



Introduction to MDAO@ONERA

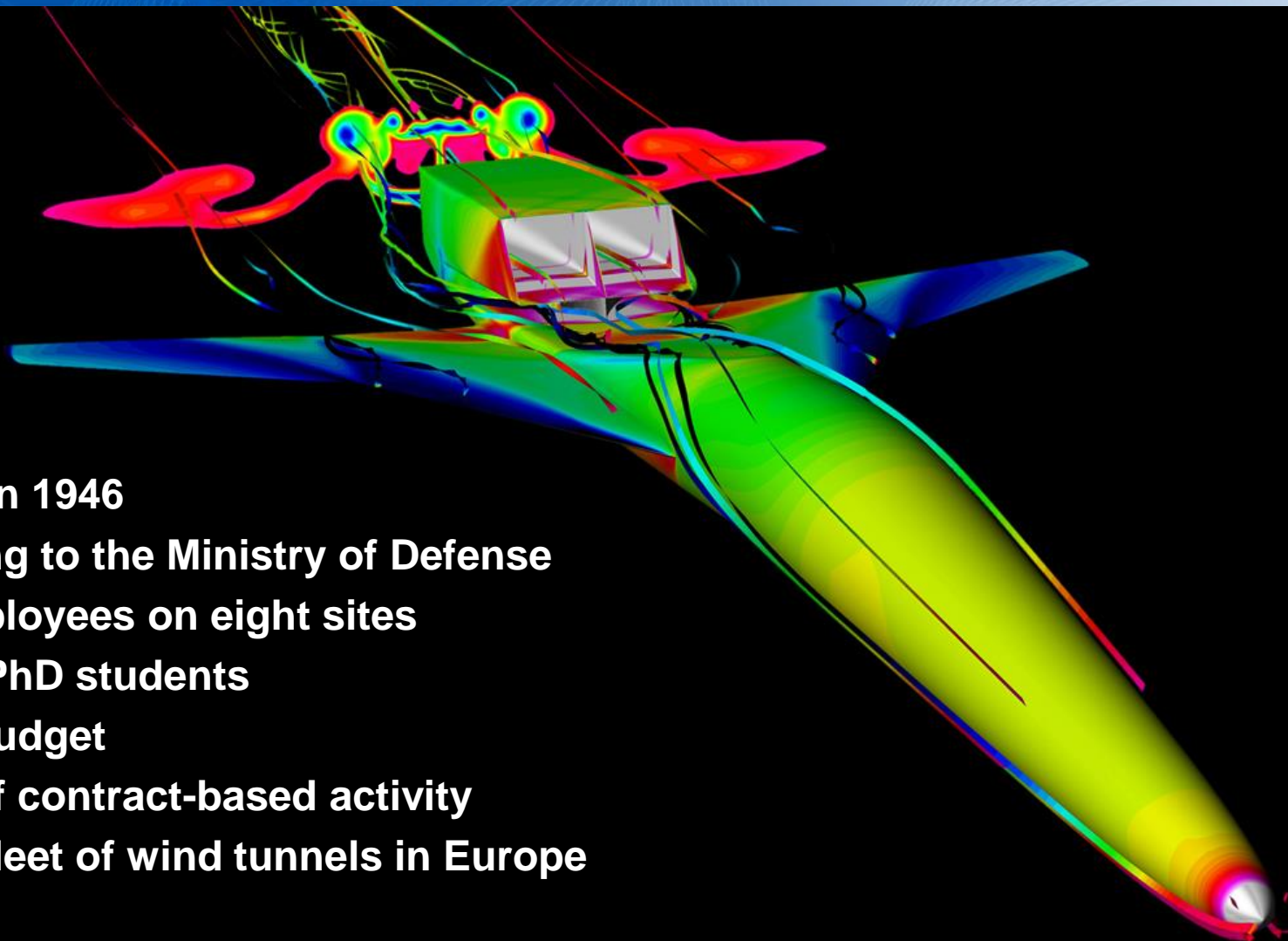
Virginie Wiels

Information Processing and Systems Department



retour sur innovation

ONERA : the French Aerospace Lab



Created in 1946

Reporting to the Ministry of Defense

1985 employees on eight sites

