MAIDESC M36

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1. Simulations

Transvalor has to simulate a free rotating wind turbine in realistic wind conditions.

Automatic meshing process

In the previous meeting (M30) TSV presented the basis of the automatic meshing process developped during the MAIDESC project.

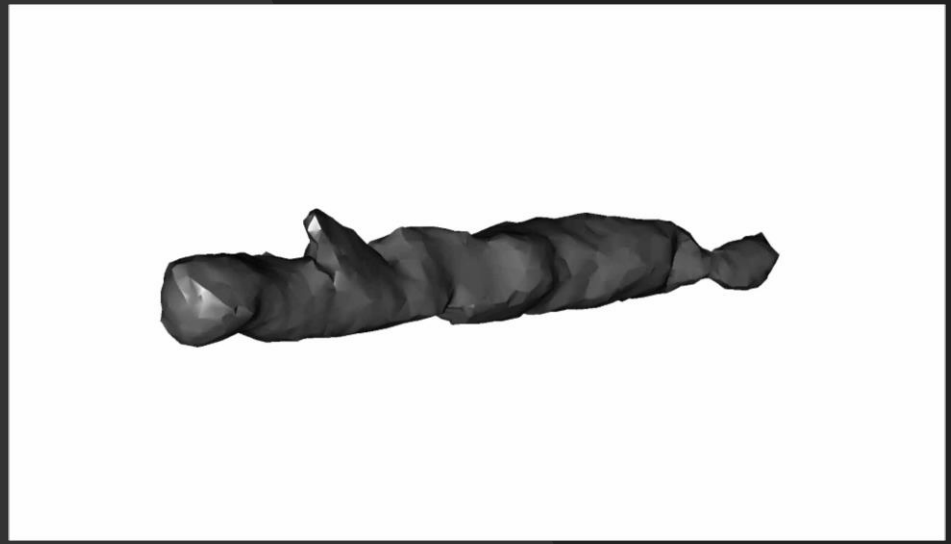
PREVIOUSLY

Working on immersed method.
Test of filtering methods.
Test of filtering parameters.
Setup automatic parameters depending on the mesh elements size.

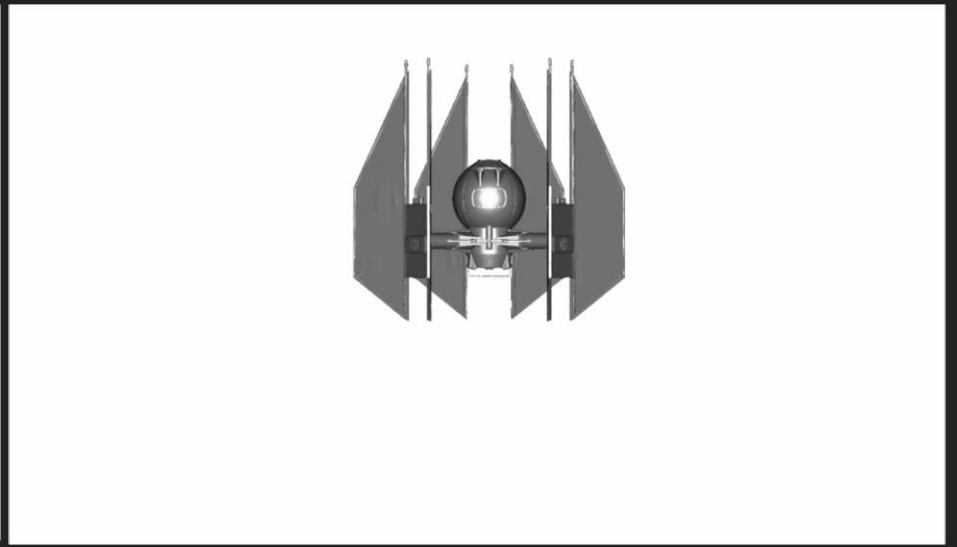
NOW

The method has been tested on several cases.
The mesh number of elements is increasing at each remeshing iteration.
Depending on the geometry complexity and the initial number of elements, a satisfying mesh is generated in several hours.

