



Published on *CD-adapco* (<http://www.cd-adapco.com>)

[Home](#) > High Performance Computing STAR-CCM+ Simulations of Industrial Air-Assisted Flare Including Experimental Apparatus

---

# High Performance Computing STAR-CCM+ Simulations of Industrial Air-Assisted Flare Including Experimental Apparatus



There is an ever-increasing demand to couple simulation and experiments in order to understand complex systems. Extensive research has been conducted for simplified flares in well-controlled environments. However, experimental, as well as computational, studies of full-scale flares present great challenges when characterizing the effect of operational and environmental parameters on the combustion efficiency of full-scale systems. Often, for the full-scale flare studies, the experiments themselves, along with the instrumentation, can be very complex and expensive, and can be very difficult to characterize in terms of accuracy. For simulations of full-scale flare operations, computational resources can impose significant restrictions on the models, and their associated accuracy, that can be used to represent the system.

In this paper we present how we use STAR-CCM+ to simulate the entire flare system. The system includes not only the flare combustion and the resulting plume, but also the experimental apparatus which is used to measure the products of combustion. Our simulation domain is large enough to capture the entire industrial flare and its surroundings. By using the STAR-CCM+ CAD and meshing capabilities, we are able to capture and resolve geometric details of the experimental apparatus which are many orders of magnitude smaller than the overall system. By making the experimental apparatus a part of the simulation system, we are not only able to compare our simulation results to the experimental results, but we are also able to quantify the sensitivity of experimental results to the location of the apparatus. As such, using our high performance computing STAR-CCM+ simulations, we illustrate the role of simulations for safe and responsible development of industrial combustion systems.

## **Author Company:**

University of Utah

## **Author Name:**

Michal Hradisky, Philip J. Smith

## **Industries:**

[Energy](#)<sup>[2]</sup>

[Oil and Gas](#) <sup>[3]</sup> ? Oil and Gas - Technology

## **Products:**

[STAR-CCM+](#)<sup>[4]</sup>

**Conference:**

STAR Global Conference 2014<sup>[5]</sup>

CD-adapco is the world's largest independent CFD focused provider of engineering simulation software, support and services. We have over 30 years of experience in delivering industrial strength engineering simulation.

---

**Source URL:** <http://www.cd-adapco.com/presentation/high-performance-computing-star-ccm-simulations-industrial-air-assisted-flare-including>

**Links:**

- [1] [http://www.cd-adapco.com/sites/default/files/Presentation/SGC2014\\_UniversityofUtah\\_MichalHradisky\\_Energy.pdf](http://www.cd-adapco.com/sites/default/files/Presentation/SGC2014_UniversityofUtah_MichalHradisky_Energy.pdf)
- [2] <http://www.cd-adapco.com/industries/energy>
- [3] <http://www.cd-adapco.com/industries/oil-and-gas>
- [4] <http://www.cd-adapco.com/products/star-ccm%C2%AE>
- [5] <http://www.cd-adapco.com/conference/star-global-conference-2014>