



XTCE (XML Telemetric and Command Exchange) Standard

Making It Work at NASA. Can It Work For You?

OMG and CCSDS Standard

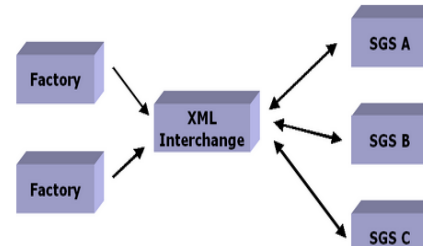


XML Telemetric & Command Exchange (XTCE)

This specification is an information model for spacecraft telemetry and commanding data. For a given mission there are a number of telemetry phases that are supported by a variety of systems and organizations. Additionally, many of these organizations support multiple heterogeneous missions using a common ground segment infrastructure. Telemetry and command definitions must be exchanged among all of these phases, systems, and organizations. This is made difficult and costly because there is no standard method for exchanging this information. The lack of standardization currently requires custom specification of the telemetry and commanding information. This customization is inherently error prone, resulting in the need to revalidate at each step in the lifecycle.

A typical example of this process is between the spacecraft manufacturer and spacecraft operating agency. The spacecraft manufacturer defines the telemetry and command data in a format that is much different than the one used in the ground segment. This creates the need for database translation, increased testing, software customization, and increased probability of error. Standardization of the command and telemetry data definition format will streamline the process allowing disparate systems to communicate without the need for the development of mission specific database import/export tools.

Ideally, a spacecraft operator should be able to transition from one ground system to another by simply moving an already existing command and telemetry database compliant with this command and telemetry database specification.