Submarine



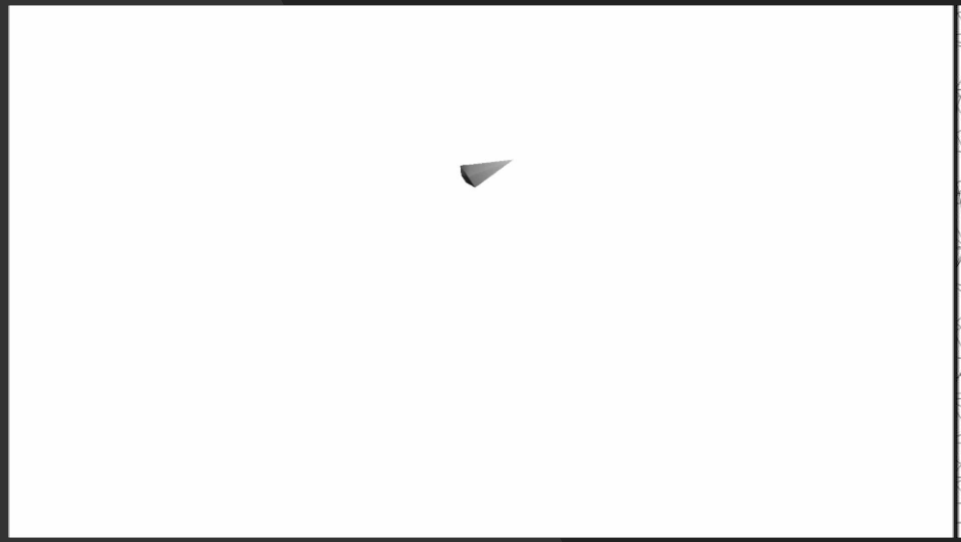
TIE Defender



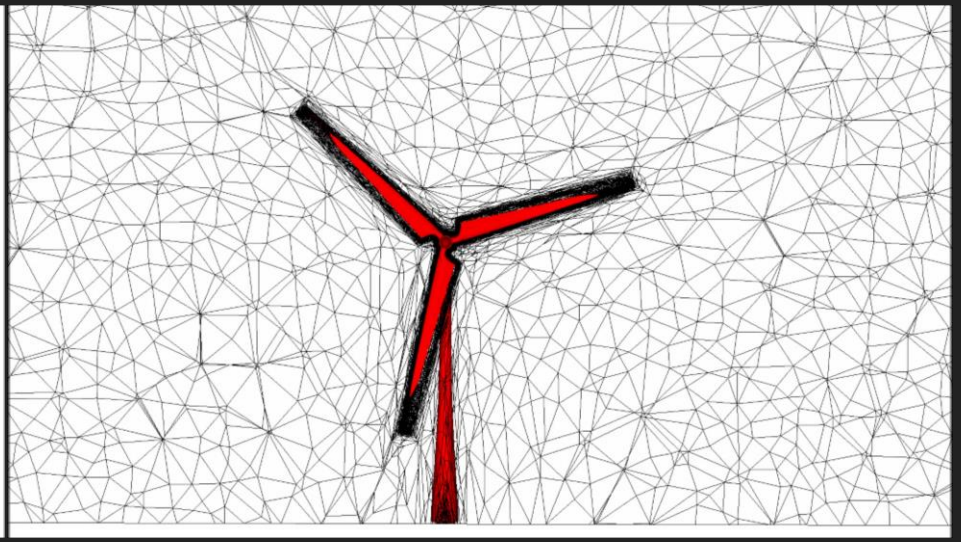
More videos available on Aeromines YouTube channel:
https://www.youtube.com/channel/UCPSnEhkEkXKXbGtnz84js9A

Wind turbine

Initial meshing



Rotating wind mill



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Challenges

- Edge Based Metric has been designed for a single criterion

Metric $$M^i = \left(\frac{1}{d} \sum_{j \epsilon \Gamma(i)} s_{ij}^2 \, \boldsymbol{X}^{ij} \otimes \boldsymbol{X}^{ij} \right)$$

