

Compact Reconfigurable Avionics

C. Honvault, J. Iilstad, D. Oddenino, T. Tsiodras

20/10/2020

- **Objective:** Extend in-flight reconfiguration capabilities of Avionics Systems
- **Applications:**

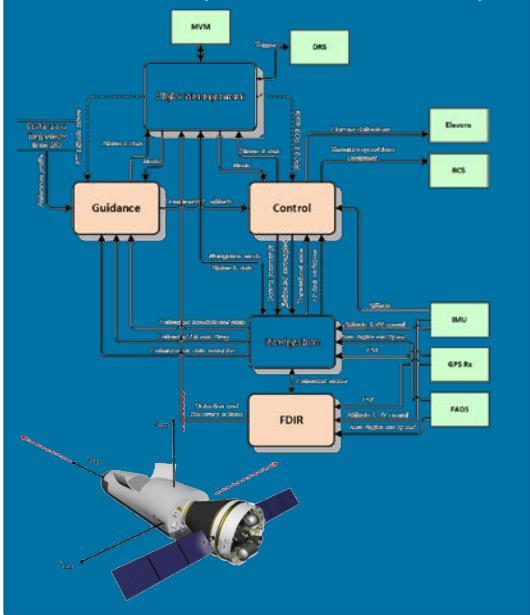
P/F	<ul style="list-style-type: none">• Ground reconfiguration to match different missions with same Hardware• In-Flight reconfiguration to manage different modes: LEOP, Orbital phase, Reentry phase, ...
P/L	<ul style="list-style-type: none">• Update of HW functions (HW patch), security algorithms, protocols, ...
P/L	<ul style="list-style-type: none">• Reconfiguration to manage different modes: Acquisition, Processing (compression, selection, ...)

- **Implementation:**
 - Three parallel TDE activities covering Hardware, Software and AOCS/GNC.

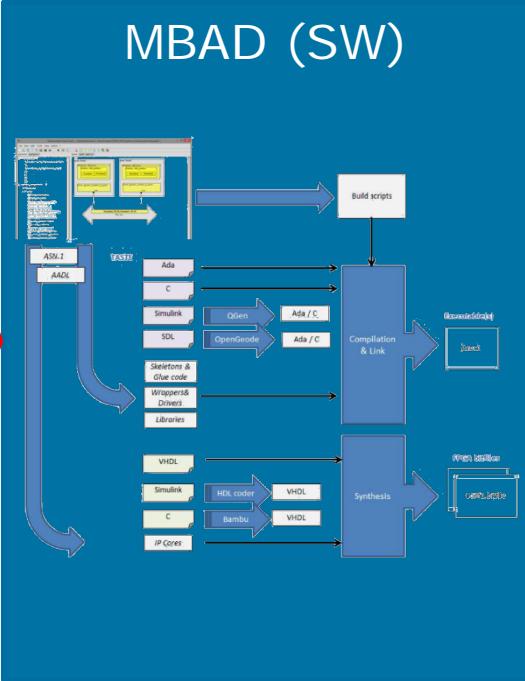
CoRA = Three parallel activities



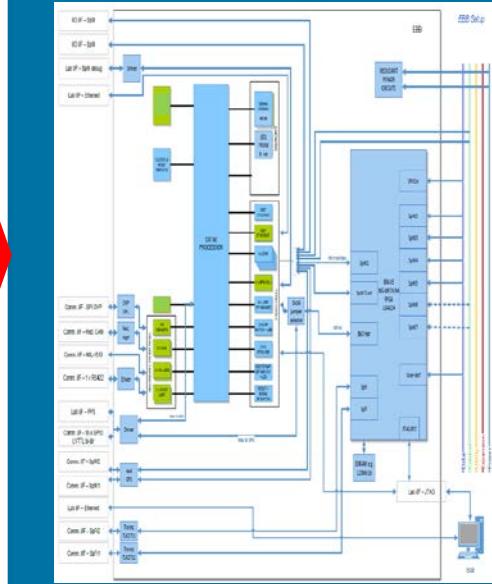
SAGE (AOCS/GNC)



MBAD (SW)

