Tele-Robotic ATHLETE Controller for Kinematics —TRACK

TRACK is useful in cases where the whole-limb posture must be unambiguously commanded.

NASA's Jet Propulsion Laboratory, Pasadena, California

TRACK is a specialized controller for the All-Terrain Hex-Limbed Extra-Terrestrial Explorer Robot (ATHLETE), which has six limbs with six kinematic degrees of freedom each. TRACK is a 1/8-scale sensed but un-actuated model of one ATHLETE limb (see figure), designed to be used as a human-interface device to aid operations. TRACK is useful in cases where the whole-limb posture must be unambiguously commanded — for example, to maximize rigidity, available range of motion, or to avoid nearby obstacles. Because TRACK mimics the link lengths and geometry of ATHLETE as well as the joint angle limits, its kinematic workspace is representative of the actual ATHLETE limb workspace.

TRACK includes rotary sensors (potentiometers) for each ATHLETE kinematic degree-of-freedom (DoF) and an extra rotary sensor for the wheel rotation; spring-loaded friction bearings to hold joint pose against gravity; tri-color RGB LEDs (light emitting diodes) at each joint and the wheel; two momentary-contact tactile pushbuttons at each joint and the wheel; USB (universal serial bus) communications and power; onboard firmware with calibration storage and ASCII (American Standard Code for Information Interchange) monitor; and host-side Java interface library.

Tele-Robotic ATHLETE Controller for kinematics.

This work was done by Jeffrey S. Norris of Caltech and Marsette A. Vona of the Massachusetts Institute of Technology for NASA's Jet Propulsion Laboratory. For more information, contact iaoffice@jpl.nasa.gov. NPO-46517

Three-Wheel Brush-Wheel Sampler

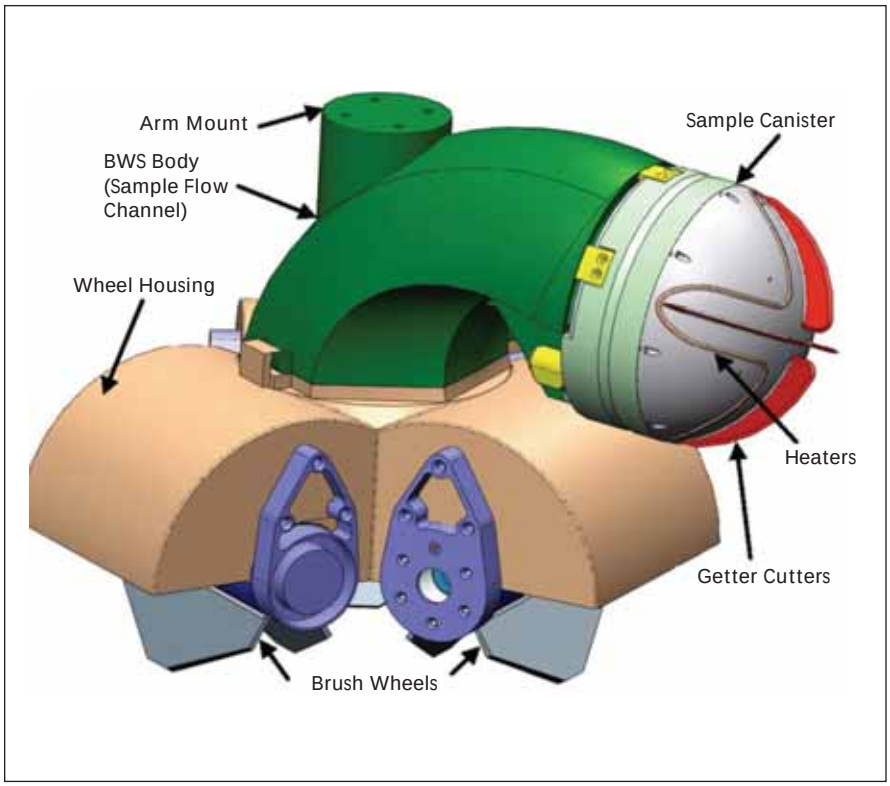
New design simplifies sample collection.

NASA's Jet Propulsion Laboratory, Pasadena, California

A new sampler is similar to a common snow blower, but is robust and effective in sample collection. The brush wheels are arranged in a triangle shape, each driven by a brushless DC motor and planetary gearhead embedded in the wheel shaft. Its speed can be varied from 800–2,000 rpm, depending on the surface regolith resistance. The sample-collecting flow path, and internal features, are designed based on flow dynamics, and the sample-collecting rates have consistently exceeded the requirement under various conditions that span the range of expected surface properties.

The brush-wheel sampler (BWS) (as is shown in the figure) is designed so that the flow channel is the main body of the apparatus, and links the brush-wheel assembly to the sample canister. The combination of the three brush wheels, the sample flow path, and the canister location make sample collection, storage, and transfer an easier task.

This work was done by Geoffrey A. Duckworth, Jun Liu, and Mark G. Brown of Caltech for NASA's Jet Propulsion Laboratory. For more information, contact iaofflce@jpl.nasa.gov. NPO-47100



This **Brush Wheel Sampler,** similar to a common snow blower, is an effective sample collector.