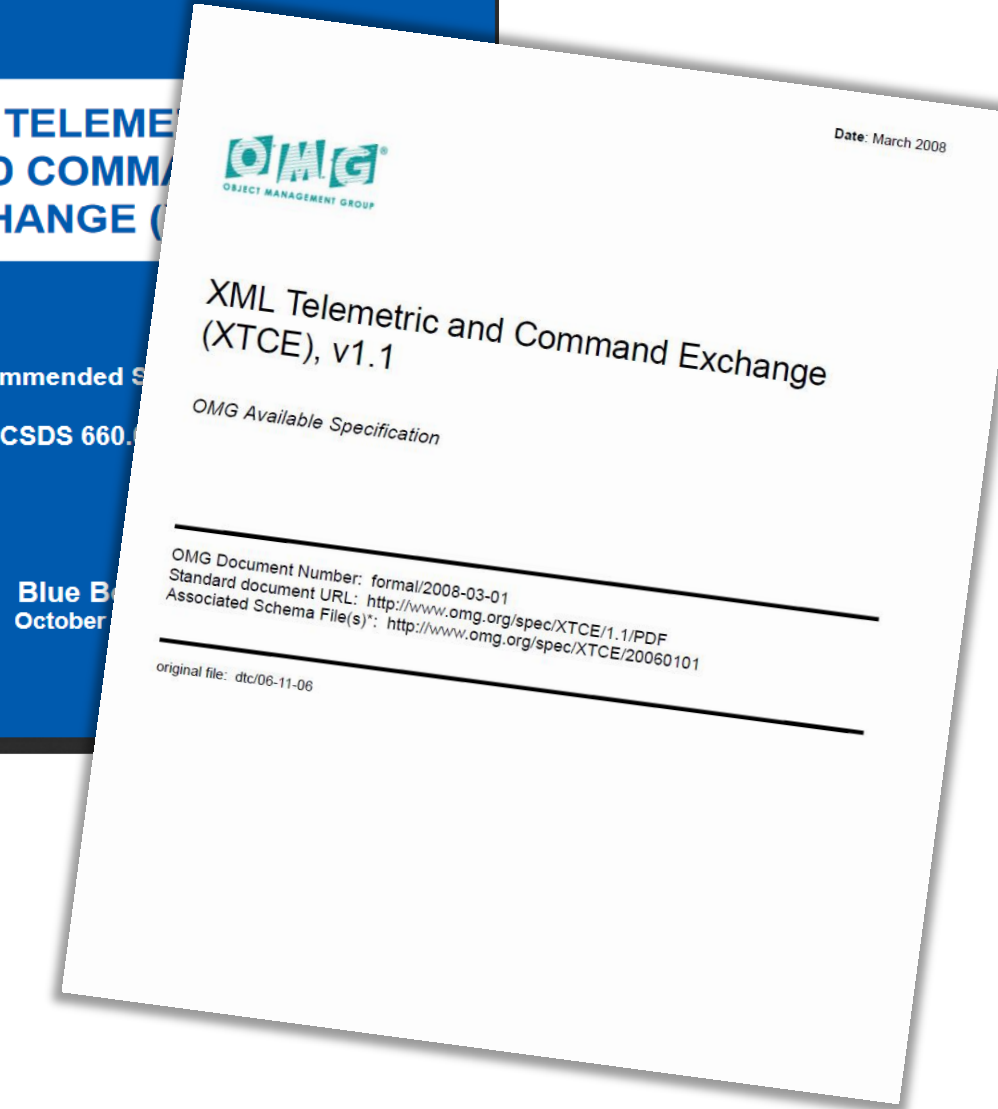
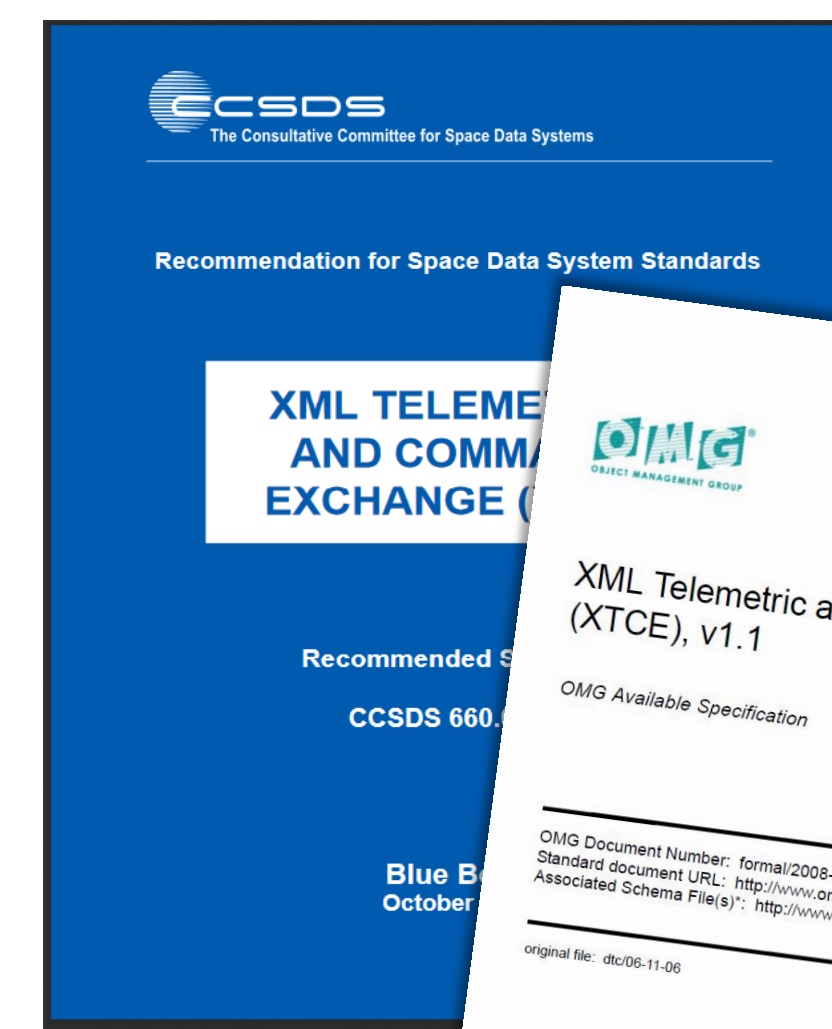
