Automatic Detection and Geolocation of North Atlantic Right Whales

Deep Vision's Autonomous Maritime Persistent Surveillance Technology

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Introduction

- Deep Vision Inc. develops state-of-the-art, real-time **autonomous maritime persistent surveillance** solutions.

- Deep Vision Inc. is an ISO 9001 certified company, located in Dartmouth, Nova Scotia, Canada.

Introduction

From the past ……..

Introduction

….to the Present

Background

- **Less than 450 North Atlantic Right Whales (NARW) left in the world**
- **460,000 square kilometres of ocean to search - one animal per 1,000 square kilometres**
- **Trying to spot them from airplanes is a tough assignment.**
- **“It's like looking for a needle in a haystack…”. - Jean-François Gosselin**
- **Only 27 actually spotted via this method.**

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- Received a grant in late 2018 from Department of Fisheries and Oceans Canada.

- Successfully developed a system that automatically **detects**, **tracks** and provides **geolocation** of North Atlantic Right Whales (NARW).

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- 3 hour flight survey, 2 km altitude
- 2,500 images (24MP – 0.25 FPS)
- ODROID-XU4 (ARM A15/A7): 8 min 16 sec
- Panasonic Toughbook (i5 -6300U): 6 min 15 sec
- Desktop (i7-2600k): 2 min 20 sec
- DELL XPS13 (i7-4500U): 2 min 13 sec

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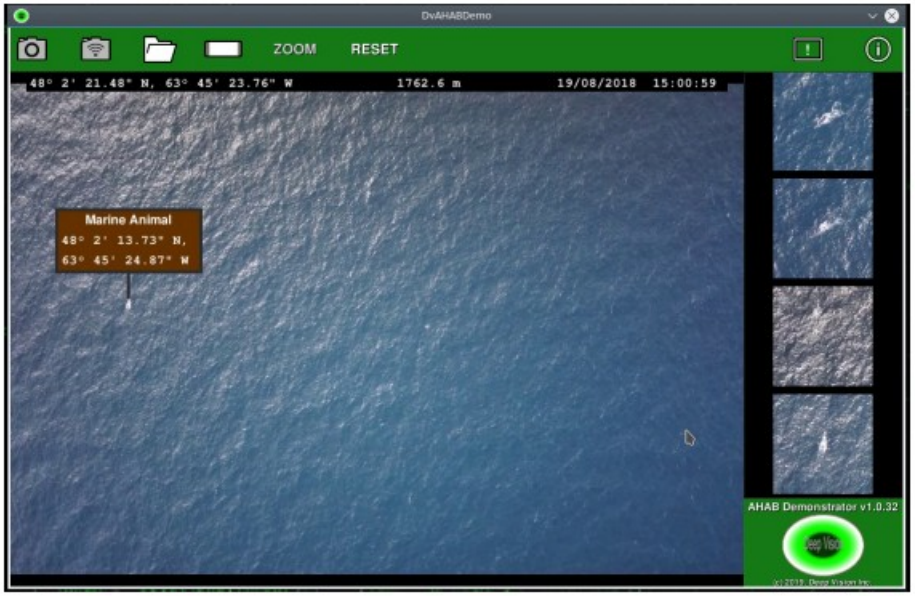
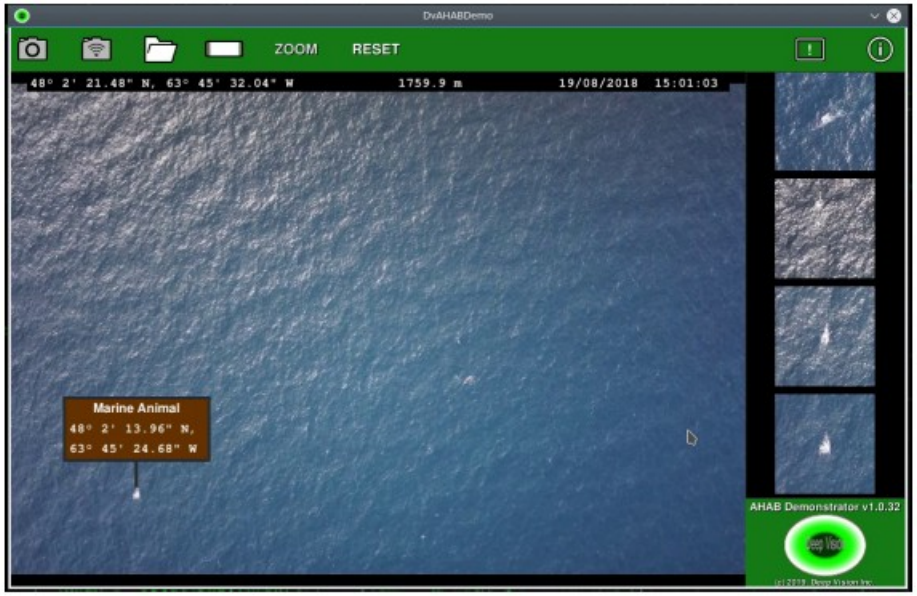
- The system provides **real-time**, **persistent situational awareness** for the detection and continuous monitoring of North Atlantic Right Whales.





