



PHOENICS

Thermocouple Example



Thermocouple

Seminar

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- PHOENICS was used to calculate the flow and temperature distribution inside a thermocouple.
- The thermocouple is used to measure the temperature in a jet-engine combustion chamber.
- The operating conditions are:
 - pressure around 3bar
 - Temperature around 950°C
- Calculations were performed for a 2D section, and also for a 3D 180° section.

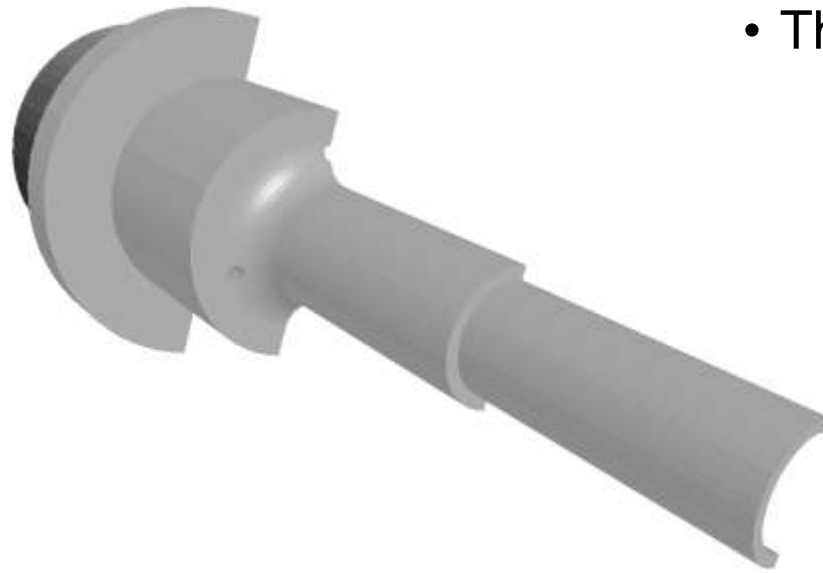


Thermocouple - Geometry

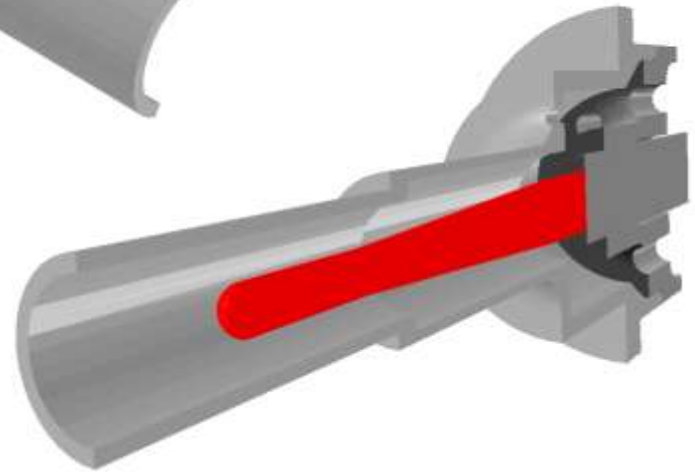
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- Thermocouple geometry



