Update:
Saving ceilometer data from the Automated Surface Observing System (ASOS)

NOAA/NWS: Dennis Atkinson, Micheal Hicks
UMBC: Belay Demoz, Ruben Delgado, Kevin Vermeesch
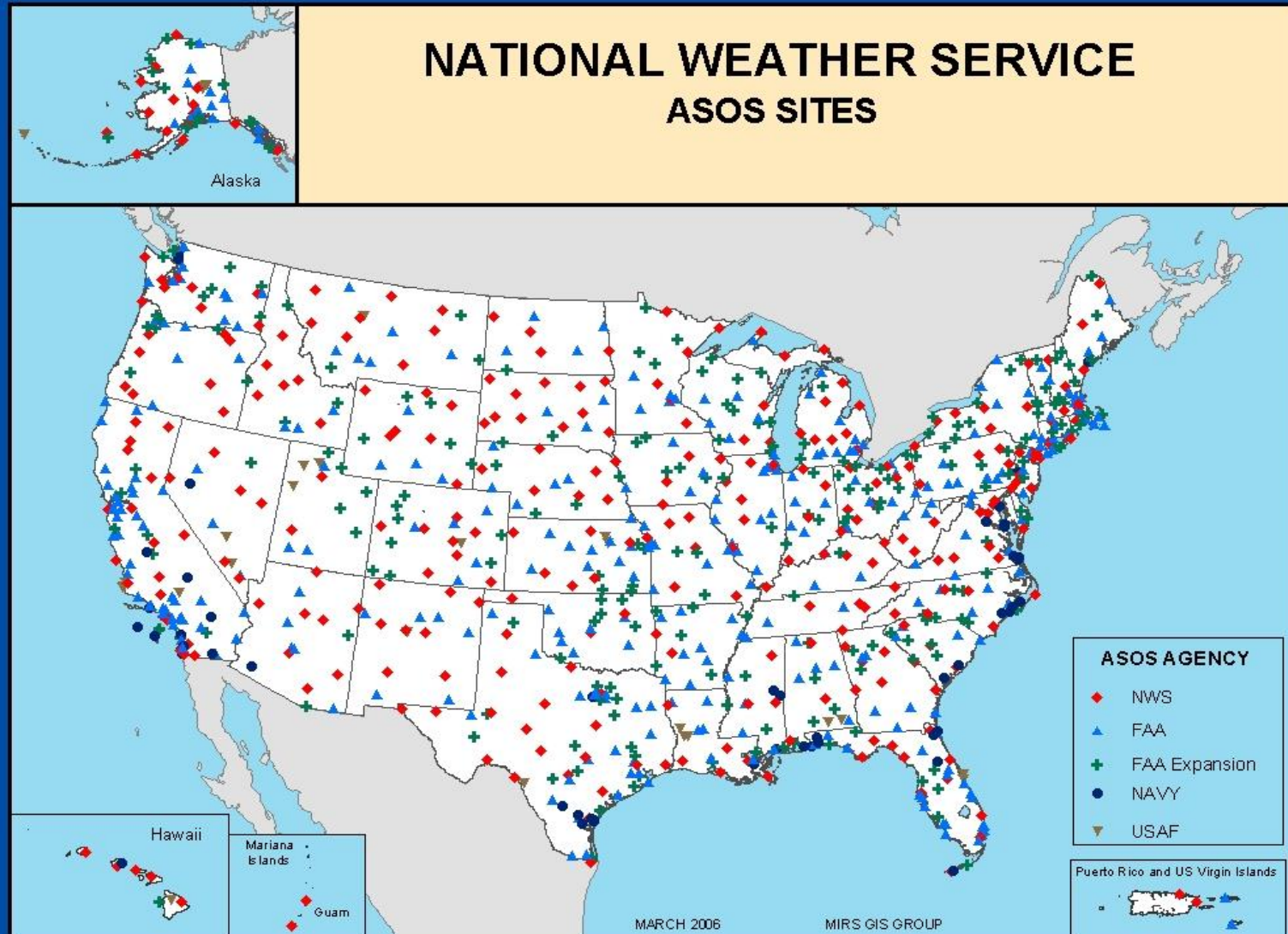**Howard Uni.:**   Demetrius Venable, Ricardo Sakai

- <u>NRC study:</u> Observing Weather and Climate from the Ground Up: A Nationwide Network of Networks (2009)

