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AEROSPACE ADVANCED TECHNOLOGY

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SEAGULL
GENERAL AIRCRAFT PRESENTATION

May 12, 2018

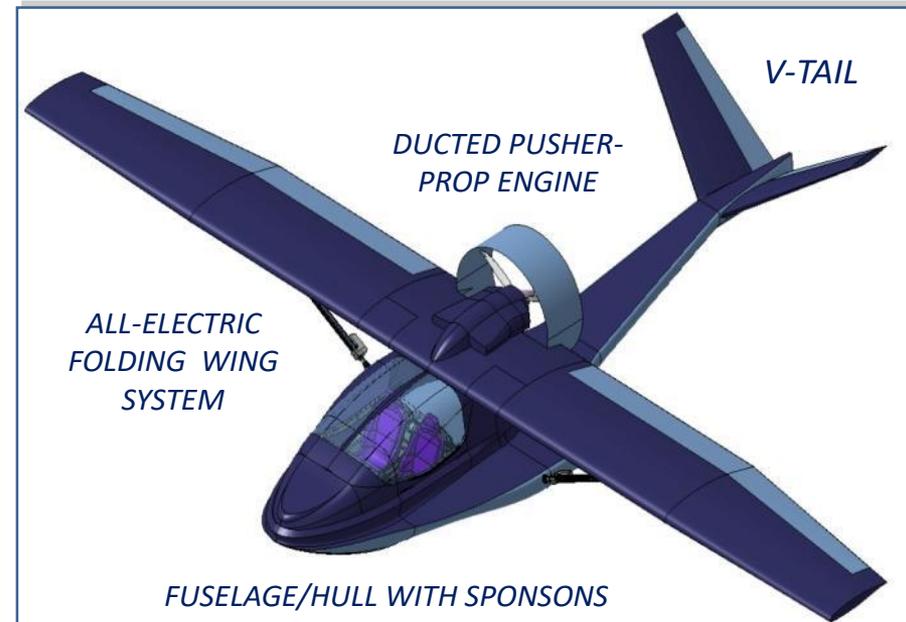
SEAGULL - The Marin-Air Vehicle for the Millennial Generation



The SEAGULL is a **breakthrough** with respect to the current transportation systems, a high performing **ultralight amphibian aircraft**, **easy** and **economical**, operating from any infrastructure in complete **autonomy**.

SEAGULL Main Characteristics

- Fully composite amphibious
- Braced wing (through linear actuators)
- Automated Folding wing allowing the usage:
 - as classical UL aircraft (no folded)
 - as sail boat (folded at 90°)
 - as ship or for ground transport and storage (fully folded aft)
- Single engine pusher configuration
- Ducted fan to ensure safety in water navigation
- Hybrid propulsion system (alternative)
- Retractable landing gear



Project partially **funded** by
MISE - Italian Ministry of the Economic
 Development (Law 808/85)

Financing of **1.3M€** of which
 55% to be returned

SEAGULL Aircraft - Operating Configurations



SEAGULL A/C in 5 words:

- ✓ UNIQUE
- ✓ INDEPENDENT
- ✓ YOUNG
- ✓ LIGHT
- ✓ ECO-FRIENDLY

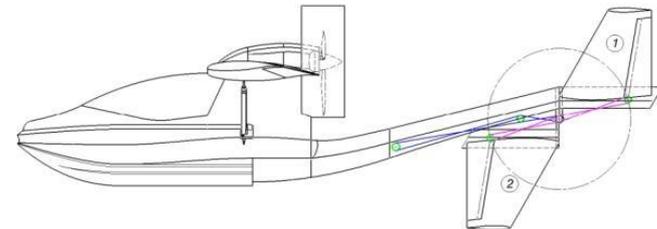
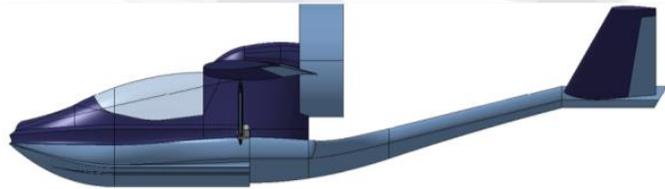
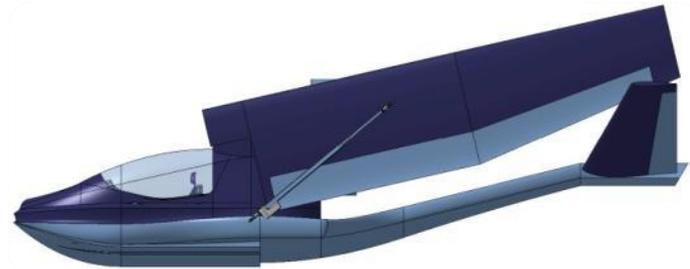
Ultralight Aircraft configuration



