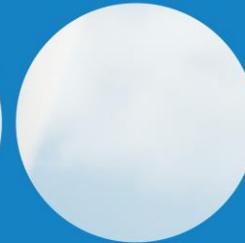


HAPSS certification challenge

Bartjan Rietdijk
Conscious Aerospace





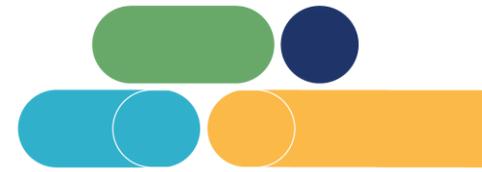
New Dutch company, founded September 2022, developing a

Hydrogen Propulsion System (**HPS**)

from tank (liquid hydrogen, fuel-cell electric) up to propeller

to be integrated into existing (**RETROFIT**)

and new built regional propeller aircraft (**CS-25**)



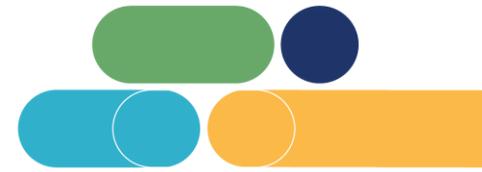
HAPSS Project – NL National Growth Fund

- National Growth Fund awarded 383 Mln € funding to Ministry of Infrastructure & Water management “Aviation in Transition” Project
 - Hydrogen Aircraft Powertrain and Storage System (HAPSS) is the largest project under “Aviation in Transition” with a ~ 90 Mln € grant
- 12 partners – combining 100+ years of aviation experience incl. hydrogen innovations

 HPS OEM / Integrator	 advanced cryogenics	LH2 Storage & Distribution	 Sensors		
 Specialists in fibre reinforced composites	 Fuel Cell System	 Compressors		 CONSULTING AND ENGINEERING	
 E-Motor			Knowledge & R&T	Engineering & Consultancy	

- Cooperation with De Havilland Canada



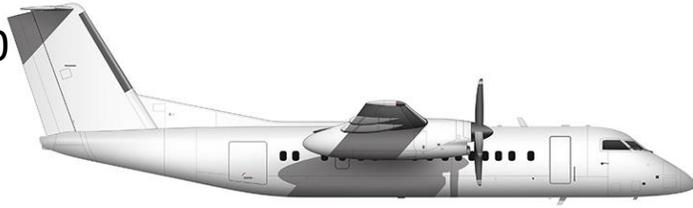


Envisaged Certification route

Planned to be certified by 2028

Existing Dash8-300

- TC A/C
- TC engine
- TC Propeller



Significant Change

- Remove engines
- Modify A/C
- Install Hydrogen Propulsion System



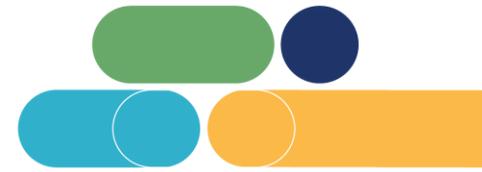
HAPSS Dash8-300

- STC A/C
- TC HPS
- TC Propeller

Build a Design Organization

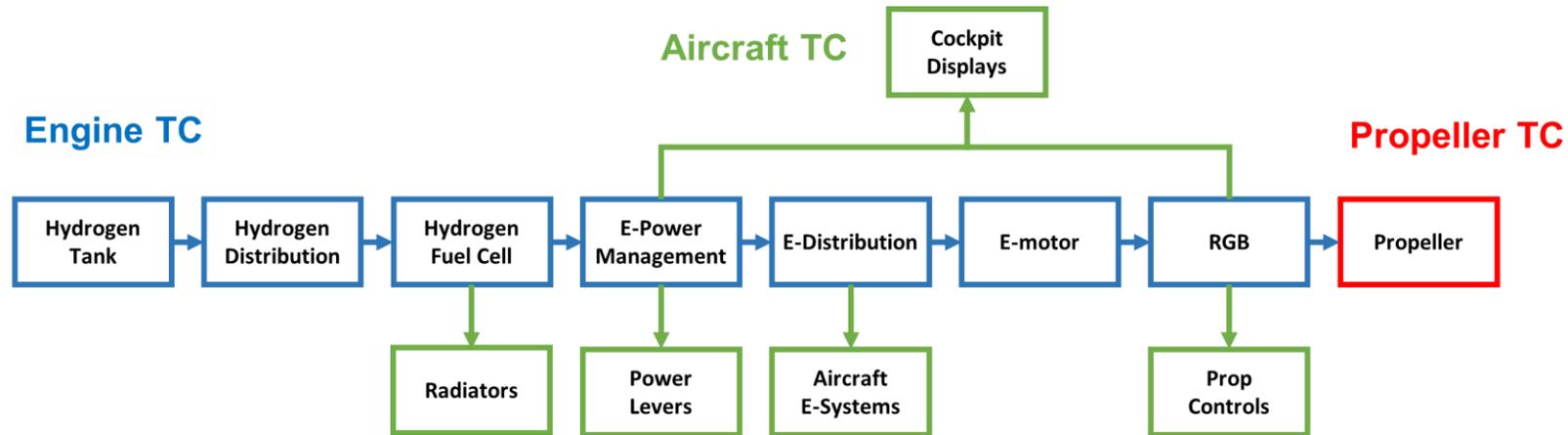
- DOA





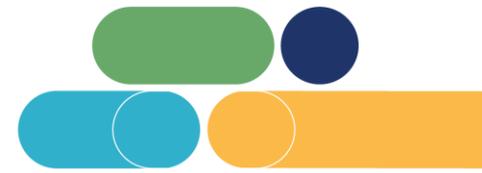
Proposed Type Certificate HPS

Type Certify the “Hydrogen Propulsion System” (HPS) from storage system up to propeller.
In analogy with the SC E-19 Hybrid Electrical Propulsion System



