GMV Aerospace & Defence view

SAVOIR
Present and Future

ADCSS – ESTEC - Oct 21st, 2024

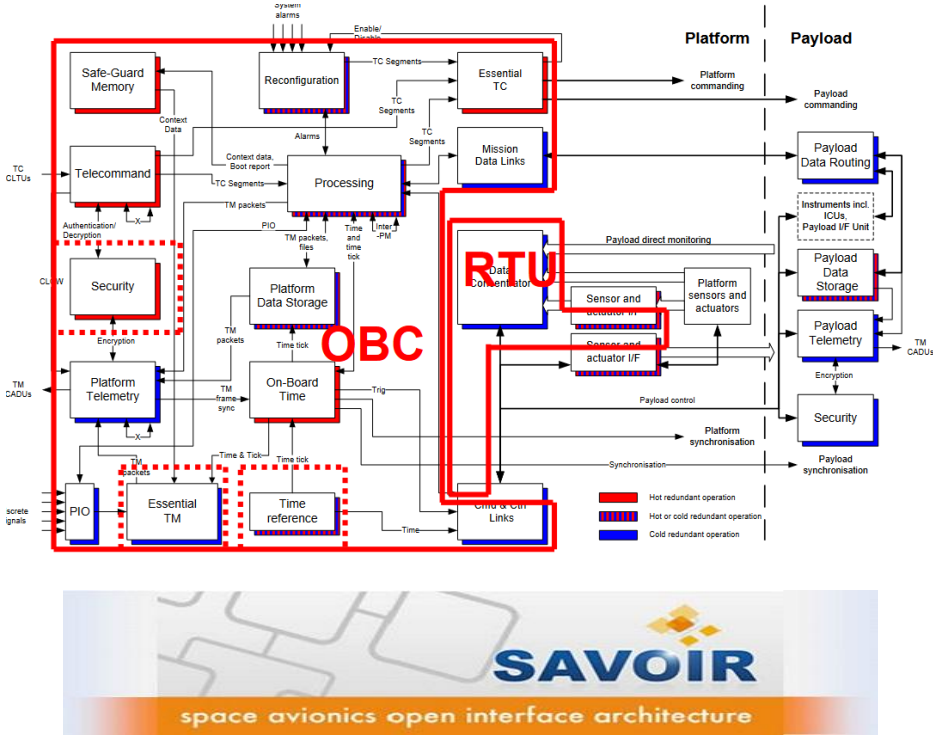
gmv
INNOVATING SOLUTIONS

CONTENTS

1. SAVOIR TODAY

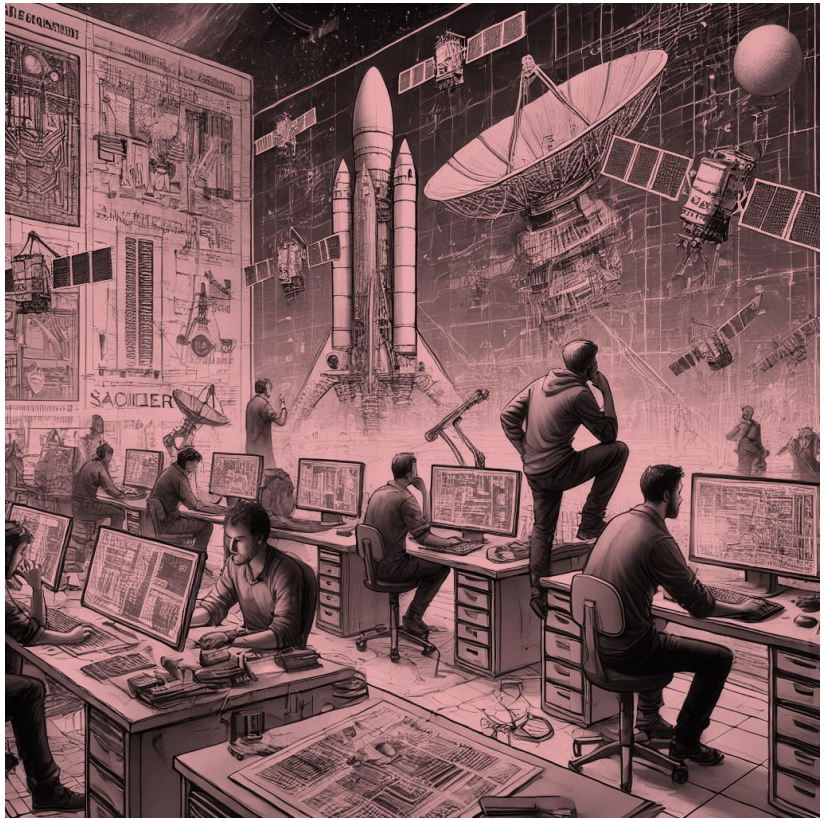
- Provides a comprehensive framework for developing highly reliable, fault-tolerant avionics systems.
- Ensures interoperability between different components and subsystems, focusing on safety, security, and reusability.
- Adopted for Spacecraft Bus mainly for larger satellites, traditional space missions, and projects with certification requirements.
- Focus on functional chains, decoupling of hardware from software. On-board systems like navigation, communication, or attitude control can be managed independently and react to real-time data.