Stretching Factor $$s_{ij} = \left(\frac{\lambda}{e_{ij}} \right)^{\frac{1}{p+2}}$$

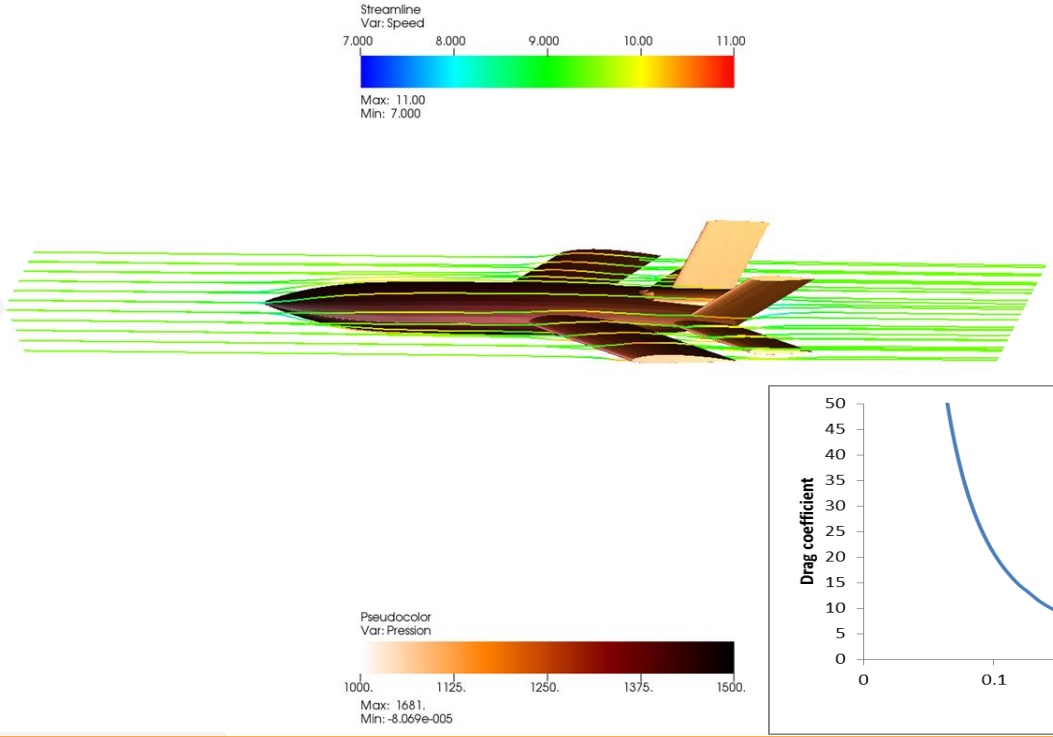
$$\lambda = \left(\frac{\sum_i \sum_{j \epsilon \Gamma(i)} e_{ij}^{\frac{p}{p+2}}}{A} \right)^{\frac{p+2}{p}}$$

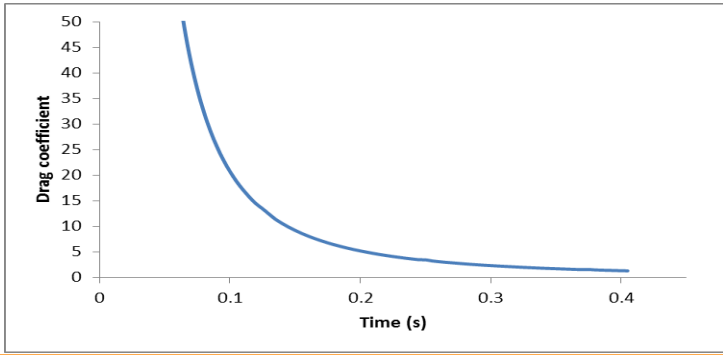
Error $$e_{ij} = \boldsymbol{g}^{ij} . \boldsymbol{X}^{ij}$$

Challenges

- Gradient is computed for each component
  - Error is obtained using a L_2 norm of the complete set
    - When gradients are highly different only the maximal value is maintained
      - This lead to the lost of information, mainly the levelset for high Reynolds.

