

The background of the slide is an aerial photograph of a busy port. Numerous colorful shipping containers are stacked in neat rows on the pier. Several large gantry cranes are positioned along the waterfront, and a large cargo ship is docked. The water is a deep blue color.

Charonite

Intelligence. Precision. Reliability.

Unmanned Aerial Vehicle Research Proposal

European Defence Agency

Charonite

- Charonite is an innovative technology venture developing cutting edge software products and expertise in search engine technology and intelligent transport systems.
- Innovative Technology Company
 - Next Generation Technology
 - High Performance Processing and Terabyte-Scale Distributed Algorithms
 - Operational since 2006
- Locations: Malta, UK, Abu Dhabi, Australia

Charonite Research Areas

- Image Processing Algorithms
- GPU Based Computation
- Position-Based and Situational Awareness Algorithms
- Search Engine Technology
- Software as a Service (SaaS) / Cloud Computing
- Distributed Transaction Processing
- Data Visualisation

Key People in Research Activities



Angelo Dalli
CEO and Founder

- Founded Charonite in 2006
- Search Technology and Artificial Intelligence expert since 2000
- More than 10 years of experience in IT consultancy and application development
- Over 22 publications in the EU and US since 2001
- Obtained R&D funding in excess of €600K and over €20 million on various EU projects
- Sits on boards of various entertainment companies and regulated industries
- Strong on both business and academic skills: has 4 degrees including Ph.D. on Search Engine technology to be conferred in Q1 2010

Key People in Research Activities



Prof. Yorick Wilks
Chief Scientific Advisor

- World-class renowned scientist with over 40 years of experience and extensive network of contacts
- British Computing Society Lovelace Medal (2009)
- ACL Lifetime Achievement Award (2008)
- Antonio Zampolli Prize (2008)
- Loebner Prize (1997)
- Senior Research Fellow at Oxford
- Various DARPA / EU projects and 300+ publications
- Invented one of the first practical Machine Translation systems at Stanford University
- Member of the UK Computing Research Council and fellow of the UK EPSRC and the ACM

Key People in Research Activities



- Image Tracking Systems Expert currently reading for Ph.D. In the field
- Managed to create generic tracking library for both vehicle tracking and crowd movement analysis
- Up to 12 simultaneous targets, with aim for 20 simultaneous target tracking