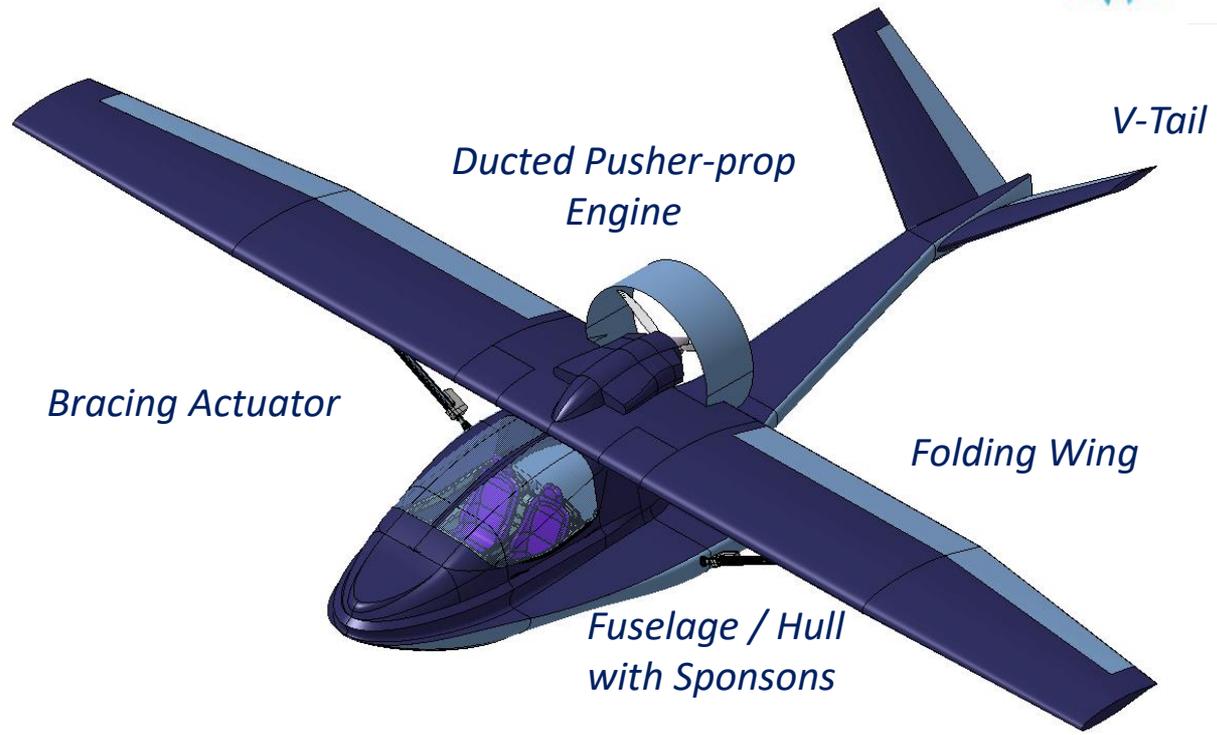
Sail configuration



Ship and Mooring Configuration



SEAGULL Aircraft – General Characteristics and Dimensions



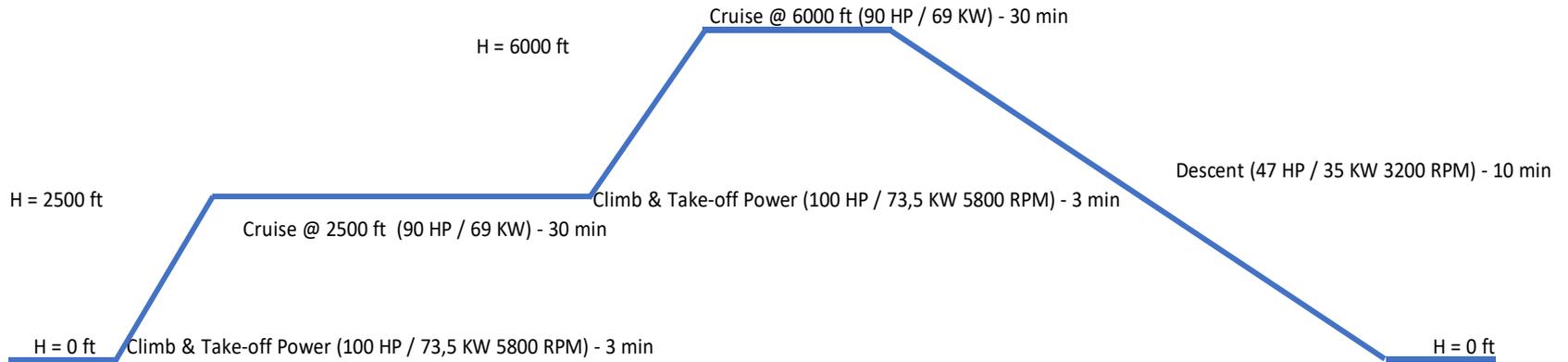
W_{TO} [Kg]	627.0
W_E [Kg]	397.0
S [m ²]	13.7
b [m]	11.5
AR	9.7
$L_{fuselage}$ [m]	7.4
H_{tail} [m]	2.4

