



The Mars Science Laboratory Entry, Descent, and Landing Flight Software

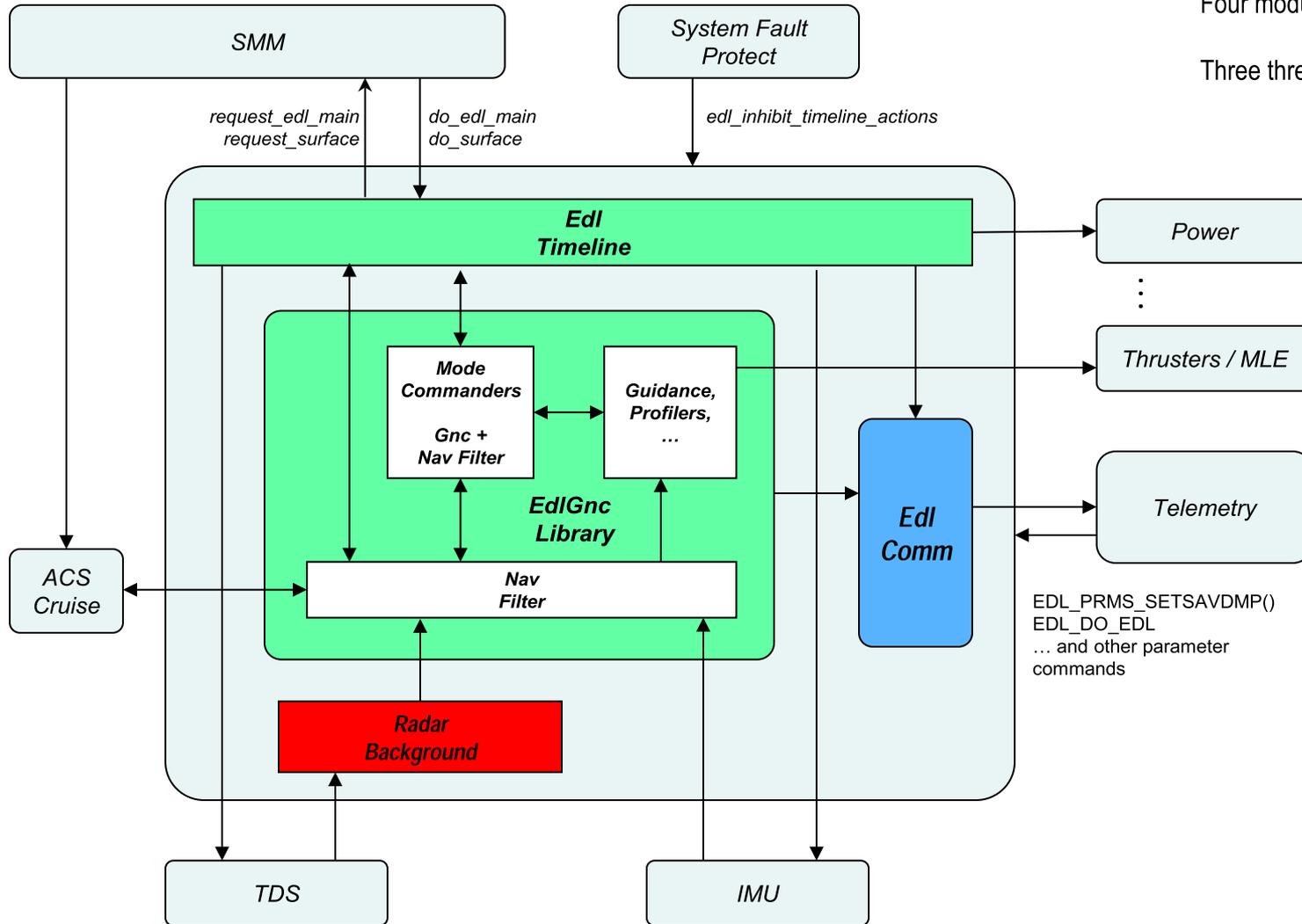
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The EDL Flight Software Organization





The MSL Flight Software Principles 1

- A module is a collection of software with high cohesion, low coupling, and singular purpose. It is the responsibility of, and is owned by, a single developer.
- A module communicates with another module through messages containing only data – no pointers may appear in a message.
- Each task executes an event loop that processes arriving messages. A task waits only on message arrival and at only one point in the code.