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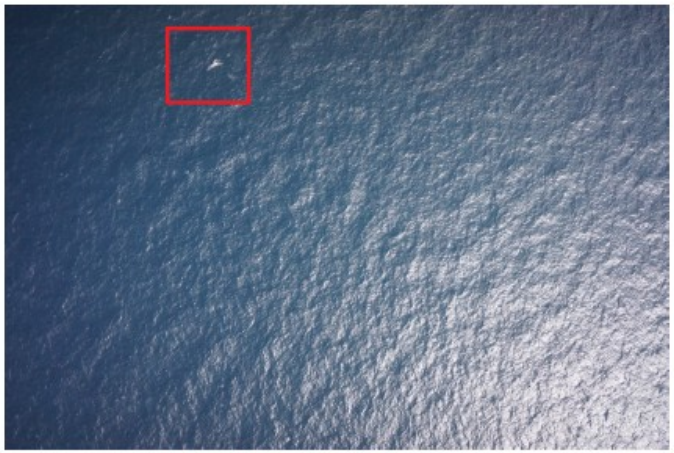
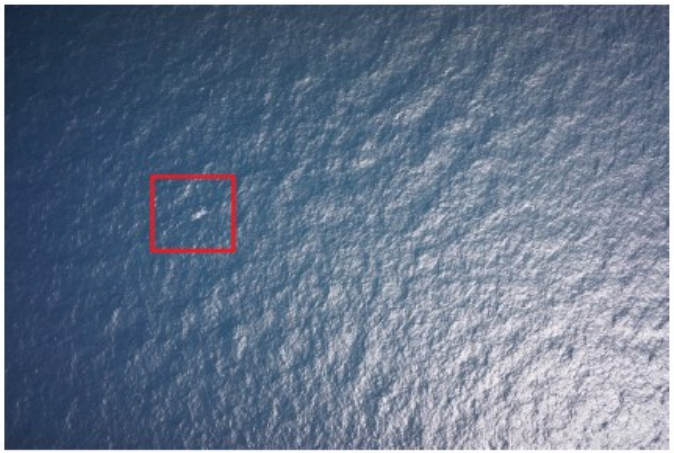
- UAV flown 2 km over the Gulf of St. Lawrence which historically is frequently visited by NARWs.
- 24MP images were captured at 1 every 4 sec (0.25 FPS).

