4.1.7 Resource and Logistics Management Activities

This section provides for the Release B Resource and Logistics Management processes. Logistics management comprises the various activities required to maintain full and proper operation of the functions of ECS for the scientific community. These activities include:

- distribution and license control of software used throughout the system
- hardware and software maintenance
- logistics and inventory control
- training and certification of operations and maintenance personnel as directed by SMC and local policy
- publication of all ECS and local policies and procedures for those who need access to them.

The full explanation of these functions and the detailed design to accomplish them can be found in the Release B CSMS Systems Management Subsystem Design Specifications (305-CD-029-00X). The scenarios, tables, and illustrations here are representative of the types of operational concepts that underlie the designs of resources and logistics management functions provided in Release B.

A few notes are important for understanding these scenarios. The specific means to distribute and control licenses for software will depend upon the type of software involved: ECS-developed software (not licensed); scientific algorithms developed within the NASA/ECS/scientific community; COTS software distributed under a site-wide or ECS-wide license; and COTS software made available with a specific number of "seat" licenses. For distribution, several methods of distribution will be available depending upon the circumstances: directly, from a central location with distribution to a site-specified "local drop-off" point (remote target platform) where local Maintenance and Operations (M&O) personnel will assume responsibility for further distribution and installation; indirectly, to a central ECS-community bulletin board service, such as for algorithms developed within the scientific community and for various

toolkits; and, for certain very large distributions that come on many diskettes or CD-ROM disks (especially from a commercial vendor), indirectly in the mail or other administrative distribution channels determined by ECS/local policy.

Resource activities involve monitoring and controlling ECS resources to satisfy operational objectives in accordance with approved priorities and configurations. Resource activities involve the use of enterprise monitoring and control applications in real time to ensure that system resources are used effectively during ground operations events. The operations views are illustrated both locally and from the system.

The Release B local resource activity concept applies to the SMC and DAACs. A Release B operation's process describes the local DAAC operator and SMC operator performing resource monitoring and control of computer and network systems.

The local operators at the SMC and at the DAACs will coordinate ground events. While DAAC operators will manage a site's LAN, schedule the center's own resources, and consider schedule policies/priorities in planning for the site, an SMC operator will manage the EBNet and be more concerned with establishing schedule policy and priorities among sites. An SMC operator will review/coordinate DAAC schedules to preclude inter-site conflicts, whereas a system administrator, whose role is usually narrowly confined to a particular system at one site, does not generally consider network issues or policies. Issues, such as failures of part of the system, especially at the component level, are procedural with the remedy implemented by the DAACs, following standard operating procedures.

Computer systems resources include super-computers, servers, workstations, and associated peripherals. The monitoring and control tasks cover initialization of the baseline configuration and configuring/reconfiguring as specified by configuration management procedures. Also included are maintenance management actions including initial problem analysis, diagnosis, recovery, and minor repairs under the direction of the lead operator. The DAACs reporting of failures to the SMC is included as well as internal trouble ticket reporting. Operator interfaces with the Management Workstation and SMC resource monitoring and control tools are presented as part of the process, along with interfaces with other activities and personnel.

Another Release B operations process describes the local DAAC operator performing resource monitoring and control on the DAAC's EOSDIS Science Network (ESN) local area network components. This process covers the monitoring and control aspects presented in the computer system resource monitoring and control process as well as the interfaces with other activities and personnel. Local System and Network Reports are identified in this process.

The Release B system resource activity concept applies to the SMC and ECS. A Release B operations process describes how the SMC operator performs resource monitoring and control of EBNet. Resources may include network routers, switching devices, and links. The monitoring and control tasks described cover initialization of the baseline configuration and configuring/reconfiguring as specified by configuration management. Also included is initial problem analysis, diagnosis and recovery, and repairs under the direction of the lead network operator (which can be performed by a local maintenance technician, an ECS sustaining engineer, a contract maintainer, or by operations personnel in minor cases). The receiving, coordination, and dissemination of DAAC resource problem/failure reports is included. Next, the process describes the coordination of inter-DAAC activities that require SMC-based

coordination; e.g., system-side WAN testing. The process also describes interfaces with other non-DAAC related activities and personnel. System Network Management Reports are described in this process.

4.1.7.1 Software Distribution Scenario

As upgrades and other changes are made to software used by ECS, both software and supporting materials must be properly distributed to users throughout the system. The software distribution function is responsible for distribution of the most current/upgraded software.

When new versions of certain software (especially COTS) are received, the SMC may distribute the new version electronically using the remote software distribution capabilities provided by the Software Distribution Manager (the *Tivoli Courier* package). For very large distributions where timeliness is not critical and overloading the network is to be avoided, distribution can be made by mail or other means. A mechanism is provided for distributing media distribution to sites as needed. This function allows the M&O Configuration Manager to distribute software to multiple sites, thereby ensuring that all sites can be upgraded to the same version at the same time, as needed. The SMC and site M&O staffs coordinate test and operational implementation of the change.

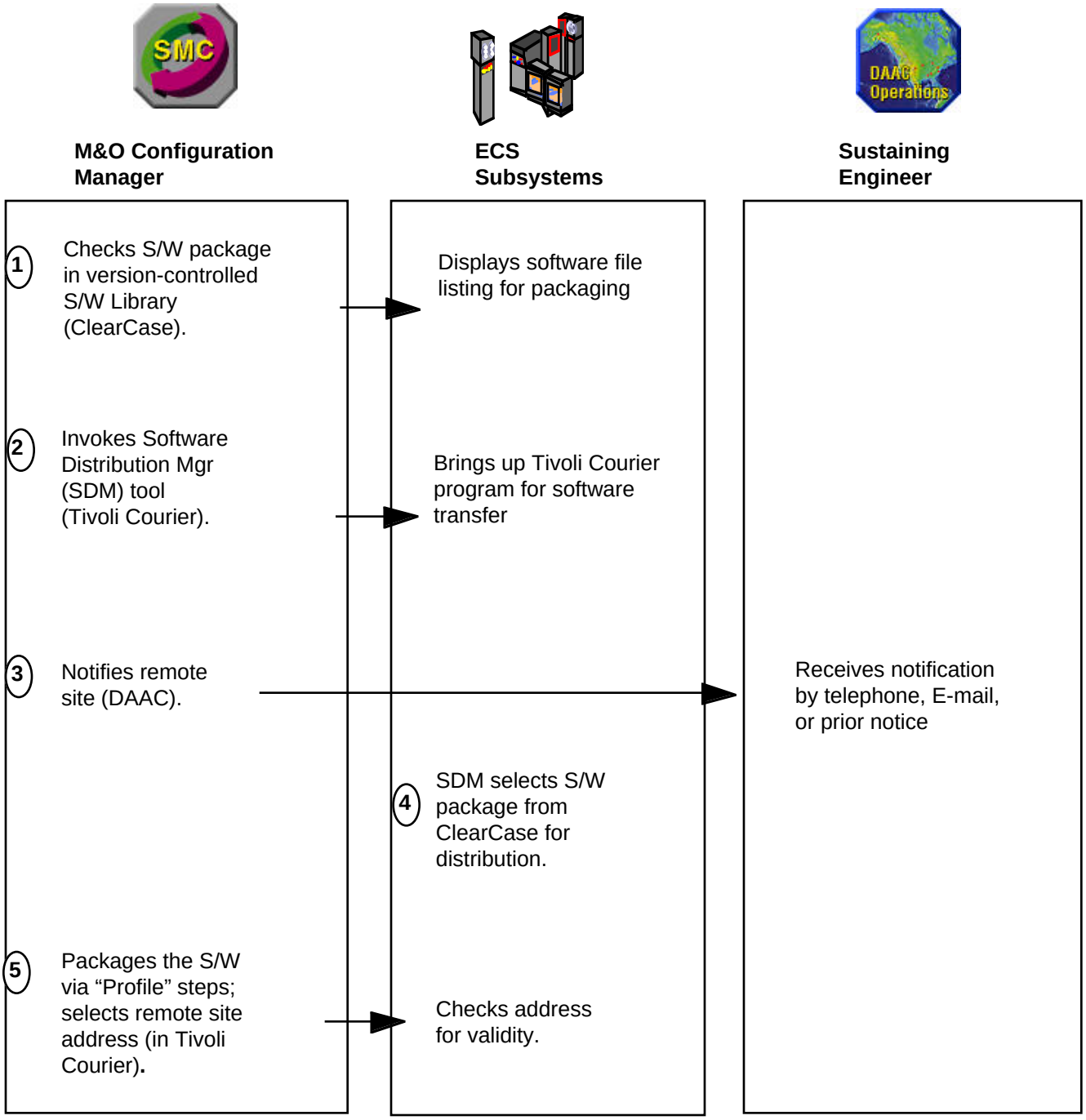

Figure 4.1.7.1-1. Software Distribution Scenario (1 of 2)

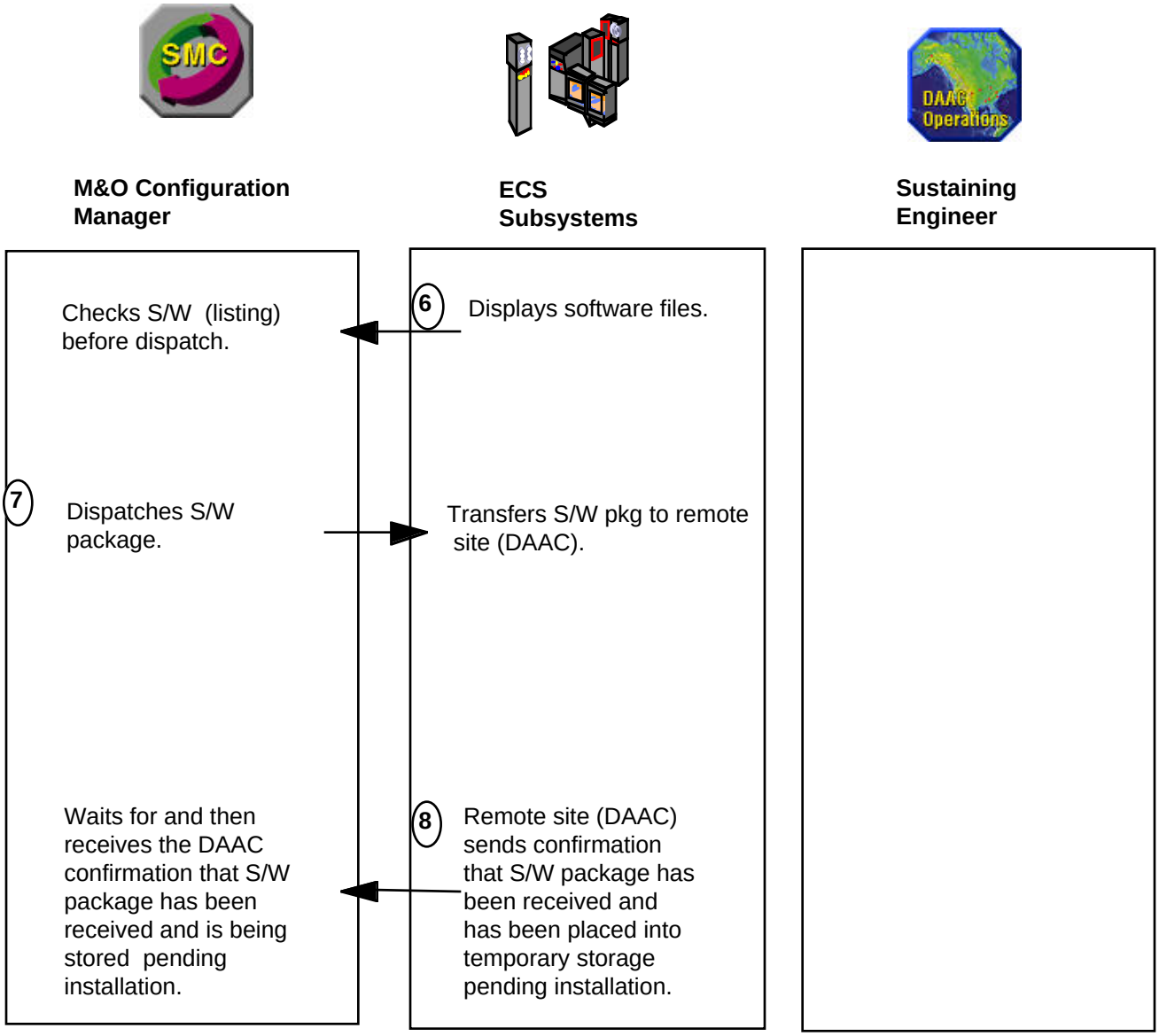

Figure 4.1.7.1-1 Software Distribution Scenario (2 of 2)

Not all sites may wish to upgrade or change their configurations at exactly the same time. The SMC Configuration Manager monitors and coordinates the implementation schedule for the sites to ensure system operations are not adversely impacted.

Table 4.1.7.1-1 shows the steps that a Maintenance and Operations (M&O) Configuration Manager at the SMC will use to distribute an issue of software to a remote "drop-off" point (a remote target platform and address location coordinated in advance with the receiving end). The coordination involves notifying the receiver that the transmission is coming, sending the software (especially sending all hard-copy, vendor-provided documentation for the software), and confirming the reception. The steps in the table are tied to the pictorial illustration in Figure 4.1.7.1-1.

Table 4.1.7.1-1. Software Distribution Scenario

Scenario Assumptions: This scenario portrays a new software package (with a site-wide license, if COTS) being distributed to a designated "drop-off" point - a remote target platform and address location designated in advance. The software package is either suitably small (so as not to overload the communications network) or is needed quickly. The M&O staff at the remote locations will transfer the software to a subsequent location(s) from which they will install, configure, and test the software to meet the needs of the end-users.

Step	M&O Staff/Maintainer	System	Purpose
1	M&O Configuration manager will verify the presence, completeness, and readiness of the (COTS) software to be "shipped" by scanning the files of the software in the ***ClearCase*** software library.	Displays the libraries/ directories/files of the software package.	Verifies readiness to ship.
2	Calls up the Software Distribution Manager (SDM), ***Tivoli Courier***, by clicking on the proper icon.	Displays the entry screen for the SDM.	Uses the SDM to ship the (COTS) package to the appropriate site(s).
3	M&O Configuration Manager will notify the remote site(s) that the package is to be sent by appropriate communications means.	Accepts and transmits notification (e-mail); could also be phone call or other means.	Notifies the remote site(s) to expect arrival of package.
4	Transfers the software to ***Tivoli Courier (***SDM) from the ***ClearCase*** software library**.**	System gives all instructions and prompts to the M&O Configuration Manager on the actions required to transfer the (COTS) package to the SDM.	Transfers/copies the (COTS) package from the SMC software library (distribution repository) to the SDM.
5	In ***Tivoli Courier***: Packages the software via the "Profile" mechanism; supplies the site address and local site address for recipients of the (COTS) package.	System gives instructions and series of prompts to the M&O Configuration Manager on the actions to perform packaging and provide addresses.	Packages the software and addresses the package to be sent.
6	Verifies the display of instructions in ***Tivoli Courier*** (SDM) before transmission.	Provides verification	Makes final check before sending the package out.
7	Sends the package by executing the "Distribute" command..	Transfers package from the SMC to the site(s).	Performs the transfer.
8	Waits for notification of arrival of package from remote site(s) and retransmits if necessary.	Indicates success/failure.	Receives notification that the transfer has been completed or must be done over.

4.1.7.2 Installation of SW Upgrade Scenario

In this scenario, depicted in Figure 4.1.7.2-1 and Table 4.1.7.2-1, a sustaining engineer is performing a scheduled software upgrade on a host. Since the upgrade is planned, it is included in the daily resource plan for the host that has been sent to the host operator. This scenario provides an overview of the interactions between the resource manager, the sustaining engineer, and the host operator. Table 4.1.7.2-1 identifies the operator-system actions follows the scenario text description.

As the scenario begins, the sustaining engineer informs the resource manager that he is ready to perform the scheduled software upgrade. The resource manager verifies that the upgrade was scheduled by looking at a copy of the resource plan for that host that he had printed out earlier in the day. The resource manager then begins the host shutdown procedure.

The resource manager queries the performance management application to determine what applications are currently running on the host. The performance management application displays list of several applications currently running on the specified host. The resource manager contacts the host operator to remind him of the planned outage. The host operator receives the message terminates the appropriate applications.

Once the applications terminate, the performance management application removes them from the list of running applications. Upon receiving an indication that the applications have terminated, the resource manager initiates the shutdown procedure to take the host off-line. The host then receives the shutdown command(s) and goes off-line.

HP Openview detects the host state change to off-line, sends a status message to all affected (registered) operators, and changes the color of icon representing the host on the HP OpenView workstation to reflect the off-line status. The resource manager observes host icon color change and informs the sustaining engineer that the host is now available for upgrade.

After completing the upgrade, the sustaining engineer informs the resource manager that the upgrade is finished, the appropriate diagnostics checked, and the host is ready to be brought back on-line. The resource manager then initiates the host start-up procedure sending the appropriate start-up command(s) to the host. After the commands have been executed, HP Openview detects the host state change to operational and sends a status message indicating this change in state to all affected (registered) operators. Finally, the host icon color on the resource manager's HP OpenView display turns green to indicate that the host is back on-line.

