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NRL Demonstrates Groundbreaking Broadband Communications Technologies at Optical Fiber Communications Conference

New communications technologies available for licensing, cooperative development by industry, academia

(*Washington, DC • 2/25/05*) —- The U.S. Naval Research Laboratory (NRL), a world-renowned leader in the physical and chemical sciences, computer science and engineering, will exhibit its research and development capabilities and highlight a variety of innovative technologies available to private industry for cooperative development at the Optical Fiber Communications 2005 conference and exhibition to be held here March 8 through 10, 2005. The NRL exhibit will be located in Booth 2691 in the Anaheim Convention Center.

Among the many NRL-developed technologies slated for display will be recent NRL breakthroughs in design of low-power, high-speed free-space communications terminals and a coast-to-coast high performance shared access file system for distributed Internet computing. Though the distributed computing demonstration is aimed a promoting this emerging architecture as an open, unlicensed industry standard – not unlike the government's development and funding of technologies that evolved into today's ubiquitous Internet – many of the other NRL-developed technologies on display will be available for licensing or cooperative development by private industry and academia.

Among the NRL technologies available for licensing or collaborative development will be its ground-breaking Multiple Quantum Well (MQW) modulating retroreflectors for free space data transfer. This technology uses infrared lasers to transmit data over distances of up to several kilometers depending on the power of the laser and size of the receive telescope. The Navy has been developing the technology since 1998 for civil and defense applications. The devices enable asymmetric data transfer using a very small, low power, nearly passive communications terminal at the sensor. Potential applications include acquisition and tracking of multiple spacecraft over long ranges, remote interrogation to distant sensors (Unmanned platforms to sensor), and intrabus links to replace heavy cables for significantly lighter weight satellite busses. Recent breakthroughs in device design and fabrication enable solar-powered communications terminals which can support functional data rates at microwatt levels. Realtime color video transmission will be demonstrated over a typical link
at the OFC 2005 exhibition.

"It is with great pride that we demonstrate this capability to the public on behalf of the Naval Research Laboratory," said Dr. G. Charmaine Gilbreath, Principal Investigator of the program for NRL and co-author on numerous publications reporting progress in the system's development. "There are a number of ways to solve the problem of eliminating a heavy, power-hungry gimbal at one end of a conventional laser communications link. NRL has pioneered an entire class of terminal strategies for asymmetric communications using retromodulators," added Dr. William S. Rabinovich, co-PI, and designer of the MQW modulators for the project.

The Global Information Grid backbone demonstration will link clients and supercomputers to distributed database systems and data visualization servers across local- and wide-area fiber optic backbone networks at speeds ranging from millions of bits per second (Mbps) to billions of bits per second (Gbps). NRL will employ the 10-Gbps (4x) Infiniband protocol to demonstrate scalable virtual data storage and access from Boston to Washington to Anaheim to provide cache-coherent distributed database access East to West Coast over the optical paths.

Distributed computing uses a technology known as “virtualization,” in which complex software links multiple computers – regardless of their physical location – on a network to execute a single task or program, as if it was a single system. Such systems provide users with access to large volumes of data and computing power without requiring knowledge or navigation of the system, insulating them from the system’s complexity.

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