

420-WP-005-003

# Interim Release 1 to Release A Transition Plan

White Paper

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White Paper—Not intended for  
formal review or government approval.

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# Abstract

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Appendix A, Update Summary, is intended to summarize the events that have occurred and the decisions that have been made since the Draft version of the Interim Release 1 (Ir1) to Release A Transition Plan (420-WP-005-002) was completed. It is intended to supercede that document in describing the planned transition. The remainder of this submittal is provided as historical data only and is fully superseded by the data provided in Appendix A.

**Keywords:** transition plan, reuse, SSI&T, SI&T, IV&V, Ir1, IATO, Release A, schedule, installation

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## **Abbreviations and Acronyms**

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# 1. Introduction

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## 1.1 Purpose

This paper addresses the issue of how and when ECS Interim Release 1 (Ir1) resources are to be reused by Release A, both within the Upper Marlboro Engineering Development Facility (EDF) and at the DAAC sites. Various requirements for use of these resources in the 1996 timeframe has posed concerns that the transition process be fully planned well in advance. Of particular concern is the plan for how and when Ir1 configurations at the sites are affected by their integration with Release A at installation time. ESDIS requested a transition plan be prepared to address this topic, however, the ECS CDRL items do not cover such information. Consequently, this white paper has been prepared to present and coordinate this issue.

The paper provides requirements for each cognizant and/or affected ECS and NASA organization. These organizations were represented by the following staff whose contribution is hereby acknowledged:

ECS Ir1	Chris Smith (chair)
ECS Release A	Howard Ausden
ECS MRS	Gary Roth
ECS M&O	Bill Burford
ECS EDS	Tom Jaeger
ECS IATO/CM	Gil Scott, Ron Durachka
ECS Sci. Office	Karl Cox, Dave Case, Tom Dopplick
ESDIS	Glenn Iona

## 1.2 Organization

This paper is organized as follows:

Section 2 covers the objectives and approach taken for this analysis

Section 3 presents a consolidated schedule for the currently planned, transition-phase relevant activities of the many organizations affected by this plan and discusses salient characteristics of each activity shown in the activity schedule

Section 4 presents an overview of the planned reuse of Ir1 resources in Release A

Section 5 provides discussion of issues and potential solutions to the contentions brought about by both reuse of Ir1 and "sharing" of common resources within Release A

Section 6 presents relevant miscellaneous material associated with this paper

Section 7 provides a brief summary of the transition planning effort.

### 1.3 Review and Approval

This White Paper is an informal document approved at the Office Manager level. It does not require formal Government review or approval; however, it is submitted with the intent that review and comments will be forthcoming. This second and final version of this paper is being circulated within the Government ECS community in order to ensure their resource requirements have been adequately addressed and that the recommendations made about the transition are acceptable.

The ideas expressed in this White Paper are valid for the early-1996 timeframe to support future planning at more detailed levels; the concepts presented here are expected to migrate into those CDRLs which may require an agreed-to transition process (e.g., ECS Intermediate Logic Network, installation procedures, etc.).

Questions regarding technical information contained within this Paper should be addressed to the following ECS and/or GSFC contacts:

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## 2. Objectives and Approach

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### 2.1 Objectives

Objectives for the transitioning of Ir1 to Release A are to:

- For Ir1: Minimize potential gap(s) in Science Software Integration & Test (SSI&T) service availability between Ir1 and Release A and ensure the availability of Ir1 interface test related equipment when needed for conducting TRMM Ground System I&T
- For Release A: Ensure the availability of Ir1 equipment needed to install, configure, test, train, accept, IV&V and activate Release A<sup>1</sup>.

#### 2.1.1 Minimize SSI&T Service Gaps

A primary purpose for providing Ir1 is to support early integration and test of science software. Soon after Independent Verification and Validation (IV&V) is completed (February 1996), Ir1 will be "ESDIS-approved" and available for use in testing ECS capabilities to rehost science software, specifically TRMM Version 1 and AM-1 beta versions.

As mentioned above, since Ir1 resources are planned to be reused by Release A, Ir1 SSI&T services could be interrupted by equipment switchover to Release A, if not discontinued entirely. During Release A equipment installation (in mid-1996), there will be some amount of downtime to do a "deinstall/install" between Ir1 and Release A. Ir1 equipment will be disconnected and moved from the Version 0 network<sup>2</sup>, reconfigured<sup>3</sup>, reinstalled on another LAN and possibly set-up within another DCE cell<sup>4</sup>. In the event of slips to Ir1 SSI&T schedules, additional resources would be needed to complete Release A equipment installation and continue Ir1 SSI&T support.

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<sup>1</sup>Ir1 COTS components are planned for full reuse by Release A at COTS installation time in mid- 1996, however, contingency planning has been done to allow ECS to provide "decision milestones" to ESDIS whereby timely Government direction could be provided to ECS to procure additional components where needed for the two Releases to exist in parallel for a limited time (see 5.2.3).

<sup>2</sup>Except at EDC

<sup>3</sup>As covered in Section 4, reconfigurations vary based on the specific equipment but may include hardware upgrades (more memory, processors and disk), operating and application software version changes, reassignment of function (an Ir1 server becomes a Release A workstation), and one case of resiting an Ir1 ingest server from MSFC to EDC for another Release A use.

<sup>4</sup>All Ir1 equipment is configured within a DCE cell (a distributed computing domain) administered from the EDF where DCE servers provide security, directory and other multi-site services. All Release A equipment will be similarly configured but administered from the System Monitoring and Coordination (SMC) facility at GSFC. It is not yet known if the two cells will exist in parallel during the transition or if Release A will reuse the Ir1 cell.

It should be noted that Ir1 capabilities could potentially be "rehosted" on the Release A COTS configurations, however, this was determined to likely lead to complications and potential contention between the Releases in the late 1996 timeframe.<sup>5</sup>

Despite the issues involved here, the objective is to make SSI&T services available to the ECS community for as long as possible with minimal gaps.

### **2.1.2 Ensure Interface Test Equipment Availability for TRMM Ground System I&T**

Another primary purpose for providing Ir1 is to support early integration and test of TRMM interfaces which include SDPF, TSDIS, SCFs, DAO and NOAA/NESDIS. As above, if Ir1 resources are reused by Release A, equipment would not be available to conduct TRMM ground system I&T activities that occur after Release A COTS installation in mid-1996. Consequently, additional resources are needed to complete Release A equipment installation and satisfy the objective of ensuring continued Ir1 interface test support past mid-1996.

### **2.1.3 Ensure Equipment Availability for Release A**

Satisfying the above objectives for maximizing Ir1 services has to be weighed carefully against the potential impact to Release A installation, configuration, test, training, acceptance, IV&V, and activation as well as ECS internal Release A activities in the Upper Marlboro EDF which require equipment.

## **2.2 Analysis Approach**

Our analysis considered all Ir1 and (pre-CSR-A) Release A usage requirements, assessed the equipment and support needs associated with them, and resolved contention issues amongst the cognizant parties. The approach to develop this plan was as follows:

1. Develop a detailed activity schedule for relevant Ir1 and Release A activities which require Ir1 and Release A system access to include:

- Ir1 site SSI&T tasks by ITs and DAACs

- EDF and Ir1 site ESDIS/IV&V testing (where stable/known)

- EDF and Ir1 site ECS usage:

  - ECS M&O pre-CSR-A COTS installation and test (including Ir1 deinstall plans)

  - Release A development in the EDF

  - Release B development (including EPs) in the EDF (TBD)

  - Release A I&T in the EDF and at sites

  - V0 migration benchmark testing in EDF

  - Toolkit 5+ development and test in EDF

  - Ir1 training, sustaining engineering, and M&O in EDF

  - IATO pre-CSR-A use in EDF and sites.

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<sup>5</sup>EDC is somewhat of an exception as discussed later in this paper.

2. Determine the service, hardware and support requirements for the above (including complexities involved in switching between Ir1 and Release A configurations)
3. Define the Ir1 hardware reuse plan by Release A (i.e., determine which Ir1 components are reused where and for what purpose in Release A).
4. Evaluate issues resulting from contention.
5. Develop and analyze proposed solutions, work-arounds, prioritizations/compromises, and recommendations along with proposed transition schedule.
6. Coordinate with cognizant parties through the White Paper process:
  - Draft transition plan white paper (previous paper)
  - Final plan (this paper).

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## 3. Activity Schedule and Requirements

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### 3.1 Activity Schedule

The Gantt chart in Figure 3-1 illustrates the salient activities which were considered to pose potential resource contention issues during the transition timeframe. Included are activities the Team identified for the following organizations:

- ECS Toolkit Developers (for Toolkit maintenance releases in 1996)

- ECS Testers (including Ir1 site testing and Release A internal and site testing)

- ECS Sustaining Engineers (support to Ir1)

- ECS M&O (support to Ir1 and Release A)

- ECS Science Office (including Ir1 SSI&T and Release A V0 migration efforts)

- ESDIS/IV&V (Ir1 component acceptance testing, IV&V and ESDIS SI&T of Ir1 interfaces).

The schedule includes an allocation of Ir1 equipment resources to the various activities. A key of the Resource Codes depicts the specific Ir1 equipment, both for site and EDF, which the organization requires for the activity. Where the same equipment is shown for two activities at the same time, a potential contention exists and is discussed in more detail in Section 5.

