Small UAS Mapping Project
Mission Concept Review

NGS Remote Sensing Division

ONMS Collaborative Center for Unmanned Technologies

23 June 2016

Mission Concept Review

Executive Summary

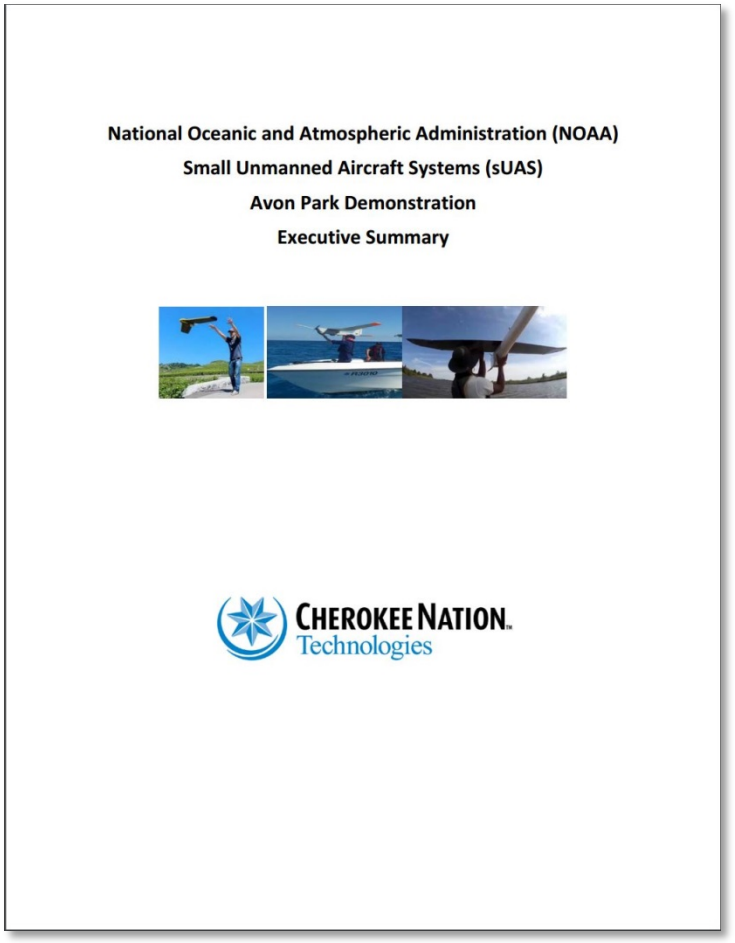
The Remote Sensing Division (RSD) and the ONMS Collaborative Center for Unmanned Technologies (CCUT) have been funded by UASPO to acquire and operate two small fixed-wing Unmanned Aircraft Systems (UAS) to further the development of UAS operational procedures specifically related to coastal and habitat mapping, living marine resource (LMR) surveys, as well as a range of emergency preparation, response and recovery requirements. The senseFly eBee RTK UAS has been identified as the system to most cost effectively meet both RSD and ONMS requirements.

- Mission Goals and Objectives
- Test and Training Locations
- Concept of Operations

senseFly eBee

The senseFly eBee RTK UAS has been identified as the system to most cost effectively meet both RSD and ONMS requirements:

- Avon Park Demonstration
- RSD Partnership with USACOE
- Duke Marine Lab LMR Surveys
- NOAA OE Grant for TBNMS SCR Surveys



National Oceanic and Atmospheric Administration (NOAA)

Small Unmanned Aircraft Systems (sUAS)

Avon Park Demonstration

Executive Summary

CHEROKEE NATION Technologies

Goals and Objectives

Mission Goals and Objectives

- Develop Joint RSD-CCUT Operational eBee Flight Program
  - Flight Operations Manual
  - System and Sensor Maintenance Plan
  - Trained and Current Crew of NOS NOAA Corps Officers, FTEs, and Contractors
  - Annual Approved Ops Plans and ORMs
- Operational
  - UAS data integration into the Coastal Mapping workflow
  - UAS data integration into ERMA
  - Integrating eBee operations into RSD and ONMS emergency response efforts
- Research and Monitoring
  - Test and evaluate thermal sensor for multiple LMR requirements
  - Test and evaluate Structure From Motion function to build Digital Elevation Models
  - Test and evaluate NIR sensor for multiple habitat mapping requirements
  - Integrate eBee into ONMS research and monitoring efforts at appropriate sites

Training Locations

Primary East Coast Test and Training Location: NGS Facility, Corbin, VA

Airspace Accessible via NOAA FAA MOU

Training Locations

Secondary East Coast Payload Test and Evaluation Location:

USACE Field Research Facility – Duck, NC

Airspace Accessible via NOAA FAA MOU

Training Locations

Potential West Coast Test and Training Location: CSU Channel Islands

Airspace requires COA (requested via AOC June 2016)

(other potential locations include CINP and San Nicolas)

Concept of Operations

Concept of Operations

The concept of this project is to develop a joint RSD/CCUT flight program with two fully operational eBee mapping systems and payloads, including all required trained operators, documents, permits, and approvals, that support RSD, ONMS and other NOAA program requirements.

Phase I – Development (Acquisition)

The first phase consists of acquiring systems and payloads, training operators, developing required documentation and manuals, and seeking required FAA, NOAA, and other agency permits and authorization.

