8. AQAHW - Algorithm Quality Assurance HWCI

Algorithm Quality Assurance HWCI (AQAHW) is the second of three HWCIs of the Data Processing Subsystem. This HWCI contains hardware resources to support DAAC operations personnel in performing planned, routine, non-science QA of product data.

QA of ECS products will include non-science QA, in-line QA, and SCF-based QA. Non-science QA will generally entail data integrity checks on data products and metadata. In-line QA is a form of science QA in which the content of the QA is evaluated using science algorithms. Processing capacity for in-line QA, to the extent that it is specified in the AHWGP inputs and Technical Baseline, is included in the Science Processing HWCI (see Section 7, SPRHW). SCF-based QA is also a form of science QA, and is specified by the product development team. ECS provides support for SCF-based QA to the extent of providing archive and communications capacity for the SCFs to sample the products for QA.

The types of non-science QA to be performed at the DAACs will be specified by the DAAC operations staff. The sections below define the working assumptions being made as to AQAHW requirements, and the specifications which flow from those assumptions.

8.1 AQAHW Requirements Analysis

The requirements for AQAHW are based upon the need to have a DAAC-based quality assurance capability to ensure the integrity of the products produced by the DAAC. Note that the ORNL and ASF DAACs do not perform science processing within ECS and therefore do not have AQAHW components.

DAAC-based non-science QA processing requirements are to be defined through interactions with the DAAC operations personnel. The current design assumption is that DAAC-based non-science QA processing will be performed at the DAACs in parallel with the other forms of QA (SCF-based QA and in-line QA). The design baseline thus includes a local (DAAC) QA workstation to support these DAAC data integrity checks. This local QA workstation is actually similar to a Science User workstation equipped with core Client Subsystem functionality. The QA workstation acts as a client to the Data Processing and Data Server Subsystems. The current operations concept assumes that the QA workstation hosts ECS as well as DAAC supplied processes (as deemed necessary by the DAAC operations personnel), which use a subset of the ECS services to "pull" production data sets using the subscription mechanism. The need for visualization support will be explored as product specific QA processes and requirements are worked jointly with the DAAC operations teams.

8.2 AQAHW Technology Assessment

The AQAHW requirements identified to date do not present any significant technical challenges, and therefore no special technology assessment efforts (prototyping, benchmarking, or product evaluations) have been performed to support the specification of AQAHW.

Because the PGE processing requirements at JPL and NSIDC are relatively small, the processing capacity provided by an SGI workstation can satisfy the AI&T processing requirements at these DAACs with capacity to spare. To take advantage of this spare capacity, these AI&T hosts have been configured with graphics options so that they can be used for QA visualization, if this is required by the DAACs. Similarly equipped SGI graphics workstations have been specified for the larger DAACs so that the AQA workstations can be used to supplement the AI&T capacity at these DAACs when necessary. This dual use of hardware is achieved in the SGI product line by equipping the workstations with the R10000 chip used for production processing, and with graphics resources sufficient to meet data visualization requirements.

8.3 AQAHW Specification

The AQAHW hardware suite at each DAAC will consist of a graphics workstation connected to ECS via the PDPS FDDI subnetwork. At JPL and NSIDC, this workstation will also function as an AI&T resource.

The AQAHW graphics workstation was selected to provide a software execution environment equivalent to the AI&T software execution environment in order to facilitate use of the AQA workstation for AI&T when necessary. The AQA workstation is also equipped with a graphics capability sufficient to support sophisticated visualization techniques.

The AQA workstation will be an SGI Indigo2 IMPACT 10000 workstation equipped with 128 MB of RAM. This workstation uses the R10000 chip, which is expected to be available in a 275 MHz implementation in the second half of 1996. The workstation will be equipped with an internal CD-ROM and two 4.3 GB internal disk drives. The workstation will provide a SCSI-2 connection for access to external disk arrays; the configuration of external disk arrays for AQAHW is detailed in the DAAC Design Specifications:

A. GSFC: DID-CD-305-030-001;
B. LaRC: DID-CD-305-031-001;
C. EDC: DID-CD-305-033-001;
D. NSIDC: DID-CD-305-035-001; and
E. JPL: DID-CD-305-036-001.

The Indigo2 IMPACT 10000 enclosure is a desktop configuration. The workstation will be configured with a 19 inch color graphics monitor.

The AQAHW workstation will reside on the ECS PDPS FDDI network. This network will provide direct access between AQAHW components and the remainder of the PDPS suite. The AQAHW components may also communicate with other ECS components and the external world via the DAAC FDDI switch.

8.4 AQAHW Design Discussion

AQAHW has been specified for each DAAC. This complement could be expanded as necessary in a variety of ways.

If a DAAC expresses a need for additional workstations for QA personnel, but does not require visualization support for these staff, X-Terminals could be assigned to the AQAHW to provide these seats. These X-Terminals would be configured in the same way that the AI&T X-Terminals are configured (see Section 9.3.1.1), and would be attached to the ECS PDPS FDDI subnetwork.

If additional visualization seats were required, additional workstations (configured as above) could be added to the ECS PDPS FDDI subnetwork to support the requirement.

If the data requirements from the Data Server (or from Science Processing) for QA are so large as to burden the ECS PDPS FDDI subnetwork, the AQA workstation may be configured with a HiPPI interface and connected to the DSS/DPS HiPPI network. This would be subject to the availability of a port on the HiPPI switch, and a slot within the workstation. (The workstation graphics boards and interface boards contend for the same set of slots; a workstation configured with the maximum graphics capabilities offered for this product -- Maximum IMPACT graphics -- could not support multiple network interfaces.)

If additional memory is required in the AQA workstation, its memory can be expanded to a maximum of 640 MB.

The Indigo2 IMPACT 10000 workstation is offered with three graphics options; the entry-level option has been selected for use in the AQA configuration. If more sophisticated graphics are required, the graphics in the workstation can be upgraded, subject to the availability of a backplane slot as noted above.

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