



Dedicated to innovation in aerospace

# Conceptual design of aircraft

PRODUCTS & SERVICES



## Efficient aircraft modelling capability for conceptual design analysis and performance evaluation

The increasing environmental impact of air travel puts a strong challenge on the aircraft industry to come up with innovative technologies. Hybrid/electric propulsion technologies and hydrogen based systems are leading to radical new aircraft configurations. Conceptual aircraft design is therefore necessary for fast analysis and quick evaluation. Unconventional aircraft configurations and enhanced propulsion layouts are being investigated as potential solutions. But what is the approximate aerodynamic performance and weight of the airframe? Efficient modelling and simulation of new aircraft concepts is needed to quickly evaluate their feasibility, e.g. in terms of performance.



### WHAT YOU NEED

- Concept studies at aircraft level;
- Different design solutions for multiple multidisciplinary requirements;
- Propulsion system requirements for an innovative aircraft;
- Weight estimates for new aircraft concepts;
- New aircraft performance estimates, e.g. in terms of environmental impacts.

### WHAT WE DELIVER

Conceptual design and sizing methodologies for conventional and radical aircraft configurations, e.g. with (hybrid) electric propulsion. Including corresponding analysis and optimisation results.

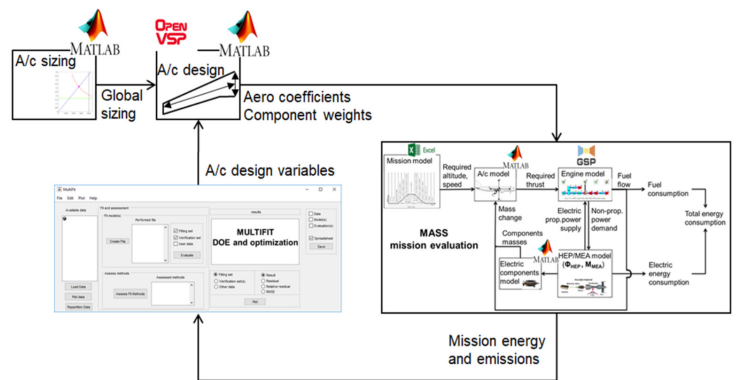
### OUR CAPABILITIES 1

- Efficient and integrated tooling: MUCH – MULTidisciplinary Conceptual design of Hybrid electric aircraft;
- Aircraft propulsion and mission modelling capabilities (GSP);
- Efficient simulation capability for mission performance and technology scenario analysis of aircraft (MASS);
- Extensive surrogate modelling and optimisation methodologies (MULTIFIT);
- All tool developments are based on a long track record in aircraft multidisciplinary design and optimisation (MDO) including collaboration with industrial and research partners.

### OUR CAPABILITIES 2

What can be achieved with the MUCH tool chain:

- Parametric conceptual design studies for conventional and unconventional aircraft configurations;
- Aerodynamic characterisation and weight estimation of innovative aircraft configurations;
- Energy performance optimisation for future aircraft concepts;
- Evaluations of alternative propulsion and power concepts, such as (hybrid-)electric systems, more electric or hydrogen based systems.



### WITH THE MUCH TOOL CHAIN NLR CAN MODEL

Aircraft configurations for efficient conceptual level design and extensive analyses and optimisations of aircraft energy performance. Models of various complexity levels can be applied, depending on the needs.