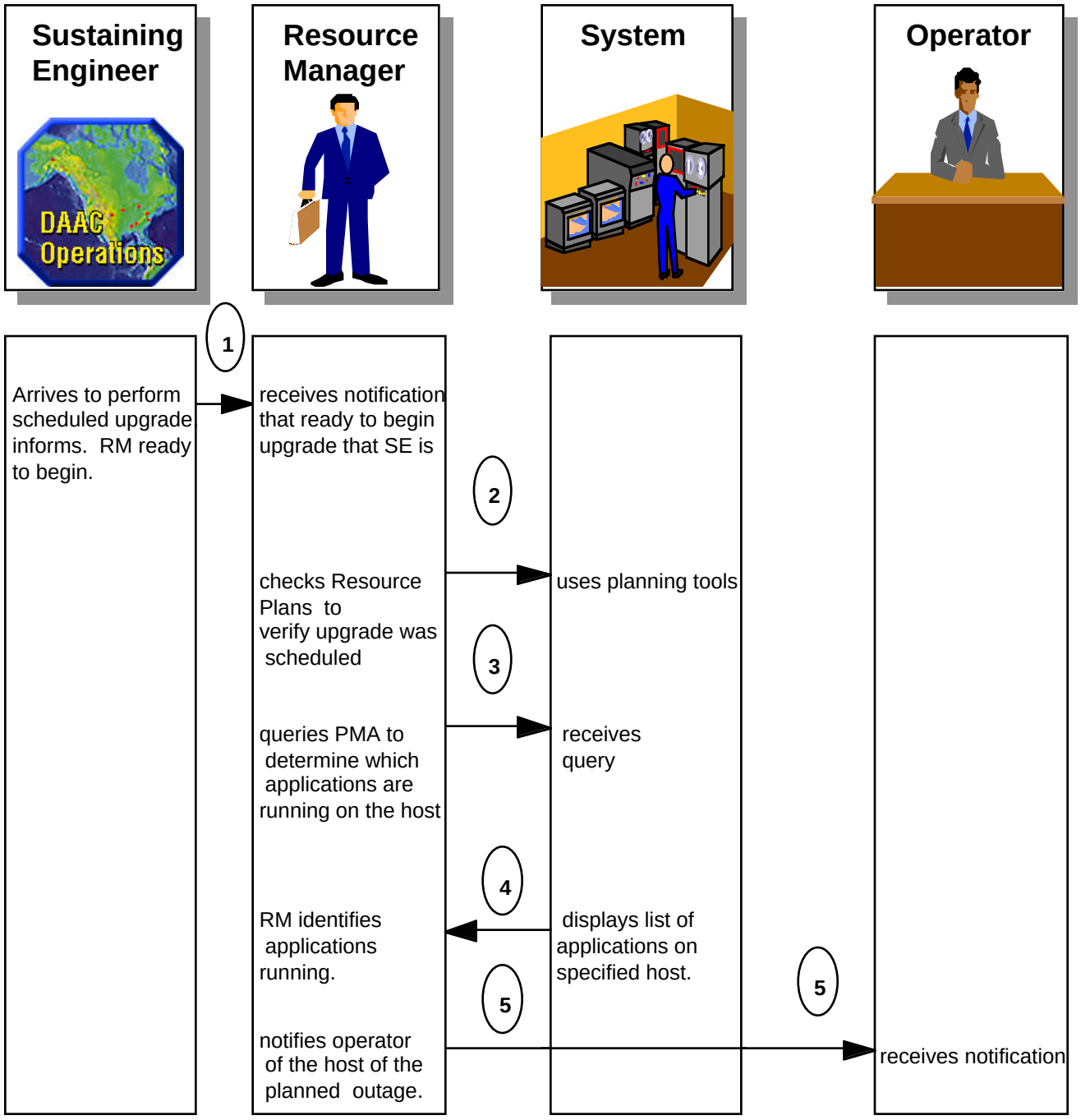

Figure 4.1.7.2-1 Installation of Software Upgrade (1 of 3)

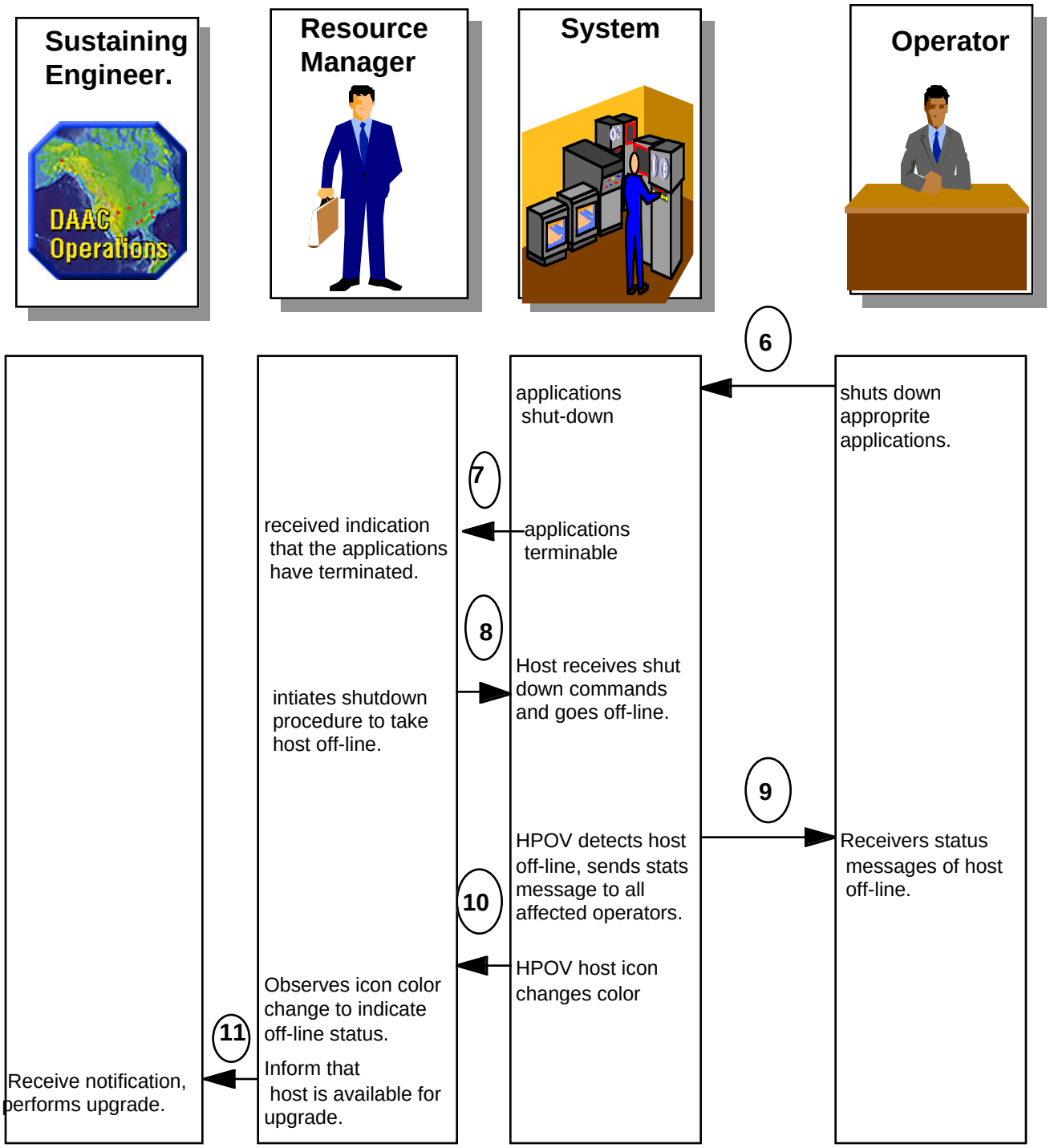

Figure 4.1.7.2-1 Installation of Software Upgrade (2 of 3)

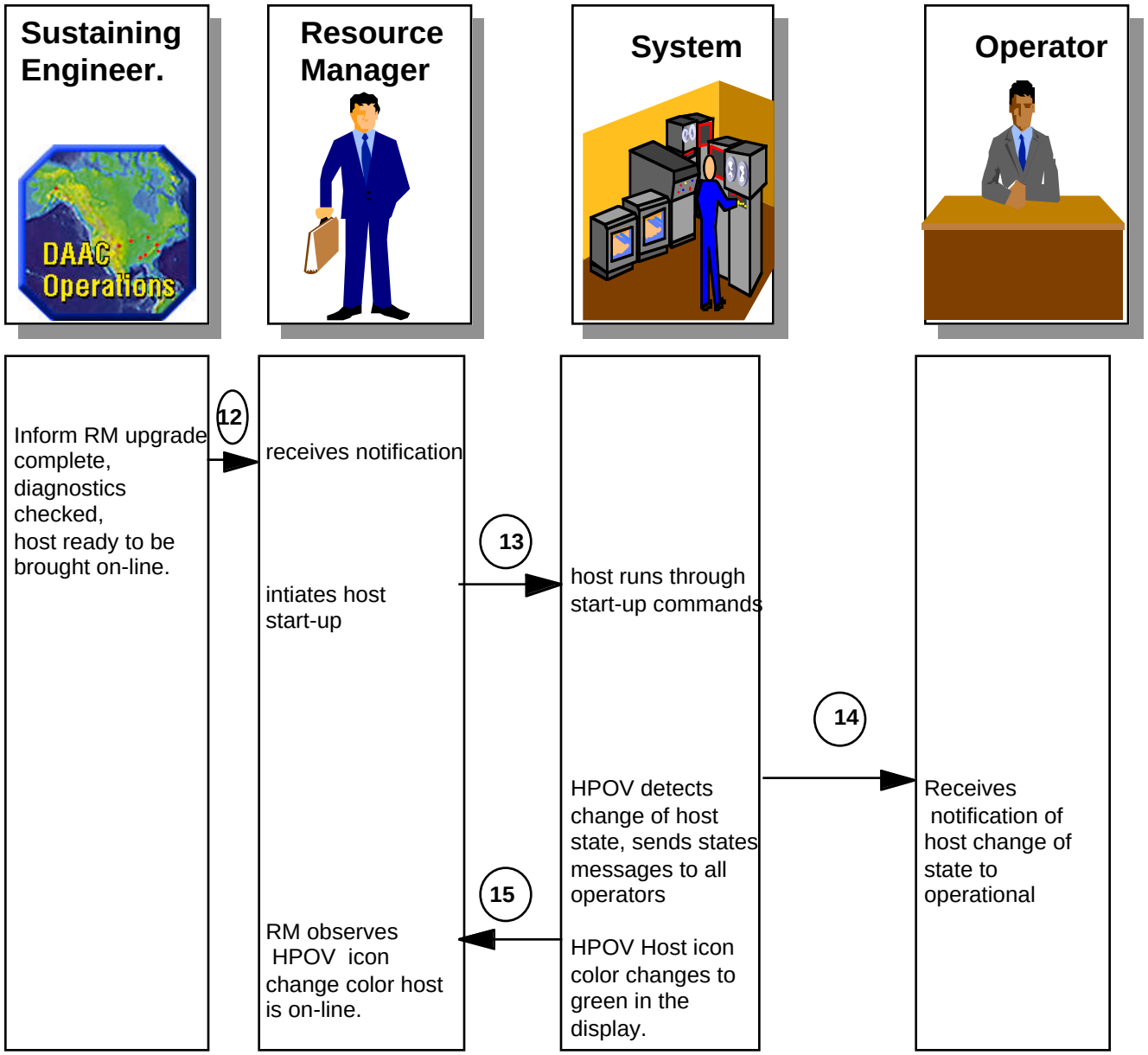

Figure 4.1.7.2-1 Installation of Software Upgrade (3 of 3)

Table 4.1.7.2-1 Installation of Software Upgrade

Step	Operator/User	System	Purpose
1	The Sustaining Engineer (SE) arrives to perform scheduled software upgrade. The SE informs the Resource Manager (RM) that he is ready to begin the upgrade.		SE notifies RM he is ready to perform upgrade.
2	The RM checks Resource Planning System to verify that the upgrade was scheduled.	Resource Planning System provides a report of the planned ground events for the day.	Confirm that maintenance has been scheduled.
3	The RM queries Performance Management Application to determine what applications are running on the specified host.	PMA executes query of currently executing applications on specified host.	Determine what applications are executing on specified host.
4	The RM identifies several applications running.	PMA displays list of applications executing on the specified host.	Identify applications executing on specified host.
5	The RM reminds the host operator of the planned outage.		Notify operator of planned outage.
6	The host operator shuts down the appropriate applications.	Applications terminated.	Applications terminated.
7	The RM receives indication that the applications have terminated.	PMAS removes applications from list off running applications.	Determine that applications have terminated.
8	The RM initiates shutdown procedures to take the host off-line.	Host receives shutdown command(s) and goes off-line.	Host is taken off-line.
9	All affected (registered) operators receive a status message from HP OpenView that host is off-line.	HP OpenView detects host off-line, sends message to operators.	Detection and notification that host is off-line.
10	The RM observes host icon in HP OpenView change color to indicate off-line status.	HP OpenView host icon changes color to reflect off-line state.	RM determination of host status.
11	The RM informs Sustaining Engineer (SE) that the host is now available for upgrade. SE performs upgrade.		SE notified to begin upgrade. SE performs upgrade.
12	The SE informs the RM that upgrade has been completed, diagnostics checked, and the host is ready to be brought back on-line.		Notification of upgrade completion.
13	The RM initiates host start-up procedure.	Host runs through start-up command(s).	Host start-up performed.
14	All affected (registered) operators receive a status message from HP OpenView that the host state is operational.	HP OpenView detects change of host state, and sends status message to operator(s).	HP OpenView detects that host is on-line and notifies operators.
15	The RM observes HP OpenView host icon change color to indicate the host is on-line.	HP OpenView host icon color changes.	RM determines that host is on-line.

4.1.7.3 Data Processing Host Routine Maintenance Scenario

In this scenario, depicted in Figure 4.1.7.3-1 and Table 4.1.7.3-1, routine maintenance is being performed on a Data Processing Subsystem host. Since the maintenance action is routine, it has been coordinated in advance both with the maintenance technician and, via the resource planning system, with the production monitor. The scenario provides an overview of the interactions between the resource manager, the enterprise management system, and the production monitor. Table 4.1.7.3-1 identifies the operator-system actions follows the scenario text description.

As the scenario begins, the technician arrives at the prearranged time to perform scheduled maintenance on the data processing host. Upon entering the site, the technician informs the resource manager that he is ready to begin maintenance. The resource manager, unsure of the day's scheduled activities, decides to check the resource planning system to verify that maintenance was scheduled. Upon reviewing the day's resource plan which he has opened on his screen, the resource manager determines that it is in fact time for the scheduled maintenance activity and begins the host shutdown activities.

In order to determine applications are running on the host, the resource manager queries the performance management application. On the resource manager's screen, the performance management application displays list of applications currently running on the specified host. Upon identifying one of these applications as a science algorithm, the resource manager contacts production monitor to determine the plan for that algorithm. The production monitor tells the resource manager that the algorithm should be finished soon, so the resource manager decides to wait until the algorithm is finished before shutting down the host. The resource manager informs the maintenance technician that there will be a slight delay before the host is available for maintenance.

After ten minutes, the science algorithm terminates. The performance management application receives a notification of the algorithm termination and removes the algorithm from the list of running applications. The resource manager notices that the scheduled processing application has terminated and initiates shutdown procedure to take the host off-line. Upon receiving the shutdown command(s), the host goes off-line.

HP Openview detects the state change as the host goes off-line and sends a status message to all affected (registered) operators. On the OpenView workstation, the color of the icon representing the data processing host changes to indicate the off-line status. Upon observing the host icon change color on his HP Openview monitor, the resource manager informs the maintenance technician that the host is now available for the scheduled maintenance activities.

After completing the maintenance actions, the technician informs the resource manager that maintenance actions have been completed, diagnostics checked, and the host is ready to be brought back on-line. The resource manager then initiates the host start-up procedure sending the appropriate start-up command(s) to the host. After the commands have been executed, HP Openview detects the host state change to operational and sends a status message indicating this change in state to all affected (registered) operators. Finally, the host icon color on the resource manager's HP OpenView display turns green to indicate that the host is back on-line.