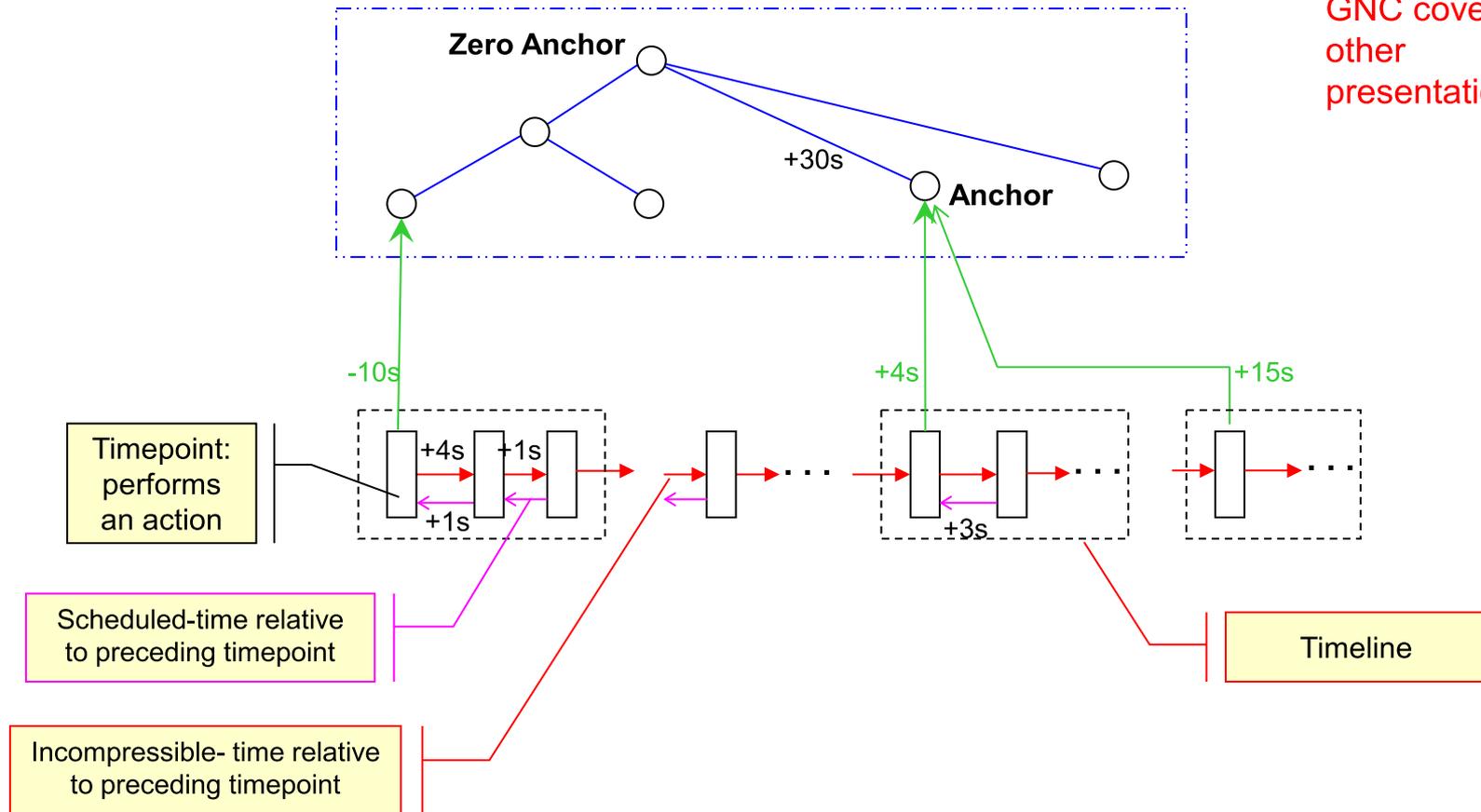
The MSL Flight Software Principles 2

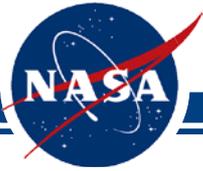
- Wherever possible, memory is allocated statically, including stack space. The remaining area is dynamic memory, which is allocated only during initialization, before any tasks have started.
- Task priorities are assigned according to Deadline-Monotonic scheduling theory. All messages for a given task should result in approximately the same computation time.
- There is a single manager or point of contact for any given decision.



