6. System Level Scenarios

ECS must support a wide range of data and algorithm sources and, once ingested into the system, support production and archiving of valuable data products for subsequent retrieval by Earth Science researchers and eventually a wider user community. ECS must also support users in finding and accessing relevant data collections and services of interest to them via information discovery and management services. ECS has a goal of supporting and indeed facilitating collaborative, interdisciplinary research. System level scenarios provide specific examples of how individual ECS activities discussed above in Section 4 combine to provide the infrastructure needed for ongoing system-wide operations (system management); ingest, production and archiving ("push"); and information discovery and retrieval ("pull").

System Management Scenarios (Section 6.1) show examples of cross-DAAC coordination for a software upgrade, and cross-DAAC resource management. Push Scenarios (Section 6.2) show examples of MODIS planning and processing, and cross-DAAC production coordination for products dependent on MODIS input (CERES, MISR, and higher-level MODIS products). Pull Scenarios (Section 6.3) show examples of an interdisciplinary investigator accessing, browsing and retrieving a wide range of data contained within EOSDIS, and a research scientist who is developing a technique which will integrate data from sensors of varying spatial, temporal, and spectral resolutions (ASTER, MODIS, and Landsat 7).

The push recovery scenario shows an example of recovery from a hypothetical situation where an error in a processing algorithm corrupts products across several DAACs over a period of a week. The pull recovery scenario shows an example of recovery from a large surge in demand for EOS products due to an unusual geophysical event.

The format for the system scenarios is identical to those in Section 4 with a slight modification to the "Scenario Steps" table. In the Section 6 "Scenario Steps" table, a column is devoted to mapping key system activities from Section 4 to those occurring in the system scenarios in Section 6.

6.1 System Management Scenarios

The DAACs, EOC and SMC utilize ECS infrastructure services to work together to identify, monitor, and resolve system-wide activities. The added value of Release B will be highlighted in each scenario.

6.1.1 Cross-DAAC Software Upgrade Coordination Scenario

The scenario depicts the process of scheduling a software upgrade across DAACs. Refer to Figure 6.1.1-1 for a pictorial description and Table 6.1.1-1 for a sequence of events of the Cross-DAAC Software Upgrade Coordination Scenario. The scenario addresses the following:

- Evaluation of upgrade requirements,

- Coordination of the upgrade with the DAACs
- Procedures for adjudicating cross-site and cross-facility schedule conflicts
- The process for acquiring, storing and maintaining schedule related policies
- Negotiating and maintaining ground event functional allocations and assessing priorities

This scenario has been entirely developed under Section 4.1.7.6, "Cross-DAAC Software Upgrade Coordination Scenario".

6.1.2 Cross-DAAC System Resource Management Scenario

This scenario depicts resource management tasks related to configuration, maintenance, inventory, and logistics at the SMC, EOC and LSM's. The scenario describes interaction of SMC and LSM configuration management functions, coordination and movement of resources between ECS sites. Refer to Figure 6.1.2-1 for a pictorial description and Table 6.1.2-1 for a sequence of events of the Cross-DAAC System Resource Management Scenario.

The scenario describes the interactions between the SMC and LSM's required for on-site and off-site corrective and preventive systems hardware maintenance, as well as monitoring off-site repair activities. SMC/LSM logistics management activities are depicted as SMC/LSM monitor and communicate information concerning spares and consumable inventories and replenishment.

The scenario begins when the SMC Resource Controller notices a warning indicator for GSFC on the HP Openview (HPOV) desktop. The Resource Controller contacts GSFC to discuss the DAACs maintenance status and potential impact to system production schedules. After talking with the GSFC Resource Manager, the SMC Resource Controller logs a trouble ticket referencing information given during the conversation. The GSFC Resource Manager logs the appropriate trouble tickets and notifies local maintenance of the need for assistance. The SMC Resource Controller and GSFC Staff determine that the GSFC DAACs downtime will not adversely affect the EOS system data production unless it extends for more than 5 hours.

GSFCs maintenance determines that the problem is a bad card for which there are spares in supply. They replace the card, conduct the appropriate systems test and bring the system back on-line. Entries are made in the maintenance log and the parts inventory, and the trouble ticket is closed.

The results of the maintenance effort are forwarded back to the SMC. The DAAC has been down less than 5 hours. No replans for data production are updated.

After consulting with the GSFC Supervisor, the SMC Supervisor makes the appropriate log entries and closes out the system trouble ticket.

