User Services Representative receives notification of the problem, retrieves the user profile, contacts the user to resolve the problem and resubmits the data transfer request once the problem has been resolved.

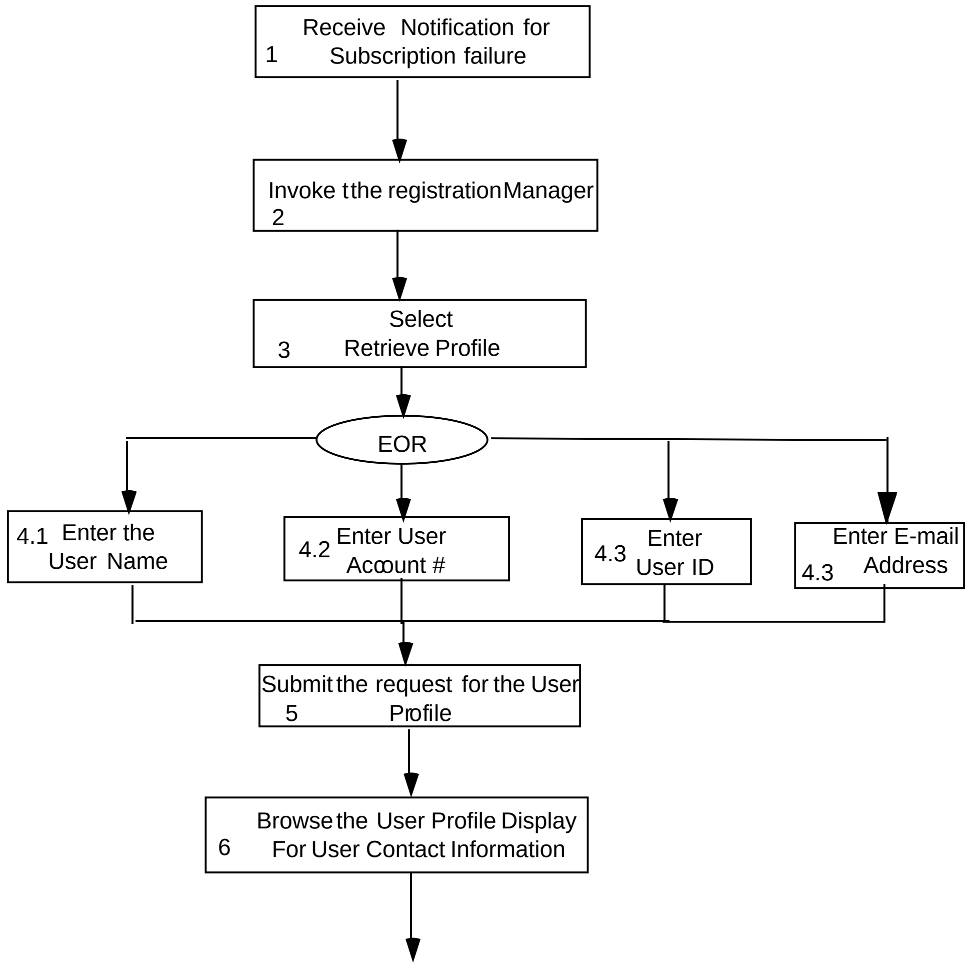


Figure 3.2.14.5-1. User Services Representative Subscription Event Error Resolution Workflow (Sheet 1 of 2)

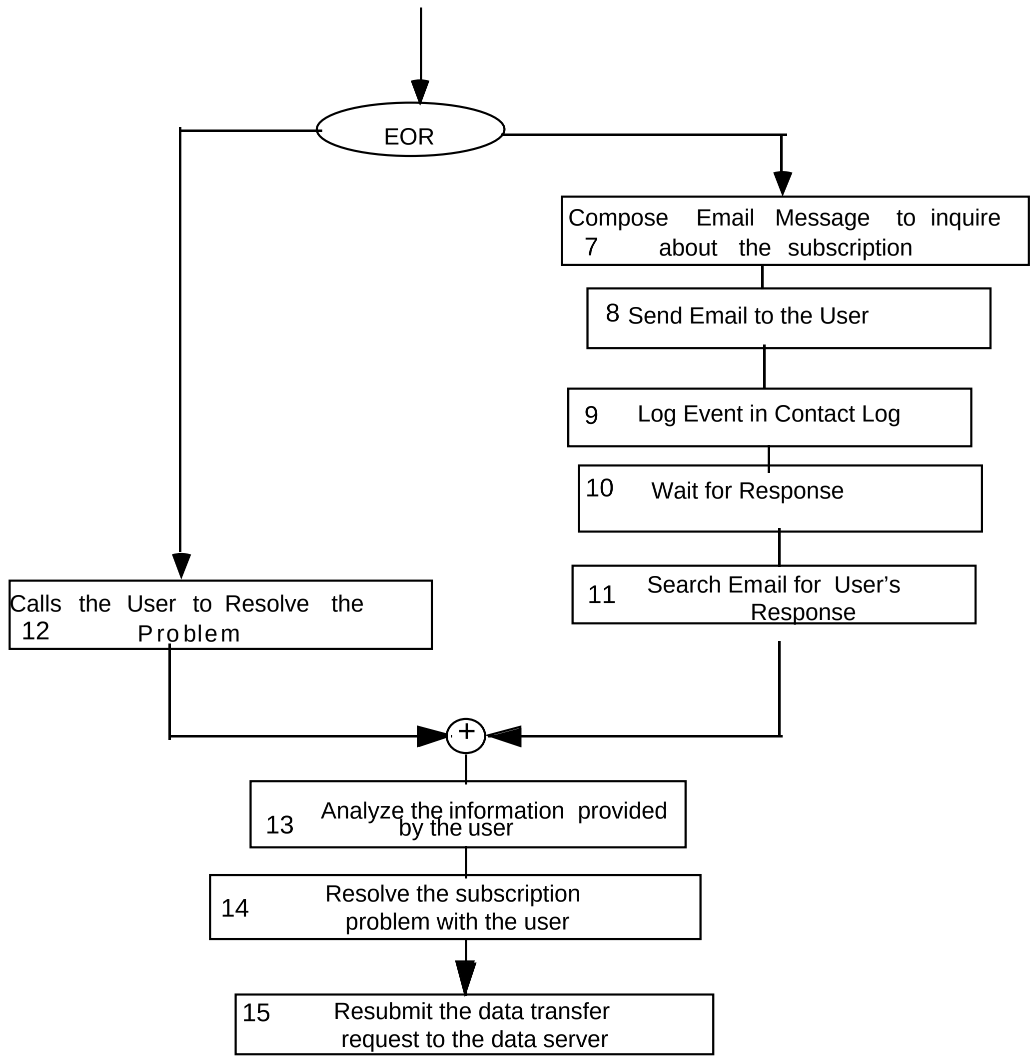


Figure 3.2.14.5-2. User Services Representative Subscription Event Error Resolution Workflow (Sheet 2 of 2)