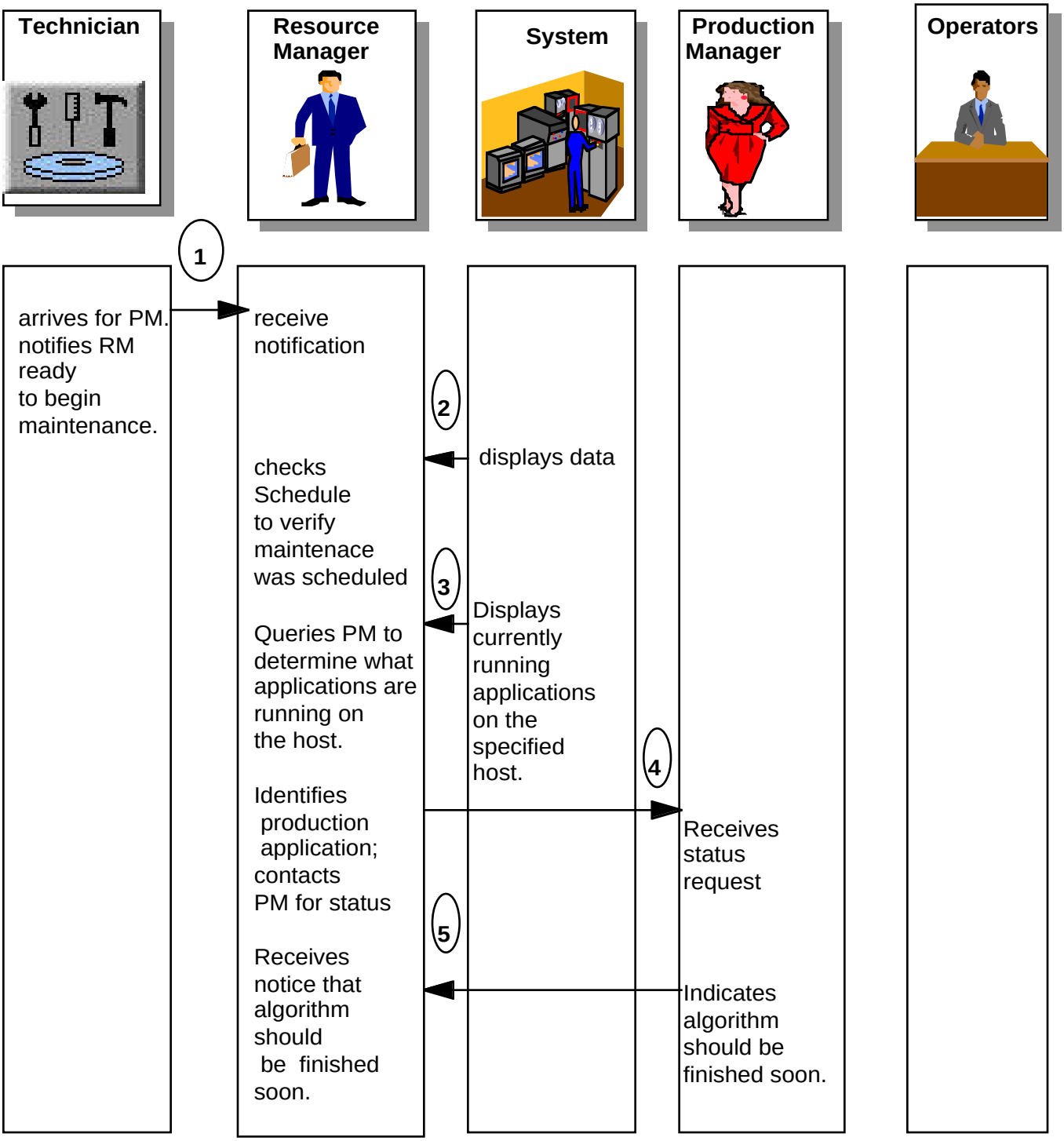

Figure 4.1.7.3-1 Data Processing Host Routine Maintenance (1 of 3)

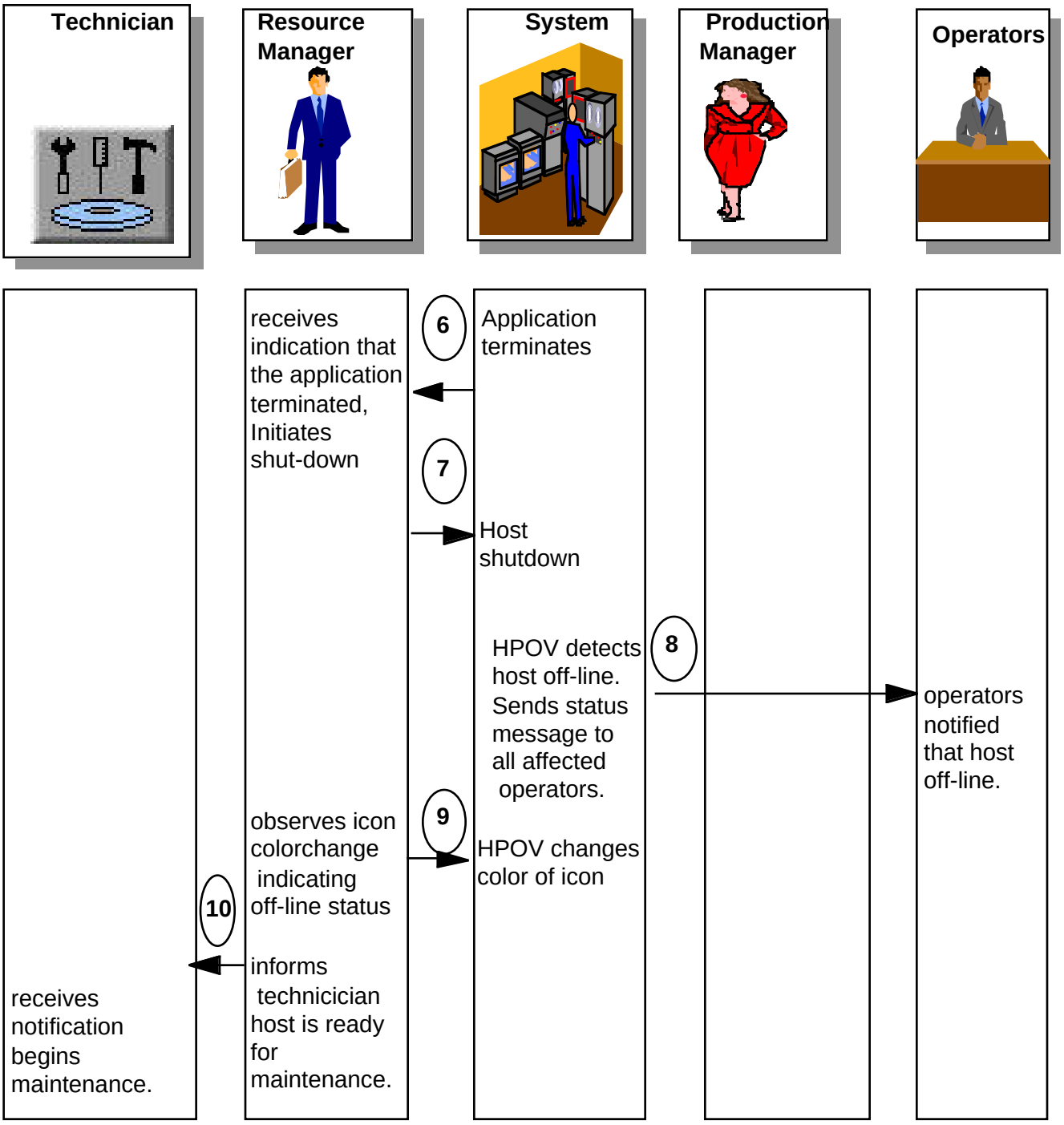

Figure 4.1.7.3-1 Data Processing Host Routine Maintenance (2 of 3)

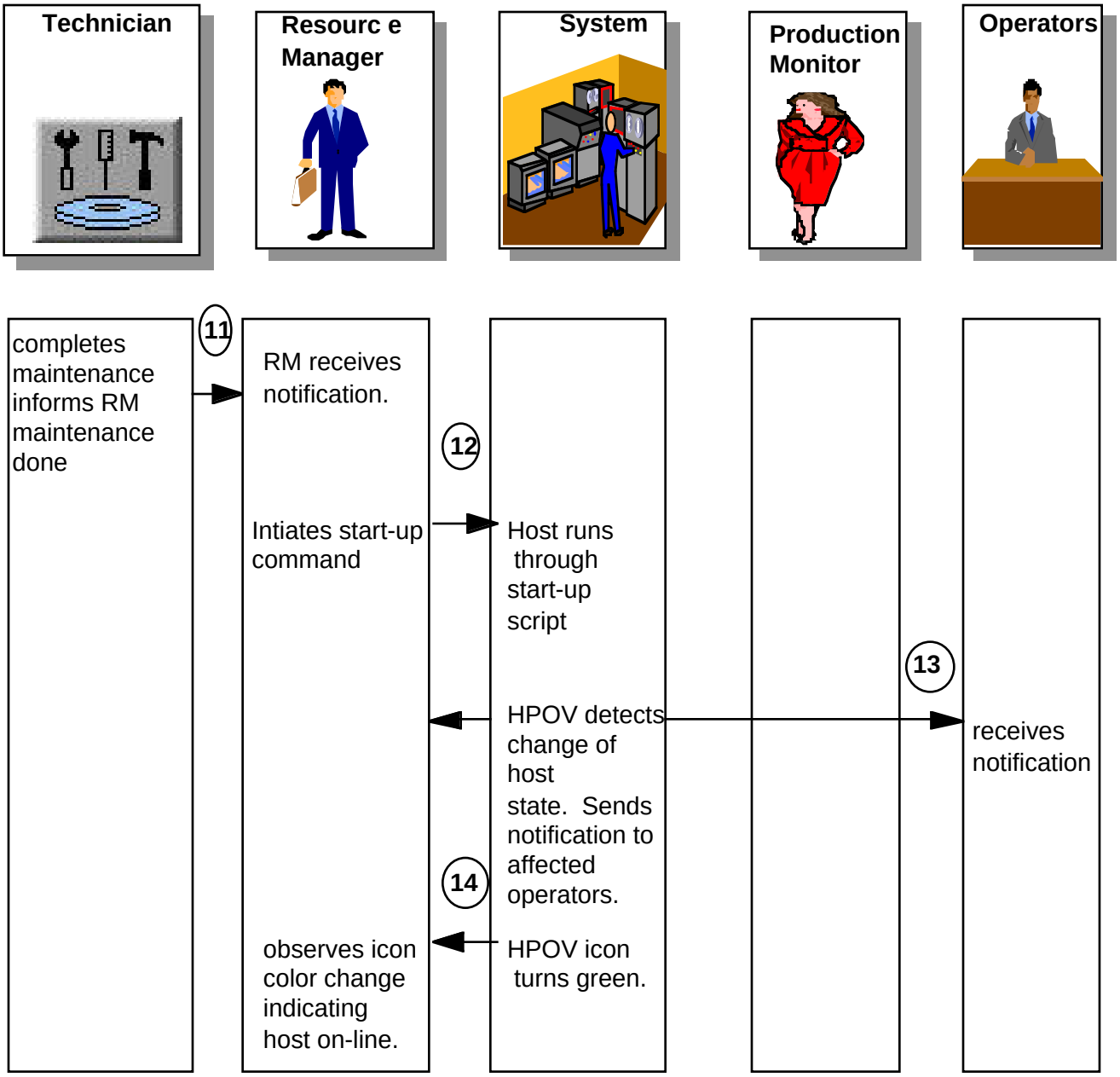

Figure 4.1.7.3-1 Data Processing Host Routine Maintenance (3 of 3)

Table 4.1.7.3-1 Data Processing Host Routine Maintenance

Step	Operator/User	System	Purpose
1	The technician arrives to perform scheduled maintenance on data processing host. The technician informs Resource Manager (RM) that he is ready to begin maintenance.		Notification that technician is ready to perform maintenance.
2	The RM checks resource scheduler to verify that maintenance was scheduled.	Resource planning system provides a report of the planned ground events for the day.	Confirm that maintenance has been scheduled.
3	The RM queries Performance Management Application to determine what applications are running on the specified host.	PMA lists currently executing applications on specified host.	Determine what applications are executing on specified host.
4	The RM identifies an application processing science data. He contacts the Production Monitor (PM) for the application's status.		RM requests status of applications running on specified host.
5	The PM notifies the RM that according to the processing plan, the algorithm should be finished soon.		Notification of the status of application.
6	The RM receives indication that the scheduled processing application has terminated.	The Science algorithm terminates. The Performance Management Application removes the algorithm from the list of running applications.	Notification of termination of algorithm.
7	The RM initiates shutdown procedure to take host off-line.	The specified host receives shutdown command(s) and goes off-line.	Shutdown specified host.
8	The affected (registered) operators receives a status message from HP Open View that the host is off-line.	HP Open View detects host is off-line, notifies operators.	Operator(s) notified that host is off-line.
9	The RM observes host icon in HP Open View change color to indicate off-line status.	HP Open View changes color of icon representing the host.	RM views that host is now off-line.
10	The RM informs the technician that the host is now available for maintenance. Technician performs maintenance actions.		Notify technician to begin maintenance. Maintenance performed.
11	The technician informs the RM that maintenance actions have been completed, diagnostics checked, and the host is ready to be brought back on-line.		Notification of completion of maintenance.
12	The RM initiates host start-up procedure.	Host runs through start-up command.	Host brought on-line.
13	The operator(s) receive a status message from HP Open View that the host state is now operational.	HP Open View detects change of state, sends status message.	Operator(s) notified that host is on-line.
14	The RM observes HP Open View icon change color to indicate host is on-line.	HP Open View host icon color turns green.	RM determines that host is on-line.

4.1.7.4 Tracking a Corrective Maintenance Action Scenario

This scenario depicts the process of tracking a corrective maintenance action. The scenario is initiated when a trouble ticket is filled out. The information on the trouble ticket explains the nature of the problem as described by the individual who identified the problem. Each trouble ticket will be assigned a maintenance work order number (WO#) if maintenance action is required. The WO# is used to track the maintenance actions, supply (logistics) actions, time expended, etc. An Operations Supervisor/Resource Manager will read the trouble ticket, evaluate the problem, and assign a technician to resolve the problem. Also, any information that is pertinent to the resolution of the trouble ticket will be forwarded to the assigned technician.

The assigned technician will first evaluate the problem to understand exactly what the problem is that led to the trouble ticket entry. Once evaluated, the technician will proceed with the necessary steps to resolve the issue. Upon completion, the technician enters into the trouble ticket the corrective actions taken. This information will then be used later for trend analysis and for similar problems encountered. Once all the corrective maintenance actions are complete and the Operations Supervisor/Resource Manager is satisfied that the technician has resolved the problem, the technician closes out the WO ticket and the trouble ticket.

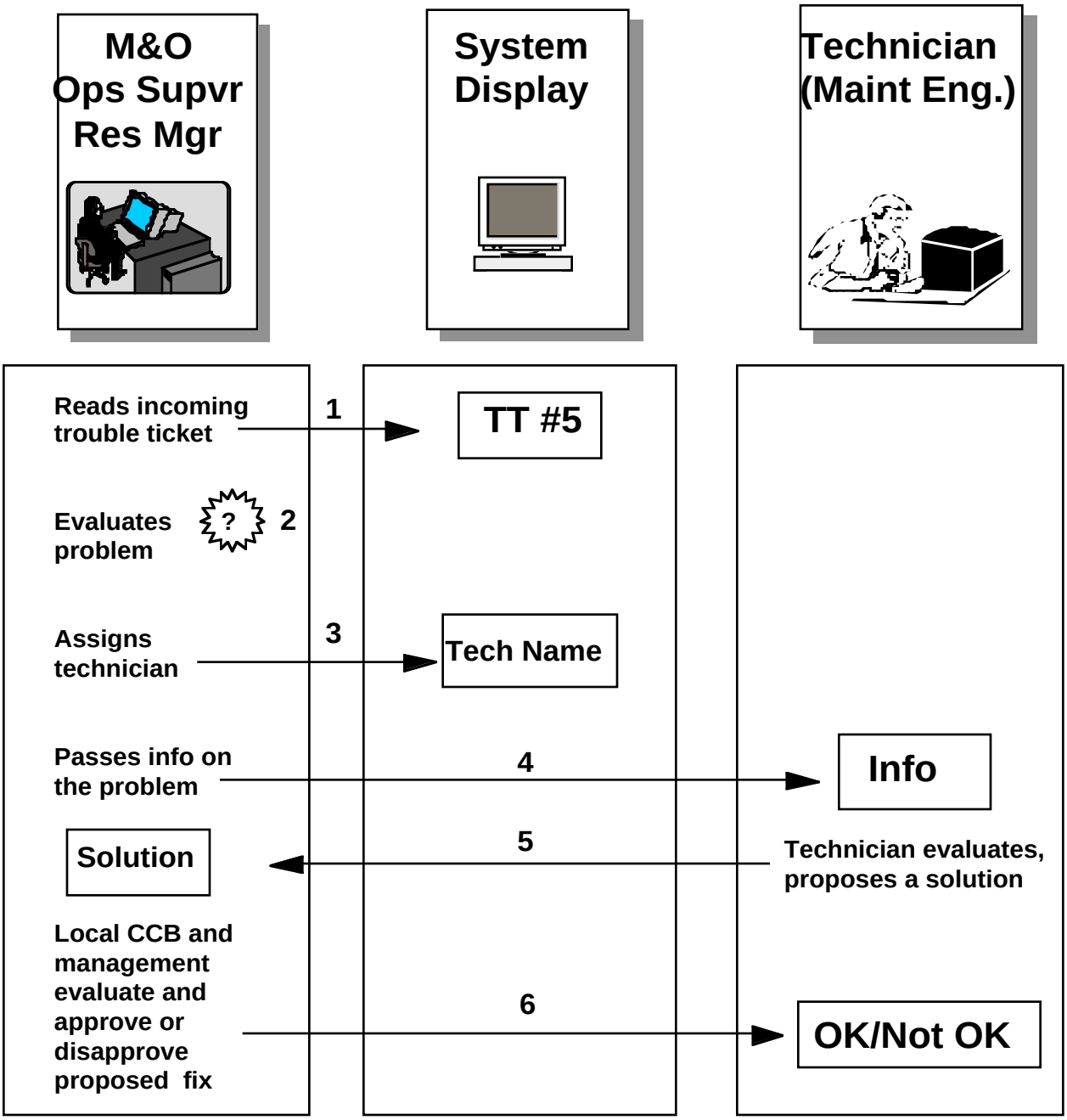

Figure 4.1.7.4-1 Tracking a Corrective Maintenance Action (1 of 2)

