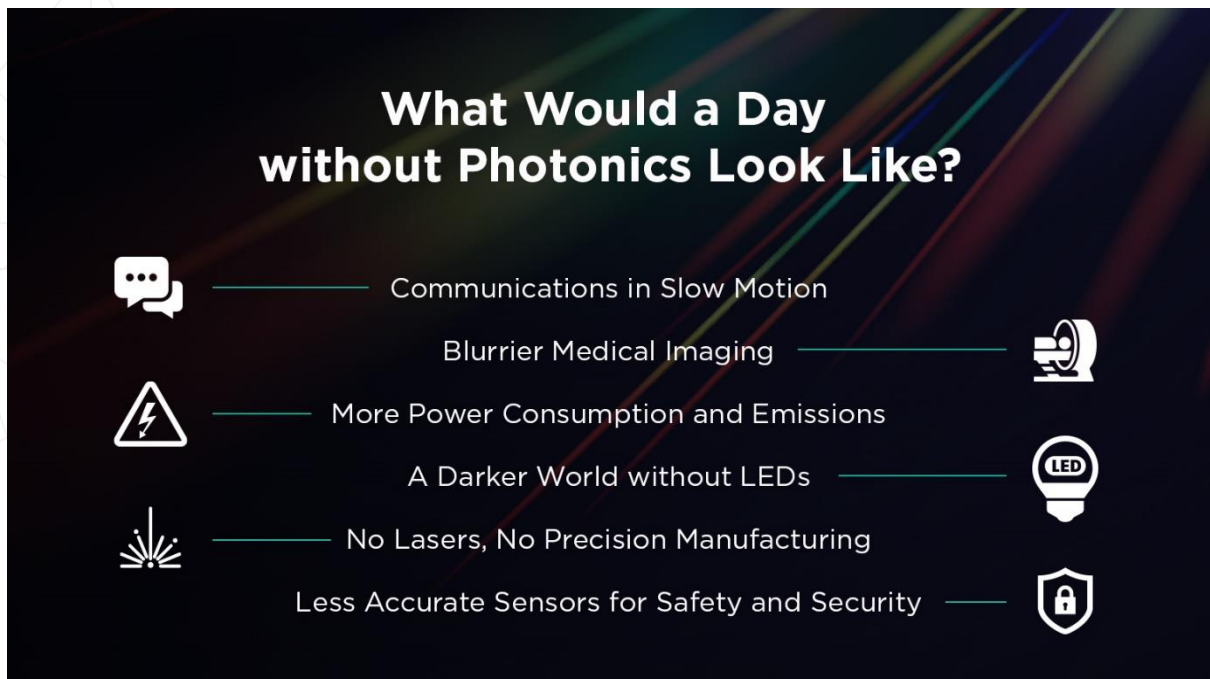


## A Day Without Photonics

On October 21, 1983, the General Conference of Weights and Measures adopted the current value of the speed of light at 299,792.458 km/s. To commemorate this milestone, hundreds of optics and photonics companies, organizations, and institutes worldwide organize activities every year on this date to celebrate the Day of Photonics and how this technology is impacting our daily lives.

In this digital and technological age, photonics is a silent hero that often goes unnoticed by people outside of that industry. This field of science and engineering, which deals with generating, manipulating, and detecting light, has quietly revolutionized how we live, work, and communicate. From the laser pointers in our presentations to the fiber-optic cables that power our internet, photonics permeates every aspect of our modern lives. So what if, for a moment, we imagined what a day without photonics would look like?



### Communications in Slow Motion

The dawn of a photonics-less day would suddenly stop our ability to communicate worldwide at the speed and scale that we currently do. After all, the fiber-optic networks that form the backbone of our global communication system are powered by photonic devices such as transceivers. A return to an age of slower copper-based communication would majorly affect everything from business and financial transactions to medical emergencies.

### Blurrier Medical Imaging

Without photonics, several medical diagnostic tools, and treatments we take for granted would be diminished. For example, laser surgery revolutionized the treatment of eye conditions, and optical coherence tomography has become vital in retinal imaging and diagnosis.

## More Power Consumption and Emissions

Solar power, a cornerstone of our sustainable energy future, relies on aspects of semiconductor science and photonics to harness the sun's energy. LEDs (which we'll discuss in the next section) have also significantly reduced power consumption. Photonics will also be critical to reducing power consumption and emissions in the information and communication technology sector, as we explained [in one of our recent articles](#). Without photonics, our dependence on fossil fuels would increase, exacerbating environmental challenges.

## A Darker World without LEDs

One of the photonics' great success stories is light-emitting diodes (LEDs) manufactured at scale through semiconductor processes. LED lighting sales have experienced explosive growth in the past decade, quickly replacing traditional incandescent and fluorescent light bulbs that are less energy efficient. The International Energy Agency (IEA) estimates that residential LED sales have risen from around 5% of the market in 2013 to about 50% in 2022. The efficiency and versatility of these light sources have transformed industries and living spaces.

## No Lasers, No Precision Manufacturing

Laser-based manufacturing processes are vital in modern industry. From precision cutting to printing, photonics has significantly impacted how we produce goods. Without it, manufacturing processes would revert to slower, less precise methods, impacting efficiency, cost-effectiveness, and product quality.

## Less Accurate Sensors for Safety and Security

Sensors also play a crucial role in [food safety](#), providing rapid and accurate detection of contaminants, pathogens, and allergens, ensuring the quality and safety of food products. Additionally, in environmental monitoring, photonic sensors facilitate real-time tracking of air and water quality, as well as the presence of pollutants, enabling timely responses to mitigate ecological risks. These sensors also play a role in [LIDAR](#) and the automotive industry. The accuracy of all these sensors would drop significantly without photonic systems and devices.

So, on this Day of Photonics, let us pause to acknowledge the immense contribution of photonics to our daily lives. It's a field that deserves our attention, admiration, and continued investment, for a world without photonics is a world where many conveniences and capabilities we take for granted would disappear or be significantly hindered.

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