NewsRelease

National Aeronautics and
Space Administration

Langley Research Center
Hampton, Virginia 23681-0001

Michael Braukus
Headquarters, Washington, DC
(Phone: 202/358-1979)

September 22, 1999

Keith Henry
Langley Research Center, Hampton, VA
(Phone: 757/864-6120)

Bradford Warner
Eastern Virginia Medical School, Norfolk, VA
(Phone: 757/446-6050)

Marguerite Beck
UVA Health System, Charlottesville, VA
(Phone: 804/924-5679)

RELEASE NO. 99-065 (Identical to HQ REL. NO. 99-103)

NASA Technology May Help Victims Of Diabetes

Some of the more than 15 million Americans who have diabetes may soon use NASA virtual reality technology as a new treatment in the self-management of the disease.

Preliminary observations show that NASA's artificial-vision technology can help patients at risk for nerve damage associated with diabetes to visualize and control blood flow to their arms and legs. This application, which comes from several years of research aimed at enhancing aviation safety, combines two technologies: sensors to measure the body's reactions and powerful computer graphics to turn those measurements into a 3-D virtual environment.

The graphics technologies are used in research with cockpit artificial-vision systems to help pilots see in low- or no-visibility situations, and as data-visualization tools to help designers study air-flow patterns around new aircraft shapes. In this fall's studies, diabetes patients will wear a 3-D virtual-reality headset to visualize the contraction and expansion of their own blood vessels.

Using self-management, or biofeedback methods -- including changes in breathing and muscle flexing -- the patients will increase blood flow, which will be measured through sensors attached to their fingertips. The system uses skin-surface pulse and temperature measurements to create a computer-generated image of what is actually happening to blood vessels under the skin. Just as pilots use artificial vision to "see" into bad weather, patients will use this virtual reality device to see beneath their skin.

The studies will be conducted by the Strelitz Diabetes Research Institutes of the Eastern Virginia Medical School, Norfolk, VA. "What we have here is an immediate and direct, real-time visual appreciation of what's happening with blood flow," said Dr. Aaron Vinik, professor of internal medicine and director of research at the Strelitz Institutes.

- more -

Researchers intend patients to use such a device to train themselves to eventually sense and control their blood flow with no device whatsoever. Previous biofeedback methods, trained patients to do this by presenting them with physiological information in simple graphics, sometimes aided by separate mental-imagery training. Virtual-reality technology is proving to be more easily learned and motivating for patients and is expected to be more effective in teaching these skills by helping patients visualize real-time physiological responses.

Studies will also begin this fall in the Behavioral Medicine Center at the University of Virginia Health Sciences Center, Charlottesville, VA, to evaluate the technology for the treatment of other blood-flow disorders. "If tests are successful, this technology may also be used to help sufferers of migraine headaches and other chronic blood-flow disorders," said NASA researcher Alan Pope. Pope and Kurt Severance, of NASA's Langley Research Center, Hampton, VA, are the inventors of the virtual-reality device.

The medical centers signed agreements with Langley's Technology Commercialization Program Office to test the NASA device. The office is part of an active NASA technology transfer program, established to move space-age technology from the laboratory to the marketplace. For more information, check the Internet at:

http://tag-www.larc.nasa.gov/tag/index.html

- end -

Editor's Note: Broadcast media organizations are invited to conduct live interviews via satellite with NASA Langley's Dr. Alan Pope (research scientist) and Kurt Severance (computer engineer), inventors of the virtual-reality biofeedback device, on Friday, Sept. 24 from 6 a.m. to 10 a.m. and 1 p.m. to 2 p.m. EDT. B-roll is available that includes the technology's aerospace application in aviation research and its current use with diabetes patients. Call Ivelisse Gilman at (757) 864-5036 to book an interview.