At low Reynolds

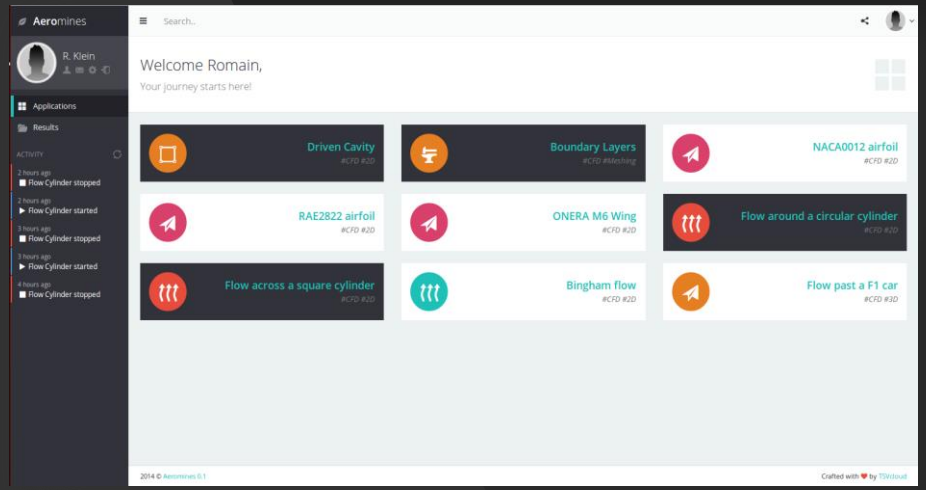


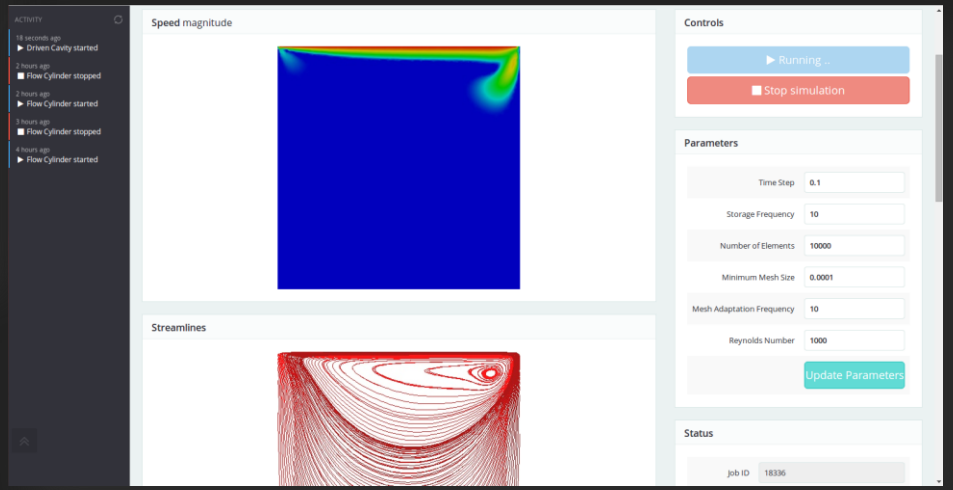


2.
Aeromines Platform

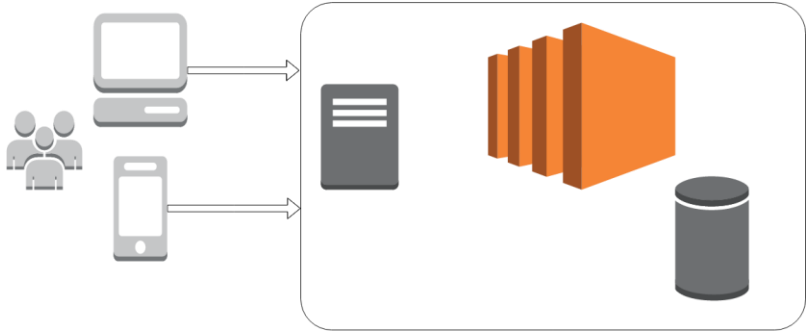
Aeromines doit faire la promotion, valoriser et diffuser les travaux de recherche.

