



**NOAA**  
**FISHERIES**

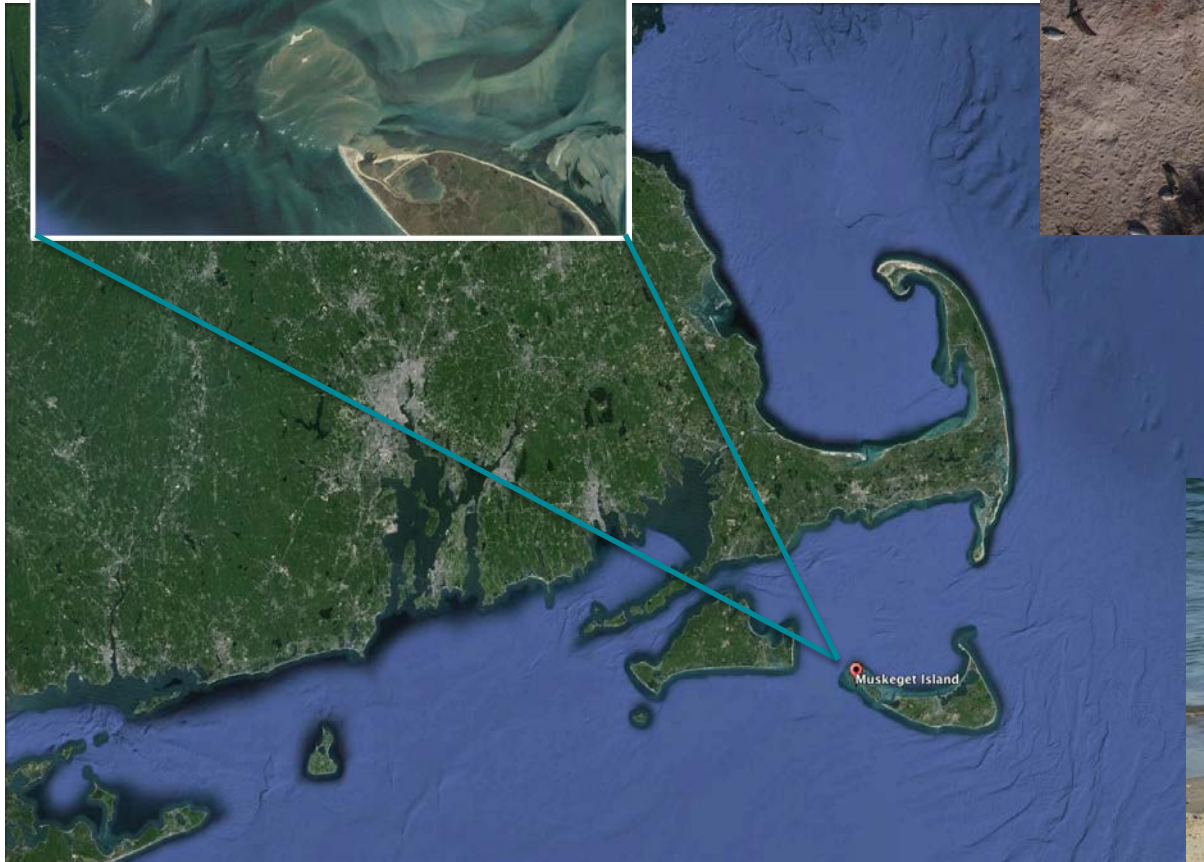
Northeast  
Fisheries  
Science Center,  
Protected  
Species Branch

# Advancements in APH-22 Technology with Applications to Protected Species

Kimberly Murray, Michael Jech, Elizabeth  
Josephson, Jennifer Johnson

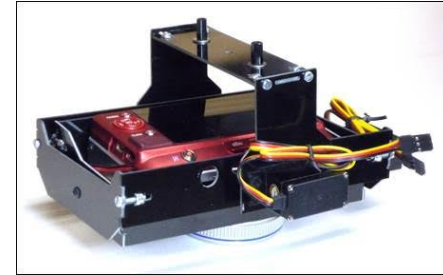
Mission Concept Review  
June 15, 2016

# Study Site



# Mission Goals and Objectives

- To field test APH-22 advancements in the study of gray seals
  - Camera gimbal
  - Laser altimeter (SF11/C)
  - Infra-red camera (FLIR Tau 324)
- To successfully launch and recover APH-22 from 23' vessel