Frame N



Frame N + 1



Frame N + 2

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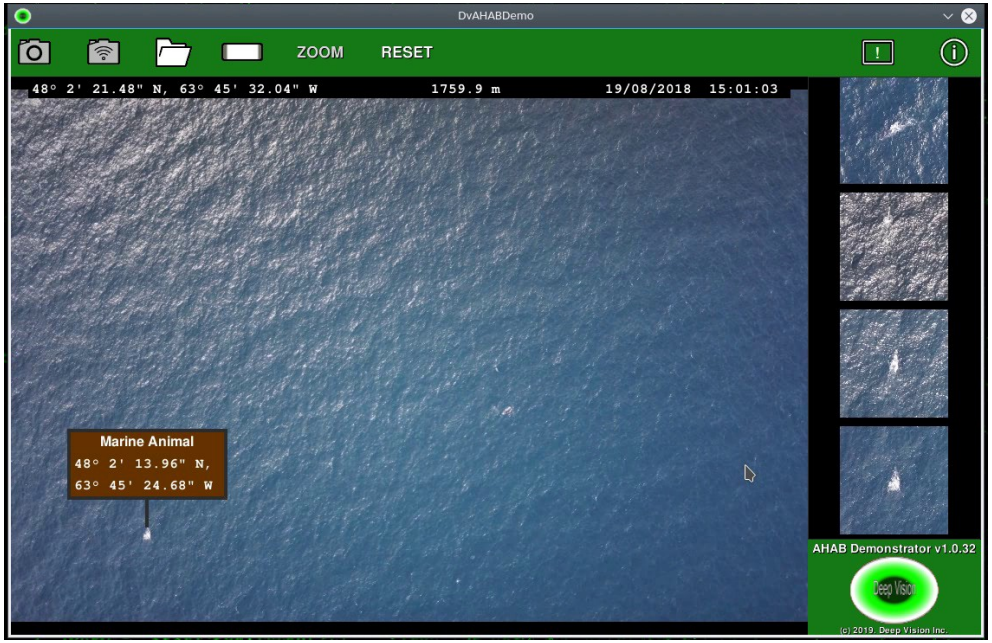
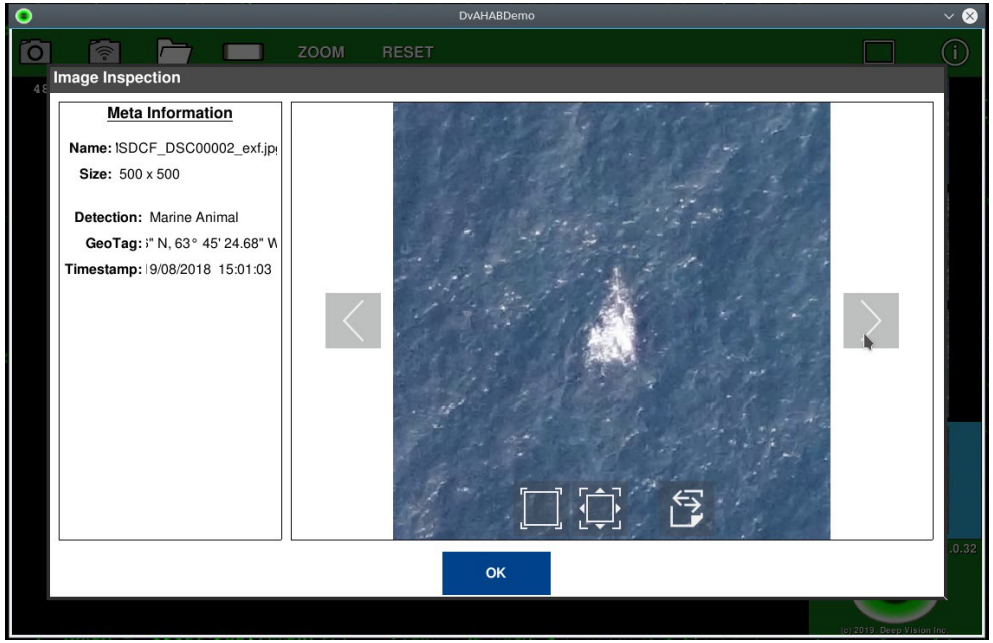
- Provides the certified Marine Mammal Observer with detailed observations for every detected NARW.
- **Expedites** NARW surveys and assessments.





AHAB – Next Steps

- Implementaion on vessels
- Real-time detection allowing real-time mitigation

AHAB – Next Steps

- Implementation on DFO-TC Patrol Aircraft
- Implementation onboard UAV flying BVLOS
- Fully autonomous mission-based behaviour