Steven Galea
Tracking Systems

Key People in Research Activities



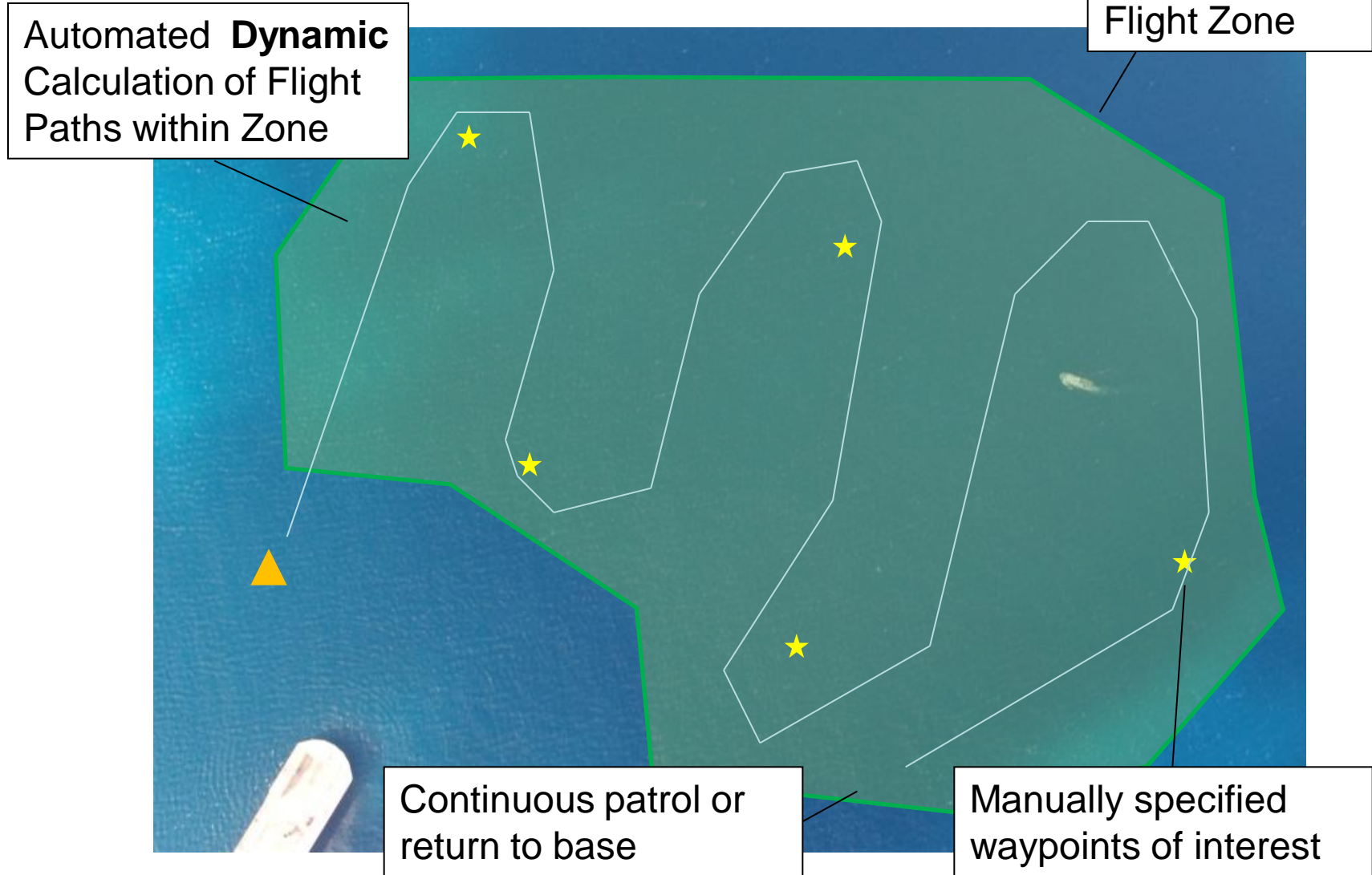
- Worked on the EU AVITRACK project for airfield image analysis and tracking with scene understanding
- System tested and used in real life in France by Airbus
- Masters in Computer Science

Mark Borg
Tracking Systems

UAV Proposal

- Research into automated control of UAVs for maritime patrol functions
 - Autonomous target detection and acquisition of relevant imagery within pre-specified flight zones
 - Control of onboard PTZ dome camera with automatic video and image relay to control centre
 - Automatic control of flight patterns within pre-specified zones
 - Research into automated or semi-automated takeoff and landing via patrol boats and similar vessels
 - Research on integration with existing UAV platforms and ATC systems

UAV Proposal



UAV Proposal

- Research into UAV based image processing algorithms
 - Application of Charonite Vision Analysis artificial intelligence algorithms to a maritime and UAV scenario
 - Automated identification of maritime vessels, class / category and speed and direction vectors
 - Research into algorithms that are specifically designed for low-power hardware usage and implementation
 - Fast onboard aerial imagery analysis reducing amount of information that needs to be relayed to control centre