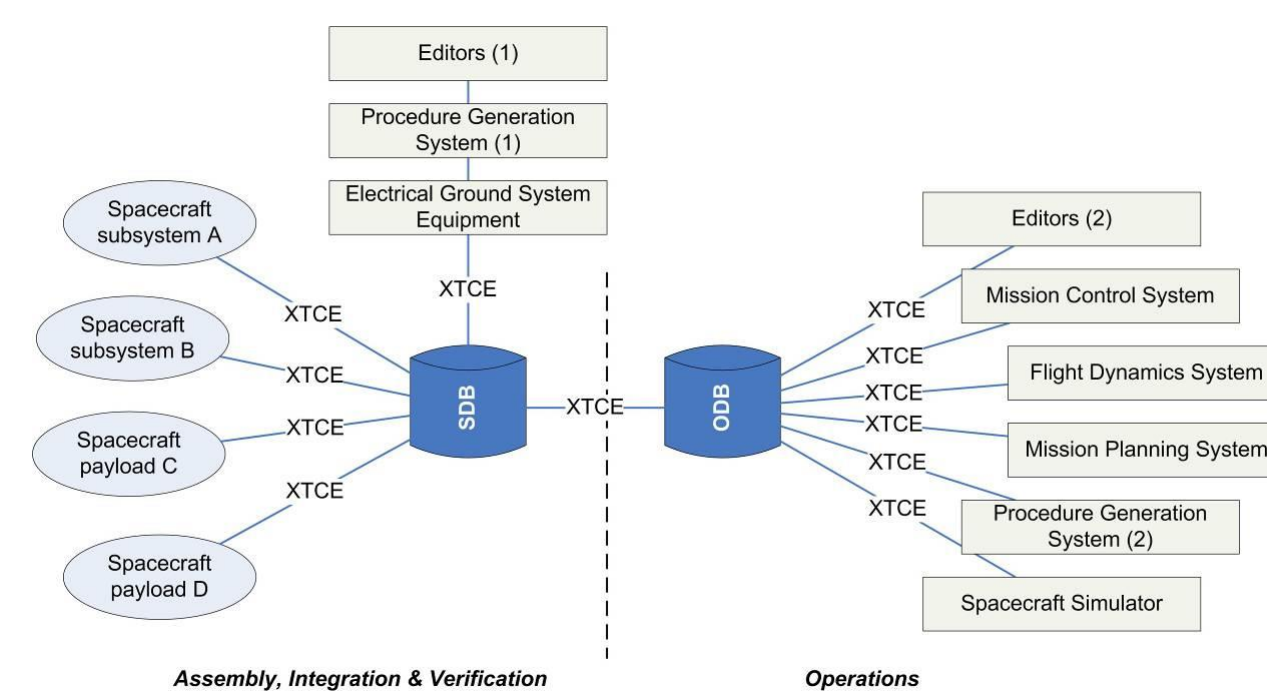
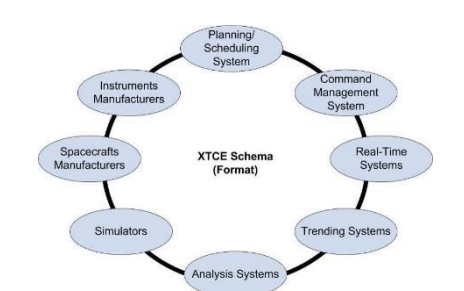


