

Student-built instrument set to launch on Pluto mission

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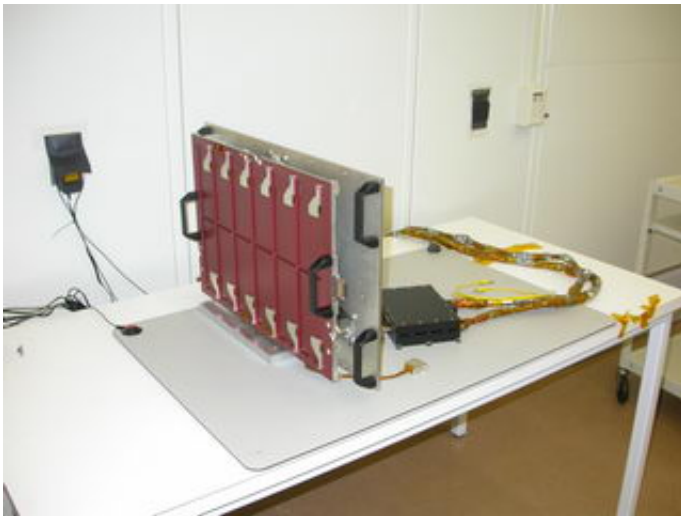


Image: All three components of the SDC assembled and ready to be put into the New Horizons spacecraft. If you will notice, the dust detector itself is protected from dust hitting it before it is supposed to.

The University of Colorado at Boulder's long heritage with NASA planetary missions will continue Jan. 17 with the launch of a student space dust instrument on the New Horizons Mission to Pluto from Florida's Kennedy Space Center.

As the first student-built instrument ever selected by the space agency to fly on a planetary mission, the CU-Boulder Student Dust Counter, or SDC, will monitor the density of dust grains in space as New Horizons

buzzes to Pluto and beyond. The dust grains are of high interest to researchers because they are the building blocks of the solar system's planets, said Research Associate Mihaly Horanyi of the Laboratory for Atmospheric and Space Physics, principal investigator for the student instrument.

The student team hopes to identify as-yet-undetected clumps of dust in the dust disk of the solar system caused by the gravity of the outer planets, said Horanyi, who is also a professor in the physics department. "This will help us to understand the formation of our own planets, as well as those seen in dust disks around other stars," he said.

"Just as importantly, this effort will provide students with an important role in a pioneering space mission for years to come," said Horanyi.

Instruments and experiments designed and built for NASA missions by CU-Boulder's LASP since the 1970s have visited Venus, Mars, Jupiter, Saturn, Uranus and Neptune. In addition, NASA's MESSENGER spacecraft, now en route to Mercury, is carrying a \$7 million device designed and built by CU-Boulder's LASP.

The SDC detector is a thin, plastic film resting on a honeycombed aluminum structure the size of a cake pan mounted on the outside of the spacecraft, said Horanyi. A small electronic box inside the spacecraft will function as the instrument's "brain" to assess each individual dust particle that strikes the detector during the mission.

The researchers are particularly interested in the dust that New Horizons will encounter in the Kuiper Belt, a vast region beyond the orbit of Neptune that contains thousands of ancient, icy objects, said Horanyi. Kuiper Belt objects are thought to contain samples of ancient material formed in the solar system billions of years ago.

Microscopic-sized dust grains hitting the SDC will create unique electrical signals, allowing the CU-Boulder students to infer the mass of each particle, said CU-Boulder doctoral student David James, who has been working on the electronics of the dust detection system on SDC for the past two years. While the spacecraft will be in "sleep mode" for much of the cruise to Pluto, CU-Boulder's dust detector will remain turned on to catch space dust during the journey, James said.

The SDC team is comprised of CU-Boulder students from electrical and computer engineering, mechanical engineering, computer science, journalism and business who designed and fabricated the instrument under the supervision of LASP faculty and staff. The students will share their findings and mission experiences with students and the public around the world via the Internet and public presentations.

"I never dreamed I would get the chance to actually work on a space mission as an undergraduate student," said Elizabeth Grogan, who began working on the SDC as software engineer while a senior at CU-Boulder. She now works at LASP as a research assistant on the New Horizons effort. "I got much more hands-on experience on this project than I could have ever gotten in a classroom," Grogan said.

The National Academy of Sciences has ranked the exploration of Pluto, its moon, Charon, and the Kuiper Belt among the highest priorities for space exploration, citing their importance in advancing the understanding of the solar system.

"We expect that several generations of CU-Boulder students will be involved in the mission during the next two decades," Horanyi said.

The New Horizons mission is led by the Southwest Research Institute's Department of Space Studies in Boulder under the direction of Alan Stern. New Horizons was designed and built at Johns Hopkins

University's Applied Physics Laboratory in Laurel, Md., which will operate the spacecraft for NASA. The piano-sized probe will launch on a Lockheed Martin Atlas 5 rocket from Cape Kennedy to begin its 10-year journey to Pluto.

The 1,000-pound probe, which will be the fastest spacecraft ever launched, will approach Pluto and Charon as early as summer 2015. In addition to the dust counter, the instrument suite includes two cameras, two imaging spectrometers and two particle spectrometers to gather data on the surfaces, atmospheres and temperatures of Pluto, Charon and the Kuiper Belt objects.

Horanyi said a group of current and former CU-Boulder students who worked on SDC are going to the Florida launch, many paying their own way from around the world. "Many of these students have moved on to other institutions and careers, but they are excited to see this mission finally launch," he said. "If all goes well, we will be having another reunion in 10 years when the spacecraft reaches Pluto."

Source: University of Colorado

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