MULTIPHYSICS APPLICATIONS FOR SUSTAINABLE ENGINEERING AND INDUSTRIAL PROCESSES

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CRÉATIVITÉ INDUSTRIELLE

COMSOL CONFERENCE

2015 GRENOBLE

SUSTAINABLE BUSINESS DEVELOPMENT

Liberté • Égalité • Fraternité
RÉPUBLIQUE FRANÇAISE

2012 : STATUT JEI
(Jeune Entreprise Innovante)

2013 : AGRÉÉE CIR
(Crédit Impôt Recherche)
Ministère de l'Enseignement Supérieur et de la Recherche :

INNOVATION ÉCO-GÉNÉRATION
CENTRE FRANCILIEN DE L'INNOVATION

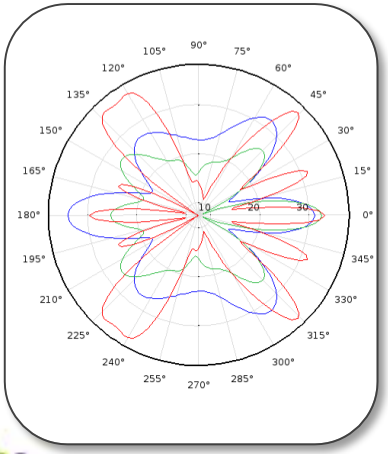
PROJETS SUBVENTIONNÉS
soutien au développement de moyens innovants par **la BPI**

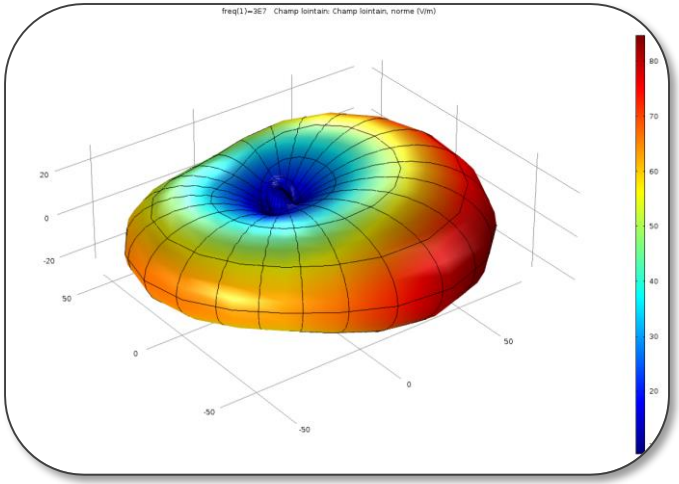
ASTech Paris Region
Opticsvalley
RAVI RÉSEAU AUTOMOBILITÉ ET VÉHICULES EN ÎLE-DE-FRANCE
Association Régionale des Industries de l'Automobile