Onboard 3D Image Processing



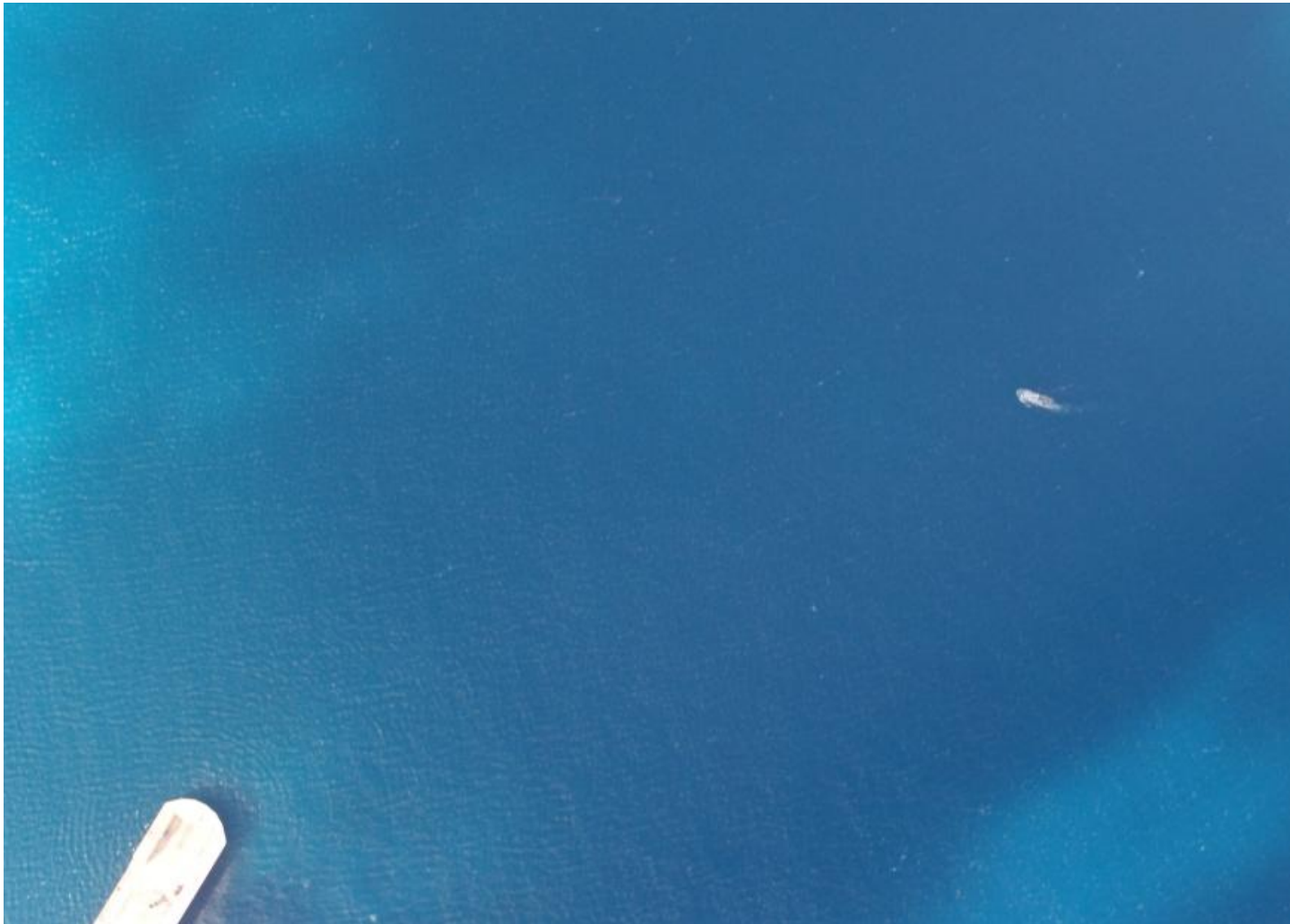
- Image above taken over Malta Freeport

Automated Image Analysis

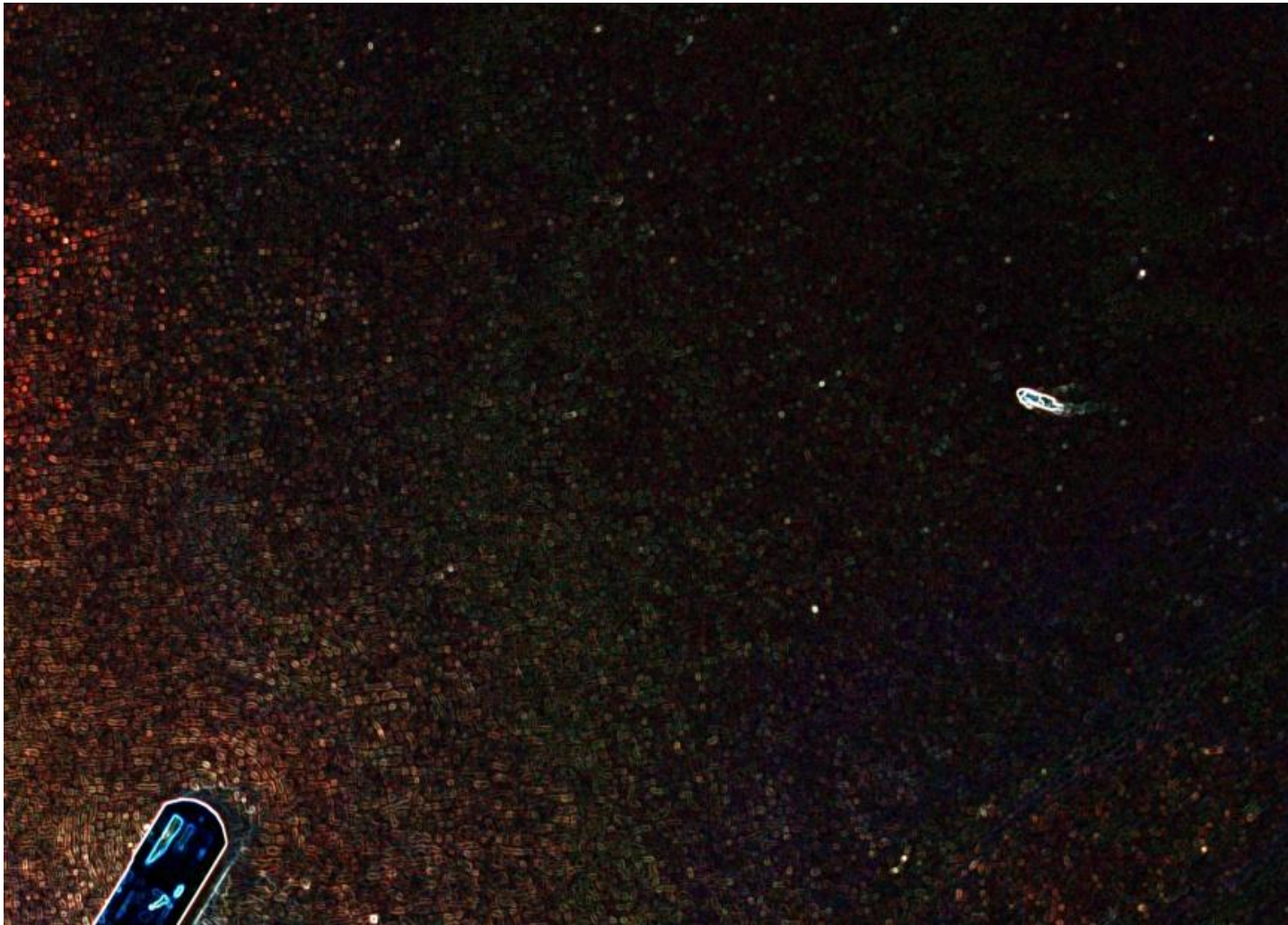


- Identification of transport road network from aerial imagery
- Initial research performed in 2008 and 2009 over Malta
- Research will extend existing algorithms to maritime imagery analysis