- The red part is the temperature sensor

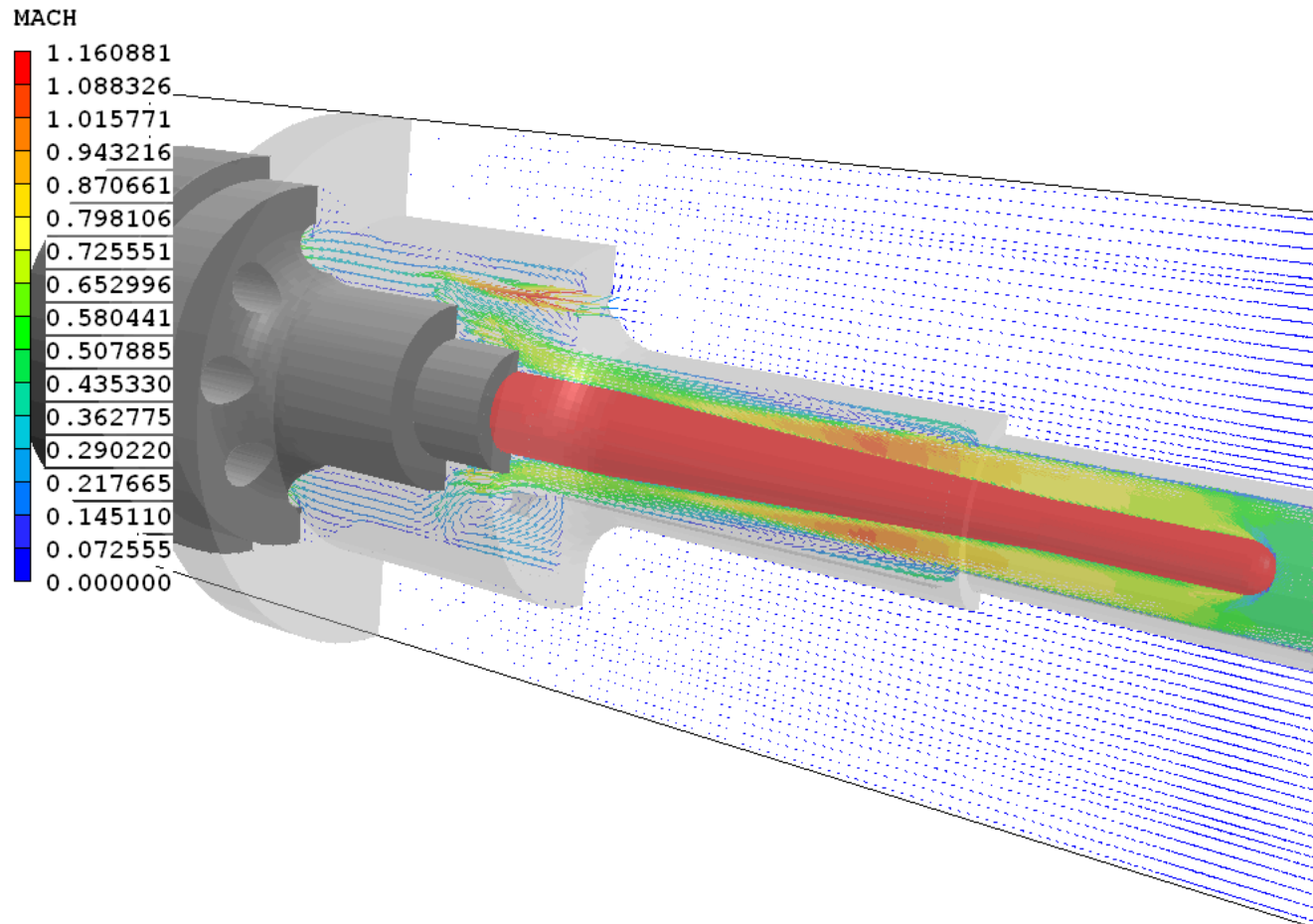




Thermocouple - Results

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