New digital 3D model of the Grate-Kiln pelletizing process for reduced energy usage and emissions

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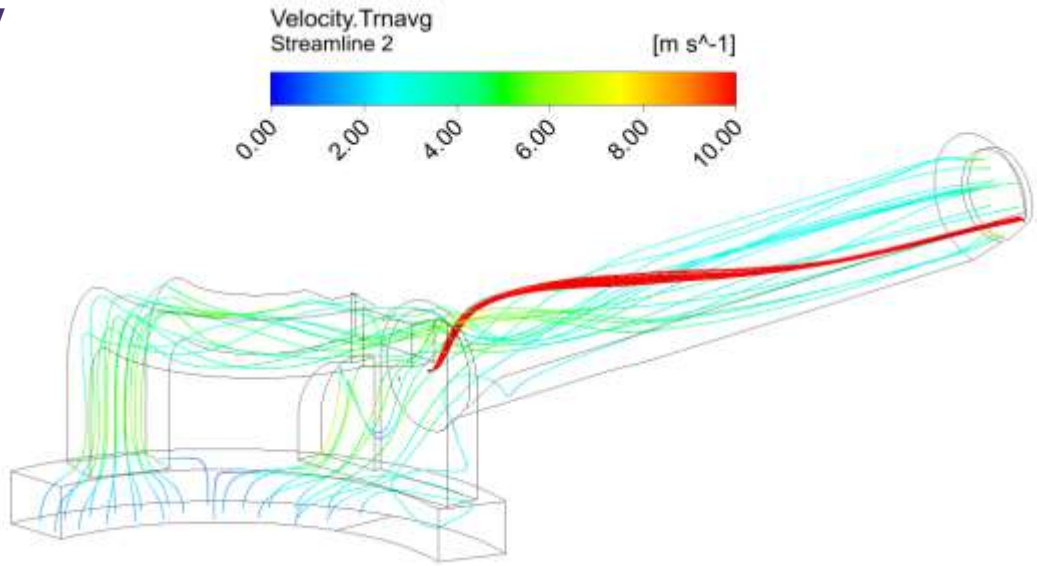

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Purpose and goals

Main purpose:
A digital 3D model that can be used to control and optimize the flow in rotary kilns for reduced energy consumption and environmental impact, and increased pellet quality.

Additional goals:
- A general simulation methodology that can be used on any complex system involving fluid flow.
- Increased understanding of the pelletizing process regarding at least three fluid mechanical related phenomena.
- A demonstration of how advanced experimental techniques can be used in harsh industrial environments.
- Publication of papers in highly ranked journals.

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Results

WP1: Simulation of flow and combustion in the pilot-scale experimental combustion furnace.

WP2: Measurements in pilot-scale with advanced experimental techniques.

WP3: Simulation in full-scale geometry.

WP4: Fluid mechanical investigation for innovative solutions to promote a stable and energy and environmental efficient combustion process.

Hence project is moving from pilot scale modelling and validation towards full-scale implementation.

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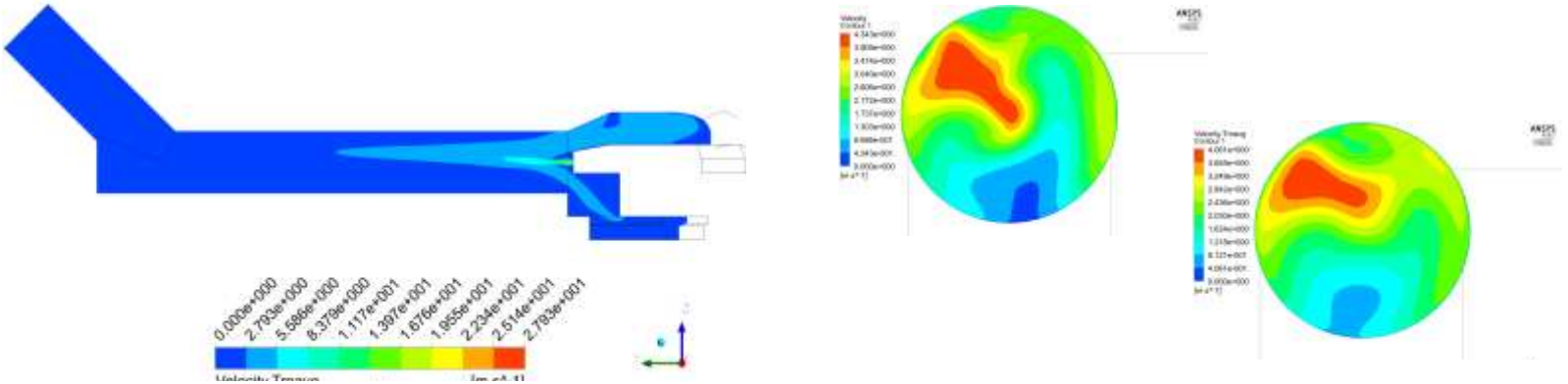
Results

WP1: Simulation of flow and combustion in the pilot-scale experimental combustion furnace.



WP4: Fluid mechanical investigation for innovative solutions to promote a stable and energy and environmental efficient combustion process.

- Literature study and preparation of experiments. First task is to investigate how the length of the flame can be controlled.

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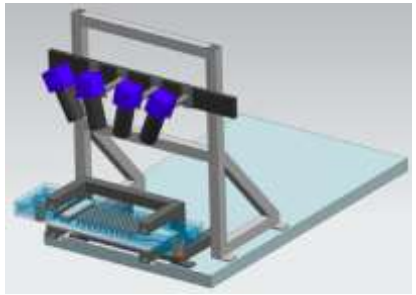
Future work

- Finalize the digital model of the pilot-scale experimental combustion furnace
- Tomographic PIV measurements on coaxial jets



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