The Timeline

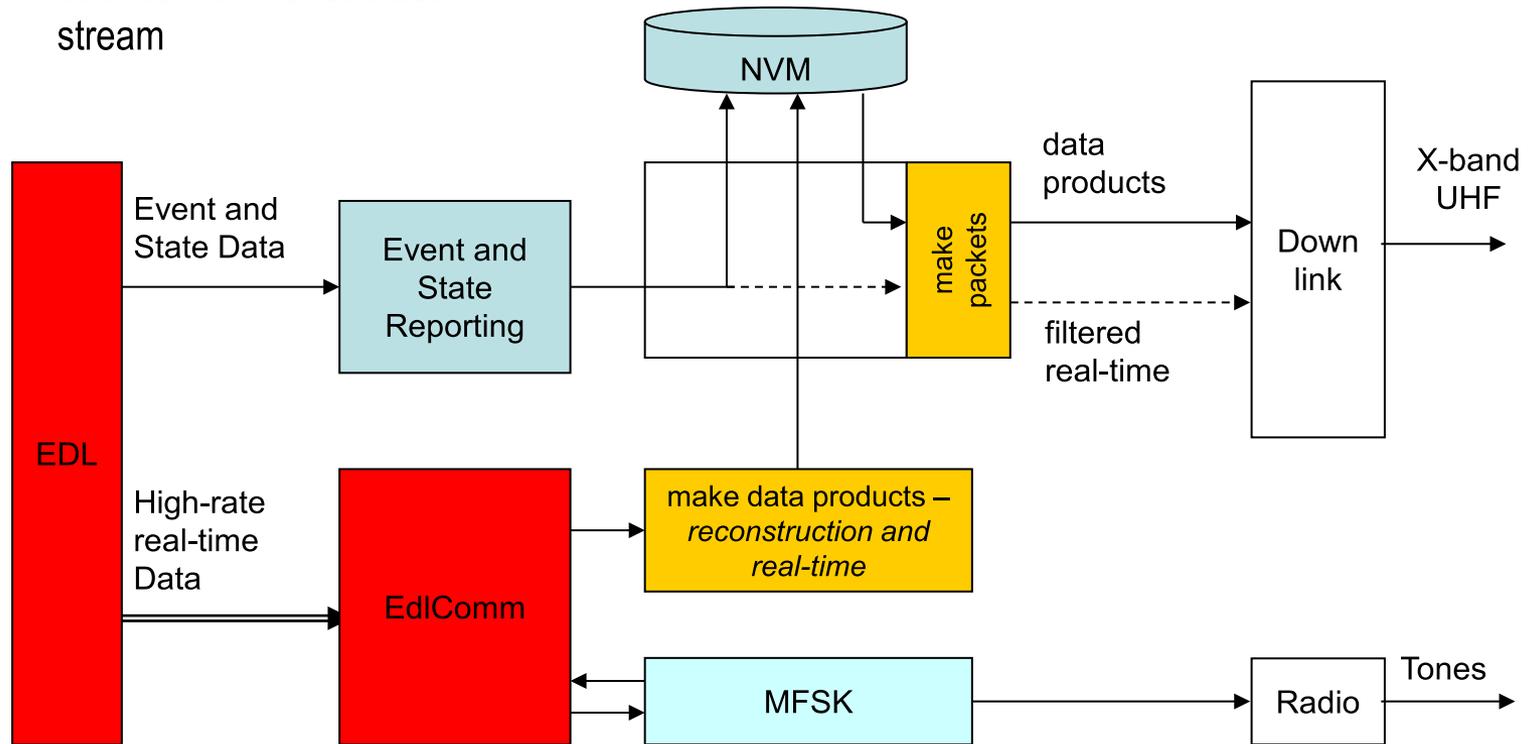
NB:
GNC covered in
other
presentations





Telemetry from EDL