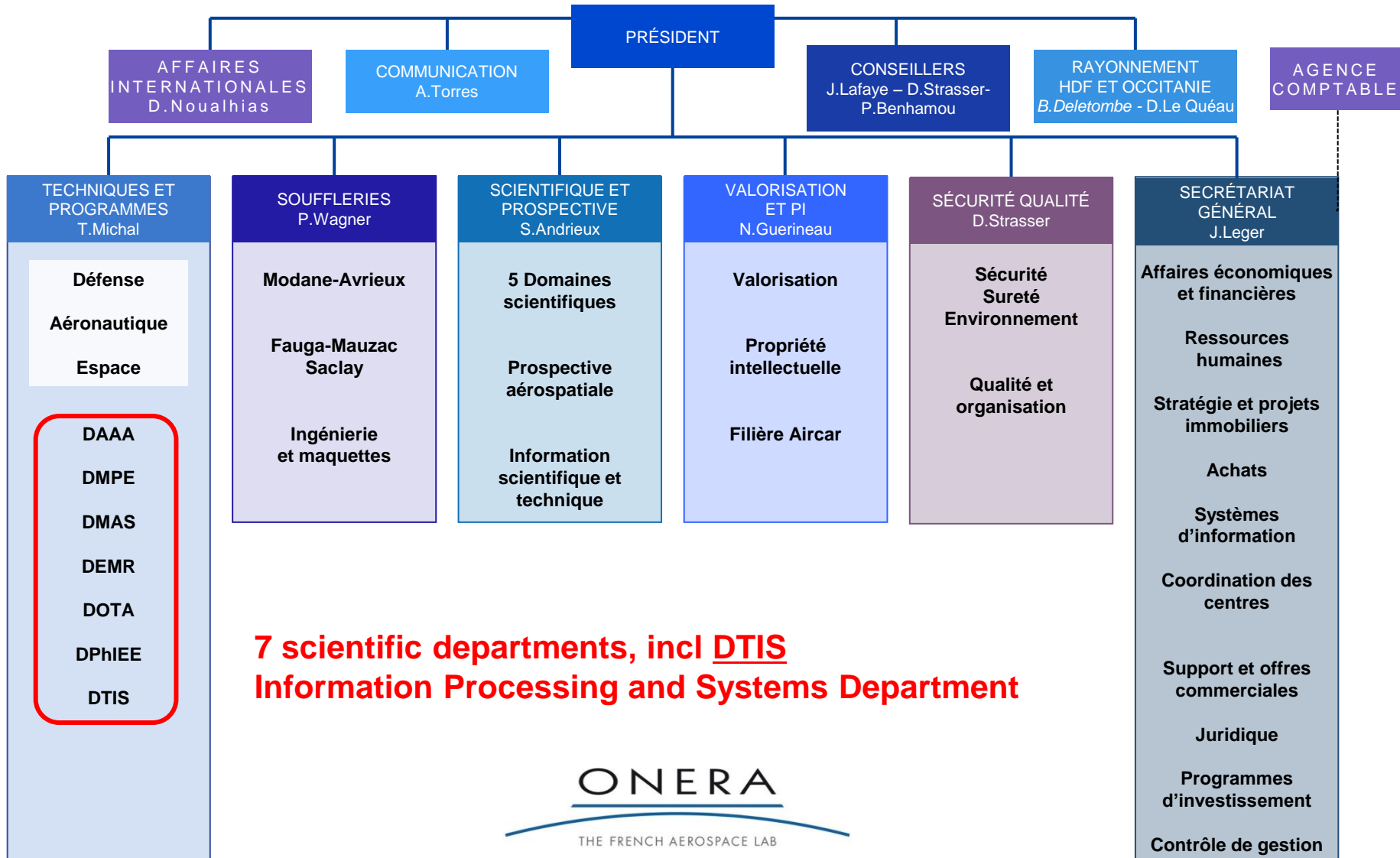
Incl 238 PhD students

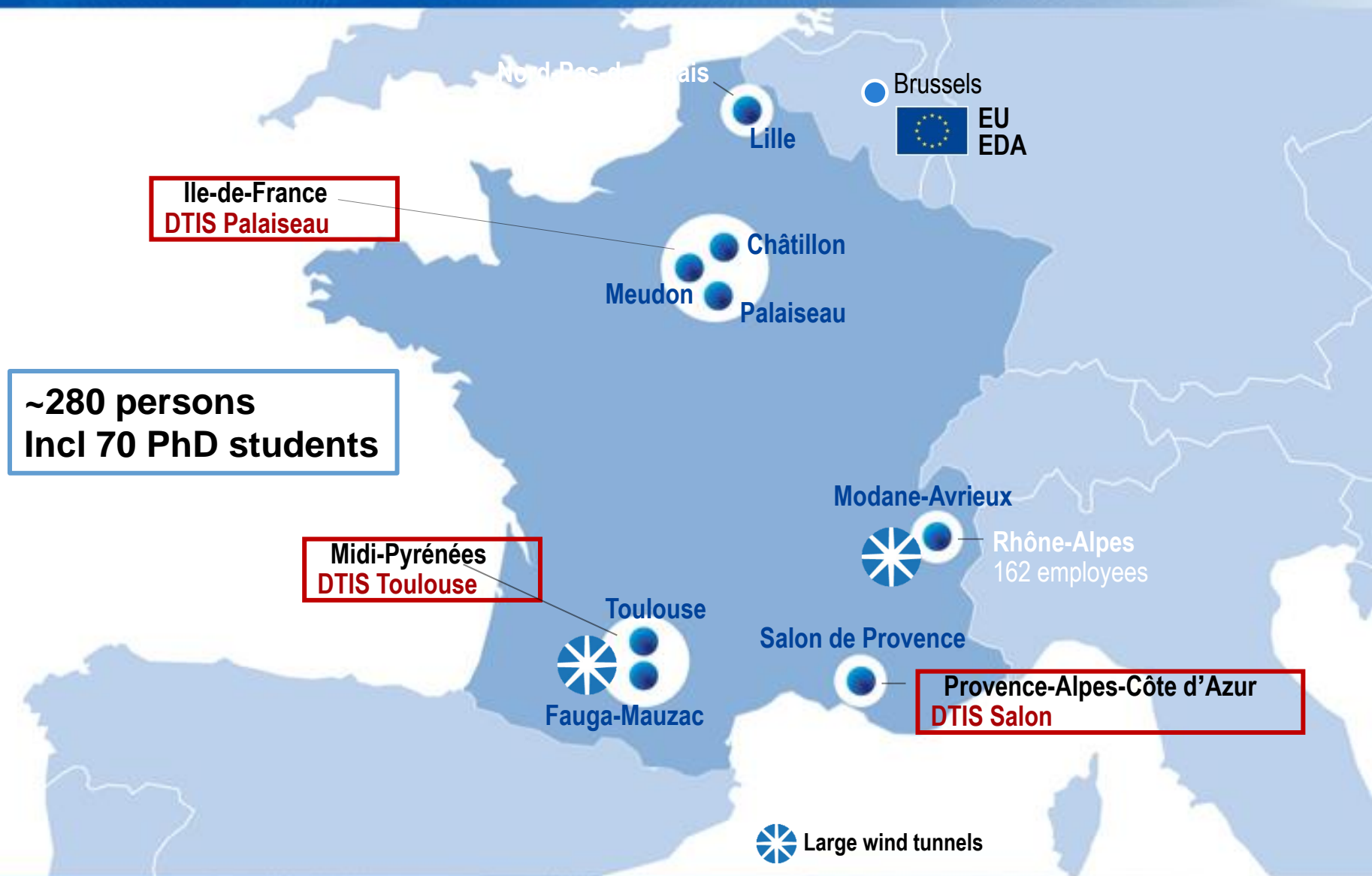
235 M€ budget

130 M€ of contract-based activity

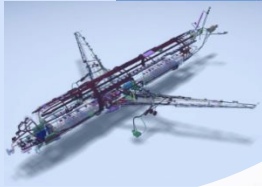
Largest fleet of wind tunnels in Europe

New organisation





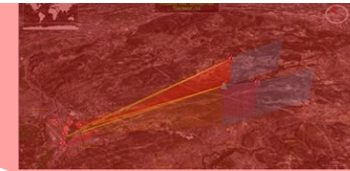
Certification



DTIS



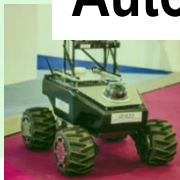
Systems of systems



Multidisciplinary Design



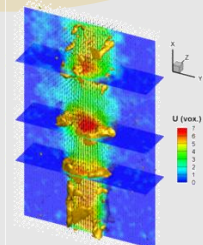
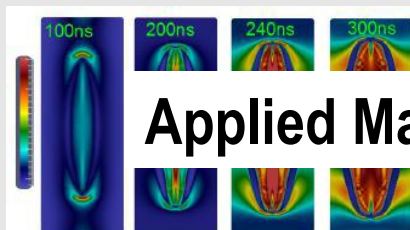
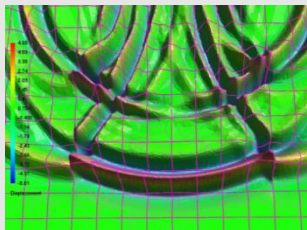
Autonomy