Documentation

[Informative Specification](#)

[XML Schema - Normative Specification](#)

[PowerPoint Tutorial](#)



- About:
- Published by OMG in 2006
 - XML Schema
 - CCSDS Adopted as Blue Book 2008
 - Used at NASA Centers, ESA, CNES, DLR, Harris, Boeing, Northrup Grumman and others
 - Intended for exchange of operations databases but some using as their native operations database
 - Supported by many COTS packages

<http://www.omg.org/space/xtce/>

<https://public.ccsds.org/Pubs/660x0b1.pdf>

Version 1.2 now in approval cycle

Example Telemetry & Command Systems Use Cases Considered



- Multiple mission control center
- Many JPL missions supported
- XML based ops database
- Compatibility with XTCE tested



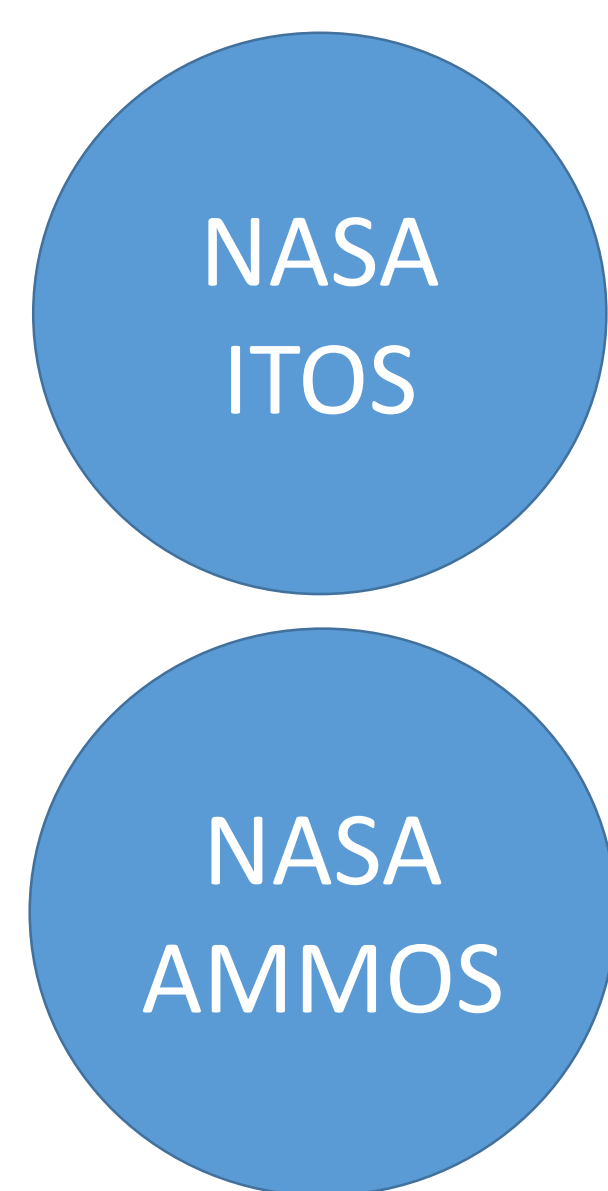
- NASA GSFC GOTS
- Many NASA GSFC missions supported
- Native ops database
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Six Different Use Cases Considered