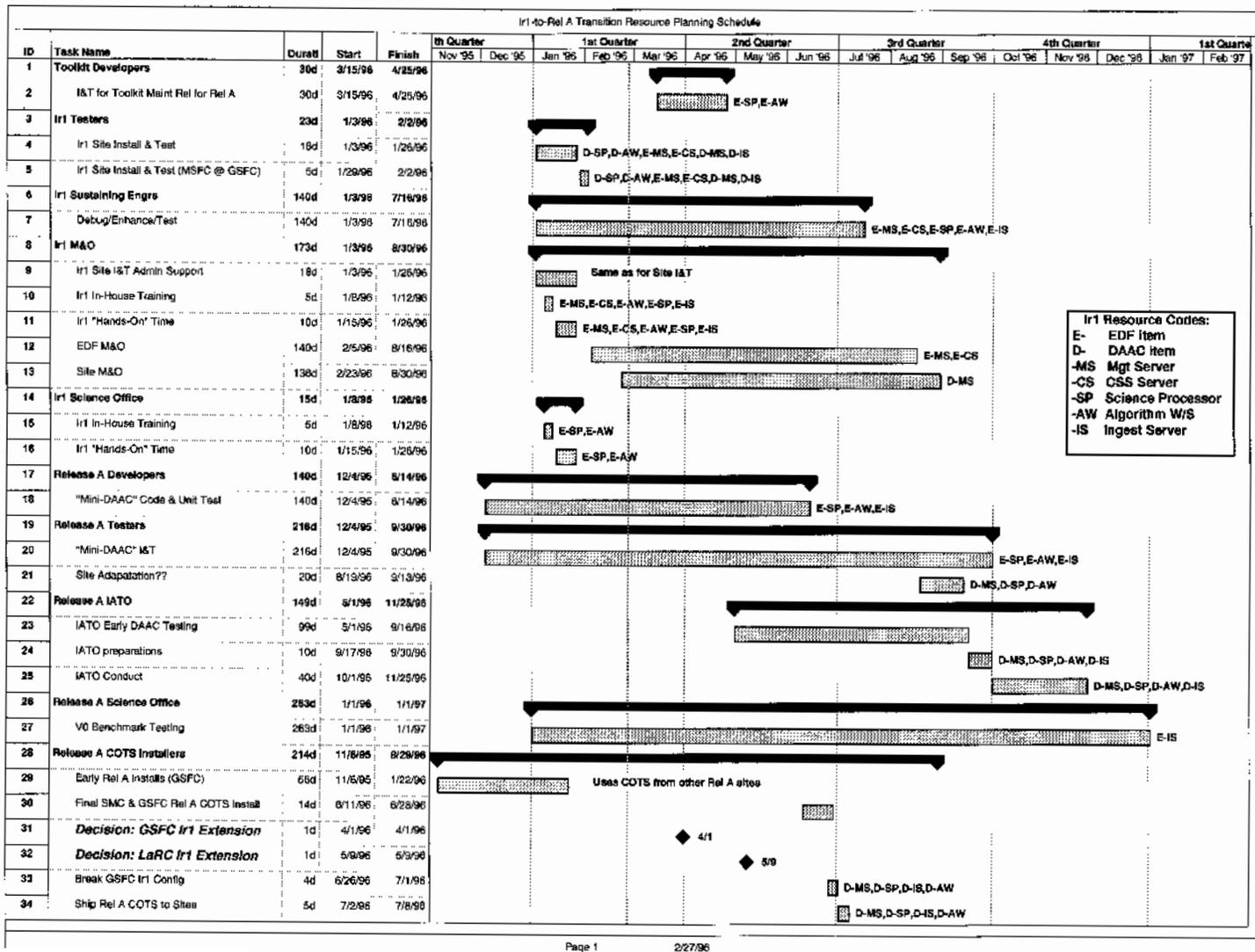


Figure 3-1. Irl-to-Release A Activity Schedule (1 of 2)

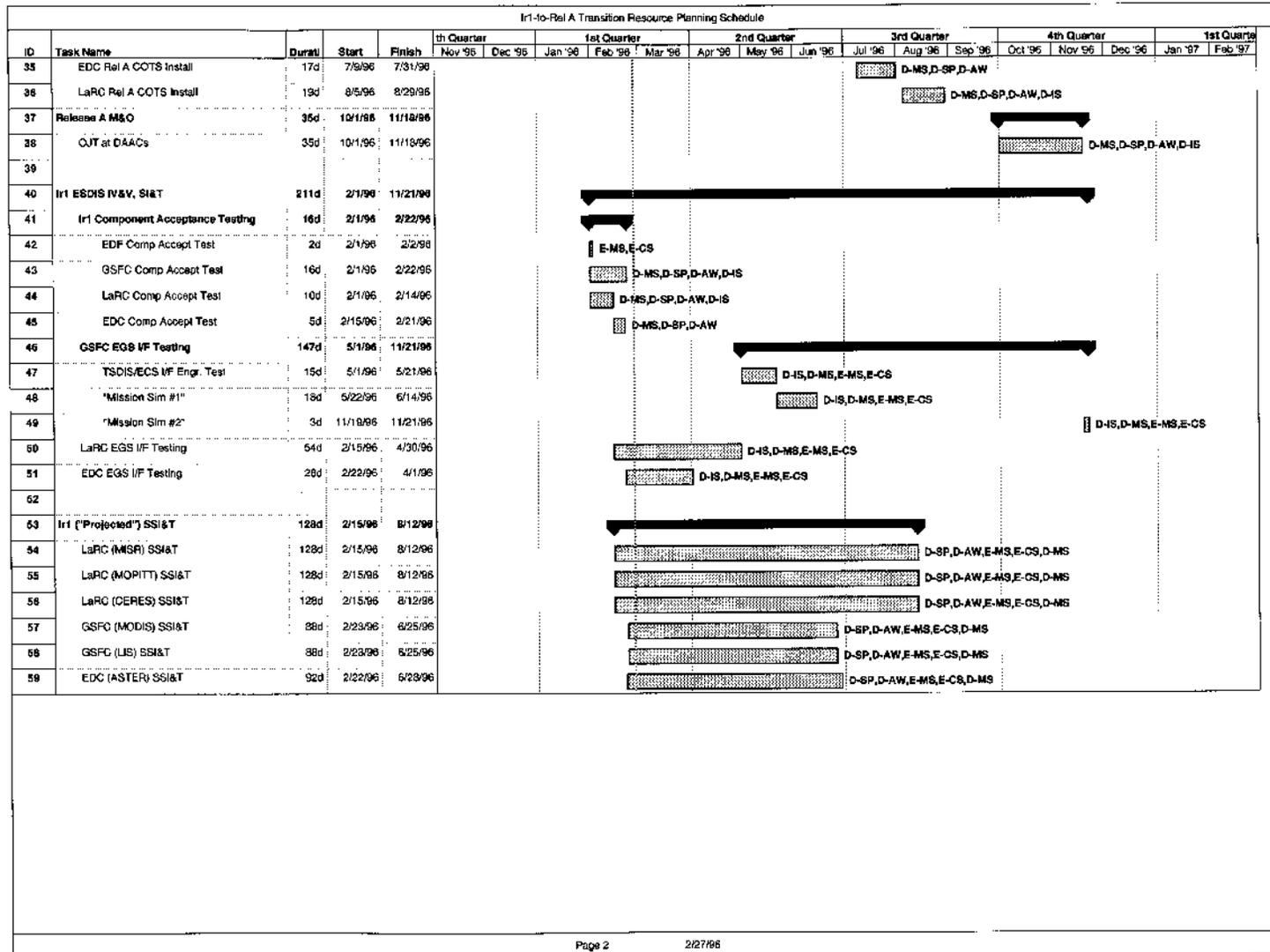


Figure 3-1. Ir1-to-Release A Activity Schedule (2 of 2)

## **3.2 Activity Requirements**

The following paragraphs discuss the activities shown in the schedule and highlights resource needs associated with them.

### **3.2.1 Toolkit Developers**

The ECS SDP Toolkit will be undergoing integration and test activities in 1996. One SCF Toolkit maintenance release has been planned during 1996 in support of Release A. We have shown one of these in the schedule as "I&T for Toolkit Maint Rel for Rel A." The resource requirements include the use of both the Science Processor and AI&T Workstation in their Release A configurations.

### **3.2.2 Ir1 Testers**

During January, 1996, Ir1 I&T will be conducting "Ir1 Site Install & Test" as shown on the schedule<sup>6</sup>. They will require access to both DAAC and EDF equipment in their Ir1 configurations. At the DAACs, the activity will go site-by-site in a serial fashion in the following order: GSFC, LaRC, EDC and MSFC at GSFC<sup>7</sup>. Their EDF equipment requirement includes only the CSS and MSS servers which provide Ir1-wide, multi-site DCE administration and monitoring<sup>8</sup>.

### **3.2.3 Ir1 Sustaining Engineers**

Beginning about Ir1 CSR, a small subset of Ir1 developers will be assigned to support Ir1 sustaining engineering. As indicated in the schedule their relevant activity is to "Debug/Enhance/Test" deployed Ir1 software until it is no longer used and/or replaced by Release A. We have arbitrarily shown this to occur through mid-July 1996--the actual end date may be December, 1996, should ESDIS elect to procure additional required hardware as described in Section 2.1.1 and 2.1.2 to prolong Ir1 service. They will require access to various combinations of Ir1-configured resources in the EDF (current plan), both stand-alone and fully integrated based on the nature of the maintenance and regression testing that is deemed appropriate.

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<sup>6</sup>Due to the late-1995 Government furlough, some slippage can be expected to these dates.

<sup>7</sup>Ir1 MSFC DAAC equipment will be installed at the GSFC.

<sup>8</sup>ECS plans to install these servers on the "pseudo-production network" within the EDF, so contention is not expected to be a problem. In our Upper Marlboro facility, we have local EDF networks and an Ethernet which connects us to the GSFC network. The GSFC Ethernet is called the pseudo-production (or pseudo-operations) network because the EPs are moved over there when they are released to the tire kickers. This prevents I&T activities from interfering with hosts in the pseudo-production environment as well as improving performance (no connection through Hughes, California). The MSS and CSS host will be moved from the EDF networks to the GSFC Ethernet after I&T and the hosts will be replaced with new boxes within the EDF.

### **3.2.4 Ir1 M&O**

Aside from supporting ESDIS and IV&V (discussed in section 3.2.12 and shown in the schedule as "Support Ir1 IV&V Comp Accept Testing"), Ir1 M&O requires access to Ir1-configured equipment for the following activities:

"Ir1 Site I&T Admin Support"

"Ir1 In-House Training"

"Ir1 'Hands-On' Time" to take place following training (now planned) in the EDF (two weeks of system time to practice what's learned in training).

Site I&T support will be provided by Ir1 M&O to configure and test COTS including the DCE cell, during site I&T in January. In-house training for other M&O personnel not traveling to the sites with I&T will likely require full-time access to EDF equipment configured as Ir1 will be at the sites. Finally, "hands-on" time can likely be considered to require less full-time access at the EDF, however, it is still considered an important Ir1 activity.