Workers design and develop common space platform avionic and some does not even know that SAVOIR exists



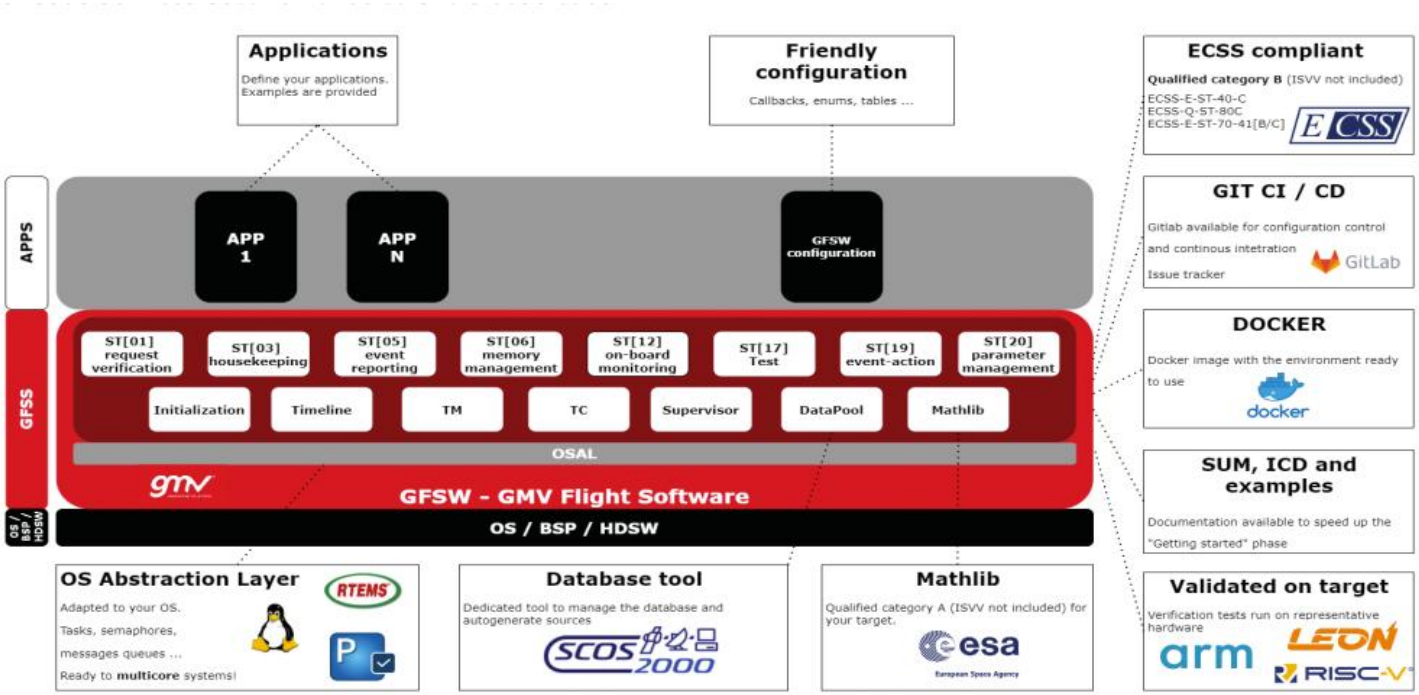
2. SAVOIR NEEDS UPDATES

- Working-Groups at the edge of the standardization frontiers
- Model-Based Design, from HW architecture to autocode
- HW-seamless integration – ADHA, APA, PC104 ….
  Are COTS real COTS?
- High-reuse as a goal (many effort per new mission)
  - Reinventing the wheel for mission specific functionalities, adaptations, operability
- SW re-writes for different missions, HWs, OS, ASWs…
- Cybersecurity is needed, not a tax
  Inter-operability & seamless integration vs zero-trust
- Are Payloads subject to standardization? Payload Controllers?



2. GMV FLIGHT SOFTWARE

- Modularity
- Abstraction