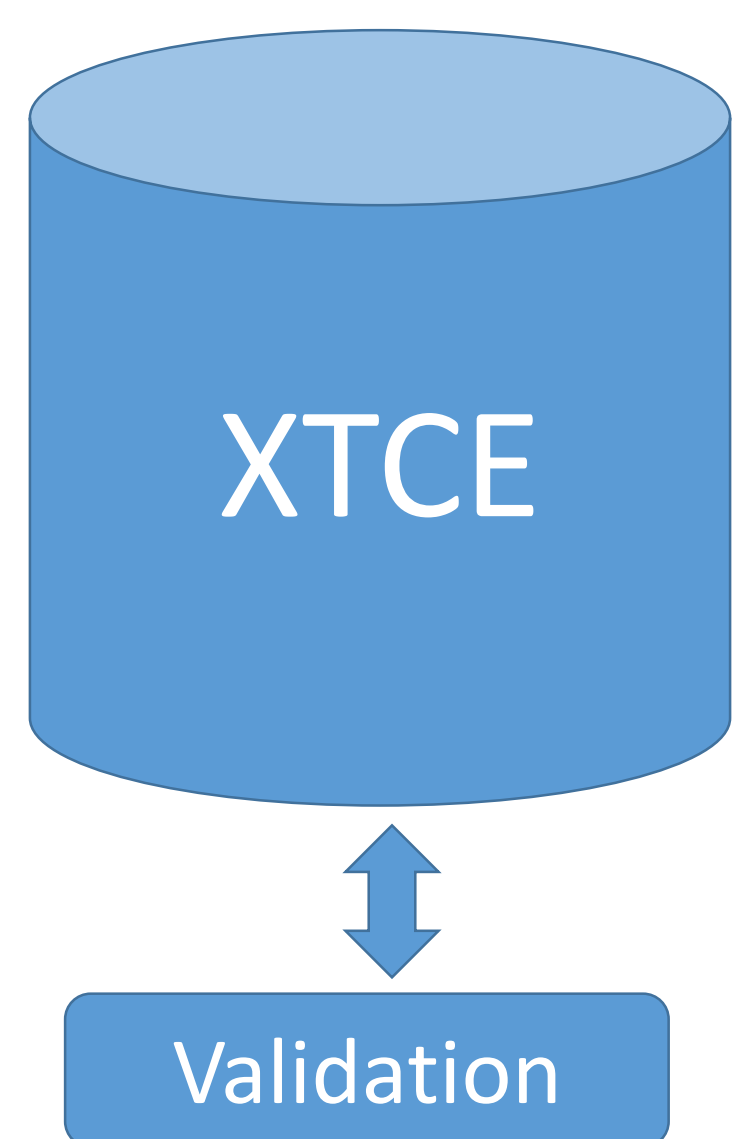
1. A spacecraft/Instrument provider delivers mission specifications for AMMOS use
2. Another Center provides XTCE file to allow an AMMOS system to provide backup Mission Operations Center capabilities
3. XTCE specification is received to allow AMMOS system to monitor selected data sets (e.g. a single instrument)
4. AMMOS provides XTCE files to allow other tools to be easily configured
5. AMMOS provides an XTCE file to another Center and they provide backup Mission Operations Center capabilities
6. XTCE specification is provided to allow another system to monitor selected data sets (e.g. Goddard monitors a JPL instrument)