### **3.2.5 Ir1 Science Office**

Aside from supporting ESDIS and IV&V (discussed in section 3.2.12 and shown in the schedule as "Support Ir1 IV&V Comp Accept Testing"), the Science Office requires access to Ir1-configured equipment for the following activities:

"Ir1 In-House Training" to take place January 8 through 12, 1996 (now planned) in the EDF

"Ir1 'Hands-On' Time" to take place following training (now planned) in the EDF (two weeks of system time to practice what's learned in training).

#### **3.2.5.1 LaRC DAAC SSI&T (CERES, MISR and MOPITT)**

Ir1 SSI&T activities at the Langley DAAC are currently scheduled and as shown in the schedule as:

"LaRC (CERES) SSI&T

LaRC (MISR) SSI&T

LaRC (MOPITT) SSI&T."

#### **3.2.5.2 GSFC DAAC SSI&T (LIS)**

Ir1 SSI&T activities at the Goddard DAAC for LIS are currently scheduled and as shown in the schedule as:

"GSFC (LIS) SSI&T."

#### **3.2.5.3 GSFC DAAC SSI&T (MODIS)**

Ir1 SSI&T activities at the Goddard DAAC for MODIS are currently scheduled and as shown in the schedule as:

"GSFC (MODIS) SSI&T."

#### **3.2.5.4 EDC DAAC (ASTER)**

Ir1 SSI&T activities at the Eros Data Center DAAC for ASTER are currently scheduled and as shown in the schedule as:

"EDC (ASTER) SSI&T."

#### **3.2.6 Release A Developers**

Release A developers will use the EDF "Mini-DAAC" configuration for unit testing and debugging with about a 25% usage level planned to start in 12/95. This activity will be in parallel with Release A I&T activities. The schedule shows this activity as "Mini-DAAC Code and Unit Test."

#### **3.2.7 Release A Testers**

The main Release A in-house I&T activity will require the EDF in its Release A "mini-DAAC" configuration with about a 50% usage level planned to start in 12/95. The schedule shows this activity as "Mini-DAAC I&T." This Release A testing will comprise three phases:

Phase 1 test 12/95 - 2/96

Phase 2 test 3/96 - 5/96

Phase 3 test 6/96 - 9/96.

Specific equipment allocations are not available at this time, so all EDF resources have been assumed for this analysis. In fact Phase 1 equipment needs may turn out to be simpler than later phases. Few Phase 1 tests require a science processor, and many Phase 1 test activities need only stand-alone configurations. During Phases 2 and 3, more tests require the full mini-DAAC configuration.

The Release A Test Procedures (containing revisions to test cases presented in the PDR-era Test Plans) were made available in November 1995.

#### **3.2.8 Release A Independent Acceptance Test Organization (IATO)**

The following activities are shown in the activity schedule for ECS IATO:

"IATO preparations" as discussed in 3.2.8.1

"IATO early DAAC testing" as discussed in 3.2.8.2

"IATO Conduct" as discussed in 3.2.8.3.

##### **3.2.8.1 Acceptance Test Preparation**

ECS independent acceptance test preparation is conducted at the EDF. First, an inventory of all resources needed to perform acceptance tests is taken. Early in this phase, an attempt is made to execute critical acceptance test sequences and test cases to insure that any major problems are found at the EDF where they are most easily corrected. In the final phases of integration and

testing prior to CSR-A, additional walk-throughs of the entire test procedure are conducted at the EDF to ensure proper format, contents, and completeness of the test scenario coverage.

All acceptance test procedures are completed prior to CSR-A. After a successful CSR-A is completed, a System Operational Readiness Review (SORR-A) is conducted to determine each site's availability and readiness for acceptance testing activities.

### **3.2.8.2 Early DAAC Testing**

Since the DAAC hardware for use at the SMC, GSFC, LaRC, and EDC sites will be delivered and installed early at the GSFC, IATO is now also planning system time there during the four month period prior to CSR-A. This usage would give the IATO additional experience at a DAAC-like site, which will translate into smoother on-site walk-throughs and acceptance tests. The expected benefits are three fold, first it follows up the EDF testing, second it relieves Release A contention for resources by the developers and I&T folks, and third it is an opportunity to test in a configuration that more closely resembles the site for which the hardware is destined.

### **3.2.8.3 Acceptance Test Conduct**

Current plans call for conducting Release A acceptance testing during the two month period following the CSR-A.

## **3.2.9 Release A COTS Installers**

The following activities are shown in the activity schedule for COTS installations:

- "Early Rel A Installs (GSFC)" as discussed in 3.2.9.1
- "Final SMC & GSFC Rel A COTS Install" as discussed in 3.2.9.2
- "Break GSFC Ir1 Config" as discussed in 3.2.9.3
- "Ship Rel A COTS to Sites" as discussed in 3.2.9.3
- "LaRC Rel A COTS Install" as discussed in 3.2.9.4
- "MSFC Rel A COTS Install" as discussed in 3.2.9.4
- "EDC Rel A COTS Install" as discussed in 3.2.9.4.

### **3.2.9.1 Early Release A Installation at GSFC**

This activity includes installation of the FDDI LAN and the COTS hardware and software for the SMC and GSFC DAAC. These will be internally networked (no current planned connectivity with the outside at this stage) and available for use in testing or other uses to be determined by ECS/ESDIS. Prior to the planned installation date, the development organization, Science Office, and/or IATO must define the configurations based on the planned interim use of these systems. System and network administration of these systems can be provided, to a limited extent, by the two Ir-1 operations personnel. However, the reconfiguring and scheduling of these resources will have to be determined by the using organizations and M&O. Following are the planned initial

installation dates for Release A systems at GSFC<sup>9</sup> (i.e., for the "early buy" scenario shown rolls-up as a single activity on the activity schedule):

SMC and GSFC DAAC install: 11/3 through 12/21/95

LaRC install: 12/22/95 through 1/4/96

MSFC (at GSFC) install: 1/5 through 1/17/96

EDC install: 1/18 through 1/22/96.

Installation resources will consist of two installation teams of 3 personnel each. These teams will install Release A systems at GSFC when EDF "Urgent Needs," DAO, Ir-1, and Mini- DAAC installations are completed. Installations of the LaRC, MSFC, and EDC equipment at GSFC will include installation, burn in, and test of the hardware only. These configurations will not be networked, but installed as stand-alone systems.

### **3.9.2.2 Final SMC and GSFC Release A COTS Install**

In the mid-June timeframe, the final Release A COTS purchases will be in-hand and final configurations will begin being made. At this point in time, the SMC and GSFC, first in the installation order (current plan), will be complete as if the "early buy" had not made a prior configuration available.

### **3.9.2.3 Break GSFC Ir1 Configuration and Ship Release A COTS to Sites**

In order to proceed with Release A COTS installations at the other 3 DAACs, the hardware in the GSFC Ir1 configuration is needed and originally would be broken down in mid-June. The Release A GSFC DAAC, as other Release A DAACs, reuses the Ir1 equipment, so in order to install Release A COTS, the Ir1 configuration set-up must be broken down. The "early buy" enabled the two GSFC DAACs to exist in parallel through May by using additional hardware from the other DAACs whose equipment was staged there.

All (non-SMC/GSFC) Release A COTS at GSFC will be shipped to sites 4 to 5 days prior to the scheduled installation date to coincide with installation team arrival at each site.

If ESDIS elects to give ECS appropriate direction to procure additional equipment well enough in advance of this time, as described earlier in 2.1.1 and 2.1.2, the breaking of the Ir1 configuration could be deferred or limited to only those components not needed past this timeframe.

### **3.9.2.4 Release A DAAC COTS Installations**

This activity includes the installation and testing of the FDDI LANs and COTS hardware and software. The systems are tested to verify that components are operational and properly networked. The current installation schedule is shown in the activity schedule to commence with GSFC in June and complete with EDC in late-August. The installations occur serially with one

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<sup>9</sup>EOC installation is not addressed in this paper due to its non-relevancy to Ir1 to Release A transition planning.

installation team and must be completed no later than 30 days ahead of Release A CSR (ECS management-imposed float period).

### **3.2.10 Release A M&O**

Release A M&O does not require access to equipment until an on-site, on-the-job training ("OJT") activity shown after CSR-A.

Aside from supporting ESDIS and IV&V (see section 3.2.12) the Science Office requires access to Ir1-configured equipment for the following activities:

"Ir1 In-House Training" to take place January 8 through 12, 1996 (now planned) in the EDF

"Ir1 'Hands-On' Time" to take place following training (now planned) in the EDF.

The training will likely require full-time equipment access configured as Ir1 will be at the sites. The later "hands-on" time can likely be considered to require less full-time access, however, it is still considered an important Ir1 activity.

### **3.2.11 V0 Migration (EDF Benchmarking)**

A V0 Migration activity will be carried out by the ECS Science Office throughout the 1996-7 timeframe. Collection-specific code development will be done on separate, dedicated equipment. An "EDF V0 Benchmark Testing" activity, however, needs to utilize the Release A EDF Ingest and Data Server.

Approximately 4-6 tests per week at approximately 1-2 hours per test will be needed after the I&T of the needed Ingest and Data Server capabilities<sup>10</sup>. Dedicated EDF equipment time is not required, but daytime access is preferred as this will be the normal schedule of the staff involved in the V0 migration effort. The benchmark testing will be coordinated with the Release A Ingest and Data Server I&T needs.

### **3.2.12 Ir1 ESDIS IV&V, EGS I/F Testing and SSI&T**

The schedule includes known "Ir1 Component Acceptance Testing, site EGS I/F testing, and "Ir1 ("Projected") SSI&T activities along with assumed resource requirements.

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<sup>10</sup>As mentioned earlier for Release A I&T, the details of the test phasing are still in work as described in the November, 1995, Draft Test Procedures. For simplicity, we have shown the V0 Migration benchmark testing as commencing in January, 1996, although Data Server and Ingest might actually not be available until sometime later in the Release A test program.

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## 4. Hardware Reuse Plan

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Figures 4-1 through 4-6 illustrate the Release A hardware configuration for the EDF, SMC and each DAAC site (GSFC, LaRC, MSFC, and EDC). The white boxes represent Ir1 hardware which is reused in the Release A architecture. The gray boxes represent new Release A hardware. When a hardware box is white and gray, this indicates reused Ir1 hardware which is upgraded (the gray area) to a more powerful machine.