- Layered
- GFlight SW Services
- Towards Autonomy
- OS Portability
- HW Portability

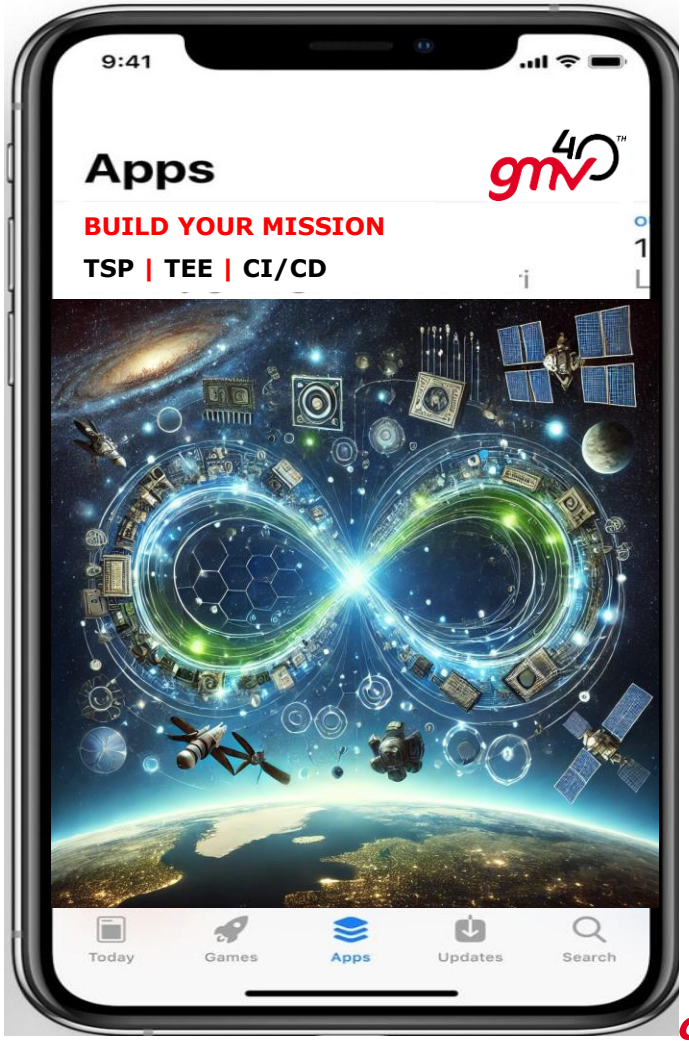


3. SAVOIR EVOLUTIONS

- App-store concept for space flight hardware/software architecture over the SAVOIR avionics reference
- Model-Based Design with ideal plug&play for enhanced flexibility
- Logic architecture adding and removing software components dynamically, leveraging the API and “as-a-service” concept
- RestFul and the publish-consume.
  Software components can be switched in and out during runtime, without requiring a system reboot or a complete software rebuild.
- Programmable HW – SDR, SDN, SW-Define-Payload,
  Regenerative Payloads
  (exploit re-configuration, dynamism)
- On-Board Autonomy
- Anchor Trust – Security-Safety

