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Northrop Grumman Donates EUV Lithography Property to University of Central Florida's College of Optics

Largest Donation in University's History Will Enhance Research in Semiconductor Manufacturing Technology

REDONDO BEACH, Calif., Aug. 17, 2004 -- The University of Central Florida, in Orlando, will be able to make rapid advances in researching a next-generation semiconductor manufacturing process called extreme ultraviolet (EUV) lithography through a donation of intellectual property and equipment by Northrop Grumman Corporation (NYSE:NOC).

Northrop Grumman's contribution to the university's College of Optics and Photonics consists of patents and patent applications, experimental hardware, data, and grants to install the equipment in university labs. With a value in excess of \$22 million, the donation is the largest in the university's history, according to university officials.

"Northrop Grumman is very proud of the close working relationship we've had for many years with the University of Central Florida," said Wes Bush, president of Northrop Grumman Space Technology, which made the donation. "As one of the country's premiere educational research centers for optics and lasers, the university will leverage the intellectual property and equipment we are donating to continue expanding the boundaries of chip-making processes. Its work will help industry overcome existing limitations on chip density, enabling further leaps in computing power and storage capacity."

Bush noted that two of the company's seven sectors have long-established operations in Central Florida. The company's Integrated Systems sector in Melbourne, where about 2,000 employees are located, conducts work in airborne ground-surveillance and battle-management systems. The company produces the E-8C Joint Surveillance Target Attack Radar System (Joint STARS) in Melbourne for the U.S. Air Force and is the prime contractor for its follow-on program, the E-10A Multi-Sensor Command and Control Aircraft. Integrated Systems' Melbourne facility is also a principal member of the team preparing to produce similar ground surveillance aircraft for the North Atlantic Treaty Organization.

Northrop Grumman's Electronic Systems sector in Apopka has about 700 employees in its Laser Systems operations. The company is a leading manufacturer of military laser systems, such as ground-based laser rangefinders for target location, laser designators for precise guidance of smart munitions, and airborne laser rangefinders and designators that are fielded onboard many of the world's most sophisticated fighter aircraft.

Both sectors have enjoyed a strong relationship with the university both in funding research and hiring its graduates. Integrated Systems has awarded grants to conduct various research projects, including a recent contract to conduct photonics

research for advanced communications systems, which resulted in more than half a million dollars in matching funds for the center.

Lithography is a key enabling technology of higher device density and performance. The technology is used to "print" ever-smaller circuits on silicon wafers. EUV light sources are expected to extend Moore's Law to the year 2020 and beyond. (Moore's Law predicts doubling transistor density/chip speed every 18 months). The computer industry's International Sematech Corp., predicts that major chip manufacturing using EUV technology will begin as early as four years from now.

"We are pleased that Northrop Grumman recognizes the University of Central Florida as a leader in optics and laser research," said John Hitt, university president. "This generous donation will give students and faculty more opportunities to improve the chips that power our computers. Our university will be able to continue to develop new and beneficial technology that will advance the state of the art in the industry."

Because of Northrop Grumman's support of the university and the company's close collaboration with the College of Optics and Photonics, the university is naming an EUV photonics laboratory for Northrop Grumman. Additionally, Martin Richardson, professor of Optics, Physics and Electrical Engineering, has been named Northrop Grumman Professor of X-Ray Photonics.

"This now gives us a platform to train the future scientists and engineers that are going to be needed as this new form of lithography comes into being," said optics professor Martin Richardson. "We can now broaden our optics program into a program of major impact in the extreme ultraviolet lithography field."

The work on EUV technology at the university began in 1990, when the College of Optics and Photonics was known as the Center for Research and Education in Optics and Lasers. The center established a unique research and educational program in laser plasmas and EUV source and optics development, the only one of its kind at the time, under the direction of professors Martin Richardson and William Silfvast. Since 1990, their research group has been supported by funding from International Sematech, the federal government and corporate partners, and they have been awarded a number of key patents. Nearly a dozen graduate masters, doctoral and post-doctoral students from the program now occupy key positions in government and industrial EUV research programs.

Northrop Grumman Corporation is a global defense company headquartered in Los Angeles, Calif. Northrop Grumman provides technologically advanced, innovative products, services and solutions in systems integration, defense electronics, information technology, advanced aircraft, shipbuilding and space technology. With 125,000 employees, and operations in all 50 states and 25 countries, Northrop Grumman serves U.S. and international military, government and commercial customers.

The College of Optics and Photonics operates through two research and education centers: the Center for Research & Education in Optics & Lasers and the Florida Photonics Center of Excellence. The college is dedicated to providing the highest-quality graduate education in optical science and engineering, to enhancing optics education at all levels, to conducting fundamental and applied research upon which future knowledge-based industries can be built and to being a vital partner in the development of Florida's technology-based industries. It is the only university-based optical science and engineering unit in the United States to have achieved the college-level of academic standing.

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CONTACT: Bob Bishop
Northrop Grumman Space Technology
(310) 812-5227
bob.j.bishop@ngc.com

Eric Van Stryland
The University of Central Florida, in Orlando
(407) 823-6835
director@creol.ucf.edu

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