

Electronic Data Sheets: Introduction

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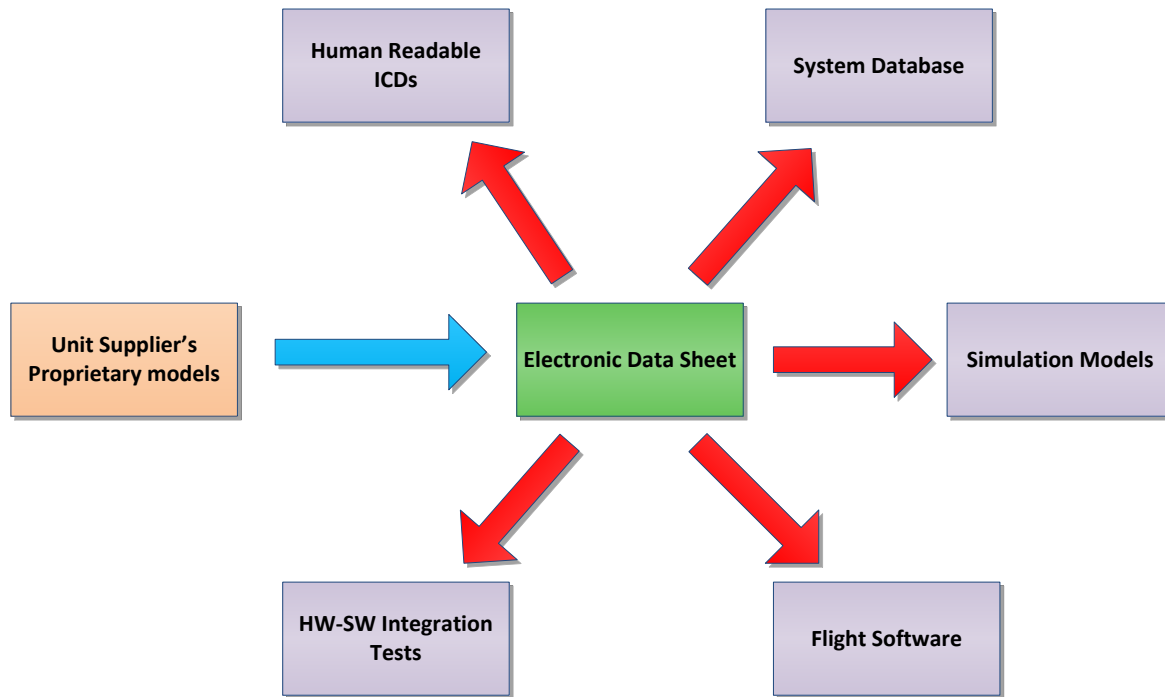
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Electronic Data Sheets (EDS) – What is it?

