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CIRPAS

- The Center for Interdisciplinary Remotely-Piloted Aircraft Studies (CIRPAS) was established by the Office of Naval Research (ONR) in the spring of 1996
- CIRPAS provides Manned and Unmanned Air Vehicle flight services to the scientific and engineering communities.
- CIRPAS became an University National Oceanographic Laboratory System (UNOLS) National Facility in 2002 and NSF National Facility in 2010

THE AIRCRAFT FLEET



UV 18-A Twin Otter (2)



Pelican



**Sentry BK 30
UAV (5)**



SPA-10



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FACILITIES:

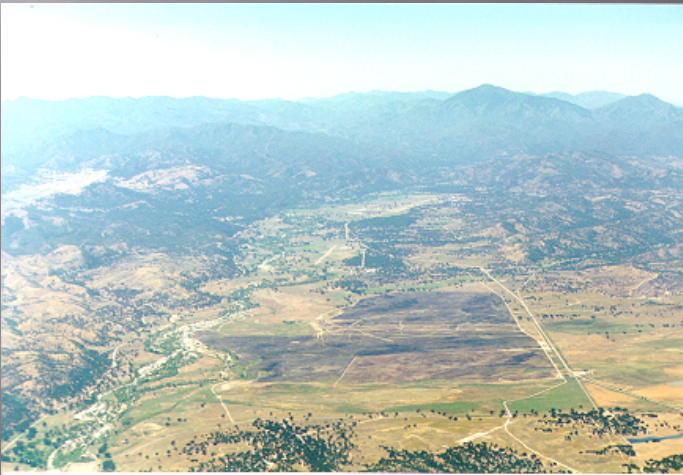
▣ Marina Facility

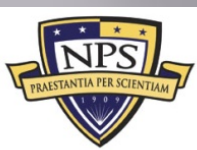
- 3500 ft runway - manned operations only
- 30,000 sq ft maintenance hangar
- Instrumentation and Calibration Laboratory
- Maintenance and Payload integration shops
- Offices



CIRPAS FACILITIES:

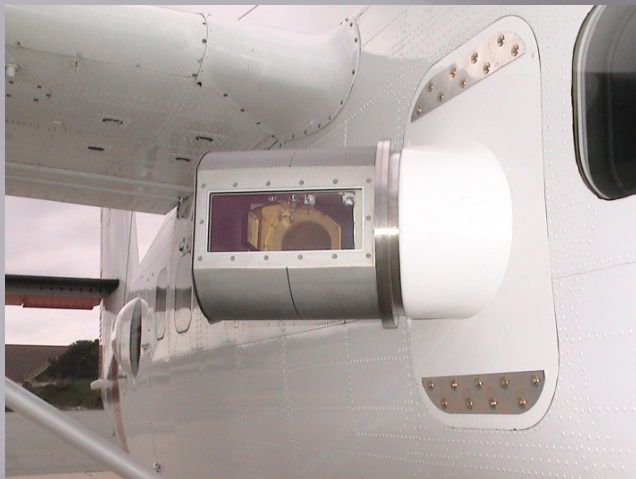
- **Camp Roberts Facility**
 - Friendly airspace for UAV testing and training (R2503).
 - Military ground maneuvers (equipment, personnel)
 - 3500 x 60 ft runway
 - 2000 sq ft hangar
 - Office Space





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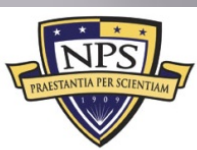
UV-18A Twin Otter



TODWL two axis scanner



- Operated for 15 years
- Research Capacity: 1500 lbs
- Research Power: 5600 W at 28 VDC, 4000W 110VAC 60 hz:
- Science Payload Stationing:
 - - Internal Standard Racks
 - - Various Pylon Mounted Pods
 - - Various Fuselage Mounted Fairings



