PPPL PRINCETON PLASMA PHYSICS LABORATORY

PRINCETON UNIVERSITY

U.S. DEPARTMENT OF ENERGY

Builders and Users

CONSTRUCTING THE NATIONAL

Spherical Torus Experiment Upgrade took years of detailed planning and oversight. The team in charge brought decades of experience to the task, working together to make the $94 million upgrade a reality.

The Builders

Ron Strykowsky: Massive coordination of details for a massive project

Ron Strykowsky compares his role as overall manager of the NSTX-U project to that of an orchestra leader conducting a team of expert musicians. Strykowsky coordinated all the engineers and technicians who constructed the device, overseeing schedules and costs and ensuring that the project met all staffing needs. He estimates that by March of 2015, 209 employees at PPPL had logged 559,487 hours working on NSTX-U – the equivalent of one person working 24 hours a day seven days a week for 64 years. “I look at it more as a conductor who doesn’t know how to play any instruments,” the 32-year veteran of PPPL says. “You don’t tell anyone how to play the violin. You ask: ‘What do you need to play the violin better?’”

Tim Stevenson: A key player finds joy in his multiple roles on the NSTX-U

Tim Stevenson gets a gleam in his eye when he talks about the upgrade. He headed the team that installed a second massive 75-ton beam box that will double the experiment’s heating power. That was just one of his tasks: As head of project management at PPPL, Stevenson monitored all NSTX-U projects to ensure that they were carried out safely and according to plan. It’s still “a joy” coming to work every day after 31 years at the Laboratory, Stevenson says. “I’m thrilled to be an engineer here,” he adds. “We are making a star and making new knowledge. How cool is that?”

Larry Dudek: Managing major components of the upgrade

Larry Dudek has been building things since joining PPPL in 1980. He most recently oversaw construction of major components of the NSTX-U, including the center stack that houses the magnets that form the heart of the upgrade. A key task was reinforcing the machine to withstand the increased electromagnetic forces within the upgraded facility. The low-key engineer compares this to installing a V-8 engine in a compact car. “You have to worry about the structure of the car, is it going to be able to handle the extra loads?” he says. Looking back, he is gratified by the quality of everyone’s work. “It’s a big achievement to have this machine upgraded and running,” he says. “It’s a big relief.”

Construction Manager Erik Perry: Bringing the project in safely and on time

Erik Perry is a hands-on supervisor. "If the people are here I've got to be here," he says. With 50-to-70 technicians working 10-hour shifts seven days a week to complete the upgrade, Perry was up at 5 a.m. to check emails each day. He oversaw the progress of construction twice every morning and twice in the afternoon, seven days a week, then rechecked emails at 10 p.m. when the late shift arrived. In his 38 years at PPPL, Perry has never missed a deadline. "The biggest thing is to try to make sure that everything is done safely and that everything gets done correctly and in the most efficient manner," he says. He has strong motivation. "I'm still here for the fusion," he says. "I want to see it made available to the world."

Michael Williams: Overseeing the Big Picture

As associate director for Engineering and Infrastructure at PPPL, Michael Williams' oversees the big picture — a skill he has developed over his 39 years at the Laboratory. Williams is modest about his contributions to the NSTX upgrade. "I stepped in occasionally to keep the gears greased and working but in the end, they really did all the work," he says of the construction team. When pressed, he acknowledges that the project took intricate planning and a multitude of meetings. "There were daily meetings, weekly meetings, scheduled meetings, spontaneous meetings, hallway meetings," he says. "An effort of this magnitude requires a lot of coordination and you can't accomplish that coordination without a plethora of meetings." He now looks forward to seeing the fruit of everyone's labors. "There's an increase in excitement in the Lab as a whole," he says. "Operating NSTX is the lifeblood of the Laboratory."

The Users

Jon Menard: Setting the scientific direction

Jon Menard's task as program director for the NSTX-U calls for guiding research on the upgraded machine, which he helped design. With more than 300 U.S. and international researchers using the facility, organizing the research program is a challenging and exciting task. "It's very satisfying intellectually," says Menard, who joined PPPL in 1999 after earning his PhD from Princeton and has since won a 2004 Presidential Early Career Award for Scientists and Engineers and a 2006 Kaul Foundation Prize. "It's really setting the whole scientific direction of what we're doing with the machine and why," he says of his role.

Masa Ono: Overseeing daily operations

Masa Ono helped design the NSTX and NSTX-U, for which he serves as project director. He oversees the daily operation of the experiment and faces new challenges each day. "We usually don't do the same thing twice," he says. "That's part of the fun because it's a new experience every day." Ono joined the PPPL staff in 1978 after receiving his PhD from Princeton University. His numerous honors include the 1999 Kaul Foundation Prize, an annual PPPL award, which he received for his work on the NSTX. "The NSTX-U will provide new capabilities so we can simulate how future devices operate," Ono says. "So it's a much more capable machine compared to NSTX."