3. SAVOIR EVOLUTIONS

- Enhance modularity, scalability, and lifecycle management
- Agile frameworks – DevOPs
  incorporate new technologies or updates later in the development cycle
- Modularity & Isolation
  Time-Space Partitioning, Trusted Executions Environments
  Docket/Podman containers
  Microservices Architecture
- Cubesat – PC104 – real COTS
- Support for Distributed Systems (the cloud above the clouds)
  Constellations, Load-balancers, Planners, Task Distribution
- New Communication protocols – speed – AI-routing - quantum



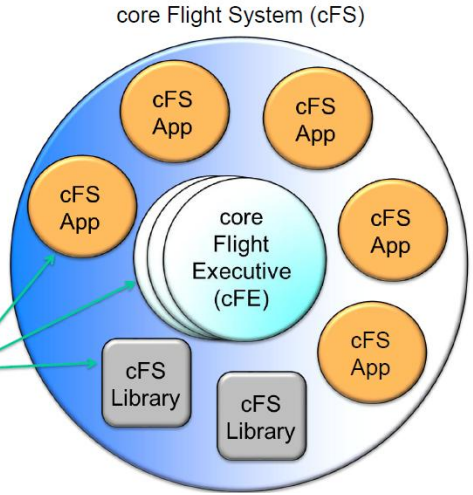
2. cFS - NASA

- **core Flight System (cFS)**
  - A Flight Software Architecture consisting of an OS Abstraction Layer (OSAL), Platform Support Package (PSP), cFE Core, cFS Libraries, and cFS Applications

core Flight Executive (cFE)

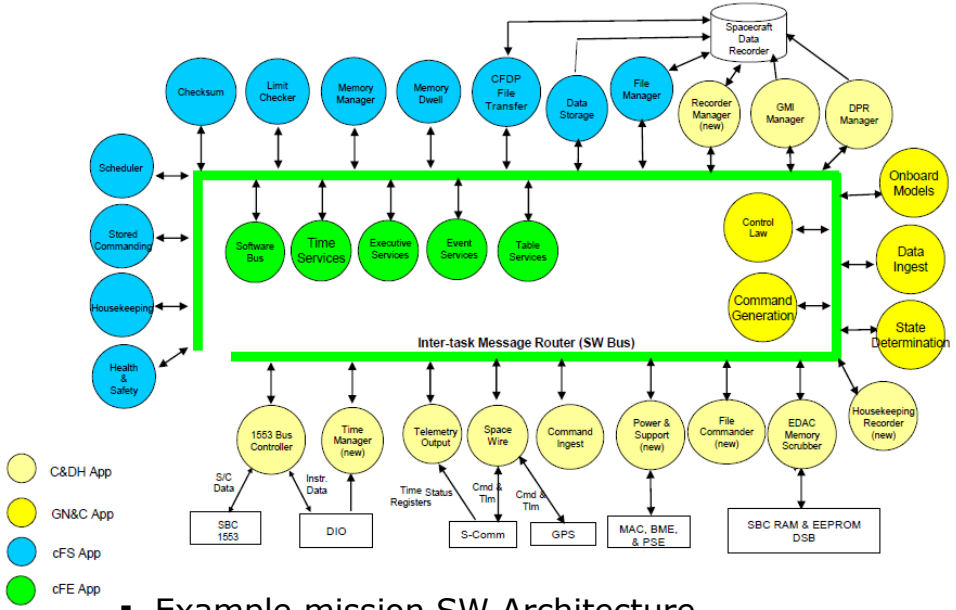
- A framework of *mission independent, re-usable, core* flight software services and operating environment

- **Each element is a separate loadable file**



- **cFE services include:**

- **Support services include:**
  - File utilities



- Example mission SW Architecture
- Easy rapid prototyping with heritage code that was cFEcompliant
- •Layered architecture has allowed COTS lab to be maintained through all builds

4. SHALL WE OPEN DISCUSSIONS?

Brainstorming - Questions

Thank you

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