MEMBER

COMSOL
Certified Consultant

COMSOL CERTIFIED CONSULTANT
SINCE 2012





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SUSTAINABLE ENGINEERING

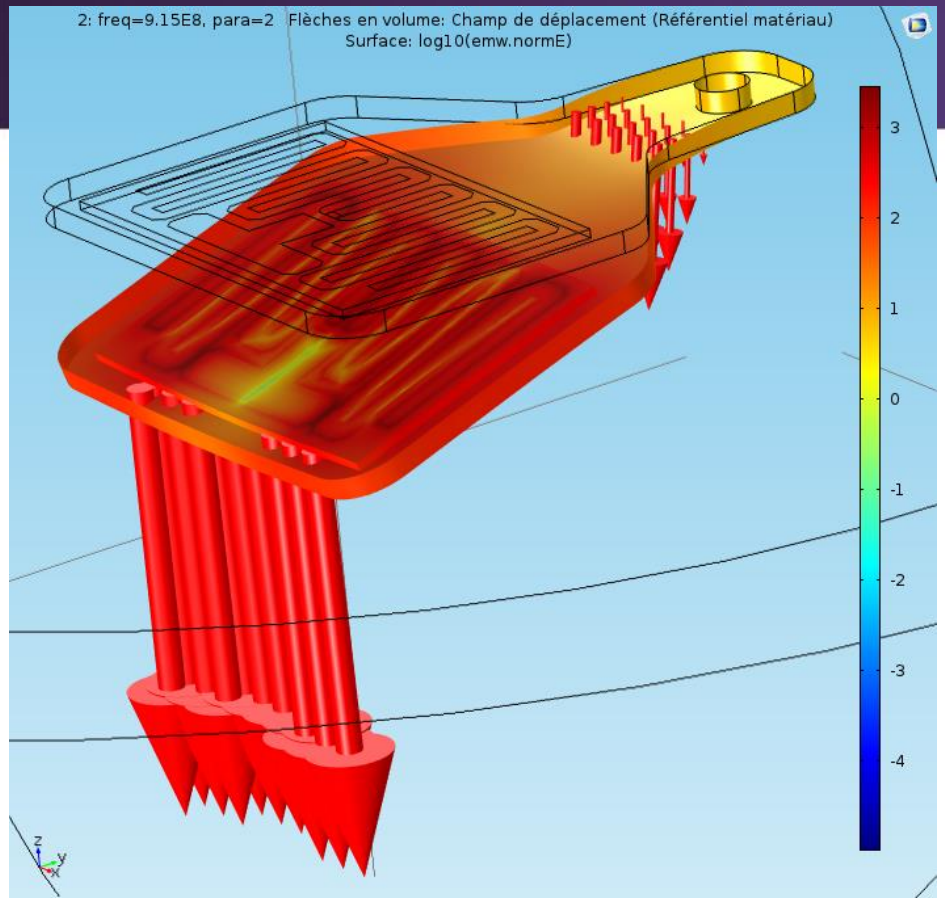
DRIVERS

- CLIMATE CHANGE
- RESOURCE CRISIS
- BIODIVERSITY

SOLUTIONS

- SPACE, ENERGY AND MATERIAL EFFICIENCY
- NEAR ZERO EMISSION ENERGY & PROCESSES
- SHARE KNOWLEDGE, TECHNOLOGY & BENEFITS

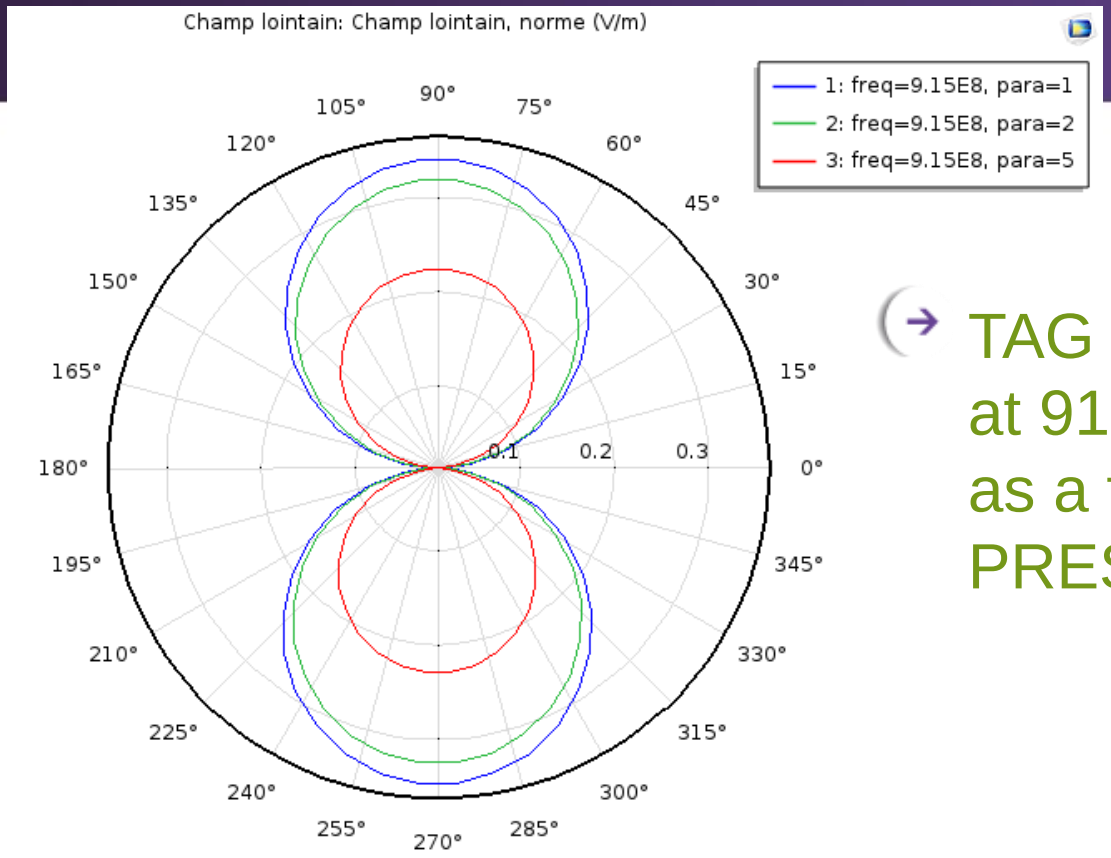
RFID TAGS : BENDING UNDER PRESSURE LOADING