V_s [KTS]	37.0 (70 km/h)
V_c [KTS]	92.0 (170 km/h)
H_{cruise} [ft]	6000
Max range	500 Km
Engine	Rotax 912 ULS Engine (baseline) Hybrid (alternative)
Propeller	Sensenich 3B0R5R68C 3 bladed 68"dia.

SEAGULL Aircraft – Basic Mission profile



The aircraft is mainly addressed to Sport and free-time utilization. The basic mission of the airplane can be defined as:



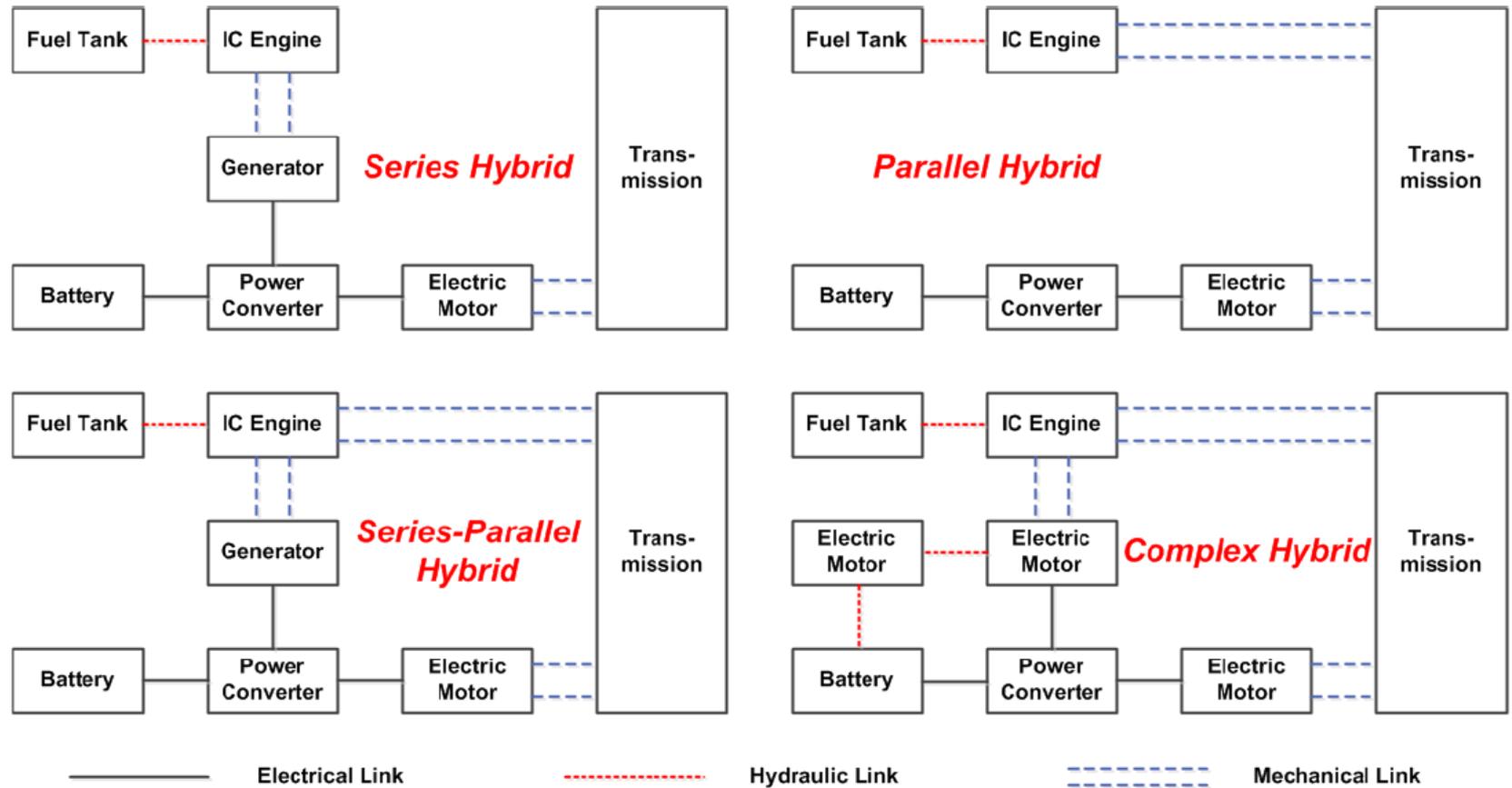
PHASE	ENGINE POWER* [kW]	RPM	Δt [min]
Take-off + climb (1+2)	73.5	5800 RPM	3
Cruise @2500 ft(3)	69.0	5500 RPM	30
Climb(4)	73.5	5800 RPM	3
Cruise @6000 ft(5)	69.0	5500 RPM	30
Descent and landing (6)	35.0	3200 RPM	10