For example, the Ir1 Science Processor in the SPRHW CI at the GSFC DAAC will be upgraded with an additional 8 CPUs and reused for Release A. The 8mm Tape Stacker, SGI RAID, and X-Terminals will also be reused.

The Ir-1 MSFC Ingest server will be moved to EDC and become the EDC Ingest Server for Release A. The MSFC server is replaced with redundant servers with more capacity.

Although the figure does not show, at LaRC, the Ir-1 Ingest Server gets upgraded and becomes the LaRC Release A QA Workstation (in the AQAHW).

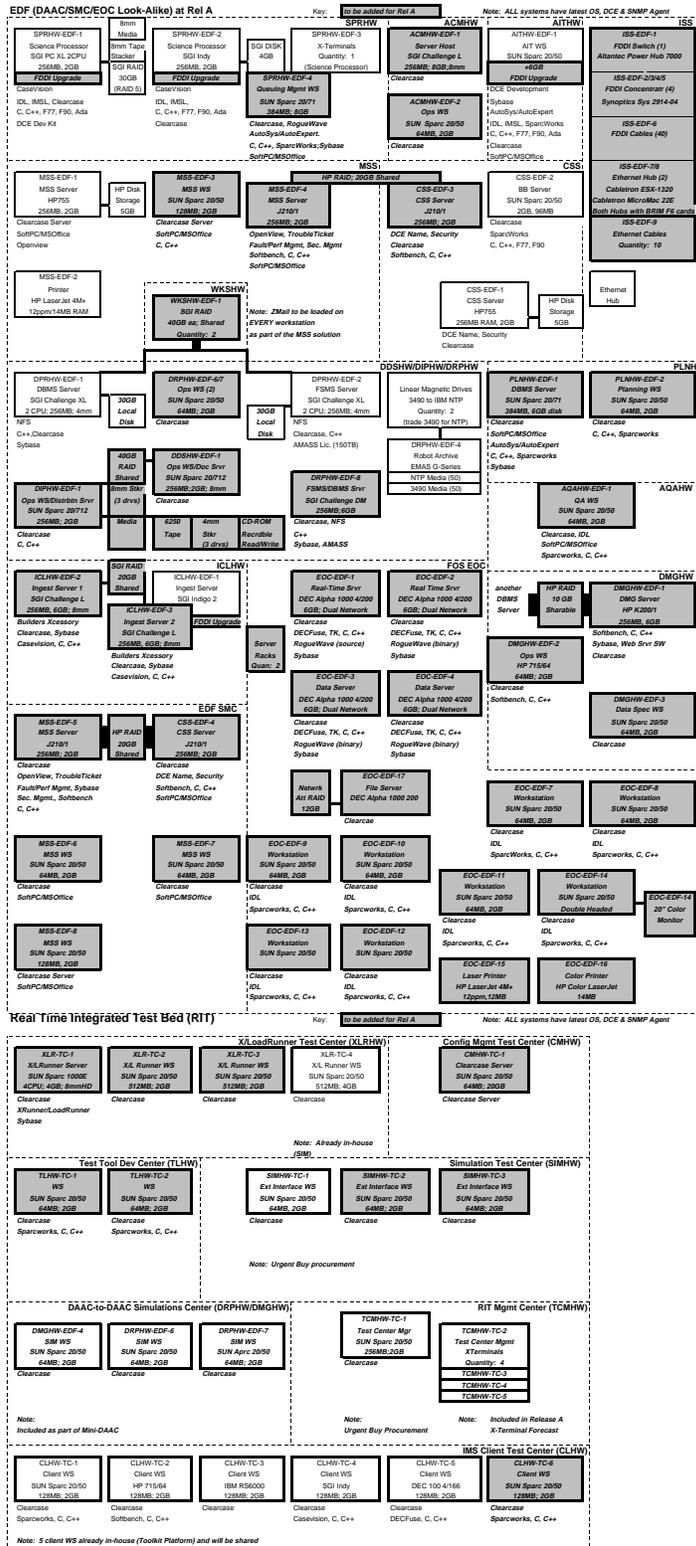


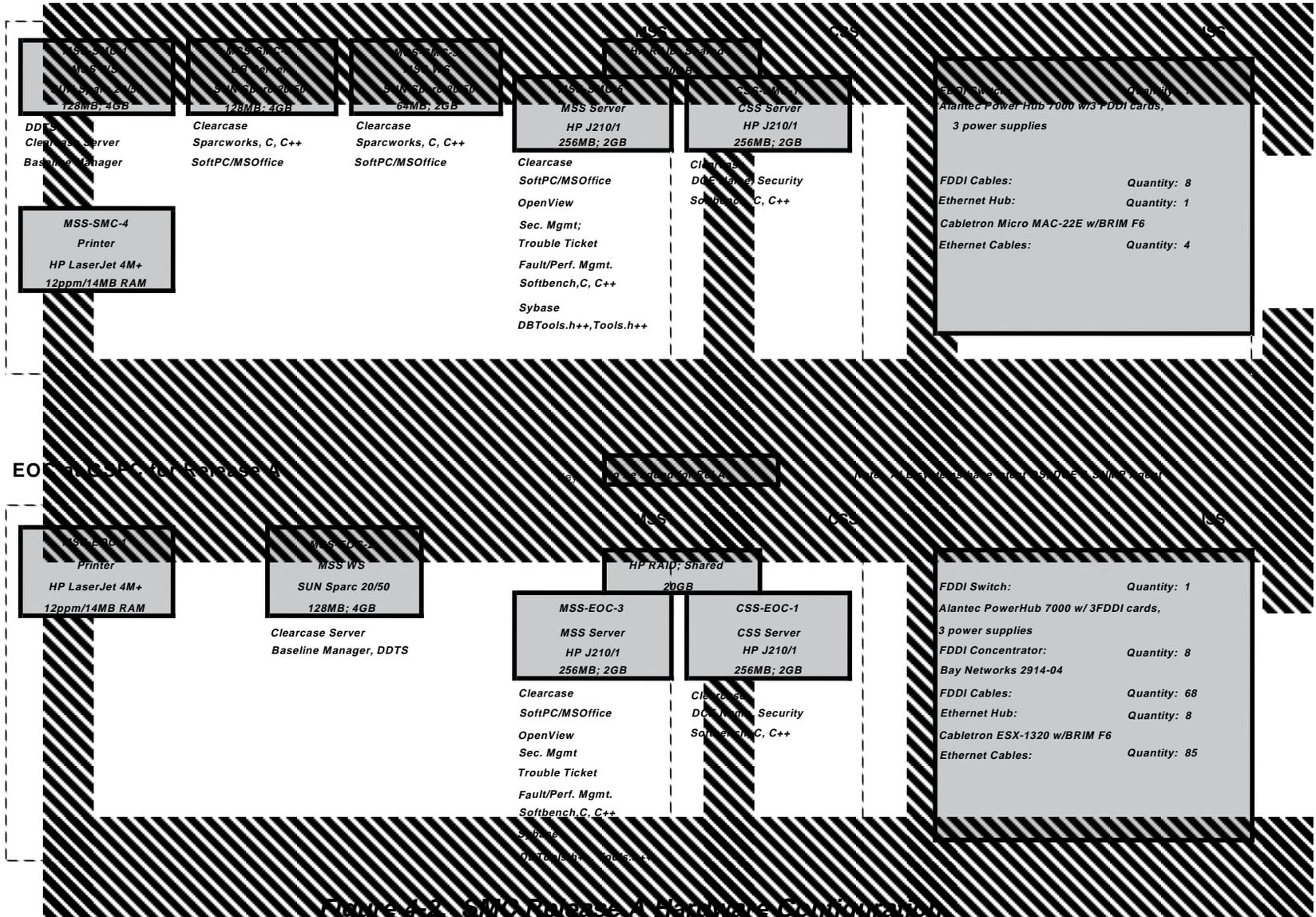
Figure 4-1. EDF Release A Hardware Configuration

**SMC at GSFC for Release A**

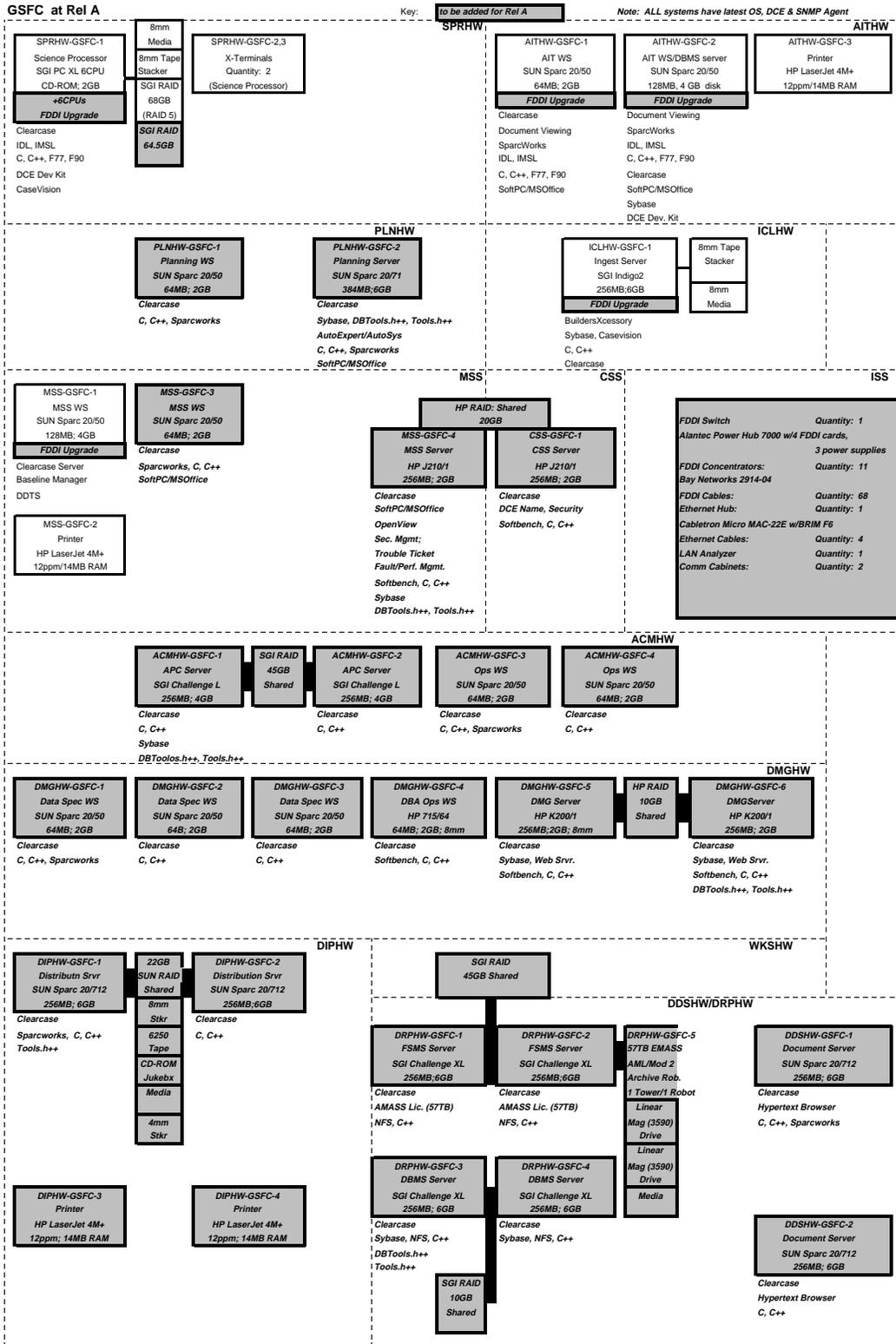
Key:

**to be added for Rel A**

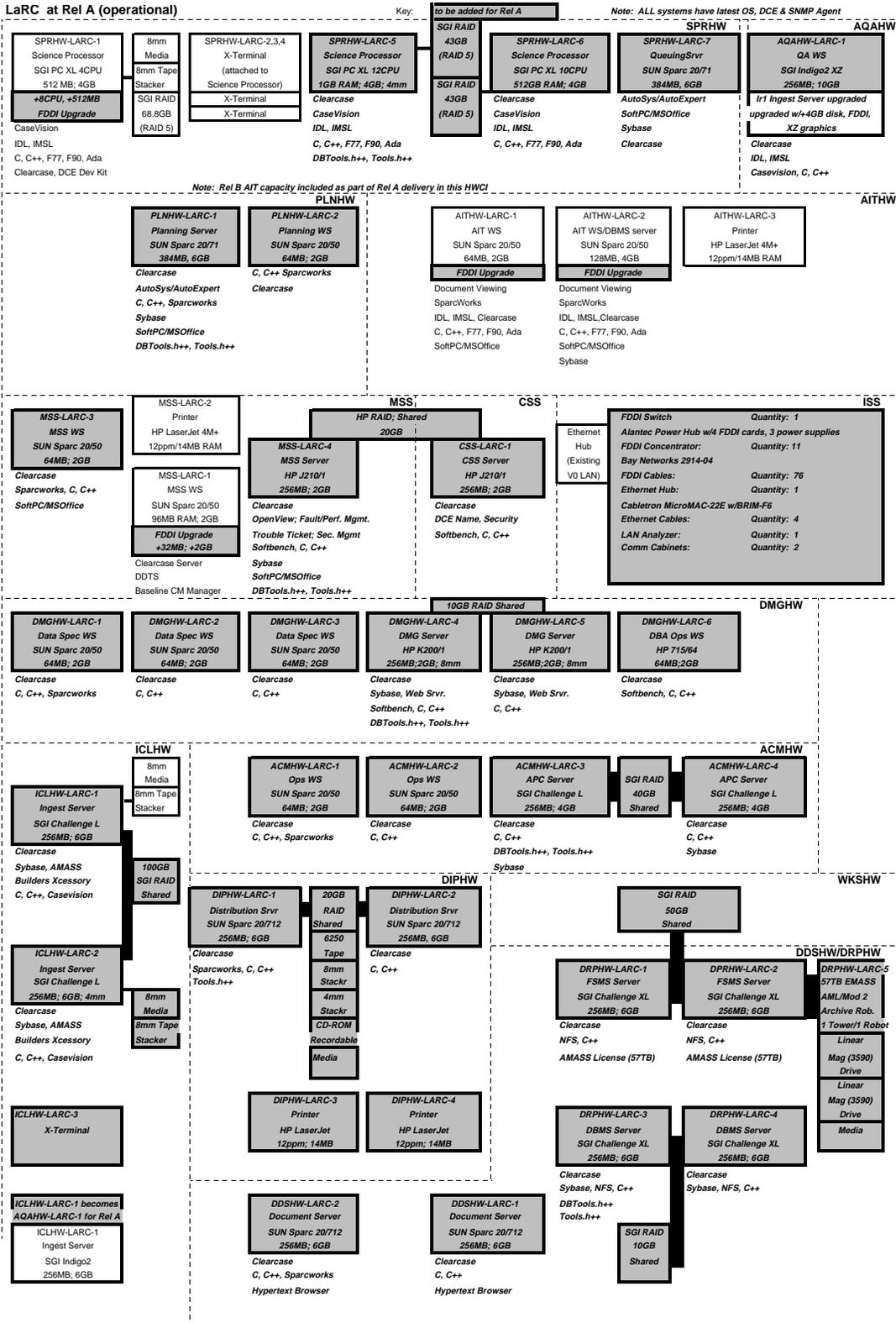
Note: ALL systems have latest OS, DCE & SNMP Agent



**Figure 4-2. SMC Release A Hardware Configuration**



**Figure 4-3. GSFC DAAC Release A Hardware Configuration**

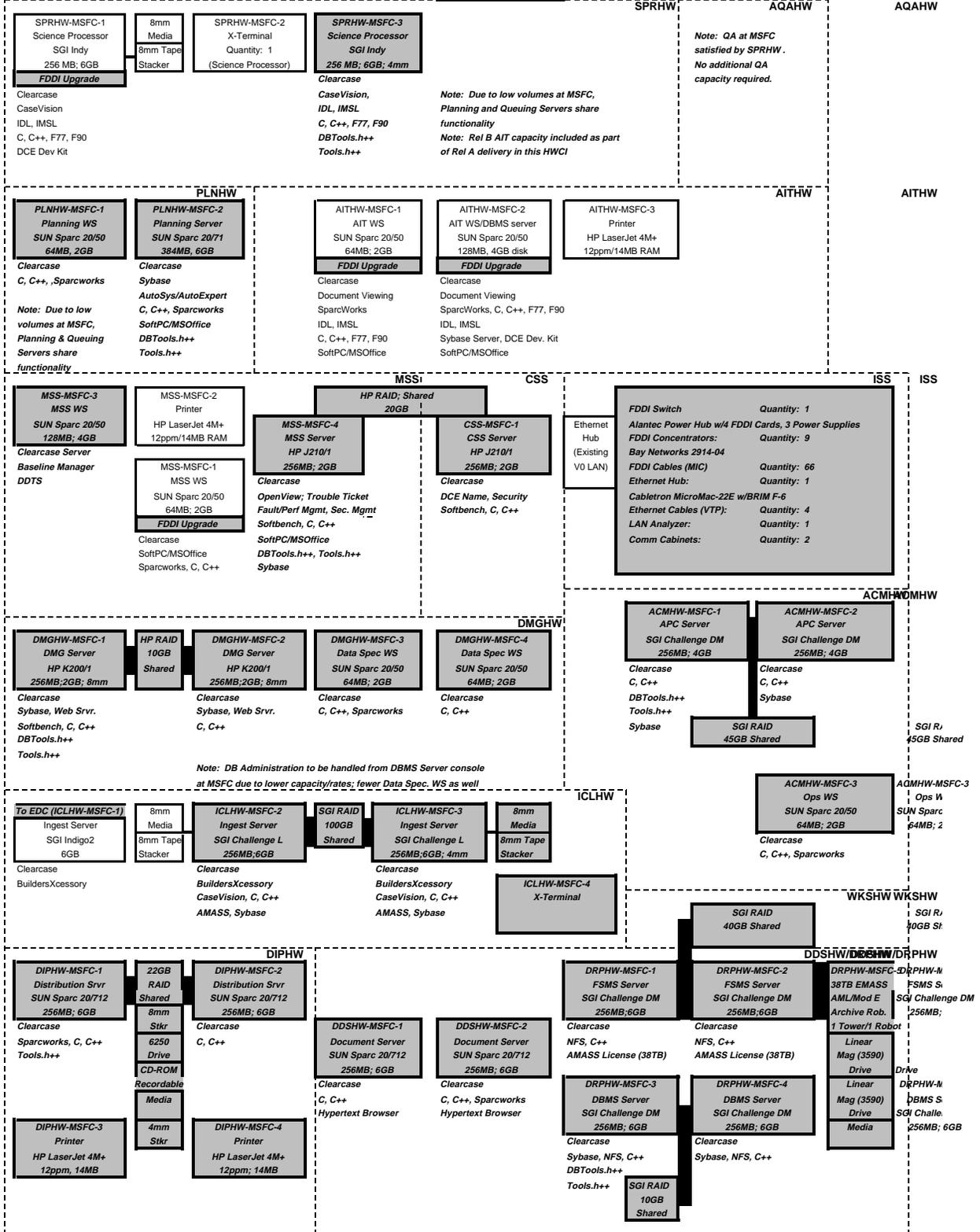


**Figure 4-4. LaRC DAAC Release A Hardware Configuration**

**MSFC at Rel A (operational)**

Key: **to be added for Rel A**

Note: ALL systems have latest OS, DCE & SNMP Agent



**Figure 4-5. MSFC DAAC Release A Hardware Configuration**



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## 5. Analysis of Issues, Solutions, and Recommendations

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In this section we analyze the activity schedule presented in Section 3 and discuss potential solutions for cases where the same equipment is required by more than one organization at the same time (i.e., contentions). By sorting the activity schedule to show all users of a particular resource, we were able to review the potential contentions on a month-by-month basis and assess solutions and recommendations.

### 5.1 EDF Resource Contentions

Within the Upper Marlboro EDF, Ir1 equipment is used by a number of organizations in both an Ir1 and Release A configuration throughout most of 1996. The following paragraphs review this use for each EDF resource where appropriate.