- Vectors



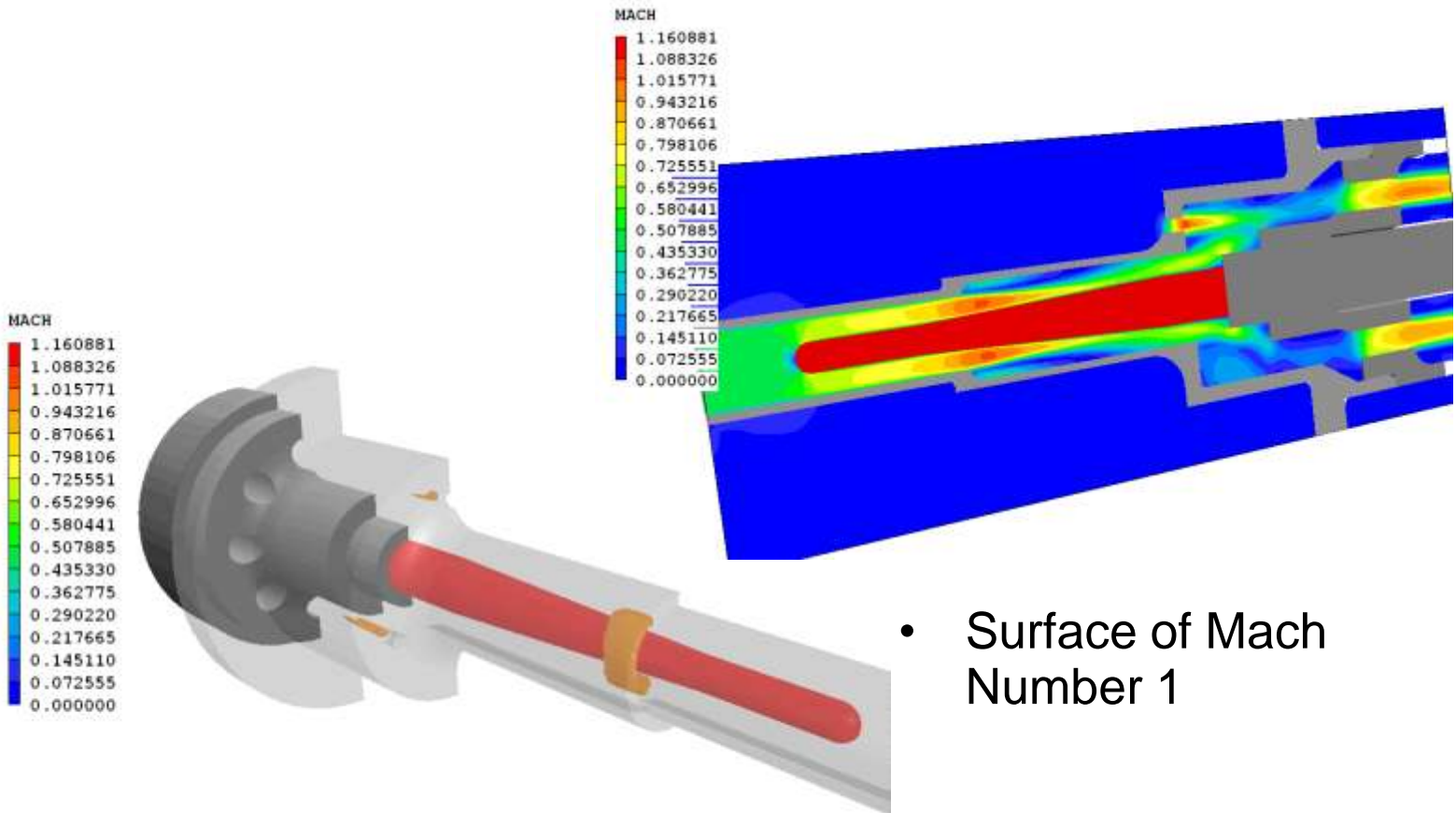
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Thermocouple - Results