TAG PERFORMANCE : REDUCED BY BENDING

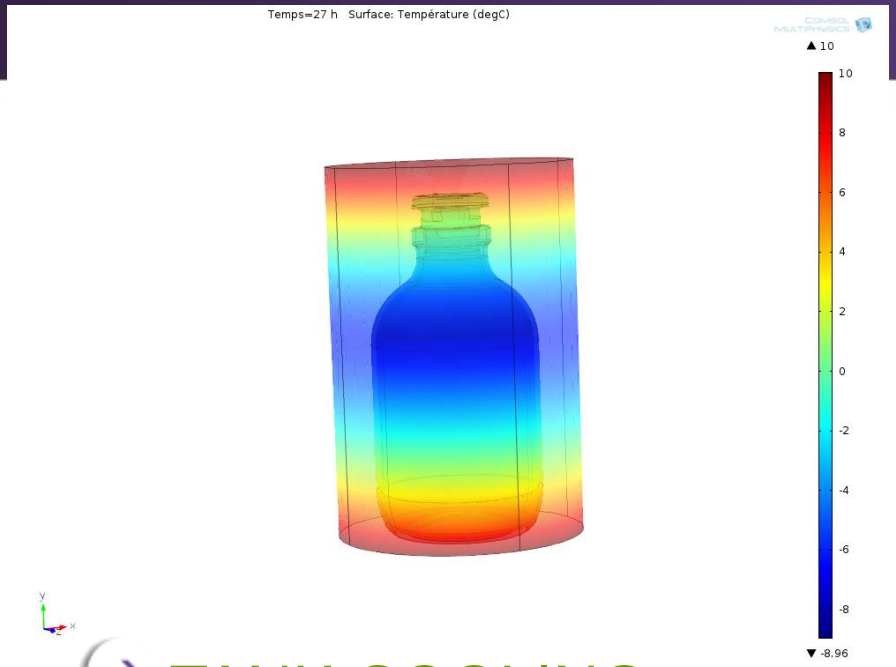
TAGS ARE USED TO STREAMLINE AND SPEED UP PROCESSES

RFID TAGS : FAR-FIELD UNDER PRESSURE LOADING



- TAG RESULTS: FAR FIELD at 915 MHz as a function of applied PRESSURE (para MPa)

