

sUAS Data Interest Group

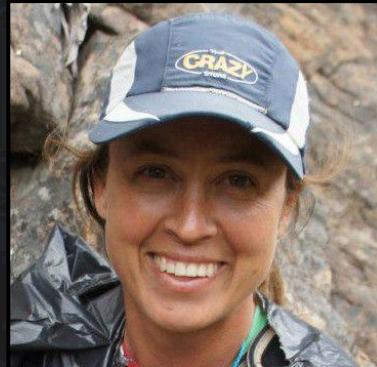
Lindsay Barbieri
University of Vermont

lkbar@uvm.edu
@barbieriiv



Dr. Jane Wyngaard
University of Notre Dame

jwyngaar@nd.edu
@jrwyngaard

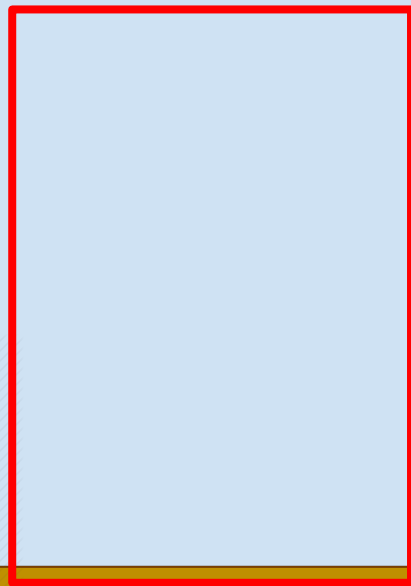


Goals:

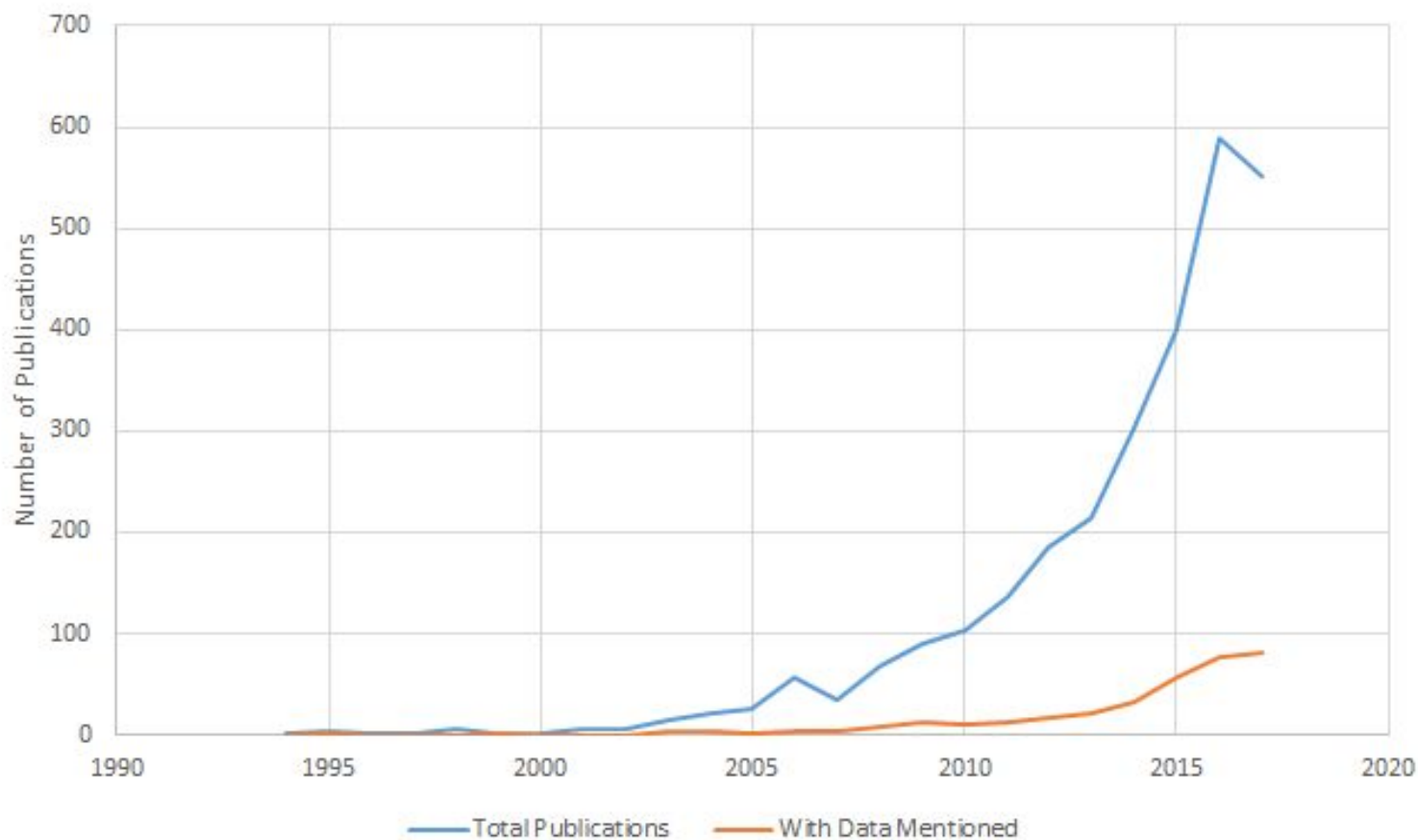
- 1. Convey why sUAS Data is Important
(and urgent) to consider**
- 2. Sampling of what we're doing and
how we're doing it**
- 3. Who are you? Why are you here?
How might you want to participate?**