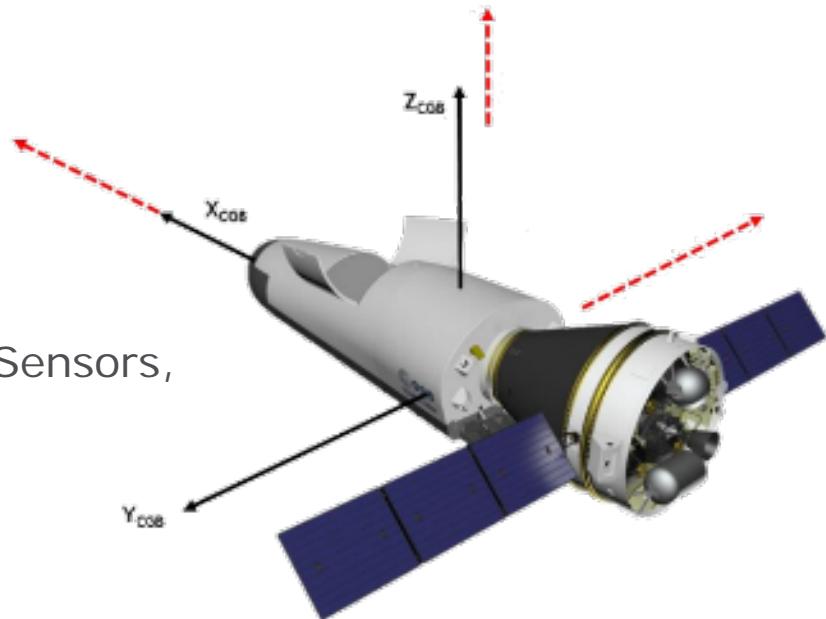


RDHC (HW)