HEAT TRANSFER

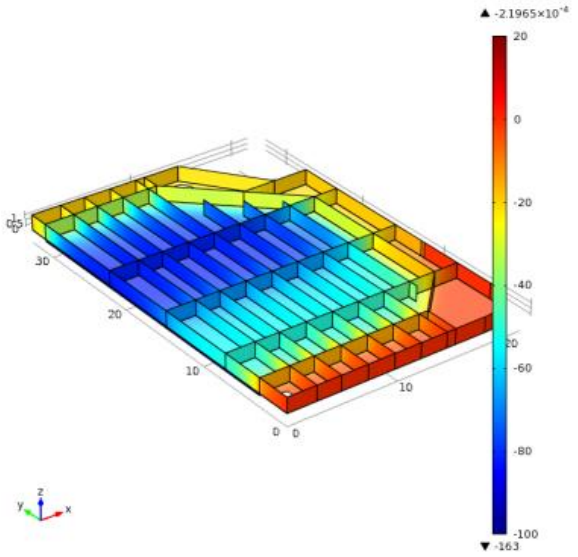


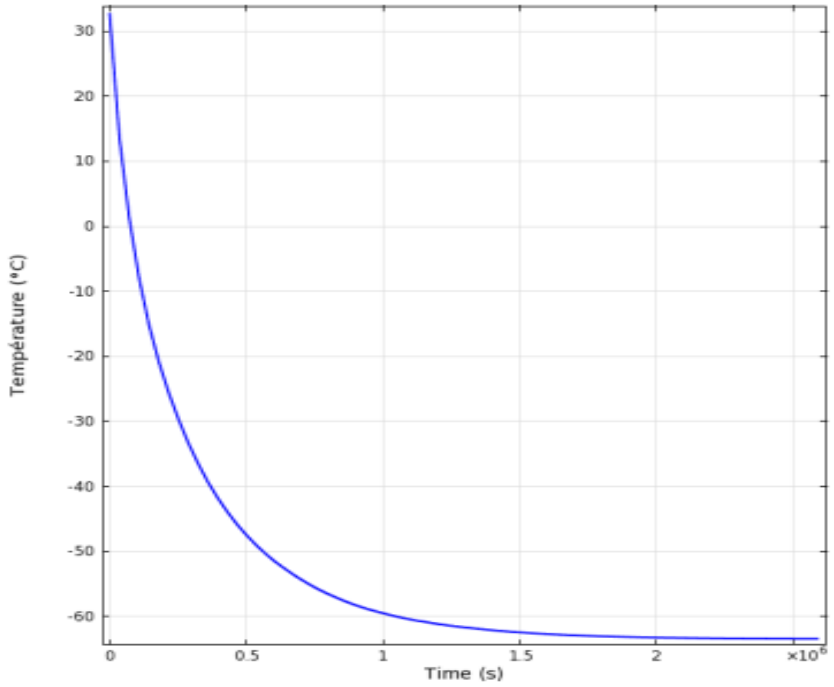
TANK COOLING

KEYWORDS: HEAT, COOLING TIME, TANKS, FUEL, RADIATION , CONVECTION

COFFERDAM TANK

- Wall cooling time study
  - Estimate time to reach -5°C
  - Temperature field at equilibrium after heat source loss

