

2-WAY AND 4-WAY COUPLING OF PARTICULES SPRAY WITH AIR FLOW AND ELECTROSTATIC FIELD

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The poster / presentation will show the theoretical aspects and preliminary results of an OF model dealing with spray simulation and development of the coupling of air flow, liquid spray flow, and electrostatic fields.

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Electrostatic painting is widely used in industries, especially for automotive applications. Since 50 years, SAMES Technologies is an international provider of innovative electrostatic solutions for paint and powder coating. Since 15 years INOPRO IAO is expert of thermal hydraulic and thermal-aeraulic 3D simulations for industry, R&D, building and environment. INOPRO IAO develops and validates the model for further use by SAMES Technologies.

The aim of the model is to take into account :

- The droplet size distribution of the liquid flow
- The dispersion of the spray inside a strong air flow,
- The electrostatic field calculation,
- The droplet electrostatic charge.

The theoretical details of the 2-ways coupling (steady state solver) and the 4-ways coupling (transient electrohydrodynamics Euler-Lagrange solver) will be shown.

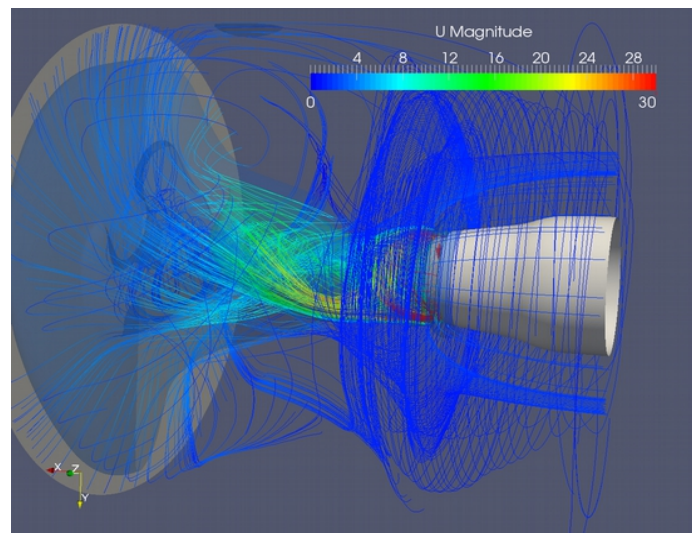


Figure 1: Droplets flow example, with strong vortex

The 2-way coupling is mainly based on the “reactingParcelFilmFoam” solver [1]. The eulerian-Lagrangian coupling has been also described by Andreini & al [2].

Acknowledgements

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References

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