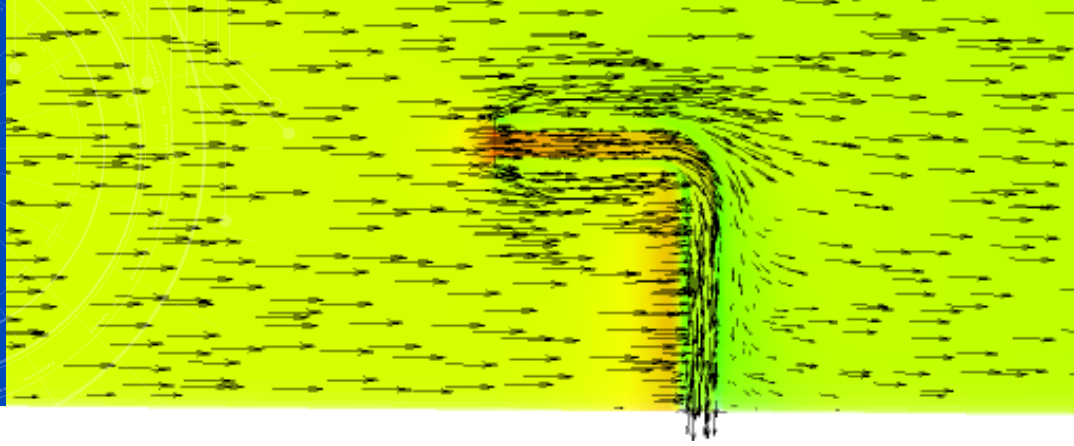
SwRI®

SOUTHWEST RESEARCH INSTITUTE

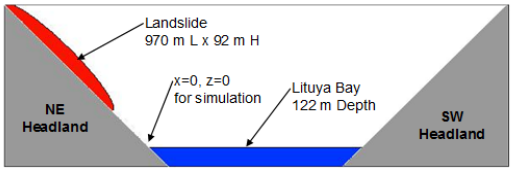


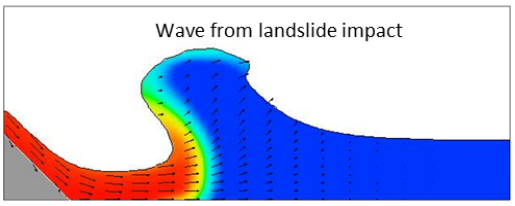
Fluids Engineering CFD Services

Computational fluid dynamics (CFD) is an engineering tool that uses numerical methods to analyze physical phenomena involving fluid flow. Multiphase flows, in particular, present many challenges due to intricate mixing and interfacial transients that can occur. Southwest Research Institute® (SwRI®) engineers have more than 30 years of experience in using and customizing both commercial and SwRI-developed CFD codes to meet client needs.

SwRI conducts research for a diverse range of clientele problems in the oil and gas industry, space science, medical community, food processing, environmental agencies, and the Nuclear Regulatory Commission. Reasons for employing CFD alone, or in conjunction with experimental testing, may include the need for:

- Rapid analysis with reduced resource requirements
- Fewer prototype iterations
- Corroboration of experimental results
- Investigation of parameters not obtainable via traditional experimental techniques (due to time scales, impracticality of sensor placement, visual obstructions, etc.)





Simulation of landslide-generated tsunami event from Lituya Bay in Alaska

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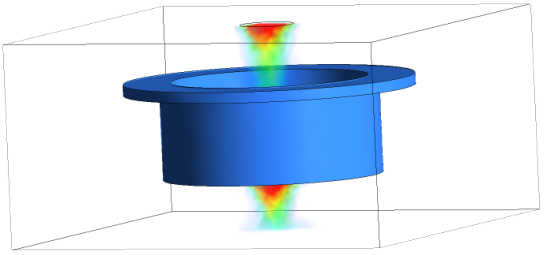
Applications

SwRI engineers have applied CFD techniques to model a wide variety of industrial scenarios, including:

- Oil and gas production/transport
- Pipeline accidental spill and leak assessment
- Space vehicle propellant dynamics
- Environmental flows
- Combustion
- Medical device operation
- Food processing
- Fluid-structure interactions



Porous boundary analysis using model developed from experimental data taken as part of the same multiphase SwRI project