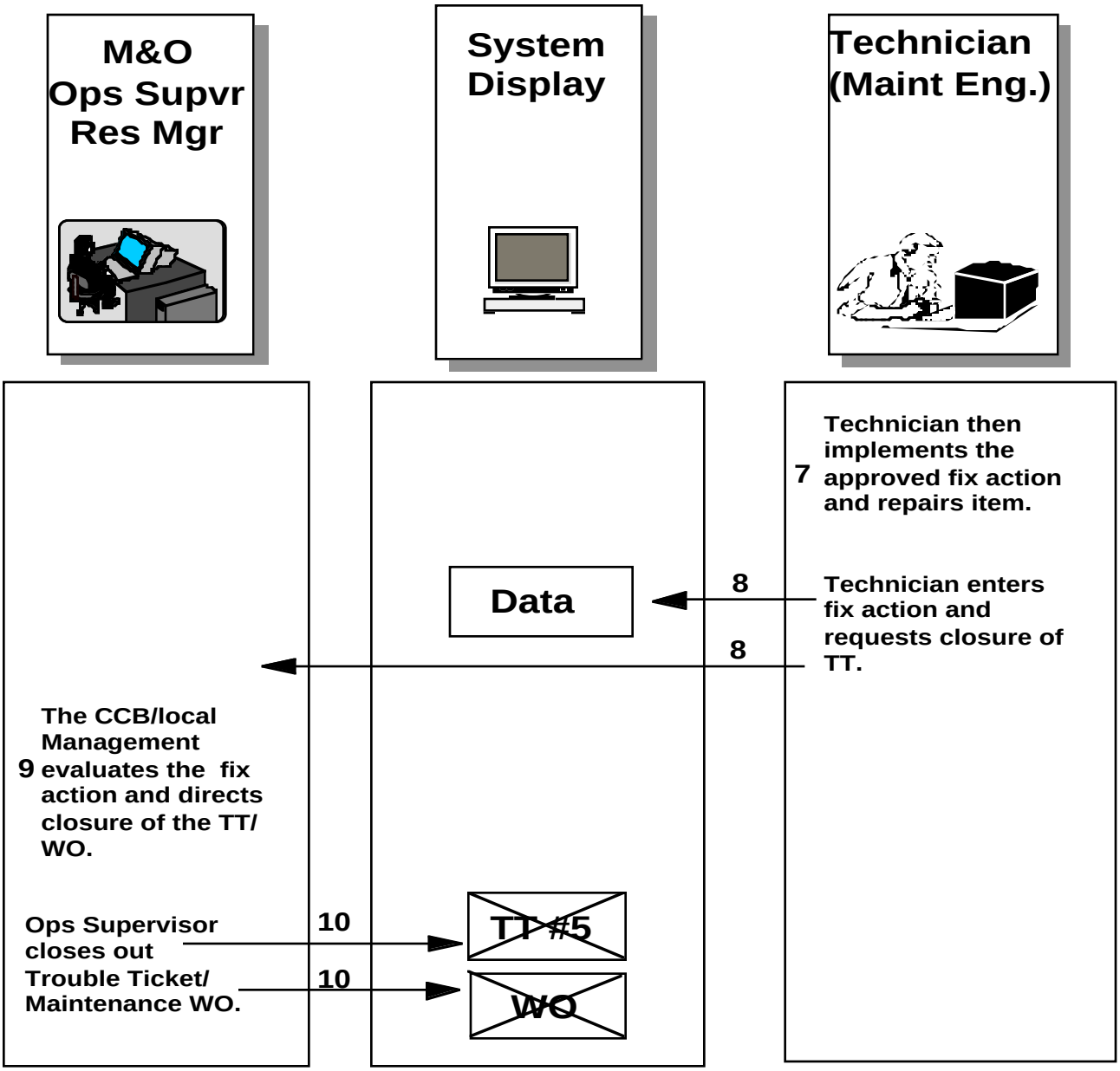

Figure 4.1.7.4-1 Tracking a Corrective Maintenance Action (2 of 2)

Table 4.1.7.4-1 shows the steps that a Operations Supervisor/Resource Manager at a service console will use to respond to a trouble ticket generated by the system. This scenario describes the steps from the local actor/system perspective. The steps shown in the table are tied to the pictorial illustration in Figure 4.1.7.4-1.

Table 4.1.7.4-1. Steps of the Scenario: Tracking a Corrective Maintenance Action

Scenario Assumptions: This scenario assumes that a trouble ticket has been generated from an end-user somewhere in the ECS who has called in/entered a trouble ticket "into the system." The work order number (WO#) that is assigned does not overwrite or otherwise interfere with other WO#s assigned to preventive maintenance (PM) WO#s.

Step	Operations Supervisor/ Resource Manager	System	Purpose
1	Operations Supervisor/ Resource Manager reads incoming trouble ticket (TT) and initiates work order (WO).	Displays trouble ticket and issues WO.	Initial report of the problem reported by the end-user and start of the solution process.
2	Operations Supervisor/ Resource Manager reads problem and evaluates the situation.	Displays problem statement from the trouble ticket.	Evaluation of the problem by Operations Supervisor/ Resource Manager.
3	Operations Supervisor/ Resource Manager assigns technician to the job.	Records the job assignment.	Operations Supervisor/ Resource Manager has decided who should investigate the problem; enters data on who is assigned.
4	Operations Supervisor/Resource Manager passes along/transmits all relevant job information from the trouble ticket to the assigned technician.	Sends technician pertinent information.	Informs the technician of details on the needed repair action; information may be available directly from the trouble ticket.
5	Technician reads problem and evaluates the situation; proposes solution/options	Displays trouble ticket.	Technician gets preliminary information to evaluate action.
6	Local CCB/supervisor/management evaluates proposal and approves or disapproves.	Displays proposal and answer.	Technicican receives responses/decisoin on proposed action.
7	Technician repairs problem/ remedies situation, per direction.	No action.	Technician performs the (repair) job.
8	Technician inputs specified information on the remedy /resolution of the problem into the trouble ticketing/maintenance manager systems.	Stores the entered information into appropriate trouble ticketing/inventory/ logistics/maintenance database.	Technician logs in any parts, materials used, time required and other information to provide a basis for trend analysis.
9	Local CCB/supervisor/management evaluates situation and approves or disapproves closure.	Displays CCB/supervisor/ management.evaluation on closure of the TT/WO.	Local management determines if action was sufficient and restores system to desired state.
10	Operations Supervisor/Resource Manager closes out the TT/WO.	Transfers necessary information and closes the TT/WO.	When the problem is satisfactorily resolved, the TT/WO is closed.

4.1.7.5 Adding/Updating an Inventory Asset Record Scenario

As assets are received, the Maintenance and Operations Staff must enter in information about the asset (hardware and software, including manuals and training materials - as determined by SMC and local procedures) into the inventory management service software. Through these actions, the system will have an accurate, up-to-date database containing all inventory items. This process is critical in the accuracy of the inventory. This scenario depicts the process of receiving an asset which will be added to the inventory as a new item or will be an upgrade/replacement to an existing asset which it will replace. If the asset that is received is a substitute for an older model that is currently part of the baseline, the actions are nearly the same except that the superceded must be deleted from the inventory.

The scenario is initiated when an asset is received. The Maintenance & Operations (M&O) Staff will first open the inventory management service software. A menu will be displayed showing the possible actions that may be taken with the inventory management service. The M&O Staff will choose to add a new asset to the inventory database. A form will be displayed that must be filled out by the M&O Staff before the asset can be added to the database. Some of the necessary information will include price, quantity received, date received, and status. The M&O Staff will complete the form and submit the information to the inventory management database. The M&O Staff will receive notification of successful update to the inventory management database, and will be returned to the main menu for the inventory management service software.

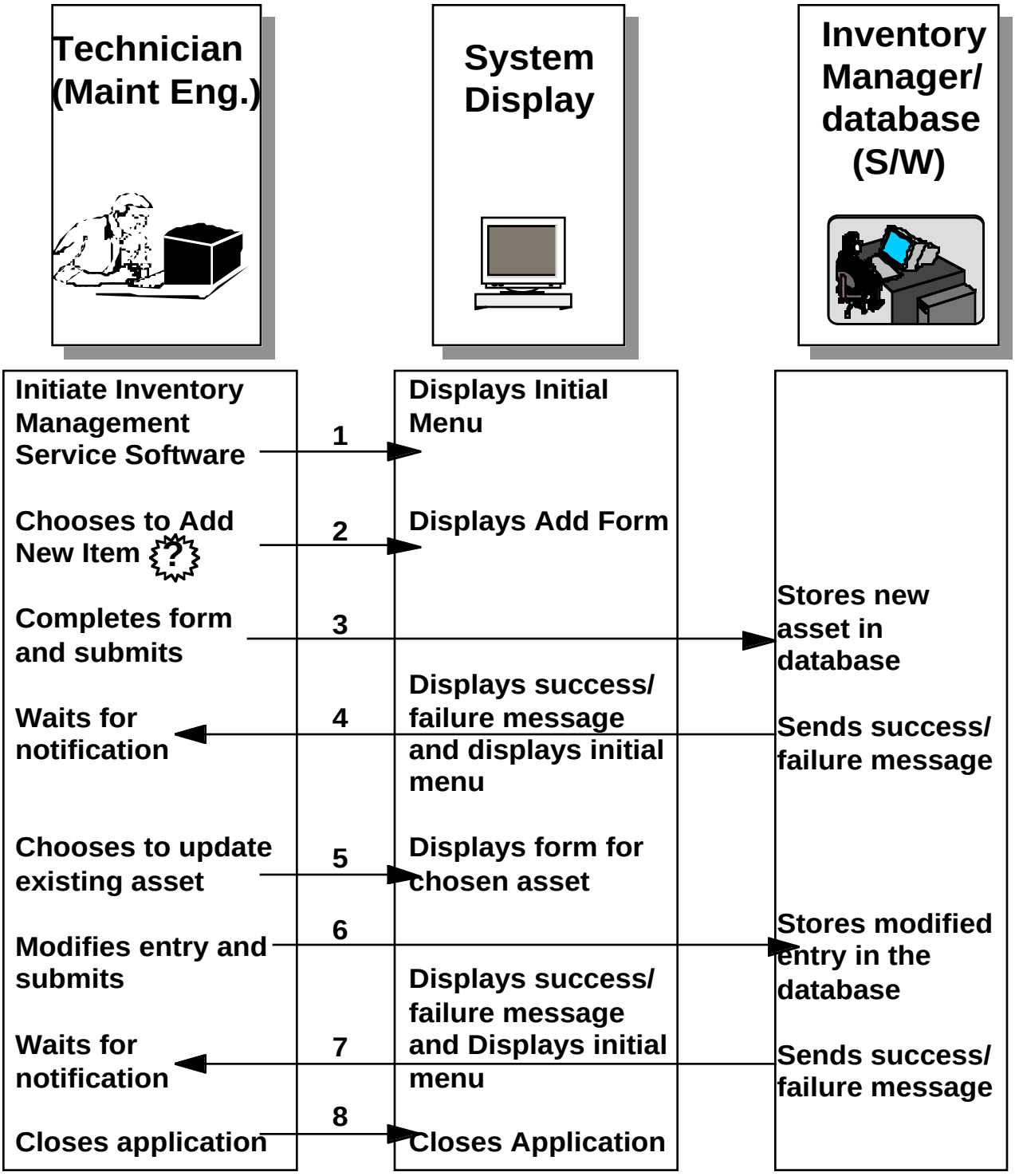

Figure 4.1.7.5-1. Adding/Updating Inventory Asset Record

If the new asset is an update/replacement for an older asset which is being removed from service: once the new asset has been added to the inventory, the M&O Staff must delete the existing asset that is being replaced. The M&O Staff may choose "delete" from the main menu of the inventory management service software and submit the change. The M&O Staff will receive notification of successful update to the inventory management database, and will return to the main menu for the inventory management service software. The M&O Staff can choose to exit, and the application will close.

Table 4.1.7.5-1 shows the steps that the Maintenance and Operations (M&O) Staff at a service console will use to add an asset to the inventory management database. This scenario describes the steps from the system perspective. The steps shown in the table are tied to the pictorial illustration in Figure 4.1.7.5-1.

Table 4.1.7.5-1. Steps of the Scenario: Adding/Updating Inventory Asset Record

Scenario Assumptions: This scenario assumes that the M&O Staff has received an asset that needs to be added to the inventory, and also requires another asset to be updated/deleted.

Step	M&O Staff	System	Purpose
1	Initiate Inventory Management Service Software	Startup of the inventory management process and displays initial menu.	An asset has been received and must be added to the inventory.
2	Chooses to add a new asset.	Displays form that needs to be filled out for a new asset to be added to the inventory.	Certain information is required for an asset to be added.
3	Completes form and submits.	Stores information in the inventory database.	Storage is required for later use.
4	Waits for notification of successful submittal.	Displays successful message and returns to main menu.	M&O Staff needs notification of success to ensure that information has been stored.
5	Chooses to update an existing asset.	Displays form that exists for the chosen asset with its associated information.	M&O Staff needs to modify status.
6	Modifies the status entry to reflect modification due to new asset that was just added being new model that should be used. The modification is then submitted.	Stores information in the inventory database.	New asset outdates a previous asset. Inventory database needs to reflect this modification.
7	Waits for notification of successful submittal.	Displays successful message and returns to main menu	M&O Staff needs notification of success to ensure that information has been stored.
8	Closes the Inventory Management Service Software.	Shutdown of inventory management process.	Closes the application.

4.1.7.6 Cross-DAAC Software Upgrade Coordination Scenario

The scenario depicts the process of scheduling a software upgrade across DAACs. The scenario addresses the evaluation of upgrade requirements, coordination of the upgrade with the DAACs, and resolution of scheduling conflicts as they arise. The scenario also traces the coordination of the upgrade request, confirmation, and adjudication that leads to the development of a coordinated master schedule by the SMC. See Figure 4.1.7.6-1 for detail illustration. The scenario describes the system activities that are necessary to ensure the software upgrade testing will be conducted in parallel to the operational system. This scenario describes these capabilities from the system perspective. See Scenario Steps (steps 5, 15-17) and Figure 4.1.7.6-1 for detail illustration of these capabilities.

The upgrade to software component DSS X.4 is used for its interfaces with multiple subsystems. The major purpose of this scenario is to address the non-interfering characteristic of concurrent activities. A description of services that DSS provides is followed to explicate the separation of which services and data in operational and test software that is necessary to achieve the objective of concurrent activities.

Object oriented applications consist of a number of interrelated objects. The object that requests information is called the requester and the object that provides a service is called the provider. The DSS may be a requester or a provider depending on the operations it performs. Distributed Object Framework of CSS subsystem provides the mechanisms for the inter-CSCI communications. For requester to connect to the provider it first has to locate the provider.

The test version of DSS has an unique identification in the Cell Directory Service (CDS) namespace provided by DCE directory service. Only the right interface specification will allow a requester to be connected with this test version of DSS. See Scenario Step 16 for the expected system activity. The data server exports its services and data collection structure via two complementary mechanisms: advertising, data dictionary export and schema export. Advertisements contain a description of the service being offered, the location of the service, a reference to the service that can be retained by clients, and searchable keywords characterizing the service. The data dictionary exports contain information defining the terms, valid values, relationship, and synonyms managed by each data server. The schema defines the structure of the data maintained by the data server and is exported to the Local Information Manager (LIM) for integration with the local site view of all of the data holdings.

All services aforementioned (Advertising, Data Dictionary, LIM/DIM) export the output from operation and test software distinctively so that the operational ECS will not be allowed to use the test output. If testing performed involves data archiving, the robotic mechanism is directed not to be mixed up with operational data archive. User community is not given the view generated from the test activities. See Scenario Step 17 for the expected system activity.

Additionally the scenario includes the process for acquiring, storing and maintaining schedule related policies, negotiating and maintaining ground event functional allocations and assessing priorities. See Figure 4.1.7.6.-1 for detail. Finally the scenario addresses procedures for adjudicating cross-site and cross-facility schedule conflicts that ensure the most efficient use of individual DAAC and system components.

The details associated with CM operations for a fielding new release are described in 4.1.2 CM Activities of 604-CD-002-001 or 5.2.5 Configuration Management Application Service of 305-CD-003-002

Scenario Assumptions

- The ESDIS CCB has approved the ECS M&O software maintenance organization to make an upgrade to the Data Server Subsystem that will result in a new version of the ECS software suite at each of the three Release A DAACs.
- The test schedule approved by the ESDIS CCB assumed all potential resource contention has been reconciled.
- The software maintenance group at GSFC (SEO) makes the fixes and then starts the software test process.
- Each DAAC has a standard set of regression tests with test data that any software upgrade is run against.
- The DAACs have a standard regression test and data set to do inter-DAAC tests.

