# Review of Draft Abstract Event Definition Standard

# Introduction

The draft Abstract Event Definition standard has been prepared by the CCSDS CSS Area to support the definition of abstract events in the context of CSS Service Management (CSSM).

The NAV WG are re-using the CSSM Event structure in the context of the Navigation Event Message standard.

The purpose of this review is to consider the potential for re-use of the CSSM Event structure in the context of MPS Planning Events.

# Overview of CSSM Event

The Abstract Event class has the following structure:

AbstractEvent

Type String 0..1

User String 0..1

LatestOffset Double 0..1

EarliestOffset Double 0..1

Identifier ID 0..1

Parameters AbstractParameters 0..\*

EventTime AbstractEventTime 1

The class AbstractParameters is sub-typed to support a range of parameter data types and has two attributes: Name (a string) and Value (of the appropriate type). Supported types are Boolean, UnsignedInt, Int, Float, Double, String, Extended, DurationInt, DurationDbl, TimeParameterA, TimeParameterB.

The class AbstractEventTime includes an enumerated attribute to identify the epoch Time system, and is sub-typed to support Time references as follows:

Absolute Time (using CCSDS Time Code A)

Absolute Time (using CCSDS Time Code B)

Relative Time to another Event (as a Double and IDRef)

Relative Time (using CCSDS Time Code A): relative time as a Double; absolute time

Relative Time (using CCSDS Time Code B): relative time as a Double; absolute time

It is specifically stated that the AbstractEvent Identifier is unique for every occurrence of a particular event within a particular event file, but that if the planning information is regenerated then the Identifier for a particular event may change.

# Suitability for Re-use as basis of MPS Planning Event

The structure of the CSSM Abstract Event has been specified from the perspective of its use within a single self-standing file format. It does not reflect the complexity identified within the MPS Information Model of a compound object structure that supports:

* The separation of Event Definition and Event Instance
* The evolution of Event Definition over time
* The evolution of Event Instance status over time

This has led to the definition of the MPS Planning Event as four-layer structure comprising Event Identity, Event Definition, Event Instance and Update. This supports both the representation of Event Definitions within the Planning Database, and the representation of Event Instances within Planning Requests and Plans. It also allows for the archiving of evolving event status over an extended period such as the mission lifetime.

This complexity is absent in the CSSM Abstract Event specification, which provides support only for the representation of a snapshot of an Event Instance at a particular point in time.

The representation of Event Parameters [Arguments in MPS terminology] is similar to MPS in that it supports multiple data types. However, for MPS these data types must correlate to the MAL Attribute types to be MO compliant. It is this that allows encoding and transport according to multiple standard MAL technology bindings. The CSSM AbstractParameters data types are not MAL compliant.

To take advantage of standard MO services (such as the Archive service), MO Service specifications should define their service information in terms of MO COM Objects. The CSSM Abstract Event is not itself derived from the COM Object. However, this could be addressed by using the CSSM Abstract Event structure as the body of a COM object.

The fact that the Abstract Event Identifer does not remain consistent across multiple iterations of the generated planning information is a serious flaw from a Mission Planning perspective as it precludes the automatic correlation of Planning Events inserted in a Plan with the updated timing of those events in the next iteration of the Navigation Event Message. This should be raised as a significant issue to be addressed prior to adoption of the NEM standard.

# Preliminary Conclusion

The CSSM Abstract Event information model does not provide for representation of the four-layer compound object representation of the MPS Planning Event (Identity, Definition, Instance and Update), which has been developed to allow for coherent representation of Planning Events over an extended period of time in the context of Planning Configuration Data, Planning Requests, Plans and Plan Status History. It is also not MO MAL compliant in the set of data types used. For these reasons it is considered unsuitable as a basis for modelling the MPS Planning Events themselves.

The MPS Information Model does, however, allow for the representation of external Events that constitute the source of Planning Event Instances. In principle there is no reason why the CSSM Abstract Event and NAV Events derived from it could not re-used directly to model the External Events to which they relate. There is currently one serious shortcoming which would need to be rectified to permit this: the lack of consistency between the ID of successive iterations of the same CSSM Abstract Event. If different IDs can be used for the same Event in successive regenerations of the planning information (including Navigation Events), then there is no way to correlate these within the Mission Planning information model.