The real-time stream is a substream of the recorded stream

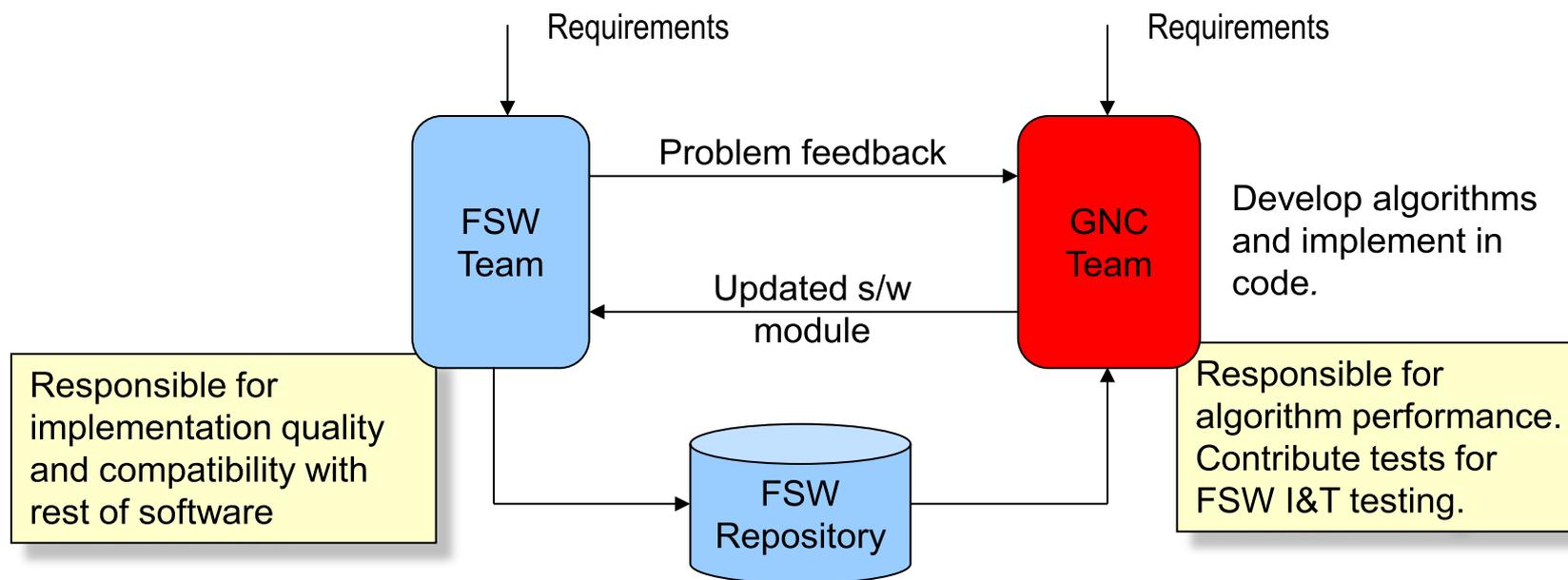




MSL Software Configuration

FSW and Gnc Interface:

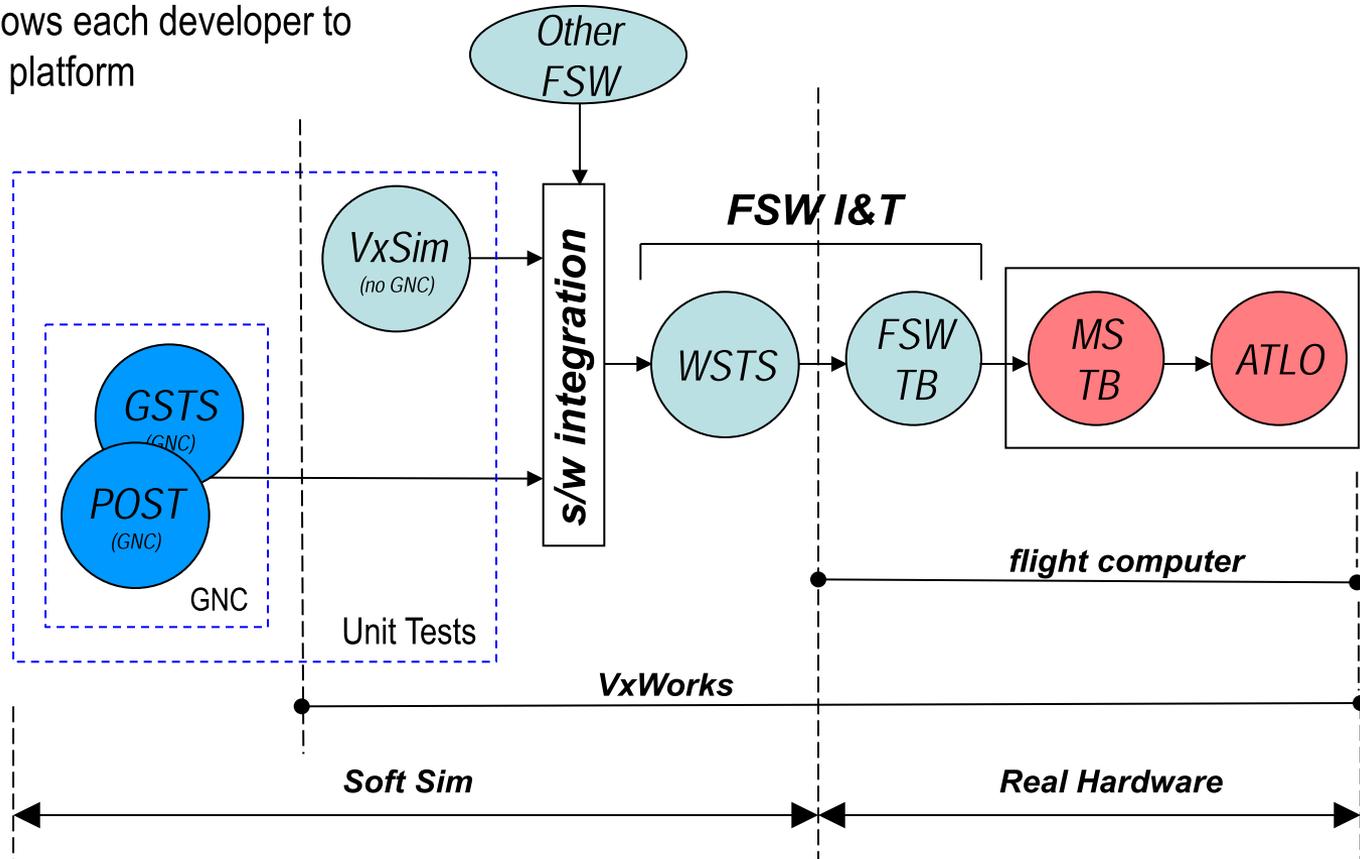
1. No agreement means no commit.
2. A team never modifies a file belonging to the other team.





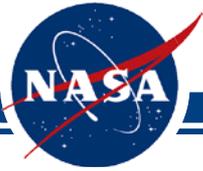
Testing

Several platforms:
Soft-sim allows each developer to have a test platform





BACKUP



EDL Flight Software Organization