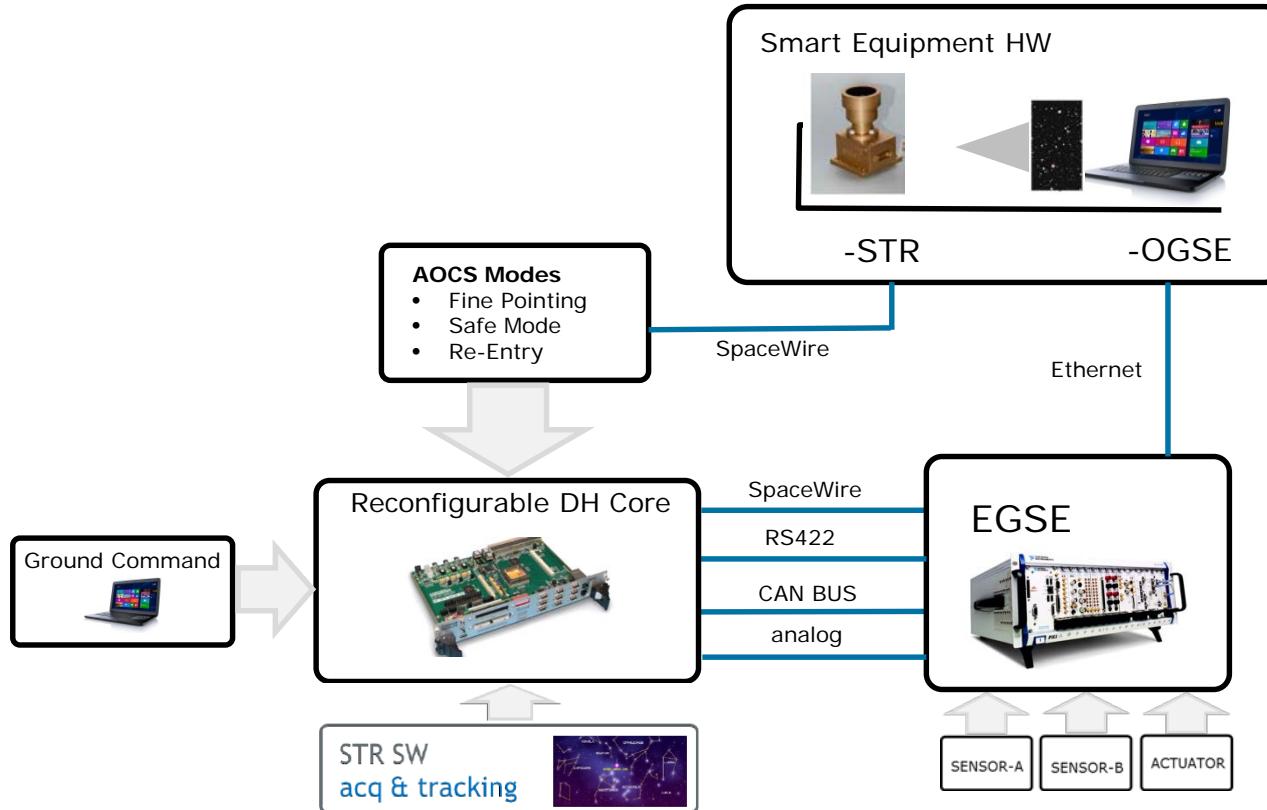


CoRA-SMART Use Case

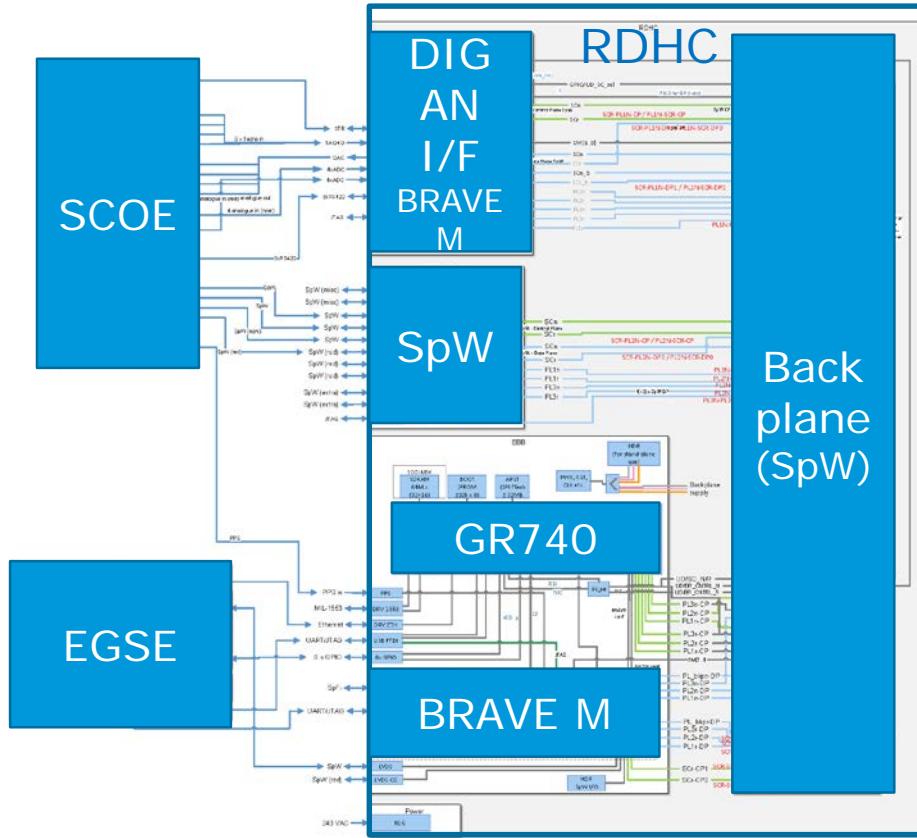
- Reference mission use case: Space Rider
 - Reusable
 - Orbital phase of up to two months
 - Inertial Pointing Mode (IPM)
 - Safe Mode (SFM)
 - Star Trackers, GNSS, Gyros, Sun Sensors, Reaction Wheels, Thrusters
 - Re-Entry phase
 - Re-Entry Mode (REM)
 - Gyros, Fluid Air Data System, Thrusters, Entry Elevons



