ries of capillary detection channels, which would be coated with probe molecules, each designed to capture a specific functional group. Once the flow had run its course, an instrument yet to be developed (perhaps an integrated optical spectrometer) would be used to detect and analyze molecules of interest that had accumulated in the channels. The outputs of the instrument would be used to construct a matrix of data from which the concentrations of the target molecules would be estimated.

This work was done by Ying Lin and Nan Yu of Caltech for **NASA's Jet Propulsion Laboratory**. *Further information is contained in a TSP (see page 1).* *NPO-40281*

Multicompartment Liquid-Cooling/Warming Protective Garments

Lyndon B. Johnson Space Center, Houston, Texas

Shortened, multicompartment liquid-cooling/warming garments (LCWGs) for protecting astronauts, firefighters, and others at risk of exposure to extremes of temperature are undergoing development. Unlike prior liquid-circulation thermal-protection suits that provide either cooling or warming but not both, an LCWG as envisioned would provide cooling at some body locations and/or heating at other locations, as needed: For example, sometimes there is a need to cool the body core and to heat the extremities simultaneously. An LCWG garment of the type to be developed is said to be shortened because the liquid-cooling and -heating zones would not cover the whole body and, instead, would cover reduced areas selected for maximum heating and cooling effectiveness. Physiological research is under way to provide a rational basis for selection of the liquid-cooling and -heating areas. In addition to enabling better (relative to prior liquid-circulation garments) balancing of heat among different body regions, the use of selective heating and cooling in zones would contribute to a reduction in the amount of energy needed to operate a thermal-protection suit.

This work was done by Victor S. Koscheyev, Gloria R. Leon, and Michael J. Dancisak of the University of Minnesota for **Johnson Space Center**.

In accordance with Public Law 96-517, the contractor has elected to retain title to this invention. Inquiries concerning rights for its commercial use should be addressed to:

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