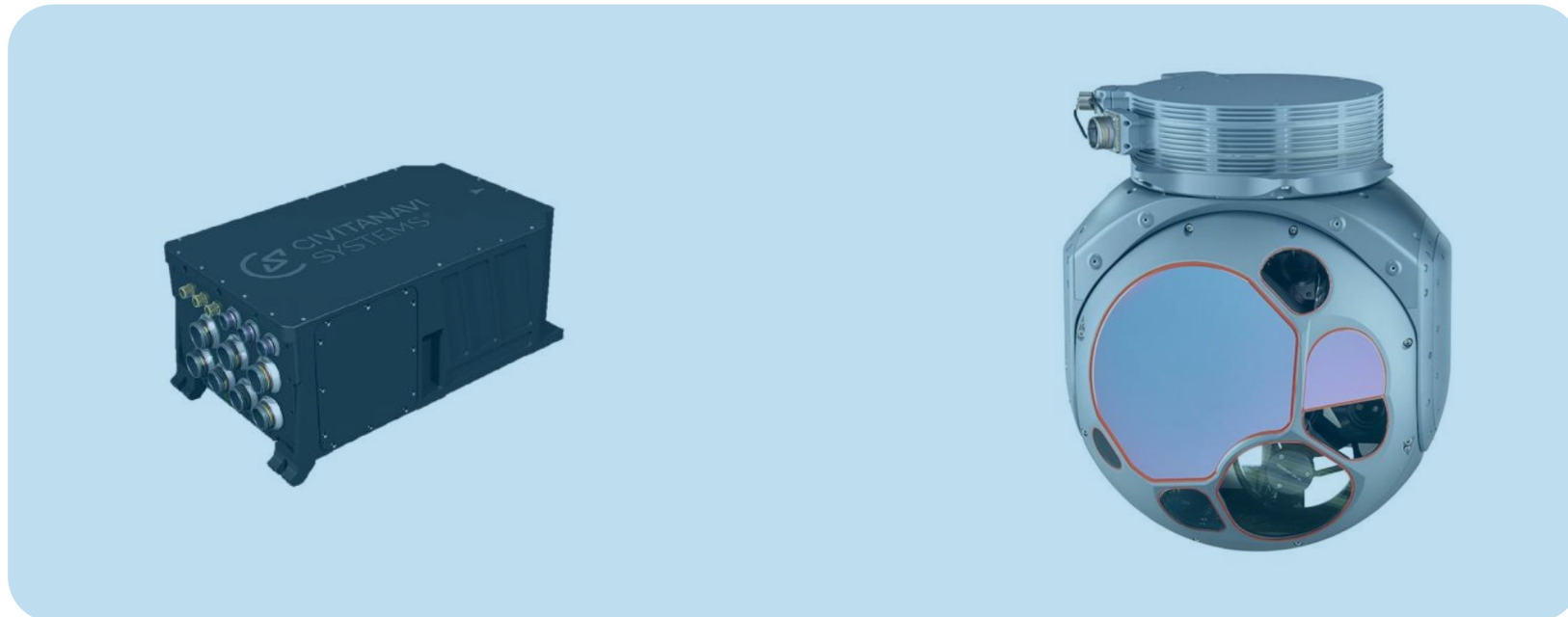


# The future of Avionics

## Navigation, Stabilization and Advanced Imaging Systems



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January 2023

# Today's presenters

22+ years  
experience



**Andrea Pizarulli**

Co-founder and  
Chief Executive Officer



46+ years  
experience



**Mike Perlmutter**

Co-founder and  
Executive Director



38+ years  
experience



**Mark Chamberlain**

President and  
Chief Executive Officer



# Latest Press Release



## PRESS RELEASE

### **CIVITANAVI SYSTEMS INVESTS IN PV-LABS AND INCREASES THE TECHNOLOGICAL KNOW-HOW IN ADVANCED IMAGING SYSTEMS**

*Pedaso (FM), & Burlington (ON), January 30 2023* – Civitanavi Systems S.p.A. (EURONEXT MILAN, CNS) leading Italian manufacturers of inertial navigation, georeferencing and stabilization systems and PV-Labs Ltd, a privately held company based in Canada and a leader in the design and manufacture gyro-stabilized gimbals and advanced ISR&T (Intelligence Surveillance Reconnaissance and Targeting) imaging systems, have announced today the signing of a binding agreement for CNS to purchase a 30% minority ownership in PV-Labs Ltd for 2.5 million USD. The agreement provides CNS with a call option to purchase the remaining 70% ownership which can be exercised in 5 years. The two companies will start to cooperate and strengthen their combined technological and product development knowhow. The transaction is expected to close within 90 days after approval of Investment Canada Act (“ICA”) application (equivalent of Italian “Golden Power”).

PV-Labs is a SME (Small and Medium-sized Enterprises) and was founded by Mark Chamberlain (former founder and CEO of WESCAM Inc, now L3Harris WESCAM) and has designed a unique line of Airborne ISR&T products, based on PV-Labs’ patented new stabilization technique for gimbals, called “Fifth-generation Advanced Stabilization Technology”, or “FAST” to address the growing demand for high performance ISR&T products worldwide, organically and by licensing to other ISR&T players to meet localization and other market needs.