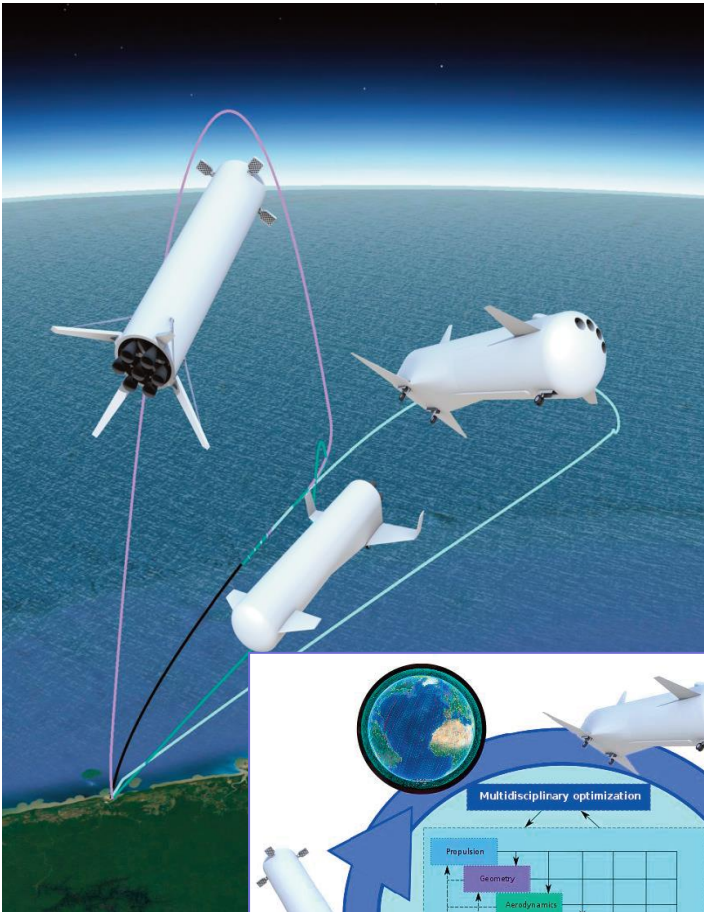
Surveillance



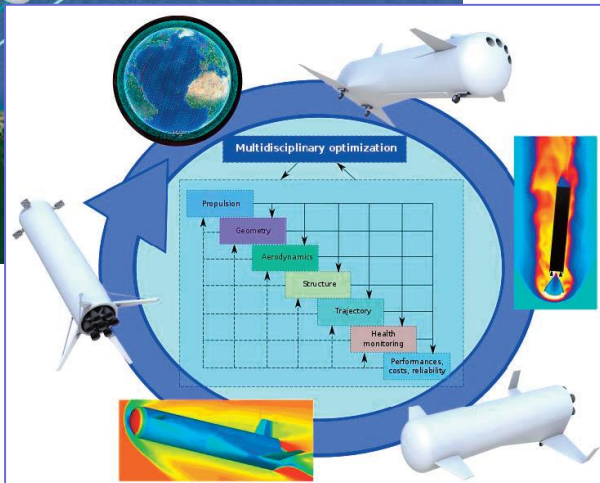
Applied Mathematics



Multidisciplinary Design Analysis and Optimization



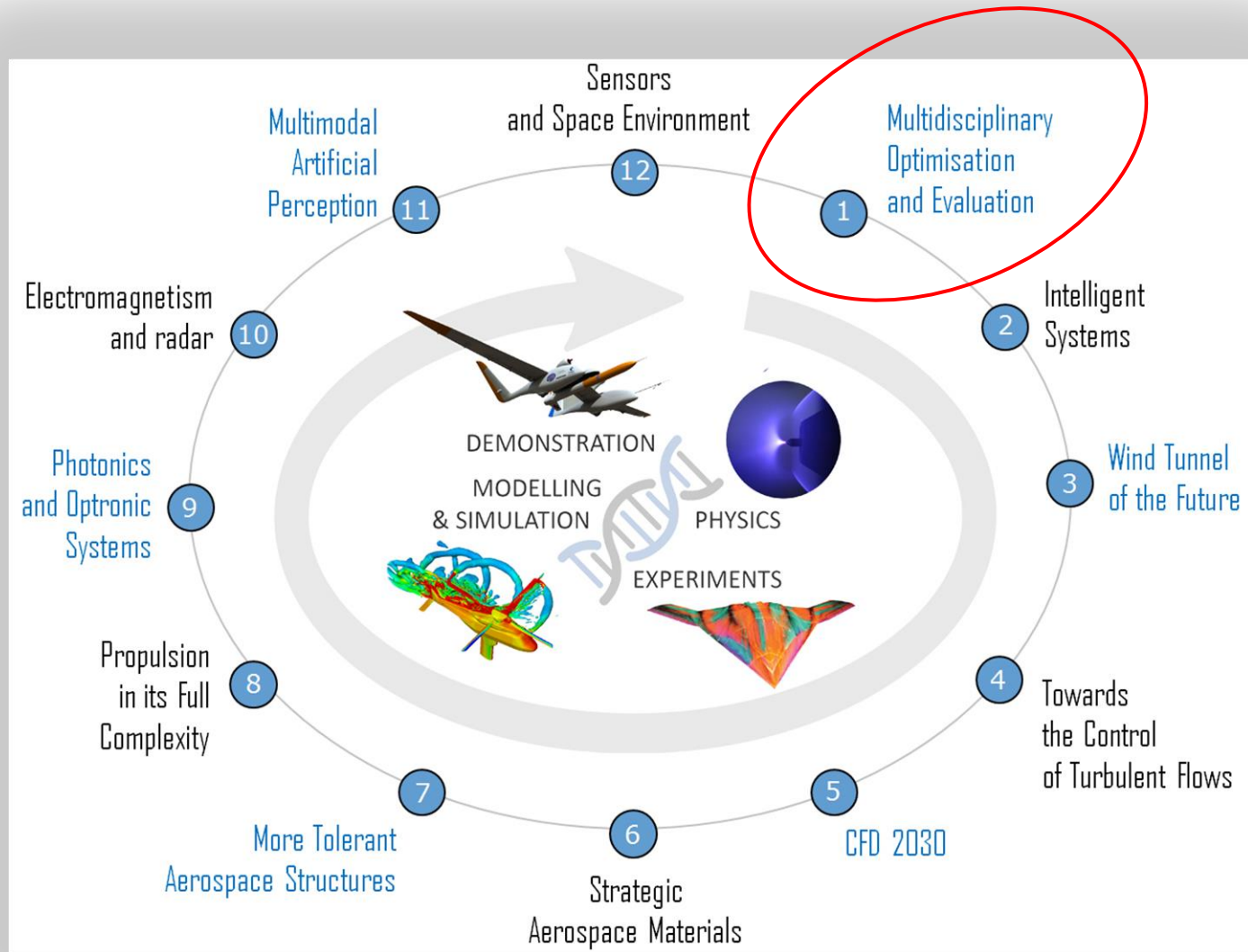
- Provides efficient answers on how to integrate increasing knowledge into the design process, while reducing the design cycles.
- Could provide a competitive advantage in reducing delays and cost in the design process
- Core of key methodologies, such as multi-disciplinary problem formulation and decomposition, optimization under uncertainties and surrogate modeling based on high-fidelity tool integration



