ABSTRACT

Imagine you are an engineer or technician working on a critical space system and all the information you need is immediately available to you when you need it. All your work procedures, not just the ones you happened to have with you, are accessible on demand. You can quickly document your work with images and text without lifting a finger. Every move you make is recorded on demand and you can play it back later for training or analysis. For your particular task, you can immediately see exactly what others have done before you. Imagine having a telepresence capability that streams what you are seeing — as you see it — to colleagues anywhere in the world. In addition, all the emergency sensors and system health data is instantly available. When an emergency occurs, you find out immediately and further instructions are made available exactly when you need them. And all of this can be wirelessly transmitted across the globe or stored locally on your person. Now imagine all of this displayed and accessible right from your safety goggles using an embedded, lightweight wearable computer. The technology being proposed for this effort is a wearable computer with an optical head-mounted display providing various means of communication and augmented reality data to its user. Emerging wearable technologies are showing promise across many industries, from manufacturing to medical, yet there is minimal investment in the areas that specifically apply to NASA's unique mission. The wearable computer would allow users to have access to and modify critical information on a transparent, interactive display in their non-obstructed field of view without taking their eyes or hands off the work in front of them. The proposed technology would dramatically improve the user's situational awareness thus improving safety and efficiency. Once the technology is proven initially for ground operations, it can be transitioned for use in many other areas ranging from laboratory research to in-space mission operations, as well as to commercial manufacturing.
ANTICIPATED BENEFITS

To NASA funded missions:
All ground operations for NASA missions can benefit from this technology as it increases the safety of operators while also increasing their efficiency.

DETAILED DESCRIPTION

The technology being proposed is a wearable computer with an optical head-mounted display providing various means of visual communication and augmented reality information to its user. The wearable computer would allow personnel to have access to and modify critical information on a transparent, interactive display in their field of view, and to also integrate critical sensor information and bring telepresence capabilities via an on-board camera and microphone without taking their eyes or hands off the work in front of them. This integration of capabilities represents a significant advancement over the state of the art with the purpose of dramatically improving situational awareness thus improving the safety and efficiency. Data to be included would be determined via user studies, but may include safety critical work procedures, temperature, life support, air pressure, and instrument measurements. This technology will be proven initially for ground operations at Kennedy Space Center, but it can also prove beneficial in many other areas ranging from an airplane’s cockpit to laboratory research on the ISS, and even eventually on an exploration mission on the Martian surface. In all these realms, the user will need assistance and this technology will bring them the information they need, where they need it, and when they need it.
U.S. WORK LOCATIONS AND KEY PARTNERS

Other Organizations Performing Work:
- Abacus / IMCS (Baltimore, MD)
- Florida Institute of Technology (Melbourne, FL)
- Purple Rock Scissors (Orlando, FL)

PROJECT LIBRARY

News Stories
- KSC team delves into wearable tech in space
  - (http://www.floridatoday.com/story/tech/science/space/2015/01/04/ksc-team-delves-wearable-tech-space/21262681/)
DETAILS FOR TECHNOLOGY 1

Technology Title
Smart Glasses for NASA Operations

Technology Description
This technology is categorized as a hardware system for wearable applications.

The technology being proposed is a wearable computer with an optical head-mounted display providing various means of visual communication and augmented reality information to its user.

Capabilities Provided
The wearable computer would allow personnel to have access to and modify critical information on a transparent, interactive display in their field of view, and to also integrate critical sensor information and bring telepresence capabilities via an on-board camera and microphone without taking their eyes or hands off the work in front of them. This integration of capabilities represents a significant advancement over the state of the art with the purpose of dramatically improving situational awareness thus improving the safety and efficiency. Data to be included would be determined via user studies, but may include safety critical work procedures, temperature, life support, air pressure, and instrument measurements.

Potential Applications
This technology will be proven initially for ground operations at KSC, but it can also prove beneficial in many other areas ranging from an airplane’s cockpit to laboratory research on the ISS, and even eventually on an exploration mission on the Martian surface. In all these realms, the user will need assistance and this technology will bring them the information they need, where they need it, and when they need it.