

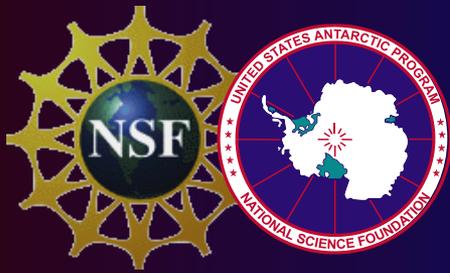
Scientific Committee for Oceanographic Aircraft Research

United States Antarctic Program (USAP)

UAS/UAV Operations

28-29 June 2016

Tim McGovern, Ocean Projects Manager
Division of Polar Programs, National Science Foundation



USAP UAS Operations Summary

2015

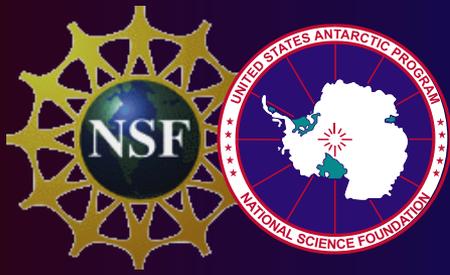
- **Two UAS deployed from a research vessel (NB Palmer)**
- **Two UAS deployed from a station (McMurdo)**

2016

- **Three UAS deployed from vessels (NB Palmer and USCGC Polar Star)**
- **Two UAS deployed from a station (McMurdo)**

2017

- **Eight UAS deployed from vessels and/or sea ice stations (NB Palmer)**
- **Two UAS deployed from a station (McMurdo)**



USAP UAS Operations 2015

Dr. Frank Nitsche, Columbia University Lamont
Doherty Earth Observatory

Dr. Guy Williams, Institute of Marine and Antarctic
Studies, Antarctic Climate and Ecosystem CRC,
University of Tasmania, Australia

UAS:

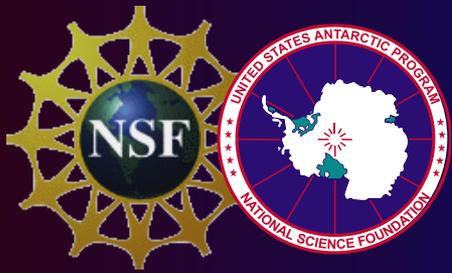
- DJI S1000
- Phantom 2 Vision+

Primary purpose: basis of a pilot study of in the
use of ship-based UAS for surveying floe size
distribution in the seasonal ice zone

DJI S1000

Phantom 2 Vision+





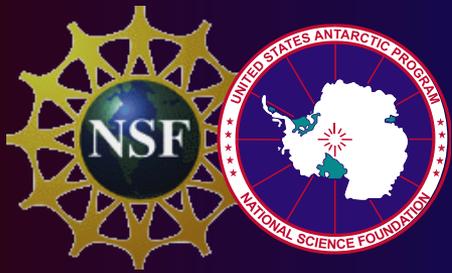
USAP UAS Operations 2016

Dr. Maria Vernet, Integrative Oceanography Division, Scripps Institution of Oceanography

UAS: DJI Phantom 3 Professional Quad copter

Primary purpose: scientific outreach; operated by Maria Stenzel (Nat Geo photographer)





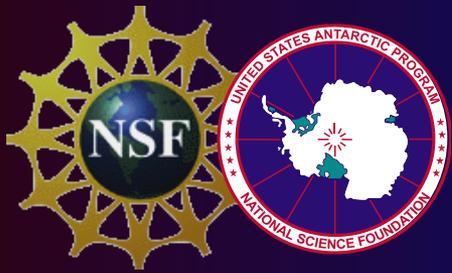
USAP UAS Operations 2017

Dr. John Cassano, University of Colorado

- Flip Unmanned Aircraft Systems (UAS), for use in the vicinity of McMurdo Station / Pegasus runway, Antarctica

Primary Purpose: Flip flights will be used as training flights for project personnel





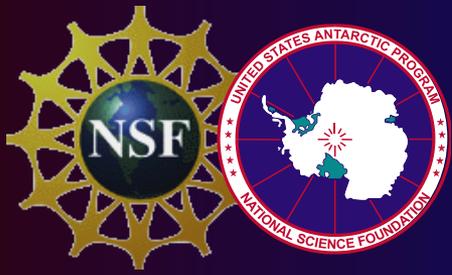
USAP UAS Operations 2017

Dr. John Cassano, University of Colorado

- Small Unmanned Meteorological Observer (SUMO) - fixed-wing UAS

All SUMO flights will take place from ice stations, i.e. take off and landing on the sea ice





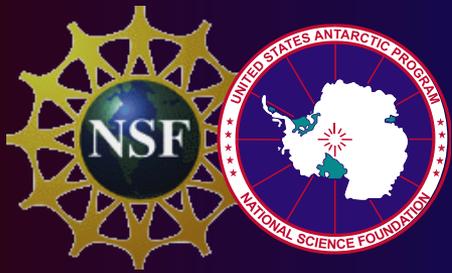
USAP UAS Operations 2017

Peter Guest, Naval Postgraduate School

- InstantEye (IE) miniature quad-rotor UAS

IE flights will take place from ice stations and from the ship





USAP UAS Operations 2017

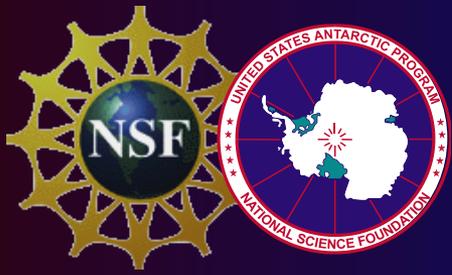
Dr. Guy Williams, Institute of Marine and Antarctic Studies, Antarctic Climate and Ecosystem CRC, University of Tasmania, Australia

Dr. Ted Maksym, Woods Hole Oceanographic Institution

- Multicopters over Sea Ice [MSI]
 - DJI Phantom 3 and 4 quad-rotor UAS
 - DJI S1000+ 'Spreading Wings' octo-copter UAS
 - DJI Matrice 100 dual quad-copter UAS

MSI flights will take place from ice stations and the ship





USAP UAS Operations 2017

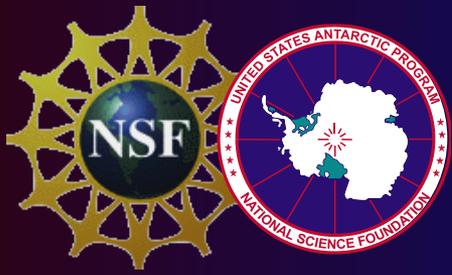
Dr. Guy Williams, Institute of Marine and Antarctic Studies, Antarctic Climate and Ecosystem CRC, University of Tasmania, Australia

Dr. Ted Maksym, Woods Hole Oceanographic Institution, USA

- Fixed-wing over Sea Ice [FSI]
 - Zeta FX-61 Phantom fixed-wing UAS (with Pixhawk)
 - Skywalker X6 fixed-wing UAS (with Pixhawk)
 - 3DRobotics Aero-m fixed-wing UAS (with Pixhawk)

FSI flights will take place from ice stations and the ship



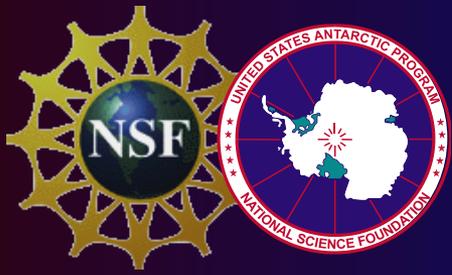


USAP UAS Operations 2017+

What lies beyond?

- Anticipate further interest from science community in bringing advanced UAS/UAV technologies to the Antarctic
- Current operations are limited to Visual Line of Sight (VLOS)

Expect the BVLOS boundary to be pushed any day.....



Questions?