Intelligent **P**iracy **A**voidance using **T**hreat detection and **C**ountermeasure **H**euristics

IPATCH

Modern Maritime Piracy

- Huge economic and human cost to shipping industry
- Inappropriate use of countermeasures can result in unnecessary cost and place ship and crew at greater risk
- Better understanding of effectiveness and implications of existing countermeasures needed
- New non-military, non-lethal countermeasures needed



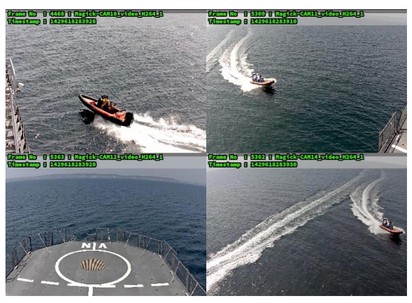


IPATCH Research Objectives

- Collect, integrate and analyse historical data on piracy incidents to produce a **piracy knowledgebase**
- Analyse the legal, ethical, economic and societal implications of countermeasures
- Produce a **manual** for the shipping industry to support effective use of countermeasures
- Develop an **on-board surveillance system** for the early detection and mitigation of piracy threats
- Publish a **maritime dataset** for the performance evaluation of visual surveillance algorithms

Maritime visual surveillance dataset

- Video from 13 visible and thermal cameras, plus radar, AIS, navigation and environmental data
- 16 scenarios simulating behaviour of pirate ‘skiffs’ and innocent fishing boats
- Ground-truthed and published as a benchmark dataset for the performance evaluation of detection and tracking algorithms




Piracy Knowledgebase

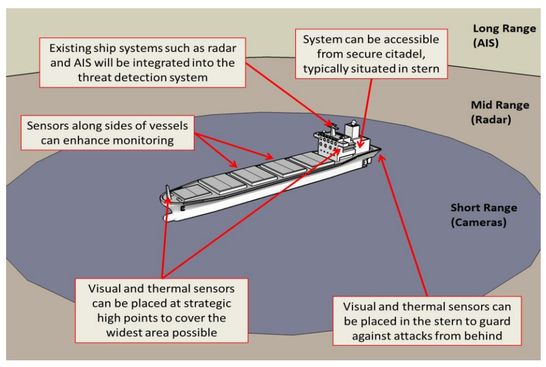
- Fusion of piracy incident reports and complementary data from public sources into single database of 99 variables
- 830 incidents, July 2010 to April 2014 in East and West Africa
- Calculation of piracy risk and countermeasure performance indicators

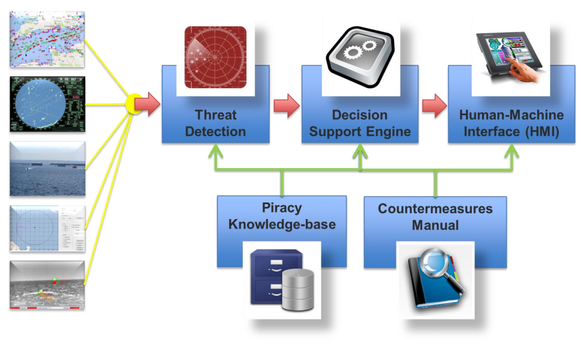
Countermeasures Manual

- Catalogue of countermeasures: usage, costs and deployment recommendations
- Assessment of legal and ethical implications
- Assessment of effectiveness in different situations, based on piracy incident database analysis

> A proper lookout is the single most effective method of ship protection where early warning of a suspicious approach or attack is assured, and where defences can be readily deployed
>
> - IMO’s Best Management Practices

On-board surveillance system





- Fusion of 360° multi-spectral sensor data (visible and thermal cameras, radar, AIS, navigation and environmental)
- Advanced algorithms for object detection, tracking, and piracy threat recognition
- Decision support engine supports the captain in selecting the most appropriate countermeasures for a given threat
- Human-Machine Interface (HMI) displays situational awareness picture and alerts crew of potential threats

- IPATCH addresses topic SEC-2013.2.4-2 ‘Non-military protection measures for merchant shipping against piracy’ in the European Commission’s 7th Framework Programme
- **Consortium:** 9 partners from 7 EU Member States
- **Active:** April 2014 – March 2017
- **Budget:** €5m
- **Website:** www.ipatchproject.eu

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