

Industrial Perspective

AeroGust Project Workshop
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Larger aerospace companies provide vital industrial perspective:

- Context for the research to ensure future exploitation
- Experience on the current gust loads process
- Understanding of the certification route to the project
- Helping to direct the research of all partners through test case selection and analysis of results

Airbus Defence & Space

Presented by Michail Iatrou



Main Objective:

Development of a UAV **airframe** for long endurance flights up to the high subsonic regime



Airframe:

structural weight reduction for very high aspect ratio wings

Certification Authorities:

- Where will a future military UAV operate i.o.w.
Will certification be needed?

Open Question

- How will a certification process for a future UAV
look like? CS-23, CS-25?

Open Question

Why are we part of AEROGUST?

- As observers, keep the connections with other cutting edge technology developers and providers in Aeroelasticity
- Track technology development and confirm or not feasibility/applicability of new approaches and methods
- Compare with in-house developments of methods and tools

Interesting results so far:

- Report on coupling with full order geometrically non-linear finite-element structural methods (D2.5)
- Uncertainty Quantification and Sensitivity Analysis in Gust Loads Analysis of Highly Flexible Aircraft (IFASD Abstract)

Dassault Aviation

Presented by Laurent Daumas



Industrial design issue :

Gust is one of the major sizing case for wings (incl. slats) and HTP

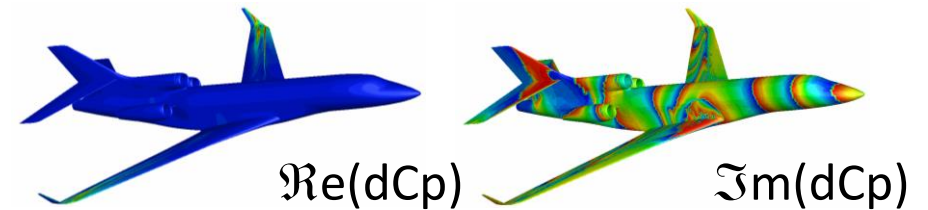
Dassault Aviation objectives

Reduce global sizing loads which will lead to a structural mass reduction →
develop and validate new process

Status at kick-off meeting

Status of process and tools :

- Gust modeling is performed using CFD based on angle of attack method, this leads to over-conservative design
- Linearized CFD tools are available and used for flutter design
 - o but not relevant for “high frequency/amplitude” gusts
- Unsteady CFD (DES) is available and used for several aerodynamics applications

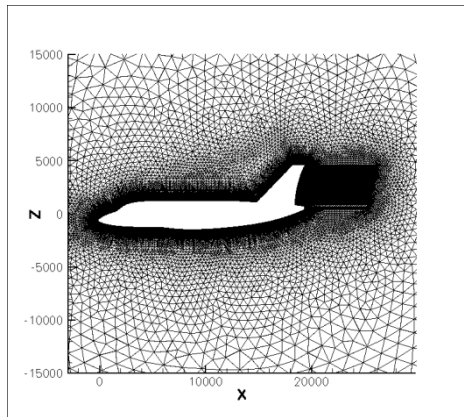


Aerodynamics :

Unsteady FVM approach has been developed, validated and applied to a generic Falcon configuration → big improvement in modeling capability already achieved within the AEROGUST project

Future work :