M12 – Aeromines POC





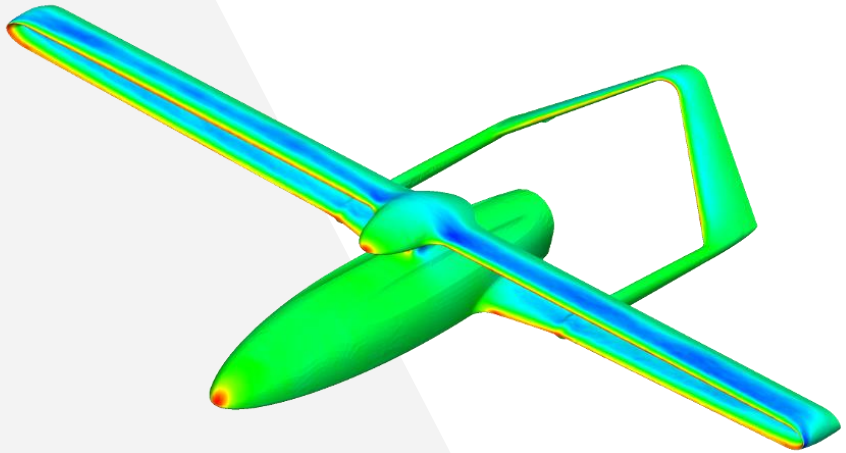
Aeromines –Calcul Haute Performance Délocalisé

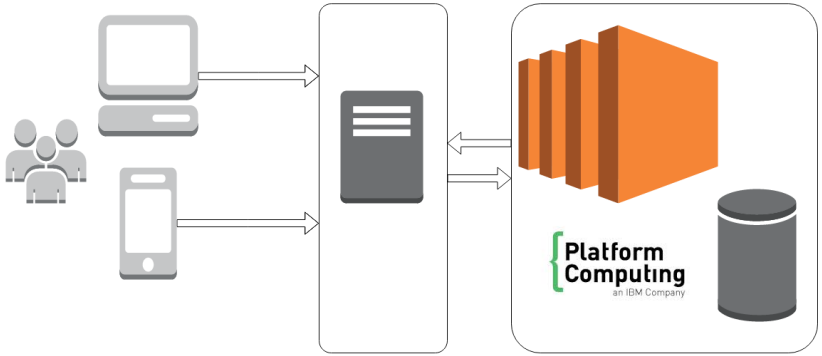


AVANTAGES

- Facilité d'utilisation (Interface personnalisée, Gestion de compte, ..)
- Repertoire d'applications
- Visualisation distante temps réel

Aeromines vers le nuage





AVANTAGES

- Environnement de Production
- Sécurité des données (encryption, IPsec, ..)
- Cloisonnement par Utilisateur
- Elasticité des ressources

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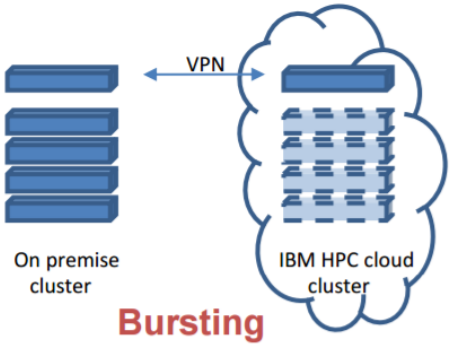
Le vrai coût du nuage pour le Calcul Haute Performance?

Vers une solution hybride!

Aeromines – « Cloud Hybride »



AVANTAGES

- Ressources illimitées
- Meilleure gestion des ressources
- Orchestration globale
- Local?