

ILLINOIS INSTITUTE OF TECHNOLOGY

iit magazine

Winter 2009

2009

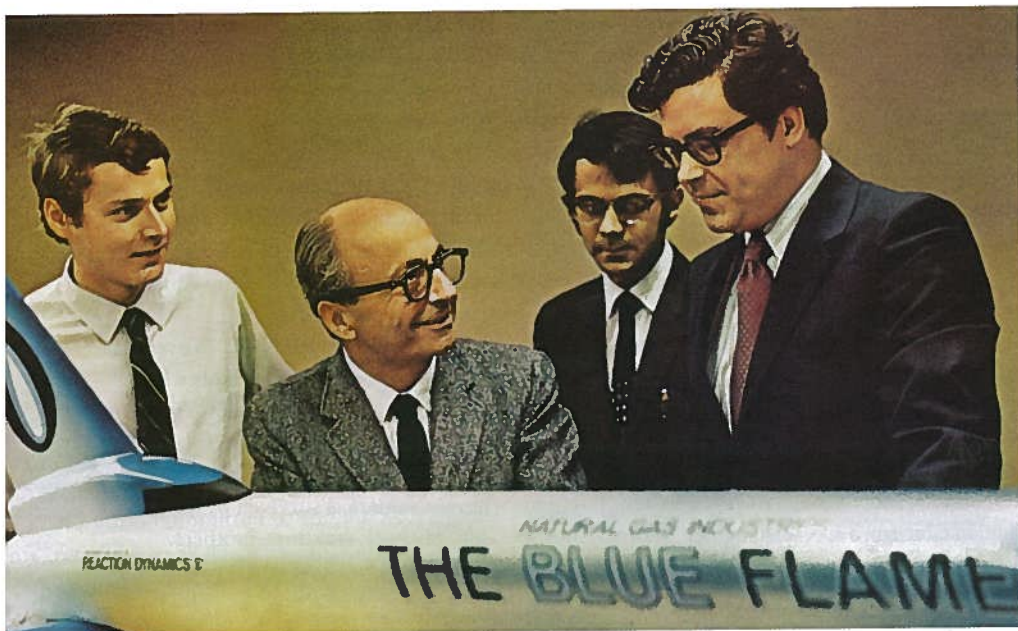
A New Year

NEW PEOPLE: Provost, Alumni Association President, Trustee Leadership **NEW INITIATIVES:** Strategic Plan and Alumni Engagement Program to Launch **NEW RESEARCH:** Sustainable Cities, Mercury Remediation, Energy Scavenging

By Marcia Faye



THE RIDE OF A LIFETIME



[Left to right] Then IIT graduate student Thomas Morel, along with T. Paul Torda, Krishna Pandey (M.S. ME '69), and Sarunas C. Uzgiris with a model of the Blue Flame in a photo taken by Joseph Sterling

In 1965, Dick Keller, a former Institute of Gas Technology (IGT) employee, Ray Dausman, and Pete Farnsworth formed Reaction Dynamics, Inc., a three-person partnership with one purpose: to design a rocket-propelled car that would break the land speed record—the fastest speed attained by a wheeled vehicle on land, as opposed to on water, in the air, or on rails. The trio eventually developed a rocket-propelled dragster called the X-1, which gained a formidable reputation on the drag strip circuit. With this achievement, the men approached Keller's former employer and IIT affiliate IGT in the hopes that the natural gas industry would sponsor the creation of a vehicle capable of breaking the land speed record.

IGT was interested in the group's idea and solicited enthusiastic support from industry leaders. With this vote of confidence, Reaction Dynamics asked T. Paul Torda, a professor in IIT Armour College of Engineering's Department of Mechanical, Materials, and Aerospace Engineering (MMAE), to serve as consultant on the car, named the Blue Flame in homage to its

natural gas roots and liquefied fuel component. Torda agreed and enlisted the help of Sarunas C. Uzgiris (M.S. ME '63, Ph.D. MAE '66), assistant professor, along with a team of eight graduate students and four senior undergraduate design classes. Thomas Morel (M.S. ME '69, Ph.D. '72), president and founder of the engine software firm Gamma Technologies, Inc., was among the group of graduate students, and he was tasked with the aerodynamic design.

"I came to IIT from Czechoslovakia in January 1968 with almost no money in my pocket," says Morel, not realizing the rich adventure that awaited him only two months down the road, or more literally, the salt flats. "Professor Andrew A. Fejer, then chair of the MMAE department, was kind enough to help me get support for my studies." Fejer introduced the talented student to Torda, who assigned Morel the task of determining the shape of the Blue Flame. With much encouragement from his mentor and information on declassified rocket designs obtained from National Advisory Committee for Aeronautics reports, Morel embraced his role

in the project, which formed the basis of his master's thesis.

The IIT team knew that the Blue Flame had to have a low drag to attain the high speed needed to beat the 600.601 mph record, set in 1965 by Craig Breedlove. "While we knew that we had to achieve the lowest possible air resistance, we were also concerned about the generation of lift," explains Morel. "The lift had to be minimized, and in fact we wanted it to be slightly negative. That was one of our worries—that at high speeds the car would lift off and when it came down, could hurt the driver." This led to a design with a specially designed nose for low drag, triangular body shape, and slight nose-down body inclination.

Finally, the day arrived when the team knew it had a winner on its hands. "Once the shape was designed, we tested a model in an aeronautical wind tunnel at Wichita State University and determined that we should have low enough drag to be able to break the world record. We then took a smaller-scale model to a supersonic wind tunnel at Ohio State University and confirmed the drag and lift characteristics at speeds up to Mach one," says Morel.

Longtime speed racer Gary Gabelich jumped at the opportunity to drive the Blue Flame. A former test astronaut for North American Aviation, Gabelich had been racing vehicles since high school and was no stranger to Bonneville Salt Flats, where the 38-foot Blue Flame would be put to the test. On October 23, 1970, within only a small window of time before the weather would make racing impossible, Gabelich took the Blue Flame through its two mandatory runs and surpassed Breedlove's land speed record by 21.8 mph.

Though Morel was not present on that momentous day at Bonneville, the Blue Flame—on permanent exhibit at the Auto & Technik Museum in Sinsheim, Germany—will always occupy a special place in his memories of IIT. While the Blue Flame served as a testament to the versatility of natural gas and received wide media coverage, Morel says that there is something more he will remember than the excitement of helping to design an elite machine.

"I enjoyed all of the people I was working with who felt that we could intellectually pull off the project," he says. "I was so impressed by them, these people who had a vision and a dream, and who worked for untold hours and put everything they had into accomplishing them."