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- Mach Number contours



- Surface of Mach Number 1

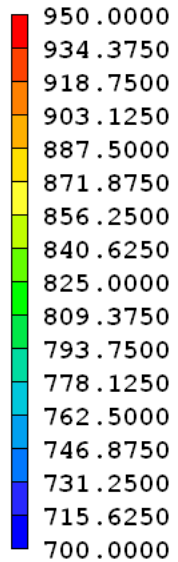


Thermocouple - Results

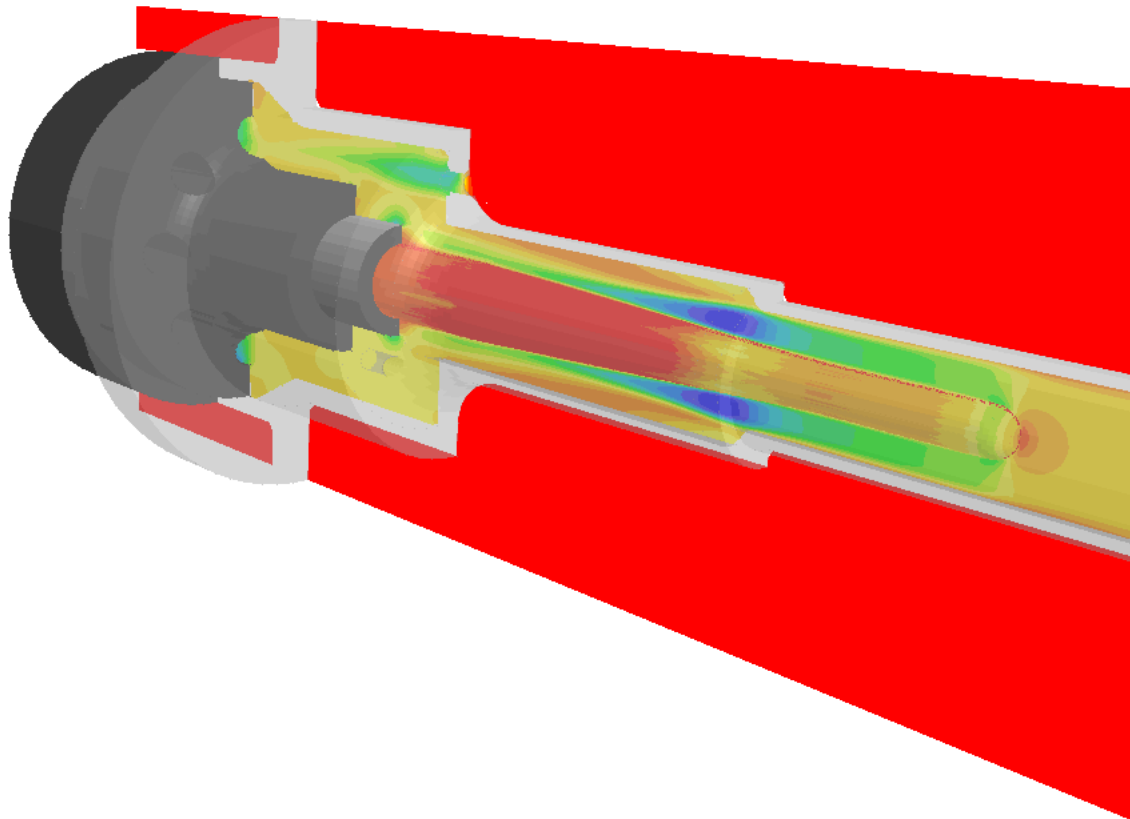
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- Temperature distribution