Interface output of new CFD process with structural design process

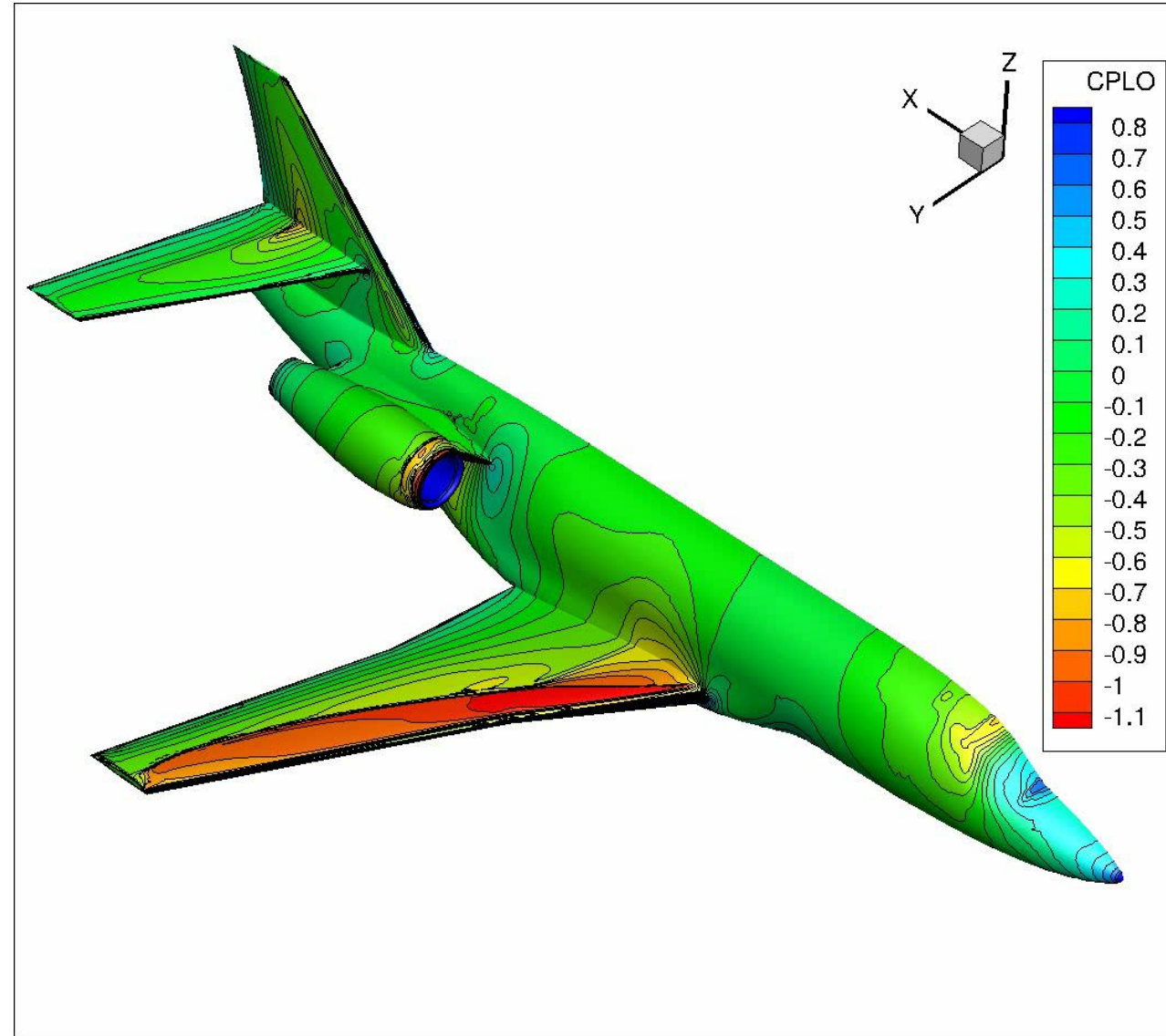


Gust characteristics

$$x_{g0} = -15 \text{ m}$$

$$l_g = 5 \text{ m}$$

$$v_{g \text{ max}} \sim +2^\circ \text{ aoa}$$



Aerodynamics :

Innovative advanced methods developed by different partners :

- based on ROM
- Gust model taking into account atmospheric disturbances

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- maturation through AEROGUST project
 - available results show promising capability
 - applicability to industrial problems will be fully assessed during the last year of the project

Piaggio Aerospace

Presented by Massimiliano Genta



Main Objective:

- To have awareness of new developments in gust analysis and consider potential impact for company. To compare in-house method with other approaches for a common test case and to perform sensitivity analysis on aerodynamic non-linearities based on WTT data.

Gust loads are important safety criteria and part of the design and optimisation loop.

- New design
 - Relies on know-how from people as resource to save time and money. CFD and simplified structural models used but would not have experimental validation
- Derived design
 - dimensioning load cases may be similar
 - certification approach may be simplified
 - calculation models are already tuned
- Change to consolidated design
 - dimensioning load cases are similar
 - certification approach maybe simplified
 - loads may be evaluated as a “delta” and calculation models may be sufficient



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