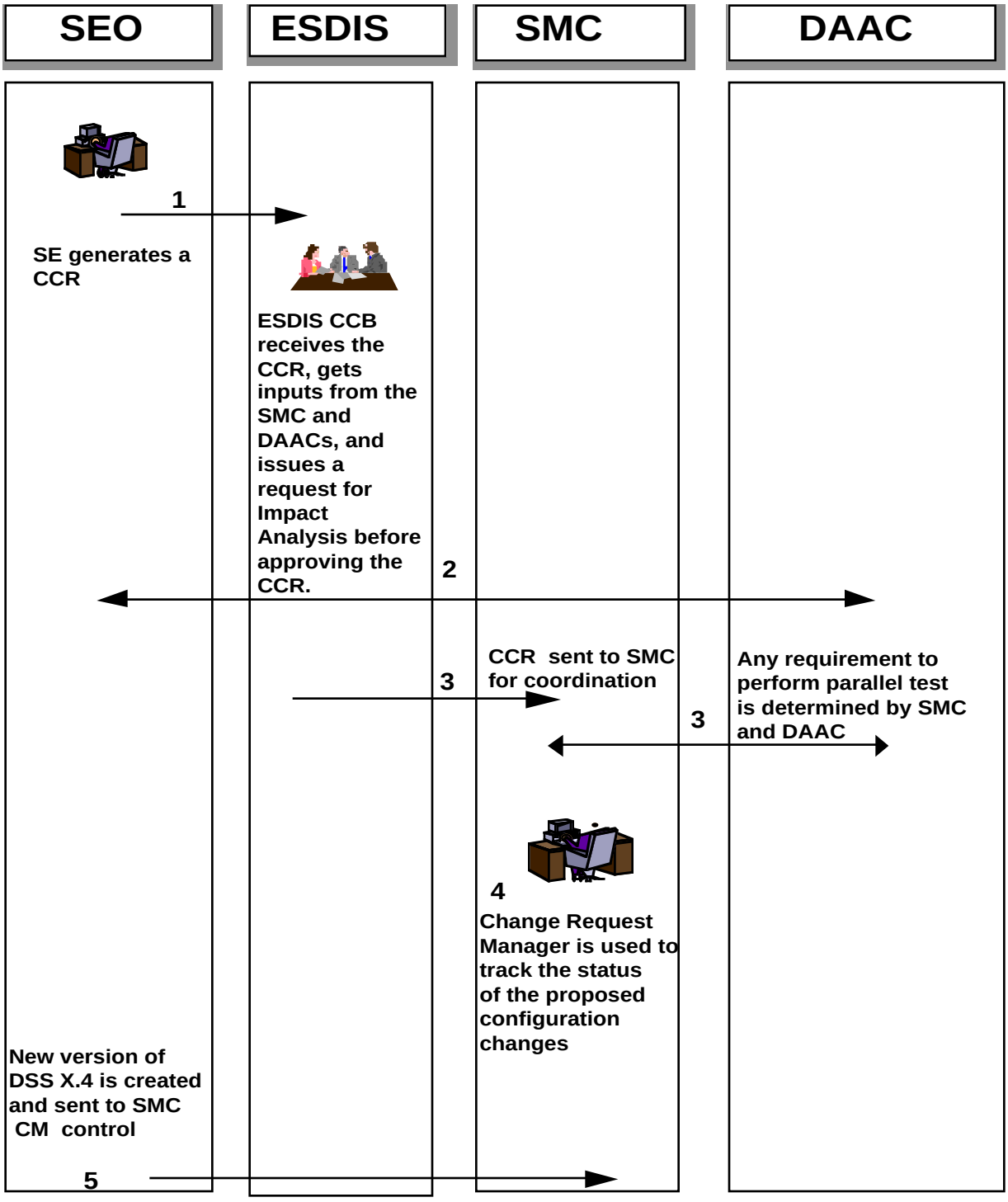

Figure 4.1.7.6-1. Cross-DAAC Software Upgrade Coordination Scenario (1 of 5)

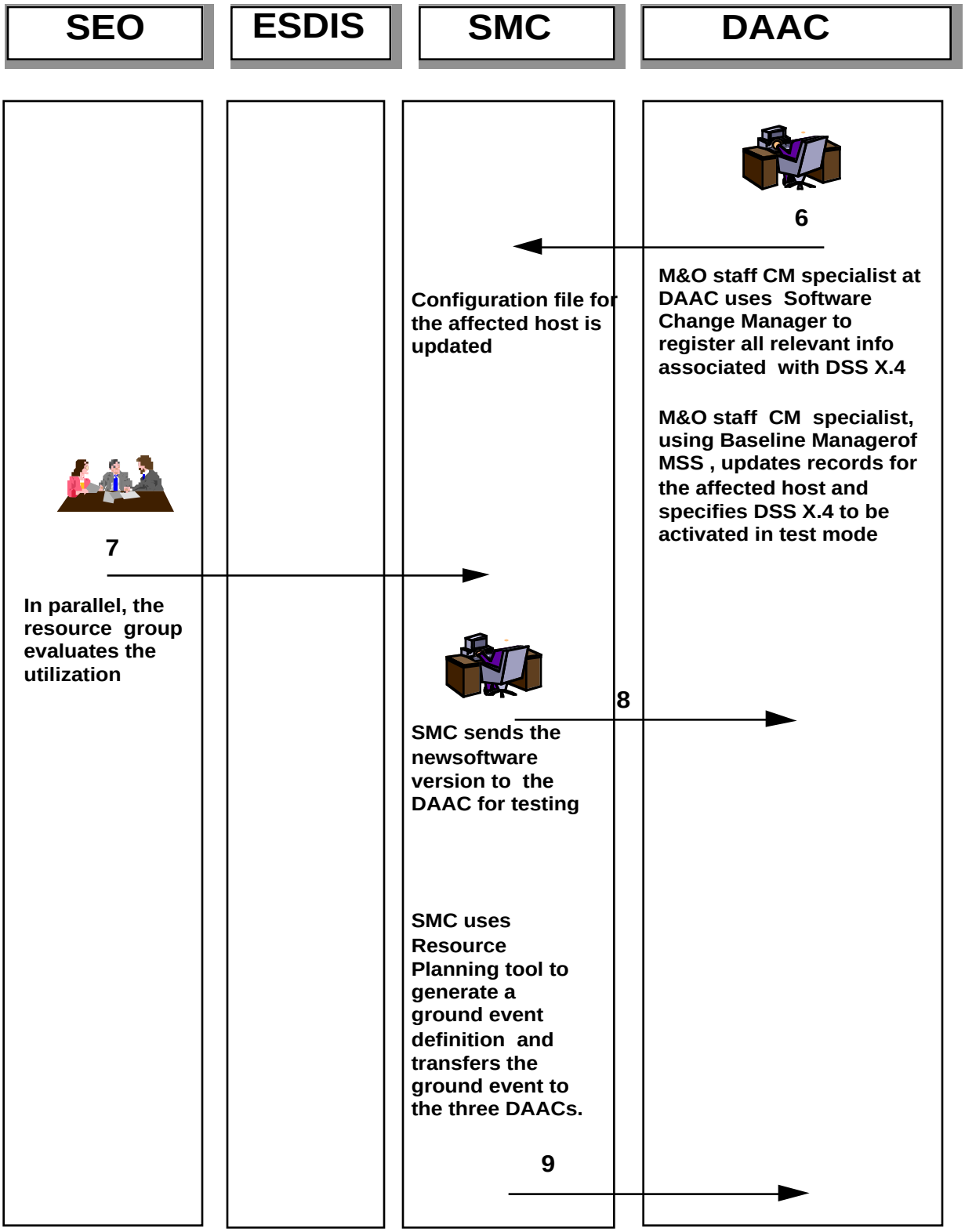

Figure 4.1.7.6-1. Cross-DAAC Software Upgrade Coordination Scenario (2 of 5)

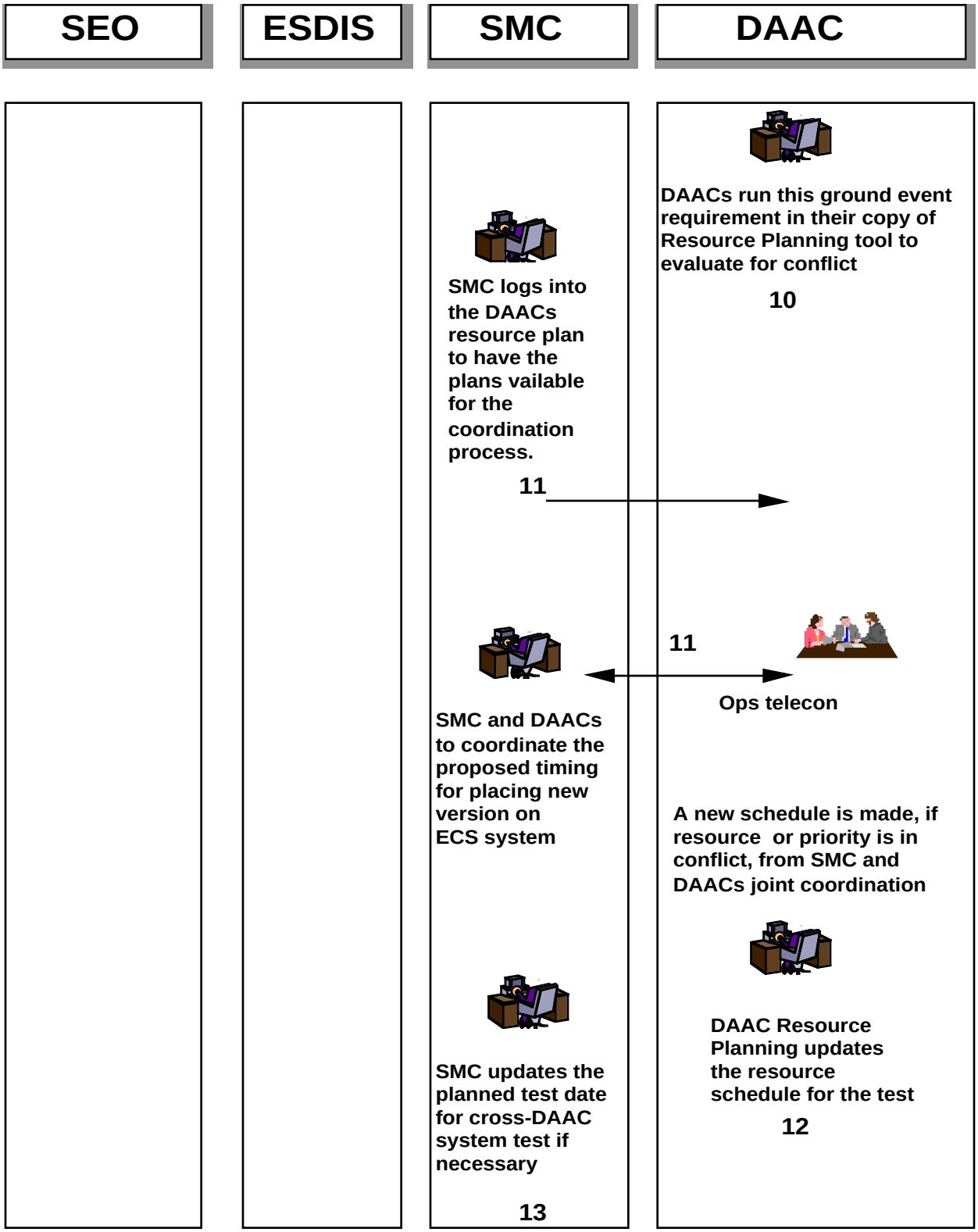

Figure 4.1.7.6-1. Cross-DAAC Software Upgrade Coordination Scenario (3 of 5)

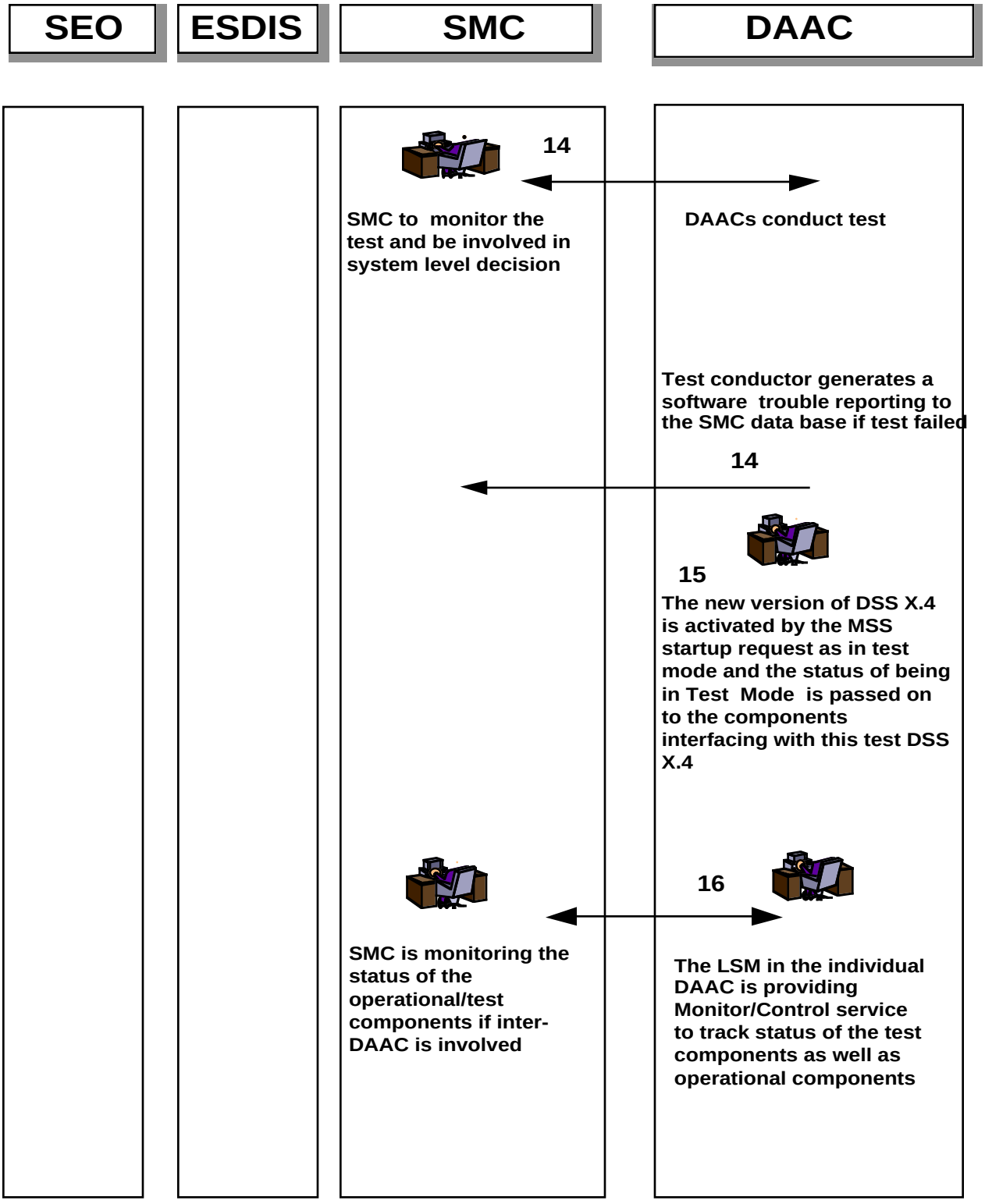

Figure 4.1.7.6-1. Cross-DAAC Software Upgrade Coordination Scenario (4 of 5)

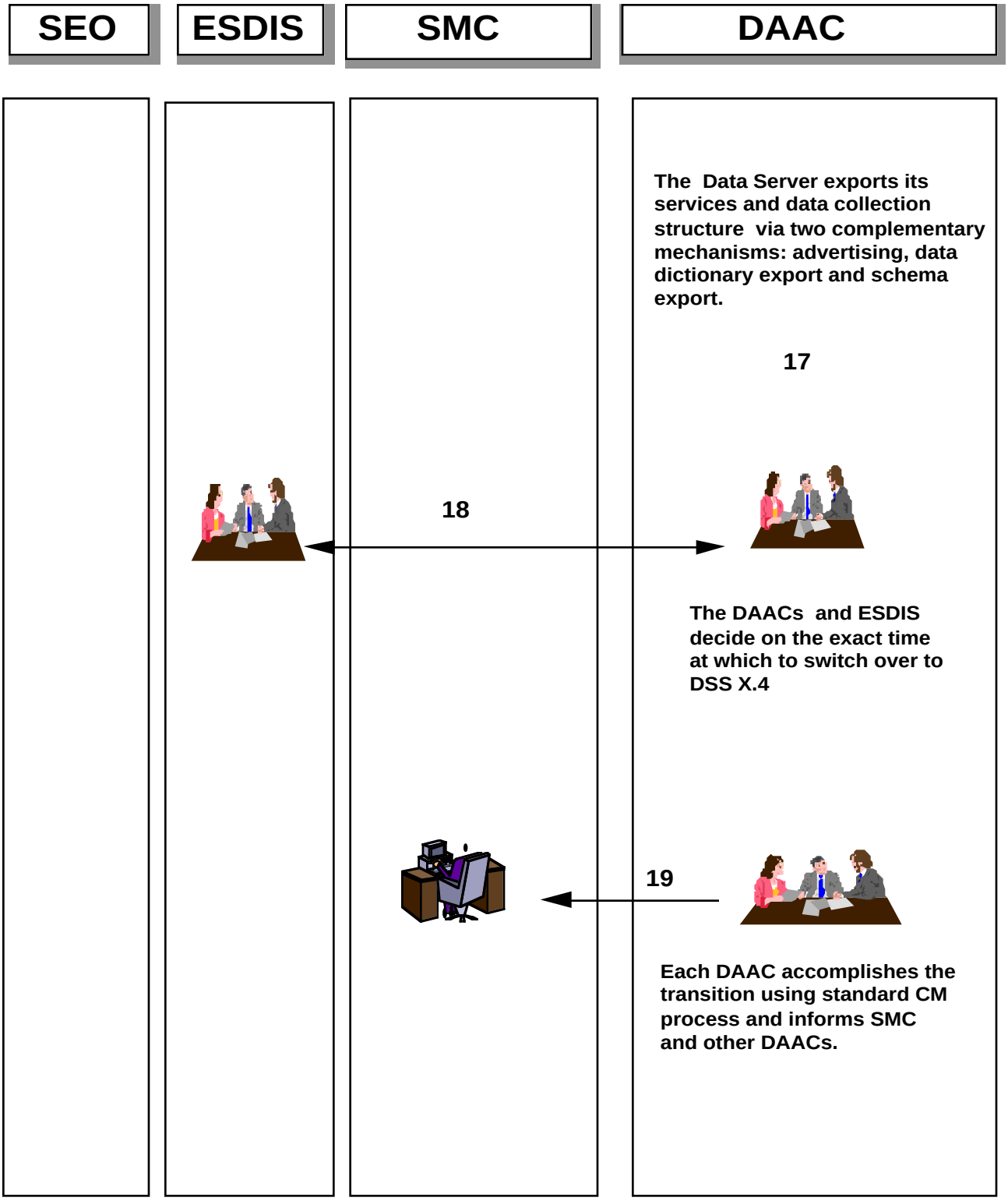

Figure 4.1.7.6-1. Cross-DAAC Software Upgrade Coordination Scenario (5 of 5)