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New UV-18A Twin Otter



Army Golden Knights UV-18A
Transferred to CIRPAS on
Sept 2013

Now BUNO 762255

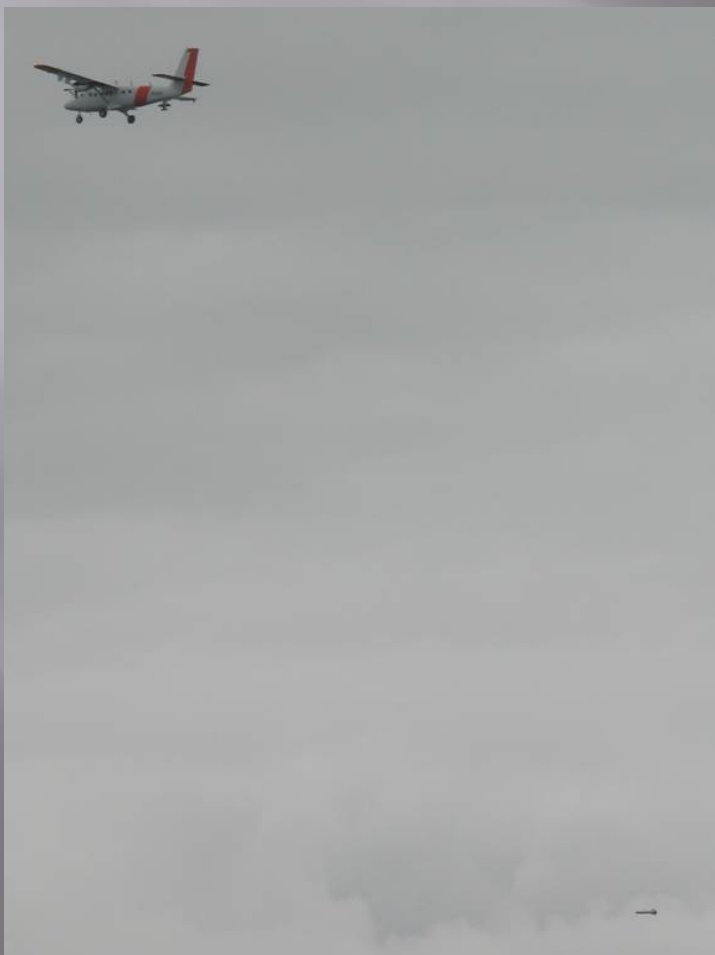
ALL Research Modifications to our
current Twin Otter (256) are
transferable to the New Twin
Otter (255)

Army has provided funds to cover
all maintenance and all
Research Modifications. In
Sep 15, 255 will set-up in the
same configuration as 256



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INSTRUMENTATION - Smart Towed Vehicle



Operates at 100 Ft
1,200 Ft. Separation Possible
75 Lbs. Flux Payload
Final Test Flights end of April 2015

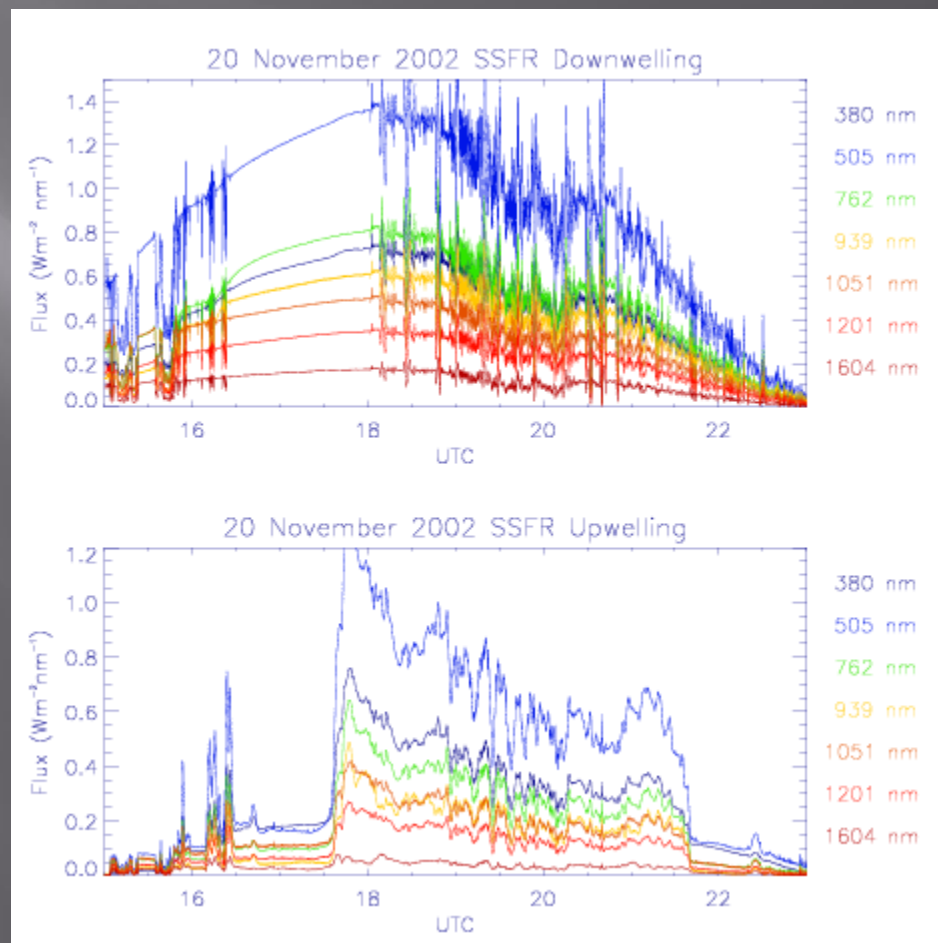


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INSTRUMENTATION Stabilized Radiometer Platform



- Radiometric Stabilized Platform Now Operational
- Flight test completed in Spring 2014
- Holds 3 Radiometers Stable within 15 Degree of Aircraft Movement