# What is needed for a modern aircraft to fly and do surveillance?



## ONEBOX

- **VMS:** Vehicle Management System
- **FCC:** Flight Control Computer
- **A-PNT:** Assured Position, Navigation and Timing with or without GPS.

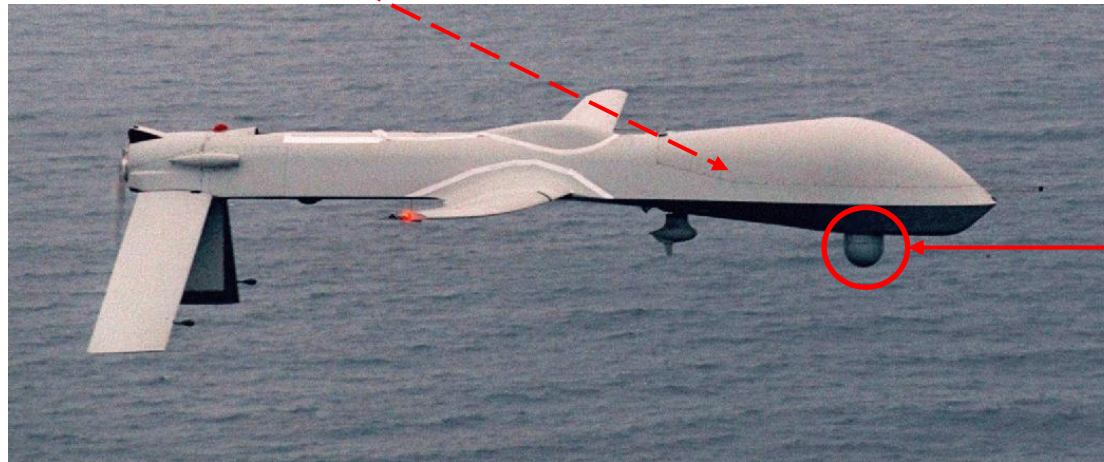


## INERTIALS SENSORS

- **IMU:** Inertial Measurement Unit. Inertial sensor block for gimbals stabilization



- **Gimbal:** 2 axis electromechanical movements
- **ISR (Intelligence, Surveillance and Reconnaissance):** payload in the gimbal to host sensors for imaging and targeting
- **Stabilization:** in order to have a good imaging such payload needs to be stabilized with inertial sensors (gyroscopes)
- **Targeting:** in order to understand the target position, navigation (position and true heading) is necessary



Civitanavi and PV-Labs can supply near to 100% avionics





# Typical ISR imagining missions at various altitude/distance

Thermal Imager from UAV



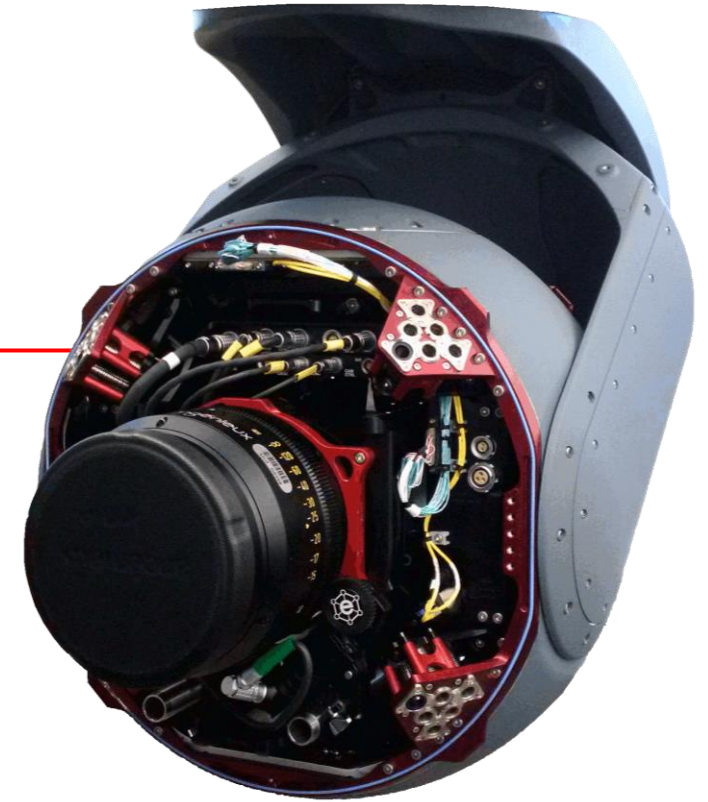
Higher resolution and better magnification is needed for a given ISR size...and therefore better stabilization