*The basic Powerplant include the installation of ROTAX 912 ULS/S engine 100 SHP@5800 RPM

SEAGULL Aircraft – Alternative Powerplant: Hybrid



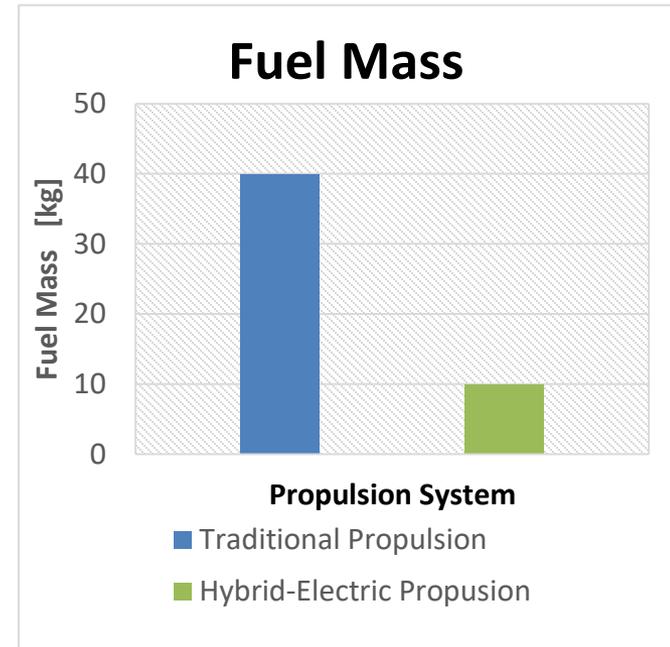
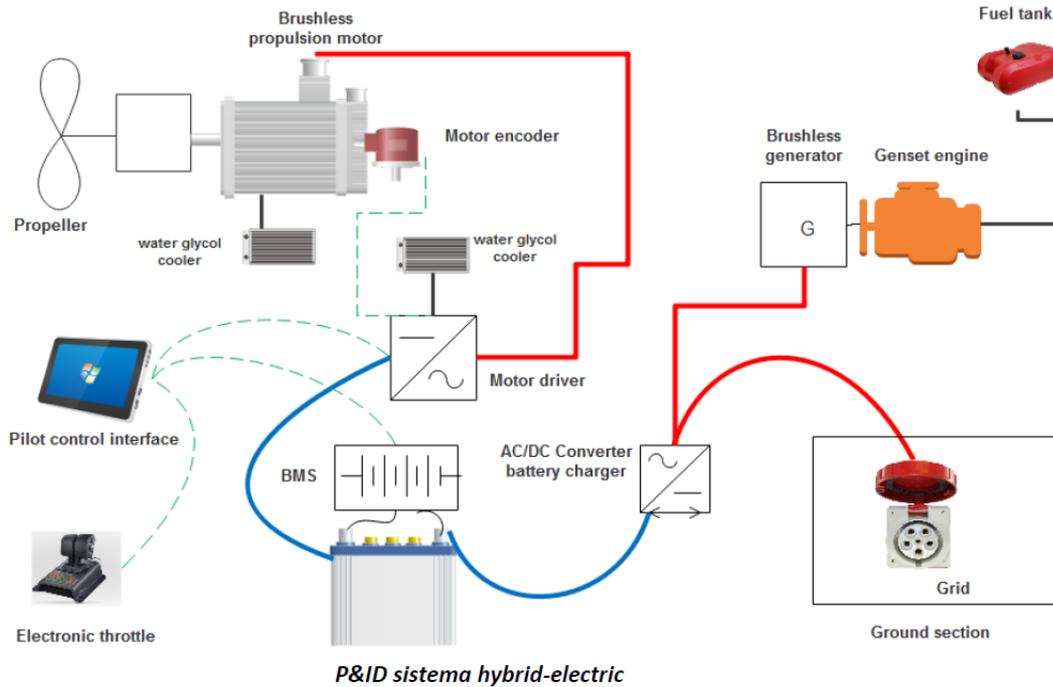
Architecture of Hybrid-Electric Propulsion System