Table 4.1.7.6-1. Steps of the Scenario: Cross-DAAC Software Upgrade Coordination (1 of 3)

Step	Operator/User	System	Purpose
1	A CCR is generated by sustaining engineering for ESDIS CCB. The CCR contains a high level test plan and resource requirements for each DAAC.	CCR is registered in the SMC's CCR database	Register in SMC's CCR database
2	Each of the DAACs and SMC evaluate the CCR and send comments into ESDIS CCB. ESDIS CCB issues a request for Impact Analysis before approving the CCR.	ESDIS CCB received comments from DAACs and SMC	CCB to receive comments from DAACs and SMC
3	ESDIS CCB is held with DAACs on telecon. It is determined that the upgrade is required and must be implemented within the same day at all three operational DAACs. It is also determined that the testing can be done on a DAAC-by-DAAC basis and requires an inter-DAAC system test. The CCR is approved and sent to SMC for coordination. Any requirements or requests by the SEO or the individual DAAC to do parallel testing with ops prior to formal implementation is decided at this time as it would impact the time of implementation.	CCR is approved and sent to SMC for coordination Parallel testing with ops is decided	Coordinate parallel test and operations
4	The Change Request Manager of MSS subsystem maintains records of proposals for changing the configuration of the ECS and ECS resources and tracks their implementation. M&O staffs CM specialists interface with the service to compose, register, and track the status of resource change requests electronically.	Change Request Manager is used to compose, register, and track the status of resource change request	Configuration change request
5	After making the software fix, the maintenance team requests the creation of a new version of the Data Server Subsystem (DSS X.4). This is done through the CM process using the CM tool.	The new version of DSS X.4 is now under ECS SMC CM control	CM requests the creation of new software
6	Software Change Manager of MSS subsystem allows the identification and registration of the names, version numbers, file types, format references, file associations, relevant permissions of the software under testing. The same service also specifies the test environments, test support database, and instructions of test utility for loading test data if necessary. Based on the above information, M&O staffs CM specialists utilize this MSS service to update a previously established ECS file system for that affected host to store configuration-related information for the proposed to be tested software. M&O staffs CM specialists again utilize MSS to specify that this new version of the Data Server Subsystem (DSS X.4) software to be activated in test mode as opposed to be in operational mode.	All relevant information associated with the test version of DSS X.4 is registered in through the Software Change Manager. Baseline Manager service of MSS updates records that describe software, databases, and documentation and that summarize how subsystems, and configuration items have changed,	Configuration of software components in a specified host is changed
7	In parallel the maintenance team requests of the GSFC DAAC resource group the utilization of ops resources to test out DSS X.4. The resource group evaluates the utilization and schedules resources dedicated to the maintenance team.	GSFC DAAC resource and schedule is evaluated for this test	Evaluate resource impact from test
8	Once the fix is tested to SEO's satisfaction, SMC sends the new software version to the DAACs for testing. The SMC CM sends the software change and associated documentation files and SMC baseline data to the sites electronically.	This transmission is accomplished via the inter-DAAC network from the GSFC CM organization to the DAACs CM team	Transmission of new software

Table 4.1.7.6-1. Steps of the Scenario: Cross-DAAC Software Upgrade Coordination (2 of 3)

Step	Operator/User	System	Purpose
9	SMC uses Resource Planning tool to generate a ground event definition. SMC then uses the same tool to electronically transfer the ground event to the three DAACs.	A ground event definition is generated by Resource Planning and electronically transferred to three DAACs	Generate ground event definition
10	The DAACs run this ground event requirement in their copy of the Resource Planning tool to evaluate for conflict.	DAAC's copy of Resource Planning is used to evaluate the requirement of the ground event	Evaluate requirements in DAAC
11	SMC logs into the DAACs resource plan to have the plans available for the coordination process. The DAACs and SMC hold an ops telecon to coordinate the proposed timing for placing the new version on the ECS system. This requires evaluation of required resources at each of the DAACs, various aspects of the resource requirements for both operational and test software when they are concurrently active, potential resource impact to the operational software and, if priorities need to be adjusted to accomplish the task, a discussion and SMC in conjunction with DAACs decision on modifying priorities is made. The discussion involves scheduling both the test periods and the day on which the new version will be implemented.	DAAC resource plans accessed by SMC to facilitate coordination. A new schedule is made, if resource or priority is in conflict, from SMC and DAACs joint coordination.	SMC to coordinate system test activity
12	Once a coordinated schedule for the system test and the upgrading of versions has been agreed upon, the rest of the scheduling is performed on a DAAC-by-DAAC basis up to the time of the inter-DAAC system test. The scenario for the resource planning at the DAACs is covered by the Resource Planning scenario.	DAAC's Resource Planning updates the resource schedule for this test	Resource planning to schedule the test
13	Each DAAC follows standard testing and CM procedures during the test phase. As the testing proceeds to the inter-DAAC test date, the DAACs and the SMC remain in contact to understand if there are any reasons to delay or modify the planned test date. SMC updates the planned test date for cross-DAAC system test if necessary.	Cross-DAAC system test schedule is updated if necessary.	Cross-DAAC system test consideration
14	The test conductor of the inter-DAAC test is from one of the DAACs or from the sustaining engineering organization at GSFC. SMC's role is to monitor the activities and be available to be involved in system level activities requiring priority decisions. The conduct of the test is between the DAACs. When the test is successful, would proceed to the next phase.	If the test fails, the process repeats itself, potentially all the way back to the maintenance team. (Software problems are tracked with the software trouble reporting system.) Software trouble report is generated in the SMC database by the test conductor if test failed.	Generate software trouble report if test fails

Table 4.1.7.6-1. Steps of the Scenario: Cross-DAAC Software Upgrade Coordination (3 of 3)

Step	Operator/User	System	Purpose
15	The new version of the Data Server Subsystem (DSS X.4) software is activated by the MSS start up request through CSS provided LifeCycle service by the M&O test conductors .	MSS starts up the test software and the status of being in Test Mode is passed on to the components interfacing with this test DSS X.4 This service also registers the identification of this new software in the namespace provided by DCE directory service. The status that this new version of DSS is in Test Mode is passed on from MSS to this new DSS X.4 and is going to be the state information to be conveyed from this new DSS X.4 to other software that it communicates with or renders service to.	M&O test conductor activates new test software
16	The system monitoring capability provided by Local System Management (LSM) in the individual DAAC and the EOS Operations Center (EOC) , if the test involves only one DAAC or by SMC if inter-DAAC is involved, is providing Monitor/Control service to track status of the test components as well as operational components. The M&O test conductors and SEO at the DAAC are utilizing LSM to monitor test components and SMC is tracking test status .	ECS Monitor/Control service in either DAAC or SMC is monitoring the components in both operational or test modes. The components under test are monitored as in test mode while the operational components are shown as on-line and in operation or failed. The unique identification in the namespace for the test version of DSS is required for the right interface specification.	Monitor both operational and test software components Test version of DSS only interacts with other software components through right interface specification
17	The M&O test conductors and SEO at the DAAC are utilizing LSM to monitor all services aforementioned (Advertising, Data Dictionary, LIM/DIM) export the output from operation and test software distinctively so that the operational ECS will not be allowed to use the test output.	The output from operational and test software are distinctively separable. Archiving involving test data is separated from operational archiving. Test views are not exported to the user community	Test output is not used by operational software Test output is separated for archiving and user's view
18	The DAACs in conjunction with ESDIS decide on the exact time at which to switch over to DSS X.4. If there are potential problems associated with having different versions at the sites, the transition time may occur in a tight time window. If not, each DAAC has a window in which to accomplish the task.	DAAC switches over to new DSS X.4.	Decide to switch over to new software
19	As each DAAC accomplishes the transition using standard CM process, they inform the SMC and the other DAACs.	SMC and other DAACs are informed of the new DSS X.4 in that DAAC	DAAC transition to new software

4.1.7.7 Operational System and Test Activity Run in Parallel Scenario

See Figure 4.1.7.7-1 for a pictorial representation and Table 4.1.7.7-1 for a sequence of events for the Operational System and Test Activity Run in Parallel Scenario.

The parallel test scenario was created to address the reality of, and therefore the need for infrastructure and procedure for, simultaneous operations and test activities in the DAACs and the SMC monitoring and performance testing requirements (SMC3300, SMC3305, SMC3400, and SMC3397). The following summarizes the issues driving concurrent testing and scenario development:

- It is operationally unacceptable to stop operations in order to test a new release, although certain upgrades (e.g., operating system) will require downtime.
- Hardware modifications to support concurrent ops and testing are not desirable.
- There are level 3 requirements that call for simultaneous ops and test (see above).
- By definition, concurrent ops and test reduces system capacity for ops, so users will have to accept the potential for degraded performance.

This scenario describes a situation that a host computer under a pre-approved master schedule will have both operational tasks and concurrent CI or system-level tests. This scenario depicts ECS/DAAC system coordination for installation & test and performance monitoring activities in preparation for and during testing. Described in the scenario are activities directly concerned with concurrent ops and test, but also coverage of some pre-test activities (i.e., preparation for delivery, delivery, and integration). This scenario does not cover inter-DAAC testing concerns.

Scenario Description

Pre-delivery planning

The SEO makes a request of the DAAC resource manager (RM) to schedule DAAC resources for installation and test of Test software. The DAAC RM evaluates the required resources and schedules the resources to be provided to the maintenance team. *The scenario for resource planning at the DAACs is covered by the Resource Planning Scenario.* The SEO SE updates the system schedule using the scheduling tool.

The RM instructs the DAAC system administrator (SA) to setup a test account for use with the new software. The test account user ID is unique to the test activity and has access to the RM-identified host and disk resources. The test account has write permissions for test files and directories only. The SA will populate the partitioned database with the support input data sets required to support the test, as specified in the test plan. The SA uses the DAAC CM tool to verify/setup the test account. At a minimum, the CM tool displays account listings with user ID, host access, group and user permissions, and disk limits.

Inspection of the S/W

The DAAC SE receives the new software according to plan and logs the receipt to the CM tool. The SE informs the RM of the arrival of the software and requests the permission to begin the installation. The CM tool maintains the S/W test process log. The RM acknowledges the request,

sends a reminder to the host operator of the impending installation and test and issues a general system administration message regarding the use of the host for concurrent operations and test. System administration tools allow the RM to issue/display screen alerts/reminders and/or e-mail regarding the test. The RM gives permission to the SE to begin the inspection.

The DAAC SE verifies that the test environment contains the appropriate environment variable values and path settings. The SE verifies account readiness and unloads the test media onto the host disk according to the accompanying instructions. The SE inspects the software:

- Checks files against the delivery list
- Reads documentation
- Verifies version numbers of each delivered CSCI
- Verifies environment for linking
- Compiles and links objects files

The software is inspected primarily to make sure that all the identified files are present, text and documentation files address what they are supposed to, and that the software compiles. If there are any errors, delivery is rejected, and the errors are logged in the S/W test process log (maintained by the CM tool?). Otherwise, the SE informs the CM admin. of successful inspection. The software is provisionally accepted by the DAAC. The CM tool maintains the database for the software configuration.

Integration of the S/W

The sustaining engineer brings up the test software. At startup of the test S/W, the sustaining engineer looks at the process ID table to determine that the test processes are running under the correct mode, user, group, mission, and site. Furthermore, the sustaining engineer and the operations supervisor confirm that test software may only write to test processes, files, and directory structures . System displays test process list showing process name, process ID, UUID, mode, user, group, mission and site.

Once the system is running, the SE verifies that test clients access and/or write test services only, and that test services serve only test clients. The system supports the verification of valid client/server communication. If identified by the resource plan, the SE dedicates spare archival volumes to the test effort. If needed and available, a limited database(s) may be hosted on additional data server hardware to be used for test purposes. The CM tool maintains the software configuration in relation to identified, dedicated volumes of the archiver.

Testing during Ops

Testing addresses resource usage and performance monitoring. The preliminary scenario covers testing within the DAAC only.

Since this test is planned, it is included in the daily resource plan for the host that has been sent to the host operator. As the test scenario begins, the SE informs the resource manager that he is ready to perform the scheduled test. The resource manager verifies that the test was scheduled by

looking at a copy of the resource plan for that host that he had printed out earlier in the day. The resource manager then begins the preparations for the test procedure.

The resource manager sends out a system administration message (using UNIX root/console message display) to remind all DAAC personnel of the potentially degraded performance of the host. The resource manager queries the performance management application to determine what applications are currently running on the host. The Performance Management tool displays a list of the processes and load statistics on the selected host. The resource manager contacts the host operator to remind him of the planned test and possible performance impact. The host operator receives the message and terminates any non-essential applications. The processes are removed from memory.

Once the applications terminate, the performance management application removes them from the list of running applications. The Performance Management tool displays the process list for the selected host.

The resource manager queries the performance management application to verify the current host status is operational. The performance management application displays a normal operational status. The RM resets the status to reflect a concurrent test mode and to warn potential users that scheduled tests will probably impact any operations they might conduct on the host. HP Openview acknowledges the change, sends a status message to all affected (registered) operators, and changes the color of icon representing the host on the HP OpenView workstations to reflect the heavy usage status. The resource manager observes the host icon color change and informs the sustaining engineer that the host is now available for test.

The SE conducts the test. Depending on the test, see the SEO, M&O, IATO, or IV&V test plan.

The performance management tool monitors the host CPU utilization and detects an increase in the CPU load beyond what was expected for the test. The PM tool changes the host state from mildly degraded to heavily degraded. HP OpenView detects the changes and updates the icon color from a heavy usage condition (yellow) to a degraded condition (orange). The RM sees the host icon state change and warns the host operator and the SE that testing will have to stop until the cause of the anomalous CPU usage is determined.

The sustaining engineer suspends the test process. The performance management tool detects the load change and changes the host state to mildly degraded. HPOV detects the change and updates the host icon accordingly. The process management tool displays the test process as suspended.

The host operator and the SE determine that one of the test processes was in debug mode and that this caused the extra CPU usage. The debug mode is dynamically disabled by reducing the trace level. Testing resumes. The process management tool display the test process as active.

After completing the test, the sustaining engineer informs the resource manager that the test is finished, the appropriate diagnostics checked, and the host is ready to be brought back to a fully operational state. The resource manager then initiates the procedure, sending the appropriate commands to the host. After the commands have been executed, HP OpenView detects the host state of change to fully operational (green).

The SE logs test status and results into the CM tool under S/W test process log. The SE sends e-mail to the CM and the DAAC Supervisor recommending the S/W be placed on the CCB review list. A report of the test and its results is prepared and distributed to the DAAC CCB, the DAAC manager, the Ops Working Group, and the SMC.

Scenario Assumptions

- Tests are conducted within a single DCE cell
- The ECS On-Site SE performs installation and checkout, component tests, and integration testing.
- The ESDIS CCB has approved the ECS SEO test plan for the new software and the SEO has coordinated with each of the affected DAACs.
- The Change Request Manager maintains records of proposals for changing the configuration of the ECS and ECS resources and tracks their implementation. DAAC CM specialists interface with the service to compose, register, and track the status of resource change requests.
- The DAAC receives the software, checks it for bugs, and makes any necessary fixes and then starts the software test process.
- Each DAAC has a standard set of regression tests with test data that any software upgrade is run against.
- Backups of all pertinent databases are made prior to testing.
- Stubs are used to represent external interfaces during CI or subsystem testing. Data sent to stubs is to be compared with what the external entity would expect. Once all subsystem interfaces have been tested in this manner, stubs can be replaced, one at a time, with the real external interface.
- Standard CM procedures allow the identification and registration of the names, version numbers, file types, format references, file associations, and relevant UNIX permissions of the software under testing. The same procedures also specify the test environments, test support database, and instruction of test utility for loading test data if necessary.

