Many of you will be aware there has, over the last few months, been considerable discussion of the role of the ALMA M&C Bus Standard Interfaces (AMBSI's). Attached to this message is a policy statement, approved by both the Computing and System Engineering IPT's, concerning the use of AMBSI's in ALMA.

Consideration of the issues discussed here has been ongoing since mid May of this year. Two sessions were held at ALMA Week in early June in order to provide an opportunity for input from all elements of the ALMA Project. Since then, further comments and opinions have been collected via email.

What are the ALMA M&C Bus Standard Interfaces (AMBSI's)?

The AMBSI's are a piece of interface hardware that connects ALMA electronics to the ALMA Monitor and Control Bus. An AMBSI is always embedded in a larger device that is designed specifically for ALMA; it is then an internal part of that device. There are two variants, known as AMBSI1 and AMBSI2. Both designs have passed formal review, and design documents can be found on ALMAEDM, with document numbers 70.35.10.01 (for AMBSI1) and 70.35.10.02 (for AMBSI2).

Who controls and maintains AMBSI's?

The attached policy describes the administrative organization responsible for the AMBSI's. In a nutshell, the Computing IPT is responsible for the control and maintenance of both AMBSI designs. The head of Control Software within the Computing IPT will be the point of contact for all AMBSI–related issues.

Software maintenance for the AMBSI2 and the standard libraries on the AMBSI1 will be done within the Control Software group. Development and maintenance of device specific code that resides in the AMBSI1 is the responsibility of the IPT responsible for the device in which the AMBSI1 is embedded. Designers who want to have device specific software in the AMBSI1 should realize that, because the CAN interrupt must have the highest priority, they will not have the highest possible performance available for their applications.

What is the future of AMBSI's?

This issue has spawned much recent discussion. The AMBSI's were developed in phase 1 of the ALMA project, and as the project is now entering phase 2 it is an appropriate time to assess how well they are performing. Numerous hardware engineers have operating equipment that uses these interfaces, and control software has interacted with much of this hardware at the ALMA Test Facility (ATF). The bottom line is they work reliably and meet the AMB specifications.

Recent discussions have focused on a number of areas:

1. *Why not drop the requirement that hardware designers use a standard interface and just specify that they meet the AMB specifications?*
   This has been tried, to a limited extent in phase 1. The one piece of hardware that has not used an AMBSI has cost the control software group a considerable amount of time in diagnosing why it is not working as expected. It is still not meeting the AMB

specifications, and making it compliant will not be easy. It is the opinion of both the Computing and Systems Engineering IPT's that this option is not acceptable.

2. *Various permutations of building a new AMBSI board, dropping support for an existing design (either AMBSI1 or AMBSI2), or updating the existing design have been suggested as alternatives to the current policy.*
   Many of these options have merit and assessing them fully has been time consuming. One consideration that precludes many of the options that have technical merit is the schedule. In order to meet system integration test milestones in 2004, many groups need access to AMBSI's (both variants), in particular the AMBSI design, right now. This restricts us to options that maintain compatibility with current designs.

While the AMBSI designs are frozen, the Computing and System Engineering IPT's may consider design change proposals that meet certain requirements detailed in the attached policy. The intent is that device designers may rely on AMBSI designs that will not change in such as way as to require changes in their device hardware or software, as far as is practically possible. Conversely, device designers should base their designs on the current AMBSI's, and not assume any changes in AMBSI design.

Additional AMBSI-related Documentation

The following documents might be of interest:

Brooks, Mick, and D'Addario, Larry, *ALMA Monitor and Control Bus Interface Specification* (ALMA-70.35.70.03-001-A-SPE)

Brooks, Mick, *ALMA Monitor and Control Bus AMBSI1 Standard Interface Design Description* (ALMA-70.35.10.01-001-A-MAN)

Koski, W., *ALMA Monitor and Control Bus AMBSI2 Standard Interface Design Description* (ALMA-70.35.10.02-001-A-MAN)

While their final location in Sitescape may not be fixed (for example, although reviewed and approved as part of ALMA Phase 1 these documents have not yet been through the ALMA Document Approval Process), at the time of writing the documents may be found at: http://almaedm.tuc.nrao.edu/forums/alma/dispatch.cgi/officialcomp

Ralph Marson, 2003-07-31