MICROWAVE PHOTONIC ASSISTED LARGE ANTENNA ARRAY

Revolutionizing Wireless Performance with Photonic Intelligence

Stellar Phronesis

Mourelatos Christos, Co-Founder

6GSNS

Introduction

Greek-based company founded in 2025, ESA BIC GR incubatee

Provides Antenna System and Photonic Processor Design

Headquarters at Thessaloniki

Enable the future of scalable and intelligent wireless systems

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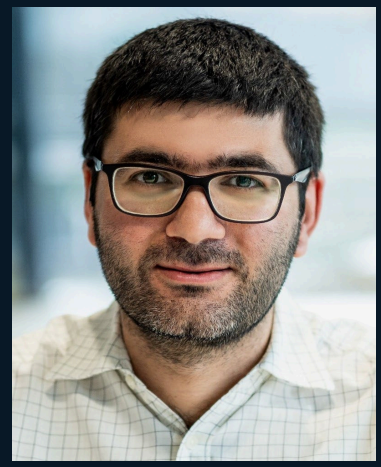
Core Competencies

- ✓ Antenna and Antenna Array Design
- ✓ Multibeam Beamformers
- ✓ Fiber – Wireless Systems
- ✓ Microwave Photonics
- ✓ Photonic Integrated Circuit Design and Systems
- ✓ AI / ML processing algorithms
- ✓ Horizon Application preparation and coordination

5Gphos Int5Gent MIMOSA PARALIA



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Ronis Maximidis
PhD Antenna arrays.
PostDoc: Photonic FiWi and MIMO FSO

Christos Mourelatos
AI Optimization/Processing
Deep-Tech Commercialization

Mission & Technology

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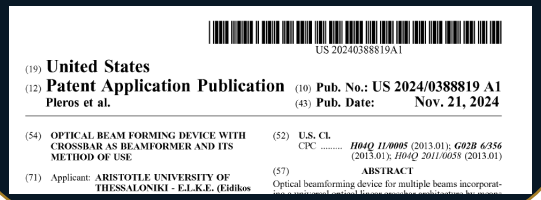
Novel photonic integrated processor architecture



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Pleros et al. (43) Pub. Date: Nov. 21, 2024

(54) OPTICAL BEAM FORMING DEVICE WITH CROSSBAR AS BEAMFORMER AND ITS METHOD OF USE

(71) Applicant: ARISTOTLE UNIVERSITY OF THESSALONIKI - E.L.K.E. (Eidikos

(52) U.S. Cl.

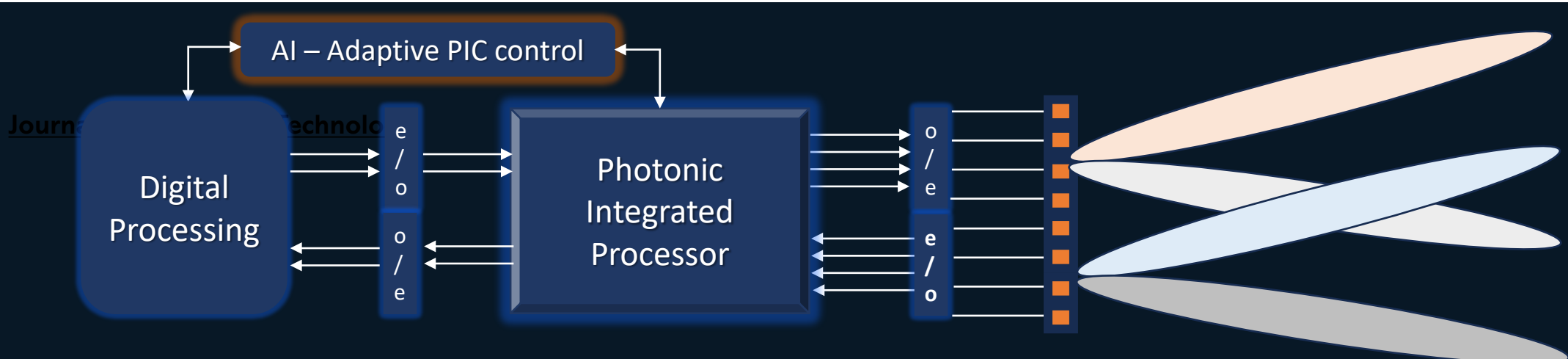
CPC *H04Q 11/0005* (2013.01); *G02B 6/356* (2013.01); *H04Q 2011/0058* (2013.01)

(57) ABSTRACT

Optical beamforming device for multiple beams incorporat-

AI-driven adaptive processing

Real-time environmental self-correction, adaptive MIMO processing with, dynamic bandwidth allocation.



Microwave Photonic MIMO signal processing

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"It is expected that the move towards **Integrated Microwave Photonics** will open the path to **very low power consumption** of a fraction of a Watt … and **very high-density transmitter** arrays…"*

"Current (BFN) designs rely on microphotonic circuits as the "photonic core" of such a BFN equipment and the main effort is to reduce the **power consumption** and **minimize** the **mass** and **volume**."*

esa European Space Agency

Example of photonic multibeam beamformer

**ESA TECHNOLOGY HARMONISATION ADVISORY GROUP - PHOTONICS*

Our Purpose: "High-Throughput, Low-Power Wireless Systems"

Microelectronic – Front-End Module (FEM) HORIZON-JU-SNS-2026-FEM-STREAM-B-02

Expected Outcome (EO) #1: Covers the FR3 range as defined by the relevant Agenda Item of **WRC 27 (7 to 15 GHz range) with possible extension up to 24 GHz** if required by some regional implementations, with inherent tuning capabilities to accommodate potential regional variations.

EO#2 : Enables integration of **a large number of antenna** elements beyond the State of the Art and support **massive MIMO** implementation with compensation of increased path loss compared to 5G FR1 implementations.

EO#3 : Enables at least **an order-of-magnitude increase in RF processing** compared to 5G FR1 implementations.

EO#4 : Enables **low-cost and low energy implementation** of the elementary constituent modules, efficient packaging and is mainly based on the integration of microelectronics heterogeneous technologies where European industry has strong expertise and know-how.

EO#5 : Addresses new 6G requirements for **greater uplink capacity** as required by new classes of traffic/use cases.

EO#6 : Addresses ITU requirements for IMT 2030 especially for what concerns **increased carrier rate, user rate and latency**.

EO#7 : Enables support of both **cellular (FR1-like) and FWA (FR2-like) use case scenarios**.

EO#8 : It is based on a strong and lasting cooperation between European lead suppliers of telecom systems and technologies and lead suppliers of **European microelectronics systems and technologies**, in view of stimulating a telecom components ecosystem in Europe and to clearly increase European sovereignty in the domain.

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Technology for Next-Gen Space Antennas

DEEP TECH PIONEERS
hello tomorrow

HCDI
Hellenic Centre for Defence Innovation

Associate member of

ΕΒΙΔΙΤΕ
Ένωση Ελληνικών Βιομηχανιών Διαστημικής Τεχνολογίας &

esa BUSINESS INCUBATION CENTRE Greece

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