The primary EDF reuse issues to be addressed include the following:

- A means is needed to share the equipment amongst the Ir1 sustaining engineers (in the Ir1 configuration) and Release A organizations (in the Release A configuration) through the first half of 1996.<sup>11</sup>
- A means is needed to provide full time access to the equipment for the Ir1 Science Office and M&O organizations in support of their training for three weeks in January despite the need to also make it available to the Release A organizations which also require it.

#### 5.1.1 Sharing Equipment Between Ir1 Sustaining Engineering and Release A in the EDF

Despite its unpredictability, we would expect the Ir1 sustaining engineering activities to be heavily "front-loaded" (bugs fixes and enhancements will tend to trail off over time with most of the effort in January and February). We also expect the nature of most of these early activities to require limited and intermittent system time. In essence, getting to the system in most cases should be workable even during shared daytime shifts.

Despite the best case situation described above, Ir1 is a distributed system and certain activities may involve the E-SP and E-AW to be in their Ir1 configurations and be administered by the E-MS and E-CS to perform regression tests. It is expected to be a tedious and time-consuming task to reconfigure the equipment between Ir1 and Release A to handle such cases (we expect that different versions of software<sup>12</sup> and differing DCE cell configurations<sup>13</sup> for Ir1 and Release A will make this reconfiguration inefficient particularly given the inability to plan for unknown Ir1 sustaining engineering activities).

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<sup>11</sup>Release B development is expected to begin in 2Q96. For this analysis, we have assumed future Release B COTS purchases would be adequate to preclude EDF contentions between Ir1, Release A and Release B in mid-1996.

<sup>12</sup>One case is Autosys. For Ir1, an early version is being used which runs on Irix 6.1 whereas for Release A a later version will not run on Irix 6.1 until the middle of 1996.

<sup>13</sup>Ir1 is administered from DCE servers on the EDF "pseudo-production" network whereas Release A will probably be administered from SMC DCE servers, see Section 6.2.

Instead of trying to "bump" and unexpectedly delay Release A users, **we plan to conduct Ir1 sustaining engineering activities which would require EDF reconfiguration be carried out at Ir1 DAACs, where available.** For example, in January when we would expect the highest amount of bug fixing, Ir1 sustaining engineering will make use of the Ir1 GSFC or LaRC DAAC once Ir1 I&T have completed their site tests there. In later months, these sites would also be used in between ESDIS IV&V, ESDIS SI&T and SSI&T activities or during second shift there if need be.

### **5.1.2 Supporting Ir1 Training and Release A in the EDF**

Unlike an unpredictable sustaining engineering need, full-time access to the EDF equipment in its Ir1 configuration is required in support of training for Ir1 M&O and Ir1 Science Office personnel through most of January. However, we already have discussed the various Release A organizations' needs in this same timeframe.

As above, the solution involves already installed and tested Ir1 DAACs. Specifically, **we plan to conduct Ir1 training in January which would require EDF reconfiguration be carried out at the Ir1 GSFC DAAC.**

### **5.1.3 Toolkit Maintenance Release Testing at Release A GSFC "Early" DAAC**

To reduce EDF contentions among Release A organizations, **we plan to conduct Toolkit Maintenance Release I&T on the Release A GSFC "Early" DAAC.** This equipment is not currently planned for other use in this timeframe.

### **5.1.4 EDF Scheduling and Control**

To reduce EDF contentions among the Release A organizations, careful scheduling and control of use will be necessary. We have already established a lead organization to manage this, MRS' Development Environment Group, and are now setting-up scheduling processes for system use.

## **5.2 DAAC Resource Contentions/Issues**

At the DAACs, activities are generally serial, so multi-organizational contentions are not a problem.<sup>14</sup> The series of activities to take place is summarized as follows:

- Ir1 COTS installation (prior to Ir1 CSR)
- Ir1 site I&T by ECS (just after Ir1 CSR)
- ESDIS IV&V component acceptance testing on Ir1
- ESDIS SI&T and IT/DAAC SSI&T using Ir1 (may be conducted in parallel without interference)

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<sup>14</sup>ESDIS, ITs and DAACs have been working on a serial scheduling of the Ir1 DAAC equipment for each science software delivery (see Section 3.2.5).

- Ir1 deinstall/Release A COTS install <sup>15</sup>
- Release A site I&T/adaptation
- Release A IATO preparation (just prior to Release A CSR)
- Release A IATO conduct (following Release A CSR)
- ESDIS IV&V component acceptance testing on Release A.

The primary issue to be addressed is the impact of the Ir1 deinstall/Release A COTS install. Due to the reuse of Ir1 equipment by Release A, when the Release A COTS is installed, the Ir1 configuration at the DAAC is (potentially) no longer available.

### 5.2.1 Release A COTS Installation Changes

To satisfy several of the planned SSI&T dates, **we have already planned for the installation order be changed to do GSFC, EDC, then LaRC.** It offered the advantage of increasing the availability of the Ir1 configurations for supporting planned SSI&T activities at all sites.

### 5.2.2 Rehost Ir1 on Release A at EDC

**We plan to rehost the Ir1 configuration on the Release A EDC DAAC COTS installation.** EDC is an exception to the other Release A DAACs. There are only limited changes to the Ir1 configuration involving processor upgrades and reuse of the relocated Ir1 MSFC D-IS. Though such reconfiguration was described as tedious and time-consuming earlier in Section 5.1.1, it may not necessarily be as complex in this instance.

### 5.2.3 Procure Additional Release A COTS

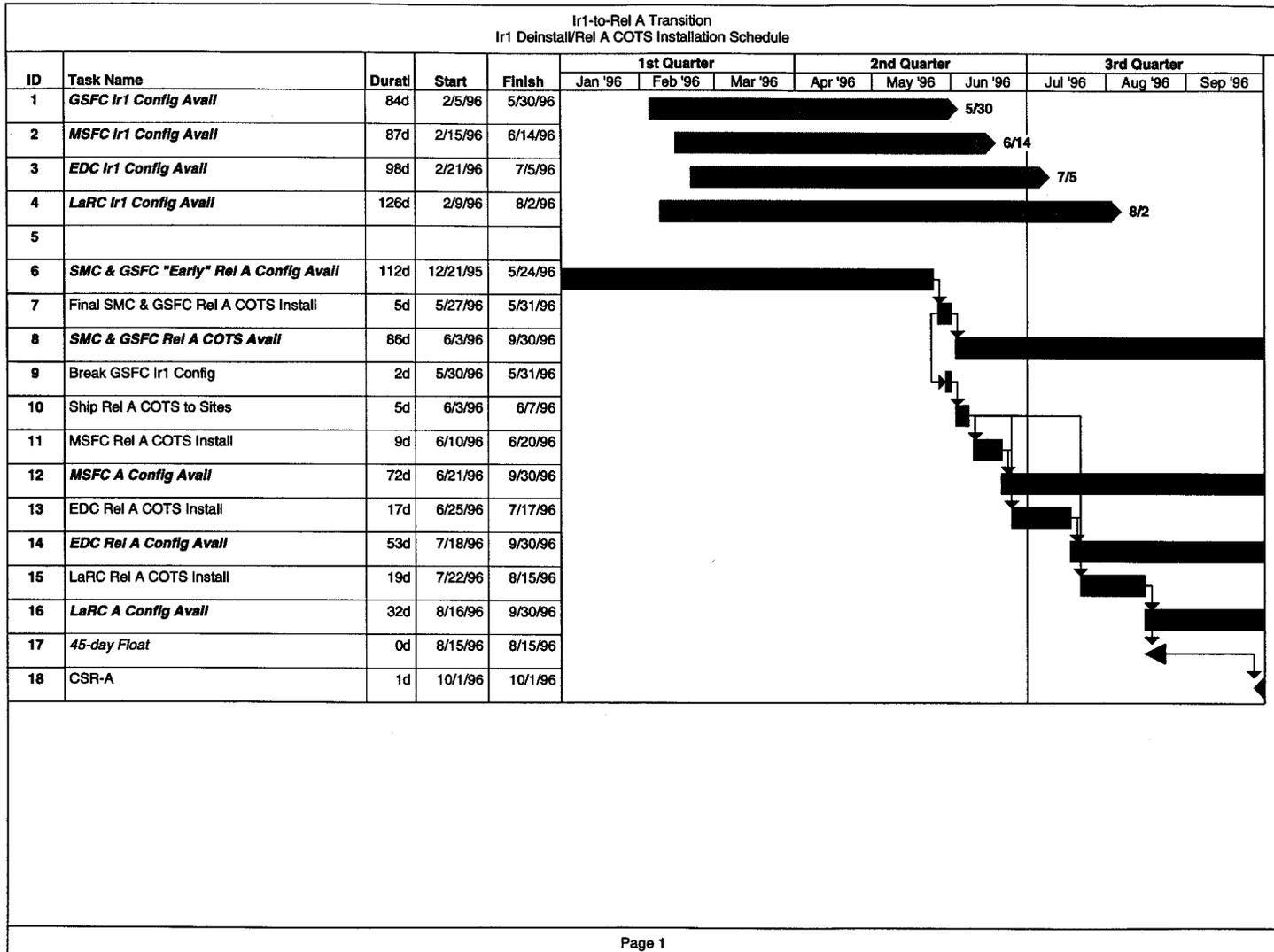
Although the above plans enable supporting the planned SSI&T activities at the DAACs, we are aware of the likelihood of unplanned ones as well. For example, it is conceivable that the ESDIS SI&T schedule could slip and/or that some ITs and DAACs would wish to conduct tests while Release A is undergoing several months of non-availability (i.e., during the pre-CSR-A "float," Release A site I&T/adaptation, IATO preparation and conduct, IV&V and SI&T)--Release A is essentially unusable between mid-August 1996 and mid-January 1997.

ESDIS requested ECS to plan for "decision points" as late as possible in 1996 whereby direction could be provided to buy additional COTS (for Release A COTS installation) in lieu of reusing Ir1 (and thus impacting its continued service). These points are planned 62 days ahead of the planned Release A installations for GSFC and LaRC as shown in Figure 5-1.

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<sup>15</sup>Unless additional Release A COTS components are procured to extend Ir1 services.

Figure 5-1. Ir1 Deinstall/Release A COTS Installation Schedule



## 6. Miscellany

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This section is intended to address loose ends and other transition-related issues.