Data Activity

Table 3.2.14.5-1. Data Activity for User Services Representative Subscription Event Error Resolution

Object Name	Data Element	Activity																
		1	2	3	4.1	4.2	4.3	5	6	7	8	9	10	11	12	13	14	15
MsAcUserProfile	messageText									I								
	addressee									I								
	originator									I								
	messageText	D								I								
	messageId	D								I								
	userId						I											
	userName				I													
	accountNumber					I												
	homeDAAC								D									
	telNum								D									
	EmailAddr								D									
	organization								D									
	researchField								D									
	affiliation								D									
	sponsor								D									
	projectName								D									
	PI								D									
	MailAddr								D									
	ShipAddr								D									
	AltShipAddr								D									
	billAddr								D									
	mediaPref								D									
	priviledgeLevel								D									
	creationDate								D									

3.2.15 Data Distribution

Data distribution is a process of monitoring and controlling distribution requests. Data distribution processing mainly consists of preparing requested data objects for distribution on specified media or via the network and subsequently delivering or causing the delivery of data products to requesting clients. Data distribution processing will generate the necessary packaging materials if the data is to be distributed on media. The packaging materials include the packing list, showing all data objects stored on the delivery media, media labels that the Data Distribution Technician will affix to physical media, and shipping labels for routing of physical media. The physical media include CD ROM, and various types of tapes (4mm, 8mm, 3480/3490, and 6250 bpi 9-track). Figure 3.2.15-1 depicts the context in which data is distributed.

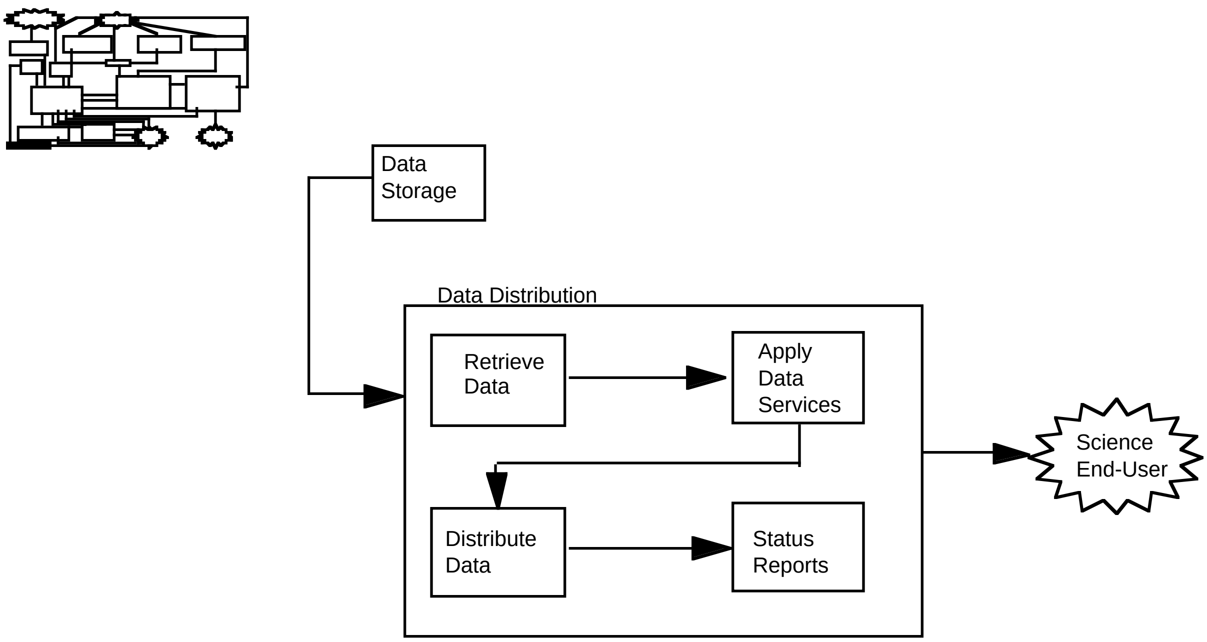


Figure 3.2.15-1. Data Distribution Context Diagram

3.2.15.1 Description

This scenario describes both electronic and physical media distribution. Physical media is written to an 8mm tape. Pull distribution data is staged for the user to pull via ftp. Push distribution is supplied by the data server via ftp to user designated sites using user provided information. A packing slip is created for each distribution request. The packing slip lists the granules and the files in those granules which are to be distributed either in electronic or physical form. The packing slip is mailed with the physical media. If the request is for electronic distribution, a flat text file containing the packing slip is placed in the ftp pull directory, or it is ftp pushed to the requested destination. When data is ready for pull an email notification is sent to the user. The user's address is taken from the user's profile. Data is deleted from staging after successful completion of the pull data or upon expiration of a designated hold period. Figure 3.2.15.1-1 depicts the functional flow of data distribution.

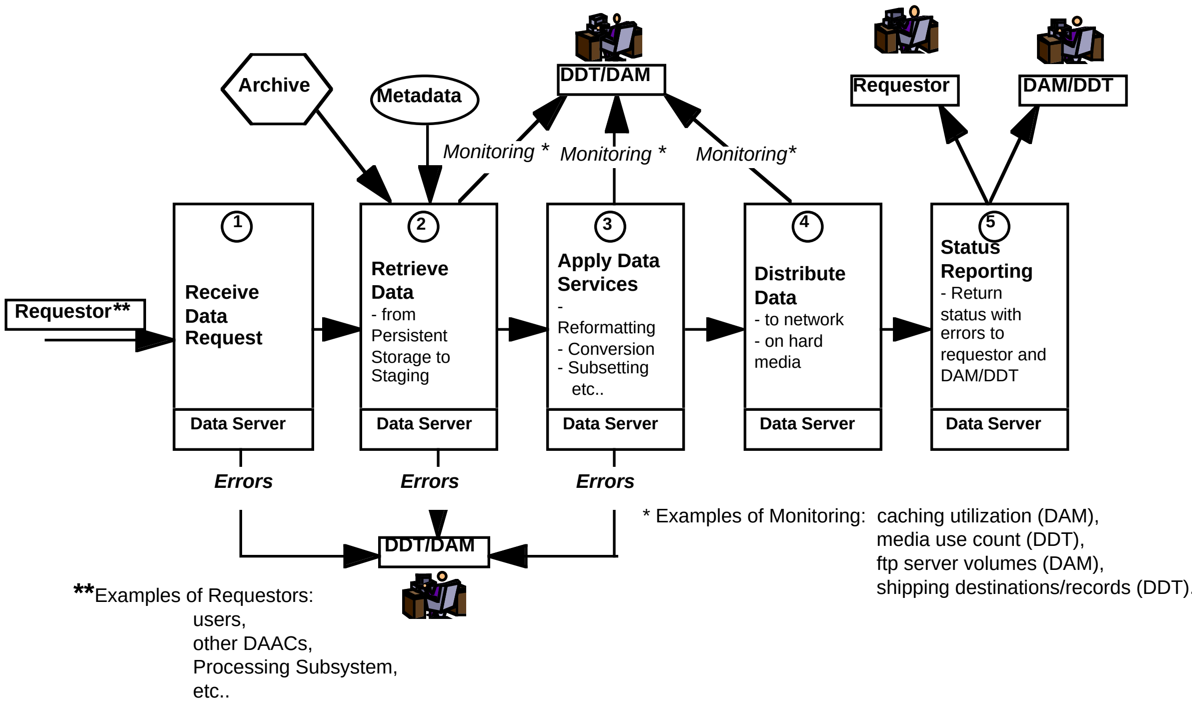


Figure 3.2.15.1-1. Data Distribution Functional Flow

3.2.15.2Operator Roles

The DAAC Distribution Technician (DDT) is responsible for physical media distribution, e.g., mailing of tapes, resolving problems, monitoring electronic distribution operations, and coordinating with the appropriate external and internal sources to resolve distribution conflicts. The DDT responds to alerts that are automatically generated by distribution processing using data server monitoring tools and MSS event log browsing tools. He will package, label, and ship output to science users, and follow up and trace undelivered output.

The DAAC Archive Manager (DAM) is responsible for monitoring the performance of data distribution activities. He will assist the DDT in analyzing errors that are encountered.

3.2.15.3Detailed Points of View

The detailed points of view diagram shown in Figure 3.2.15.3-1 depicts the normal science electronic data distribution (pull) activities.

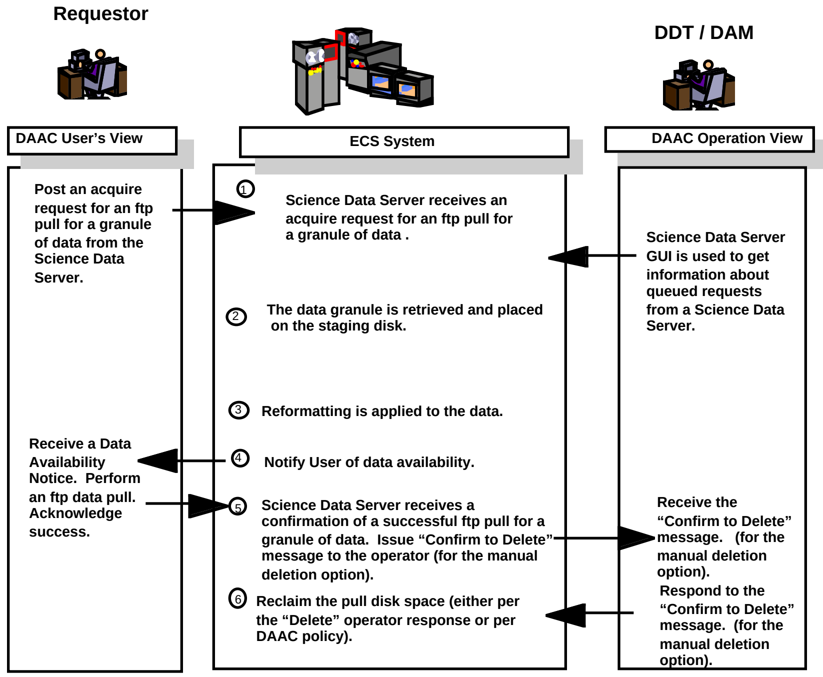


Figure 3.2.15.3-1. Data Distribution (Pull) Points of View

The detailed points of view diagram shown in Figure 3.2.15.3-2 depicts the normal science media data distribution activities.

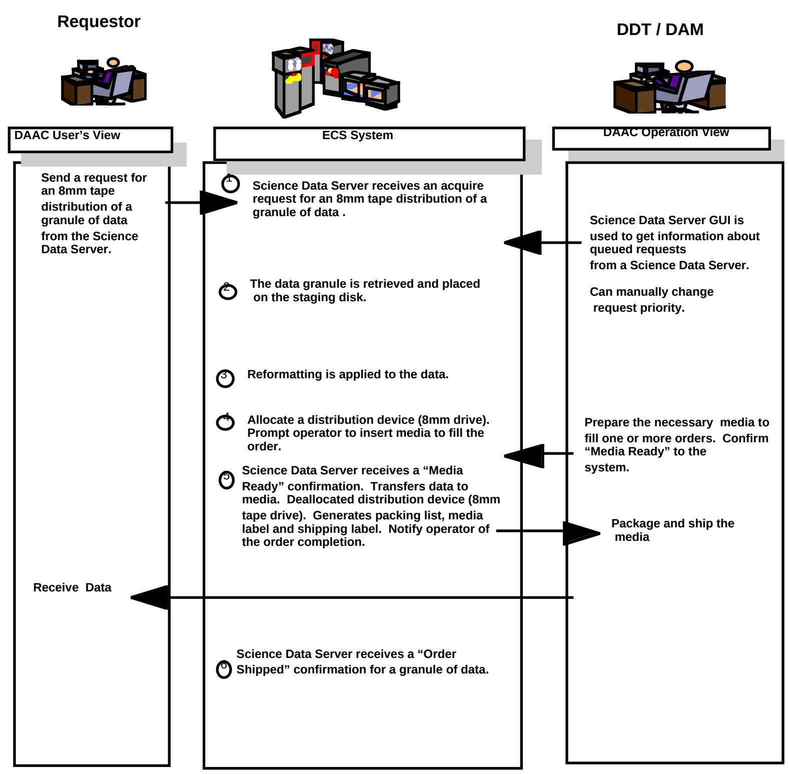


Figure 3.2.15.3-2. Data Distribution (Physical Media) Points of View

The detailed points of view diagram shown in Figure 3.2.15.3-3 depicts the a data push fault.

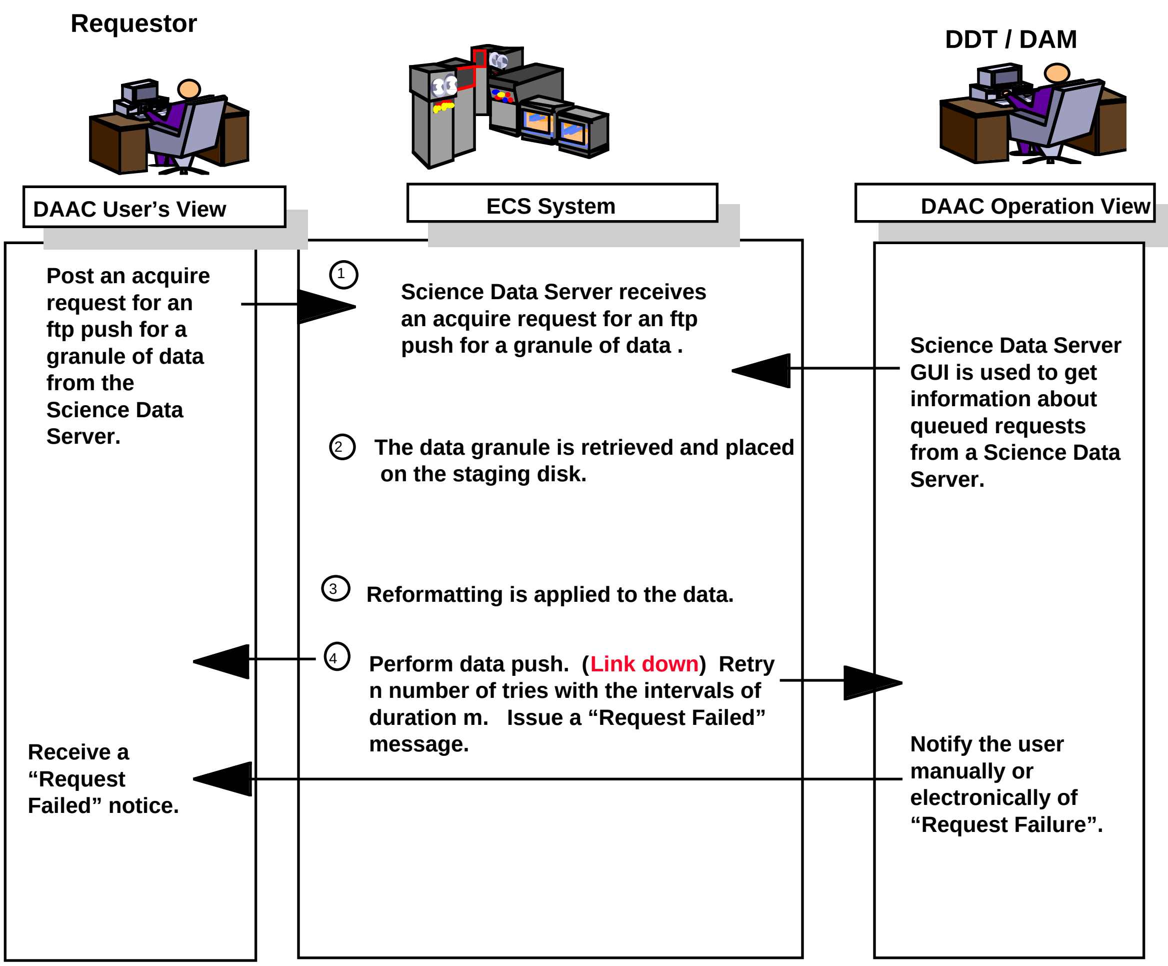


Figure 3.2.15.3-3. Data Distribution (Data Push Fault) Points of View

3.2.15.4Tracking Data Distribution Activities Workflow

The scenario depicted in Figure 3.2.15.4-1 shows the steps taken in tracking data distribution activities. The data activity Table shows the object, data element, and all relevant operator role activities.

Workflow

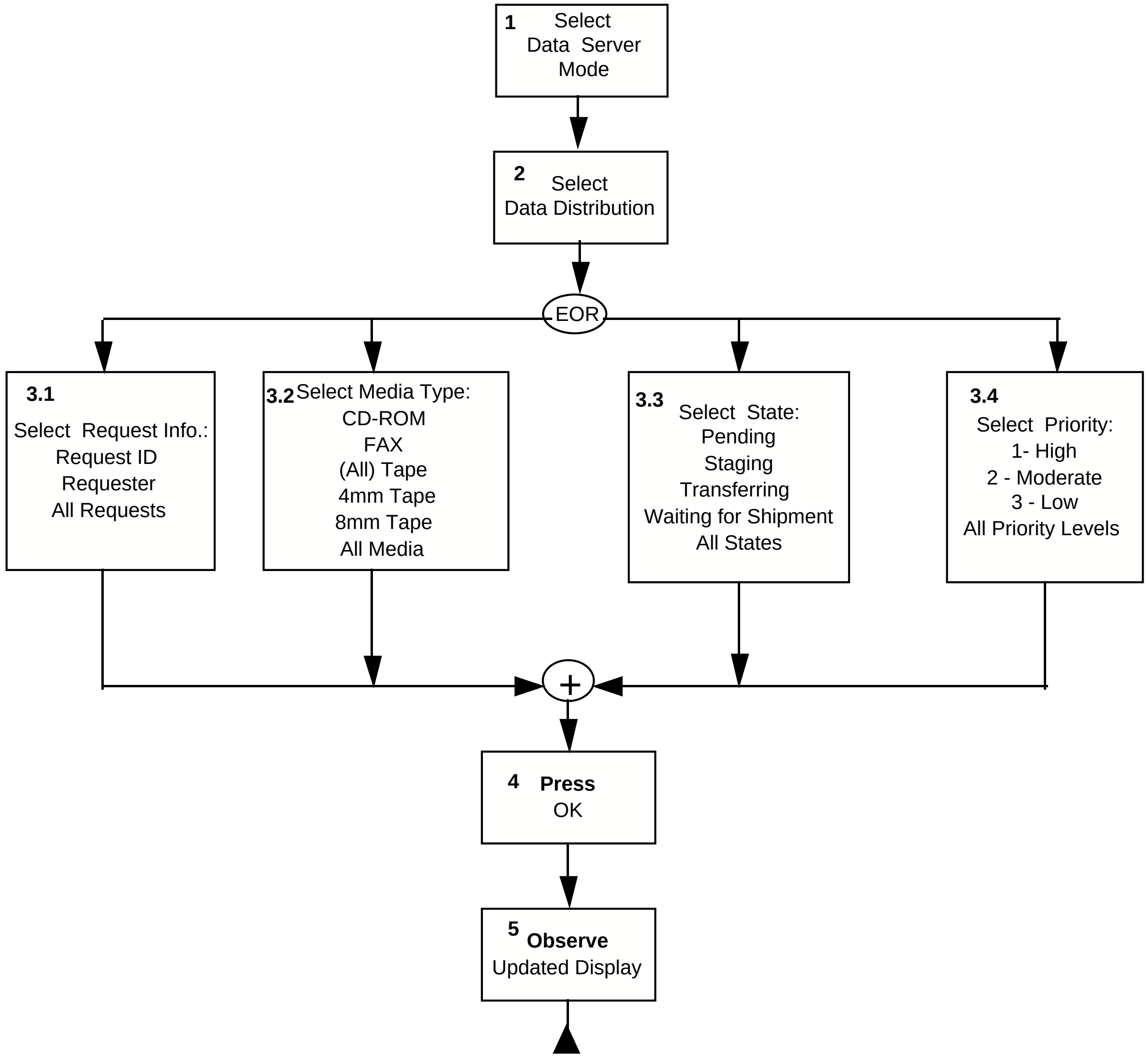


Figure 3.2.15.4-1. Tracking Data Distribution Activities Workflow

Data Activity

Table 3.2.15.4-1. Data Activity for Tracking Data Distribution Activities

Object Name	Data Element	Activity							
		1	2	3.1	3.2	3.3	3.4	4	5
DsGuAdminGUI	Data Server Option	I							
	Data Distribution		I						
	Press OK							I	
	Observe								I
DsDdRequestList	Status		D	D	D	D			D
	Media		D	D	D	D			D
	Request ID		D	D	D	D			D
	Requestor		D	D	D	D			D
	Priority		D	D	D	D	I		D
	Size		D	D	D	D			D
	Submission Time		D	D	D	D			D
	# of Files		D	D	D	D			D
	# of Volumes		D	D	D	D			D
	# of Subrequests		D	D	D	D			D
	Request Information			I					
	Media Type				I				
	State					I			

3.2.15.5Writing to 8mm Tape Workflow

The scenario workflow depicted in Figure 3.2.15.5-1 shows the steps taken when writing to an 8mm tape for mail distribution. The data activity Table shows the object, data element, and all relevant operator role activities.

Workflow

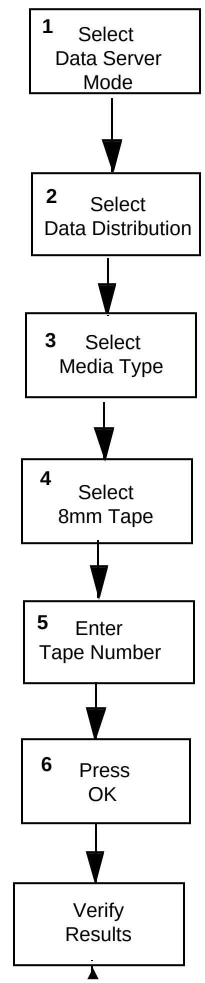


Figure 3.2.15.5-1. Writing to 8mm Tape Workflow

Data Activity

Table 3.2.15.5-1. Data Activity for Writing to 8mm Tape

Object Name	Data Element	Activity						
		1	2	3	4	5	6	7
DsGuAdminGUI	Data Server Option	I						
	Data Distribution		I					
	Press OK						I	
	Verify Results							I
DsDdRequestList	Status		D					D
	Media		D					D
	Request ID		D					D
	Requestor		D					D
	Priority		D					D
	Size		D					D
	Submission Time		D					D
	# of Files		D					D
	# of Volumes		D					D
	# of Subrequests		D					D
	Media Type			I				
	8mm Tape				I			
	Tape Number					I		

3.2.15.6 Viewing Pull Volume Information Workflow

The scenario workflow depicted in Figure 3.2.15.6-1 shows the steps taken when viewing the pull volume information. The data activity table shows the object, data element, and all relevant operator role activities.

Workflow

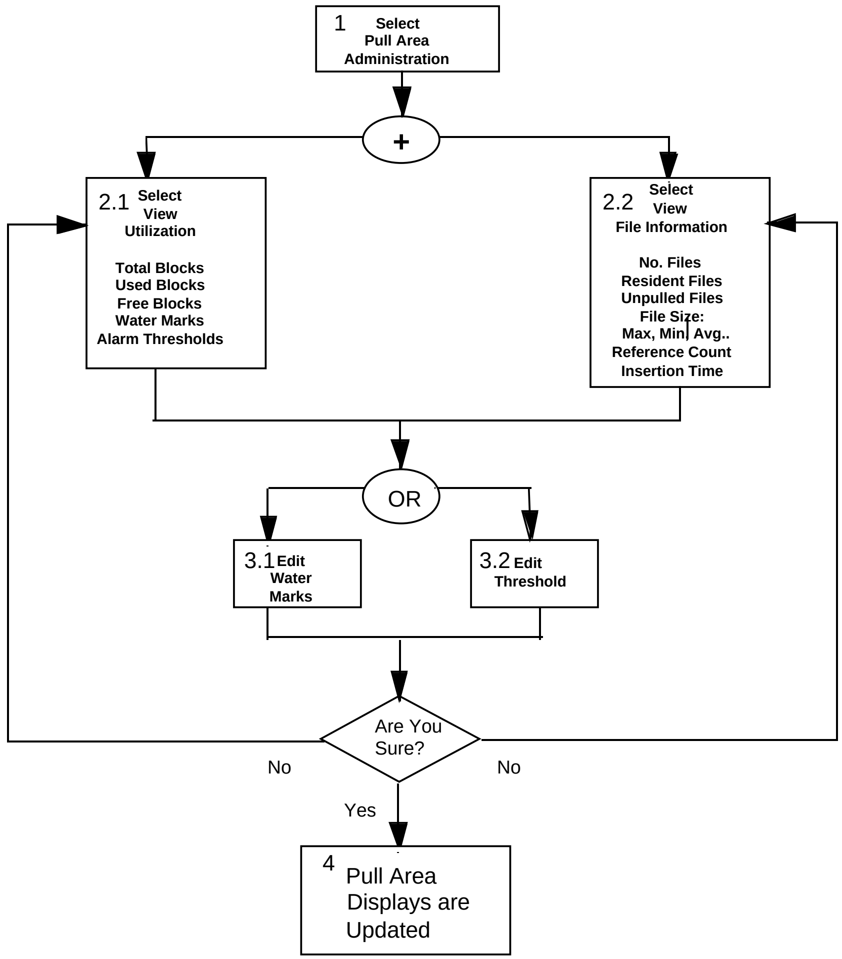


Figure 3.2.15.6-1. Viewing Pull Volume Information Workflow

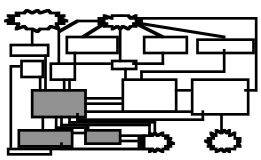
Data Activity

Table 3.2.15.6-1. Data Activity for Viewing Pull Volume Information

Object Name	Data Element	Activity					
		1	2.1	2.2	3.1	3.2	4
DsGuAdminGUI	Data Server Option	I					
	Pull Area Administration						
DsStPullMonitor	Pull Area Utilization		D				D
	Total Block Size		D				D
	Blocks Used		D				D
	Free Blocks		D				D
	Water Mark		D		E		D
	Alarm Threshold		D			E	D
	File Information			D			D
	# of Files			D			D
	Resident Files			D			D
	Unpulled Files			D			D
	File Size			D			D
	Reference count			D			D
	Insertion Time			D			D
	Updated Pull Area						

3.2.16 DIM / LIM Data Dictionary Update Error

In an error-free schema update scenario, the data server provides the data dictionary with the new valids and schema upon the instantiation or modification at the data server of the data type. The data dictionary provides the point of entry for updates to the unified data base of which DIMs and LIMs are a part. The data dictionary automatically updates the data dictionary database with the information provided to it by the data server. This update effectively updates the LIM and DIM schema, since the DIM, LIM and Data Dictionary are all different views of the data dictionary database. After the update, the data dictionary provides a notification to the data server that verifies completion of the update. The update verification ensures that the ESDT has been fully instantiated in the replicated database. This activity is automated for DIM and LIM and largely transparent to operators unless errors are encountered.



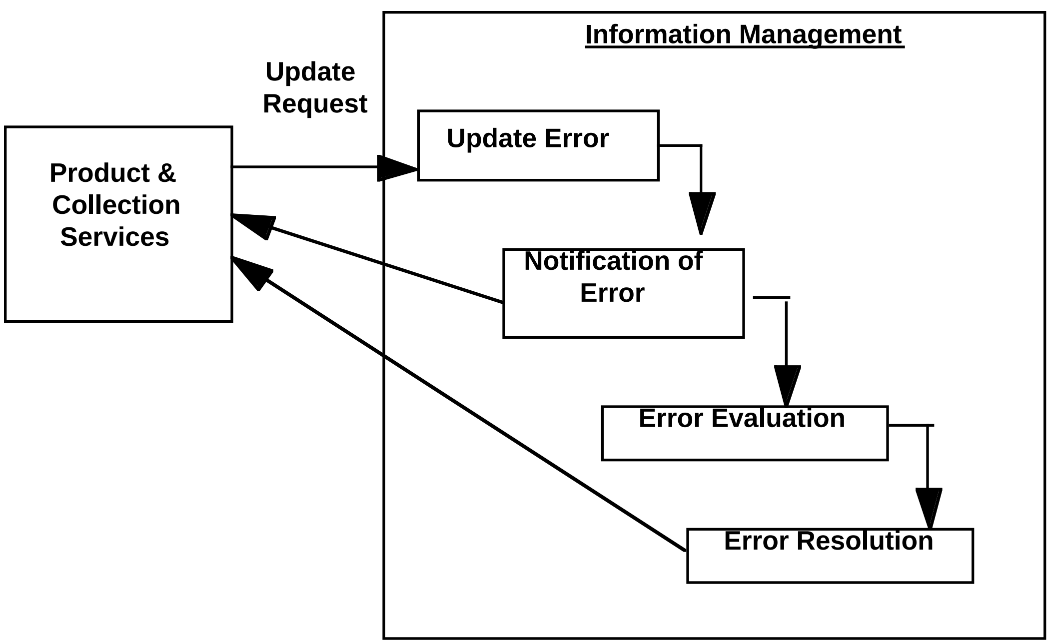


Figure 3.2.16-1. Data Dictionary Update Error Resolution Context Diagram

3.2.16.1Scenario Description

This scenario describes the opertor activities in the event conditions occur when problems are found by the data dictionary in the exported valids and schema. The scenario assumes the V0 data has been converted to the ECS model and the Data Server has successfully instantiated or modified the data types. When an update failure occurs the Data Dictionary will notify the Data Server and an e-mail message is sent to the DAAC Science Data Specialist. The problem is then investigated by searching through various logs and the DAAC Science Data Specialist and Data Base Administrator resolve the database update problem.   Figure 3.2.16.1-1 depicts the functional flow for the detection and resolution of the data dictionary update error.

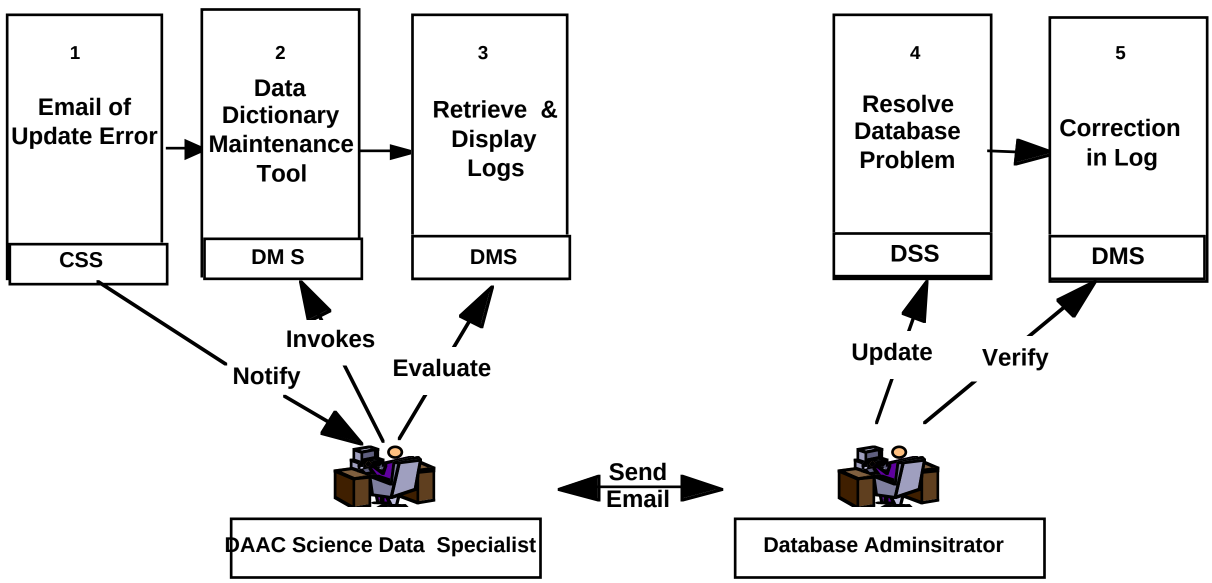


Figure 3.2.16.1-1. Data Dictionary Update Error Resolution Functional Flow

3.2.16.2Operator Roles

DAAC Science Data Specialist receives notification of update error and investigates problem using the dictionary maintenance tool. The logs are analyzed and forwards the corrected metatdata to the DBA.

Data Base Administrator receives corrected metadata and updates the database.

3.2.16.3Detailed Points of View

The Data Dictionary Update Error Resolution points of view diagram details the steps that the DAAC Science Data Specialist and Database Administrator must take to correct the update error.

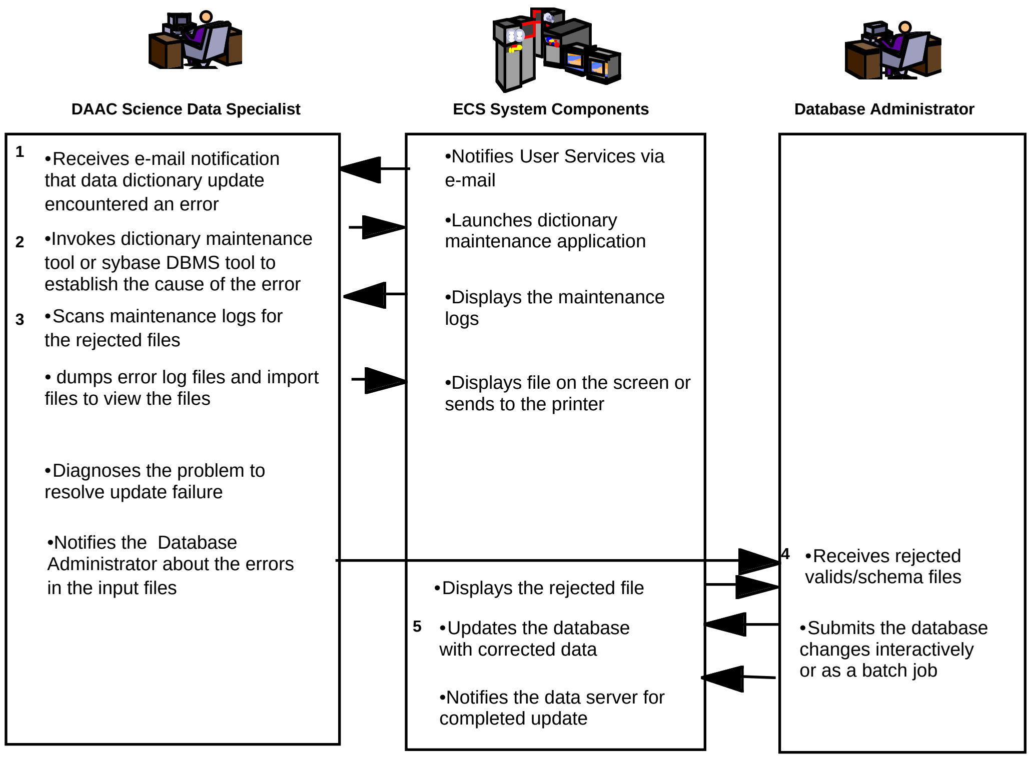


Figure 3.2.16.3-1. Data Dictionary Update Error Resolution Points of View

3.2.16.4Data Dictionary Update Error Resolution Workflow

The workflow in Figure 3.2.16.4-1 details the steps that the DAAC Science Data Specialist takes to resolve the data dictionary update error.

This section continues on the next page.

Workflow

ROLE: DAAC Science Data Specialist

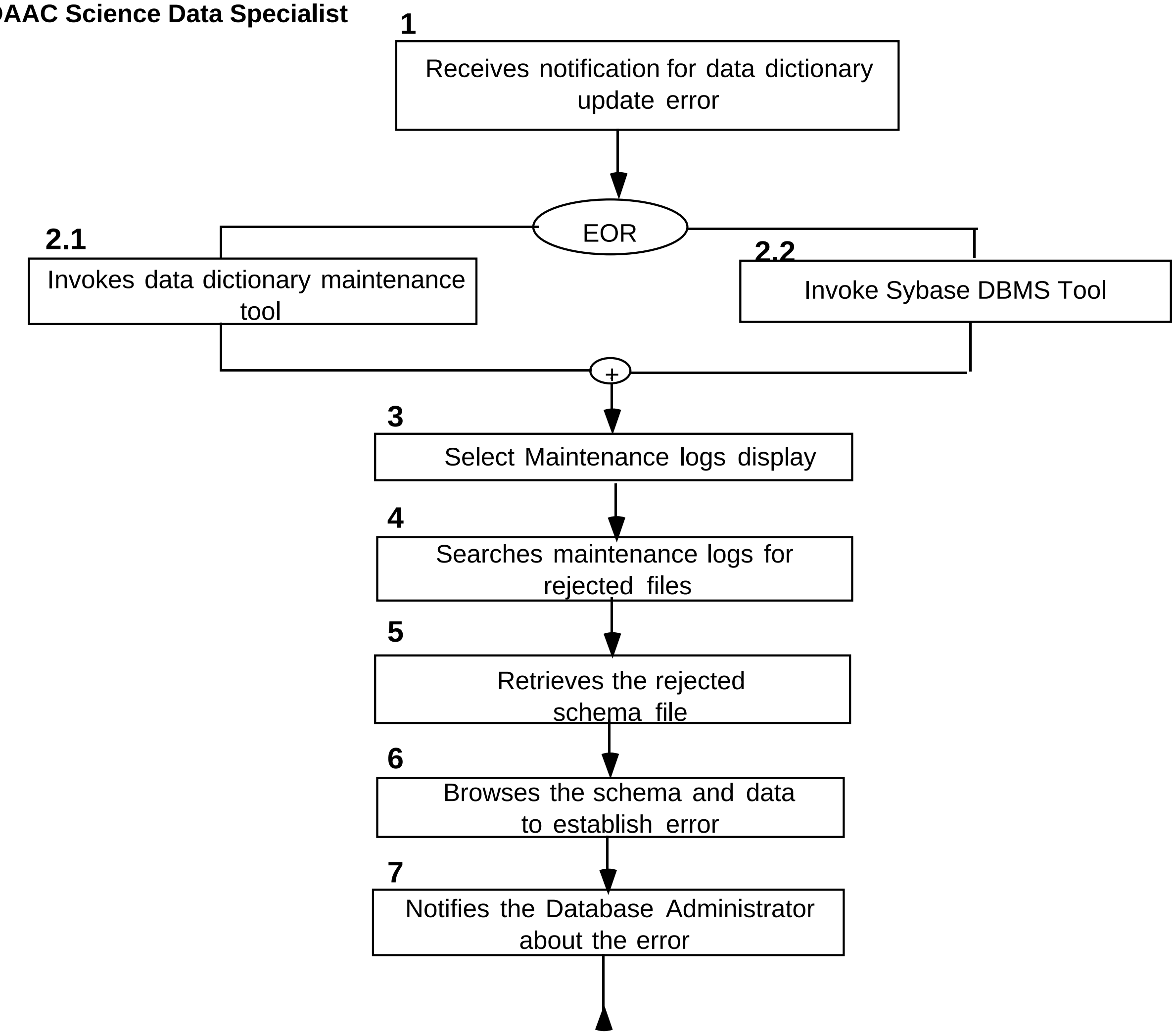


Figure 3.2.16.4-1. Science Data Specialist Workflow

Data Activity

Table 3.2.16.4-1 Data Activity for Science Data Specialist

Object Name	Data Element	Activity							
		1	2.1	2.2	3	4	5	6	7
CsEmMailRelA	messageId messageText	D							
DmDdErrorlog	errorLog		D						
	errorLog			D					
	errorId errorMessage errorType				D	D			
DmDdSchemaInfo	fileName fileId correctionInfo validsInfo					D	D	D	
CsEmMailRelA	messageId messageText								I

3.2.16.5 Data Dictionary Update Error Resolution Workflow

The workflow in Figure 3.2.16.5-1 details the steps that the Database Administrator takes to resolve the data dictionary update error.

Workflow

ROLE: Database Administrator

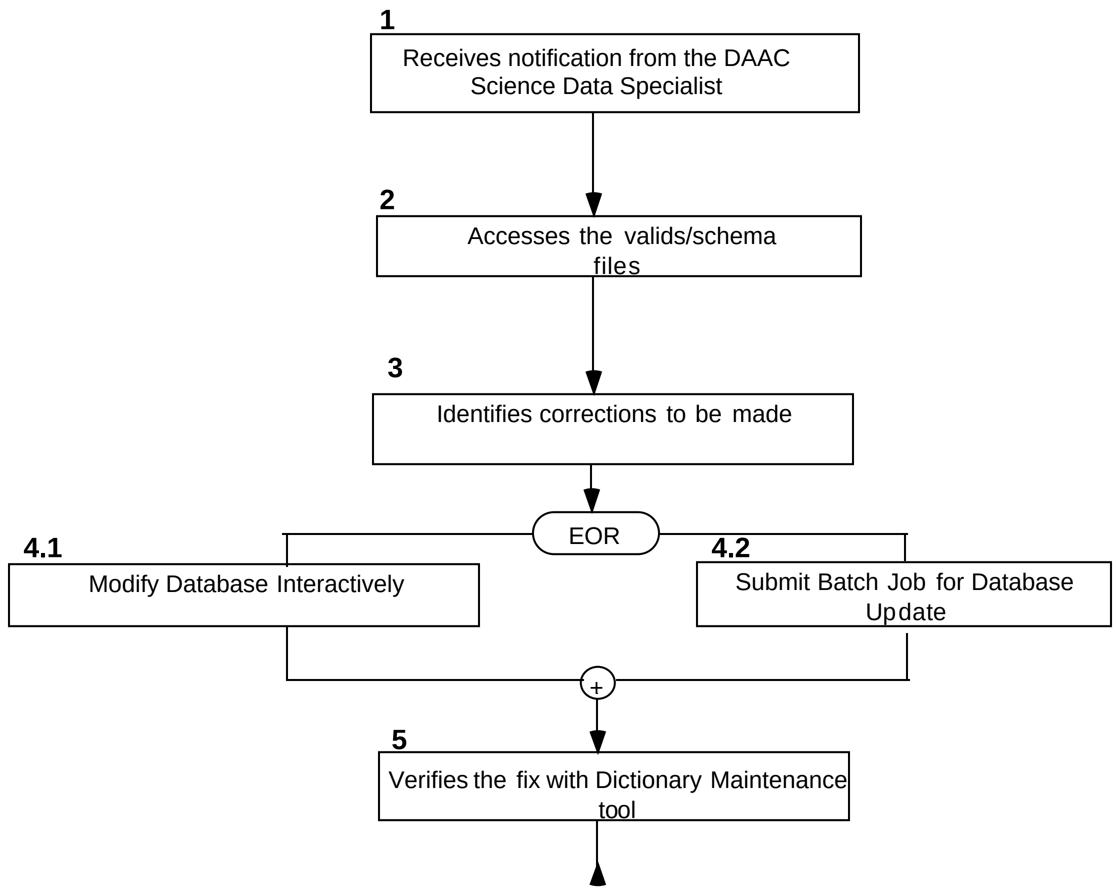


Figure 3.2.16.5-1. Database Administrator Workflow

Data Activity

Table 3.2.16.5-1 Data Activity for Database Administrator

Object Name	Data Element	Activity					
		1	2	3	4.1	4.2	5
CsEmMailRelA	messageId messageText	D					
DmDdErrorlog	errorLog						I
	errorLog			D	I	I	
	errorId errorMessage errorType						
DmDdSchemaInfo	fileName fileId correctionInfo validsInfo		D				

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