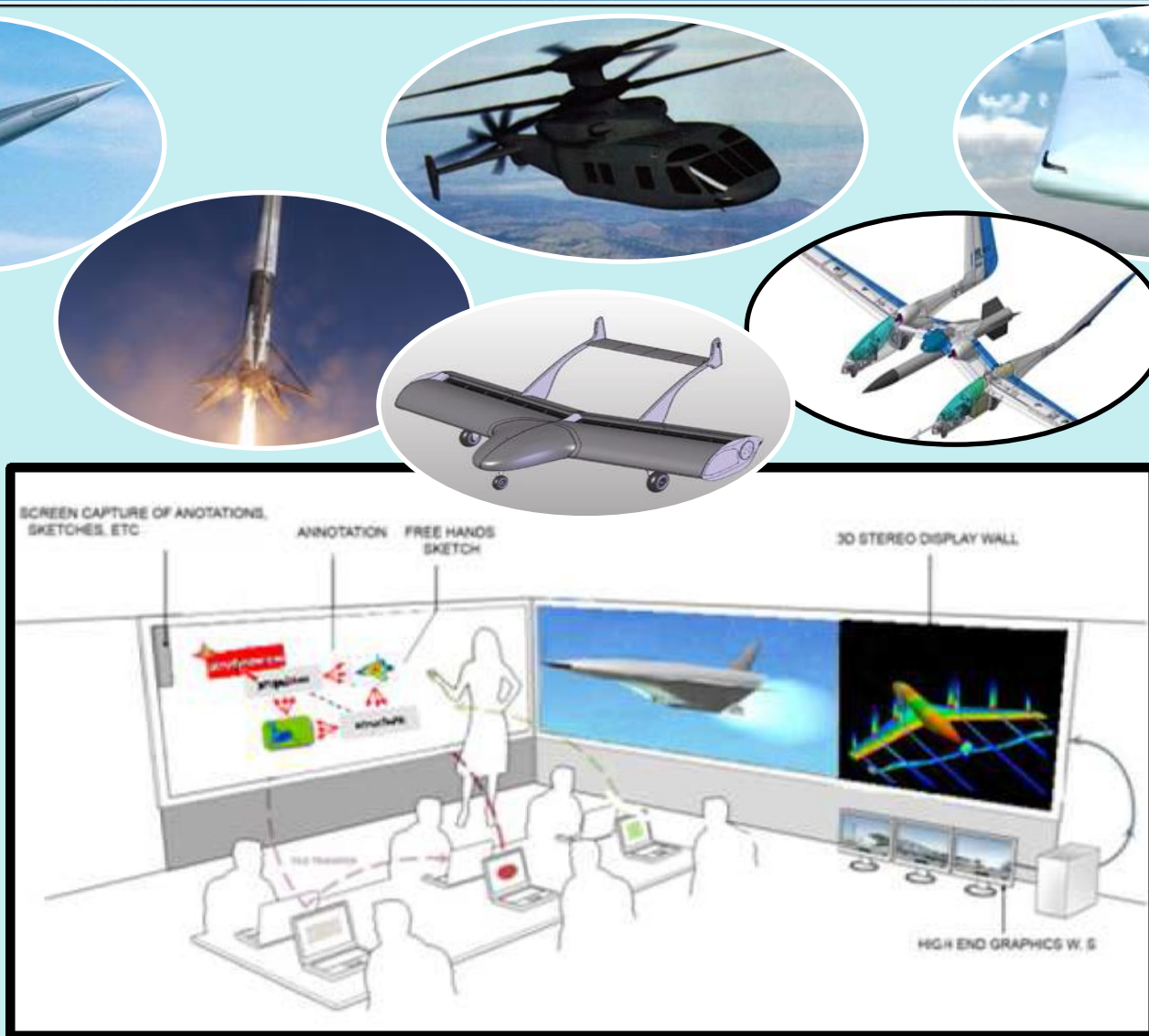
Challenges :