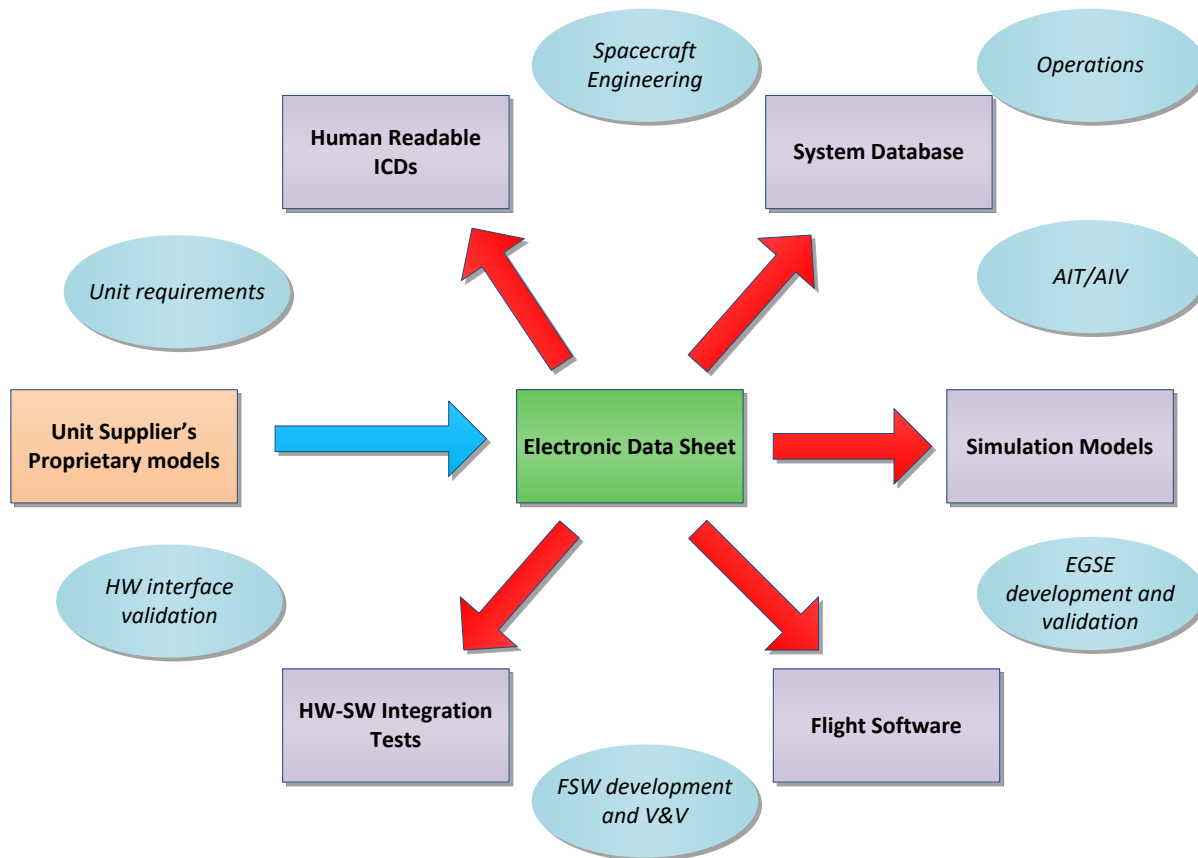


- **Machine-readable mechanism to describe interfaces of electronic units onboard spacecraft**
 - Sensors, actuators
 - Other units (PCDU, RTU, Solid State Mass Memory)
 - Instruments
- **Objective: Replace paper ICDs**
 - Initially functional/data handling (i.e. TM/TC ICD)
 - But gradually also electrical, thermal, mechanical

Electronic Data Sheets – Use Cases



Electronic Data Sheets – Multiple Domains



Electronic Data Sheets – Key Points



- **EDS: Unambiguous machine readable interface specification**

- The key thing is to standardize EDS contents and format
- Standardised EDS to be delivered together with electronic units
- Tools to generate proprietary engineering artifacts and models
 - Software code, spacecraft database, tests, simulation models

- **Growing interest in industry**

- Making life easier (automatic flow of engineering data, inherent consistency, data validation)
- Saving time/money/resources by reusing engineering data (digital spacecraft engineering)
- Technology is available to do this

- **Provides a great tool for interoperability**

- Within the same spacecraft, spacecraft to spacecraft, system of multiple spacecraft
 - 1) Interfaces described in standardised machine understandable unambiguous format
 - 2) Proprietary tools available to support system engineering on both sides without necessity to use the same architecture/standards (e.g. ESA's PUS encoded in EDS)

1. SAVOIR Electronic Data Sheet Definition

- GSTP activity with 3 primes

2. Standardization in CCSDS

- **Plan for 2018:**
 - **Publish XML Specification for Electronic Data Sheets Blue Book (876.0)**
Interoperability tests involving two prototypes (ESA and NASA toolchain), mimicking scenario of NASA instrument onboard ESA satellite or vice versa, interface defined in EDS (e.g. ESA JUICE mission to icy moons of Jupiter with NASA UVS instrument)
 - **Update “Electronic Data Sheets and Common Dictionary of Terms - Overview and Rationale” Green Book (870.1)**
- **Currently ongoing 3rd agency review of the XML Spec for EDS (876.0)**



Lunar Orbital Platform - Gateway Elements

GATEWAY

A spaceport for human and robotic exploration to the Moon and beyond



HUMAN ACCESS TO & FROM LUNAR SURFACE

Astronaut support and teleoperations of surface assets.



U.S. AND INTERNATIONAL CARGO RESUPPLY

Expanding the space economy with supplies delivered aboard partner ships that also provide interim spacecraft volume for additional utilization.