SEAGULL Aircraft – Alternative Powerplant: Hybrid



Series Hybrid-Electric Propulsion System



Main advantages of the Hybrid-Electric propulsion system:

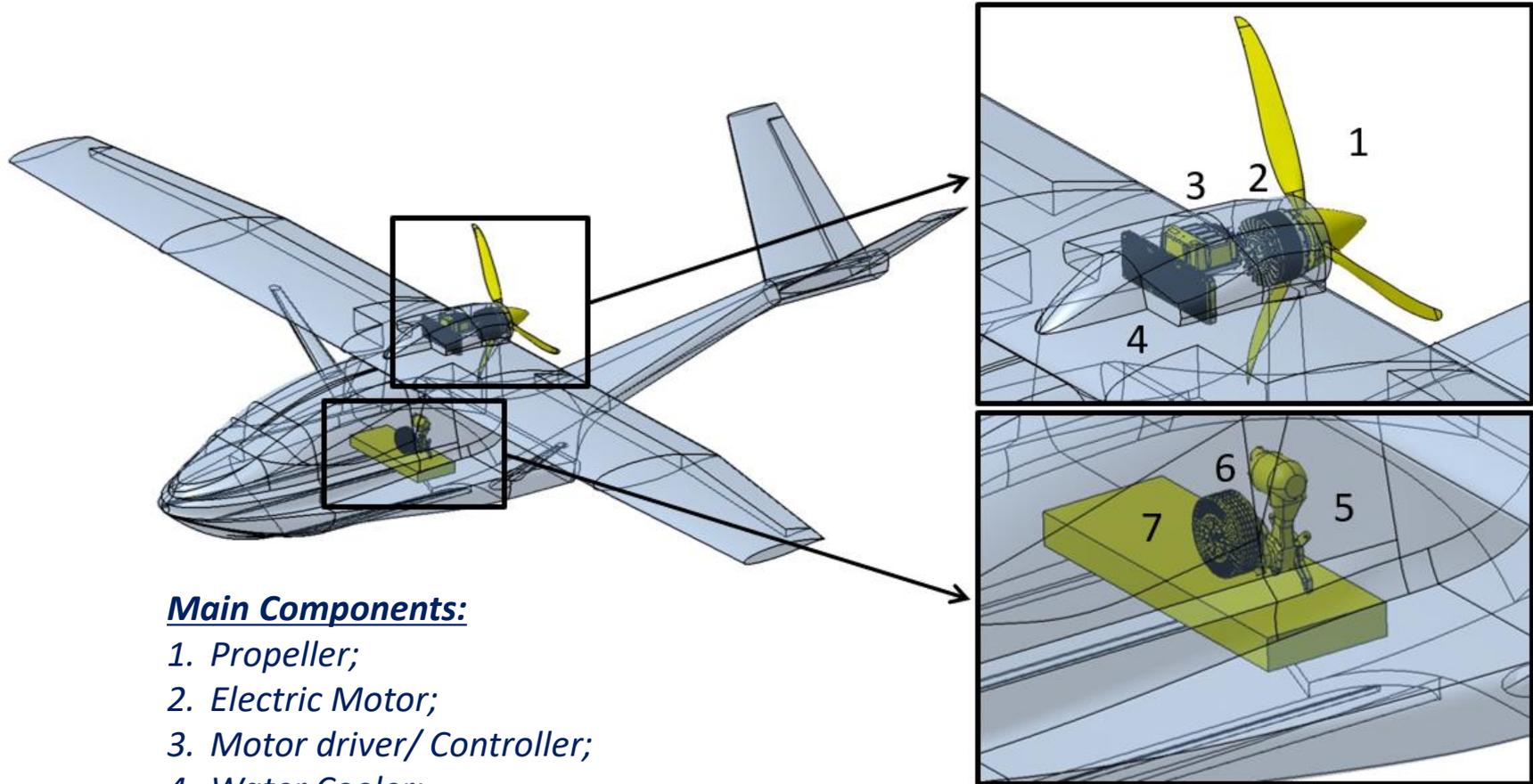
- Less consumption and pollution by using hybrid drives;
- Increase of efficiency of aircraft by distributed propulsion;
- Silent propulsion
- Lower operation costs (fuel, maintenance);
- Safety increase with redundant energy source.

