



PHOTONICS: LIGHTING OUR FUTURE

WHAT IS PHOTONICS?

Look around you – your phone, computer, TV – all are modern-day technologies made possible largely by photonics.

Optics and photonics are the science and application of light. Specifically, photonics generates, controls and detects particles of light to advance manufacturing, robotics, medical imaging, next-generation displays, defense technologies, biometric security, image processing, communications, astronomy and much more.

Simply put, photonics technology is lighting our future by addressing and solving the challenges of a modern world. It enhances our quality of life; safeguards our health, safety and security; and drives economic growth, job creation and global competitiveness.

A LESSON IN HISTORY

A 1998 report prepared by the research arm of the National Academy of Science presented a comprehensive view of the potential impact of optics and photonics on health care, manufacturing, defense, communication and many other industries.

Since the release of the “Harnessing Light” report, many countries have significantly increased their national commitments to the optics and photonics industries. For example, in 2011, Germany committed nearly €1 billion (\$1.3 billion in USD) to photonics research and development (R&D) over 10 years; China began funding several programs targeting photonics supply chains; and the European Commission, as part of its new Horizon 2020 program, has directed €1.6 billion (over \$2 billion in USD) to photonics-related R&D over the next seven years, and has designated photonics as one of only five key enabling technologies for future prosperity.

Historically, the US has been a leader in photonics R&D; but the current US share of the global photonics industry is only 17 percent – behind Japan and with increasing competition from Europe, South Korea, Taiwan and China. Global competition is putting at risk our nation’s leadership position, which is causing a substantial loss of global market share to overseas competitors as well as thousands of US jobs.

THE NATIONAL PHOTONICS INITIATIVE

Now is the time for the United States to make photonics a national priority. In 2012, the National Research Council released a sequel to “Harnessing Light” that called for a National Photonics Initiative (NPI) to increase collaboration and coordination among US industry, government and academia to identify and further advance areas of photonics critical to regaining US competitiveness and maintaining national security.

New opportunities in these fields — including high-efficiency lighting, genome mapping, high-tech manufacturing, nuclear threat identification, cancer detection and new optical capabilities vital to supporting the Internet’s growth — offer the potential for even greater societal impact in the next few decades. The NPI advocates for US investment in photonics to grow our economy, protect and improve the lives of our people, and position the United States as a global technology leader. The time is now to light our future.