Concept of Operations

Concept of Operations (cont'd)

Phase II – Testing, Evaluation, and Integration

During this phase, the eBee and sensors will be tested and evaluated to determine the specific ONMS and RSD requirements that can readily be augmented or replaced by eBee operations. Procedures and protocols will be developed for integrating eBee operations and data collection into existing workflows and research and monitoring programs.

Phase III – Operations

Utilizing the results of Phase II, the eBee will transition to full operational support of successful mission sets throughout RSD, ONMS, NOAA, and other partner agencies.

Schedule

Draft Schedule

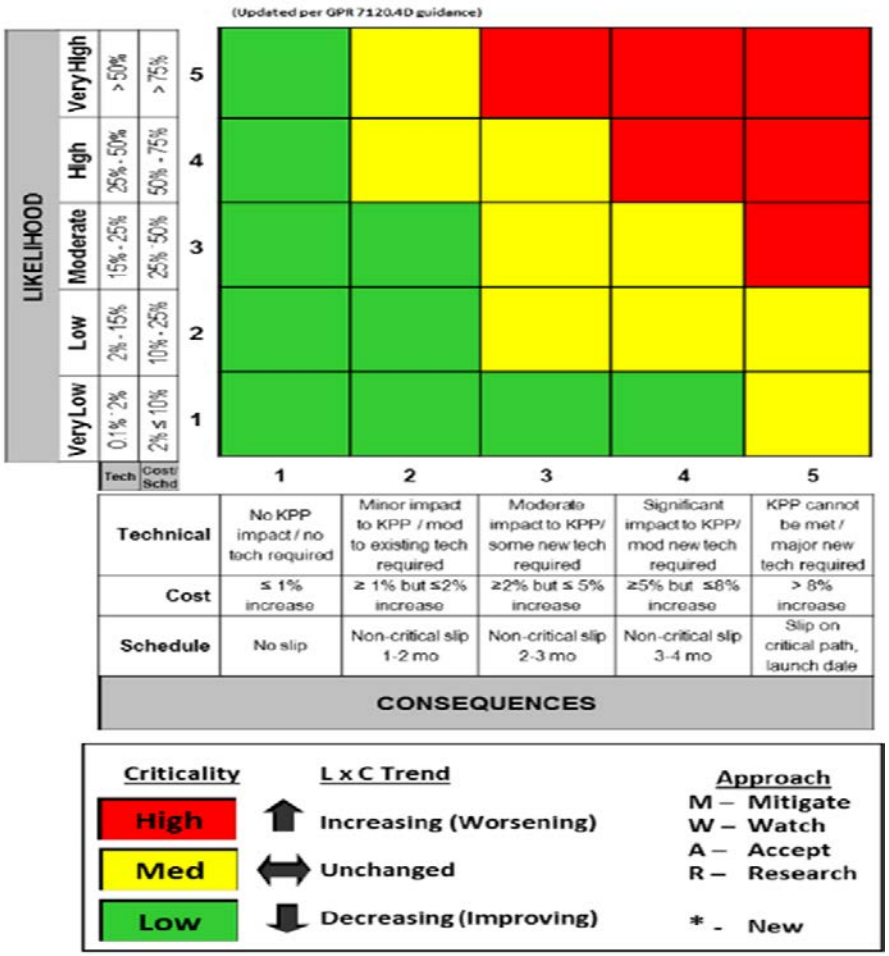
- June 2016 – Requisition systems and payloads
- June 2016 – Submit COA request(s)
- June 2016 – Submit Ops Plan and ORM
- July 2016 – Draft eBee Flight Ops Manual
- August 2016 – Receive systems and payloads
- September 2016 – Training and system acceptance
- September 2016 – Draft Transition Plan
- September 2016 – Test and evaluation flights at FRF
- October/November 2016 – LMR/ORR evaluation flights on west coast
- Spring 2017 – Operational flights at FKNMS
- Spring 2017 – Interim system/mission evaluation report
- Summer 2017 – Operational CM and LMR flights
- July 2017 –September 2017 – Final Transition Plan

Performance Metrics

eBee Mission	TRL	Performance Metric	Target TRL
Coastal Mapping	8	Assess horizontal and vertical geometric accuracies of payloads using SFM techniques. Determine whether new methods are equivalent or better than traditional techniques currently used for shoreline mapping	9
	8	Construct workflow for auto-extracting MHW from photogrammetrically derived point clouds and DEMs acquired (coverage vs cost) (equivalent or better)	9
LMR Surveys	8	Obtain accurate and precise measurements (within 5%) of pinnipeds at remote haulouts	9
	8	Identify and accurately count (within 5%) nesting seabirds with thermal and/or IR payload	9
Habitat Mapping	8	Ability to produce geo-rectified imagery of shallow water coral and seagrass habitats (y/n)	9
	8	Assess the feasibility of small UAS imagery to derive GIS products in support of habitat mapping work across NOAA (y/n)	9
Emergency Response	8	Develop procedures and protocols to integrate eBee data into ERMA (y/n)	9
	8	Obtain blanket clearances and permits to allow response flights within 24 hrs (y/n)	9

Risk Assessment

	X,Y
Technical:	1,1
Cost:	1,1
Schedule:	3,4



Transition Planning

- Draft Transition Plan based on md4-1000 TP and NOAA Template
- Develop eBee RSD Flight Operations Manual
- Develop / Finalize Data Collection and Management Plan
- Track eBee System Operating, Maintenance, and Upgrade Costs
- Develop Future Operating Budgets
- Finalize eBee Transistion Plan

Questions