- Thermodynamic Profiling Technologies Workshop 12-14 April, 2011

- ASOS Ceilometer Workshop, NWS/Sterling, VA. March 22, 2012

GOAL: *How ASOS ceilometer backscatter data would be used if NWS could provide it.*
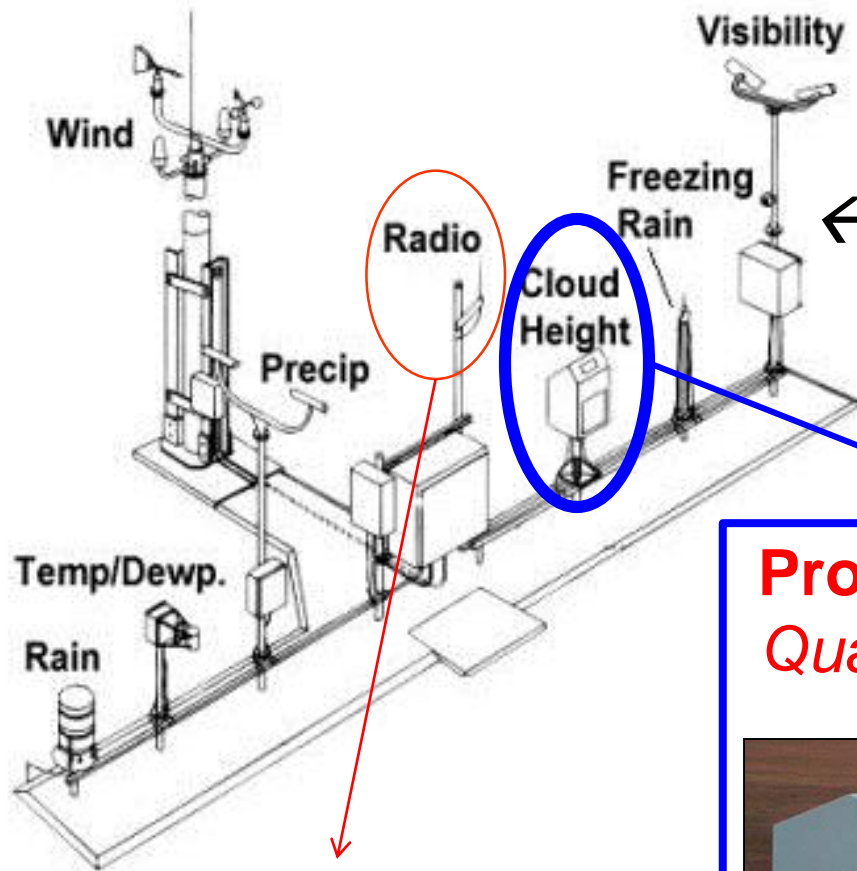
Questions answered are:

- What is available from the CL31?; Quality of the data?; How often?

- How would the data be saved without operational interference.

- List the available applications for backscatter data

- Describe the research that is underway or required

- List challenges for research-to-operations (RTO)

- Chart a course of action to achieve goals

ASOS Ceilometer Sites

NATIONAL WEATHER SERVICE
ASOS SITES

ASOS AGENCY
- NWS
- FAA
- FAA Expansion
- NAVY
- USAF

MARCH 2006   MIRS GIS GROUP

ASOS (instrumentation/Issues)

← *Each ASOS*

NATIONAL WEATHER SERVICE
ASOS SITES

Wind
Radio
Precip
Temp/Dewp.
Rain
Cloud Height
Freezing Rain
Visibility

Problem-1:
Quality of the lidars

CT12K   CL31

Problem-2:
Limited bandwidth transmission to main frame ASOS computer

Problem-3:
- *Inertia*
- *"Operational"!*

First steps: Science
- Limited network of Ceilometer: ***Baltimore-Washington-area-Network***
- CL31 vs CT12 Vs CL51 vs Lufft: ***An example of comparative data***
- CL31 data statistics: ***Cloud base above 12000 ft needs to be reported***
- **PBL study***: *PBL from CL31: Mult-algorithm comparison***

NWS – stands for National Weather Service
- Timing of frontal passage: ***Example: Is it wave or front?***
- Night time convection: ***PECAN experiment [Elevated storm]***
- Low level jet evolution: ***Case of August 2007***

More on Air Quality Applications
- PM-studies: ***Scaling Satellite-measured AOD and PM-Correlations***
- Fire and Air quality: ***The case of 9-10 June 2015***
- Volcanic ash monitoring: ***How could ASOS help?***

Operational Steps needed

ASOS CL31 Data Polling at NWS - Sterling, VA

Step 1: Collect and evaluate COTS ceilometer's profile data in a local network [***Completed***].

Step 2: Evaluate methods of Polling ASOS ceilometers for profile data without interfering with ASOS functions

Ceilometer profiles at 1min resolution were collected for four months using a data logger

- – Polling on Class-II was utilizing the backup ceilometer
- – Polling on Class-I was utilizing the primary ceilometer

No interference observed that could be traced to the installation of the data logger on the ceilometer!

Milestones and Future

- **CL31 PBL Proof of Concept completed**
- **Management approval to proceed**
- **Data collection from ASOS demonstrated**
- **Case Studies Completed**
  - **PBL, PECAN, Fire etc, (severe storm) – demonstration network completed**

Completed

- More case study/data analysis
- Working on WMO Volcanic Ash expert team
- BAMS paper in draft

In Progress

- Algorithm Assessment/Testing in ASOS Operational Environment Complete (planned December 2017)
- Algorithm Incorporated into ASOS* (planned June 2018) * dependent upon ASOS ACU/DCP upgrade completion

Future