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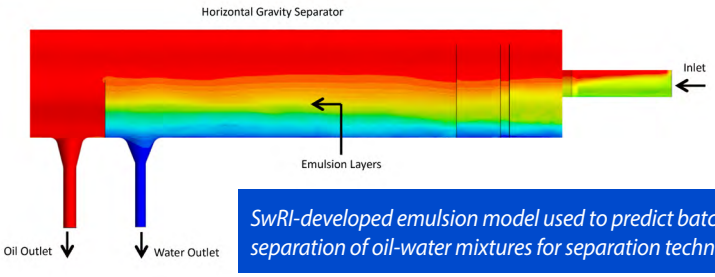
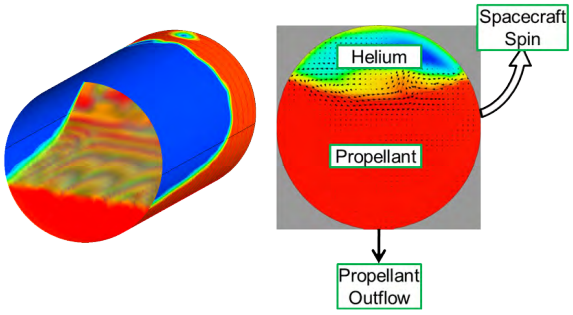
Using state-of-the-art software in combination with parallel processing capabilities, SwRI strives to provide timely solutions for development and operational challenges.



SwRI-developed emulsion model used to predict batch separation of oil-water mixtures for separation technology



Slosh modeling analyses carried out under a 1-g environment (left: nuclear steam suppression tank response to earthquake) and 0-g environment (right: propellant flow dynamics in spinning satellite)

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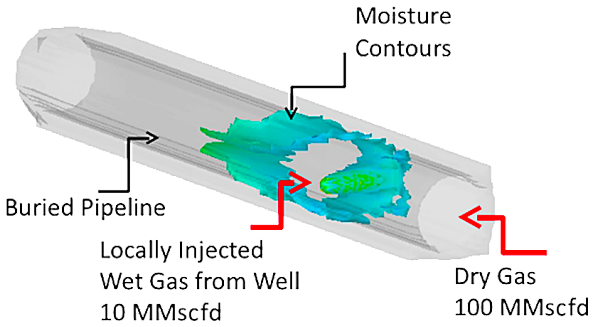

SwRI-developed moisture/humidity model used to gauge susceptibility of gas transmission pipelines to corrosion

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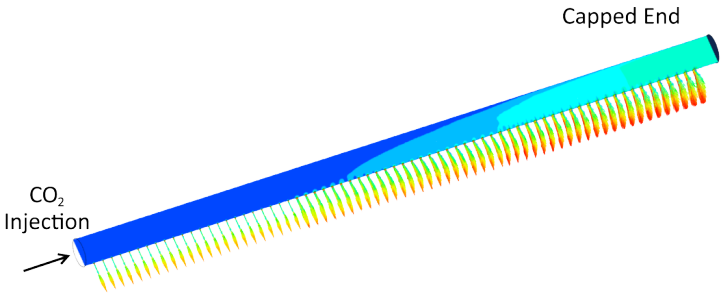

Bubble column sparger analysis conducted to determine uniformity of gas flow from outlets and bubble size (velocity contours with vector overlay at outlets)

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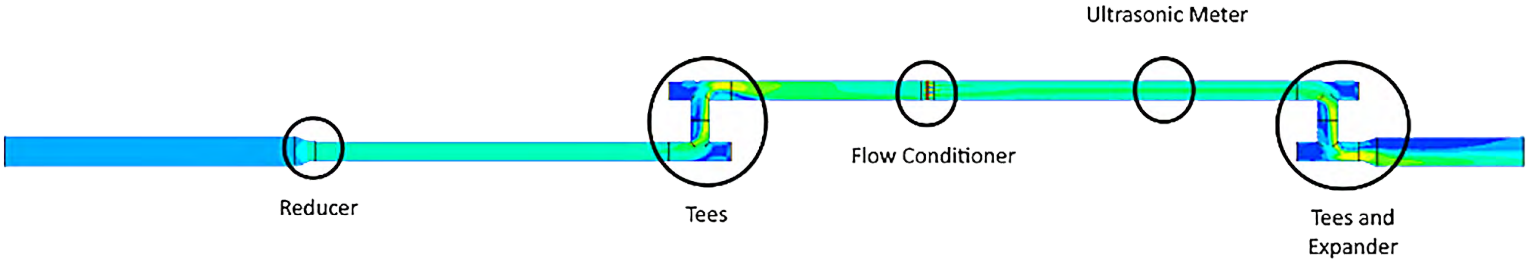

CFD simulations used to assess the velocity profile distortions in natural gas metering stations caused by different header configurations upstream and downstream of an ultrasonic meter (simulation results validated by SwRI experiments)

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We welcome your inquiries.
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Designed & printed by SwRI MPS 18-0624 271236 tp