SEAGULL Aircraft – Alternative Powerplant: Hybrid



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Hybrid- Electric Propulsion - SEAGULL



Main Components:

1. Propeller;
2. Electric Motor;
3. Motor driver/ Controller;
4. Water Cooler;
5. Endothermic Engine;
6. Generator;
7. Battery pack

SEAGULL Aircraft – Airframe Architecture



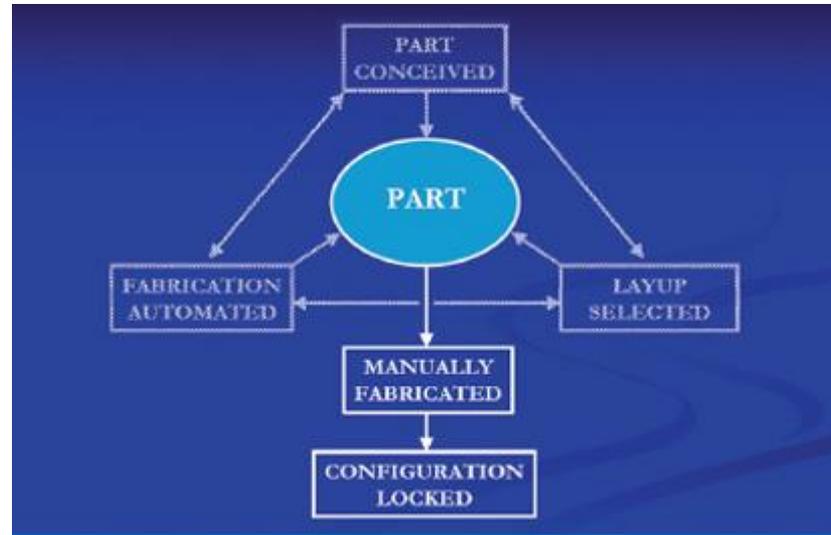
Fully composite amphibious means: *Composite Materials >70% using Automated (AFP) and Out-of-Autoclave processes*

Design Target
 $W_{TO} < 650\text{Kg}$
 CS-LSA (Light Sport Aircraft)

- Low certification costs
- Low fuel consumption (low pollutants emission)

