4.2.3 Science Data Distribution Activities

Discussion is provided for the Release B data distribution process describing the modes of distribution (electronic, and media) with a definition of the processes that follows. The objective of the following paragraphs is to demonstrate that the distribution process is largely automated, however DAAC operation's staff is required to support physical media distribution, e.g., U.S. mailing of a 8 mm tape, resolve problems, monitor electronic distribution operations, and coordinate with the appropriate external/internal sources to resolve distribution conflicts. The

added value of Release B functionality is emphasized while demonstrating the system activity (Release A & B).

Electronic Data Distribution

A Release B operations process illustrates what (along with descriptive text) roles the operation's staff plays with electronic distribution, e.g., working with User Services in resolving problems. This process illustrates examples of the types of data or document formats, e.g., HDF, HTML used in electronic distribution which, therefore, requires familiarity by the operation's staff. Tools that are required to perform monitoring, analysis, visualization, and report generation are defined. The types of output (such as transfers in process, status, and alarms) that is displayed to the operator and how the operator would respond including interaction with other operators at the DAAC, User Services and if necessary outside of the DAAC would be presented. The process also identifies the maintenance needed for electronic distribution of data and the role that the DAAC operations plays in the maintenance.

Media Distribution

A Release B operations process illustrates what (along with descriptive text) roles the operation's staff plays in providing physical media support and delivery. The process includes the steps taken by the operator/mail clerk from the time the request is submitted by the user until the operator has confirmed receipt. Examples of steps within the process: the mounting of tapes (non-robotics), using the auto-processed address label and shipping documentation, wrapping and shipping physical media, and logging and tracking order and report generation.

4.2.3.1 Network Data Distribution (Pull) Scenario (Nominal)

This scenario describes the process and affected components when data is requested for distribution via an external network. The mechanism for distribution is a File Transfer Protocol (ftp). For data pull operations, data will be staged to the appropriate Pull Volume and a notification will be sent to the requester either via an Active Client or via email. The notification will provide the requester with the necessary path and file naming information to retrieve the requested data from the associated Pull Volume. Data will remain on the associated Pull Volume for a specific time interval established via DAAC Policy. A nominal network pull distribution scenario is described in Table 4.2.3.1-1. A graphical representation of this scenario is depicted in Figure 4.2.3.1-1.

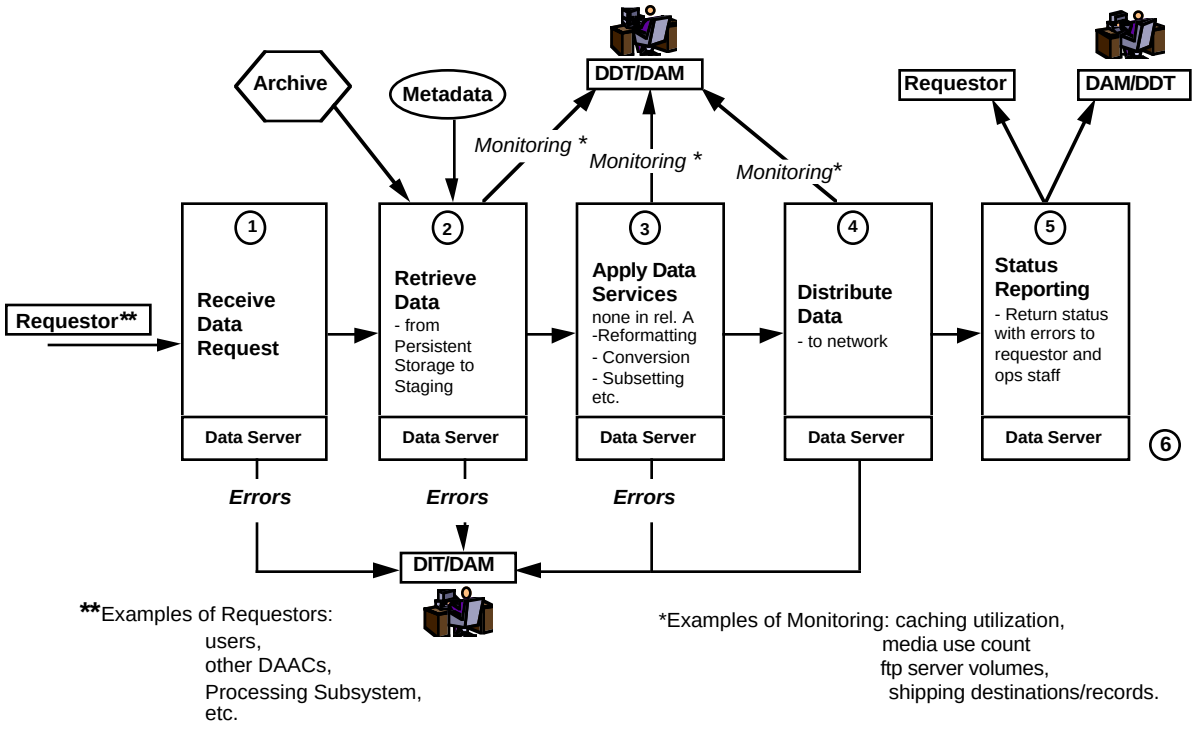

Figure 4.2.3.1-1. Network Data Distribution (Pull) Scenario (Nominal)

Table 4.2.3.1-1. Network Data Distribution (Pull) Scenario (Nominal) (1 of 2)

Purpose and Precondition:

A user connects to the system and performs a search for a specific data product. When the system notifies the user that the product is found, the user requests an ftp pull of that data. The data is retrieved from the archive and placed on the Data Server Pull Volume. The user is notified of the data's readiness and now has a DAAC-set period of time to retrieve the data. The data is deleted from the Pull Volume after an operator confirmation (the confirmation can be turned off).This scenario assumes operator confirmation of staging delete is set to off.

Step	Operator/User	System	Purpose
1	A user establishes a client session to a Data Server and creates a working collection of data.	The Data Server assigns a session ID and logs the initiation of the session. The Data Server logs and queues the search request sent by the user to create a working collection and searches the Metadata Database in accordance with the user's indicated search attributes when the request is reached in the request queue. Identified granules are returned to the user's working collection.	Establish a Data Server session an initiate a search.
2	The user refines the contents of the working collection to specific granules of high interest. The user invokes an acquire (via ftp pull) service to obtain the high interest granules.	The Data Server logs and queues subsequent search requests to identify high interest granules and searches the Metadata Database in accordance with the user's refined search attributes when the request is reached in the request queue. The user's working collection is updated with the results of each subsequent search. Distribution Management logs the Acquire Via ftp Pull Request and sends a Data Retrieval Request to Storage Management listing the granules of high interest to be retrieved and placed on the Pull Volume.	Refine search criteria to high interest data and acquire this data.
3		Storage management logs and queues the Data Retrieval Request. When the request is reached in the request queue, Storage Management requests the appropriate granules be retrieved from the archive via the Archive Management OTS Product. The granules are placed on the Working Storage and transferred to the Pull Volume, the reference count for each file in those granules is incremented and a Data Retrieval Request completed message is logged and sent to Distribution Management .	Retrieve the appropriate granules and place them on the user pull volume.

Table 4.2.3.1-1. Network Data Distribution (Pull) Scenario (Nominal) (2 of 2)

Step	Operator/User	System	Purpose
4		Distribution Management extracts the file names and path names associated with the high interest granules. A Retrieval Complete Notification is created which includes file and path names. This notification is sent to the requesting user's client.	Notify user that data is available.
5	The users retrieves the requested data from the DAAC's pull volume.	CSS Subsystem detects and logs that an authorized user has accessed specific files on the pull volume. CSS provides a Pull Volume Access Notification to Storage Management which enumerates the path names and files retrieved by an associated user ID.	User pulls data. ECS detects the pull and arranges volume cleanup.
6		Storage Management receives and logs the Pull Volume Access Notification. Storage Management parses the notification and determines which files were retrieved by the user. The reference count for those files is decremented.	Update reference counters.

4.2.3.2 Network Data Distribution (Push) Scenario (Nominal)

This scenario describes the process and affected components when data is being distributed via an external network. The mechanism for distribution is a File Transfer Protocol (ftp). For data push operations, data will be staged to Working Storage and then transferred to the requester. The distribution request specifies the necessary system, path and security information to allow the transfer. A notification is sent to the user when data has been transferred. Data will remain on the Working Storage area for a specific time interval established via DAAC Policy. A nominal network push distribution scenario is described in Table 4.2.3.2-1. A graphical representation of this scenario is depicted in Figure 4.2.3.2-1.

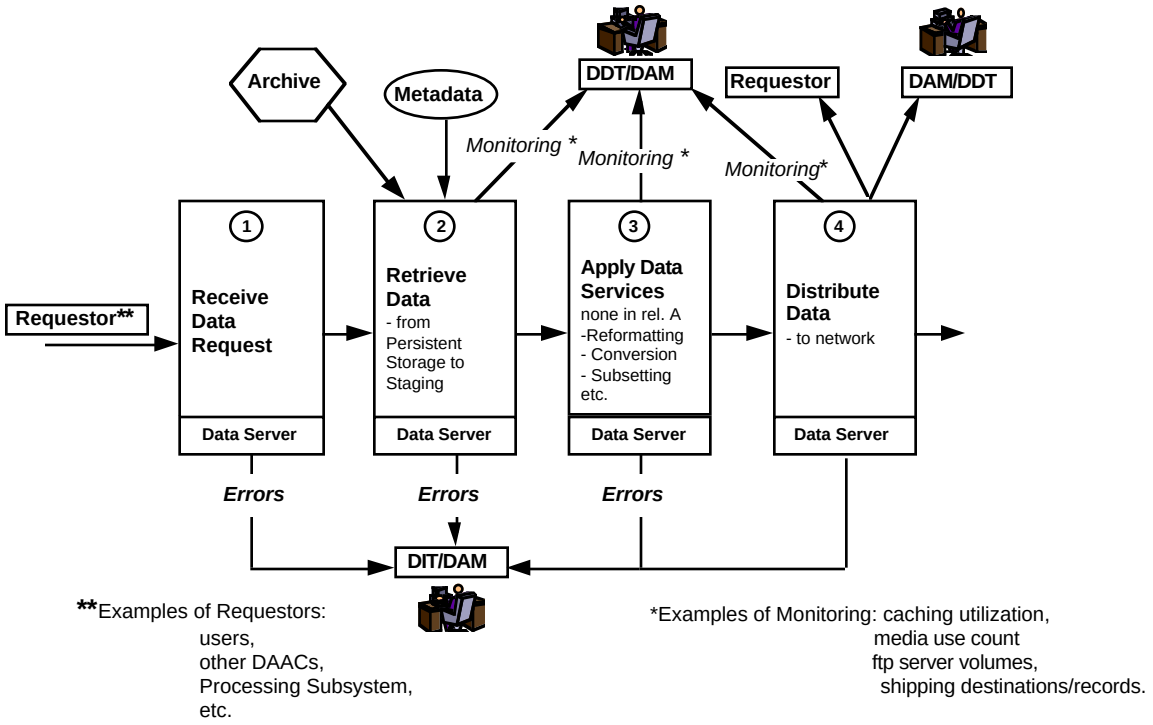

Figure 4.2.3.2-1. Network Data Distribution (Push) Scenario (Nominal)

Table 4.2.3.2-1 Network Data Distribution (Push) Scenario (Nominal) (1 of 2)

Purpose and Precondition:

A user connects to the system and performs a search for a specific data product. When the system notifies the user that the product is found, the user requests an ftp push of that data (the user supplies all necessary security information that would enable placing the requested data directly on the user's system). The data is retrieved from the archive and placed on the Data Server Working Storage. The data is pushed to the user's system and a notification is sent upon completion.

Step	Operator/User	System	Purpose
1	A user establishes a client session to a Data Server and creates a working collection of data.	The Data Server assigns a session ID and logs the initiation of the session. The Data Server logs and queues the search request sent by the user to create a working collection and searches the Metadata Database in accordance with the user's indicated search attributes when the request is reached in the request queue. Identified granules are returned to the user's working collection.	Establish a Data Server session an initiate a search.

Table 4.2.3.2-1 Network Data Distribution (Push) Scenario (Nominal) (2 of 2)

Step	Operator/User	System	Purpose
2	The user refines the contents of the working collection to specific granules of high interest. The user invokes an acquire (via ftp push) service to obtain the high interest granules.	The Data Server logs and queues subsequent search requests to identify high interest granules and searches the Metadata Database in accordance with the user's refined search attributes when the request is reached in the request queue. The user's working collection is updated with the results of each subsequent search. Distribution Management logs the acquire via ftp push request. When the request thread is processed , Distribution Management sends a Data Retrieval Request to Storage Management listing the granules of high interest to be retrieved.	Refine search criteria to high interest data and acquire this data.
3		Storage management logs and queues the Data Retrieval Request. When the request is reached in the request queue, Storage Management requests the appropriate granules be retrieved from the archive via the Archive Management OTS Product. The granules are placed on the Working Storage and a Data Retrieval Request completed message is logged and sent to Distribution Management.	Retrieve granule files and stage them for distribution.
4		Distribution Management provides login, system, and security information received in the Acquire via ftp Push, to Storage Management. Storage Management utilizes CSS services to push the high interest granules to the user's system. Distribution Management logs a distribution complete message and sends a distribution completed notification to the client or emails the user if no client is active.	Distribute data and notify user that data is available.

4.2.3.3 Network Data Distribution (Push) Scenario (Fault)

This scenario describes the process and affected components when data is being distributed via an external network or internally to another subsystem. The mechanism for distribution is a File Transfer Protocol (ftp). For data push operations, data will be staged to Working Storage and then transferred to the requester. The distribution request specifies the necessary system, path and security information to allow the transfer. A notification is sent to the user when data has been transferred. Data will remain on the Working Storage area for a specific time interval established via DAAC Policy. One potential network push fault scenario is described in Table 4.2.3.3-1. A graphical representation of this scenario is depicted in Figure 4.2.3.3-1.