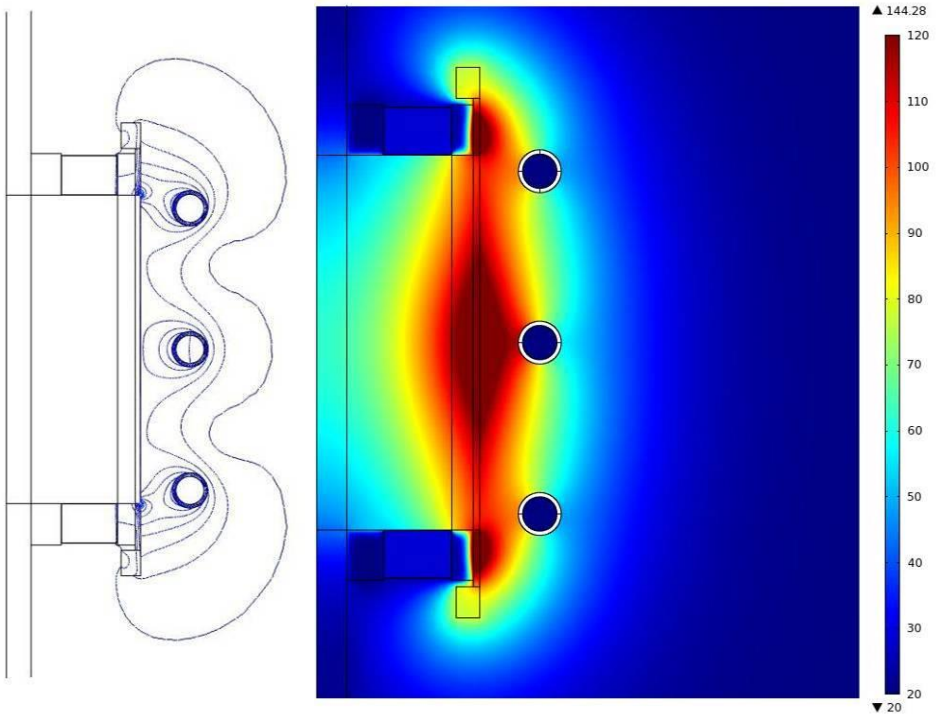




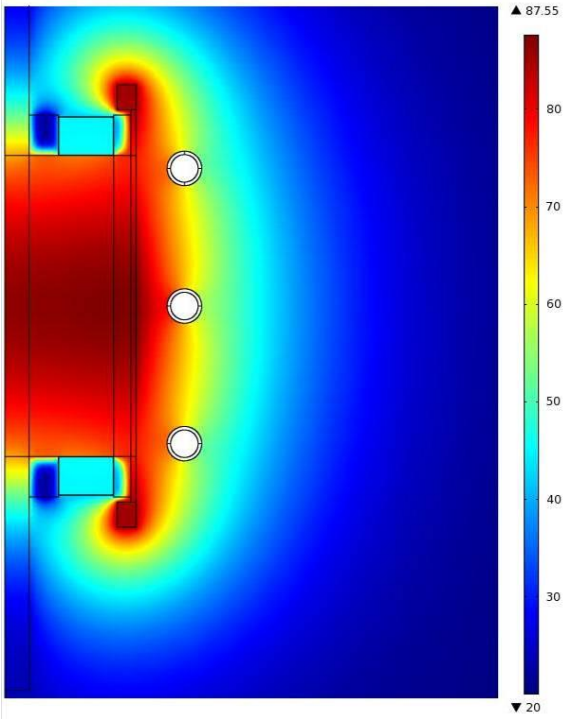
THERMAL – ELECTROMAGNETIC FIELD STRONG COUPLING