Design and Manufacturing based on **Part Centric Design Approach:**

Manufacturing process defined when the part is conceived

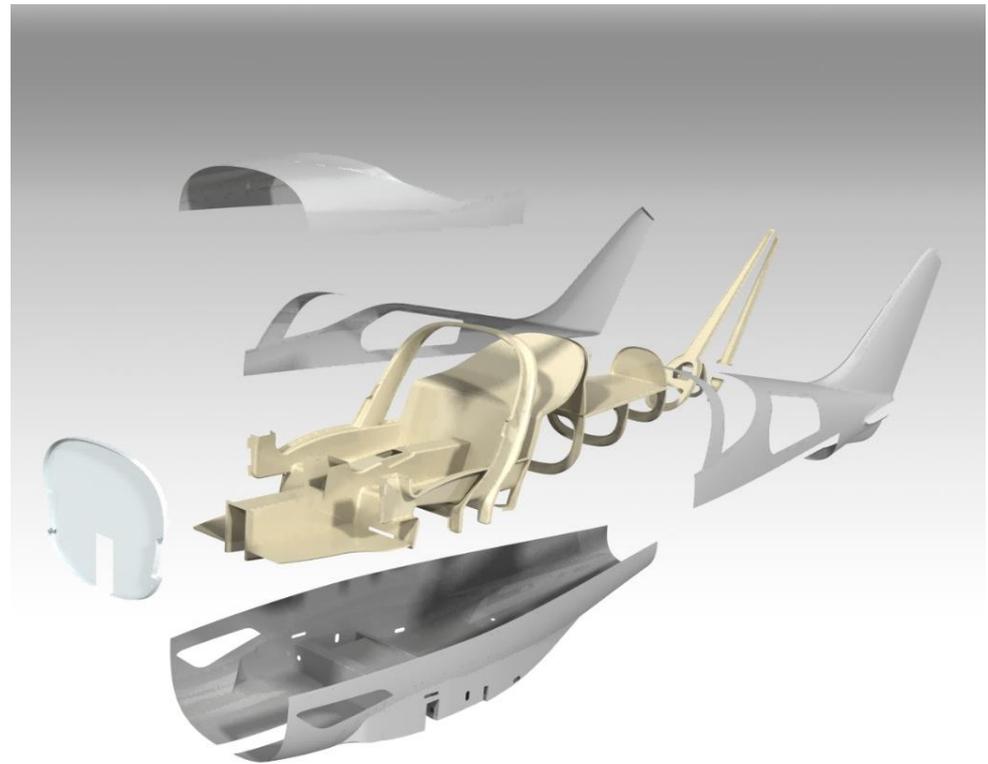


SEAGULL Aircraft – Airframe Architecture

Fuselage and Tail components architecture

The evaluation and definition of the proper manufacturing process and the fuselage airframe assembly of each component is under investigation.

The use of large **monolithic parts** will extensively applied depending also by the manufacturing capabilities. When manufacturing constraints limit this approach the main components could be split into smaller subcomponents.

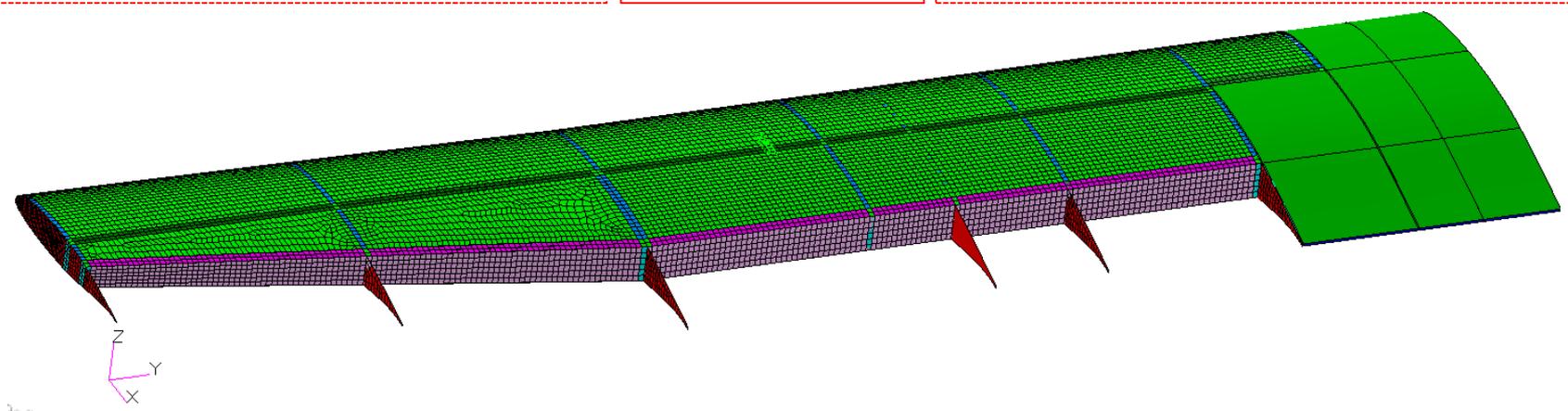
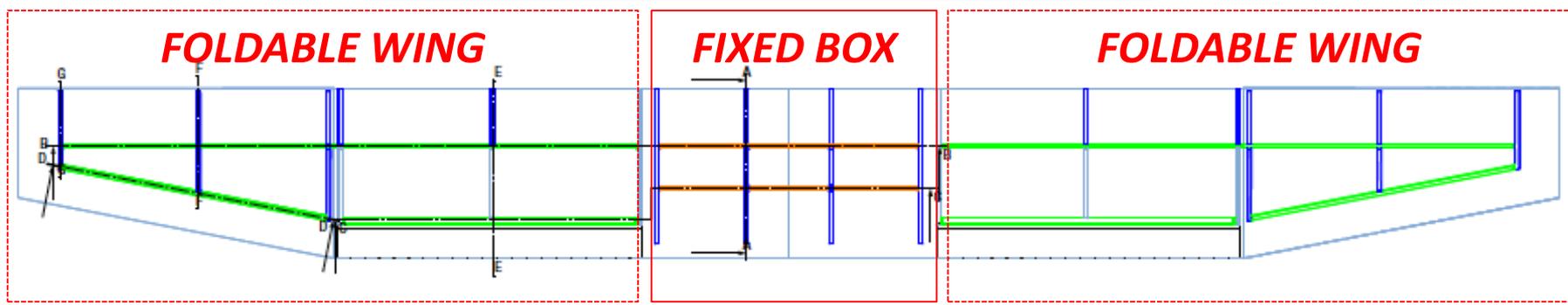


