

Dual-use Fiber Optic Sensing Security for Military and Civilian Applications



Overview

Figure 1 depicts the operating principle of the proposed ISAC-OF, which is composed of a signal transmitter, fibre link, and signal receivers. In the signal transmitter, an LFM optical carrier is first generated with SSB modulation. Subsequently, the transmission code with PAM4 format is loaded onto the LFM optical carrier to generate the transmiss. The experimental setup of the ISAC-OF is shown in Fig. 2. A continuous-wave laser (CWL) with ultra-narrow linewidth (NKT Koheras Basik X15, linewidth <0.1 kHz) acts as the laser source. The centre wavelength and the output power of the laser are 1549.5 nm and 13 dBm, respectively. The CW light is split into two branches by a 90:10 optical coupler (. The transmission performance of the proposed ISAC-OF has been measured under different launching powers, received powers, and LFM bandwidths. For comparison, the conventional single-carrier 56 Gbit/s PAM4 transmission is also performed under back-to-back (B2B) and 24.5 km conditions. Figure 3a shows the BER evolution with the increment of the recei. In addition to the transmission performance, the sensing performance of the ISAC-OF is also tested. A 56 Gbit/s PAM4 signal is first loaded on a 1 GHz LFM optical carrier, and the transmission light with 15 dBm launching power is launched into the fibre. In the experiment, a 5 m bare fibre is coiled around a PZT at a 22.5 km location. A sinusoidal.

Article Content

Unlocking the strategic power of dual-use technologies

However, creating technologies that can serve both civilian and military uses is not straightforward. To address the challenges, this Viewpoint explores current trends, models to adopt, and best practices

Civilian Technology and Military Security

The purpose of the second question -concerning divergence and convergence in dual-use technology— is to make explicit the differences and similarities between military and civilian technologies and their

Defense & Security | Idil by Fiber Optics Group

Photonics-based communication systems, such as fiber optic communication networks, can provide secure and fast communication links for military and security organizations.

Dual-use export controls | SIPRI

SIPRI focuses on dual-use export controls through developing and strengthening national laws, regulations and relevant embargoes.

Emerging Technologies and Applications in Fiber Optic Sensing

This Special Issue aligns with Photonics " focus on photonic devices, optical sensing, and their applications. We aim to compile high-quality research that addresses both theoretical advancements

A review of fiber optics technology for military applications

For the past two decades, fiber optics technology has been under development in the Army, Navy, and Air Force for applications, which range from fiber optic payout dispensers for air,

The Power of Dual-Use Technology: Bridging Civilian

Nations are increasingly relying on dual-use technology, a concept that exploits the power of civilian innovations and repurposes them for military

Why civilian-first innovation will drive better dual-use

Tech built for civilians can unlock better dual-use tech for defence, argues Jano Costard of SPRIND, the German federal agency for innovation.

Integrated sensing and communication in an optical fibre

The integration of high-speed optical communication and distributed sensing could bring intelligent functionalities to ubiquitous optical fibre networks, such as urban structure imaging,...

Long Distance Military Fiber-Optic Polarization Sensor Improved by an ...

The second problem is the attempt to use existing telecommunications routes to save costs associated with laying new cabling intended exclusively for the operation of the security fiber-optic sensor.

Dual-Use Technologies and the Future of Innovation

Dual-use technologies refer to scientific and technical innovations that can be employed in both civilian and military or security contexts. These are not

Military Security Solutions

Fiber SenSys, Inc. has a rich history of successful military projects providing security solutions in support of force protection and critical resource sites for fixed and tactical installations worldwide. Delivering

Understanding Dual-Use Technologies in Defense Applications

In an era where technological advancements are rapidly evolving, the notion of dual-use technologies in defense has gained considerable prominence. These innovations, capable of serving

Fiber Optic Distributed Sensing Applications in Defense, Security and ...

Distributed Fiber Optic Sensing is a powerful technology with wide spread use in applications from down-hole oil & gas wells to environmental monitoring of streams. This paper will

JRC horizon scanning on dual-use civil and military research

This report presents the results of a horizon scanning exercise, carried out by the Joint Research Centre (JRC), aiming to identify "emerging" issues displaying potential for dual-use research and further

How Civilian Dual-Use Technologies Are Reshaping

The future of civilian dual-use technologies will not be defined by innovators alone. Whether drones or AI software, these tools are already

Fiber at the Frontlines: The Fragile Backbone of Modern Communication

As fiber optics continue to play a pivotal role in both civilian and military applications, ensuring the security and resilience of this infrastructure becomes paramount.

Long Distance Military Fiber-Optic Polarization Sensor

The ever-increasing demands for the use of fiber-optic sensors powered by long optical fibers is forcing developers to solve problems associated

Dual-use innovation: Confronting the challenges and

This paper advocates for the design of an EU dual- use innovation framework spanning technologies, infrastructures and financing frameworks that

Strengthen dual-use technologies by enhancing EU defence funding

We recognise that technology, particularly in its early stages of development often seen in university research, can hold potential for both civilian and defence end-uses. However, this does not

Fiber optic sensors for industry and military applications

with high resolution. The developed fiber optic inclinometers showed high resolution and great temperature stability in both experiments and practical applications. Secondly, a smart helmet was

Perimeter and Border Security with Fiber Optic Sensing Technology

This is an area where fiber optic sensing technology can be utilized with high effect to increase security and response times.

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Applications of distributed acoustic sensing for security and surveill

ABSTRACT This chapter examines the application of distributed acoustic sensing (DAS) in security and surveillance using optical fiber sensing cables, which contain regular monomode optical fibers of the

Fiber-Optic Drone Technologies: A Multidisciplinary Review from ...

This paper explores the emergence of fiber-optic tethered drone technologies as a resilient alternative that significantly en-hances signal immunity, data security, and real-time control.

Dual-use innovation: Confronting the challenges and delivering EU ...

This paper advocates for the design of an EU dual- use innovation framework spanning technologies, infrastructures and financing frameworks that serve both civilian and military purposes.

Reconsider Using Undersea Cables as Military Sensors

COMMENTARY: Reconsider Using Undersea Cables as Military Sensors iStock illustration The United States should think twice about the

Enhancing public safety and security with fiber optic sensing and ...

Abstract: We review various use cases of distributed-fiber-optic-sensing and machine-learning technologies that offer advantages to telecom operators' fiber networks on existing fiber

Sensors & Transducers

Abstract: Distributed fiber optic sensors have gained a lot of attention due to their numerous monitoring applications in aerospace, defense, security, civil engineering, and energy monitoring over the last

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