Inductor is optimized for energy end process efficiency

EM - field

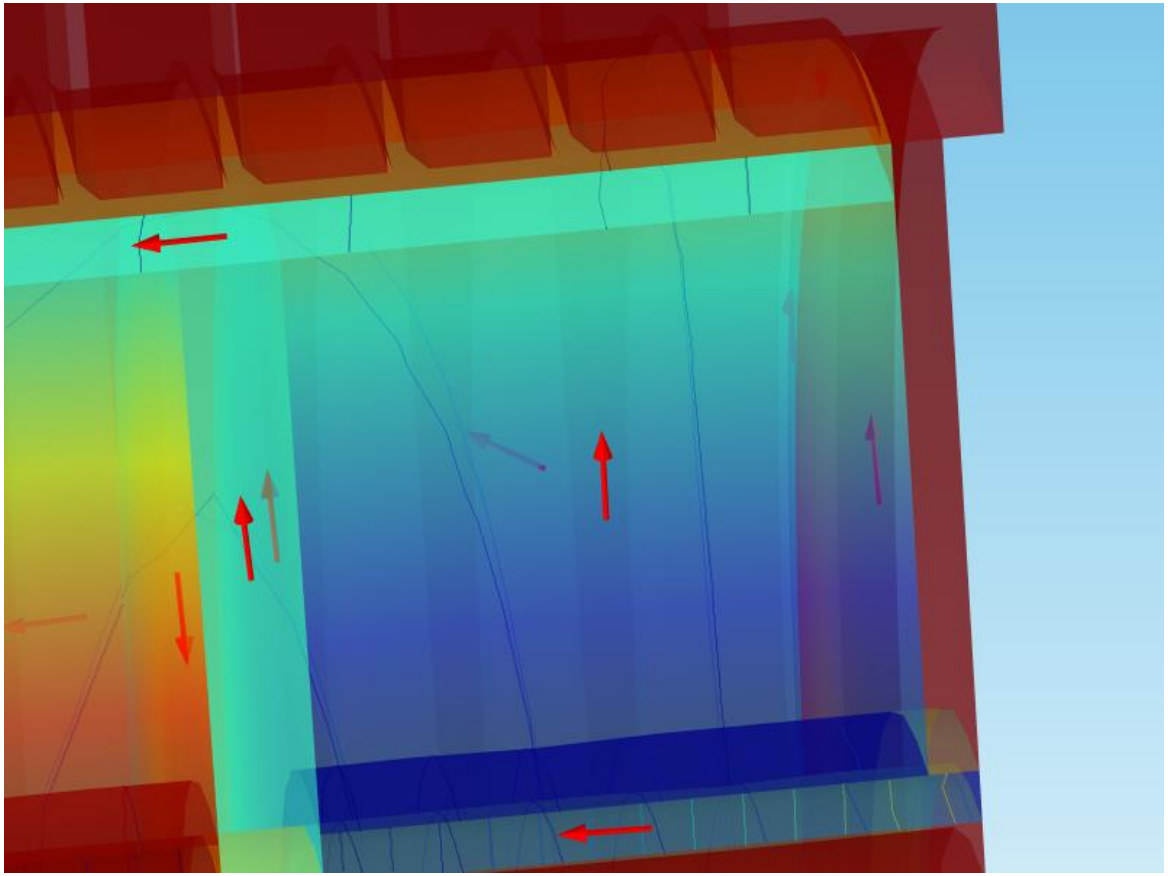


Heat diffusion



SEEBECK-PELTIER-THOMPSON EFFECT

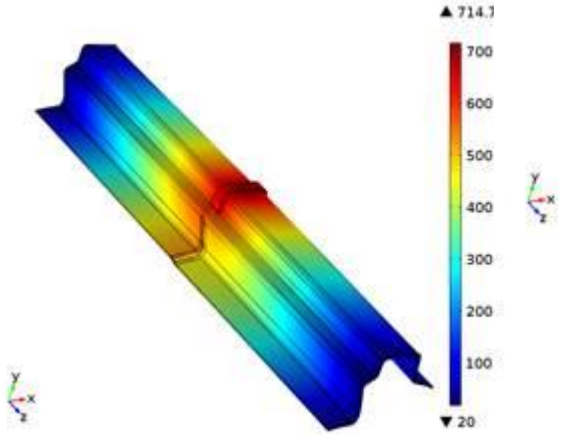
- Multiphysics coupling : fluid-thermal-electric currents

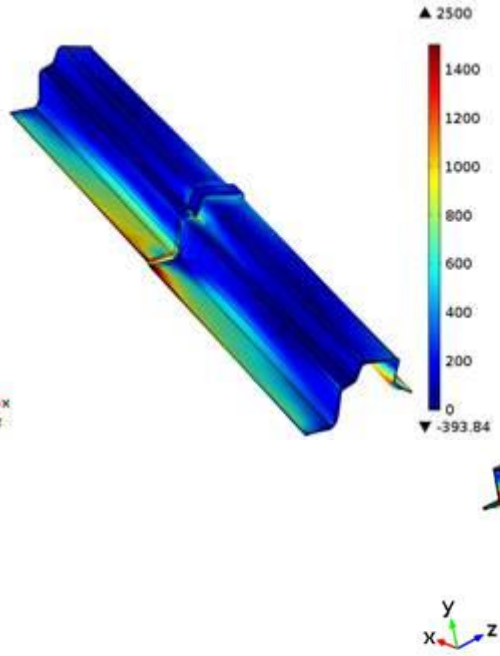


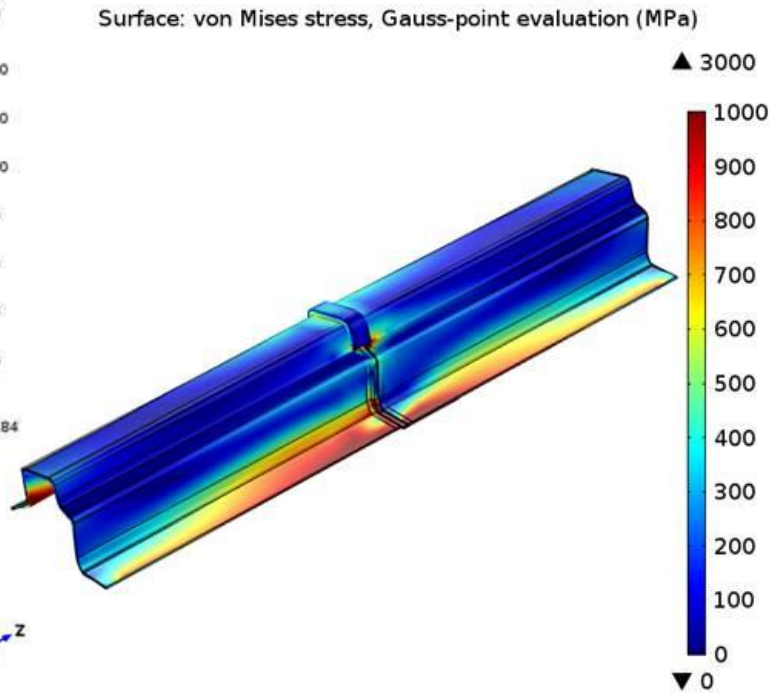
WELDING

THERMOMECHANICAL SIMULATIONS

a.