CoRA-SMART AOCS/GNC Elements



CoRA-Reconfigurable Data Handling Core

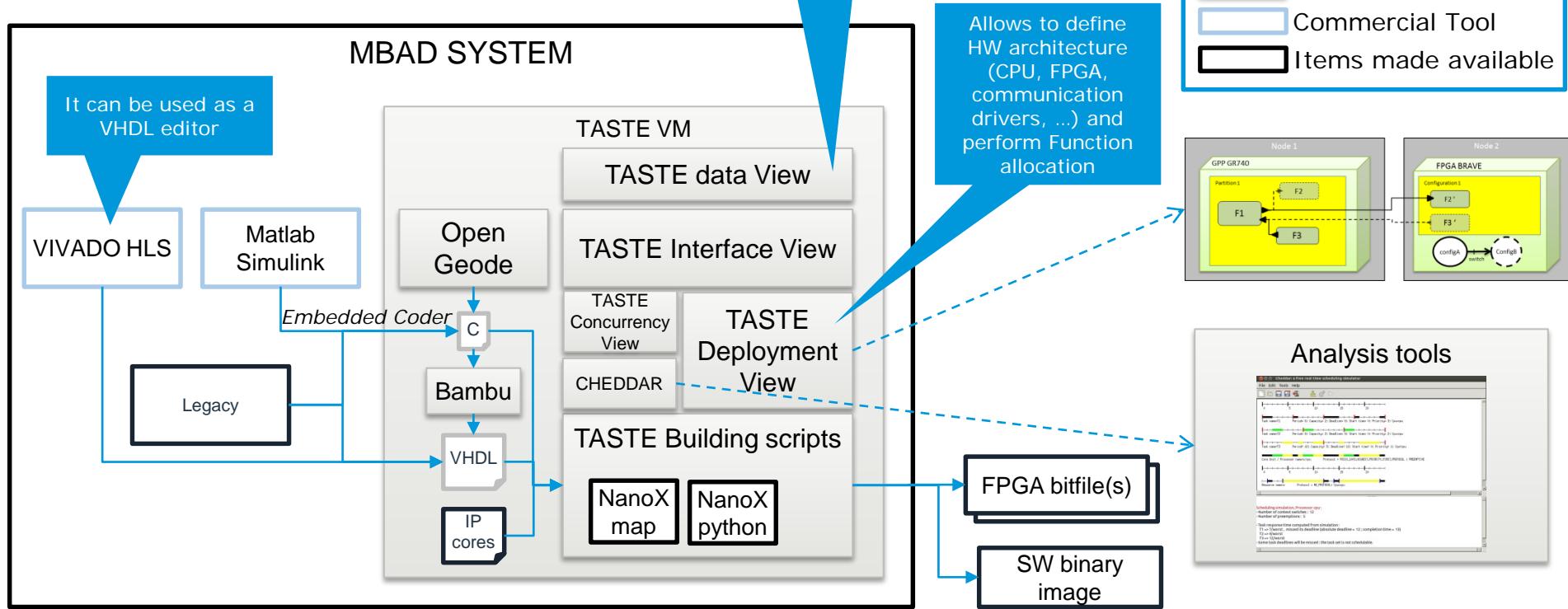


ESA UNCLASSIFIED - For Official Use