Goals:

- 1. Convey why sUAS Data is Important
(and urgent) to consider**
- 2. Sampling of what we're doing and
how we're doing it**
- 3. Who are you? Why are you here?
How might you want to participate?**



Drone Publications: Web of Science Search



Research Areas: Top 15	Number of Articles
Engineering	1145
Computer Science	452
Remote Sensing	380
Robotics	324
Automation Control Systems	285
Instruments / Instrumentation	243
Imaging Science Photographic Technology	217
Geology	170
Environmental Sciences Ecology	148
Telecommunications	144
Physical Geography	123
Chemistry	110
Agriculture	104
Electrochemistry	98
Meteorology Atmospheric Sciences	73
Science Technology Other Topics	65

Research Areas: Top 15	Number of Articles
Engineering	1145
Computer Science	452
Remote Sensing	380
Robotics	324
Automation Control Systems	285
Instruments / Instrumentation	243
Imaging Science Photographic Technology	217
Geology	170
Environmental Sciences Ecology	148
Telecommunications	144
Physical Geography	123
Chemistry	110
Agriculture	104
Electrochemistry	98
Meteorology Atmospheric Sciences	73
Science Technology Other Topics	65


```
graph LR; A[Science Question / Campaign Planning] --> B[Select and Integrate Platform & Sensors]; B --> C[Pre-Flight Check / Sensor Calibration]; C --> D[Mission Planning / In field]; D --> E[Executing Mission (flight & data collection)]; E --> F[Post Processing]; F --> G[Analysis];
```

**Science
Question /
Campaign
Planning**

**Select and
Integrate
Platform &
Sensors**

**Pre-Flight
Check /
Sensor
Calibration**

**Mission
Planning /
In field**

**Executing
Mission
(flight &
data
collection)**

**Post
Processing**

Analysis

**Science
Question /
Campaign
Planning**

**Selection
of Platform
& Sensors**

**Sensor
Integration
on
Platform**

**Pre-Flight
Check /
Sensor
Calibration**

Pre Flight

**Mission
Planning /
In field**

**Executing
Mission:
Flight &
Data
Collection)**

**Download
in Field
Data /
Streaming**

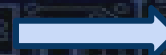
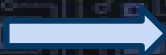
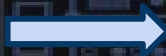
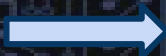
Flight