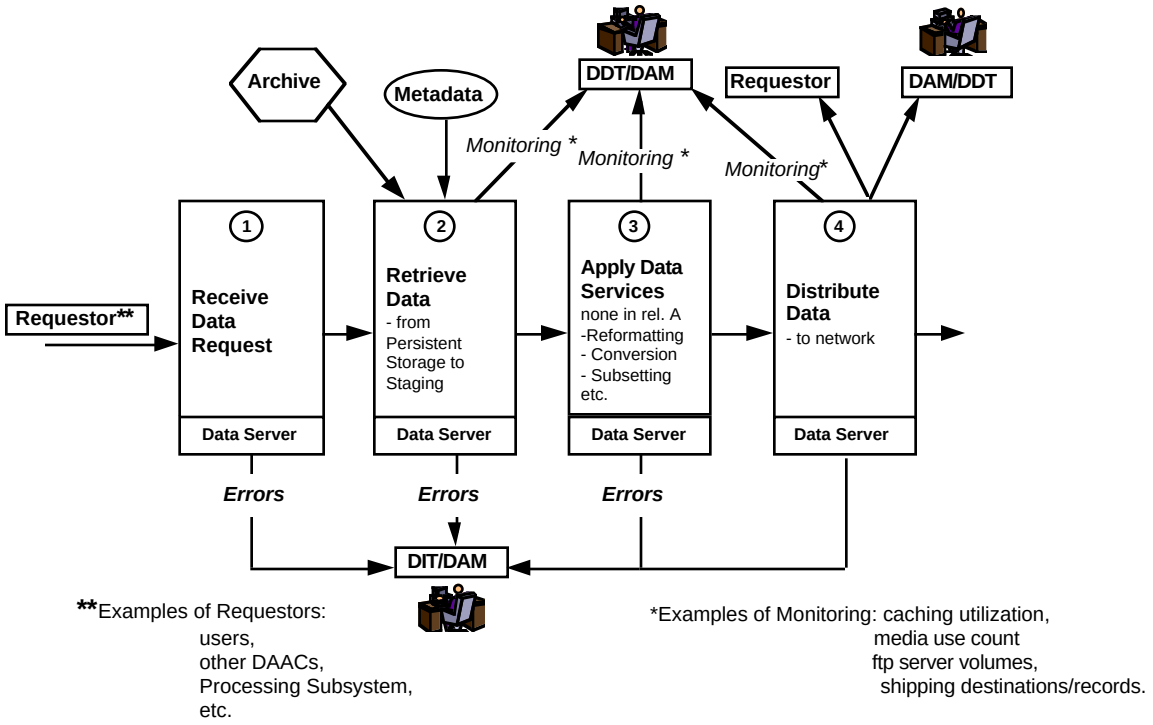

Figure 4.2.3.3-1. Network Data Distribution (Push) Scenario (Fault)

Table 4.2.3.3-1 Network Data Distribution (Push) Scenario (Fault)

Purpose and Precondition:

A user connects to the system and performs a search for a specific data product. When the system notifies the user that the product is found, the user requests an ftp push of that data (the user supplies all necessary security information that would enable placing the requested data directly on the user's system). The data is retrieved from the archive and placed on the Data Server Working Storage. Data Server connects to the user's system and begins data transfer. A fault occurs at this time, severing the link to the user's system. The Data Server retries N times (where N is determined by DAAC Policy). If none of the retries are successful, the requester is notified of the error and the request is canceled. the requester is notified of the failure.

Step	Operator/User	System	Purpose
1	A user establishes a client session to a Data Server and creates a working collection of data.	The Data Server assigns a session ID and logs the initiation of the session. The Data Server logs and queues the search request sent by the user to create a working collection and searches the Metadata Database in accordance with the user's indicated search attributes when the request is reached in the request queue. Identified granules are returned to the user's working collection.	Establish a Data Server session an initiate a search.
2	The user refines the contents of the working collection to specific granules of high interest. The user invokes an acquire (via ftp push) service to obtain the high interest granules.	The Data Server logs and queues subsequent search requests to identify high interest granules and searches the Metadata Database in accordance with the user's refined search attributes when the request is reached in the request queue. The user's working collection is updated with the results of each subsequent search. Distribution Management logs and queues the acquire via ftp push request. When the request thread is processed , Distribution Management sends a Data Retrieval Request to Storage Management listing the granules of high interest to be retrieved.	Refine search criteria to high interest data and acquire this data.
3		Storage management logs and queues the Data Retrieval Request. When the request is reached in the request queue, Storage Management requests the appropriate granules be retrieved from the archive via the Archive Management OTS Product. The granules are placed on the Working Storage and a Data Retrieval Request completed message is logged and sent to Distribution Management.	Retrieve granule files and stage them for distribution.
4		Distribution Management utilizing login, system and security information in the Data Distribution Request, attempts to push the high interest granules to the user's system. The transfer is interrupted. Distribution Management waits the prescribed interval and retries. The wait and retry sequence repeats until successful transmission or until the DAAC Policy specified number of retries is exceeded. Distribution Management sends a Distribution Request Failure Message to the operator console and passes on a distribution failure notification to the client or emails the user if no client is active.	Data distribution failed. Request failure reported. Notify the user.

4.2.3.4 Physical Media Distribution Scenario

This scenario describes the process and affected components when data is being distributed via physical media. The mechanism for distribution is Unix tar or cpio formatted granules on a physical data volume (e.g. 6250, 4mm, 8mm, 3480/3490 tape) and Unix structured file system,

tar, or cpio for CD ROM. For physical media operations, data will be staged to Working Storage and then transferred to the Physical Media Distribution Volume. The distribution request specifies the necessary Unix data format, compression method if any, and media form factor required. A notification is sent to the user when data has been shipped. Data will remain on the Working Storage area for a specific time interval established via DAAC Policy. One of many potential physical media distribution scenarios is described in Table 4.2.3.4-1.

Table 4.2.3.4-1. Physical Media Distribution Scenario (1 of 2)

Purpose and Precondition:

A user connects to the system and performs a search for a specific data product. When the system notifies the user that the product is found, the user requests an physical media distribution of the data. The data is retrieved from the archive and placed on the Data Server Working Storage. The data is transferred to the Physical Media Distribution Volume, copied to physical media, and shipped to the user. A email message is sent to the user when the medium has been shipped.

Step	Operator/User	System	Purpose
1	A user establishes a client session to a Data Server and creates a working collection of data.	The Data Server assigns a session ID and logs the initiation of the session. The Data Server logs and queues the search request sent by the user to create a working collection and searches the Metadata Database in accordance with the user's indicated search attributes when the request is reached in the request queue. Identified granules are returned to the user's working collection.	Establish a Data Server session an initiate a search.
2	The user refines the contents of the working collection to specific granules of high interest. The user invokes an acquire (via physical media) service to obtain the high interest granules.	The Data Server logs and queues subsequent search requests to identify high interest granules and searches the Metadata Database in accordance with the user's refined search attributes when the request is reached in the request queue. The user's working collection is updated with the results of each subsequent search. Distribution Management logs and queues the acquire via physical media request. When the request thread is processed , Distribution Management sends a Data Retrieval Request to Storage Management listing the granules of high interest to be retrieved.	Refine search criteria to high interest data and acquire this data.

Table 4.2.3.4-1. Physical Media Distribution Scenario (2 of 2)

Step	Operator/User	System	Purpose
3		Storage management logs and queues the Data Retrieval Request. When the request is reached in the request queue, Storage Management requests the appropriate granules be retrieved from the archive via the Archive Management OTS Product. The granules are placed on the Working Storage Volume and a Data Retrieval Request completed message is logged and sent to Distribution Management.	Retrieve the appropriate granules and place them on the user pull volume.
4		Distribution Management provides format parameters received in the acquire via physical media request, to Storage Management. Storage Management generates the physical media volume requested by the user. Distribution Management generates volume labels, mailing labels, and a packing list. Distribution Management logs the completion of media generation and alerts the Data Distribution Technician.	Distribute data and notify user that data is available.
5	The Data Distribution Technician affixes the volume and mailing labels, packages the physical media volume along with the packing list, and ships the package. The operator then updates the status of the Distribution Management Request to "shipped".		Package and ship the physical media volume.
6		Distribution Management receives and logs the state change on the Distribution Management Request and sends an email message to the requester stating the requested medium has been shipped.	Notify user.

4.2.3.5 Network Data Distribution (Pull) Scenario (Flood of Requests)

This scenario describes the process and affected components when multiple users request data for distribution via an external network. The mechanism for distribution is a File Transfer Protocol (ftp). For data pull operations, data will be staged to the appropriate Pull Volume and a notification will be sent to the requester either via an Active Client or via email. The notification will provide the requester with the necessary path and file naming information to retrieve the requested data from the associated Pull Volume. Data will remain on the associated Pull Volume for a specific time interval established via DAAC Policy. Table 4.2.3.5-1 describes the Data Server's approach to accommodating a flood of requests. A graphical representation of this scenario is depicted in Figure 4.2.3.5-1.

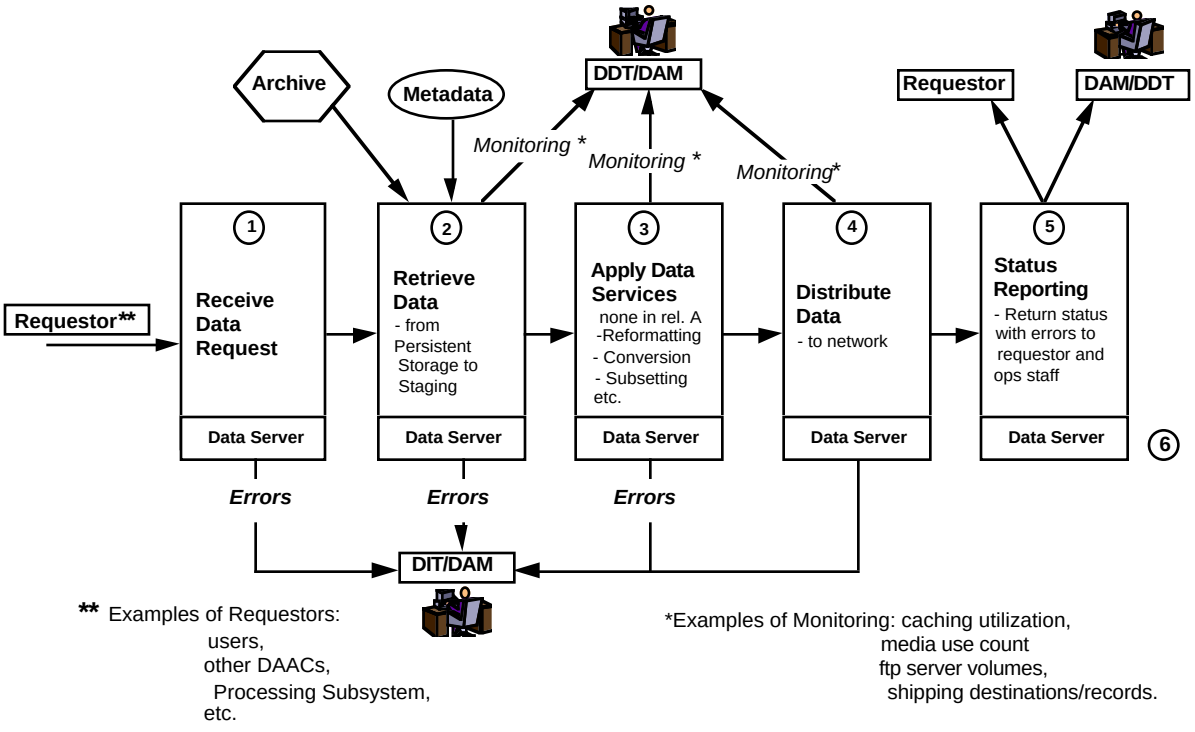

Figure 4.2.3.5-1. Network Data Distribution (Pull) Scenario (Flood of Requests)

Table 4.2.3.5-1. Network Data Distribution (Pull) Scenario (Flood of Requests) (1 of 2)

Purpose and Precondition:

A vast number of users are requesting distribution of multiple data products via ftp pull. The Science data server active sessions threshold is exceeded and session requests are queued. Data is retrieved for active sessions and placed on the Pull Volume. The Pull Volume becomes full and Distribution Requests are queued. Each user is notified of the data's readiness and now has a DAAC-set period of time to retrieve the data. Any time the reference count for a file reaches zero, the associated files are deleted and the free space list is updated.

Step	Operator/User	System	Purpose
1	A vast number of users attempt to establish client sessions to a Data Server and create a working collection of data.	The Data Server assigns a session ID and logs the initiation of each session until the active session limit is reached. Subsequent session requests are placed on the inactive vector. The Data Server logs and queues the search requests sent by the users of active sessions. Data Server periodically reorders the request queue based on priority and begins processing the associated requests. The Data Server searches the Metadata Database in accordance with each user's indicated search attributes when the request is reached in the request queue. Identified granules are returned to each user's working collection.	Establish a Data Server session an initiate a search.
2	Each user refines the contents of the working collection to specific granules of high interest. The users invoke an acquire (via ftp pull) service to obtain the high interest granules.	The Data Server logs and queues subsequent search requests sent by the users of active sessions. Data Server periodically reorders the request queue based on priority and begins processing the associated requests. The Data Server searches the Metadata Database in accordance with each user's indicated search attributes when the request is reached in the request queue. Each user's working collection is updated with the results of each subsequent search. Distribution Management logs the Acquire Via ftp Pull Request and sends a Data Retrieval Request to Storage Management listing the granules of high interest to be retrieved.	Refine search criteria to high interest data and acquire this data.
3		Storage management logs and queues the Data Retrieval Request. Storage Management periodically reorders the request queue based on priority and begins processing the associated requests. When the request is reached in the request queue, Storage Management requests the appropriate granules be retrieved from the archive via the Archive Management OTS Product. The granules are placed on the Working Storage Pull Volume, the reference count for each file in those granules is incremented and a Data Retrieval Request completed message is logged and sent to Distribution Management.	Retrieve the appropriate granules and place them on the user pull volume.

Table 4.2.3.5-1. Network Data Distribution (Pull) Scenario (Flood of Requests) (2 of 2)

Step	Operator/User	System	Purpose
4		Distribution Management extracts the file names and path names associated with the high interest granules. A Retrieval Complete Notification is created which includes file and path names. This notification is sent to the requesting user's client or an email notification is sent.	Notify user that data is available.
5	The users retrieves the requested data from the DAAC's pull volume.	CSS Subsystem detects and logs that an authorized user has accessed specific files on the pull volume. CSS provides a Pull Volume Access Notification to Storage Management which enumerates the path names and files retrieved by an associated user ID.	User pulls data. ECS detects the pull and arranges volume cleanup.
6		Storage Management receives and logs the Pull Volume Access Notification. Storage Management parses the notification and determines which files were retrieved by the user. The reference count for those files is decremented. If the reference count for any files reach zero, then Storage Management enters a Pull Volume File Deleted message in the Archive Activity Log. The associated files are deleted from the pull volume and the freed space is added to the free list. Note: Disk residency is a DAAC configurable parameter.	Retrieved pull volume files are deleted.

4.2.3.6 Network Data Distribution (Push) Scenario (Request From Hell)

The mechanism for distribution is a File Transfer Protocol (ftp).This scenario describes the process and affected components when data is requested for distribution via an external network and the request size exceeds the maximum number of files permitted in a request or the maximum capacity of the distribution system. Configurable parameters will exist for the maximum number of bytes in a request, and the maximum number of files in a request. The Distribution Management software will check each request against these limits. A request which exceeds either limit will be suspended with a new state of OPINT, indicating operator intervention required; the operator will also be notified of the existence of the request. The requester will be notified that the request has been suspended because its size requires operator intervention and that the request will be processed as subrequests which will be delivered to the requester individually. The operator can view the details of the request via selection of a view function, which exists in the Release A CDR design and will be augmented to support operator sectioning of these large requests.

The display of the details of a distribution request will include a list of the granules and files in the request, and their individual sizes and types. The operator will be able to position a cursor within this list to delimit (via a GUI-supported selection such as a Delimit button) where the request should be sectioned into multiple requests (termed subrequests). The operator will then be able to submit (via a GUI-supported selection, such as a Submit button) - at his discretion - each of these subrequests for processing. For data push operations, data will be staged to

Working Storage and then transferred to the requester. The distribution request specifies the necessary system, path and security information to allow the transfer. Each submitted subrequest will be processed as an independent request, with generation of its own packing slip (if the distribution is via physical media) and notification to the requester when distribution is complete, with the notification also indicating the parent request of this subrequest. Notification to the requester of completion of the last subrequest will also indicate completion of the entire (parent) request. A nominal network push distribution scenario is described in Table 4.2.3.6-1.

Table 4.2.3.6-1. Network Data Distribution (Push) Scenario (Request From Hell) (1 of 2)

Purpose and Precondition:

A user connects to the system and performs a search. The working collection created from the search is large and the user decides to acquire via ftp push the entire working collection. The request is too large, based on system configurable parameters and is partitioned by the DDIST Technician and sent to the user as appropriate.

Step	Operator/User	System	Purpose
1	A user establishes a client session to a Data Server and creates a working collection of data.	The Data Server assigns a session ID and logs the initiation of the session. The Data Server logs and queues the search request sent by the user to create a working collection and searches the Metadata Database in accordance with the user's indicated search attributes when the request is reached in the request queue. Identified granules are returned to the user's working collection.	Establish a Data Server session an initiate a search.
2	The user is interested in all data in the working collection, and an acquire (via ftp push) service to obtain all granules.	Distribution Management logs the Acquire Via ftp Push Request and detects the request exceeds configurable size parameters. The request is suspended with a status of OPINT, the operator is notified that the request requires operator intervention, and the user is notified the request exceeds size parameters and will be processed as separate subrequests.	Acquire this data.
3	The operator views the request.		Examine request and determine problem and corrective action.
4	The operator selects a subset of the request from the distribution request details and submits this subset.	Distribution Management logs the Acquire Via ftp Push Request and sends a Data Retrieval Request to Storage Management listing the granules to be retrieved and placed on Working Storage.	Subrequest generated and submitted.

Table 4.2.3.6-1. Network Data Distribution (Push) Scenario (Request From Hell) (2 of 2)

Step	Operator/User	System	Purpose
5		Storage management logs and queues the Data Retrieval Request. When the request is reached in the request queue, Storage Management requests the appropriate granules be retrieved from the archive via the Archive Management OTS Product. The granules are placed on the Working Storage and a Data Retrieval Request completed message is logged and sent to Distribution Management.	Retrieve the appropriate granules and place them on the user push volume.
6		Distribution Management provides login, system, and security information received in the Acquire via ftp Push, to Storage Management. Storage Management utilizes CSS services to push the high interest granules to the user's system. Distribution Management logs a distribution complete message and sends a distribution completed notification to the client or emails the user if no client is active.	Distribute data and notify user that data is available.
7	When distribution is completed for the first subrequest, the operator submits each subrequest and steps 5 & 6 are repeated until the original distribution request is fulfilled. The operator does not have to wait for the first subrequest to finish before submitting the next one, nor does he have to submit the next one immediately after the first one completes. Request submissions are completely at the operator's discretion and will be based on available resources.	When processing of the final subrequest is complete the notification which Distribution Management provides to the requester indicates that all subrequests into which the request was sectioned have now been processed.	Continue distribution of the subrequests until the original request if completed.

4.2.3.7 8mm Tape Stacker Distribution Scenario

This scenario describes the process and affected components when data is being distributed via 8mm tape media which is housed in a tape stacker device. The mechanism for distribution is Unix tar or cpio formatted granules on the 8mm tape volume. For physical media operations,

data will be staged to Working Storage and then transferred to the Physical Media Distribution Volume. The distribution request specifies the necessary Unix data format, compression method if any, and media form factor required. A notification is sent to the user when data has been shipped. Data will remain on the Working Storage area for a specific time interval established via DAAC Policy. One of many potential 8mm tape stacker distribution scenarios is described in Table 4.2.3.7-1.

Table 4.2.3.7-1. 8mm Tape Stacker Distribution Scenario (1 of 2)

Purpose and Precondition:

A user connects to the system and performs a search for a specific data product. When the system notifies the user that the product is found, the user requests a physical media distribution of the data via 8mm tape. The data is retrieved from the archive and placed on the Data Server Working Storage. The data is transferred to the Physical Media Distribution Volume, an 8mm tape drive is allocated, and the data is copied to a blank pre-loaded 8mm tape volume in the tape stacker. After generation of the 8mm tape volume has been completed, the 8mm tape device is deallocated and the 8mm tape volume is removed from the tape stacker. An email message is sent to the user when the 8mm tape volume has been packaged and shipped.

Step	Operator/User	System	Purpose
1	A user establishes a client session to a Data Server and creates a working collection of data.	The Data Server assigns a session ID and logs the initiation of the session. The Data Server logs and queues the search request sent by the user to create a working collection and searches the Metadata Database in accordance with the user's indicated search attributes when the request is reached in the request queue. Identified granules are returned to the user's working collection.	Establish a Data Server session an initiate a search.
2	The user refines the contents of the working collection to specific granules of high interest. The user invokes an acquire (via 8mm tape) service to obtain the high interest granules.	The Data Server logs and queues subsequent search requests to identify high interest granules and searches the Metadata Database in accordance with the user's refined search attributes when the request is reached in the request queue. The user's working collection is updated with the results of each subsequent search. Distribution Management logs and queues the acquire via physical media request. When the request thread is processed , Distribution Management sends a Data Retrieval Request to Storage Management listing the granules of high interest to be retrieved.	Refine search criteria to high interest data and acquire this data.
3		Storage management logs and queues the Data Retrieval Request. When the request is reached in the request queue, Storage Management requests the appropriate granules be retrieved from the archive via the Archive Management OTS Product. The granules are placed on the Working Storage Volume and a Data Retrieval Request completed message is logged and sent to Distribution Management.	Retrieve the appropriate granules and place them on the working storage volume.
4		Distribution Management requests and receives from Storage Management allocation of an 8mm tape drive. The tape drive allocated is serviced by an 8mm tape stacker.	Allocate an 8mm tape device.

Table 4.2.3.7-1. 8mm Tape Stacker Distribution Scenario (2 of 2)

Step	Operator/User	System	Purpose
5		Distribution Management requests the Data Distribution Technician for the tape to use for the distribution. The tape stacker has been pre-loaded with blank 8mm tape cartridges which already have media labels affixed.	
6	The Data Distribution Technician indicates that the next available blank tape in the stacker should be used for the distribution.		
7		Distribution Management provides format parameters received in the acquire via physical media request to Storage Management. Storage Management generates the 8-mm tape volume requested by the user. Distribution Management generates mailing labels and a packing list. Distribution Management logs the completion of media generation and alerts the Data Distribution Technician.	Distribute data and notify user that data is available.
8		The Data Distribution Technician is prompted to remove the 8mm tape generated from the tape stacker.	Deallocate the 8mm tape device.
9	The Data Distribution Technician removes the 8mm tape volume, packages it along with the packing list, affixes the mailing labels, and ships the package. The operator then updates the status of the Distribution Management Request to "shipped".		Package and ship the 8mm tape volume.
10		Distribution Management receives and logs the state change on the Distribution Management Request and sends an email message to the requester stating the requested 8mm tape volume has been shipped.	Notify user.

4.2.4 Production Planning Activities

The Production Planning activities begin with the introduction of science software into the system at Science Software Integration and Test time. The Planning subsystem interfaces with the Science Software Integration and Test Tools user interfaces within the Data Processing subsystem for information on Product Generation Executives (PGE) that make up the science software. The information that is collected is referred to as a PGE Profile. This includes information on the PGE executable, the input data type(s) it requires, the output data type(s) it generates, the PGE resource requirements - hardware platform, memory, disk storage etc.

Another preliminary step of Production planning is resource planning. The Ground Event Editor is used to enter the activity description, resource requirements, time requested (both preferred and acceptable variances), and a duration. Reservations for maintenance and testing of system components are made to Production Planning by the Resource Manager on a weekly basis. A resource plan identifying ground events on DAAC-wide resources is produced. (See Scenario 4.1.6.1).

The Production Request Editor is used to enter Production Requests. A Production Request describes an order for data that is to be produced by the Data Processing subsystem. Production Requests may signify the need for processing of new data (Routine Production Requests) or the need for the reprocessing of data (Reprocessing Production Requests). The planning subsystem takes these Production Requests and uses the PGE profile information to work out the Data Processing Requests (DPR) that will be required to fulfill the Production Request. For more information on the use of the Production Request Editor, see Scenario 4.2.4.4.

The Production Planner uses the Production Planning Workbench to issue commands to initiate plan creation, plan activation and the canceling of a plan, as well as providing reports / status of progress within a plan. The Planning subsystem uses the Document Data Server within the Data Server subsystem to store production plans. The Document Data Server then makes those plans available to the user community. To aid in handling inter-DAAC data dependencies, the Planning User Interface will also provide the ability to display another DAACs plan at the local site. The data dependencies between the two sites will be identified by the system.

A nominal duration for a production plan would be 30 day candidate plans that aid in evaluating activities at a high level. This candidate plan is generated and made available by subscription to the community on a biweekly basis. The Planning Subsystem interface incorporates these plans and reflects the current production requests, resource and data availability. Like the 30 day plan, the Production Planner generates 10 day candidate plans on a weekly basis. This plan is almost identical to the 30 day plan; however, it would reflect any changes occurring after the generation of the 30 day plan covering that period. This plan is suitable for high level activities and reflects intermediate changes.

A 27 hour daily schedule is generated and updated as needed from the current planning database and will reflect the current activities. The Production Scheduler must then generate, review, approve and activate the daily plan. A display of the schedule and evaluation is then provided by the Planning subsystem. The Production Scheduler may replan as necessity dictates. This replan would then cover the remainder of the planning period. Additionally, there are a number of "Limited Automatic Replan" events that can be configured to notify the operator that a replan might be wise. These would also be cases for replanning. (See scenario 4.2.4.2 - Replanning Production).

In addition, On-Demand Production Requests are received from the Data Server. On-Demand Production Requests (ODPRs) are checked against resource usage thresholds. If it exceeds a resource usage threshold, it will be passed into the regular planning stream and planned as any other standard or reprocessing request. ODPRs that do not exceed the resource usage threshold will be sent directly to the Data Processing subsystem.

4.2.4.1 Routine Production Scenario

This scenario describes routine production planning within the Planning Subsystem. A routine plan is used to ensure the efficiency and timeliness of processing jobs. The production plan is an automated process of standard production job information contained in the planing database that is populated at algorithm I&T with updates as required. The arrival of data triggers subscription

notifications that will lead to job executions. Standard plans are generated at specified times by the production planner.

Production planning begins with resource planning. Reservations for maintenance and testing of system components and production are made to Resource Planning on a monthly and weekly basis. A Ground Event Editor is used to enter the activity description, resource requirements, time requested (both preferred and acceptable variances), and a duration. A resource plan identifying ground events on DAAC-wide resources is produced including the schedule of resources allocated to production.

A new candidate plan is created using the Planning Production Workbench. The production planner selects the production requests that should be included in the plan from a list that includes standard, reprocessing and any deferred on-demand production requests. The production planner can then review and modify if necessary production strategies are used to determine priorities by the Planning Subsystem when creating a replan. Approval or disapproval of a change in priorities is a policy issue that should be resolved at the individual DAACs. Planning Subsystem then schedules all ground events and DPRs within the timeframe selected. DPRs are scheduled based on their resource requirements, data dependencies and priorities.

Within the production plan are 30 day candidate plans that will aid in evaluating activities at a high level -- e.g., for staff planning. This candidate plan regarding data availability is generated and made available by subscription to the community on a biweekly basis. The Planning Subsystem interface incorporates these plans and reflects the current production requests, resource and data availability. Like the 30 day plan, the Production Planner generates 10 day candidate plans on a weekly basis. This plan is almost identical to the 30 day plan; however, it would reflect any changes occurring after the generation of the 30 day plan covering that period. This plan is suitable for high level activities and reflects intermediate changes. The time it takes to generate a candidate plan will vary based on the number of production jobs being planned, but will likely take anywhere from 5 to 15 minutes for a 30-day plan.

A 27 hour daily schedule is generated and updated as needed from the current planning database and will reflect the current activities. The Production Scheduler must then generate, review, approve and activate the daily plan. Displaying and activating a daily plan will likely take from 2 to 5 minutes depending on the number of jobs remaining in Data Processing queues. A display of the schedule and evaluation is then provided by the Planing subsystem. The Production Scheduler may replan as necessity dictates. This replan would then cover the remainder of the planning period.

In addition to viewing candidate plans for the local DAAC, the production planner may wish to check for any conflicts in the plan with plans from other DAACs. The Planning Subsystem has the ability to import plans from other DAACs from the data server. Cross-DAAC data dependencies are identified by the Planning Subsystem. Any conflicts can be noted and worked out with the other DAACs and with the SMC if necessary.

During processing, Operations constantly monitor the progress of processing against the plan. Graphical displays of processing, including activities such as queued, active and delayed waiting for input are shown through the Planning Subsystem. Throughout the day operations generate

periodic post-production reports pertaining to plan processing. Reports from the Planning Subsystem include job status summaries, jobs run vs. jobs scheduled and time delay analysis.

See figure 4.2.4.1-1 for a pictorial description and table 4.2.4.1-1 for a sequence of events for the Routine Production Scenario.

