Maritime Unmanned Systems of Systems
Dr. Jesper Christensen
September 27th, 2022
Contents

ATLAS UNMANNED SYSTEMS EXPERTISE

UNMANNED MISSION SCENARIOS

UNMANNED SYSTEMS OF SYSTEMS

OODA LOOP & CURRENT CHALLENGE
Unmanned Systems within the ATLAS ELEKTRONIK Group
25-Years of Expertise in Europe & North America
ATLAS PROVIDES BOTH: UNMANNED VESSELS & PAYLOAD SENSORS
UNMANNED MISSION SCENARIOS

Applications in Focus
The ATLAS ELEKTRONIK Group

Commercial

Anti-Submarine Warfare

Inspection

Search & Salvage

Intelligence, Surveillance & Reconnaissance

Military Hydrography & Rapid Environmental Assessment

MISSIONS

Mine Hunting

Mine Sweeping
Mine Hunting

**THREAT ASSESSMENT**
- Fast Transit to task area
- High Area Coverage Rates by using towed sonar for detection and classification
- Data sharing to command center via communication link

**FAST AND EFFECTIVE**
- Fast Transit to task area
- Using AUV for Detection and Classification
- SeaFox for Identification and Disposal onboard

**MOBILE AND SCALABLE**
- Components can be brought into scenario from all places of opportunity
- Containerized Modules support flexible operations
ATLAS SeaFox Mine Identification & Disposal System

Specifications

**Weight**
43 kg

**Velocity**
Up to 6 knots

**Propulsion**
4 propellers and vertical thruster provide high maneuverability

**Dimensions**
Length: 1.3 m
Ø 42 cm

**Control (Modes)**
Manuel Steering
Pre-planned

**Payload**
Camera,
Spotlight

**Warhead**
Highly effective
Shaped Charge

**Communications**
Fiber Optic Link

**Wide operation range**
Works up to sea state 4 and 3 knots of current down to a depth of 300 m
SeaCat Unmanned Underwater Vehicle

Specifications

Onboard Sensors
- Navigation (INS, DVL, GPS)
- Acoustic Modem
- Obstacle Avoidance
- Leakage Sensor

Weight in Air
- 183kg – 290kg

Energy
- 3.4 – 13.5 kWh; Li-ion battery

Controls
- Independent Control Fins
- Horizontal Thrusters
- Vertical Thrusters

Navigation Accuracy
- <0.1% D.T. CEP 50

Communications
- 1000 Base-T Ethernet
- Acoustic Modem
- Wi-Fi 2.4 GHz
- Iridium

Velocity
- Up to 3.1 m/s (6 knots)

Endurance
- Up to 24h

Max Operating Depth
- 300m / 600m

Dimensions
- 3.1m – 4.5m, ø 32.4cm

Side Looking Payload
- Synthetic Aperture Sonar (SAS)
- or Side Scan Sonar

SwapHead
- MBES & Camera (standard)
Hybrid Autonomous Underwater Vehicle System

DETECTION – CLASSIFICATION – IDENTIFICATION
ARCIMS Unmanned Surface Vehicle

Specifications

- **Weight**: 6000 kg
- **Payload Capacity**: 4000 kg
- **Control (Modes)**: Remote Control, Manual Steering, Pre-Planned
- **Communications**: RF-Link, SATCOM
- **Onboard Sensors**: Navigation (INS, GPS), Radar, EOT, AIS
- **Propulsion**: Twin Engine / Jet Propulsion
- **Crew**: 0 – 8 Persons
- **Velocity**: Up to 40 knots
- **Endurance**: Up to 12h
- **Dimensions**: Length: 11m – 15m, Beam: 3.4m
The Combination leads to Unmanned Maritime Systems

System of Systems (SoS)

**SoS Suite**

- Radar
- Night-vision camera
- 3 daylight cameras
- LiDAR
- Forward Looking Sonar
- Side-Scan Sonar
- 2 Underwater Cameras
- Explosive shaped charge
- AIS* transponder

*AIS: Automatic Identification System*
Autonomy in Unmanned Maritime Systems -> AI is the key driver

Boyd’s OODA Loop and Strong and Weak AI

Finding and Tracking Lost Cargo
Container Simulation ATLAS Lake

object recognition USV

radar view USV

video stream drone 1

video stream drone 2

SideScan Sonar

container 87.5%
Contact

ATLAS ELEKTRONIK GmbH
Sebaldsbruecker Heerstrasse 235
28309 Bremen | Germany
Phone: +49 421 457-02
Telefax: +49 421 457-3699

www.atlas-elektronik.com