**Post
Processing**

**Secondary
Data
Products /
Analysis**

**Fusion /
Integration**

Post Flight



**Science
Question /
Campaign
Planning**

**Selection
of Platform
& Sensors**

**Sensor
Integration
on
Platform**

**Pre-Flight
Check /
Sensor
Calibration**

Pre Flight

**Mission
Planning /
In field**

**Executing
Mission:
Flight &
Data
Collection)**

**Download
in Field
Data /
Streaming**

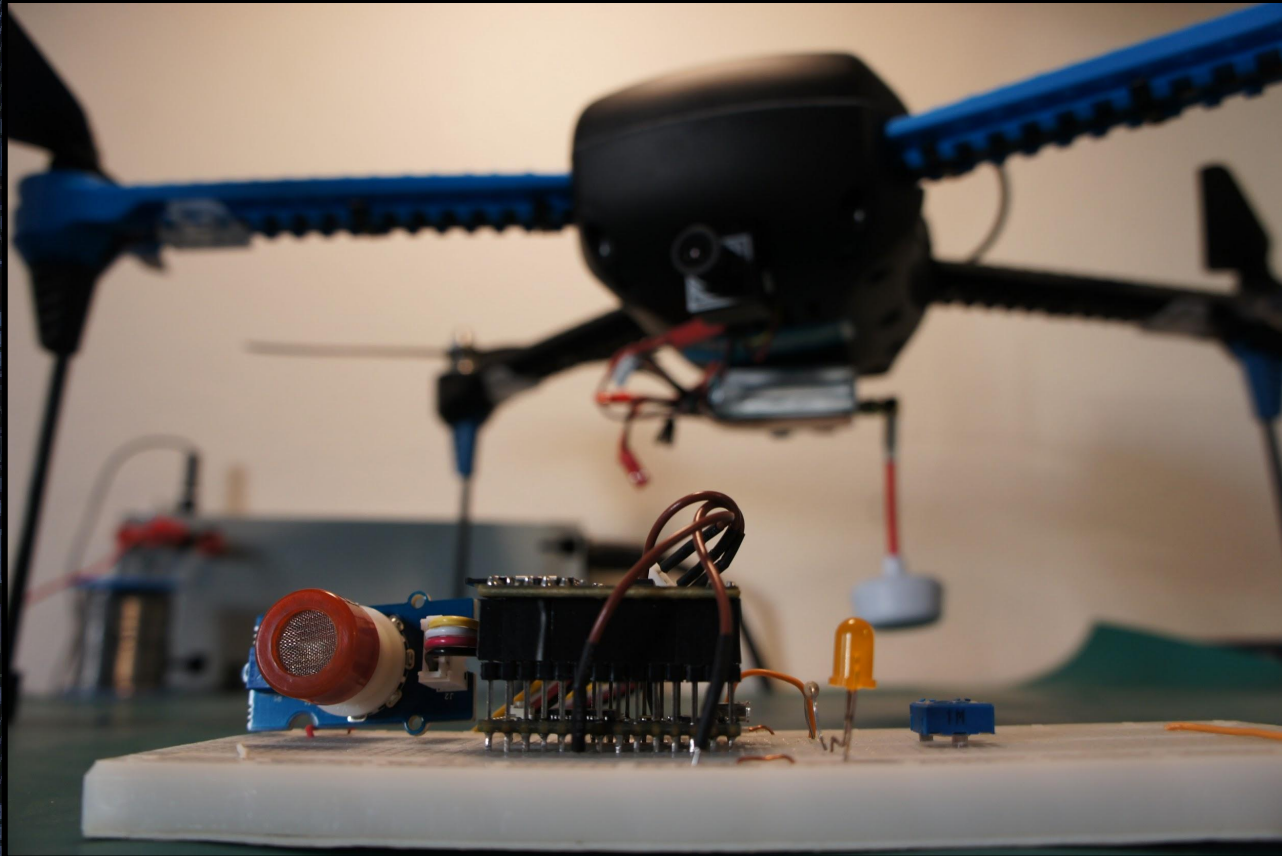
Flight

**Post
Processing**

**Secondary
Data
Products /
Analysis**

**Fusion /
Integration**

Post Flight



Pre Flight

Flight

Post Flight

Analysis

**Science
Question /
Campaign
Planning**

**Selection
of Platform
& Sensors**

**Sensor
Integration
on
Platform**

**Pre-Flight
Check /
Sensor
Calibration**

Pre Flight

**Mission
Planning /
In field**

**Executing
Mission:
Flight &
Data
Collection)**

**Download
in Field
Data /
Streaming**

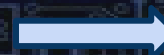
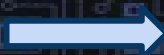
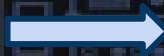
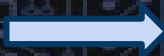
Flight