# PV-Labs Gimbal and Imaging System examples

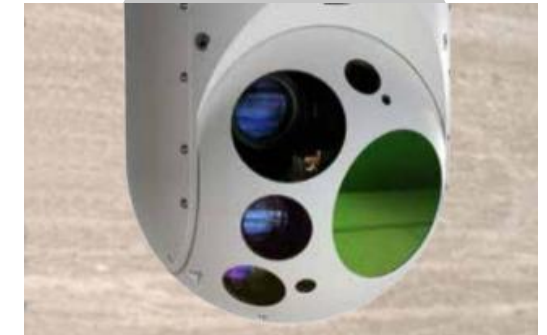


# PV-Labs Gimbal and Imaging System examples





# Other Gimbal and Imaging/Targeting System examples



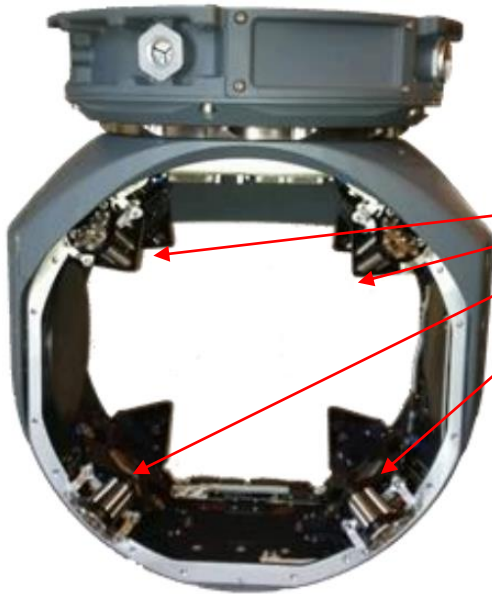
Success of mission objective depends upon performance of ISR and Navigation



# “FAST” - “Fifth-generation Advanced Stabilization Technology”

Proposed 15” Gimbal  
With equivalent payload  
volume available

- 15” payload equivalent to competitor 20”
- 3 axis stabilization;  $\leq 4$  microradian jitter performance on all fixed and rotor wing aircraft
- Larger payload volume than all other systems in class
- Open Architecture
- Easy custom payload integration
- Best in class durability and maintainability
- Core components are user serviceable
- ITAR Free solutions available.



- 5th generation stabilization with active damping
- $\leq 4$  microradian jitter performance

Benchmark 20” Gimbal



More space in the payload for a given ISR size!

# What can be done combining CNS and PVL technologies and capabilities?



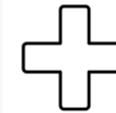
- 1** Enhance ISR navigation and stabilization capabilities with ad hoc IMU for ISR  
means  
**HIGHER PERFORMANCES THAN THE COMPETITORS**
- 2** Create a **tightly integrated system** and better line of sight errors  
means  
**HIGHER PERFORMANCES**
- 3** Bundle of **ONEBOX** and **IRS** provide a very integrated and compact system  
means  
**HIGHER PERFORMANCES AND LOWER PRICE**
- 4** **Common platform** architecture (10–25-inch sizes systems)  
means  
**LOWER TOTAL COST OF OWNERSHIP**
- 5** **CNS state of the art aerospace & defense design, qualification and manufacturing** capability for ISR production  
means  
**QUICKER TIME TO MARKET & SCALE -UP**

CNS and PVL will enter the ISR market with the most advanced system on the planet...

# Large and growing TAM<sup>(1)</sup> exposed to a diversified set of key end markets

## Global Electro-Optical/Infrared (EO/IR) Systems Market Outlook

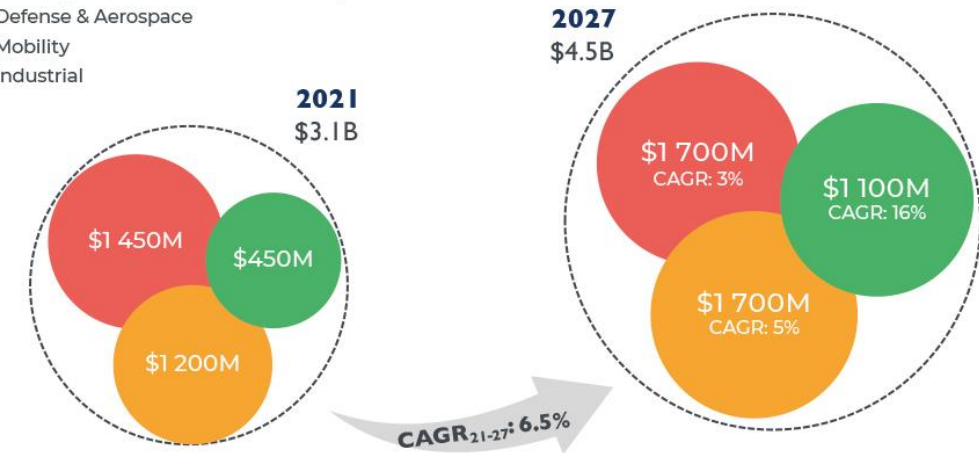
“ The global electro-optical/infrared (EO/IR) systems market size reached a value of USD 15.35 billion in 2021. During the forecast period of between 2023 and 2028, the market is expected to grow at a CAGR of 5.60% to reach USD 21.29 billion in 2027.



### 2021-2027 high-end inertial sensor market forecast

(Source: High-End Inertial Sensing 2022, Yole Intelligence, June 2022)

- Total high end inertial sensor industry
- Defense & Aerospace
- Mobility
- Industrial



...to address a \$25.8B market!





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