# APH-22 ([aerialimagingolutions.com](http://aerialimagingolutions.com))

- Vertical take-off and landing (VTOL) UAS
- 4.5 lbs
- 32" wingspan
- Powered by 4-cell Lithium Polymer battery
- Flight durations  $\leq 35$  min, depending on payload and environmental conditions





# Performance Metrics

APH-22 System Configuration	Current TRL	Performance Metric	Anticipated TRL if Metric Achieved
Platform and standard camera	8	Ability to launch and recover from a vessel	9
	8	Ability to fly standard platform in waypoint mode	9
Platform and standard camera/video with gimbal and laser altimeter	7	Obtain accurate and precise (within 5%) measurements of seal lengths	8
	7	Identify molt stage (via color, pelage) of animal >=80% of time	8
	7	Ability to acquire video (y/n)	8
	7	Ability to launch and recover from a vessel	8
	7	Ability to fly enhanced platform in waypoint mode	8
Platform and infrared camera with gimbal and laser altimeter	7	Improve detection and/or characteristics of seals compared to standard camera	8
	7	Ability to launch and recover from a vessel	8
	7	Ability to fly enhanced platform in waypoint mode	8

# Concept of Operations

- Flights will be conducted over Muskeget Island, winter 2016/17
- Class G airspace
- All flights line-of-sight under 400' altitude
- Operation protocols approved by AOC and FAA for similar project in January 2016
- Other possible area of operation: Monomoy Island, NWR. Awaiting approval from FWS
- 3 Certified pilots (Jech, Josephson, Johnson)

# Project Plan

	FY16 Qtr 3	FY 17 Qtr 1	FY17 Qtr 2	FY17 Qtr 3	FY17 Qtr 4	FY18 Qtr 1	FY18 Qtr 2	FY 18 Qtr 3
Procure equipment	X							
Pursue airspace clearance for Monomoy	X							
Update ORM clearance – Muskeget		X						
Test new equipment		X						
Conduct field work		X	X				X	
Analyze imagery				X	X	X		
Write reports							X	X

# Risk Assessment

(Read X, Y)

Technical: 2, 3

Cost: 1, 1

Schedule: 3, 3

(Updated per GPR 7120.4D guidance)

LIKELIHOOD	Very High	High	Moderate	Low	Very Low							
	> 50%	25% - 50%	15% - 25%	2% - 15%	0.1% - 2%							
	> 75%	50% - 75%	25% - 50%	10% - 25%	2% ≤ 10%							
	5	4	3	2	1							
						Tech	Cost	Schd				
									1	2	3	4
						<b>Technical</b>	No KPP impact / no tech required	Minor impact to KPP / mod to existing tech required	Moderate impact to KPP / some new tech required	Significant impact to KPP / mod new tech required	KPP cannot be met / major new tech required	
						<b>Cost</b>	≤ 1% increase	≥ 1% but ≤ 2% increase	≥ 2% but ≤ 5% increase	≥ 5% but ≤ 8% increase	> 8% increase	
						<b>Schedule</b>	No slip	Non-critical slip 1-2 mo	Non-critical slip 2-3 mo	Non-critical slip 3-4 mo	Slip on critical path, launch date	
<b>CONSEQUENCES</b>												

Criticality	L x C Trend	Approach
<b>High</b>	↑ Increasing (Worsening)	M – Mitigate
<b>Med</b>	↔ Unchanged	W – Watch
<b>Low</b>	↓ Decreasing (Improving)	A – Accept
		R – Research
		* - New



# Transition Planning

- Draft TP complete
- Test APH-22 advancements against performance metrics, and document results
- Streamline data processing and analysis for standard operational usage
- Track all hardware and software costs
- Transition Plan will be reviewed annually and updated as needed.