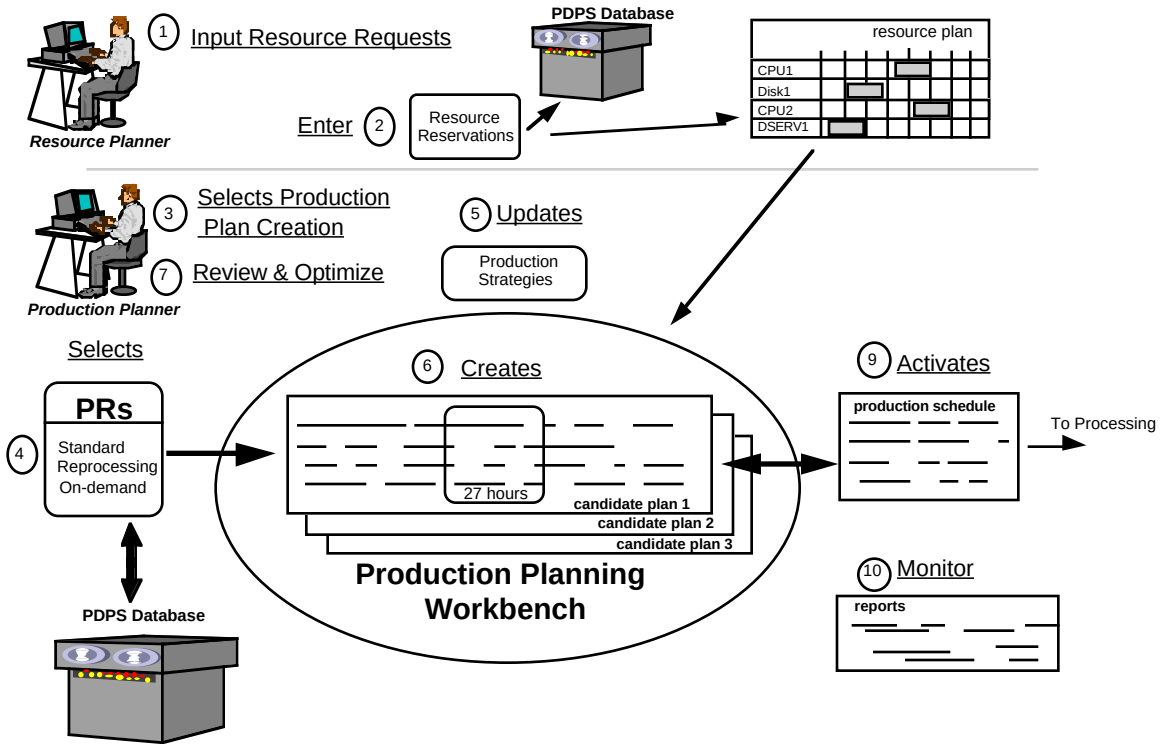

Figure 4.2.4.1-1. Routine Production Scenario

Table 4.2.4.1-1. Routine Production Scenario

Step	Operator/User	System	Purpose
1	Resource Planner initiates the Ground Event Editor.	The Workbench displays a template for entering Ground Events.	Enter Ground Events.
2	The Resource Planner makes reservations regarding maintenance and testing of system components using the Ground Event Editor	A resource plan is created for DAAC wide resources. Ground events are stored in the PDPS database to be used again when creating candidate production plans.	Create Resource plan.
3	Production Planner initiates Planning Production Workbench and selects candidate plan creation.	Planning Subsystem lists standard, reprocessing and on demand production requests (PR).	Create Candidate Plan
4	Production Planner selects PRs to be used in the candidate plan and the time frame of the plan.	Planning determines data processing requests (DPRs) to plan based on selected PRs.	Select DPRs
5	Production Scheduler updates the production strategies database.	Planning Subsystem determines priorities for the DPRs based on these production strategies.	Determines priorities
6	Production Scheduler requests that a candidate plan be generated.	Planning Subsystem schedules all ground events and DPRs within the timeframe selected.	Generate plan
7	Production Scheduler reviews candidate plan and modifies production strategies if needed.	Planning Subsystem displays multiple candidate plans.	Optimize plan
8	Production Scheduler selects an option to import a plan from another DAAC to confirm that there are no conflicts.	Planning Subsystem imports the plan and identifies any data dependencies.	Coordinate plan
9	Production Scheduler generates, reviews, approves, and activates a 27 hour daily Plan from the current planning database.	Planning Subsystem polls processing and updates plan to reflect currently active queues and processing information	Activate plan
10	Operations monitor the progress of processing against the plan	Processing Subsystem provides graphical displays of processing - queued, active, delayed waiting for input, etc. Planning Subsystem produces reports for job status summaries, jobs run vs. jobs scheduled and time delay analysis.	Monitor processing

4.2.4.2 Replanning Production Scenario

On occasion, due to unexpected factors such as a failed TDRSS contact that could not be restored for a few hours, the standard production processing objectives for a day cannot be accomplished.

Adjustments on priorities will ensure that the standard production processing will be accomplished. The current active plan will be inaccurate and a replan must be executed.

Once such an event occurs, within the hour, the Production Scheduler evaluates the current schedule and the impact that it will have. 'What if' candidate planning capabilities within the Planning Subsystem will allow for impact assessment. Each iteration of the daily plan takes approximately 5 to 15 minutes.

The Production Monitor lowers the priorities of existing reprocessing jobs to halt reprocessing. Production Monitor lowers the current cumulative resource usage threshold for on-demand production requests and Production Scheduler lowers the priorities of existing on-demand PRs in order to halt all on-demand production during this hour. Planning Subsystem begins to defer on-demand requests for future processing. The Planning Subsystem allows operator to modify priorities of jobs currently in the production scheduler processing queue. The Production Scheduler then generates a new schedule to reflect the situation. The operator transfers the revised plan, within two hours, to the Data Server for subscription access in order to notify users and other DAACs of plan changes.

At the end of the days processing the Production Scheduler notes that the standard Processing objectives have been achieved. When the next daily schedule is generated, reprocessing jobs and on-demand requests are given a somewhat higher than normal priority level to compensate for the lost reprocessing time and the cumulative resource usage threshold for on-demand production requests is restored. The Planning Subsystem provides displays for evaluation old processing planned vs. achieved. Processing priorities are adjustable. See Figure 4.2.4.2-1 for a pictorial description and table 4.2.4.2-1 for a sequence of events for the Replanning Production Scenario.

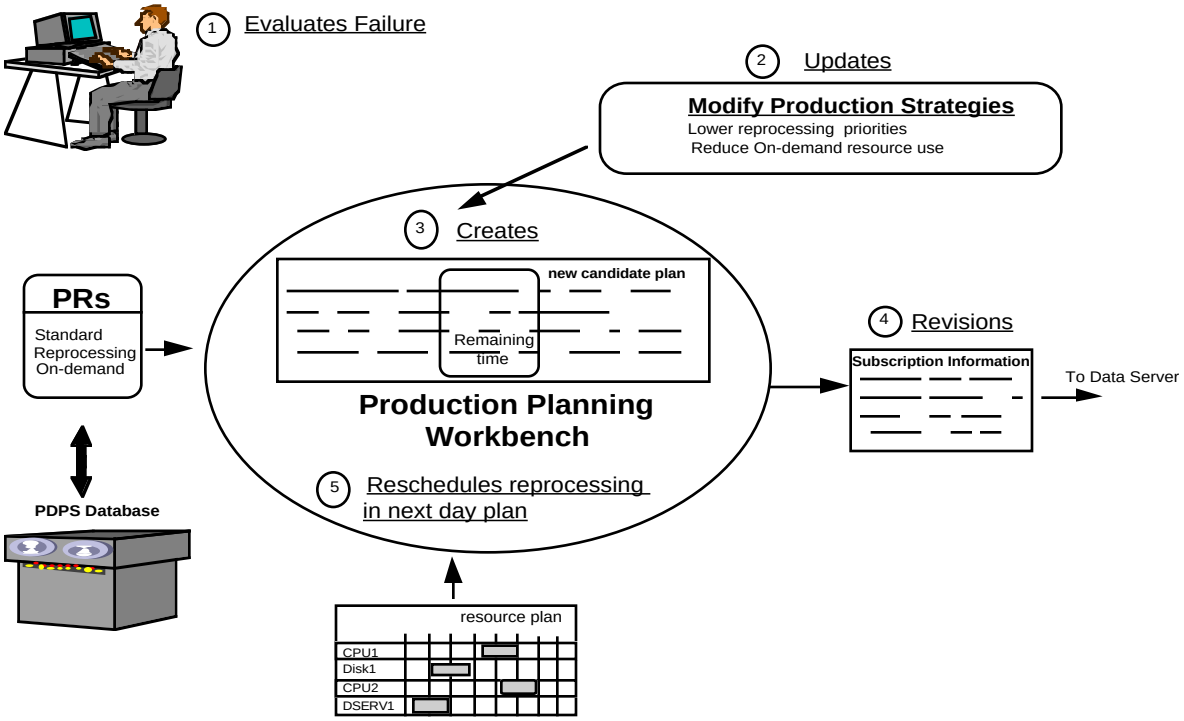

Figure 4.2.4.2-1. Replanning Production Scenario

Table 4.2.4.2-1. Replanning Production Scenario

Step	Operator/User	System	Purpose
1	The Production Scheduler evaluates impact of failure on current schedule	Processing Subsystem provides GUI displays via the production scheduler COTS for impact assessment.	Determine action
2	Production Scheduler lowers priorities of existing jobs to be reprocessed, as well as the current cumulative resource usage threshold for on-demand production requests along with its priorities.	Planning Subsystem defers on-demand requests for future processing, allows operator to modify priorities on current jobs.	Process standard production first.
3	Generate a new schedule to reflect the situation	Planning Subsystem supports replanning.	Activate new plan.
4	Operator transferred revised plan to the data server for subscription access.	Operator transfers revised plan to Data Server for subscription access.	Notify users of plan changes
5	Production Scheduler notes that Standard processing objectives have been achieved, and gives reprocessing jobs higher than usual priority on next daily schedule.	Provide reports for evaluation of processing planned vs. achieved.	Reprocess.

4.2.4.3 On-Demand Processing Requests Scenario

This scenario describes the processing of an On-Demand Product Request (ODPR). The scenario begins when an ODPR is received by planning from the Data Server. Internally, the ODPR is automatically compared to various acceptance criteria and resource usage thresholds. In this case, the ODPR causes the cumulative resource usage threshold to be exceeded. The ODPR is automatically deferred and it is sent to planning for inclusion in subsequent plans. The operations staff is notified of the deferral and checks the status and resource usage information about the ODPR. It is determined that the ODPR should be run immediately and makes it a 'hot job' (scenario 4.2.4.5). The job is then executed on a priority basis. The output data product(s) are then sent to the Data Server. On-Demand Production Requests would require no operator activity in the routine case when resource usage thresholds are not exceeded. See figure 4.2.4.3-1 for a pictorial description and table 4.2.4.3-1 for a sequence of events for the On-Demand Processing Request Scenario.

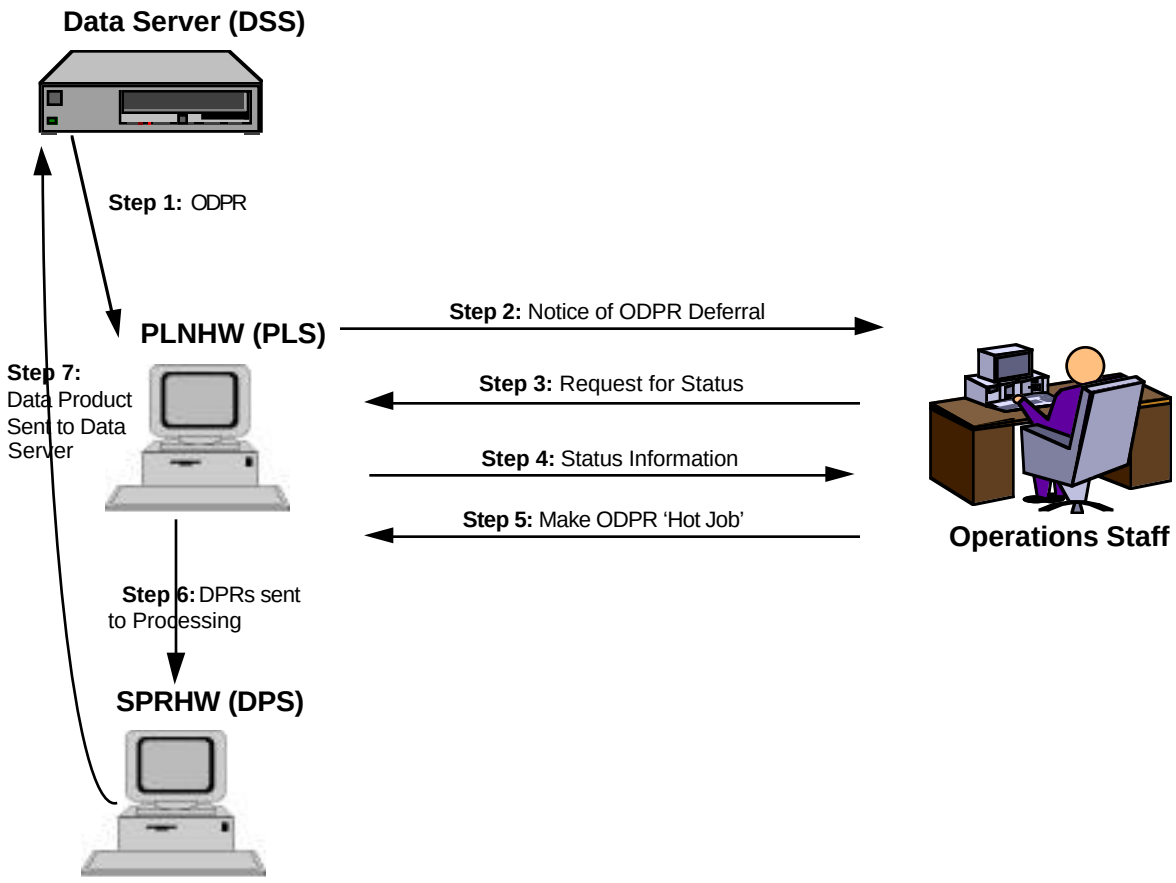

Figure 4.2.4.3-1. On-Demand Processing Request Scenario

Table 4.2.4.3-1. On-Demand Processing Request Scenario

Step	Operator/User	System	Purpose
1		Data Server Subsystem generates ODPR	Product needs to be produced
2	Ops. Staff receives deferral notice	Planning Subsystem defers ODPR because of resource thresholds	Notification
3	Ops. Staff requests status	Planning Subsystem collects status information	Information gathering
4	Status information reviewed	Status is displayed	Information display
5	Ops. Staff makes ODPR a 'Hot Job' (scenario 4.2.4.5)	Planning Subsystem re-sets job priority, replans and implements new plan.	Force immediate processing of deferred job.
6		Planning Subsystem passes DPRs associated with ODPR on to Processing Subsystem	Produce requested data.
7		Processing Subsystem sends data product to Data Server	Archive product in user accessible area

4.2.4.4 Planning Reprocessing Requests Scenario

This scenario describes the addition of a "Data Set" reprocessing request to the current set of Production Requests to be planned. The term "Data Set" limits this scenario to reprocessing requests that cover a long time span, such as six months. Smaller requests will not require as many steps. Normally reprocessing would be done because the initial processing was inadequate in some way. Scenario 4.1.6.4 addresses this issue of identifying users of problems with data. The scenario begins with the Production Scheduler receiving a validated Reprocessing Request - this could come from the IWG (Investigator Working Group) or other ESDIS source, probably via e-mail. The acceptance of "Data Set" Reprocessing Requests is a policy decision, and is handled outside ECS.

The new request is entered into the system using the Production Request Editor GUI. It is assumed that any such request refers to a PGE that has already been through Algorithm Integration and Test, and all information about the PGE has already been entered into the PDPS Database. The Production Request Editor will allow the entry of the time span and priority for the request, and to mark it as a Reprocessing request. There will also be some specific Reprocessing Options that can be chosen to control how the reprocessing task proceeds. These will determine the order in which products will be generated for large (multi-product) requests. Once the operator is done entering the request, it is added to the PDPS Production Request list.

Once the request has been entered, the Production Scheduler will likely want to determine the impact of a new Reprocessing Request before it is entered for actual production. To do this, the Planning Workbench UI is used to produce a "what if" candidate plan (See scenario 4.2.4.1 for details). If the resulting candidate plan either performs the Reprocessing task too slowly or impacts other processing to much, the Production Scheduler can change the priority of the Reprocessing Request and try again until a satisfactory plan is produced. This plan can then be activated if desired (See scenario 4.2.4.1). Each iteration of producing a long-term (30 day) plan

will take approximately 5 to 15 minutes. See figure 4.2.4.4-1 for a pictorial description and table 4.2.4.4-1 for a sequence of events for the Planning Reprocessing Requests Scenario.

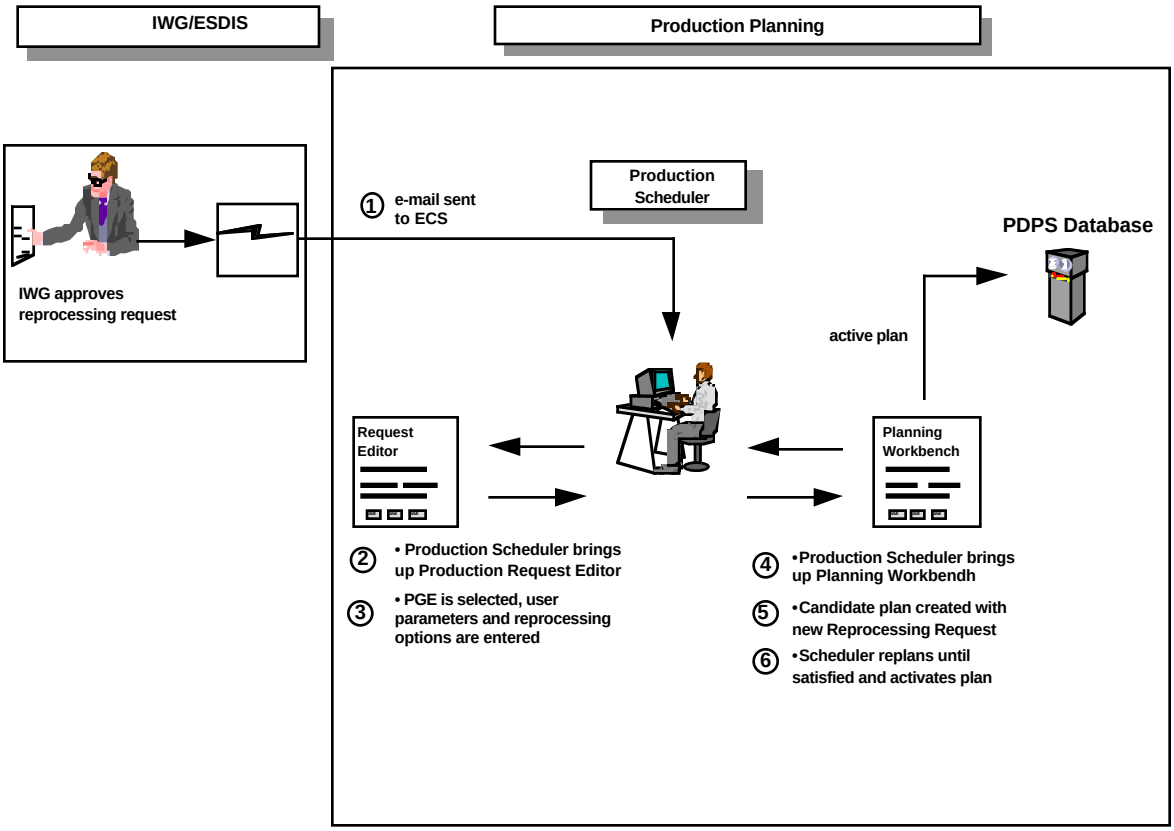

Figure 4.2.4.4-1. Planning Reprocessing Request Scenario

Table 4.2.4.4-1. Planning Reprocessing Request Scenario

Step	Operator/User	System	Purpose
1	IWG sends validated Reprocessing Request to DAAC	The e-mailed request is received by the Production Scheduler	New request
2	Using the Production Request Editor, the Production Scheduler will initiate the entry of a Reprocessing Production request	The Production Request Editor supplies the operator with a list of PGEs or output data types to choose from.	Enter production request
3	The Scheduler chooses the PGE or output data type, user parameters, and reprocessing options	The Editor responds with default user parameters for that PGE and requests for a time frame for the request.	Select PGE
4	The Scheduler quits the Production Request Editor and decides to replan using the Planning Production Workbench.	The Editor exits, and the Workbench starts up. The Workbench presents the Scheduler with a list of production requests to be planned.	Initiate planning
5	The Scheduler adds the new reprocessing production request to the list to be planned and initiates a candidate plan creation for a particular time frame	The Workbench plans all data processing requests selected that fall within the time frame of the plan.	Creates a candidate plan.
6	The Scheduler reviews the plan. If necessary, the Production Scheduler may modify the production strategies to ensure the reprocessing request is completed in a timely manner without affecting standard processing.	The Workbench accepts any changes to the production strategies and creates additional candidate plans as necessary.	Optimize the plan.

4.2.4.5 Add Hot Job Scenario

This scenario describes inserting a "Hot Job" or high priority request into the current production stream. The stimulus for a hot job could either be a new request coming in with an exceptionally high priority, or it could be an existing request that needs to have its priority increased. In either case, this could be done from either Planning or Data Processing. Here we will discuss a Planning scenario although a replan actually isn't necessary - only changes in priority need to be made and will automatic effect when the job runs, regardless whether a replan takes place or not.

The Production Scheduler is informed by the DAAC manager that a certain task needs to be given top priority(priorities of requests are a policy issue decided within each site). The Production Request Editor would be used to modify the Production Request to change the priority and to resubmit the request. If the request had already been sent to Data Processing, this modify command would be sent there. The operations staff can then use the Data Processing User interfaces to follow the progress of the request. Changing the priority on a job takes less than five minutes to complete. See figure 4.2.4.5-1 for a pictorial description and table 4.2.4.5-1 for a sequence of events for the Add Hot Job Scenario.

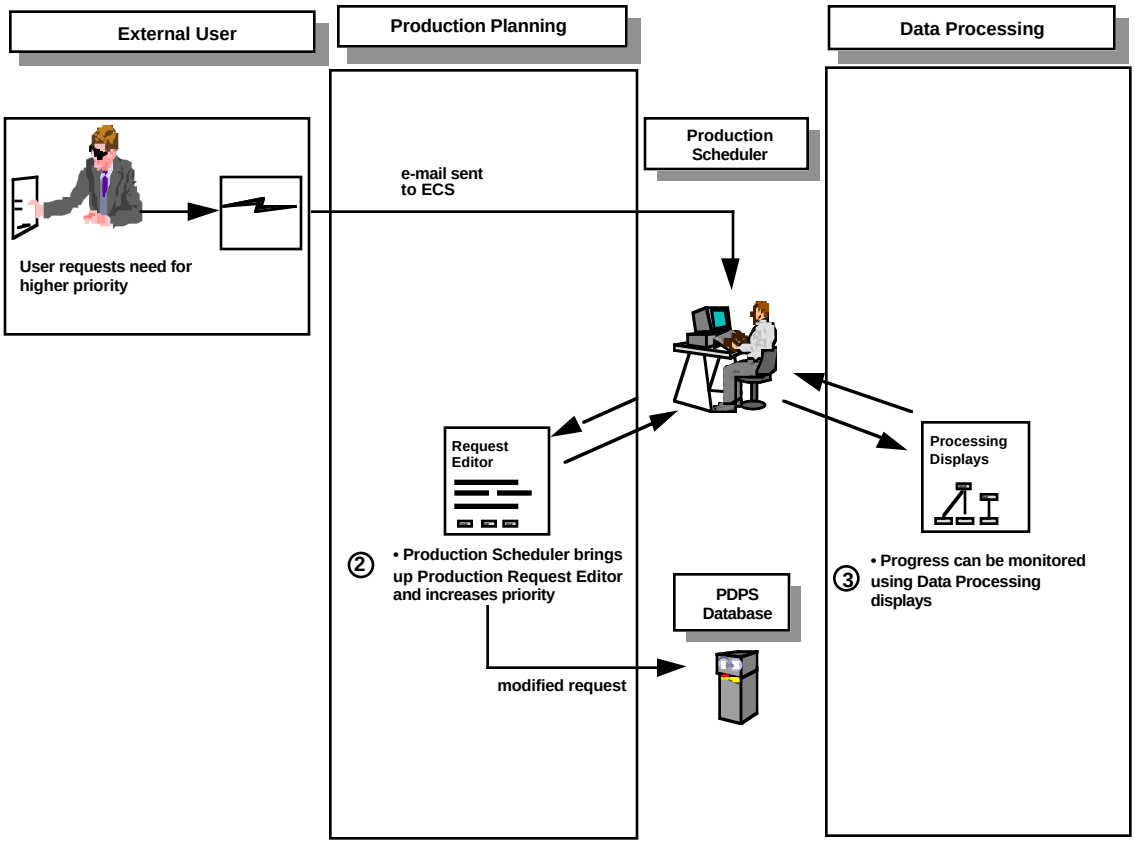

Figure 4.2.4.5-1. Add Hot Job Scenario

Table 4.2.4.5-1. Add Hot Job Scenario

Step	Operator/User	System	Purpose
1	DAAC manager or Production Scheduler receives high priority request		High priority request
2	Using the Production Request Editor, the Production Scheduler will increase priority of request	The Production Request Editor supplies the operator with a list of PGEs or output data types to choose from.	Modify production request
3	The Scheduler quits the Production Request Editor and follows progress of request.	The Editor exits. Data processing monitoring tools are used to graphically display progress	Follow progress

4.2.5 Production Processing Activities

Production processing activities are initiated by the submission of a Production Request (PR) by a user (Standard PR) or by an operator (On-Demand PR). For each PR, Planning generates one or more Data Processing Requests (DPRs). A DPR requests one PGE (Product Generation Executive) to be executed. A PGE is the smallest schedulable entity managed by Planning and Processing. A PGE consists of executables and scripts that may lead to the generation of standard data products. Before the execution of a PGE, the input data granule(s) must be retrieved from the Data Server (Data Staging), and after its execution the output data granules must be archived (Data Destaging). The archive location, planned start/end execution times and processing priority are also part of the information in a DPR.

The production processes are automated with only minimal operator interaction on individual production jobs. To support such automation, productions plans, each of which describes the processing objectives for a particular time period, are generated by Planning Subsystem using the PRs, resource availability information, production rules, and PGE profiles. For a given time period two types of plans exist: candidate plans and active plan. A candidate plan is a potential plan and it represents a "what if" planning result. Several candidate plans may exists at one time. An active plan is the candidate plan selected by operations to be the current plan. An active plan specifies, among other things, the priorities of the DPRs current kept in the PDPS Database. A DPR is only included in the queue of an active plan only if either all its input data is already available in the Data Server or expected to be available within the time limit the DPR is planned for execution. Only DPRs in the former category will be considered for execution by the Processing Subsystem. The Planning Subsystem monitors data arrival and checks data availability, and uses the information to update the queue in the active plan.

The Processing Subsystem controls resource allocation and execution. Upon the availability of processing and local memory resources, the DPR for which input data is available and is of the highest priority is executed next. This begins with the staging of the required input data, if it is not already in local memory. Its associated PGE is then executed. Upon completion, the output data is destaged. The scheduling of the different types of processing tasks, including PGE executions, data staging and destaging are performed by the COTs product AutoSys. In Release B, to expedite the processing of a DPR whose input data requires a substantial amount time to

stage, its input data is prestaged in a timely manner (predictive staging) if memory resources are available.

Although operator interactions normally are not required, an operator can monitor the status of the DPR being processed and view the complete active plan using the AutoSys GUI. If necessary, an authorized operator can also, using ECS provided utilities, suspend or terminate the current operation of the subsystem, whether it is PGE execution, data staging, or destaging. The operator can also use the AutoSys GUI to change the priorities of the DPRs in the active plan and in attempting to change the order in which the DPRs in the queue will be processed. Such an operator can also delete a DPR form the queue. If an authorized operator wants to insert a DPR in the active, an On-Demand PR can be submitted using ECS provided utilities. If the PR under consideration does not require processing and memory resources that exceed some preset thresholds, and the processing resource quota reserved for On-Demand processing has not been used up, appropriate DPRs are generated and inserted in the queue. Otherwise the PR is set aside and appropriate reports are generated and displayed to the operator. In this case, the operator can resubmit it as a standard PR.

The operator can also use ECS provided utilities to view the profile of a PGE when it is being executed. This can be used as a means to detect any processing anomalies, such as using too much processing or memory resources in comparison with the information in its PGE profile. Alert signals could have already been generated for such anomalies by the subsystem. In such a case, the operator can suspend the process and attempt to identify the cause of the problem. If the problem can be readily corrected, the process can be resumed. Otherwise, the processed is terminated with the appropriate reports generated.

4.2.5.1 Production Processing Job Anomaly Scenario

This scenario describes the handling of PGE job anomalies within the Processing subsystem.

The Processing subsystem notices that a PGE has exceeded either its expected resource usage or processing time by more than a specified margin. It notifies the Production Monitor using an Autosys alarm event. The Production Monitor than inspects the alarm comment and uses a browser tool to get more information. The Production Monitor then consults with the Operations Supervisor and the Data Specialist as to possible reasons and in order to get permission to terminate the PGE. Upon receiving permission, the PGE is terminated using an Autosys send event command, and the status of the PGE Autosys jobs altered in order to initiate data destaging. The data is destaged to the Data Server, which causes the generation of a subscription notification to the SCF. The SCF may then diagnose the possible causes of the job anomaly.

The Operations Supervisor may also authorize the Production Planner and Production Monitor to remove or put on hold other jobs as a result of the anomaly.

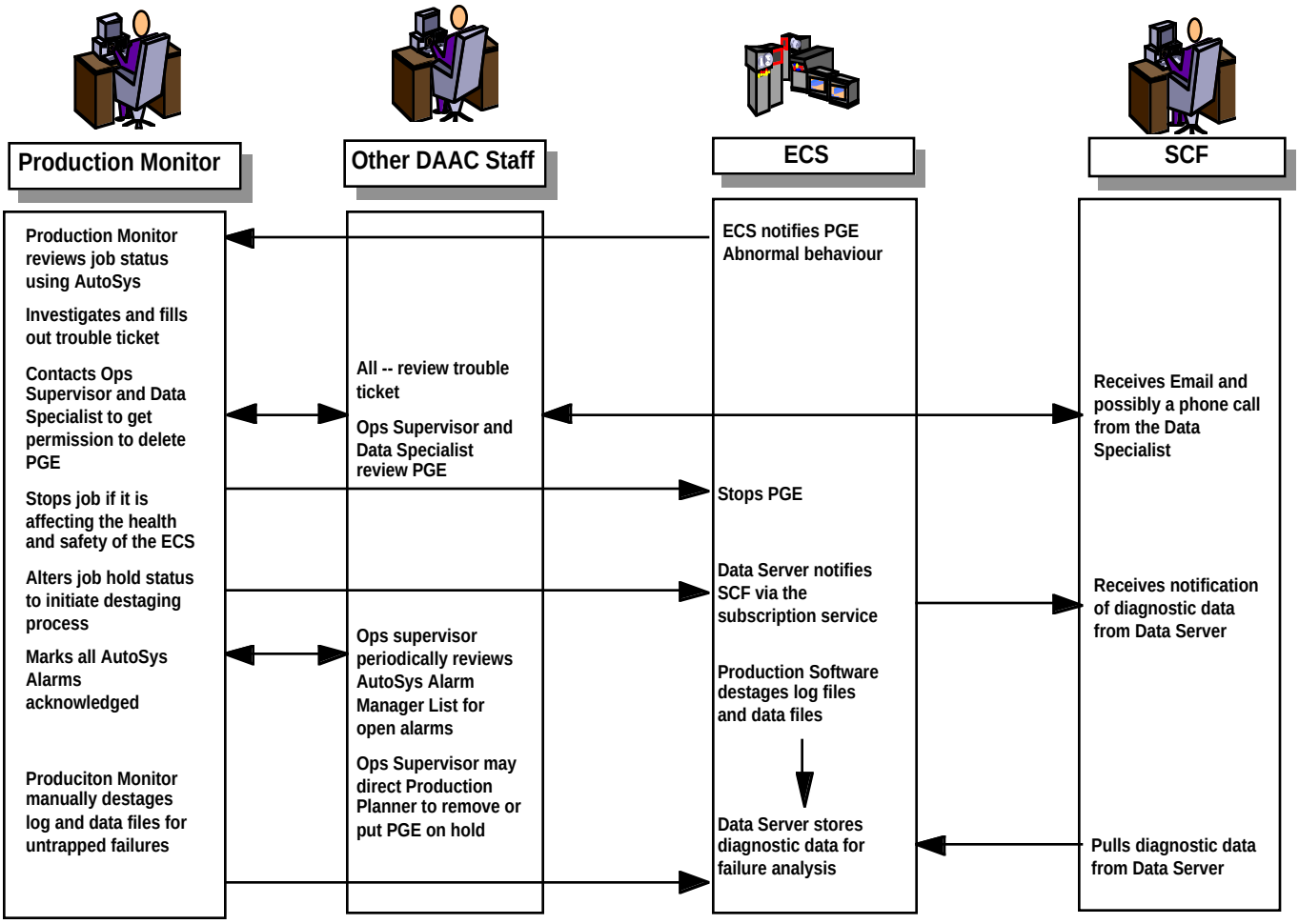

Figure 4.2.5.1-1. Production Processing Job Anomaly Scenario

Table 4.2.5.1-1. Production Processing Job Anomaly Scenario

Step	Operator/ User	System	Purpose
1	Reviews job status using Autosys. Investigate and fill out trouble ticket	Notifies PGE abnormal behavious	Notice abnormal behaviour
2	Consult with other DAAC staff, then kill PGE	Kills PGE	Prevent further processing
3	Alter hold status of Autosys job to initiate data destaging	Destage data to the Data Server. Data Server subscription notification sent to SCF.	Store and make available diagnostic information
4	SCF staff retrieve diagnostic data	Data retrieved from Data Server	Diagnose PGE

4.2.5.2 Production Processing Job Abnormal Termination Scenario

This scenario describes the handling of PGE job abnormal termination within the Processing subsystem.

If the PGE developer puts an associated SDP Toolkit function in the code, then upon the trapping of a terminal error, the PGE notifies the SCF via e-mail that it is about to terminate Autosys recognises from the PGEs exit status that the job has failed and notifies the Production Monitor using an Autosys alarm event. The Production Monitor than inspects the alrm comment and uses a browser tool to get more information on the PGE. They then generate a trouble ticket and consults with the Operations Supervisor and the Data Specialist as to possible causes. The Data Specialist may in turn consult with the Instrument Team at the SCF.

Upon the termination of the PGE, the data, which may include a core file of some description, is destaged to the Data Server, which causes the generation of a subscription notification to the SCF. The SCF may then diagnose the possible causes of the job anomaly.

In the case where the relevant SDP Toolkit command for graceful termination is not included, or the PGE makes an untrapped failure, the Production Monitor will manually destage the log and data files to the Data Server, which will generate the subscription notification as for the trapped error.

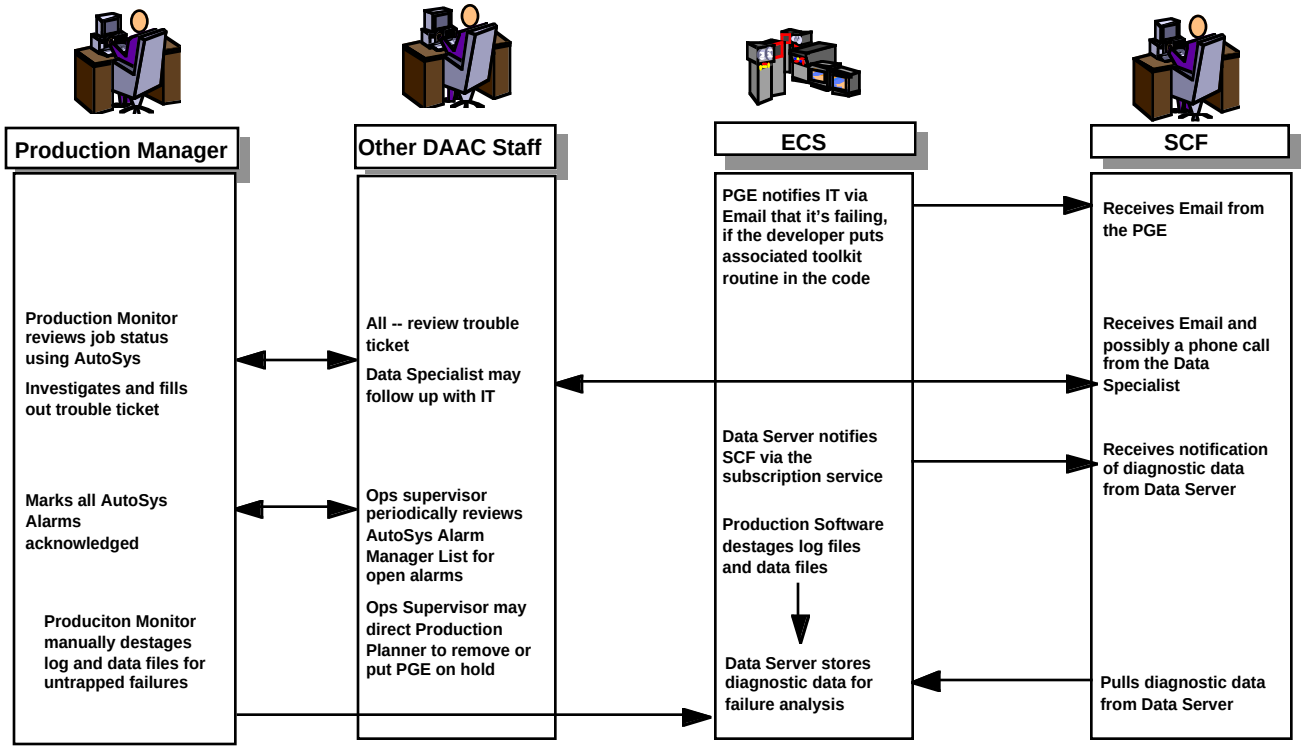

Figure 4.2.5.2-1. Production Processing Job Abnormal Termination Scenario

Table 4.2.5.2-1. Production Processing Abnormal Job Termination Scenario

Step	Operator/ User	System	Purpose
1	Reviews job status using Autosys. Investigate and fill out trouble ticket	PGE notifies IT via E-mail that it is failing, if the developer puts associated toolkit routine in code. Autosys generates alarm. Data destaged to the Data Server, subscription notification sent to SCF.	Notify PGE failure and make diagnostic data available.
2	Acknowledge alarm	Update display state	Acknowledge PGE failure
3	SCF staff retrieve diagnostic data	Data retrieved from Data Server	Diagnose PGE failure

4.2.5.3 Quality Assurance Scenario

This scenario describes automated run-by-run non-science quality assurance (QA), inline QA and product data QA. Automated run-by-run QA is the process of performing metadata range checking during the production process to assess whether the process produced the requested product. It is based upon metadata values characteristic of ESDTs as defined by scientists during SSIT.

There are levels of specifications for generating data products. The scientists develop software that determine if the products meet these specifications. Execution of that software is called inline QA. Inline QA metadata updates trigger product QA which is performed at the SCF by the instrument team who have intimate knowledge about product content. However, ECS at the DAACs can support product QA as outlined in this scenario.

As shown in Figure 4.2.5.3-1, the scenario starts with the SSIT Team defining metadata values which are entered into the PDPS database by the system during SSIT. Metadata values set during the production process are compared to the database values. Findings become part of the metadata.

The Instrument team and the DAAC data specialist use the subscription service to be informed when products are available to be retrieved from the data server. This scenario takes into account that subscription requests must be made before the events described herein can happen. Update of product metadata inserted to the data server causes a notice of product availability to be distributed to those who requested notification when inline QA takes place.

Next, the instrument team and, if applicable, the DAAC data specialist perform QA. Performing QA of product data is the primary role of the instrument team, but ECS provides the same tools at a DAAC that the instrument team uses to perform QA at a SCF. Basically, ECS provides COTS visualization tools and COTS tools for updating product metadata with QA information. Both the instrument team and the DAAC data specialist can update the metadata with the QA results. Once the product and metadata are archived to the data server, subscription notices are sent to requestors of the product. See Table 4.2.5.3-1 for the sequential representation of scenario events.

The SMC , archive manager and all science end-users have access to product metadata and are able to discern product quality. Quality control coordination amongst the DAAC, the SCF and ESDIS is essential and exist to help ensure integrity of products.

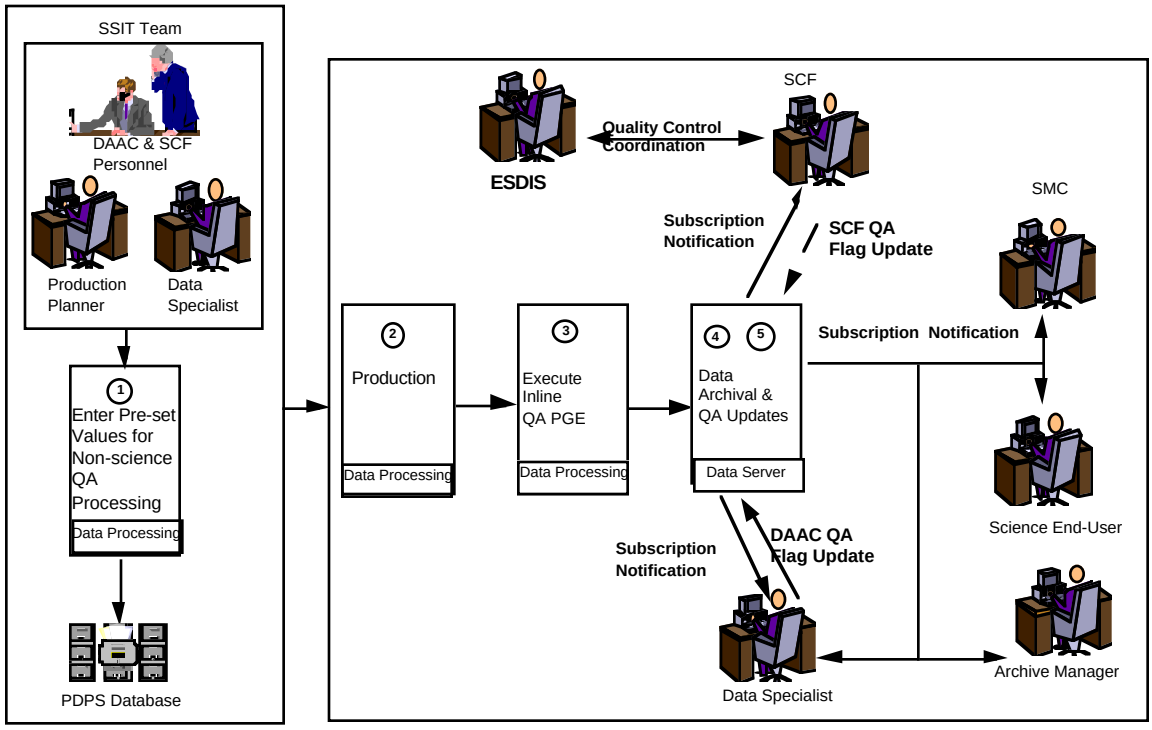

Figure 4.2.5.3-1 Quality Assurance Scenario

Table 4.2.5.3-1. Quality Assurance Scenario (1 of 2)

Step	Operator/User	System	Purpose
1	The SSIT Team set metadata parameter values to be used for Non-science QA processing.	The Data Processing Subsystem inserts the metadata parameter values in the PDPS database.	For metadata range checking performed during Non-science QA Processing.
2		The Data Processing Subsystem generates a data product based on a data processing request. Non-science QA occurs as part of that process.	

Table 4.2.5.3-1. Quality Assurance Scenario (2 of 2)

Step	Operator/User	System	Purpose
3		Execution of science software that evaluates the quality of the product generated occurs. The PGE QA flag in the metadata gets updated by the QA executable. The product and metadata are saved to the data server. Subscription service sends notices.	Inform users who requested the product that it is available and initiate product QA at the SCF and product inspection at the DAAC.
4	The instrument team receives notification of product. The instrument team retrieves the product and performs QA then updates the metadata SCF QA flag.	The data server archives the product. Subscription notifications are sent.	Inform users who requested the product that it is available.
5	The DAAC data specialist receives notification of the product and retreives it from the data server. Then the product is visually inspected. The DAAC data specialist updates the metadata DAAC QA flag.	The data server archives the product. Subscription notifications are sent.	Inform users who requested the product that it is available. Quality information in the metadata can be reviewed by all users. ESDIS, the SCF and the DAAC may confer about the quality of a product.

4.2.6 User Services Activities

User services provide an interface between the user community (i.e., users who use ECS to obtain data products) and the EOSDIS products and systems. Although largely automated, user pull activities can, at any stage, involve user services personnel. The DAAC User Services staff is asked to respond to user questions, (e.g., accounting, billing, data tracking & ordering), resolve data access problems, and act as a proxy to the user in identifying, locating and obtaining ECS data and services. Specific user services involvement in assisting users in data tracking & ordering, user registration, and responding to several different types of user requests are described in text and diagram in the following paragraphs.

User services activities routinely require access to different information fields on data display/reports than those fields which users or operations staff may require (user's telephone number, vs. user's IP address). User Services Working Group (USWG) has provided the following list of system functions desirable for User Services Staff within the DAACs. Although the capabilities are similar to those in Release A, the Release B system functionality can significantly differ from Release A in a number of areas:

User Transaction Functions: The provision of order tracking and financial accounting information will be DAAC-specific for Release A. For Release B, order tracking and financial accounting information will be ECS wide.

Data Set Histories: The provision of data set histories will be DAAC-specific in Release A. In Release B, provision for data set histories will be standardized across all DAACs.

Library/Advertising Functions: Consolidated guide information will be available through the Release A (V0) Client in Release A. For Release B, the Release A Search and Order tool will be replaced by the ECS Client, but the same WWW based information will be available through the ECS Client. Maintenance of this information will continue to be DAAC specific in Release B.

Feedback Mechanisms: User feedback mechanisms will be available through the Release A Search and Order tool and the ECS desktop in Release A. In Release B, with the upgrading of the search and order tool, a single desktop feedback capability will be available through the ECS Client.

User Notification Tools: Specific data reprocessing notification will be a DAAC-specific function in Release A. In Release B, common ECS-wide email services will be available for any notifications.

In addition, the following capabilities will be available to user services personnel in Release B:

Logging of User Services Events: The User Contact Log, a tool which consists of a database and associated GUI, will be provided to allow for logging of User Services activities.

Submission of User Orders: The ESST will be provided to User Services with an extension which will allow User Services personnel to order data and change it to a user's account.

User Profile/Password Query and Verification: Interfaces will be provided to access ECS-wide user profile information and security servers This will be available for use in caller verification and for resolving user password problems.

Statistics: Standard DAAC activity reports will be generated on a regular basis. The capability for custom reports is provided through direct SQL access to ECS-wide management data logging databases.

System Status Information: User Services will have access to Network Management Interfaces, which will provide information on ECS servers and networks. The Network Management Interfaces may be used to isolate performance or hardware problems.

Subscription Lists: Subscription lists will become available only in Release B.

DAAC-Unique Extensions: Application Programming Interfaces (APIs) which will allow integration of DAAC-unique extensions will be provided with delivered software.

It is envisioned that User Services representatives will operate in ECS as a type of super-user. User Services will have available to them the same tools which are available to the general user (the ESST, the Results tool, EOSVIEW, etc.), so that User Services may "see" the system as the

user sees it. In addition, user services will be provided with tools and privileges to view and sometimes act on ECS systems in support of the user community.

4.2.6.1 Order Tracking Scenario

This scenario describes how User Services checks on the status of a specific order, and checks on the status of all Data Server pending orders within a DAAC. The scenario covers Release B activities for computer-aided and human-aided aspects of ECS product statusing.

A scenario precondition is that a user submitted an order for production data. This is normally an automated process which is accomplished through data order capabilities provided by the ECS client, although manual ordering of data is also available directly through the User Services Staff. The order is automatically logged, and its status is updated in a order tracking database.

The role of User Services in the resolution of problems for users seeking to status product data is described below. Statusing of orders by users and operator personnel, and the logging and tracking of orders in the tracking database is illustrated.

The scenario describes a User Services representative who is requested to check on the status of an order. This request may come from any one of several sources: phone, email, fax, or walk-in. The User Services representative must first establish the identity of the user, to ensure that privileged information is not being given out to a wrong person. Access to the user profile information in this scenario assists the User Services representative in establishing the user identity. The user services representative then clicks on the Transaction Monitoring icon, which starts up the Transaction Monitoring application on his workstation. A query for recent orders for the user is formulated and sent to the Transaction Log. The query results are returned to the User Services representative, who now read the status of the order, and note where which parts are that have not been completed. User Services provides a reply based on the form in which the status request is received; in the scenario below the status is saved to a file and the user is contacted directly, although the options exist for the status to be sent via email or printed and faxed.

Refer to Figure 4.2.6.1.-1 for a pictorial description and Table 4.2.6.1-1 for a sequence of events of the Order Tracking Scenario.

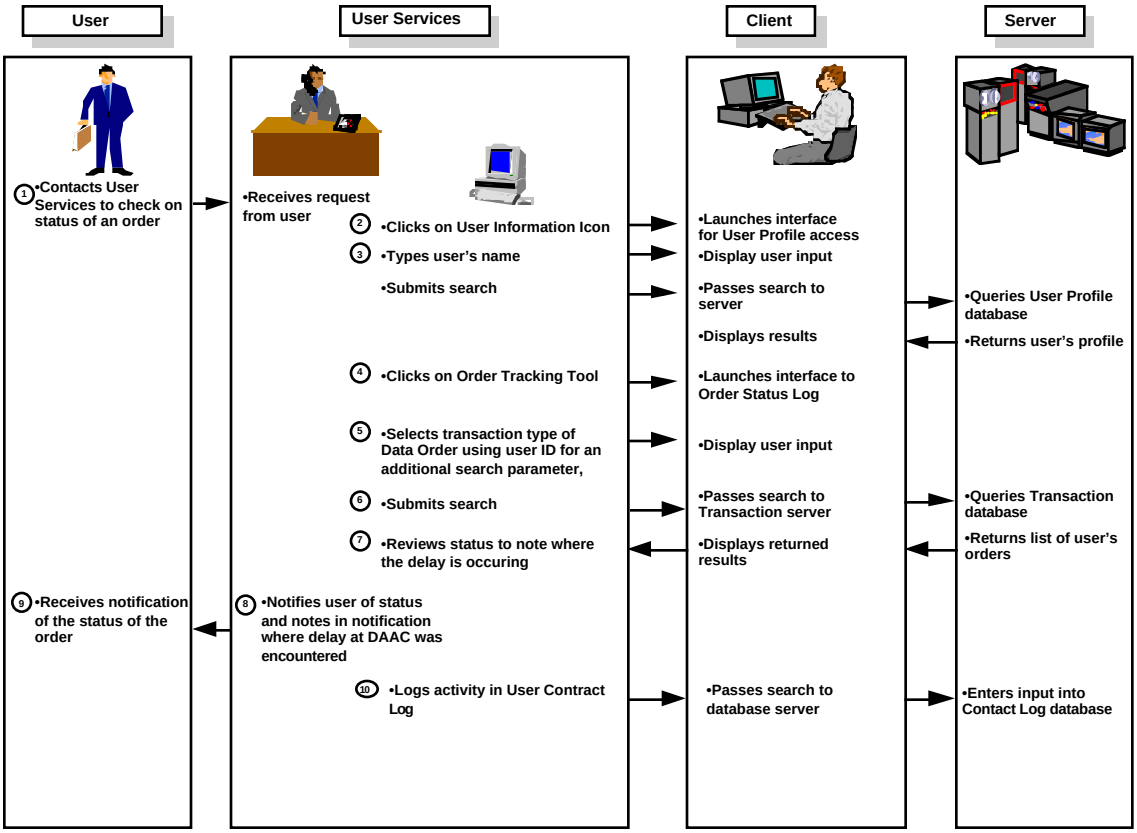

Figure 4.2.6.1-1 Order Tracking Scenario

Table 4.2.6.1-1 Order Tracking Scenario (1 of 2)

Step	Operator/User	System	Purpose
1	User contacts User Services to check on the status of an order	Not applicable to system unless email used for contact	N/A
2	User Services clicks on User Information icon	Interface to User Profile database is launched	Access application to obtain user's profile
3	User Services types user's name and submits search	User Information application queries User Database and user's profile is returned	Make user profile available to user services representative
4	User Services clicks on Order Tracking Icon	Interface to Order Tracking is launched	Access application to obtain order statusing
5	User Services selects option to status a data order, uses user id for additional search parameters	Interface accept inputs	Allow user to phrase query against the Order Tracking Database

Table 4.2.6.1-1 Order Tracking Scenario (2 of 2)

Step	Operator/User	System	Purpose
6	User Services submits the s search	Order Tracking application queries Status Logs and returns list of user's to satisfying query to User Services	Make records of orders available; user ID obtained from query of profile database
7	Notes where delay encountered	Displays query results to User Services	
9	User Services notifies user of status and notes in notification which DAAC(s) experienced delay	Not applicable to system unless email is used.	Provide response to user's request
10	User Services representative logs the event in the User Contact Log	Accept inputs and write record to database	Provide permanent record of User Services activities

4.2.6.2 Standard Procedures (Registration) Scenario

This scenario describes how the User Registration procedure (incorporated in an HTML document) is provided to a user. The scenario provides for DAAC-unique procedures which can be added to the document by User Services.

User Services receives a request for registration procedures. The representative at User Services then provides the user the URL for registration help procedures. In the present scenario, this URL is provided by phone, however it can also be communicated to the user by e-mail for electronic inquiries or by fax. The user then starts up his WWW browser viewer and opens the URL as provided by User Services. The ECS Document Data Server returns the HTML document outlining user registration procedures, and provides links to the home pages for registration. Although not described in this scenario, User Services additionally could access the registration pages themselves to prompt the user through the registration process. Note: User Services at each DAAC can develop new procedures as HTML pages and archive them in the document data server.

Refer to Figure 4.2.6.2-1 for a pictorial description and Table 4.2.6.2-1 for a sequence of events of the Standard Procedures (Registration) Scenario.

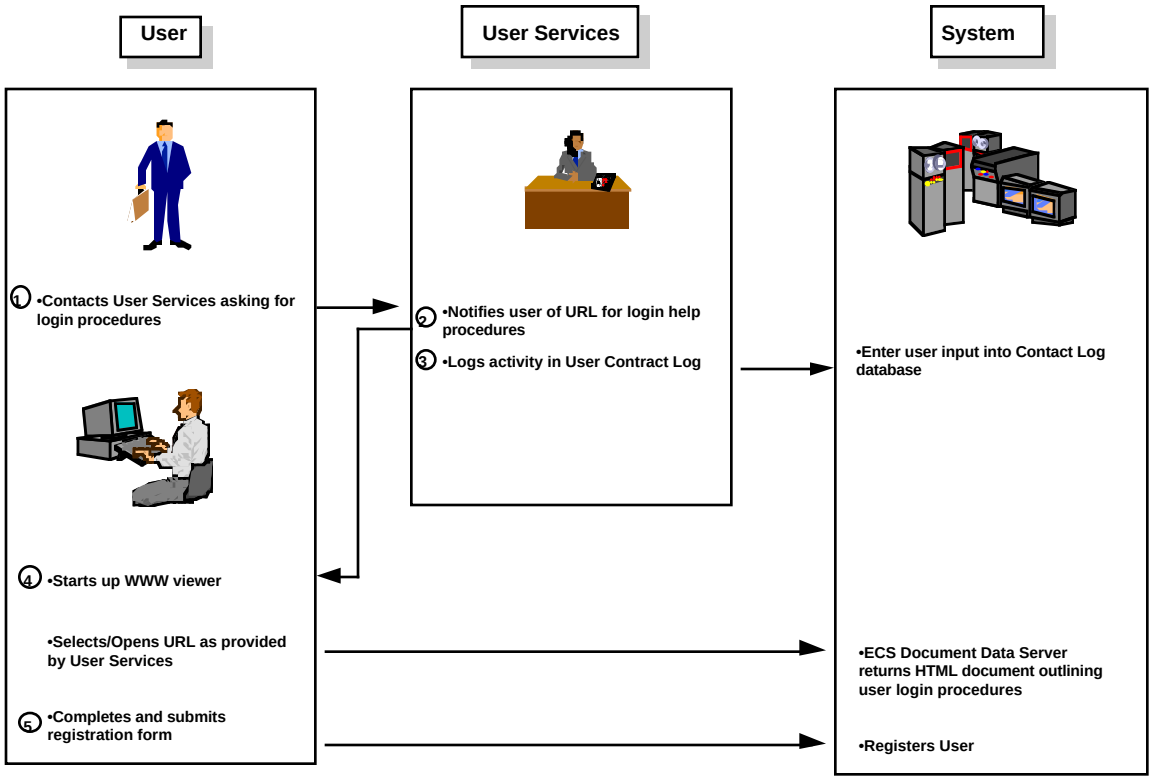

Figure 4.2.6.2-1 Standard Procedures (Registration) Scenario

Table 4.2.6.2-1 Standard Procedures (Registration) Scenario

Step	Operator/User	System	Purpose
1	User contacts User Services asking for registration procedures	Not applicable to system unless email used	User unsure how to register as an ECS user
2	User Services representative provides user with URL for registration help procedures	Not applicable to system unless email used	URL provides path to HTTP registration page
3	User Services representative logs the event in the User Contact Log	Accept inputs and write record to database	Provide permanent record of User Services activities
4	User starts up WWW viewer and Selects/Opens URL as provided by User Services to review documents	ECS Document Data Server retrieves appropriate documents	System makes requested information accessible to user
5	User completes registration form as described in documentation	ECS Document Data Server returns HTML document for registering user, and accepts user registration	User self- registers

4.2.6.3 System Status Scenario

This scenario describes how a User Services representative would respond to a user's call to report a problem and use the Network Monitor System to investigate the cause of the problem.