Conversion between Databases - Rapid Integration & Testing

Source Database



Common Database File



Target T&C Systems



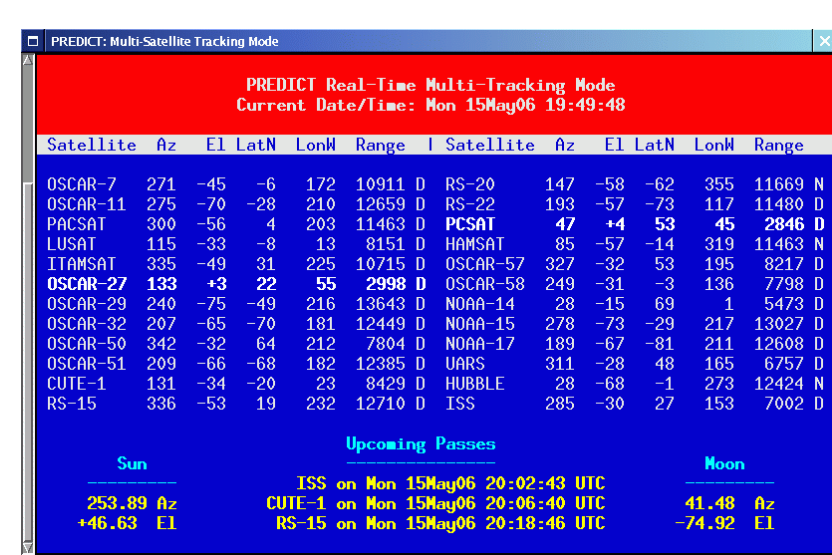
- Ingest Database
- Process Telemetry

Multiple End User Operations Perspectives

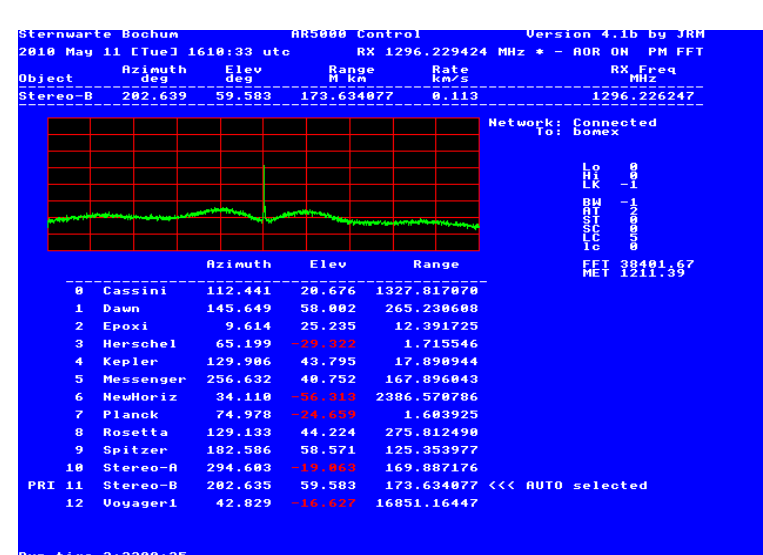
- Multiple tool chains
- Multiple tool vendors
- Technology refresh

Telemetry Processing

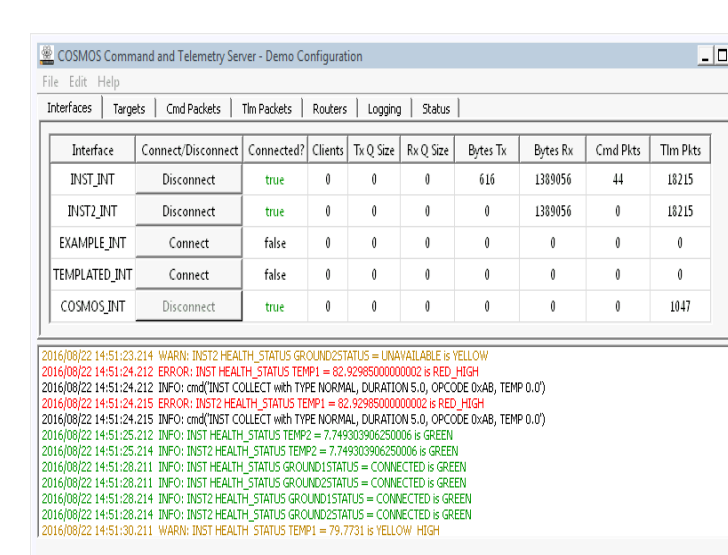
One XTCE Database, Four Telemetry and Command Processing Systems



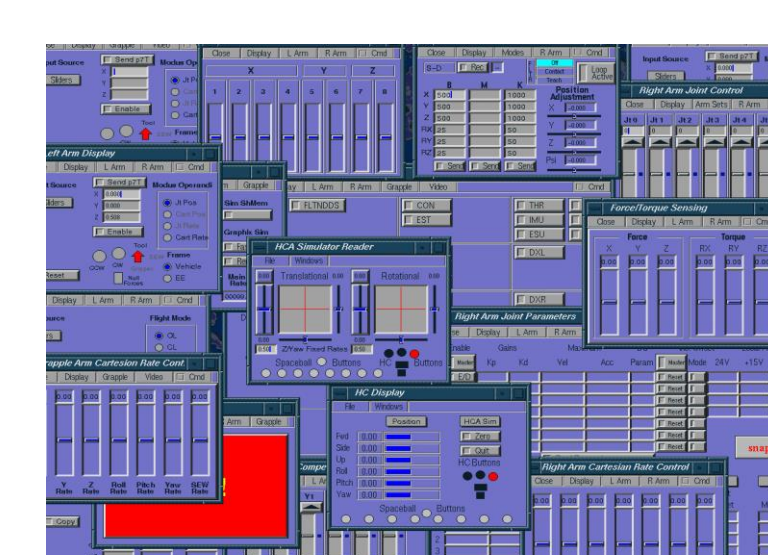
AMMOS Display



Eclipse Display



Ball COSMOS Display



ASIST Display

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