Rationale:

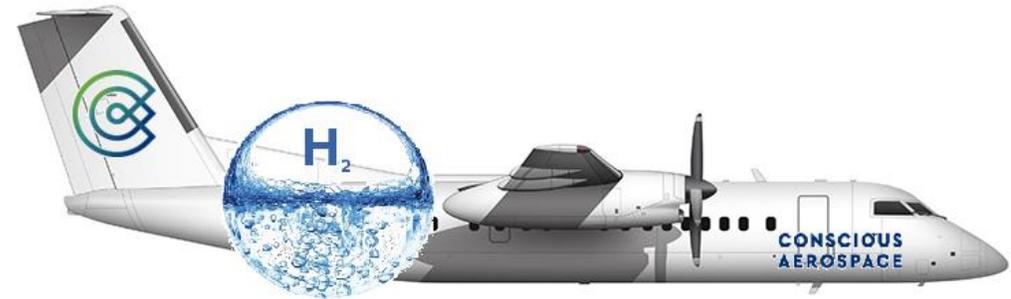
Aircraft performance is driven by a tight, centralized control of the energy chain:
physics phase change - chemical to electric - electric to mechanical



Proposed A/C certification approach

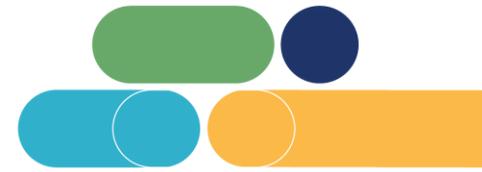
Aircraft Level: STC

- With aircraft OEM support
- Effects of hydrogen
- HPS installation as powerplant



Envisaged Certification Route to Market

- Demonstrator / Permit to Fly from NL CAA
- HPS TC from EASA
- Aircraft STC under EASA and/or Transport Canada
- Export of STC to aircraft operator countries



Certification base for A/C & HPS

HPS is novel:

- Requires a lot of conversations
- Requires learning to master new technologies
- Requires educating specialists & CVE
- Requires understanding of failure modes
- Requires public consultation
- Requires...

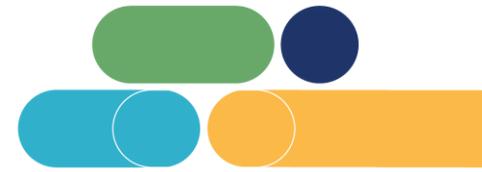


In execution

Innovation Partnership Contract
Pre-application
Application

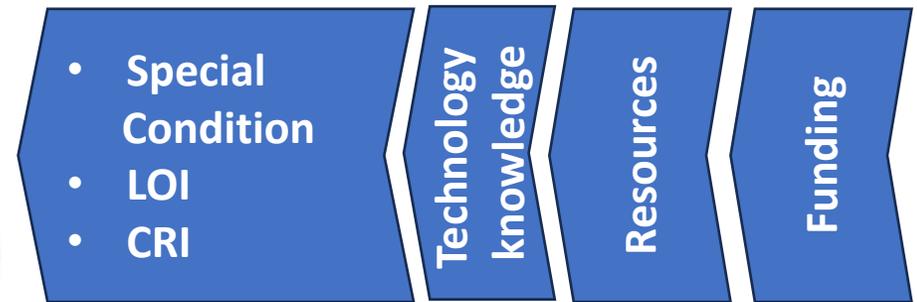
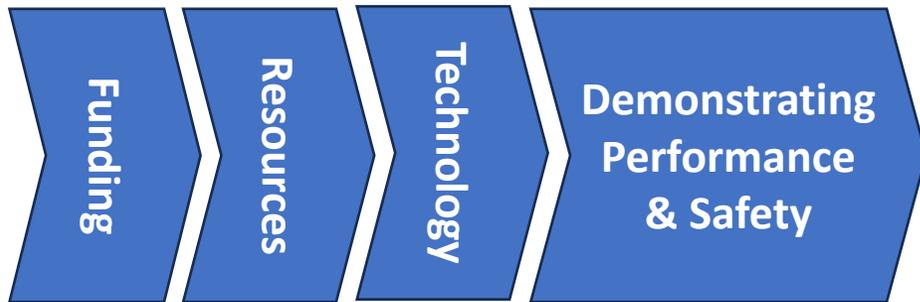
Certification Base





Certification Challenge

Dancing...



...is all about timing



Certification Conference

October 24, 2023
Cologne

Thank you!