A user receives no response while attempting to submit a query to the GSFC Data Server. The user calls User Services to find out what the problem is. The User Services representative clicks on the Network Monitor icon and the Network Monitor application starts up showing a high-level picture of ECS. The representative "opens" the icon for the GSFC DAAC and the application shows a high-level picture of that DAAC hardware. The icon for the Data Server is highlighted. When the representative "opens" the icon for Data Server, the application shows the current status of the Data Server as "Restart in Progress". The representative tells the user that the Server is restarting and should be up in TBD minutes.

Release B servers will provide error messages when they cannot service a service request. User Services can provide users information in cases in which systems are down and there is no possibility of the system providing error/status information directly to users.

The scenario assumes that the server being accessed has experienced a hardware fault which makes it impossible to operate normally. Refer to Figure 4.2.6.3-1 for a pictorial description and Table 4.2.6.3-1 for a sequence of events of the System Status Scenario

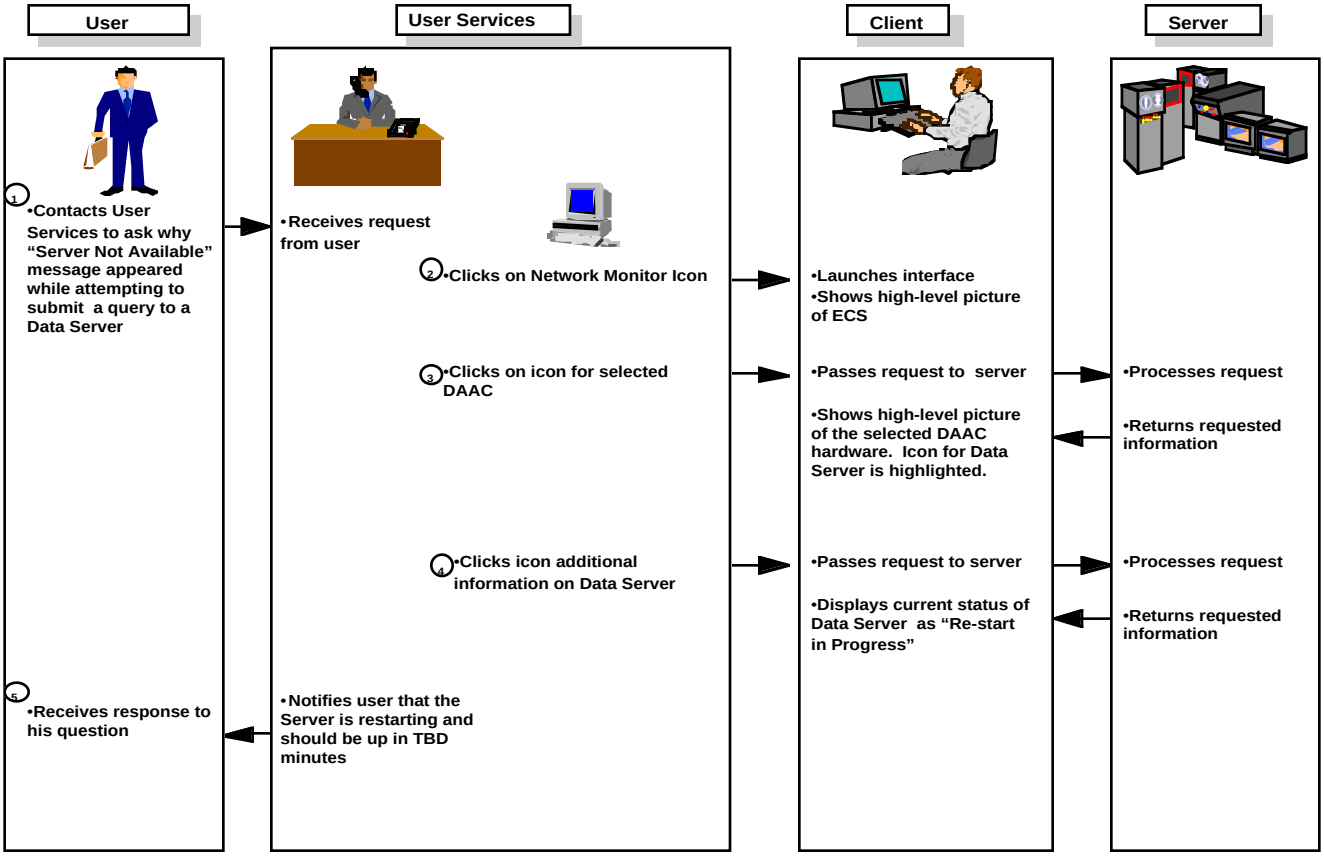

Figure 4.2.6.3-1 System Status Scenario

Table 4.2.6.3-1 System Status Scenario

Step	Operator/User	System	Purpose
1	User contacts User Services asking why "Server Not Available" message appeared while attempting to submit a query to a Data Server	Not applicable to system unless email used	User wants additional information about system
2	User Services representative clicks on Network Monitor icon	Network Monitor application starts up. Shows high-level picture of ECS	Access application which provides status of hardware and network
3	User Services representative "opens" icon for selected DAAC	Application shows high-level picture of the selected DAAC hardware. Icon for Data Server is highlighted.	Network monitor indicates what hardware is not fully in service
4	User Services representative "opens" icon for Data Server	Application shows current status of Data Server as "Re-start in Progress"	Make the cause of the error message evident
5	User Services representative notifies user that the Server is restarting and should be up in TBD minutes	Not applicable to system unless email is used	Provide user requested information;
6	User Services records activity in User Contact Log	Accept inputs and write record to database	Provide permanent record of work performed

4.2.6.4 Place an Order for a Potential User Scenario

This scenario describes how a User Services representative might place an order acting as a proxy for a reticent or new ECS user via the Release B Client.

A user contacts User Services to request TBD data to be delivered. This request may be by phone, fax, email, or a user walk-in. The User Services representative first validates the identity and status of the requester in a manner consistent with policy. Upon finding that the user is not registered, User Services registers the user. Then the User Services representative clicks on the Earth Science Search Tool (ESST) icon . When the application starts up, the representative enters the user's query parameters. The ESST queries all appropriate sites including ECS Data Servers. The representative then receives query results and selects the data for delivery. The user services representative enters the data order on behalf of the user.

Release B functionality will replace the Release A Search and Order tool with the Release B Earth Science Search Tool (ESST) and the Release B order tool. The ESST provides a capability to submit a search request to ECS, and to display the returned results. The order tool is integrated with the ESST, and provides the capability to place an order from the results returned to the ESST, as well as track the status of the order. User Services will be provided with a specialized version of the ESST so that they may submit orders on behalf of users.

This scenario assumes that there is no charge for any data ordered for the user by Users Services. For data which is not free, depending on DAAC policy additional steps may be required during

registration to obtain information necessary for billing and accounting, and to perform credit checks. Refer to Figure 4.2.6.4-1 for a pictorial description and Table 4.2.6.4-1 for a sequence of events of the Place an Order for a Potential User Scenario

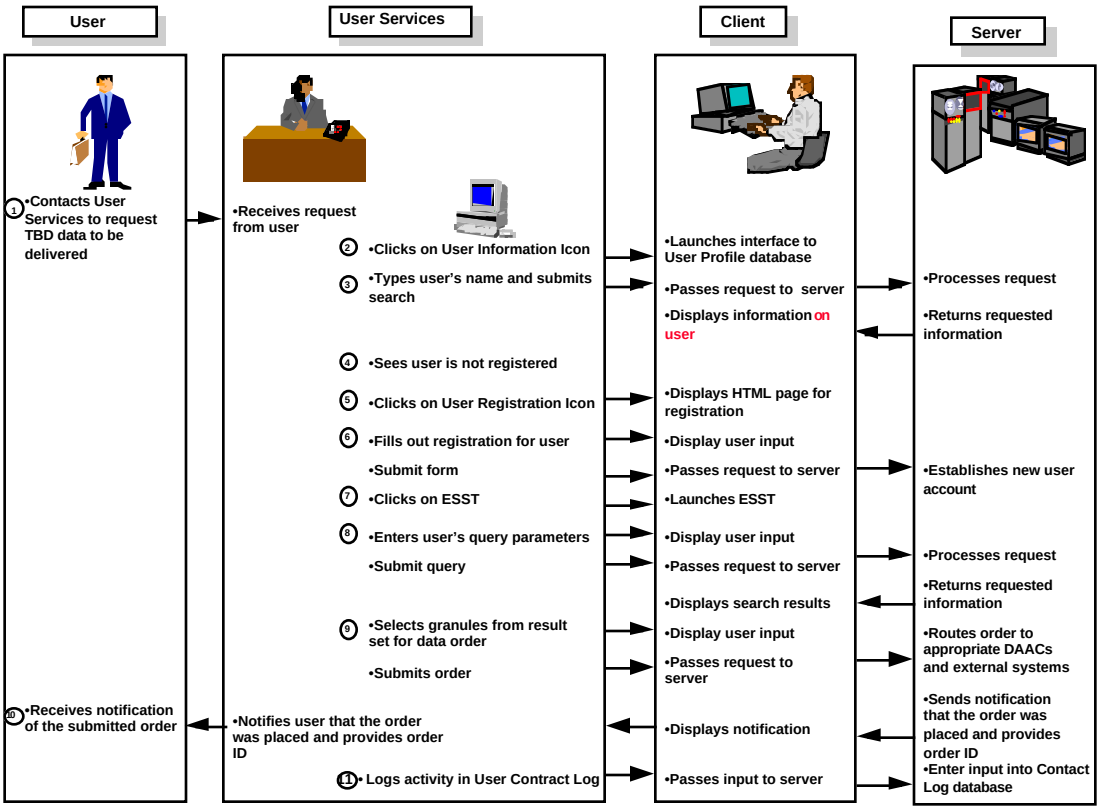

Figure 4.2.6.4-1 Place an Order for a Potential User Scenario

Table 4.2.6.4-1 Place an Order for a Potential User Scenario

Step	Operator/User	System	Purpose
1	User contacts User Services to request TBD data to be delivered	Not applicable to system unless email is used	User requires data
2	User Services clicks on User Information icon	Interface to User Profile database is launched	Access application to obtain user's identity
3	User Services types users name and submits search	User Database application queries User Database and information, including unique ID, on all users with a matching name	Make records of user profile available
4	User Services representative sees user is not registered	N/A	N/A
5	User Service clicks on user registration icon	Sends HTML page for registration to requester	Register new user
6	User Services fills out registration for user and submits form	Send registration form to management servers to establish a new user account	Register new user
7	User Services representative clicks on ESST Icon	ESST Application starts up	Launch Search Application
8	User Services representative enters user's query parameters and submits query	ECS queries all appropriate DAACs and non-ECS systems such as V0 and NOAA to satisfy search	Make requested information accessible
9	User Services selects granules from result set for data order and submits order on behalf of user	Order is routed to appropriate DAACs and external systems	System submits order to servers which have the data
10	User Services representative notifies user that order was placed and provides user with order ID	Not applicable to server unless email is used	Notify user of successful submission of order
11	User Services records activity in User Contact Log	Accept inputs and write record to database	Provide permanent record of work performed

4.2.6.5 Trouble Ticket Report Scenario

This scenario describes how a User Services representative would initiate an ECS trouble-ticket based on a user notification of system non-conformance.

User Services receives notification of a software defect from a user. The User Services representative clicks the Trouble-ticket Icon to start the application. The representative fills in items in the Trouble-ticket based on the user's inputs. The representative confirms items with the user (if the user is available) and submits the report. The application then transmits the Trouble-ticket to the Trouble-ticketing server. The Trouble-ticket application emails an acknowledgment to the user, and user services submits an entry in the User Contact Log to provide a record of the contact.

Refer to Figure 4.2.6.5-1 for a pictorial description and Table 4.2.6.5-1 for a sequence of events of the Non-Conformance Report Scenario

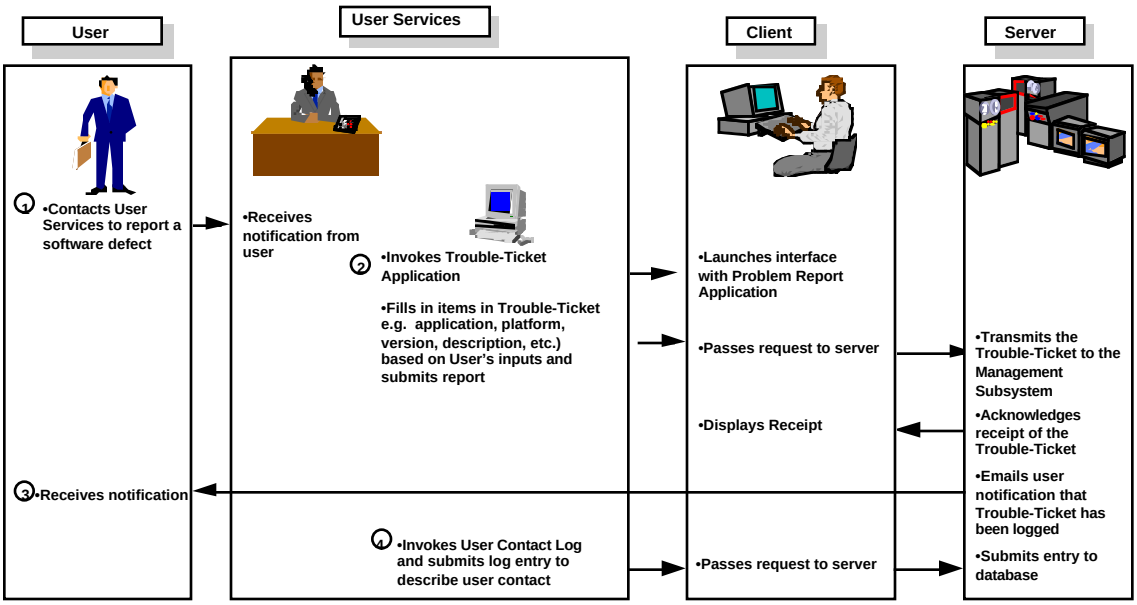

Figure 4.2.6.5-1 Trouble Ticket Scenario

Table 4.2.6.5-1 Trouble Ticket Scenario

Step	Operator/User	System	Purpose
1	User notifies User Services of a software defect	Not applicable unless email is used	N/A
2	User Services representative clicks Trouble-ticket icon	Trouble-ticket Application starts up	Make Trouble-tickets available
3	User Services representative fills in items in Trouble-ticket (e.g. application, platform, version, description, etc.) based on User's inputs and submits report	Application transmits the Trouble-ticket to the Trouble-ticket server and provides acknowledgment of receipt	Submit Trouble-ticket for further processing
4	User Services records activity in User Contact Log	Accept inputs and write record to database	Provide permanent record of work performed