Temperature, °C



Probe value
887.6262
Average value
920.4081



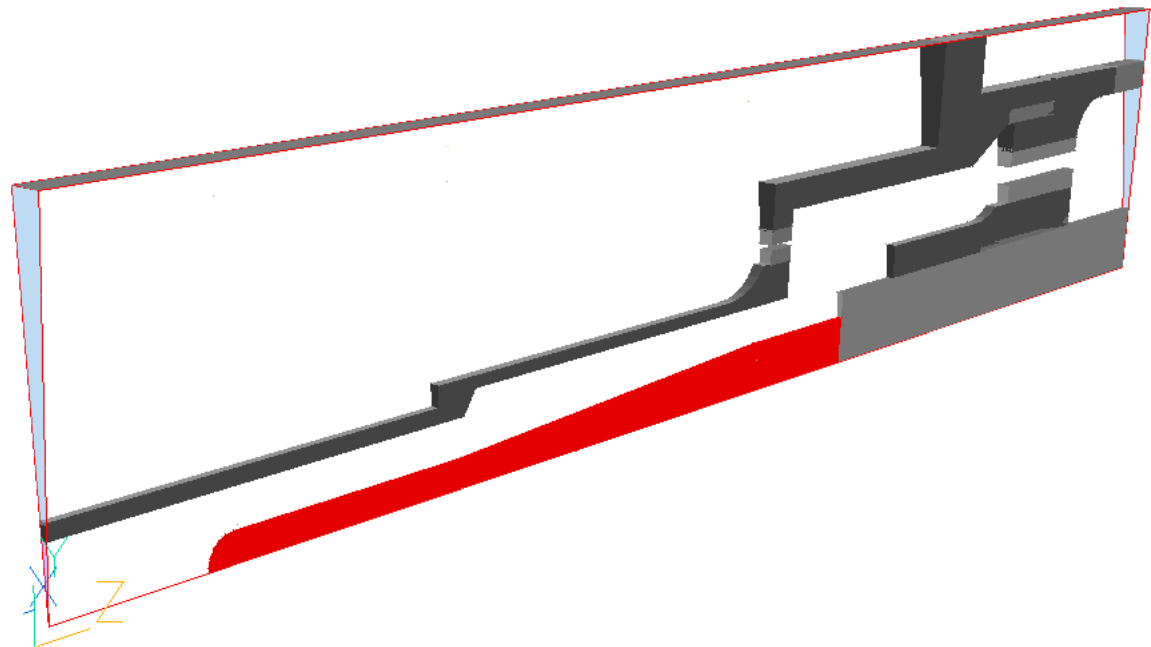
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Thermocouple - Results

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- 2D model geometry



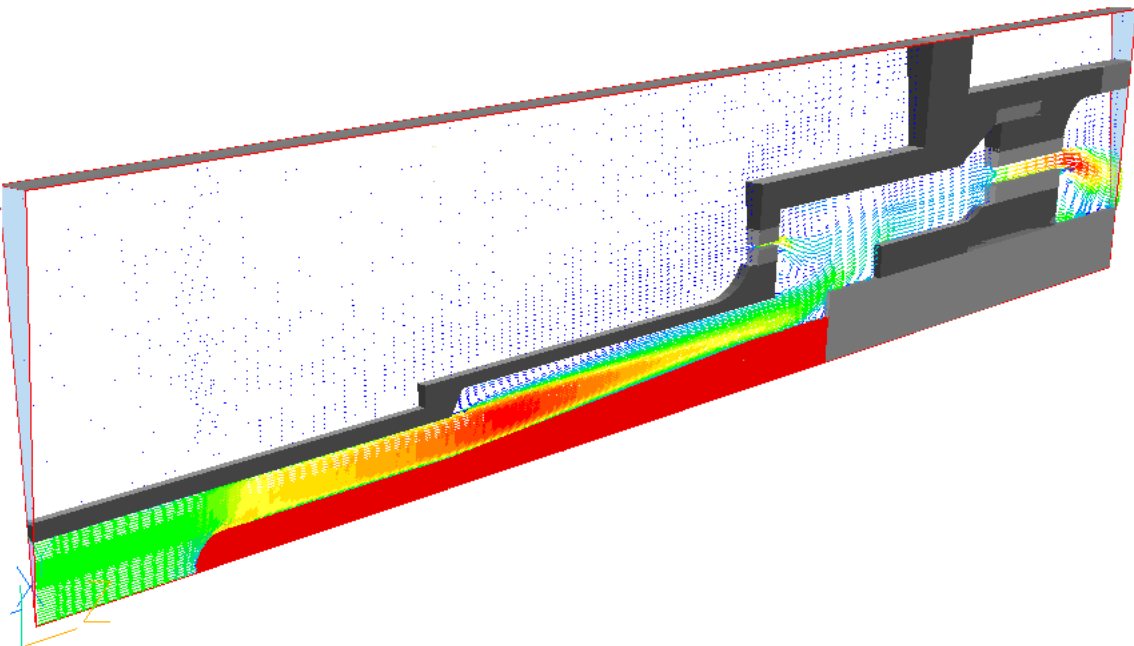
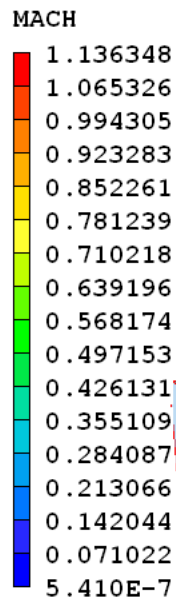
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Thermocouple - Results