### 6.1 Ir1 Scripts and Queries Migration to Release A

Though not a fallout of resource-related schedule analysis provided elsewhere in this paper, there is a data migration problem between Ir1 and Release A. During Ir1 use, we expect a number of data items to be developed which will be of value to Release A. These include items such as COTS configuration files, scripts, and queries that are developed and/or refined during Ir1 SSI&T and interface testing as well as M&O monitoring at the EDF. Some specific examples are:

- Unix shell scripts for spawning processes related to SSI&T for specific instruments
- Autosys set-ups
- Sybase queries and reports
- Historical records of events, discrepancies, SSI&T reports, etc.
- HP OpenView viewing and reporting set-ups (macros, eMail links).

This current plan for getting these items from Ir1 to Release A is to capture them prior to Ir1 deinstall. Release A I&T will take at least the purely COTS Ir1 "scripts" (for lack of a better term) and migrate/install them into the Release A site configurations as part of a pre-CSR-A site adaptation activity. This will occur for about a month, either completely prior to or during the 2-week pre-CSR IATO site walkthroughs/dry runs. Custom-oriented Ir1 "scripts" (e.g., tailoring of the Ir1 AI&T Manager for instrument-specific SSI&T) will be remotely collected from the Ir1 sites by Release A I&T at the time of Release A DAAC COTS install--so as not to be lost--and brought back to the EDF for possible migration/integration into the Release A test baseline as appropriate. In some cases, it may be left to IATO to install the custom "scripts" after CSR-A.

### 6.2 DCE Cell Migration/Transition

The approach in migrating the Ir1 DCE cell to Release A is driven by cost and complexity factors. Concurrent operation of two separate DCE cells (Ir1 and Release A) would require:

- Additional hardware to be installed
- Specific configurations maintained for each cell (directories, servers, clients, etc.)
- Additional M&O staff to administer both cells.

To minimize the impacts of cost and complexity in administering two DCE cells, **we plan to maintain the Ir1 DCE cell (named "ecscell.eos.nasa.gov") and transition it to support Release A activities as the new hardware is configured into the cell.** Rehosting Ir1 in the Release A cell mitigates the aforementioned cost and complexity factors.

There will be no M&O staff at the SMC for the early Release A install, hence both activities (Ir1 and A) would be initially monitored and administered by the same staff located at the EDF. For example, HP OpenView will be configured at the EDF to monitor all hosts both for Ir1 and "early" Release A. Release A M&O staff located at the EDF will have remote access to configure and install all hosts. Since all versions of DCE and OODCE (1.0.3) are unchanged between the Ir1 and Release A cells, there will be no impact on the transition and rehosting of Ir1 hosts into the Release A cell. Common DCE services such as the Cell Directory Service (CDS) and the Security Service will assist in uniquely registering Ir1 and Release A processes, servers, clients, etc. thus permitting concurrent operations.

### **6.3 Ir1 DAAC Scheduling**

It is obvious from this analysis that Ir1 will have many users through the period in question. **We recommend that there be a designated lead organization responsible for scheduling all deployed Ir1 use.** It is envisioned that the results of this transition planning be adopted, baselined and controlled when completed.

## 7. Summary

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We have completed the steps of our approach as outlined in Section 2.2. We have developed the activity schedule for the transition period (Section 3), examined Ir1 equipment's reuse by Release A (Section 4) and evaluated contention issues and made key plans for the transition period, including ESDIS decision milestones for deciding if Ir1 is to co-exist with Release A (Sections 5 and 6). These include the following:

- Ir1 sustaining engineering activities which would otherwise require EDF reconfiguration, will be carried out at Ir1 DAACs, where available
- Ir1 training in January which would require EDF reconfiguration will be carried out at the Ir1 GSFC DAAC
- Toolkit Maintenance Release I&T will be done on the Release A GSFC "Early" DAAC
- The installation order was changed to do GSFC, EDC, then LaRC to prolong Ir1 services
- The Ir1 configuration will be rehosted on the Release A EDC DAAC COTS installation
- Decision milestones were planned to allow additional equipment to be purchased to prolong Ir1 services if need be
- We will maintain the Ir1 DCE cell (named "ecscell.eos.nasa.gov") and transition it to support Release A activities as the new hardware is configured into the cell
- We recommended that there be a designated lead organization responsible for scheduling all deployed Ir1 use (and have proposed a process to ESDIS).

We are now delivering this final version of our Ir1 to Release Transition Plan to complete the coordination process. The proposed transition schedule, Figure 5-1, reflects the essence of where we are at this juncture.

This paper has presented a useful array of material relevant to getting our transition planning in order. It is hoped this will stimulate thought and dialog to refine and ultimately baseline these plans.

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# Appendix A. Update Summary

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## A.1 Purpose

This appendix is intended to summarize the events that have occurred and the decisions that have been made since the Draft version of the Interim Release 1 (Ir1) to Release A Transition Plan was completed (420-WP-005-002). It is intended to supercede that document in describing the planned transition.

The hardware sizing reflected in this document is based on assumptions that were current in late January and early February 1996, as listed in Section A.3. Since that time, the possibility of not performing LIS processing at GSFC has arisen. If that becomes the case, the allocation of hardware to GSFC may be revised.

## A.2 Background

The draft paper was developed during the November/December 1995 timeframe as a response to concerns that the planned/scheduled reuse of Ir1 hardware as part of Release A would impact:

- a) Science Software Integration & Test (SSI&T).
- b) TSDIS Kerberos interface testing.

To minimize these concerns, ECS was directed to develop a plan to keep Ir1 functioning until Release A was operational. This would include the replacement of some Ir1 equipment planned for Release A and development of decision dates as to when such purchases would need to be made.

The delayed release of a final version of the white paper and the availability of the hardware purchased for the Marshall DAAC have resulted in a less costly solution than originally envisioned. That is, recent decisions on the reuse of the Marshall hardware have virtually resolved the issue.

## A.3 Replan of Marshall Hardware

In late January, ECS undertook a study to replan the use of the Marshall hardware. The objectives of this study were to:

- a) Allocate the MSFC Release A hardware to the other Release A DAACs, during Release A installation and checkout, as a replacement for the Ir1 hardware originally planned for reuse by Release A. This would allow Ir1 to remain operational through 1996.
- b) Supplement the Release A GSFC DAAC hardware suite to allow LIS processing and TSDIS data product storage at GSFC for Release A.

To meet these objectives, the following assumptions were made:

- a) Ir1 Science Processing is not required after Release A installation. Therefore, the Ir1 science processors could be reused in Release A.
- b) A standalone MSFC Ir1 configuration is maintained at GSFC independent of the GSFC Ir1 configuration.

In analyzing the reuse of the Marshall hardware, the following steps were taken:

- a) The MSFC requirements reallocated to the GSFC DAAC for LIS processing and TSDIS dataset storage were analyzed.
- b) MSFC hardware available to meet these requirements was identified.
- c) The remaining MSFC hardware was allocated for integration with the Release A DAAC hardware at GSFC, LaRC and EDC as a substitute for the Ir1 hardware.

In each case, the hardware allocation was performed in the following manner:

- a) Allocation of exactly the same machine as originally required.
- b) Allocation of the same machine, but with more memory/disk.
- c) Allocation of a more powerful machine in the same class/operating system.

Tables A.3-1 through A.3-5 depict the results of this analysis and the the recommended hardware allocation. Table A.3-1 lists the MSFC Ir1 Hardware Configuration installed at GSFC.

**Table A.3-1. MSFC Ir1 Hardware String at GSFC**

Installed	Description	Substitute from MSFC Release A Hardware	Comments	New Buy
SPRHW-MSFC-1	SGI Indy, 256MG;6GB			
SPRHW-MSFC-2	X-Term			
SPRHW	8mm media			
SPRHW	8mm tape stacker			
AITHW-MSFC-1	Sun 20/50,64MB;2GB			
AITHW-MSFC-2	Sun 20/50,128MB;4GB			
AITHW-MSFC-3	HP Laserjet			
MSS-MSFC-1	Sun 20/50,64MB;2GB			
MSS-MSFC-2	HP Laserjet			
ICLHW-MSFC-1	SGI Indigo2, 6GB			
ICLHW	8mm media			
ICLHW	8mm tape stacker			

Table A.3-2 lists the GSFC Ir1 hardware planned for reuse in Release A and the substitute MSFC equipment recommended. The comment field is used to indicate whether or not this is an exact replacement. Those items flagged with an X in the "New Buy" column will need to be purchased since no suitable replacement was available.

**Table A.3-2. GSFC Ir1 Hardware Needed for Release A Configuration**

Installed	Description	Substitute from MSFC Release A Hardware	Comments	New Buy
AITHW-GSFC-1	Sun 20/50,64MB;2GB	DIPHW-MSFC-2	Sun 20/712, 256MB;6GB	
AITHW-GSFC-2	Sun 20/50,128MB;4GB	MSS-MSFC-3	Exact Replacement	
AITHW-GSFC-3	HP Laserjet	DIPHW-MSFC-3	Exact Replacement	
MSS-GSFC-1	Sun 20/50,128MB;4GB		No replacement in MSFC inventory	X
MSS-GSFC-2	HP Laserjet	N/A	No replacement in MSFC inventory	X
ICLHW-GSFC-1	SGI Indigo2	ACMHW-MSFC-1	SGI Challenge DM	

Table A.3-3 provides the same information for LaRC, while Table A.3-4 does the same for EDC.

**Table A.3-3. LaRC Ir1 Hardware Needed for Release A Configuration**

Installed	Description	Substitute from MSFC Release A Hardware	Comments	New Buy
AITHW-LaRC-1	Sun 20/50,64MB;2GB	ACMHW-MSFC-3	Exact Replacement	
AITHW-LaRC-2	Sun 20/50,128MB;4GB	DDSHW-MSFC-2	Sun 20/712, 256MB, 6GB	
AITHW-LaRC-3	HP Laserjet	DIPHW-MSFC-4	Exact Replacement	
MSS-LaRC-1	Sun 20/50,96MB;2GB	DIPHW-MSFC-1	Sun 20/712, 256MB, 6GB	
ICLHW-LaRC-1	SGI Indigo2	ACMHW-MSFC-2	SGI Challenge DM	

**Table A.3-4. EDC Ir1 Hardware Needed for Release A Configuration**

Installed	Description	Substitute from MSFC Release A Hardware	Comments	New Buy
MSS-EDC-1	Sun 20/50,96MB;2GB	DDSHW-MSFC-1	Exact Replacement	
MSS-EDC-2	HP Laserjet	N/A	No replacement in MSFC inventory	X
ICLHW-EDC-1	SGI Indigo2	DRPHW-MSFC-1	SGI Challenge DM	

Finally, Table A.3-5 lists the equipment reassigned to GSFC to meet the MSFC processing and storage requirements.