**Post
Processing**

**Secondary
Data
Products /
Analysis**

**Fusion /
Integration**

Post Flight





Pre Flight

Flight

Post Flight

**Science
Question /
Campaign
Planning**

**Selection
of Platform
& Sensors**

**Sensor
Integration
on
Platform**

**Pre-Flight
Check /
Sensor
Calibration**

Pre Flight

**Mission
Planning /
In field**

**Executing
Mission:
Flight &
Data
Collection)**

**Download
in Field
Data /
Streaming**

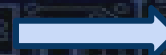
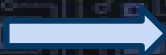
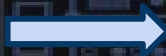
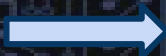
Flight

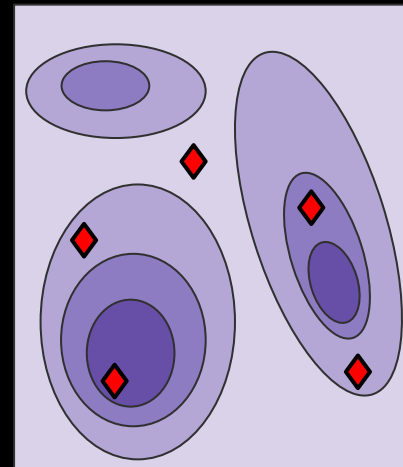
**Post
Processing**

**Secondary
Data
Products /
Analysis**

**Fusion /
Integration**

Post Flight





compare with field
points

Goals:

- 1. Convey why sUAS Data is Important
(and urgent) to consider**
- 2. Give a sampling of what we're doing
and how we're doing it**
- 3. Who are you? Why are you here?
How might you want to participate?**

Brief History

Jan 2015-present: Earth Science Information Partners (ESIP)

→ **Wiki:** http://wiki.esipfed.org/index.php/Drone_Cluster

→ **Open Science Framework:** <https://osf.io/nuvem/>

April 2017-present: Research Data Alliance (RDA)

→ **sUAS Data IG:**

<https://www.rd-alliance.org/groups/small-unmanned-aircraft-systems%E2%80%99-data-ig>

As a new technology, however, there are currently no industry-wide accepted best practices for sUAS sensor and flight data handling and management. There are many reasons for why such would be beneficial but 3 of particular note include:

1. The creation of standards would lower the barrier to entry and innovation in terms of what might be monitored with sUAS, by reducing the number of unknowns a new user faces and providing working examples to serve as guides.
2. With no common goal standards to build to, the development of mature tools for sUAS captured data processing and fusion (with sUAS and other data sources) is currently hampered. As a consequence, each use case generally develops a unique custom pipeline that only sees one-time use.
3. sUAS captured data is - for the most part - not being managed according to data stewardship best practices, such as would ensure the data is FAIR, as articulated by Force11 (Findable, Accessible, Interoperable, and Re-usable).

This interest group therefore seeks to explore and publish (via the RDA community based model), some best practices as regards the handling of sUAS captured sensor and flight data. By publishing such, after a broad, cross-community engagement process, it is hoped and expected that such will see adoption by both those already using sUAS for scientific work those just beginning to explore their possibilities. They will therefore address the 3 concerns laid out above, with the associated positive consequences for the scientific community. These outcomes also align directly with the RDA's Vision and Mission focus, namely, promoting the open sharing of data.

Report Back:

1. ESIP sUAS Data Workshop →

Representatives from:

OGC, USGS, NASA, ISPRS, RDA, NCAR, USDA, ESIP, DJI, and SenseFly

In addition representatives from the following EarthCube projects:

CHORDS, iSamples, and XDOMEs

2. Moving Forward:

Identify Challenges (paper)

ESIP Workshops & Research Coordination Network (RCN)

Goals:

- 1. Convey why sUAS Data is Important
(and urgent) to consider**
- 2. Sampling of what we're doing and
how we're doing it**
- 3. Who are you? Why are you here?
How might you want to participate?**