

RoboGlove: Initial Work Toward a Robotically Assisted EVA Glove

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OVERVIEW

The RoboGlove is a device designed to provide additional grip strength or endurance for a user. In applying this Robonaut 2 spinoff technology to the Phase VI Space Suit glove, the project is using robotic tendons and actuators to regain some of the hand performance that is lost when wearing a pressurized glove. An array of sensors embedded into the finger softgoods provides input to the control system which retracts the tendons, helping to close the user's hand. While active, this system provides augmentation, but is nonintrusive to glove usage when disabled.

INNOVATION

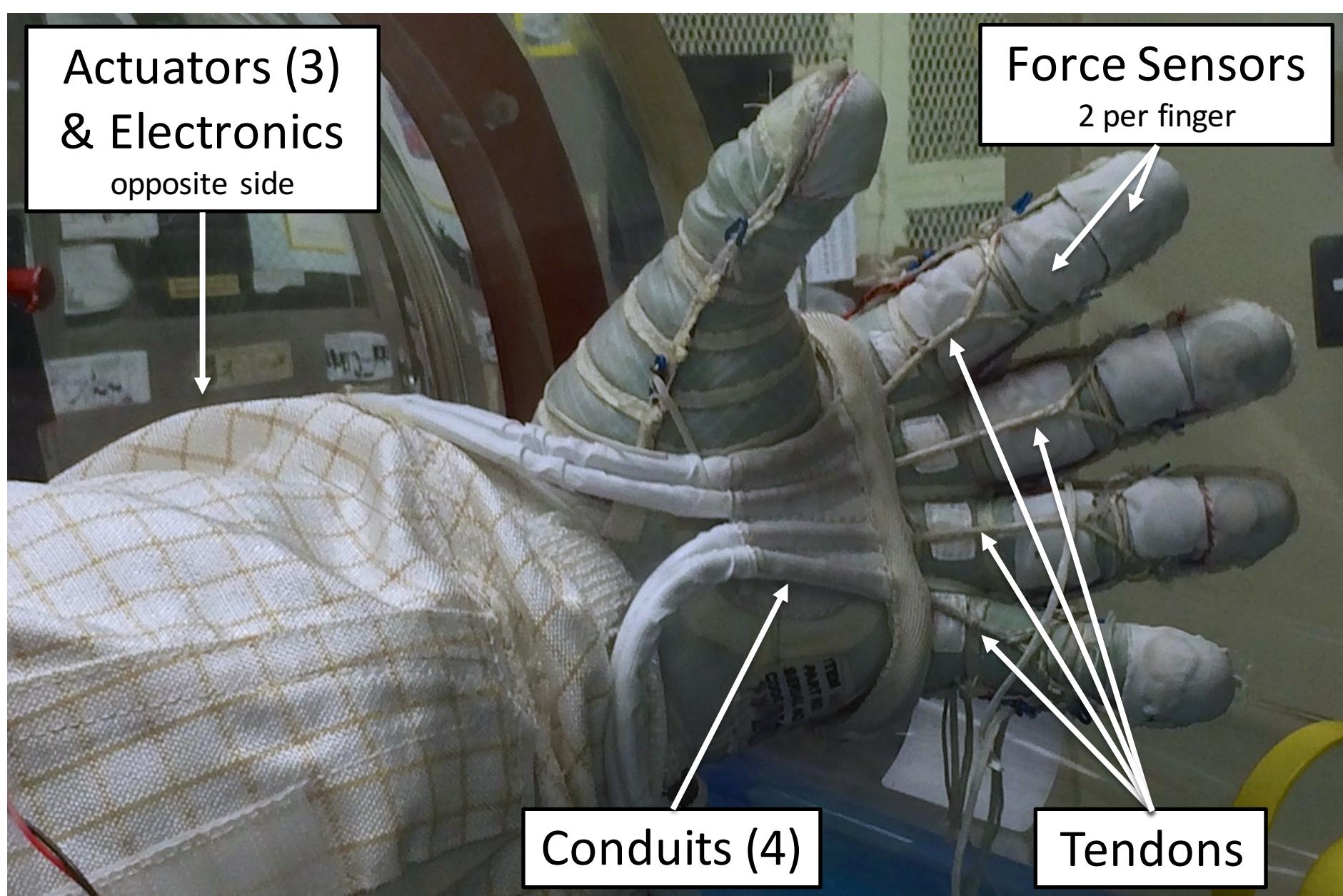
This technology would enhance a crewmember's EVA performance by allowing a robotic mechanism to assist with the opening and closing of the glove.

OUTCOME

- Glovebox and Mark III Space Suit testing of a pair of the gloves showed promise as an assistive device.

INFUSION SPACE / EARTH

- This technology could be applied to any space suit glove to restore a greater portion of user barehanded performance.
- Variations on the device could assist in many terrestrial applications where grip strength and fatigue affect human performance, including industrial and medical scenarios.



PARTNERSHIPS / COLLABORATIONS

The current Space Suit application is a collaboration between the Crew and Thermal Systems Division and the Software, Robotics, and Simulation Division at JSC through the High Performance EVA Glove Project (HPEG) under STMD Next-Generation Life Support Systems (NGLS). The enabling technology was initially developed through a partnership between NASA/JSC and General Motors, with GM testing a version of the glove in their proto-assembly labs.

PAPERS / PRESENTATIONS

RoboGlove – A Grasp Assist Device for Earth and Space, a paper discussing work on the NASA/GM application and early work on the Space Suit RoboGlove, was presented at the International Conference on Environmental Systems (ICES) in July 2015. A second paper is planned for ICES 2016.

FUTURE WORK

A full range of tests to evaluate the gloves' overall benefit is planned. Improvements to the actuators and electronics will better integrate the robotic hardware with the glove.