Identification of Targets of Interest



Identification of Targets of Interest



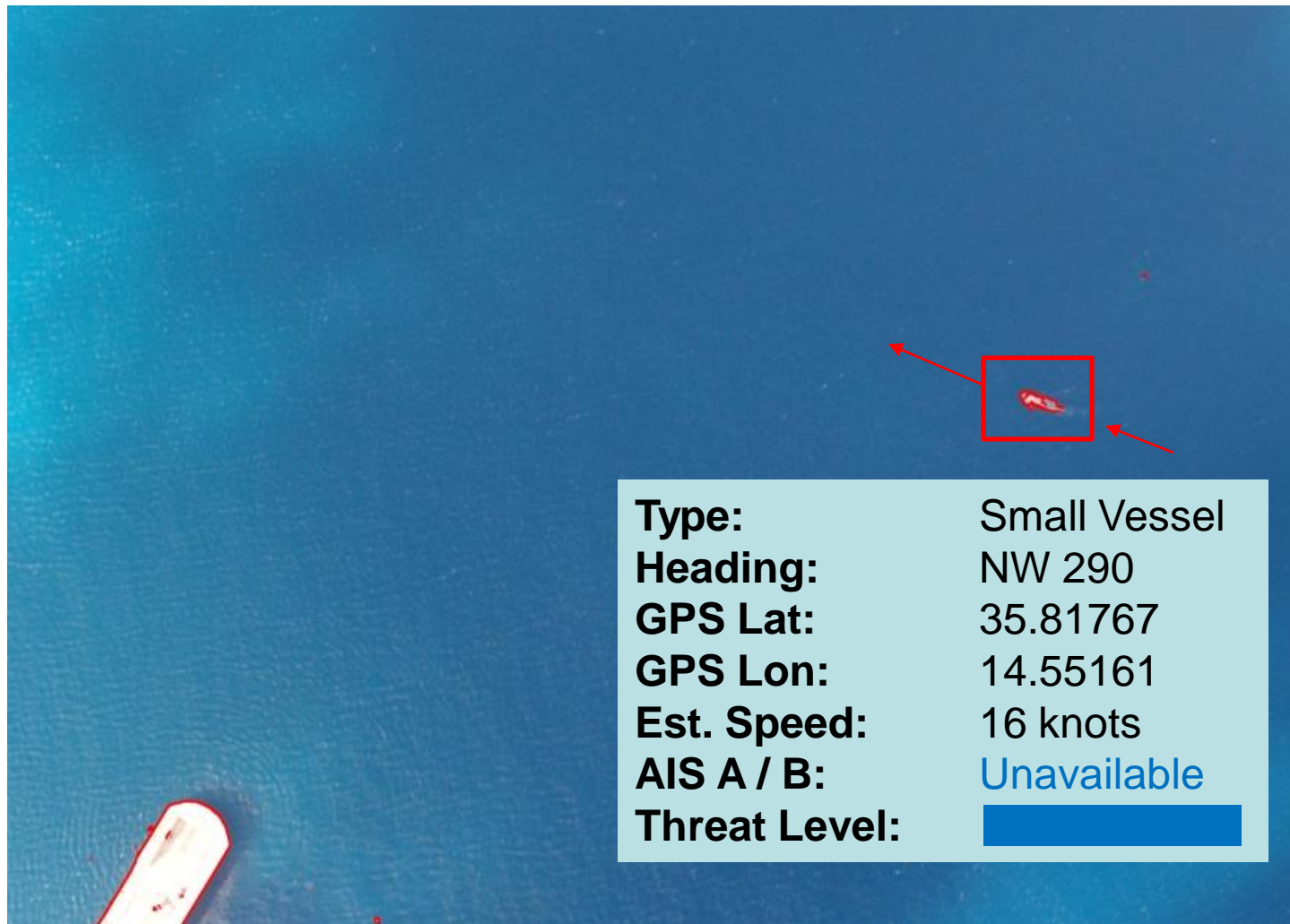
Identification of Targets of Interest



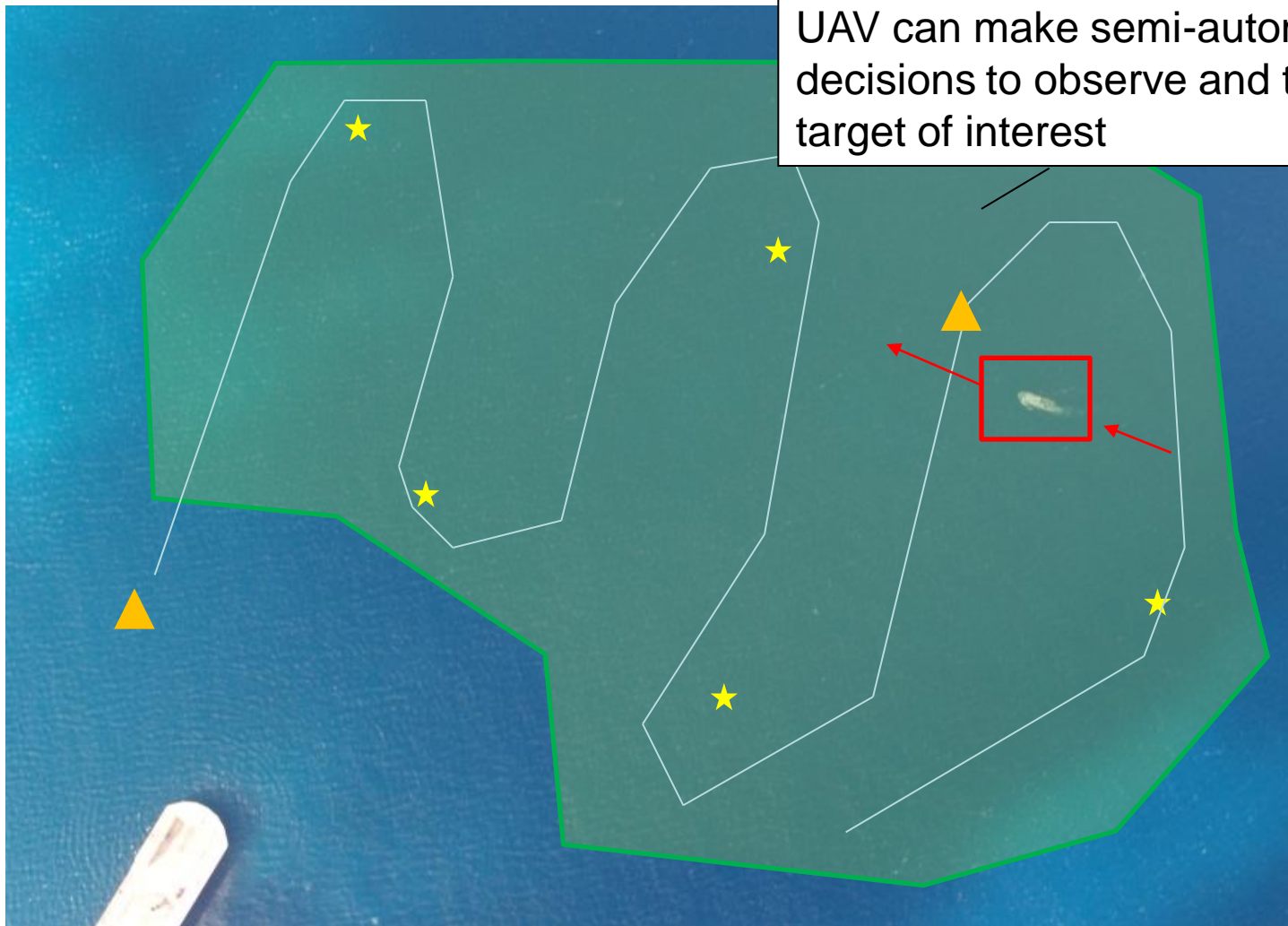
Identification of Targets of Interest



Identification of Targets of Interest



Dynamic Path Adjustment



UAV can make semi-autonomous decisions to observe and track target of interest

UAV Proposal

- Research into UAV integration in army operations
 - Research and knowledge transfer about UAV platform integration best practices
 - Testing of equipment and algorithms on flight certified hardware including small propeller planes
 - Flight certification and safety considerations
 - Ensuring that UAV obeys altitude, speed and flight zone restrictions with remote ATC control and monitoring

Potential Partners

- Charonite provides software solutions and algorithm research and development
- Good fit / requirements for potential partners:
 - **Hardware UAV platform suppliers**
 - **Low-Power Camera and Sensor suppliers**
 - **Other companies / organisations doing similar research**

Contact Information



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