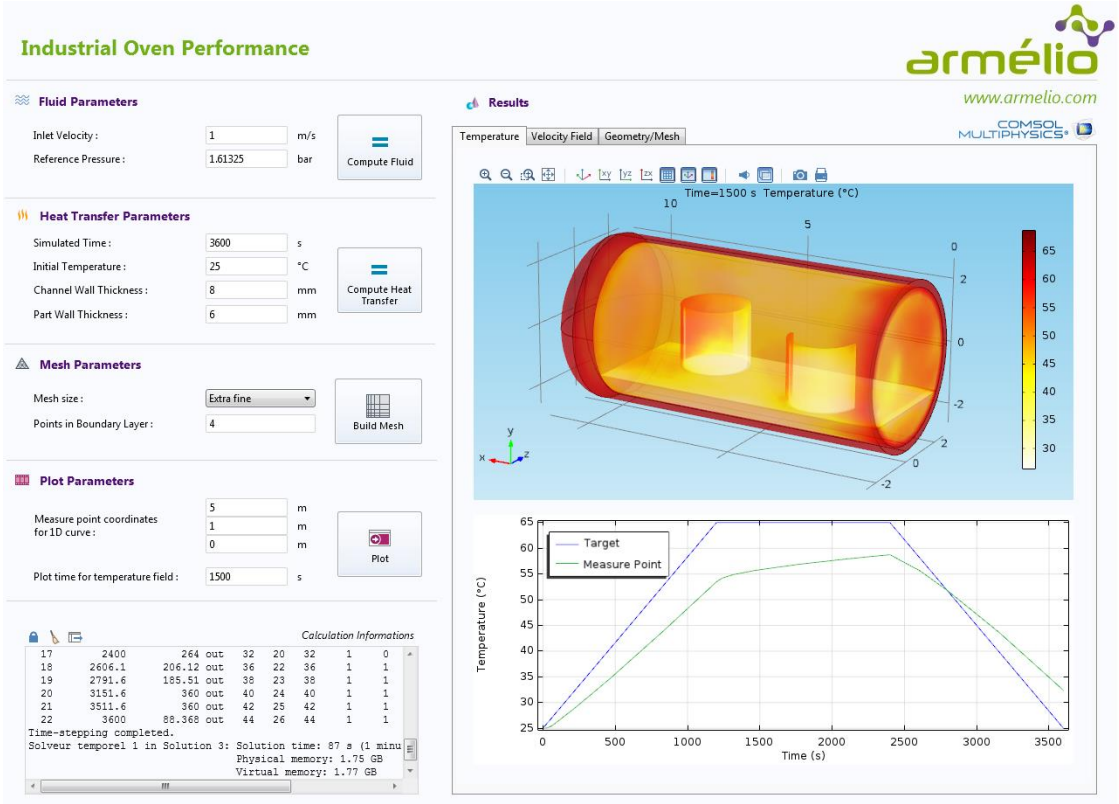






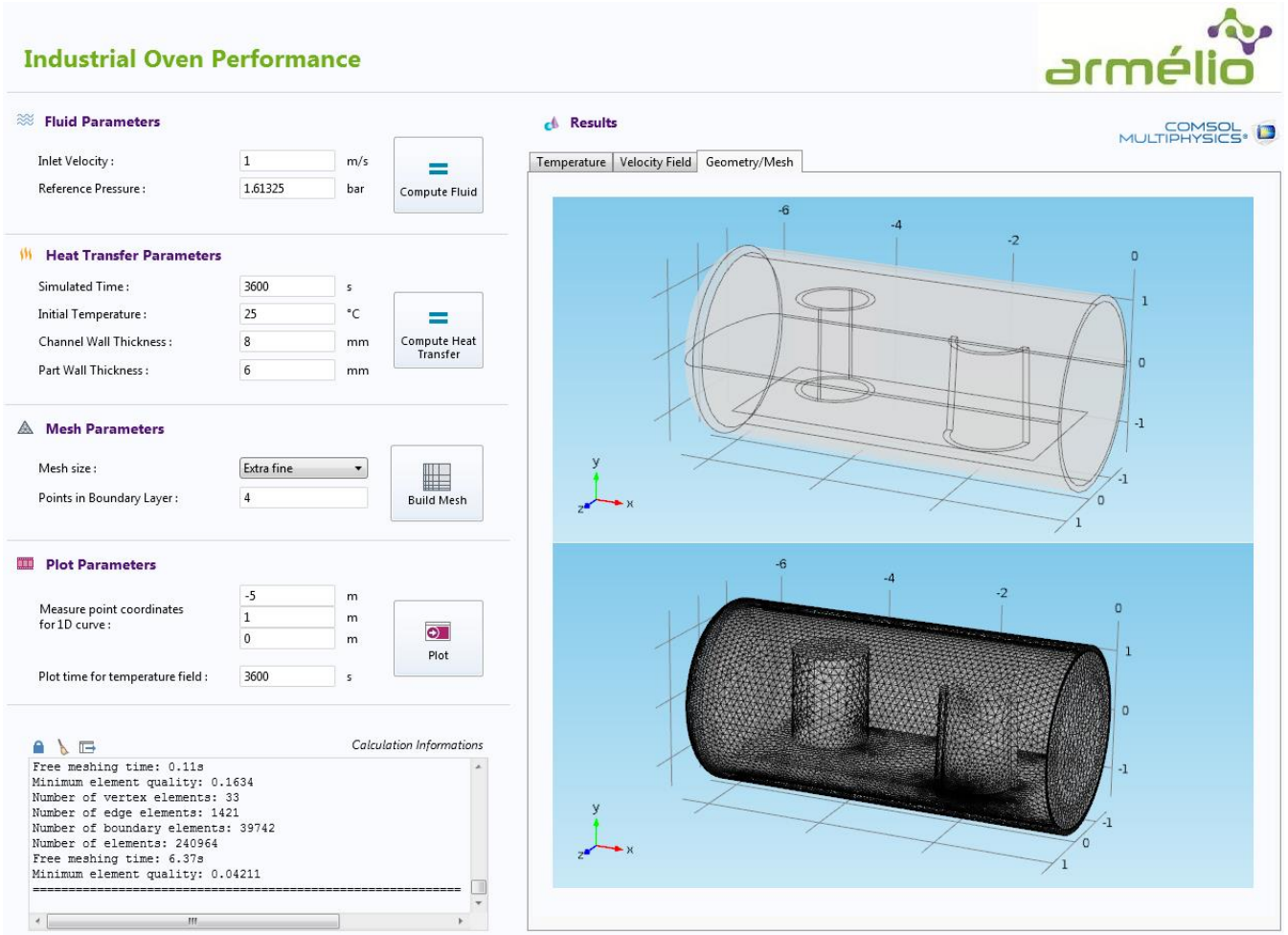
CUSTOM APPLICATIONS FOR INDUSTRIAL PROCESS OPTIMIZATION

- fluid-solid heat and mass transfer (weak multiphysics coupling)



CUSTOM APPLICATIONS FOR INDUSTRIAL PROCESS OPTIMIZATION

- Geometry
- Mesh
- Selections
- Materials
- …



CUSTOM APPLICATIONS FOR INDUSTRIAL PROCESS OPTIMIZATION

- Electricity-based processes:
  - Easier to optimize
  - Lower air pollution / GHG emissions (in France, Belgium and Switzerland)

- Thank you for your attention !
- Questions?

- www.armelio.com
- contact@armelio.com
- +33 1 6907 6487

armélio

Zone d'Activité de Courtaboeuf
7, avenue de l'Atlantique - Bât. C
91940 LES ULIS

Armélio – EnvirProd SAS
SAS au capital de 65000 €
Siret 523 546 703 EVRY
N° TVA FR19 523546703

LES ULIS ???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