In today’s complex system engineering such as in the aerospace field, the designers face requirements that become a challenge to satisfy: the system specifications are narrowing (due to safety regulations, environmental constraints, costs), the development delays are shortening and the performance of the system has to be established as soon as possible with sufficient accuracy. Therefore, a strong need exists in the industry for advanced design methodologies that could provide a competitive advantage in reducing delays, costs and help complying with difficult requirements.

Multidisciplinary Design Analysis and Optimization
Application to reusable launchers
What is MDAO?

The field of Multidisciplinary Design Analysis and Optimization (MDAO) provides efficient answers on how to integrate increasing knowledge into the design process, while reducing the design cycles.

- MDAO consists of a core of key methodologies, such as multi-disciplinary problem formulation and decomposition, optimization under uncertainties and surrogate modeling based on high-fidelity tool integration, which are validated and enriched through confrontation with various kinds of design studies.

- MDAO facilitates the exploration of the design space and allow to provide the decisionmakers with precious help to handle the complexity of ambitious future systems.

- MDAO design process is in close interaction with design experts through data management techniques to analyze results and assess trade-off between candidate solutions.

Design platform and facilities at ONERA

ONERA invests in design facilities and develops platform including multidisciplinary models coupled with MDAO methodological libraries. These resources are used to design future aerospace systems such as new transport aircraft involving blended wing body, rotary wings or distributed propulsion; convertible drone architectures or reusable launchers.

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