Stabilized Platform Off / On / Off



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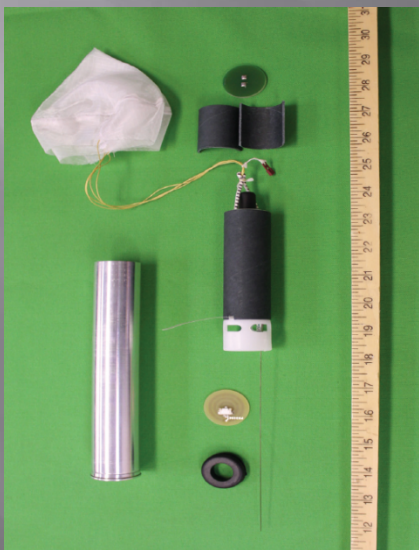
INSTRUMENTATION

MICRO-SIZED AIR-LAUNCHED EXPENDABLE METEOROLOGICAL SENSOR & CHAFF



ALE-47 Pod can shoot various chaff cuts for observation with ground or air based Radars

Aug 2014 coordinated X & W band chaff with ground based and airborne radars



The New QinetiQ MAXMS dropsonde Could be package in ALE-47 MJU-38/B form factor.

Upon ejection, the excess packaging falls away allowing the parachute to deploy and Sonde to Fall.



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2015 Science Missions

- Aerosol and Cloud Interaction Experiment: July 2015 - Monterey Area

Objective: Understand the complicated interplay between aerosol particles, cloud droplets, and dynamics in governing the physical and chemical nature of the marine boundary layer clouds and precipitation. The participating teams are from Caltech, U. of Arizona, and Georgia tech., and are led by Professor John Seinfeld of Caltech.

- Effects of organized flow-structure within the MBL on air/sea exchange rates: Aug 2015 – Monterey Area

Objective: Study the possible effects of organized structures in the boundary layer flow patterns on flux rates with the Twin Otter Doppler Wind Lidar. PI, Dr. David Emmitt of Simpson Weather Associates.

- CTV Engineering and Test flights: April 2015 – Monterey Area

Test Controlled Towed Vehicle (CTV) improved video and altitude hold stability for improved flux measurements over the sea.

- CASPER: Oct 2015 – Duck, NC

Objective: Study the influence of the atmospheric and oceanic environment on electromagnetic wave propagation. Ocean conditions will be characterized by use of buoys and ships, while the CIRPAS Twin Otter aircraft characterizes the conditions in the atmosphere. The many participating teams led by Qing Wang of the Naval Postgraduate school.



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Storm Penetrating A-10



A-10 has 11 hard points on wings and belly where 8000 lbs of instruments may be suspended.
It has a belly bay where 2200 lbs of stuff may be mounted

Engineering test flights are planned in late 2015 early 2016 (including tests of baseline instruments and communication).

Progressive science flights are planned in latter half of 2016





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Sentry Block 30 UAS

Operational For One Year:

- Med Endurance, Med payload platform.
- Small Footprint, Easily transportable, Ruggedized UAV
- 10,000 ft. Max Altitude
- 6 Hours Endurance



Sensor / Payload Descriptions:

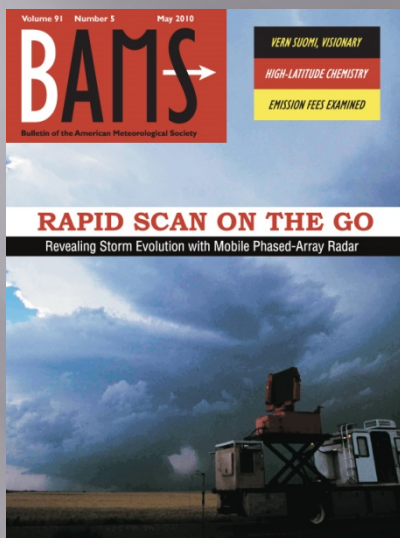
- EO/IR Imaging Payload
- 75 LBS Payload Capacity





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GROUND BASED ASSETS



MWR-05X Mobile Storm Radar

Parameter	Value
Transmitted frequency	X-Band
Transmit power	15.13 kW (peak) 240 W (average)
PRF	10 kHz (max)
Transmitted pulse width	1 μ s
Antenna type	Mechanically rotated electronically scanned phased array
Azimuth BW	1.8°
Mechanical Azimuth Scan	360°, 30 RPM
Electronic Azimuth Back-Scanning	6 to 8, depending on elevation angle
Elevation BW	2.0°
Elevation Scan	-18° to 55° relative to the horizon
Range Resolution	150 m



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GROUND BASED ASSETS



TPQ-37 Mobile Radar

S-Band Full Phased Array

Peak power: 120 KWatts

PRF: 3 kHz

Range Resolution: 150 m

Dwell time (integration time): 250 ms

Scan time: 4 beams per second

Most research modifications used for the MWR
are transferable to the TPQ-37

Conversion Process Saves Engineering Costs

Research Modifications Require Mostly time
and material costs