

1st GRUAN Implementation-Coordination Meeting (ICM-1)
Norman, Oklahoma, USA
2-4 March 2009

Item 4.1

Site report: Howard University – Beltsville, MD, USA

(Submitted by B. Demoz, D. Whiteman)

Summary and Purpose of Document

This document contains an overview of the measurement programme at the Howard University (Beltsville, MD, USA) site with respect to GRUAN requirements, and addresses the questions to be discussed in this session.

Howard University Beltsville Research Campus

B. Demoz, D. Whiteman

Acknowledgment:

Howard: D. Venable, E. