

sUAS Communities & RDA

Science & Data

Survey: sUAS Communities

Atmospheric Science

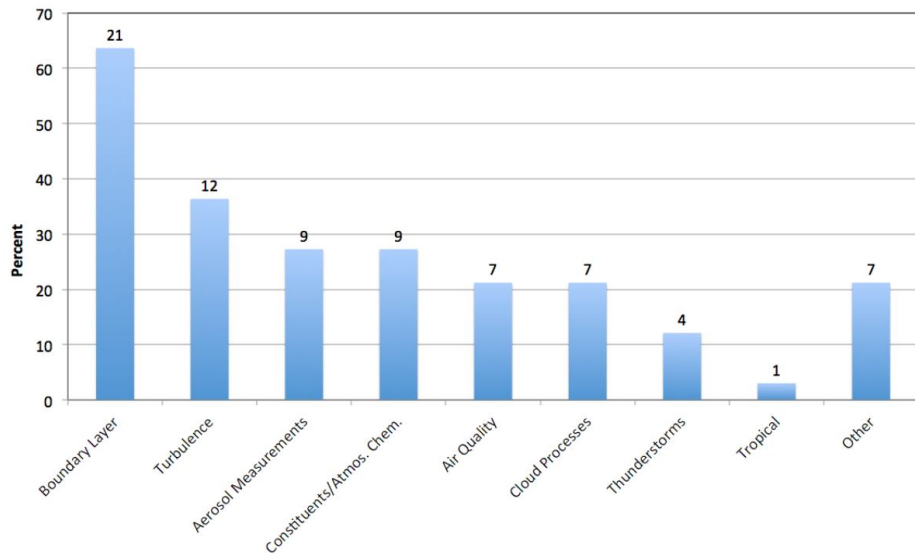
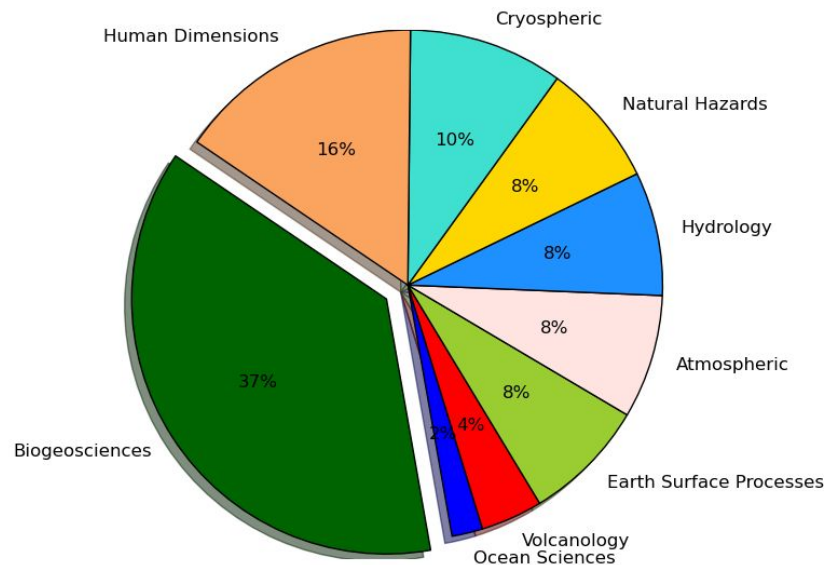


Figure 1: Research topics for which UAS are currently being used. The bars represent the percent of total respondents that selected or entered each topic; while the numbers on top of each bar represent the absolute number of times, each topic was chosen or entered.

Earth Science



Survey: sUAS Communities

Atmospheric Science

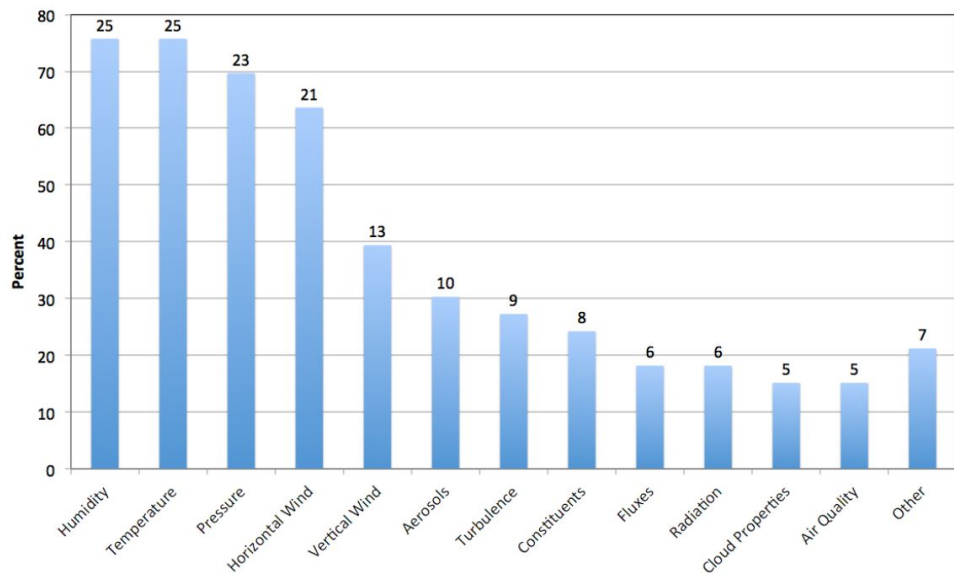
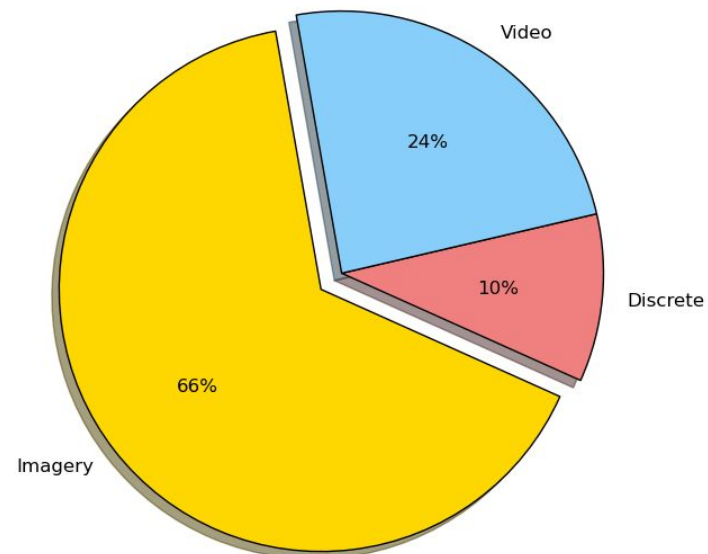


Figure 4: Atmospheric parameters currently being measured by UAS as a percent of total respondents. The numbers on top of the bars represent the absolute number of responses for each parameter.

Earth Science



The NCAR Earth Observing Laboratory Survey on Unmanned Aircraft Systems, Holger Vömel and Cory Wolff, 2016

https://www.eol.ucar.edu/system/files/NCAR_EOL_2016_UAS_Survey_Report.pdf

Pushing the Boundaries in Science Data Collection, Wyngaard and Barbieri, 2016, SciDataCon

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Atmospheric Science

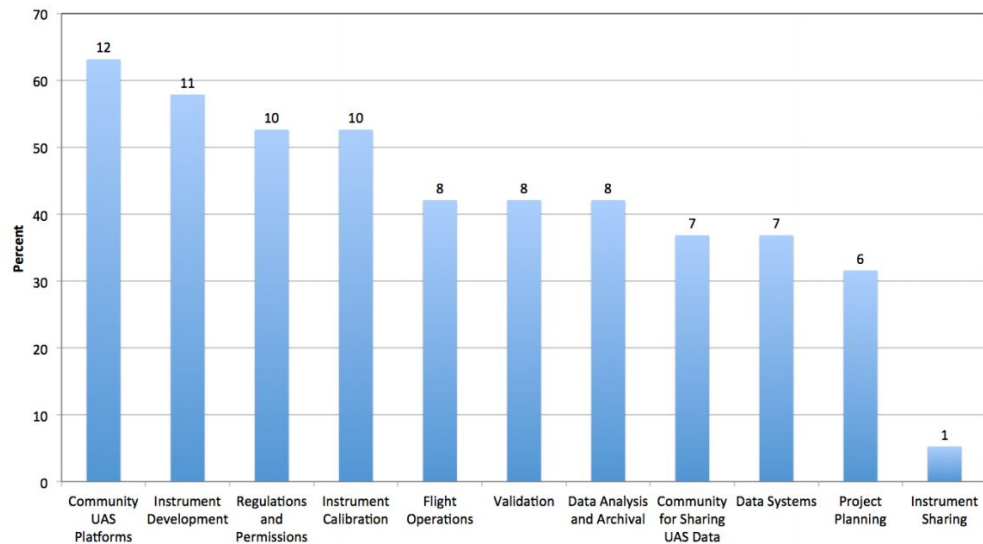
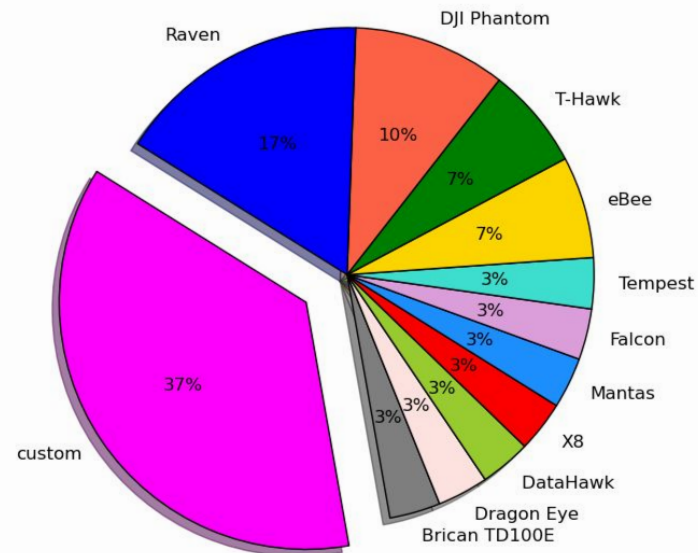


Figure 10: Support categories for which respondents, who are not using UAS, feel they would benefit from if they were to begin using UAS.

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Parrot/Pix4D Climate Grant:

one drone, one Parrot Sequoia camera, and a six-month Pix4D license.

Robert M. Pringle, Department of Ecology & Evolutionary
Biology, Princeton University, NJ:

**Role of climate in modulating wildlife
extinctions in African drylands**

Christopher B. Field, Stanford Woods Institute for the
Environment, CA:

**Drone-based detection of grassland
phenology, productivity and composition in
relation to climate**

Dr Gillian Maggs-Kölling, Gobabeb Research and Training
Centre, Walvis Bay, Namibia:

**Growth dynamics of the lichen fields of the
Central Namib Desert**

Dr. Holly P. Jones, Biology Department, NIU, IL:

**Using drones to monitor grassland responses
to shifting climate and restoration**

Lluís Brotons, InForest JRU (CTFC-CREAF, Solsona, Spain:

**Monitoring insect pest impacts in
Mediterranean forests in a climate change
context**

Jeffrey Kerby, Neukom Institute / Institute for Arctic
Studies, Hanover, Germany:

**Climate-driven greening of the Siberian
Arctic: Multispectral sensors on UAVs bridge
ground to satellite scaling challenges**

OK, so, Research Data Alliance.

Three Realms to Consider:

1. Documentation / Workflow
2. Pooling Community Knowledge (Infrastructure & Governance)
3. Data Integration, Sharing and Reuse

Documentation and Workflow

1. Standards/Best Practices: **data formats**, standard ways to **capture and document procedures**, **metadata** and **data curation practices**.

- Standards
- Best practices documents
- Workflow for data collection, processing and analysis: (integration, transformation, provenance tracking)

2. Best Practices/Documentation: **calibration and validation** of instruments and platforms, and both together:

- Validate: against towers, in tandem with manned aircraft, etc. (sensors) with satellites, aircraft (imagery)
- Calibrate: sensors, platforms themselves
 - Metadata - lots of work from the sensor communities!

Pooling Community Knowledge

Opportunities:

Many different perspectives and groups of people working on these sorts of problems and amassing community information and knowledge. Both on **sUAS use** in science (platforms, sensors, operations, science) but also on the **data aspects** that come along with sUAS use.

THIS is what many communities immediately think, talk about and point to

Challenges:

- Disparate disciplines / sectors:

- not necessarily used to cooperating together or looking to each other for ideas
- different goals and different specific data and information needs
- have different “prior experience” on data standards, management and sharing in addition to information sharing
- And are working in a **rapidly shifting and changing landscape** both technology (platforms, instruments) and operations (regulations, research)

Data Integration, Sharing & Reuse

Specific documentation and workflow practices need to be developed such that **data from sUAS** is interoperable, machine readable, etc such as to allow for **integration & reusability** with other data (UAS or ground / satellite)

Meaningfully combine:

- Multiple data streams on same sUAS

- Multiple data streams on multiple sUAS

- sUAS data with other data (in-situ ground based, towers, satellites)

Sharing & Reuse:

- sUAS Data huge potential for re-use beyond initial mission

- Granularity - Batching data together? Raw? Processed products?

- Community data sharing - Repositories exist already taking sUAS data (OpenTopography)

Where do we go from here??

Earth Science Information Partners (ESIP) Workshop - July

→ work through specific sUAS data
workflows / management / standards

RDA Plenary 10 - September

→ continue to gather the larger sUAS
community

→ put the structures in place to spin off a
working group

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**RDA Small Unmanned Aircraft
Systems' Data IG:**

tinyurl.com/z5gf4zr

ESIP Drone Cluster

Open Science Framework:

<https://osf.io/nuvem/>

RDA Working Groups



Some Ideas:

- Minimum metadata parameters for science sUAS data capture.
- Best practice data formats (while onboard, during analytics, for long term publishing, etc)
- Flight-log publication best practices: formats, readers, parameters
- Naming convention adoption in such a heterogenous domain?
- Procedures for data collection
- Information Sharing Infrastructure (e.g. work with Atmospheric community?)