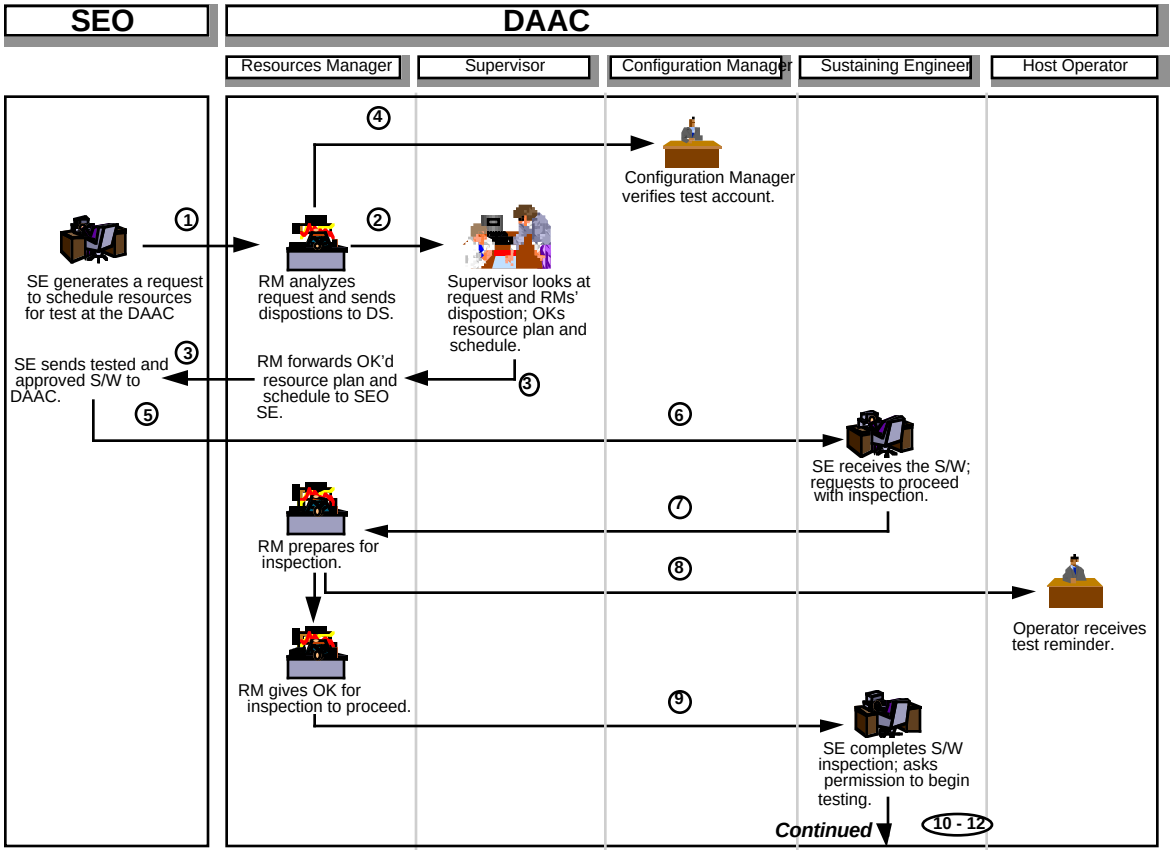

Figure 4.1.7.7-1. Operational System and Test Activity Run in Parallel Scenario (1 of 2)

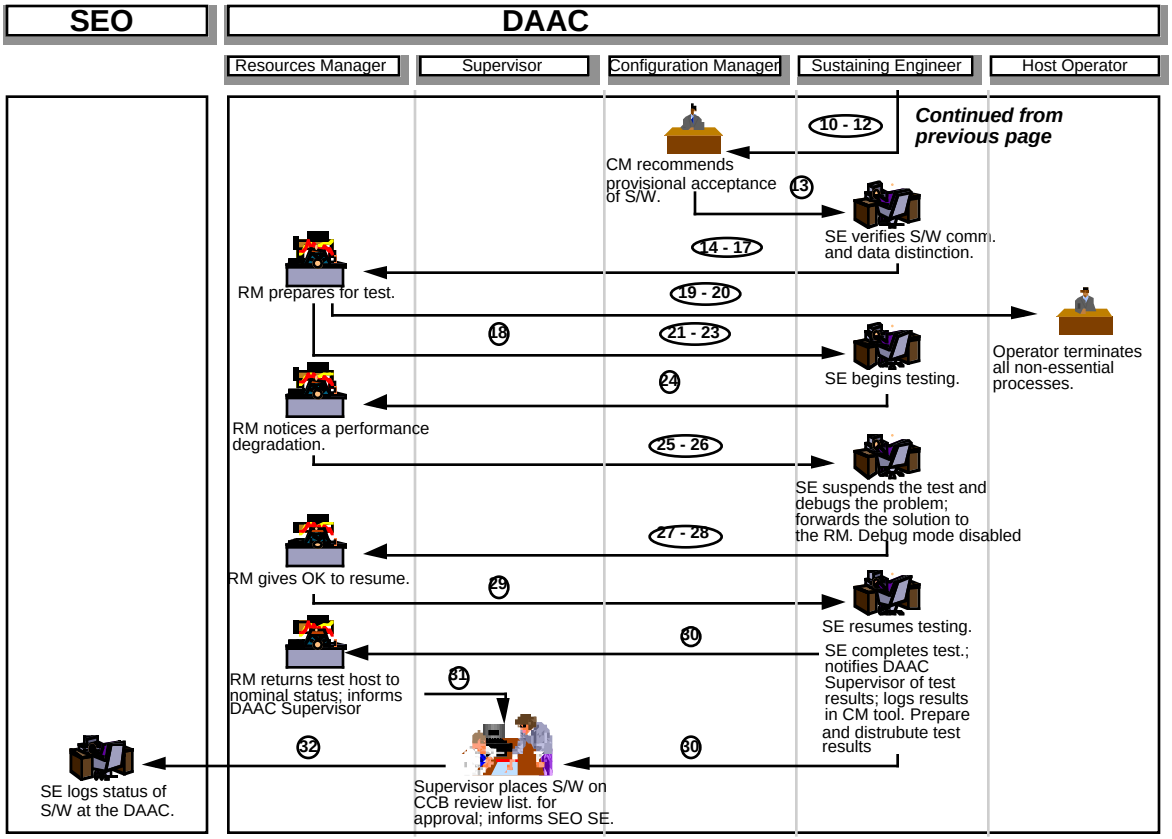

Figure 4.1.7.7-1. Operational System and Test Activity Run in Parallel Scenario (2 of 2)

Table 4.1.7.7-1. Operational System and Test Activity (1 of 4)

step	Operator/User	System	Purpose
1	The SEO makes a request of the DAAC resource manager (RM) to schedule DAAC resources for installation and test of Test software.	SEO SE Schedule tool maintains system-level DAAC plans and changes.	Pre-delivery planning: Request resources.
2	The DAAC RM evaluates the required resources and forwards the request and the resource disposition (plan) to the DAAC Supervisor. *The scenario for resource planning at the DAACs is covered by the Resource Planning Scenario.*	The RM tool maintains the resource plans and changes.	Pre-delivery planning: Evaluate and coordinate DAAC resources.
3	The DAAC Supervisor evaluates the request and the RMs disposition, updates the DAAC schedule and sends the resource plan and confirmed schedule to the SEO SE; confirms the resource plan to the RM.	The schedule tool maintains the schedule for the DAAC.	Pre-delivery planning: Coordinate resources and schedule.
4	The RM instructs the DAAC system administrator (SA) to setup a test account for use with the new software. The test account user ID is unique to the Test test activity and has access to the RM identified host and disk resources. The Test test account has write permissions for Test test files and directories only. The SA creates a hierarchical-based partition within the databases based on mode identifier, and populates the partitioned database with the support input data sets required to support the test, that are specified in the test plan.	The SA uses the DAAC CM tool to verify/setup the test account. The CM tool displays account listings with user ID, host access, group and user permissions, and disk limits.	Pre-delivery planning: Setup test account to support test.
5	The SEO SE updates his plan regarding the DAAC test of the new software.	The schedule tool maintains the overall schedule for the system and each of the DAACs.	Pre-delivery planning: Update system view.
6	The DAAC SE receives the new software according to plan and logs the receipt to the CM tool.	The CM tool maintains the S/W test process log.	Inspection of the S/W: Log S/W receipt.
7	The SE informs the RM of the arrival of the software and requests the permission to begin the installation.	E-mail?	Inspection of the S/W: Coordination of resources.
8	The RM acknowledges the request, sends a reminder to the host operator of the impending installation and test and issues a general system administration message regarding the use of the host for concurrent operations and test.	System administration tools allow the RM to issue/display screen alerts/reminders and/or e-mail regarding the test.	Inspection of the S/W: Prepare DAAC personnel for testing.
9	The RM gives permission to the SE to begin the inspection.	E-mail?	Inspection of the S/W: Coordination of resources.
10	The SE verifies account readiness and unloads the test media onto the host disk according to the accompanying instructions.	Feedback during tar process.	Inspection of the S/W: Unload S/W.

Table 4.1.7.7-1. Operational System and Test Activity Run in Parallel Scenario (2 of 4)

Step	Operator/User	System	Purpose
11	The SE inspects the software: • Checks files against the delivery list • Reads documentation • Verifies version numbers • Verifies environment for linking • Compiles and links objects files If there are any errors or missing components, delivery will be rejected.	Any errors are logged in the S/W test process log.	Inspection of the S/W
12	The SE informs the CM admin. of successful inspection.	The CM tool maintains the database for the software configuration.	Inspection of the S/W: Coordinate with CM.
13	The software is provisionally accepted by the DAAC; the SE requests permission of the RM to proceed with test.	The CM tool maintains the database for the software configuration.	Inspection of the S/W: Coordinate with CM.
14	The sustaining engineer brings up the test software. At startup of the test S/W, the sustaining engineer looks at the process ID table to determine that the test processes are running under the correct user, group, mission, and site. Furthermore, the sustaining engineer and the operations supervisor confirm that test software may only write to test processes, files, and directory structures .	Displays test process list showing process name, process ID, UUID, user, group, mission and site. Supports the verification of valid test writes.	Integration of the S/W: Verify data distinction.
15	Once the system is running, the SE verifies that test clients access test services only, and that test services serve only test clients. Test for inadvertent communication between ops/test clients/servers.	Supports the verification of valid client/server communication.	Integration of the S/W: Verify data distinction.
16	If identified by the resource plan, the SE dedicates spare archival volumes to the test test effort.	The CM tool maintains the software configuration in relation to identified, dedicated volumes of the archiver.	Integration of the S/W: Verify data distinction.
17	The SE informs the resource manager that he is ready to perform the scheduled test. The resource manager verifies that the test was scheduled by looking at a copy of the resource plan for that host that he had printed out earlier in the day. The resource manager then begins the preparations for the test procedure.	Supports the printing of the resource plan.	Testing the S/W: Resource management.
18	The resource manager sends out a system administration message to remind all DAAC personnel of the potentially degraded performance of the host.	Supports UNIX root/console message display issued by system admin level account.	Testing the S/W: Performance alert.

Table 4.1.7.7-1. Operational System and Test Activity Run in Parallel Scenario (3 of 4)

Step	Operator/User	System	Purpose
19	The resource manager queries the resource management application to determine what applications are currently running on the host. The resource manager contacts the host operator to remind him of the planned test and possible performance impact.	The Resource Management tool displays a list of the application processes and load statistics on the selected host. Displays e-mail message.	Testing the S/W: Resource management.
20	The host operator receives the message and terminates any non-essential applications.	Processes are removed from memory.	Testing the S/W: Resource management.
21	Once the applications terminate, the performance management application removes them from the list of running applications.	The Performance Management tool displays the process list for the selected host.	Testing the S/W: Resource management.
22	The resource manager queries the performance management application to verify the current host status is operational. The RM resets the status to reflect a concurrent test mode and to warn potential users that scheduled tests will probably impact any operations they might conduct on the host.	The PM tool displays the current status for the selected host (nominal to degraded).	Testing the S/W: Performance management.
23	HP Openview acknowledges the change, sends a status message to all affected (registered) operators, and changes the color of icon representing the host on the HP OpenView workstations to reflect the heavy usage status. The resource manager observes the host icon color change and informs the sustaining engineer that the host is now available for test.	Displays the HP Openview icon for the host in the appropriate state/mode.	Testing the S/W: Performance management.
24	The SE conducts the test. Depending on the test, see the SEO, M&O, IATO, or IV&V test plan.	The system monitoring tool displays a list of test and operational processes and their status.	Testing the S/W: Monitoring during concurrent test.
25	The performance management tool monitors the host CPU utilization and detects an increase in the CPU load beyond what was expected for the test. The PM tool changes the host status from concurrent to degraded. HP OpenView detects the host status and changes the icon from a heavy usage condition (yellow) to a degraded condition (orange) to inform DAAC operations of the potential problem.	The PM tool displays the CPU utilization for the test host and issues an alert when the threshold is breached. HP Openview displays the host icon in its' appropriate state.	Testing the S/W: Performance management.
26	The RM sees the host icon state change and warns the host operator and the SE that testing will have to stop until the cause of the anomalous CPU usage is determined.	No action.	Testing the S/W: Performance management.
27	The sustaining engineer suspends the test process. The performance management tool detects the load change and changes the host icon state to mildly degraded (yellow).	Displays the test process as suspended. HP Openview displays the host icon and state.	Testing the S/W: Performance management.

Table 4.1.7.7-1. Operational System and Test Activity Run in Parallel Scenario (4 of 4)

Step	Operator/User	System	Purpose
28	The host operator and the SE determine that one of the test processes was in debug mode and that this caused the extra CPU usage. The trace level can be dynamically reduced to disable debug mode.	Displays the test process as resumed (active).	Testing the S/W: Debug the problem; performance management.
29	The RM gives OK to resume testing.	E-mail?	Testing the S/W: Coordination of resources.
30	After completing the test, the SE informs the resource manager and the DAAC Supervisor that the test is finished, logs the test status and results to the CM tool. A report of the test and its results is prepared and distributed to the DAAC CCB, the DAAC manager, the Ops Working Group, and the SMC.	The CM tool allows input of test status and results, and maintains a test log.	Testing the S/W: CM of new software.
31	The resource manager then initiates the procedure, sending the appropriate commands to the host. After the commands have been executed, HP OpenView detects the host state of change to operational and sends a status message indicating this change is state to all affected (registered) operators. Finally, the host icon color on the resource manager's HP OpenView display turns green to indicate that the host is again a dedicated operational machine.	The RM tool displays host settings. HP Openview displays the host icon and the appropriate state/mode.	Testing the S/W: Performance management.
32	The DAAC Supervisor notes the results in the CM tool and recommends the software to the DAAC CCB for full approval.	CM tool maintains software status and test logs.	Testing the S/W: CM of the new software.

4.1.7.8 Mode Management Support Scenario

See Performance Management Figure 4.1.7.8-1 for a pictorial representation and Table 4.1.7.8-1 for a sequence of events for the Mode Management Support Scenario.

This scenario was created to address the activities and personnel involved in setting up and executing the testing of a Data Server modification, concurrent with production activities. This scenario does not cover inter-DAAC testing concerns. Concurrent ops and test activities could reduce the system capacity for ops, so users will have to accept the potential for degraded performance.

Scenario Description

The Resource Manager receives a hard copy of the Test Plan from the Test Plan originator.

A configuration controlled mode identifier is assigned by the Resource Manager. The unique mode identifier will serve as a means of identifying the applications and resources of a given mode.

The Resource Manager evaluates the Test Plan to identify the resources required to carry out the test. He utilizes HP OpenView to determine the current status of system resources. The Resource Planner concurrently evaluates the Test Plan to identify the hardware and software resources required to support the test.

The Resource Planner looks at the current resource plan and, after consulting with the Resource Manager, determines the best time to schedule the test. The Resource Planner uses the resource planning tool to enter a resource reservation request, specifiying the start/stop time of the test and the resource(s) to be used. Since the Resource Manager has already been consulted, the Resource Planner marks the resource reservation request as 'approved'. Since the request is approved, it is included in all subsequent resource and production plans.

The Resource Manager notifies the Resource Controller at the SMC of the intended Test Plan via E-mail.

The Resource Manager requests the System Administrator to configure the system according to the Test Plan. The System Administrator obtains the mode identifier from the Resource Manager. If the necessary hierarchical directory structure does not exist within the Cell Directory Service, the System Administrator utilizes the CDS browser to establish the proper hierarchical directory structure, based on the mode identifier. This establishes a mode-unique directory structure to enable mode dependent process separation and distinction.

Utilizing HP OpenView, the Resource Manager will determine if the map necessary for the given test mode exists. Maps for commonly executed modes may be developed and reused. If the necessary map does not exist, he will create a new map to support that specific mode. The map is loaded into HP OpenView.

The System Administrator, utilizing the Resource Plan, configures the necessary resources. The SA notifies the DBA to set up the database. The DBA, using DBMS tools, sets up a hierarchical-based partition(based on mode identifier) within the test-associated databases to permit data distinction and separation. Production processes will not be able to read from non-production data sets, and test data will not be able to be written to production data sets.

