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BB08
High thrust Green propellant engine
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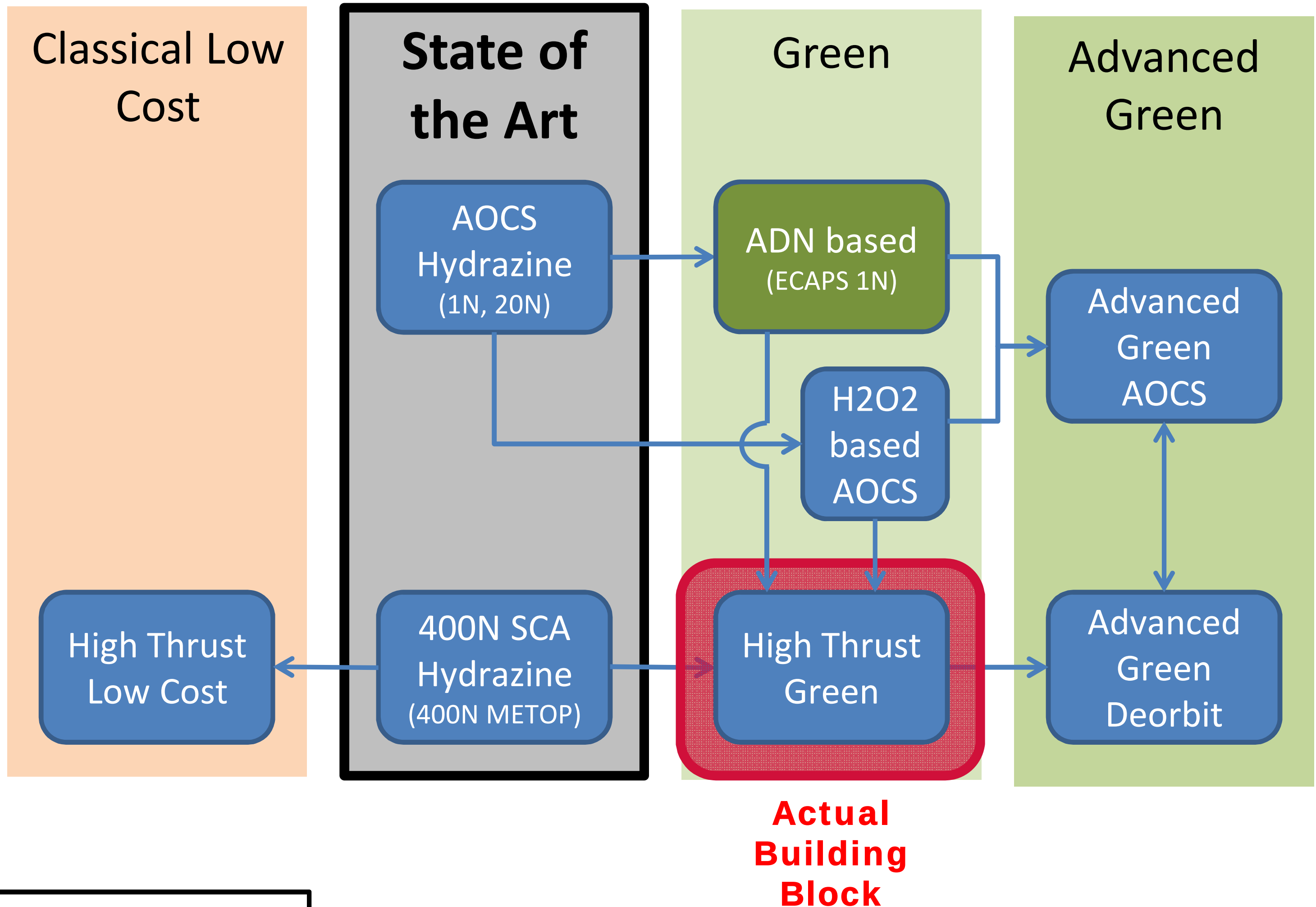
Propulsion Technology Roadmap



Description of proposed technology Building Block

Based on the heritage of the 400N SCA engine, the work done in the H2020 RHEFORM project and the successful development of an ALM printed 240 Hydrogen Peroxide Thruster a dedicated deorbit engine with green propellants is proposed.

400N Hydrazine deorbit engine

240N H2O2 deorbit engine

Description of proposed technology Building Block

- The **applicability range** would be larger LEO satellites with green propellants in an orbit that requires an active deorbiting
- The expected **Building Block performance** is estimated to be a 10s higher ISP due the use of higher performing propellants
- The expected **system level impacts** would be a lower overall propellant mass for the deorbit phase
- **Baseline** for the actual proposal is a 200N thruster design that is currently in the development in the H2020 RHEFORM project which will be tailored to the actual requirements.
- **Design options** will include other propellant candidates like Hydrogen Peroxide or HAN based propellants
- **Trade offs** will be performed w.r.t. external components (valve, heater catalyst)
- **Main technical challenges** during development will be the thermal load (ADN, HAN based propellants) and system impacts (H_2O_2 based propellants)

Work Package Description

Inputs:

- Propellant: LMP-103S with an inlet pressure of 24 bar (repressurized) down to 5 bar (blow down). As an option H2O2 shall also be considered with a low effort
- Thrust level: between 100N and 400N; assess impact on thruster design
- Target volume, mass, throughput, operational mode and thruster orientation. Remark: if these values cannot be given realistic assumptions will be used

Output: Summary report according following work logic:

- Market overview (SOA deorbit engines)
- External COTS component assessment (FCV, CBH, TFS) with focus on compatibility
- Overall design options within specified envelope (level / inlet pressure range). Within this part elaboration of optimized nozzle (orientation, expansion ratio)
- Thruster baseline layout based on lessons learned during H2020 RHEFORM program with specific focus on thermal design & materials
- Thruster performance assessment (Fvac, ISP)=f(inlet pressure)
- Catalyst selection based on lessons learned during H2020 RHEFORM program
- *Development Road Mapping and Development & Unit cost estimates*