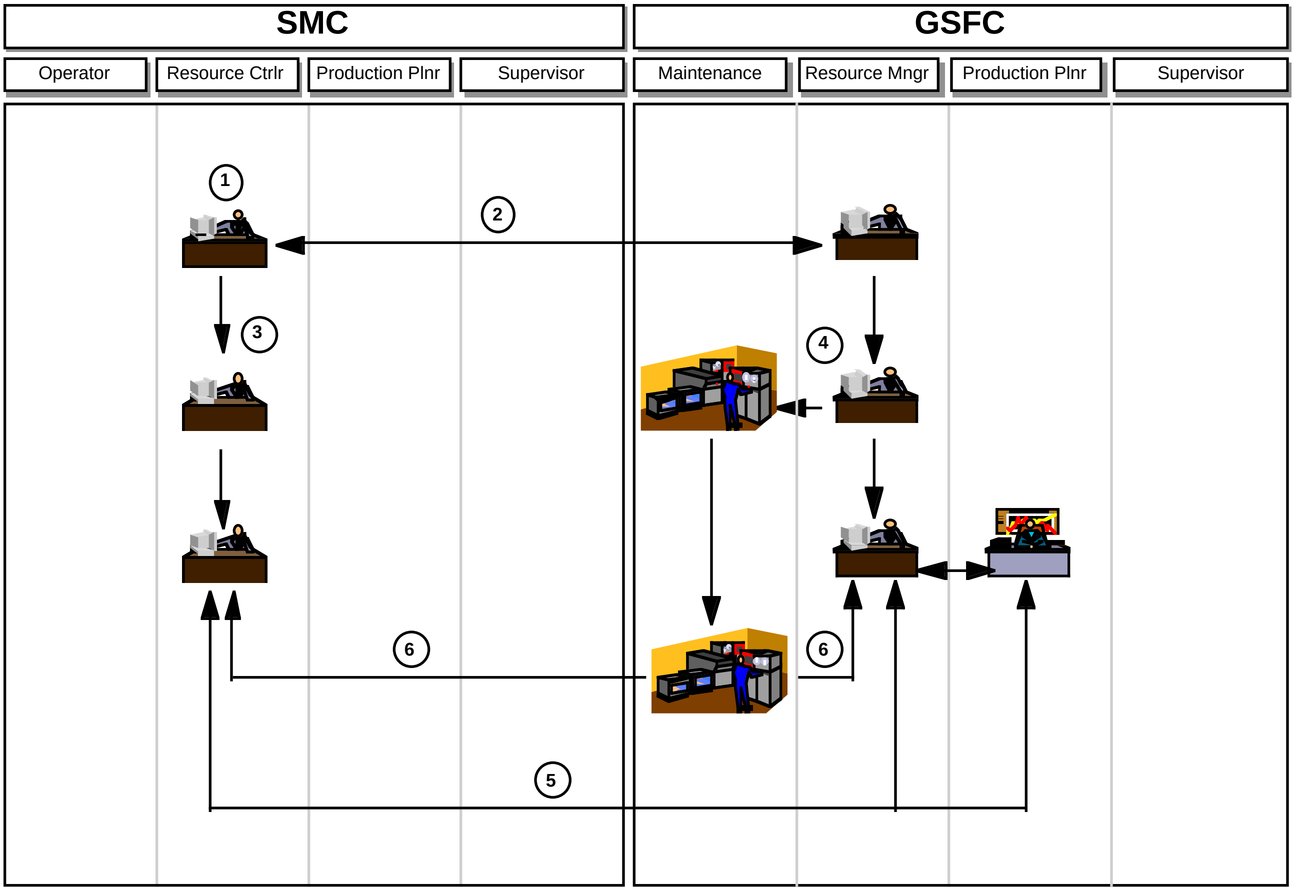

Figure 6.1.2-1. Cross-DAAC System Resource Management Scenario

Table 6.1.2-1. Cross-DAAC System Resource Management Scenario

Step	Operations Staff	System Activity	S4 Scenario
1	SMC operator notices a warning indicator for DAAC A on HP Openview console.	HPOV displays host-level status icon.	4.1.7.3
2	SMC operator notifies the Resource Manager and Shift supervisor of possible problem.	N.A.	
3	SMC Shift Supervisor contacts DAAC "A" while Resource Manager and Resource Planning Manager review problem for any possible down stream affects.	System supports SMC view of site maintenance and production plans.	4.1.2.1
4	SMC Supervisor logs a system trouble ticket referencing information given him/her by the DAAC "A" supervisor.	System supports trouble-ticketing interface.	4.1.2.1
5	Local DAAC "A" supervisor logs appropriate trouble tickets and notifies local maintenance of the need for maintenance assistance.	System supports trouble-ticketing interface.	4.1.2.1, 4.1.7.4
6	SMC Resource Manager and Resource Planning Manager determine that DAAC "A"s downtime will not adversely affect the EOS system unless it extends for more than five hours. As a result they commence drafting contingency plans while at the same time closely monitoring the progress being made at DAAC "A".	System supports SMC views of site maintenance and production plan; also supports SMC system-level production planning.	4.1.2.1, 4.1.2.2, 4.1.6.1
7	DAAC "A"'s maintenance determines that the problem is a bad card for which there are spares in supply. They replace the card conduct appropriate system tests and bring the system back on-line. Entries are made in maintenance log, parts inventory and the trouble ticket is closed. Results are forwarded back to the SMC Supervisor.	System supports corrective maintenance actions for system components; logging and inventory control for maintenance and spares; trouble ticketing interface.	4.1.2.1, 4.1.2.2, 4.1.7.4, 4.1.7.5
8	After consulting with the DAAC"A" supervisor the SMC Supervisor makes the appropriate entries and closes out the system trouble ticket.	System supports trouble ticketing.	4.1.2.1, 4.1.2.2

6.1.3 System Management Recovery Scenario

System management activities are included as part of the push and pull recovery scenarios because these recovery scenarios utilize many system management activities to recover from their hypothetical system-wide problems.

6.2 Push Scenarios

From a data perspective Release B contains a diverse set of data types and representations, an extremely large data volume (TB/day and PB archives), complex data product interdependencies, and a requirement for long-term archival of critical Earth science data products. The added value of Release B will be highlighted in each scenario.

6.2.1 MODIS Planning and Processing Scenario

This scenario describes the steps required to plan and then process the Level 0 MODIS data to higher level products at the GSFC DAAC. The scenario illustrates the collaborative nature of the planning and production processes between the MODIS instrument team and the GSFC DAAC administration and operations staff. The scenario depicts the parallel efforts between the DAAC and Instrument teams, particularly the coordination between the two teams. Three primary steps are illustrated in the scenario flow: first, the analysis and generation of a plan with instrument team peer review; next the generation of an integrated plan for the GSFC DAAC; and finally the monitoring of the production process. Refer to Figure 6.2.1-1 for a pictorial description and Table 6.2.1-1 for a sequence of events of the MODIS Planning and Processing Scenario.

In the scenario the instrument team and the DAAC provide inputs to start the planning process. The scenario will describe how the DAAC staff enters a standard production request, how the production scheduler initiates creation of candidate plans for review, how the plan is reviewed, how the plan is implemented and scheduled for execution, and how the DAAC and instrument team monitor the progress of production at the GSFC DAAC.

This scenario has been developed under Section 4.1.6.1, Routine Production Planning.

6.2.2 Cross-DAAC Production Coordination Scenario

This scenario addresses cross-DAAC planning and scheduling associated with MODIS land surface, and snow and ice products. MODIS products produced at the GSFC DAAC are needed for higher-level MODIS processing at EDC and NSIDC. This scenario explores the interactions between the DAACs and the SMC. Key activities described are: how the DAACs develop individual candidate plans, how the DAACs coordinate with each other and the SMC to resolve data availability or priority conflicts, how the DAACs create and review new plans based on negotiated agreements, and how the plans are scheduled at the DAACs. Refer to Figure 6.2.2-1 for a pictorial description and Table 6.2.2-1 for a sequence of events of the Cross-DAAC Production Coordination Scenario.

The scenario begins with the GSFC DAAC developing its' production schedule with regards to MODIS L1, L1A, L1B, and L2 processing (4.2.4.1, Routine Production Planning scenario). Once the schedule is complete, the Data Availability Schedule (DAS) is inserted to the Data Server. In this example, both the EDC and NSIDC have made subscriptions against the DAS at GSFC. The insertion of the DAS to the GSFC Data Server triggers a notification to the other DAACs. With the DAS available, the subscribing DAACs may view it.

The EDC develops a candidate production plan for MODIS L3 land surface products (4.2.4.1, Routine Production Planning scenario). EDC determines that the MODIS L2 availability stated in the GSFC DAS will be too late. EDC contacts GSFC to determine if GSFC can adjust its' production priorities to move up the delivery of the MODIS L2 land surface data. GSFC agrees to move its' schedule up to accommodate the EDC production plan.

The NSIDC develops a candidate production plan for MODIS L3 snow and ice products (4.2.4.1, Routine Production Planning scenario). NSIDC determines that the MODIS L2 availability stated in the GSFC DAS will be too late to meet the L3 production schedule. NSIDC contacts GSFC to determine if a schedule adjustment is possible. GSFC replies that it has already moved it's schedule up to accommodate the EDC and all jobs within the 30 day plan are of similar priority. The NSIDC determines that the availability of MODIS L3 snow and ice is a high priority and contacts the SMC for a resolution (4.1.6.3, Schedule Adjudication scenario).

The SMC reviews the production plan of each of the DAAC and determines that the MODIS L3 snow and ice data is critical to an upcoming international analysis. It identifies the shift in priorities that will result in an acceptable data availability schedule for the EDC and NSIDC, and directs GSFC to lower priority on another production job to allow earlier processing to produce MODIS L2 data. GSFC replans the MODIS L2 production (4.2.4.2, Replanning Production scenario) to comply with the SMC shift in priorities. Once the new plan is complete, GSFC inserts a new DAS to the Data Server. EDC and NSIDC review the new DAS and determine that the new dates are satisfactory to meet the MODIS L3 candidate plans.

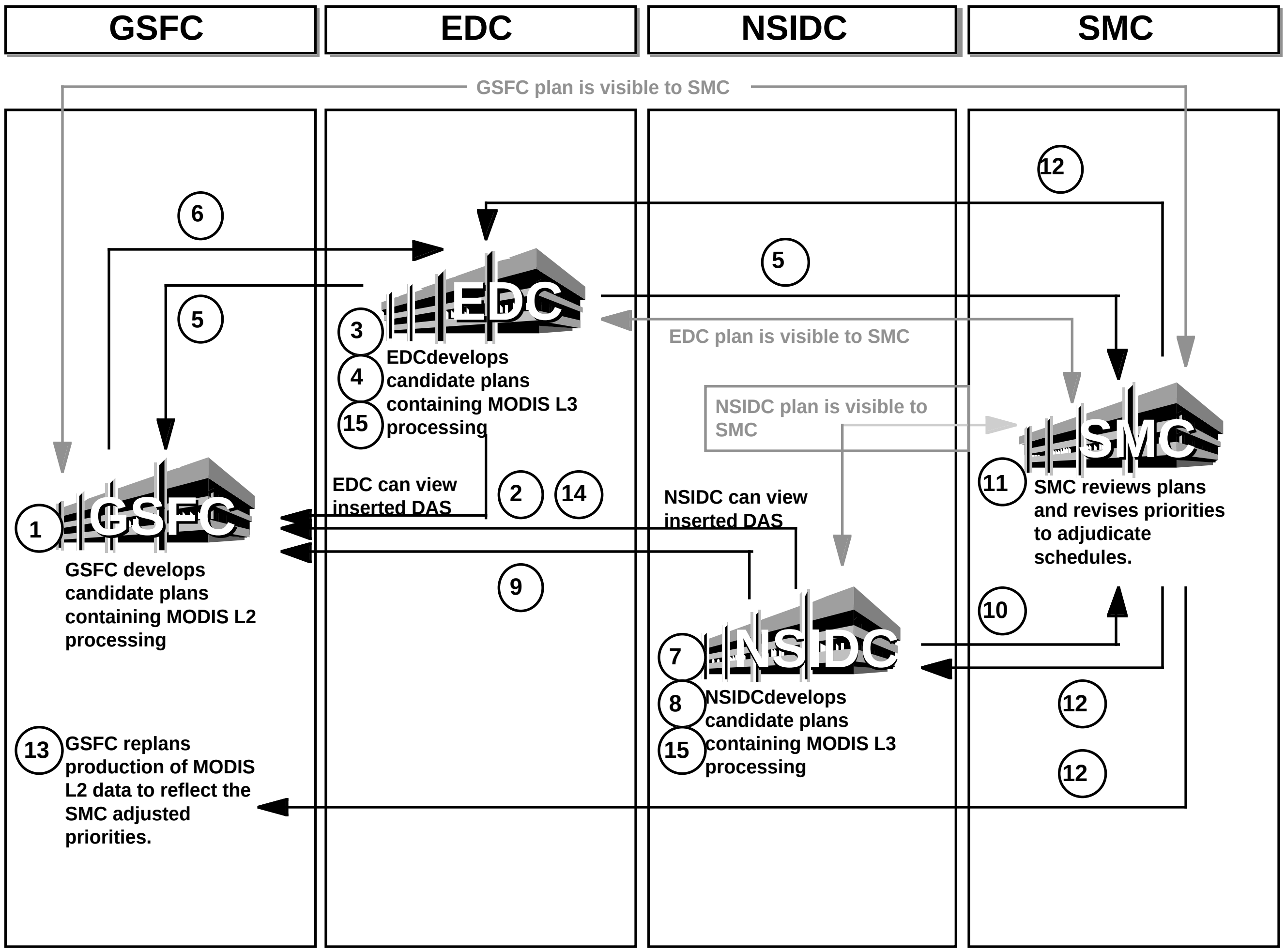

Figure 6.2.2-1. Cross-DAAC Production Coordination Scenario

Table 6.2.2-1. Cross-DAAC Production Coordination Scenario

Step	Operations Staff	System Activity	S4 Scenario
1	GSFC develops candidate plans containing MODIS L2 processing	Candidate plan for GSFC MODIS L2 established	4.2.4.1
2	GSFC inserts DAS to its' Data Server.	System supports a Data Availability Schedule	N.A.
3	EDC reviews MODIS L2 data availability schedule.	EDC can view DAS	N.A.
4	EDC develops candidate plan containing MODIS L3 processing.	Candidate plan for EDC established	4.2.4.1
5	If MODIS L2 data is not in time for L3 processing at EDC, contact GSFC for conflict resolution.	System supports production plan reviews and "what-if" scenarios.	4.1.6.3
6	GSFC agrees to adjustment of data production priorities resulting in earlier delivery of MODIS L2 land surface data to EDC.	System supports replan based on GSFC adjustment of priorities.	4.2.4.2
7	NSIDC develops candidate plan containing MODIS L3 processing.	Candidate plan for NSIDC L3 snow and ice product established	4.2.4.1
8	NSIDC reviews MODIS L2 availability	GSFC candidate plan is visible to EDC	N.A.
9	If MODIS L2 data is not in time for L3 processing at NSIDC, contact GSFC for conflict resolution.	System supports production plan reviews and "what-if" scenarios.	4.1.6.3
10	GSFC cannot alter candidate MODIS production plan without changing system-wide production priorities. NSIDC contacts SMC for schedule adjudication to resolve conflict.	System supports SMC plan adjudication	4.1.6.3
11	SMC reviews production plans at GSFC, EDC, and NSIDC.	GSFC, EDC, and NSIDC plans are visible to SMC	N.A.
12	Based on review, SMC directs GSFC to alter it's production priorities to meet NSIDCs candidate plan. Replan also allows EDC to meet its candidate production plan.	System supports replan based on SMC review of priorities.	4.2.4.2
13	GSFC replans its MODIS L2 production based on the priorities set by the SMC.	System supports production replan	4.2.4.2
14	Once replan is done, GSFC inserts new DAS to Data Server.	System supports a Data Availability Schedule	N.A.
15	Both EDC and NSIDC review the DAS and find it agrees with their candidate MODIS L3 production plans.	System supports candidate production plan review and "what-if" planning scenarios.	4.2.4.1

6.2.3 Push Recovery Scenario

The push recovery scenario presents a hypothetical situation where an error is discovered in a MODIS algorithm after a week of producing MODIS Level 1 products. These Level 1 products are used to create Level 2 products that are input to further processing at EDC, LaRC, and NSIDC. The scenario will address recovery steps taken by the operations staff using available ECS functionality and tools. Recovery includes identification of corrupted products, updating of the MODIS algorithm, I&T of the updated algorithm, planning for reprocessing of all corrupted products, scheduling of resources at GSFC, EDC and NSIDC, and monitoring of reprocessing production. Refer to Figure 6.2.3-1 for a pictorial description and Table 6.2.3-1 for a sequence of events of the Push Recovery Scenario.

The scenario begins when a member of the SCF QA staff discovers an error in an algorithm used to produce MODIS L1 data at the GSFC DAAC. The QA staff immediately brings this to the attention of the GSFC DAAC Supervisor who directs the Production Supervisor to shut down production of MODIS L1, and identify and purge the corrupt data from the archive, saving it to tape for any required examination.

The Algorithm Development Team (ADT) at the SCF begins debugging the algorithm. The ADT locates the code error and fixes it, resulting in a new algorithm. The SCF and the GSFC DAAC undergo integration and test for the new algorithm (SSI&T). The new algorithm is accepted by the GSFC DAAC.

Once the new algorithm has been accepted, MODIS L1 processing is submitted as an on-demand request. The request has the highest priority and so is scheduled as a "hot job". A candidate replan for MODIS L2 is developed. The corresponding Data Availability Schedule (DAS) is inserted into the GSFC Data Server and can be viewed by DAACs subscribing to the MODIS DAS.

The DAACs dependent upon the MODIS L2 processing review and accept the new DAS, reporting to GSFC and the SMC that the impact to their respective production plans is within tolerable limits.

The GSFC DAAC Supervisor gives the Production Supervisor the "OK" to begin the production processing of MODIS L1. Production is initiated and monitored by the Production staff.

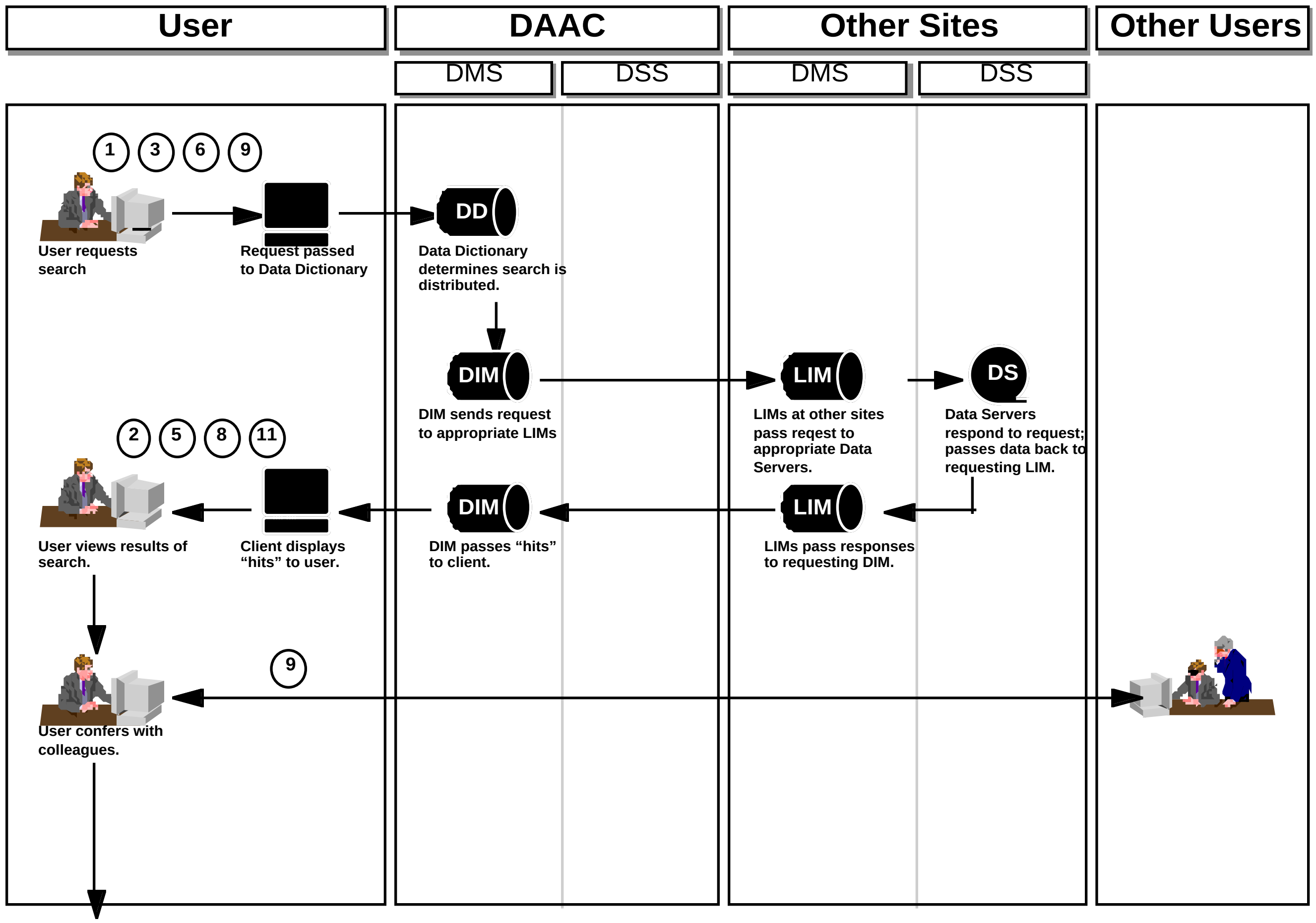

Figure 6.2.3-1. Push Recovery Scenario

Table 6.2.3-1. Push Recovery Scenario (1 of 2)

Step	Operations Staff	System Activity	S4 Scenario
1	GSFC QA staff discovers an error in an algorithm used to produce MODIS L1; informs GSFC supervisor.	System supports algorithm QA and debugging.	4.2.5.1, 4.2.7.2
2	Supervisor instructs that MODIS L1 production be halted.	System supports monitoring of PGE status.	N.A.
3	Notices are posted to the Bulletin Board and the Advertising Service warning of the bad data.	Bulletin Board/Advertising	N.A.
4	The corrupt data is identified and purged from the archive.	System supports identification of affected granules and manual deletion from archive.	4.2.3.3
5	GSFC algorithm development team develops a new algorithm to replace the faulty one.	System supports development of new algorithm (science) software.	N.A.

Table 6.2.3-1. Push Recovery Scenario (2 of 2)

Step	Operations Staff	System Activity	S4 Scenario
6	AI&T is conducted on the new algorithm.	System supports algorithm integration and test.	4.2.7.1
7	MODIS L1 reprocessing added to GSFC production schedule as hot job.	System supports "hot job" scheduling.	4.2.4.5
8	GSFC candidate replan for MODIS L2 is developed.	Candidate replan for MODIS L2 established.	4.2.4.2
9	GSFC inserts the MODIS DAS into its' Data Server.	System supports a DAS	N.A.
10	Subscribing DAACs ftp DAS and review for schedule impact; report acceptable impact to SMC and to GSFC.	DAACs can retrieve and view a DAS.	N.A.
11	SMC indicates its acceptance of the plan.	SMC can view DAS and GSFC plan.	
12	GSFC initiates and monitors processing	System supports production initiation and monitoring.	N.A.

6.3 Pull Scenarios

ECS as a system must support a diverse set of users (disciplines, expertise, objectives, methods, tools) who are geographically distributed and use widely varying computational and networking capabilities. An inherent part of the scientific research method is that increased understanding leads to changes in the way scientists conduct Earth science research. ECS must support the reality that the scientists' interactions will change many times over the life of the system. The added value of Release B will be highlighted in each scenario.

6.3.1 Development of Land Surface Hydrologic Model Scenario

This pull scenario describes activities that will be typical of a broad range of interdisciplinary users who will access, browse and retrieve a wide range of data contained within EOSDIS. The scientist's primary goal in this scenario is the development of hydrologic models for mesoscale watersheds and extension of these models to regional and global scales via remotely-sensed data and currently available in-situ data. Refer to Figure 6.3.1-1 for a pictorial description and Table 6.3.1-1 for a sequence of events of the Development of Land Surface Hydrologic Model.

In-situ and remotely-sensed data are used in the initial phase of model development followed by further refinement with additional remotely-sensed data as more science products become available. Once the model has reached a satisfactory level of performance for mesoscale analysis, the model will be extended to larger land areas (i.e. regional scale). The model will be tested in different regions of the world, preferably where in-situ data is existent.

The scenario includes step-by-step descriptions of the science scenario in user terms. The scenario begins with the user exploring the availability of EOS and other science products for limited geographical areas such as drainage basin boundaries, flood plain, and stream channels associated with the Little Washita watershed in Oklahoma. The user queries various DAACs about the availability of products from EOS-AM1 instruments and other missions, such as ERS, JERS, and RADARSAT SAR products, as well as in situ data such as soil maps, DEM, rainfall data, and run off data.

The user invokes ECS services such as browse and subsetting to make final decisions as to which data products best meet the researcher's modeling needs. Finally the user places orders for selected data products.

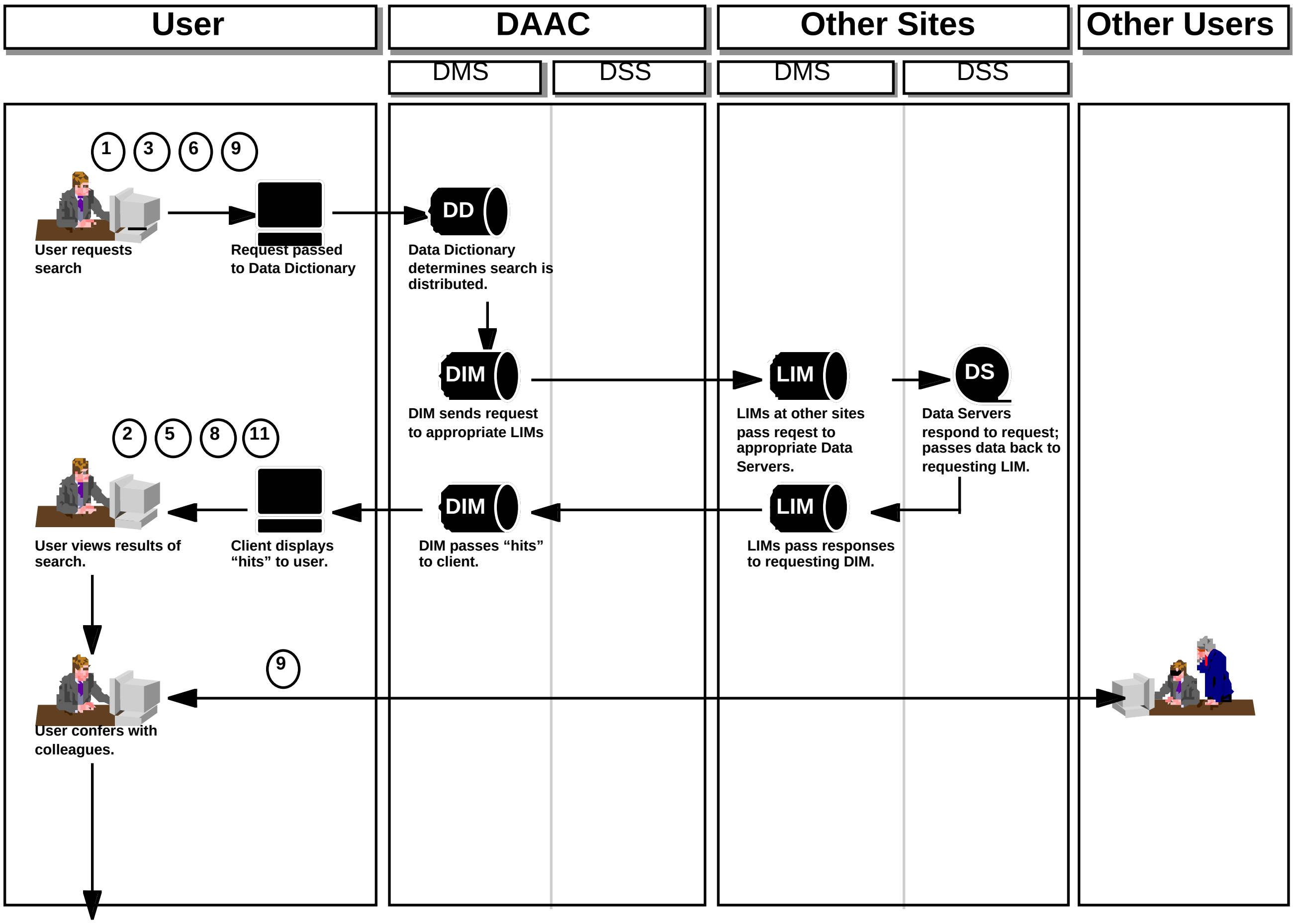

Figure 6.3.1-1. Development of Land Surface Hydrologic Model Scenario

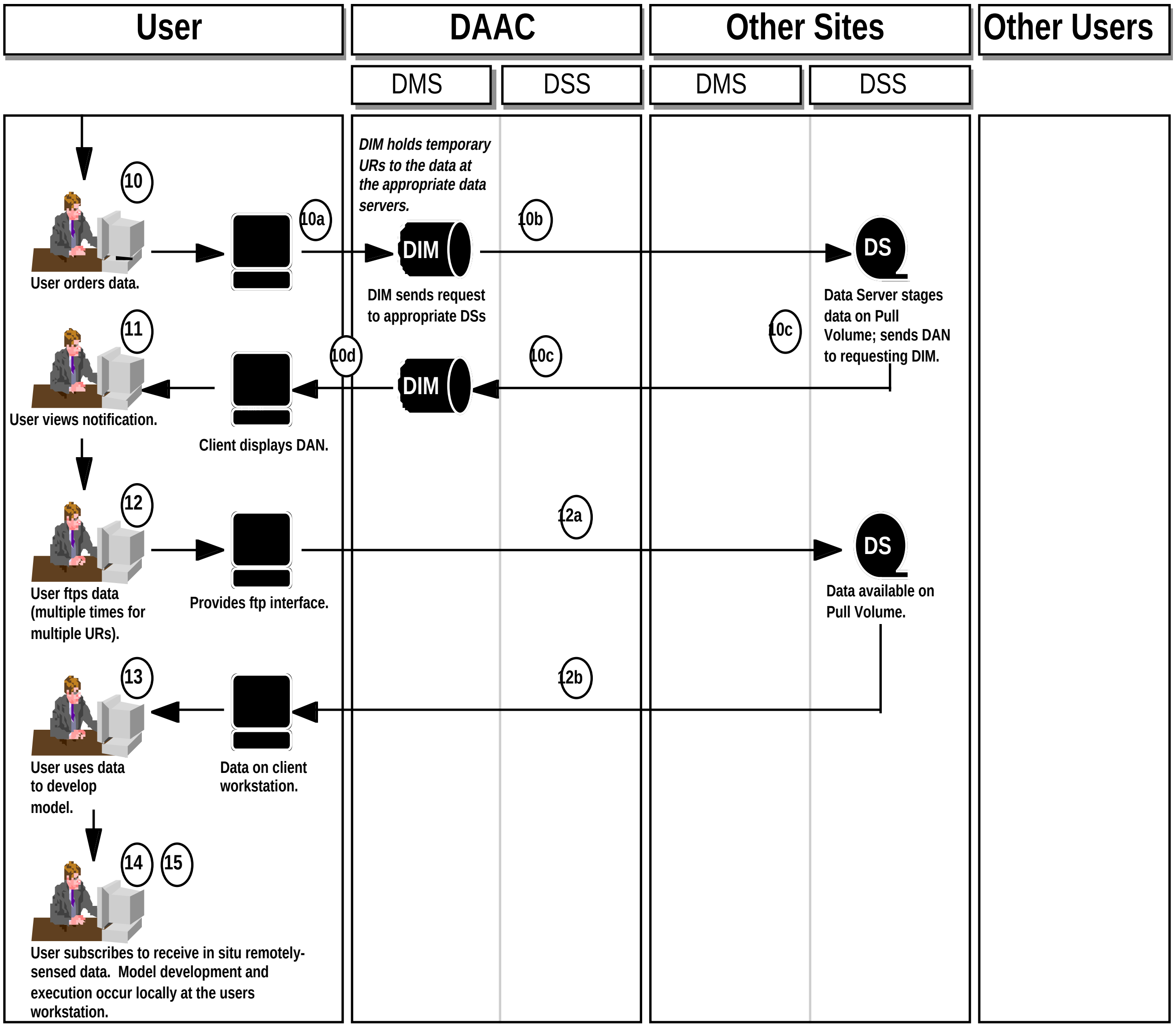

Figure 6.3.1-2. Development of Land Surface Hydrologic Model Scenario

Table 6.3.1-1. Development of Land Surface Hydrologic Model Scenario (1 of 2)

Step	User	System Activity	S4 Scenario
1	User sets attribute parameters and submits an inventory search of ECS for availability of EOS and other science data.	System supports inventory search and retrieval.	4.2.9.1
1a		CLS passes search parameters to the Data Dictionary (DD).	
1b		DD determines whether the search is distributed; passes parameters to the DIM.	
1c		DIM makes a request of appropriate LIMs at other DAACs	
1d		LIMs at other DAACs make request of appropriate Data Servers.	
1e		Data Servers at other sites return results (UR) to their LIMs.	
1f		LIMs at other DAACs pass results back to originating DIM.	
1g		DIM passes results to CLS.	
1h		CLS displays results to the user.	
2	User examines results of inventory search.	System supports displays of search results.	4.2.9.1
3	User submits a request for ECS provided guide information (for inventory query parameters)	System supports guide search and retrieval.	4.2.9.1
4	User views results of guide request.	System supports display of guide information.	4.2.9.1
5	User requests one browse image per data set.	System supports browsing and subsetting of searched data sets.	4.2.9.1
6	User views browse images.	System supports display of browse imagery.	4.2.9.1
7	User requests the QA statistics and accuracy limits for the geographic areas (Little Washita Watershed).	System supports search and retrieval of QA data by spatial parameters.	4.2.9.1
8	User examines the requested statistics.	System supports the display of QA data.	4.2.9.1
9	User consults colleagues and compares the different types of data products.	System supports exchange of data between science users.	
10	User places order for the data products desired.	Client supports ordering of results data.	4.2.9.1
10a		Client passes order parameters to DIM.	

Table 6.3.1-1. Development of Land Surface Hydrologic Model Scenario (2 of 2)

Step	User	System Activity	S4 Scenario
10b		DIM sends request to appropriate Data Server.	
10c		Data Server stages data to Pull Volume; DAN sent to requesting DIM.	
10d		Notification is sent to Client.	
11	User views notification.		
12	User ftp's data (multiple times for multiple URs).	Ftp request is forwarded through Client to Data Server.	
12a		Data is pulled off of Data Server Pull Volume.	
12b		Data arrives at Client workstation.	
13	User uses data to develop model.		
14	User subscribes to receive in situ monthly/yearly remotely-sensed data.	System supports subscription of desired data.	4.2.9.1
15	Model development and execution occur locally at the users workstation.	N.A.	

6.3.2 Development of Methods to Integrate Data Sets of Varying Resolutions Scenario

This scenario describes an investigation whose purpose is to develop a technique which will integrate data from sensors of varying spatial, temporal, and spectral resolutions. The product will be a surface reflectance model with a resolution which is greater (finer) that any of the individual input data sets. The technique will make use of the lack of coincidence in repeat pixel location and will require precise georegistration of pixels in the input data sets. Once the pixels are georegistered, they are integrated into a surface reflectance model using a Bayesian maximum posterior probability approach. Other potential applications include surface modeling of forest fire damage, crop assessment, snow pack, and sea ice variations. Refer to Figure 6.3.2-1 for a pictorial description and Table 6.3.2-1 for a sequence of events of the Development of Methods to Integrate Data Sets of Varying Resolutions Scenario.

The scenario includes step-by-step descriptions in user terms. The flow begins with search and access of cloud-free Landsat-7 data. Based on the acquired the Landsat-7 data, the user picks a time period and a research area that has relatively static surface features over the chosen time period. Coincident MODIS Level 1B data are located, subsetted, and acquired for the time period, geographic area, and parameters of interest. Also, the user locates and retrieves DEM fragments for the research area. At the SCF, the scientist uses the DEM products in conjunction with solar and satellite viewing geometry to create a constant albedo model of the satellite measured illumination. The user registers FOVs from multiple MODIS observations and applies local algorithms to determine corrections to the constant albedo model that best estimate the actual MODIS measured reflectivities. Landsat 7 data is used to validate the results.

Subsequently, the researcher submits a DAR for ASTER collection and a standing request for cloud-free ASTER and MODIS scenes. The research process is then repeated and potentially enlarged to other geographical areas using coincident MODIS and ASTER data.

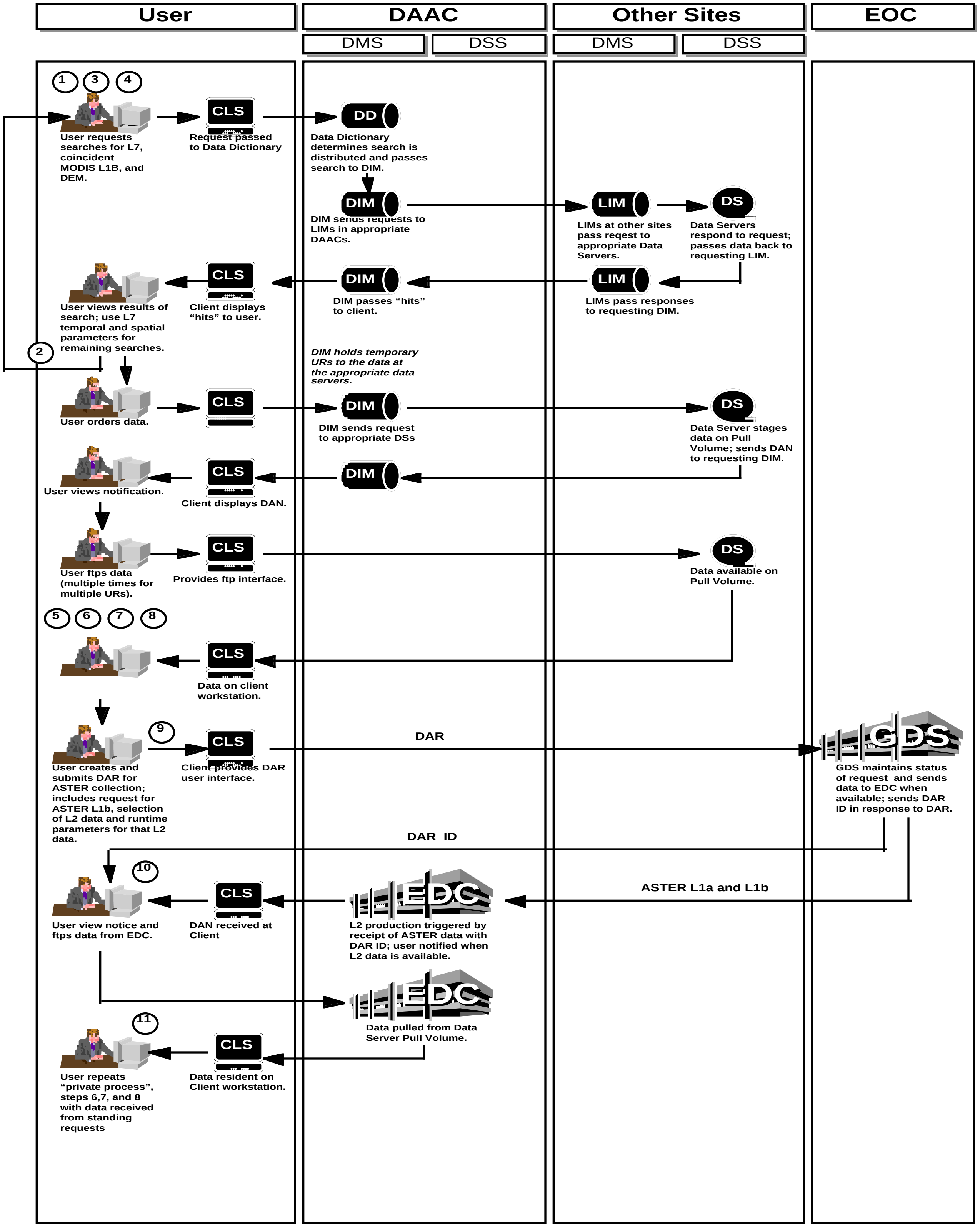

Figure 6.3.2-1. Development of Methods to Integrate Data Sets of Varying Resolutions Scenario

Table 6.3.2-1. Development of Methods to Integrate Data Sets of Varying Resolutions Scenario

Step	Operations Staff	System Activity	S4 Scenario
1	Search and access L7 data.	System supports search and retrieval of L7 data.	
2	Select a time period and research area.	System supports selection of data attributes including temporal attributes.	
3	Locate, subset and acquire coincident MODIS L1B data for the time period, geographic area, and parameters of interest.	System supports spatial, temporal, and pertinent parameters for coincident MODIS L1B	
4	Locate and retrieve DEM fragments for the area of interest.	System supports search and retrieve of in situ (DEM) data.	
5	Use DEM products in conjunction with solar and satellite viewing geometry to create albedo model of satellite measured illumination.	Conducted at users workstation with user software	N.A.
6	Register FOVs from MODIS observations.	Conducted at users workstation with user software	N.A.
7	Apply local algorithms to determine corrections to the constant albedo model to best estimate actual MODIS measured reflectivities.	System supports development of science algorithms.	
8	Compare with L7 data to validate results.	Systems supports view of L7 data. Statistical analysis conducted with users software.	
9	Submit DAR for ASTER collection. Includes DAR for L1b, selection of L2 products and L2 runtime parameters (all using the same DAR tool).	System supports data acquisition for ASTER collections and subscriptions for ASTER data (subscription created by the Client upon submittal of a DAR).	
10	Submit standing-request for MODIS scenes.	System supports subscriptions for ASTER and MODIS data.	
11	Repeat process using ASTER and MODIS data received from standing request.	Above steps.	

6.3.3 Pull Recovery Scenario

The pull recovery scenario presents a hypothetical situation where a large volcano eruption is observed by instruments on EOS-AM1 and Landsat 7. As a result, ECS is inundated by a rapid rise to over 50,000 users wanting to access, browse and retrieve data from ECS. This scenario is analogous to the demand experienced by the JPL WWW server during the impact of asteroids on the Planet Jupiter. The scenario will address recovery steps taken by the operations staff, at a typical DAAC, using ECS available functions and tools. Refer to Figure 6.3.3-1 for a pictorial description and Table 6.3.3-1 for a sequence of events of the Pull Recovery Scenario.

Operations actions take place at a typical DAAC. This scenarios assumes that the event data is already archived.

Initially, thousands (50K) of users request all available data on a volcanic eruption. The event is witnessed by EOS-AM1 and Landsat 7, and as such, data is available from several instruments, and across the DAACs. Symptoms of the flood are first displayed by an HPOV status icon showing a problem occurring on the HTTP server responsible for serving advertising HTML pages. The on-duty operator investigates the problem by examining the pull-side resource statistics. The HPOV problem status indicates that the servers ping time-out interval is being exceeded. The server maintenance application confirms this by showing the operator statistics on servers and queues. The operator responds to the rising flood by limiting the number of sessions that can occur on the Web Server. New users will now receive a "too busy, come back later" message if the session limit is already at maximum when they click on the volcanic data URL(s).

There are also a vast number of pull (ftp) requests for Data Server. The Science Data Server active sessions threshold is exceeded and session requests are queued. As the queue grows, the average length of time a user waits for data grows. Each user is notified of the data's readiness and now has a DAAC-set period of time to retrieve the data. As the number of requests grow, the DAAC may shorten the time a set of data remains on the Pull Volume. As part of the data availability notice to the user, the amount of time the data will be resident on the Pull Volume is shown. Any time the reference count for a file reaches zero, the associated files are deleted, freeing up space for the next set of pull data.

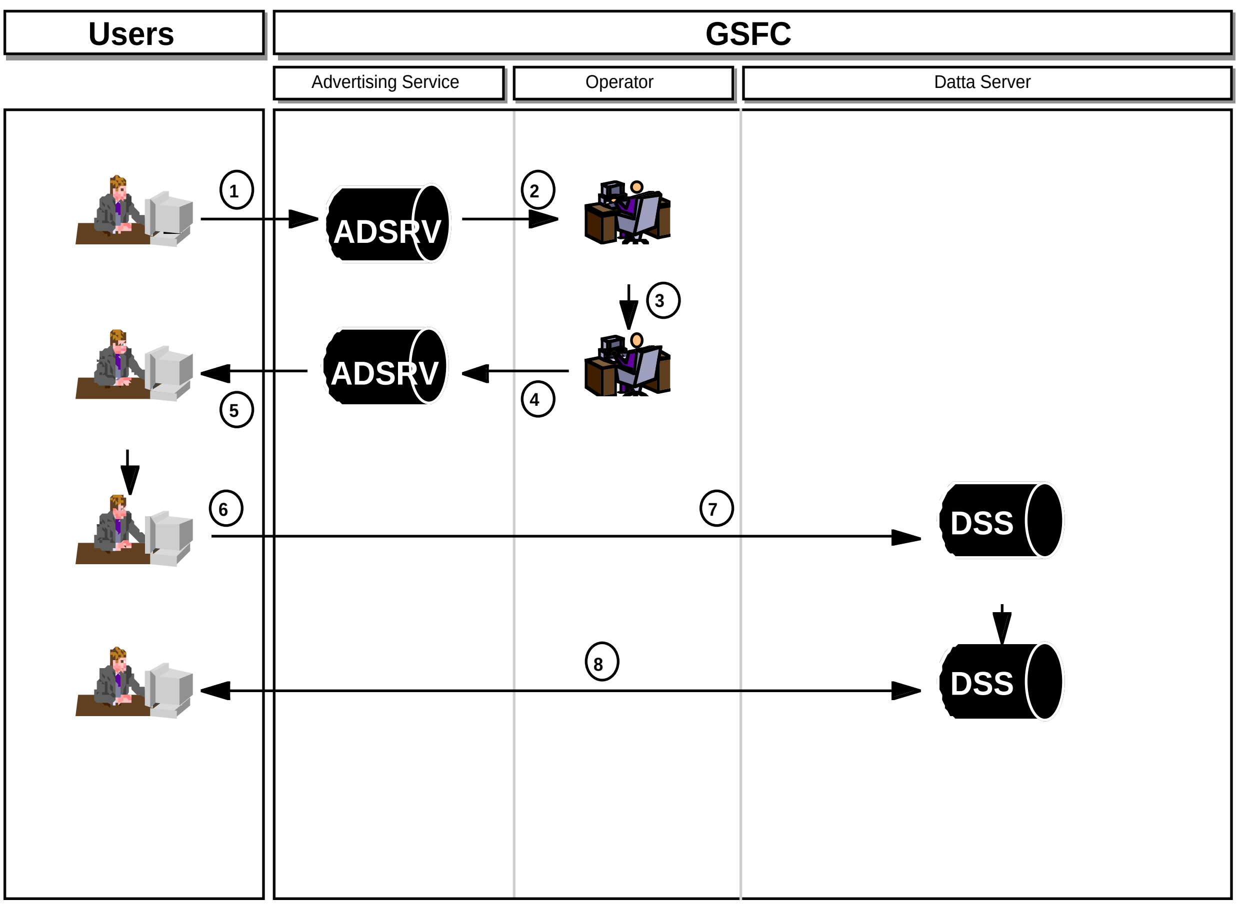

Figure 6.3.3-1. Pull Recovery Scenario

Table 6.3.3-1. Pull Recovery Scenario

Step	Users/Operations Staff	System Activity	S4 Scenario
1	50K Users make a search requests for the same data within a short time frame.	System usage statistics rise.	4.2.8.6
2	Excessive usage is noted at the advertising service.	Alarm flags to operator.	4.2.8.6
3	The on-duty DAAC operator examines activities across the pull-side resources.	System displays resource statistics indicating that affected database servers are exceeding their ping time-out interval; system supports unified database administration.	4.2.8.6
4	Operator limits the amount of sessions allowable at the Web Server.	System supports Web Server administration.	4.2.8.6
5	New Users receive busy notice when attempting to access the URL for the data in question.	Displays "too busy, come back later" notice.	N.A.
6	Users with ECS sessions order data (through client).	Science Data Server active sessions threshold is exceeded and session requests are queued.	4.2.3.5
7	Users continue to order data.	As space becomes available, users are notified of data availability, and amount of time data will be available.	4.2.3.5
8	User ftp's requested data; additional users continue to request same data.	DAAC shortens time availability of requested data?	4.2.3.5