The System Administrator copies the support data sets into the established directory structure. He installs the updated Data Server application(s) and test driver(s) onto the server(s). The Resource Manager is then notified that the system configuration has been completed.

The Resource Manager notifies the Resource Controller, via E-mail, of the start of the test.

From within HP OpenView, the Resource Manager initiates the Mode Management Service(MMS). The MMS will then prompt the RM for the mode identifier, test driver host location, and test driver name. The RM inputs the requested information. The Mode Management script initiates the test driver on the specified host within the specified mode and environment. The Data Server application being tested is executed. Data Server test application(s) register within the DCE Cell Directory Service under the specified test mode, and register in HP OpenView, where the icons are displayed in the appropriate map.

The Resource Manager monitors and controls the Data Server test application, via HP OpenView. The System Administrator, via a local workstation, also monitors and controls the Data Server test application. The test executes according to the test driver (The test reads the input data, writes data to the archiver, and updates the metadata database. The test searches the metadata database for the same data, loads data from archiver, and writes data to the output file.).

The Resource Manager and System Administrator determine that all data and process interactions are isolated to the test mode.

Upon completion of the test, the test driver terminates the Data Server test application. HP OpenView will then detect termination of the Data Server test application and the associated applications will reflect a change of state. The System Administrator and Database Administrator acknowledge the test completion and reconfigure the system to the desired state as outlined in the Test Plan.

The Resource Manager notifies the Resource Controller, via E-mail, that the test has completed.

Scenario Assumptions

- The test is conducted within a single DCE cell
- The Data Server modification has been initially tested within the development environment
- Some degradation of Ops capacity is acceptable

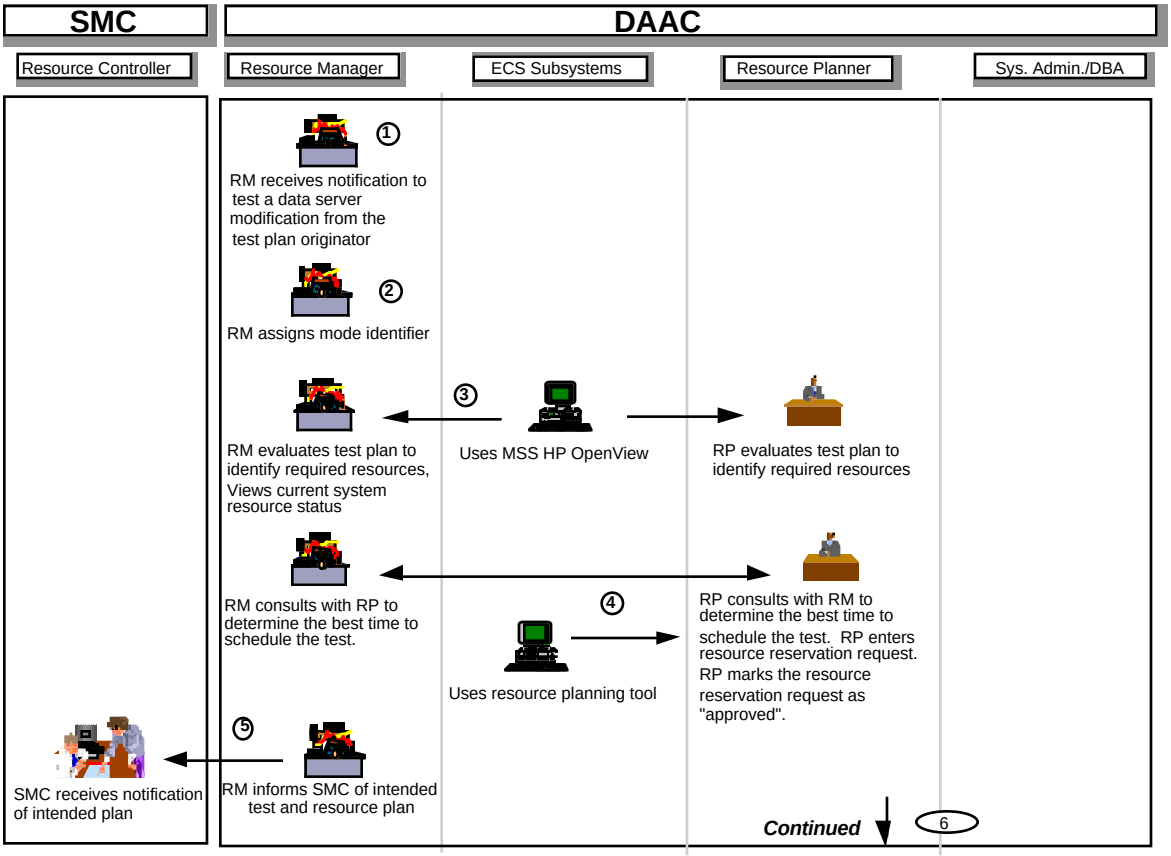

Figure 4.1.7.8-1. Mode Management Support Scenario (1 of 4)

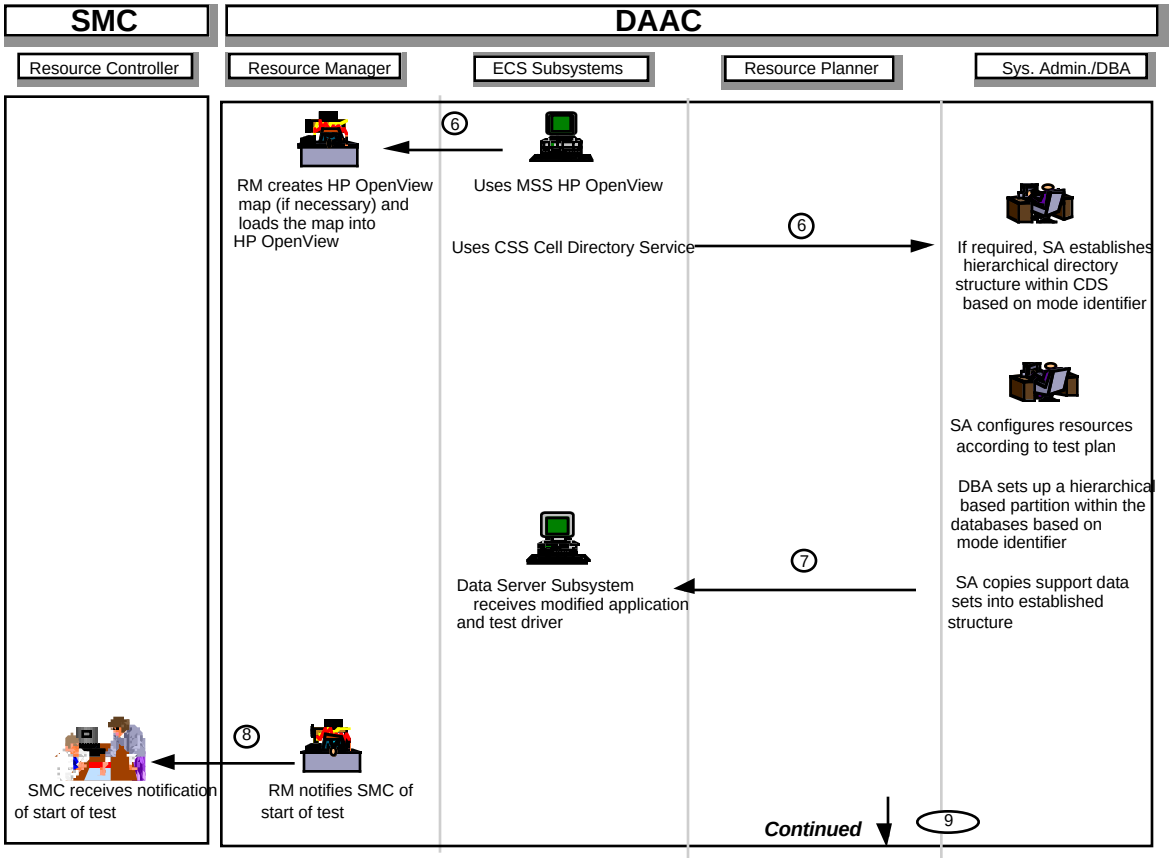

Figure 4.1.7.8-1 Mode Management Support Scenario (2 of 4)

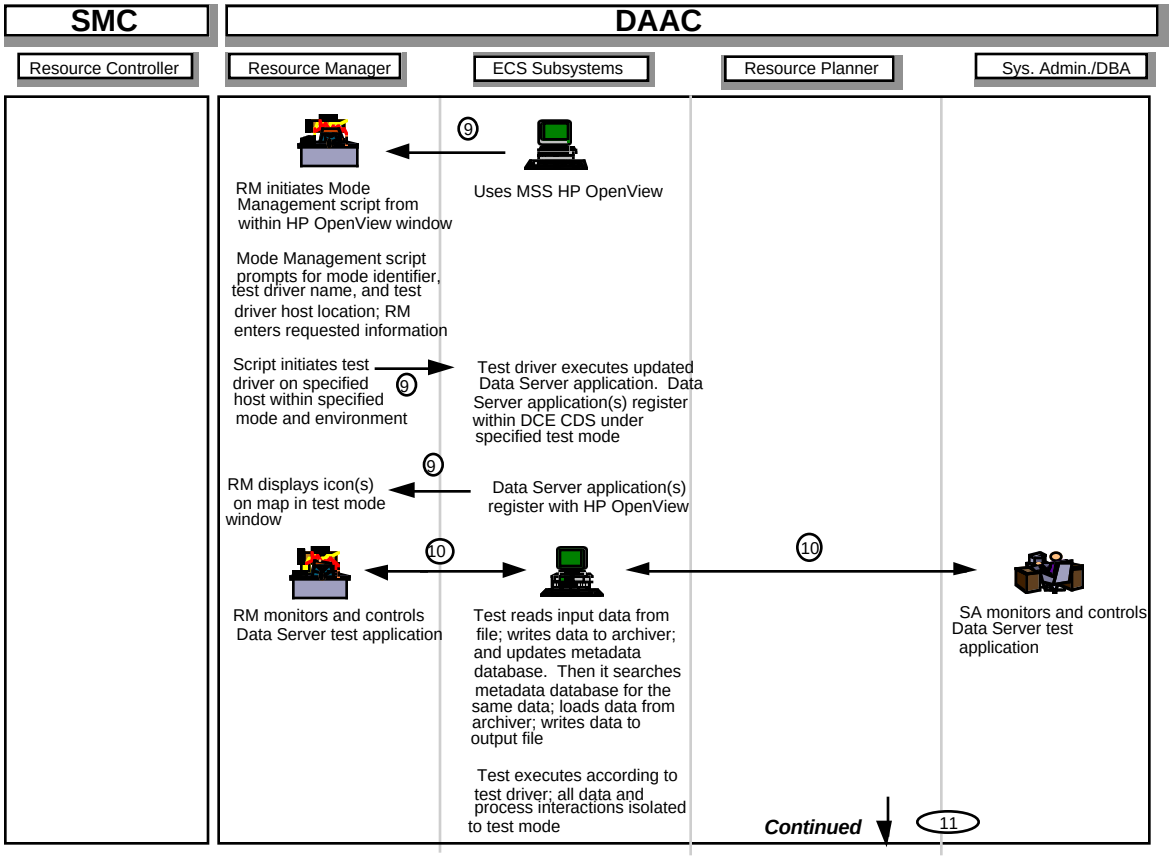

Figure 4.1.7.8-1 Mode Management Support Scenario (3 of 4)

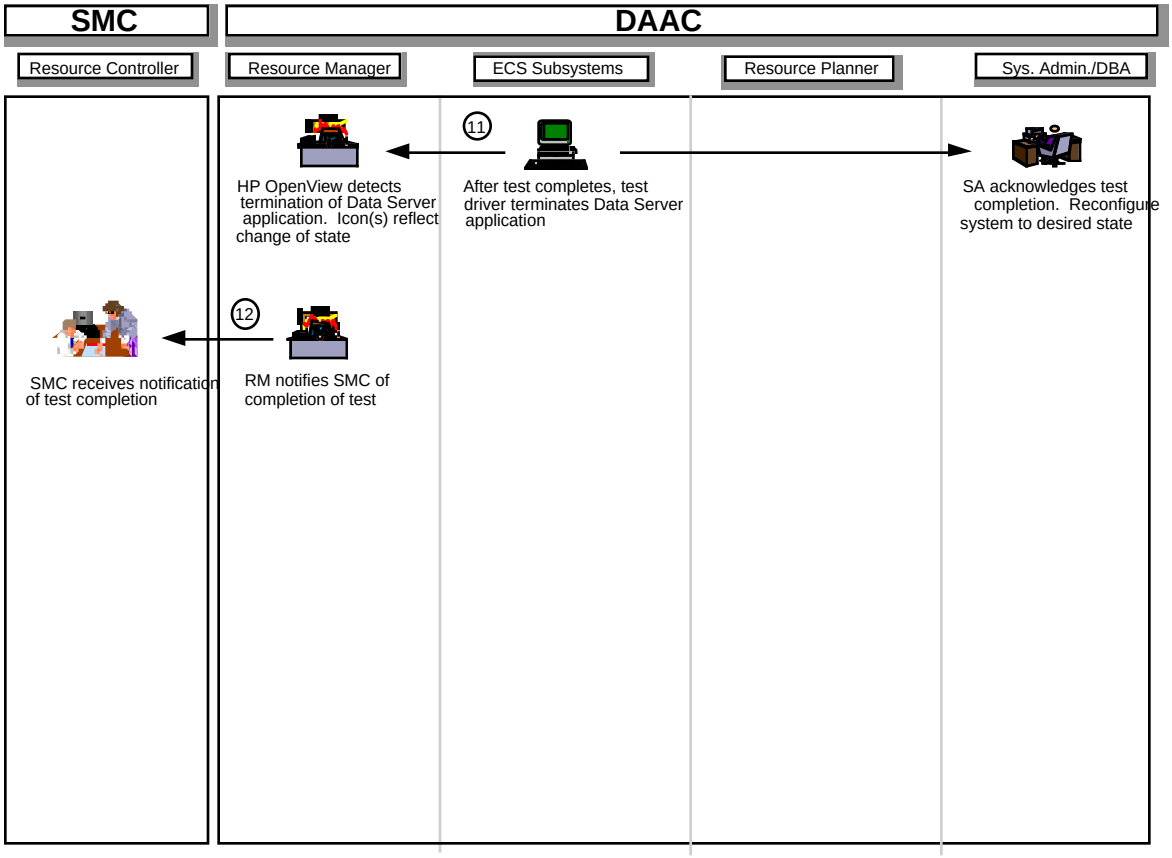

Figure 4.1.7.8-1 Mode Management Support Scenario (4 of 4)

Table 4.1.7.8-1. Steps of the Scenario: Mode Management Support (1 of 2)

Step	Operator/User	System	Purpose
1	Resource Manager receives notification to test a Data Server modification from the test plan originator.		Test notification.
2	Resource Manager assigns a mode identifier.		Mode allocation.
3	Resource Manager and Resource Planner evaluate test plan to identify required resources. RM uses HP OpenView to view current status of system resources.	Display system resource status.	Evaluate Test Plan. Identify resource needs and current resource status.
4	Resource Planner views current resource plan, and consults with Resource Manager to schedule the test. Resource Planner, via the resource planning tool, enters a resource reservetion request, specifiying the start/stop time of the test and the resources to be used. Resource Planner marks the resource reservation request as "approved".	Resource planning tool used to enter resource reservation request	Develop a resource reservation request for implementing test.
5	Resource Manager informs SMC of intended test and resource plan.	E-mail message from Resource Manager to SMC	Notification of scheduled test event.
6	Resource Manager creates an HP OpenView map for the appropriate mode(if necessary). RM loads map into HP OpenView. System Administrator establishes hierarchical directory structure within CDS based on mode identifier.	HP OpenView map created(if necessary). Map loaded.	Configure system for test. Load updated software and test drivers.
7	System Administrator configures resources according to resource plan. DBA creates a hierarchical-based partition within the databases based on mode identifier. System Administrator copies support data sets into established structure.	Data Server Subsystem receives modified application and test driver.	Configure system for test activity.
8	Resource Manager notifies SMC of start of test.	E-mail message from Resource Manager to SMC.	Notification of impending test activity.
9	Resource Manager initiates Mode Management script from HP OpenView. Script prompts for mode identifier, test driver name, and test driver host location; Resource Manager enters requested information. Script initiates test driver on specified host within specified mode and environment. Resource Manager displays test application icon(s) on HPOV map.	Test driver executes updated Data Server application(s). Data Server application(s) register within DCE CDS under specified test mode. Data Server application(s) register within HPOV.	Test initiation.

Table 4.1.7.8-1. Steps of the Scenario: Mode Management Support (2 of 2)

Step	Operator/User	System	Purpose
10	Resource Manager and System Administrator monitor and control Data Server test application.	Test reads input data from file; writes data to archiver; updates metadata database. Test searches metadata database for the same data; loads data from archiver; writes data to output file.	Monitor and control test activity.
11	Resource Manager views termination of Data Server test application(s) in HPOV by the icon's change of state. System Administrator acknowledges test completion. Database Administrator reconfigures system to desired state.	After test completion, test driver terminates Data Server application(s) and HPOV detects termination.	Test completion and reconfiguration of system resources.
12	Resource Manager notifies SMC of completion of Data Server test activity.	E-mail message from Resource Manager to SMC.	Notification of conclusion of test activity.