

## **Issues arising from the “reference model (2 levels of SOIS-compliance)” thread**

This thread has been running for a while now and has touched on several very diverse issues that we have to face up to in SOIS. Some of these issues we have met before, and it is to our discredit that we have never put them to bed conclusively. Other issues are new, or at least being openly discussed for the first time. However, all of these issues are important and this note is an attempt to clearly identify those issues. The intention is that we can then spawn a series of more specific discussion threads to discuss each of them.

In my view, the issues to be addressed are:

1. The graphical representation of the reference model,
2. The definition and meaning of SOIS compliance,
3. The relationship between service interfaces, protocols, cross-support, and interoperability,
4. Plug and play issues
5. TCONS and other network/transport protocols (again!)

### **1. The graphical representation of the reference model**

In our context, pictures are needed to give a simplified representation of a more complex reality, to provide a starting point for more detailed description, and above to represent a unified view.

In my opinion the picture that we have fails on all three counts. It is too ‘busy’ and cluttered to provide a clear simple picture, rather than acting as a starting point for discussion it aims to preclude further discussion, and it causes more disharmony than unity every time we take a look at it together.

I’m sorry if that sounds harsh, but I believe that we need to step back and review exactly what we want from pictures and diagrams, and we need to apply recognised best practices in crafting them. What we have at the moment violates even the most basic principles of diagramming, and is more a hindrance than a help to our work.

So let’s go back to square one a re-work this issue with fresh eyes.

### **2. The definition and meaning of SOIS compliance**

From the discussion it seems that we have several ideas of what it means to be SOIS compliant ranging from:

*To be SOIS compliant means that you have to implement all of the SOIS services using the SOIS defined protocols*

All the way down to:

*To be SOIS compliant means that you only have to implement the service interface of at least one SOIS service*

We are not the first people to have faced this issue and there are many possible solutions. The first step is for us to agree on a definition of what SOIS compliance means for us.....which shouldn't really be too difficult.

### **3. The relationship between service interfaces, protocols, cross-support, and interoperability**

This is related to the compliance issue, but goes much further into the aims of our work. Max has pointed out that using common service interfaces is a big step forward for re-use potential and simplifying flight software development. A couple of meetings back Dai explained the difference between service agreements and interoperability agreements, and way back before that we all discussed the three views model that relates services, protocols, and service interfaces to users, implementers, and agencies.

Let's take a fresh look at all of this in the light of the SOIS goals.

### **4. Plug and Play**

I think the real problem here is that we have never agreed exactly what plug-and-play really means in the spacecraft onboard context. Until we do we won't get a clear picture of whether there are plug-and-play services per se, or whether we only need to provide support for plug-and-play enabling capabilities (e.g. device discovery and enumeration).

We should not ignore the excellent work that has already been done by Philippe David in this area, but by his own admission some of this work strays beyond the boundaries of what we should be considering in SOIS. This work deserves some more scrutiny.

I think that now is an opportune moment to re-consider and clarify our position on plug-and-play for spacecraft onboard use and I'm intending to review all of the material that we have discussed before in order to work up a short tech. note within the next couple of weeks.

### **5. TCONS and other network/transport protocols**

This one just will not go away. The discussion on this has been lively, verging on hostile at times, but we are getting no nearer to a consensus. The trouble is that we are dealing with a mixture of subjectivity and a lack of mutual understanding and at the end of the day whatever we put on the table will not be credible until it is proved by comparative demonstration.

I think there is a genuine lack of understanding from many people about the constraints that we, as onboard systems developers, face in terms of processing and memory resources. But I also think that there is a lack of clarity about what the real timing and latency requirements for onboard software are. This latter is largely due to the fact that onboard software architectural concepts are in a state of transition at the moment, and SOIS is one of the enabling technologies that will allow that evolution to proceed.

There is clearly a very strong interest from other communities to run other protocols over the onboard network and we must respect this. That interest is stemming from a wider view of a space mission and we are in no position to challenge it.

In the absence of any real hard evidence to indicate the correct way to proceed I would strongly urge that we save our energy on futile discussion for the time being, but that we make it a firm goal to demonstrate the use of TCONS on the test bed during the next inter-plenary period. That implementation will give us far more knowledge and experience of what the real issues are, as well as giving us a demonstrable system on which we can experiment with different approaches to handling other, non-TCONS protocols.

If that is an acceptable approach then we just need to accept that right now there are several different opinions within the group, but not allow this to interfere with forward progress. I'm sure that we can do this.

Chris Plummer, 8/3/2005