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Dante Versus The Volcano

PITTSBURGH, PA—Late this fall, when summer breaks over the frozen continent, a mountaineer will rappel down the throat of a live Antarctic volcano.

No daredevil human, but rather an 8-legged robot named Dante will descend into the inferno. Designed and built at Carnegie Mellon University, Dante will get a piggyback to the rim of Mount Erebus on an 8-wheeled autonomous land vehicle named Virgil.

But it's all downhill from there. Dante will pick its way to the crater floor guided by vision sensors—stereo cam-

Dante begins its descent into Mount Erebus crater, unreeling tether from its partner Virgil.

eras and a laser rangefinder. A tether will serve as rappelling cable, data link and power cord from Virgil's diesel generator.

Dante's body comprises two concentric frames, each with four legs that walk in pairs.

Once at the bottom, Dante will park itself near outgassing vents and collect samples, its instruments operated remotely via the data link. After a day on the crater floor, Dante will spend another 16 hours crawling back up to Virgil.

The most tortuous quest a robot's ever undertaken, the Erebus project will challenge the technology planned for Moon and Mars rovers.



ILLUSTRATION BY JEFF MANGIAT

Robotic Bubble Bucket Truck



KRAFT TELEROBOTICS PHOTOS

GUNMA, JAPAN—Many of Japan's electric companies aren't using bucket trucks anymore. Instead, their linemen work from enclosed, windowed cabins fitted with twin telerobotic manipulator arms.

The cabins are built by Aichi Sharyo Co. The arms, supplied by Kraft Telerobotics of Overland Park, Kansas, extend and retract from the cabin's base. The operator uses force-feedback joysticks to move

the arms, which, although hydraulically actuated, are controlled via fiberoptic cables. Also at the lineman's disposal is an overhead boom winch, which can hoist objects up to 300 pounds for the arms to put into place.

The entire system is insulated so the user can operate on live lines or work during storms.

The Canadian utility Hydro Quebec has developed a similar system using the Kraft arms. Meanwhile, Pacific Gas & Electric recently bought several Kraft manipulator systems and may come up with its own version.



Japanese linemen guide robotic arms from insulated bubble cabs.

World's Heaviest Roller

CAPE CANAVERAL, FL—The Air Force's new mobile service tower for Titan rockets is, at 11.4 million pounds, the heaviest thing ever to propel itself along railroad tracks.

The tower at Launch Complex 40 is essentially a 23-story building mounted on custom railroad cars. The structure rolls in to envelop the entire launch pad, screening the rocket from the elements. Designed by Bechtel Corp., it can withstand hurricane-force winds.

Inside, work platforms support inspection teams, while payload processing goes on in a clean-room.

For a moving vehicle, the tower boasts some impressive statistics. Six-and-a-half miles of piping snake through the complex, and there's



enough wiring and cable to run from Washington, D.C., to Baltimore and back again.

The tower will get its inauguration this month when a Titan III, carrying *Mars Observer*, blasts off. Titans are the backbone of the Air Force's rocket fleet, and the service tower is designed for a minimum 15-year life span.

Massive 23-story launch-prep tower for Titans was built on rolling stock.



AIR FORCE PHOTOS