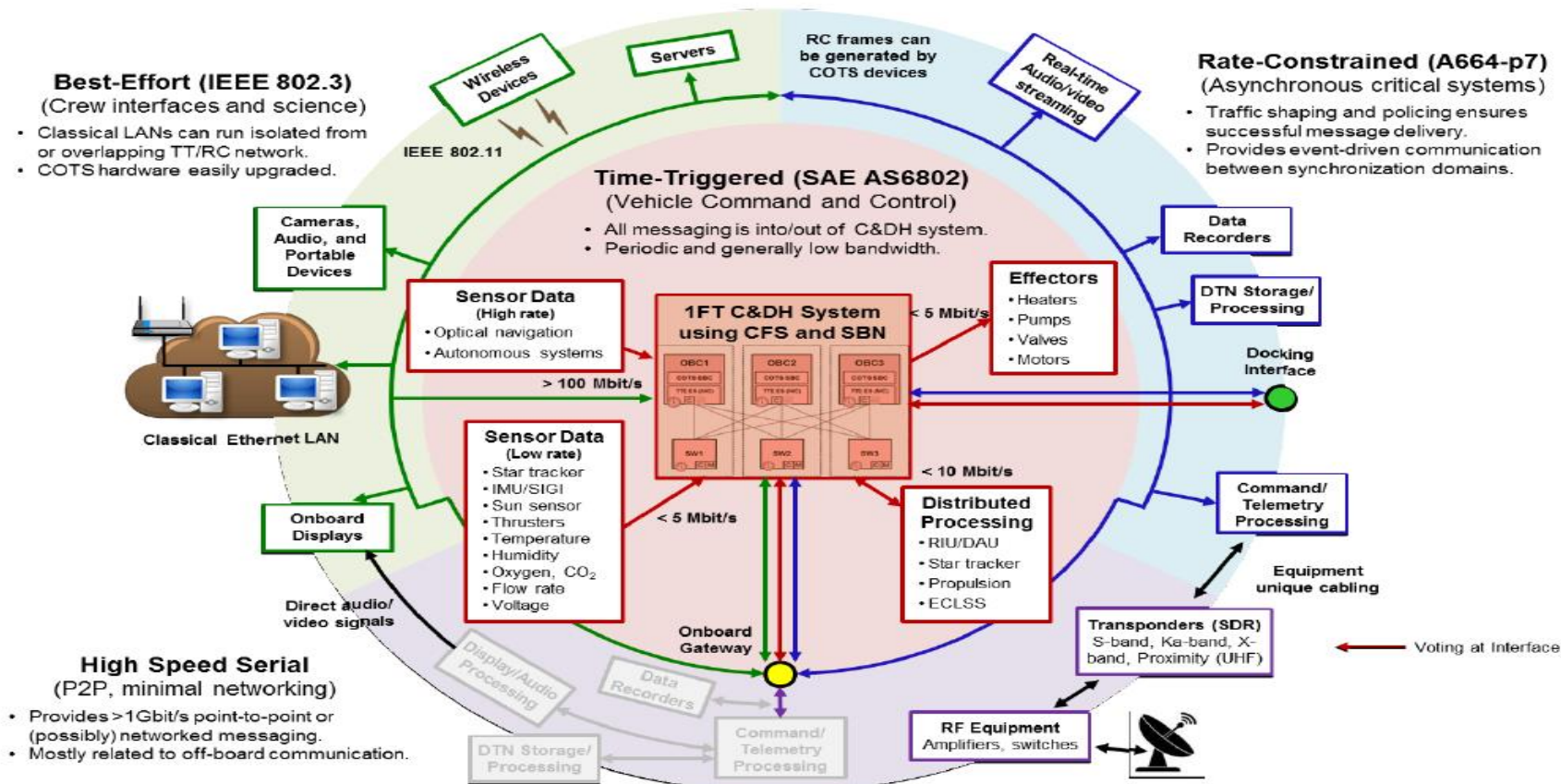


SAMPLE RETURN

Pristine Moon or Mars samples robotically delivered to the Gateway for safe processing and return to Earth.



Lunar Orbital Platform-Gateway prototype example





Problem Statement

How to ensure consistent data exchange definitions across multiple elements being developed across multiple agencies?



EDS Tool Supports Systems Integration

- NASA cFS Command and Data Dictionary tool (CCDD)
 - Database of system data exchange and configuration
 - Auto-generation of design, code, and configuration artifacts
 - Graphical User Interface for viewing and editing
 - Inputs:
 - Component EDSs
 - System design parameters
 - Outputs:
 - Component EDSs (as modified by design parameters)
 - Ground system databases (XTCE)
 - System configuration files
 - “C” header files for software components
 - Parameter table definition files
 - Bus definitions for modeling tools (Mathworks Simulink)
 - System documentation

Session Organization



- **Speakers invited to broaden our view on EDS**
 - Spin in from different industry (Volvo)
 - Unit suppliers (RUAG, Jena Optronik)
 - Different views and use cases (DLR, satsearch, SPiN)
- **4 talks before the coffee break at 15:00**
- **3 talks after coffee break**
- **Wrap up at 16:20**