SEAGULL Aircraft – Airframe Architecture



Wing components architecture

Wing composed by Foldable and Fixed parts



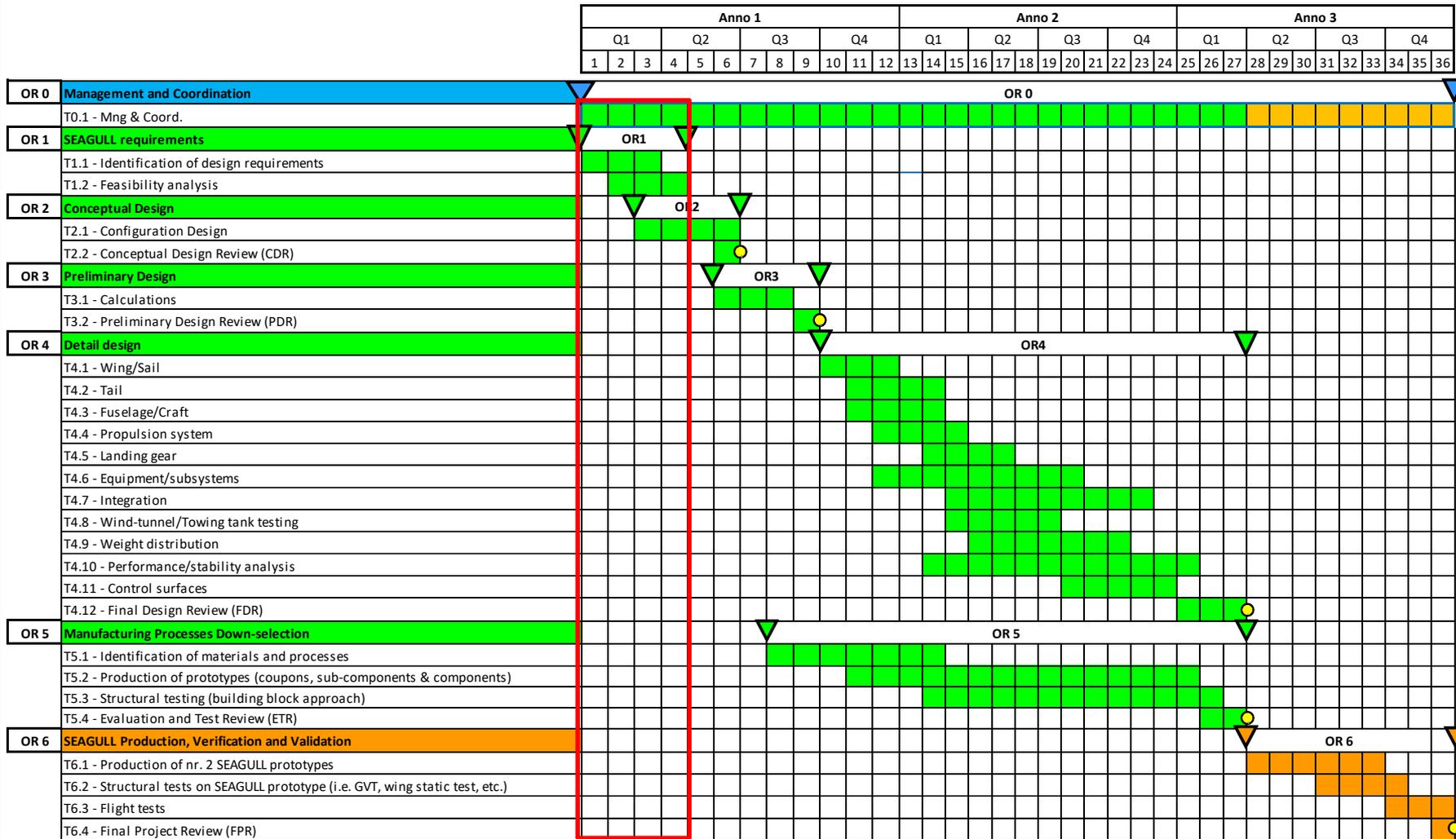
Ongoing activities:

- Study of the **Folding mechanism** composed by torsion tube and struct-actuator;
- **Ribs, Spars and Skin** sizing by FEM upon defined the manufacturing processes

Activities scheduling - GANTT



SEAGULL - General Aircraft Presentation



Start date: January 2018

← 3 years →

End date: December 2020

Thank you for your attention

*If You Want To Go Fast, Go Alone.
If You Want To Go Far, Go Together.*



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