- Multi-fidelity
- Integration of control and navigation discipline
- Interactive optimization
- Model-free design
- Physic-based evaluation

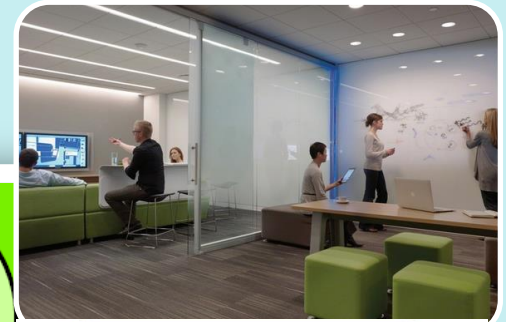
MDAO in the ONERA Strategic Plan



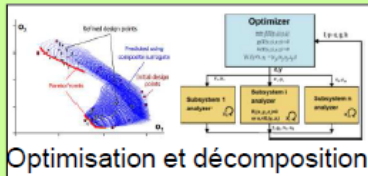
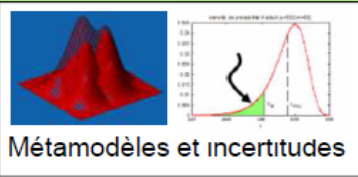
ACADIA Project @ ONERA



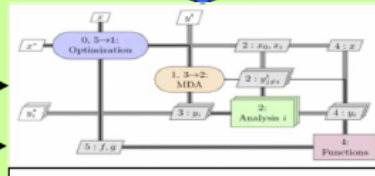
ACADIA Project @ ONERA



Bibliothèques



Gestion formelle du processus :
spécifications, modèles, tâches,
état du design...



Workflow : couplage des
modèles et appel des outils



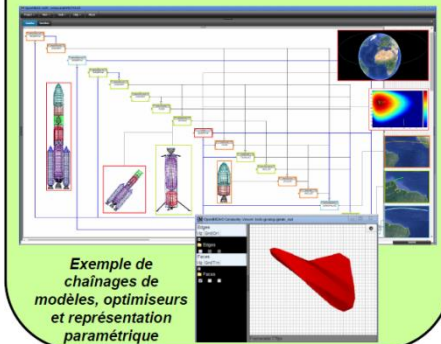
Archivage et
gestion de
configuration

Processus intégré



Moteur d'aide à la
décision : critères
de choix de
méthodes, guides
méthodologiques

Processus intégré : capitalisation
sous framework Python OpenMDAO



OPENMDAO