**Table A.3-5. MSFC Release A Hardware Reassigned To GSFC Release A Configuration to Support MSFC Processing and Storage Requirements**

Installed	Description	Substitute from MSFC Release A Hardware	Comments	New Buy
DRPHW-MSFC-2	SGI Challenge DM		Used for LIS processing in lieu of SPRHW-MSFC-1 which remains in the MSFC IR1 string	
SPRHW-MSFC-3	SGI Indy, 256MB, 6GB			
PLNHW-MSFC-1	Sun 20/50, 64MB, 2GB		Used for MSS in lieu of MSS-MSFC-1, which will stay in the MSFC IR1 config.	
PLNHW-MSFC-2	Sun 20/71, 384MB, 6GB		Used for as a queuing server in SPRHW	
MSS-MSFC-2	HP Laserjet		Needed for MSFC IR1	X
DMGHW-MSFC-3	Sun 20/50, 64MB, 2GB			
DMGHW-MSFC-4	Sun 20/50, 64MB, 2GB			
ICLHW-MSFC-2	SGI Challenge L		Requested for Illustra Benchmarking	
ICLHW-MSFC-3	SGI Challenge L		I/O board requested for Illustra Benchmarking	
ICLHW	SGI RAID, 100GB		Requested for Illustra Benchmarking	
DIPHW	8MM Media			
DIPHW	8MM Stacker			
ICLHW-MSFC-4	X-Term			
ACMHW	SGI RAID 45GB			
WKSHW	SGI RAID 40GB		Requested for Illustra Benchmarking	
DIPHW	Sun RAID 22GB			
DRPHW	Linear Mag 3590			
DRPHW	Media			

The total cost of those items identified in the "New Buy" column is estimated to be less than \$60,000 and has been ordered so as not to impact installation schedules (see draft Transition White Paper, 420-WP-005-002).

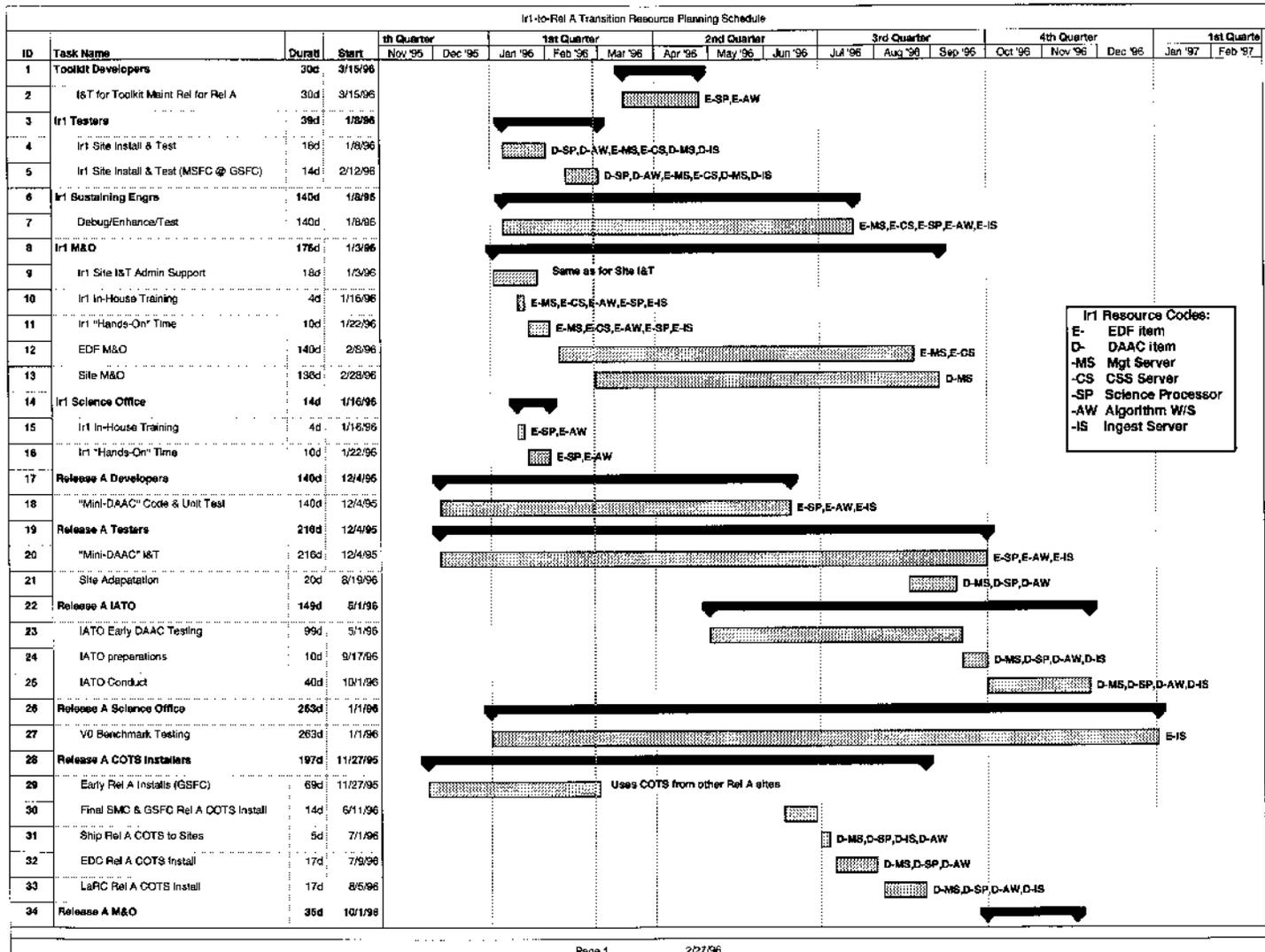
#### **A.4 Results**

The allocation described in Tables A.3-1 through A.3-5 fully satisfies the Release A requirements at LaRC. EDC's requirements are fully met with the addition of one more HP Laserjet for MSS. GSFC's needs will be fully met with the addition of two more HP Laserjets for MSS (one as an Ir1 replacement and one for the MSFC upgrade) and a Sun Sparc 20/50. The estimated total cost of these additional items is less than \$60,000 and have been ordered so as not to impact the proposed schedule.

#### **A.5 Schedule**

Figure A.5-1 describes the currently proposed schedule for installing the Release A hardware and COTS at GSFC, LaRC and EDC. While this schedule has been coordinated with the installation group and is believed to coincide with planned events at the DAACs (e.g., the planned relocation of EDC), it is not final. Once the proper coordination with the DAACs has occurred, the ECS ILN will be updated to reflect the appropriate schedule.

Currently, Ir1 is planned to be operational through December 1996, since SIM II testing is scheduled to be completed by then. It may be feasible to extend operations beyond this date. However, if that is desired, the impact upon the M&O staff would need to be assessed prior to making such a commitment.



**Figure A.5-1. Ir1 to Release A Resource Planning Schedule (1 of 2)**



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# Abbreviations and Acronyms

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AI&T	algorithm integration and test
AM-1	EOS AM Mission spacecraft 1
ASTER	advanced spaceborne thermal emission and reflection radiometer (formerly ITIR)
CCR	configuration change request
CDRL	contract data requirements list
CERES	Clouds and Earths Radiant Energy system
CIDM	client, interoperability and data management
CM	Configuration Management
COTS	commercial off-the-shelf (hardware or software)
CSR	consent to ship review
CSS	communication subsystem
D-AW	DAAC Algorithm Workstation (PDPS)
D-IS	DAAC Ingest Server (INS)
D-MS	DAAC Management Server (MSS) (includes Data Server, CSS and Ir1 gateway)
D-SP	DAAC Science Processor (PDPS)
DAAC	distributed active archive center
DCE	distributed computing environment (OSF)
DAO	Data Assimilation Office
DOF	distributed object framework
DS	data server
E-AW	EDF Algorithm Workstation (PDPS)
E-CS	EDF CSS Server
E-IS	EDF Ingest Server (INS)
E-MS	EDF Management Server (MSS)
E-SP	EDF Science Processor (PDPS)
EBnet	EOSDIS backbone network (combines Ecom and ESN)
ECS	EOSDIS Core System
EDC	EROS Data Center (DAAC)

EDF	engineering development facility
EDS	Electronic Data Systems
EGS	EOS ground system
EPs	evaluation packages
EROS	Earth Resources Observation System
ESDIS	Earth Science Data and Information System
FDDI	fiber distributed data interface
GSFC	Goddard Space Flight Center
GUI	graphical user interface
H/W	hardware
I&T	integration and test
IATO	Independent Acceptance Test Organization
Ir1	Interim Release 1
IV&V	independent verification and validation
LAN	local area network
LaRC	Langley Research Center (DAAC)
LIS	lightning imaging sensor
M&O	Maintenance and Operations
MISR	multi-angle imaging spectro-radiometer
MODIS	moderate resolution imaging spectro-radiometer
MOPITT	measurements of pollution in the troposphere
MRS	Multi-Release System
MSFC	Marshall Space Flight Center
MSS	systems management subsystems
NCR	non conformance reports
NESDIS	National Environmental Satellite, Data, and Information Service
NOAA	National Oceanic and Atmospheric Administration
NRCA	non conformance reporting and corrective action
NSI	NASA Science Internet
OJT	on-the-job training
OODCE	object oriented distributed computing environment

PDPS	planning and data processing system
QA	quality assurance
S/W	software
SCDO	Science and Communication Development Office (ECS)
SCF	science computing facility
SDP	science data plan
SDPF	science data processing facility
SE	system engineering
SDPF	Sensor Data Processing Facility
SI&T	system integration and test
SMC	system monitoring and coordination facility
SDP	software development plan
SORR	segment operational readiness review
SSI&T	science software integration & test
TBD	to be determined
TCP/IP	transmission control protocol/internet protocol
TRMM	Tropical Rainfall Measuring Mission
TSDIS	TRMM Science Data and Information system
V0	Version 0 of ECS