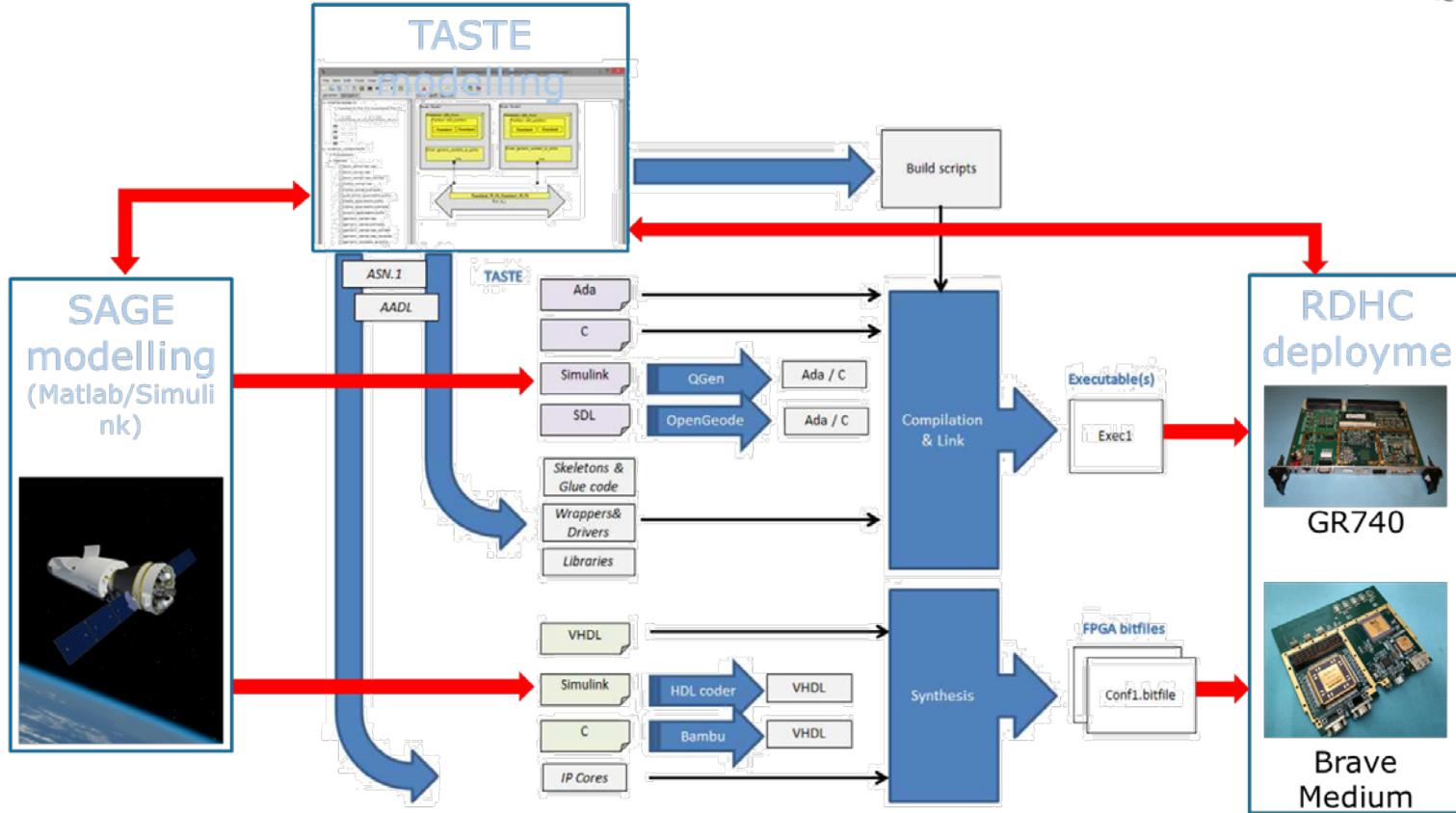
C. Honvaut, J. Istad, D. Oddenino, T. Tsiodras | ADCSS 2020 | 20/10/2020 | Slide 6