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- Vectors



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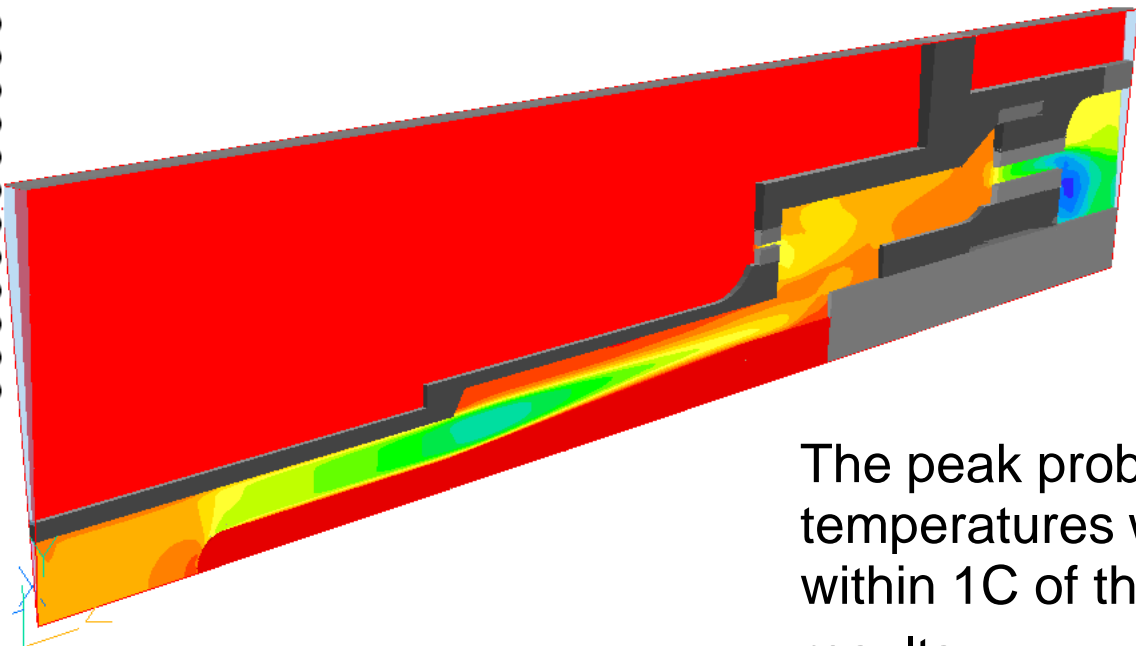
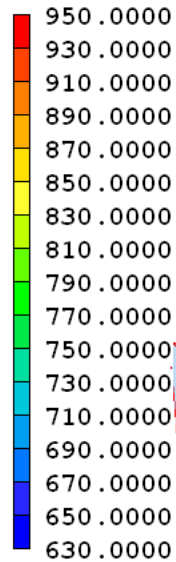


Thermocouple - Results

Seminar

- Temperature contours

Temperature, °C



The peak probe temperatures were within 1C of the 3D results

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