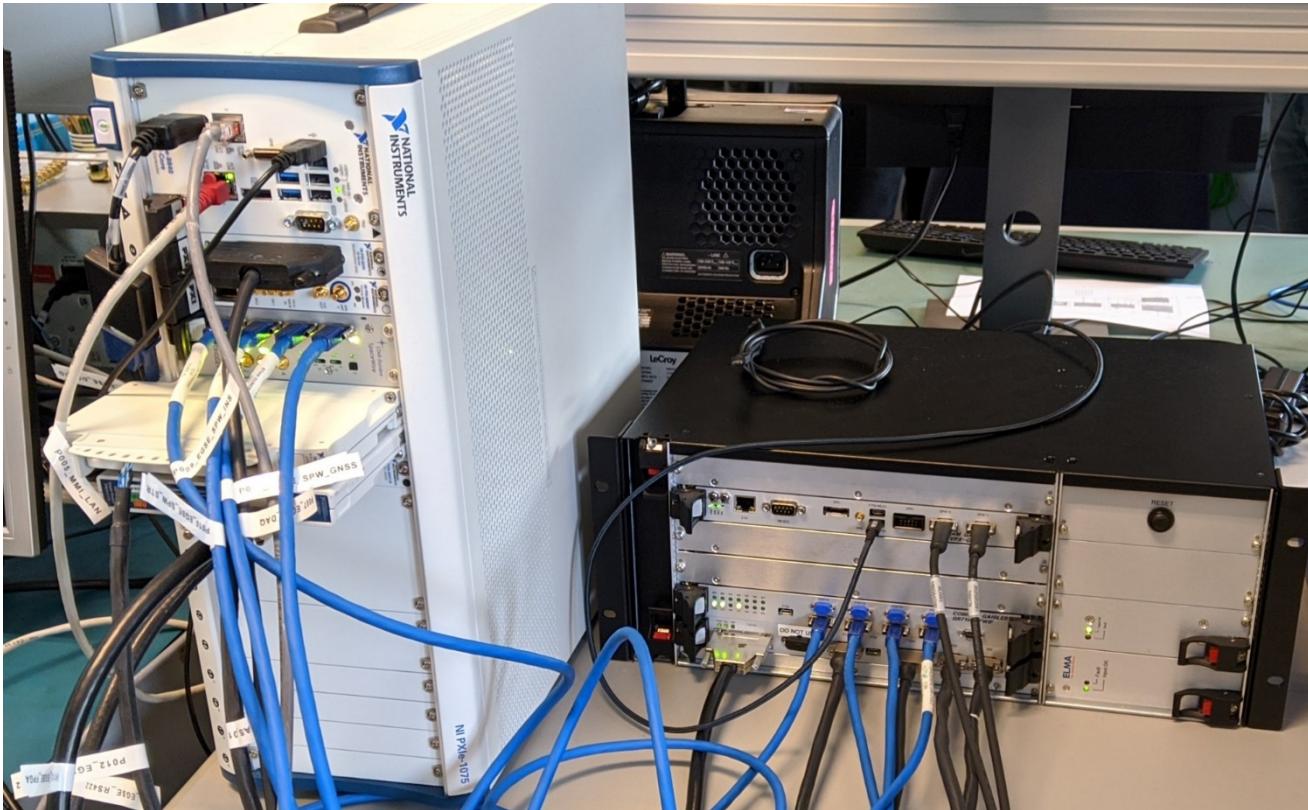
CoRA-MBAD Toolchain



CoRA – Development Flow



CoRA - Demonstrator



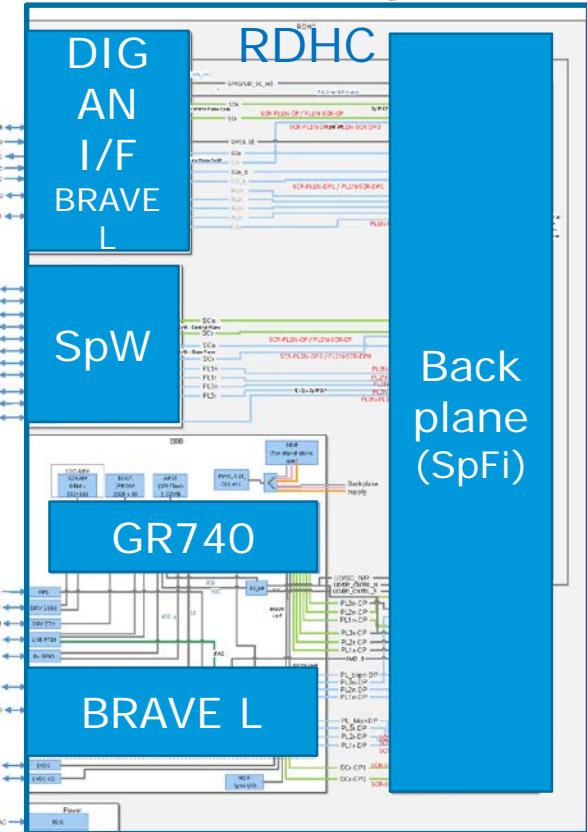
ESA UNCLASSIFIED - For Official Use

C. Honvaut, J. Istad, D. Oddenino, T. Tsiodras | ADCSS 2020 | 20/10/2020 | Slide 9



CoRA-RDHC evolutions

- BRAVE Large is replacing BRAVE Mediur
 - In support to GR740
 - In DIGAN I/F
- SpaceFiber is replacing SpaceWire on the backplane.



CoRA-MBAD evolutions

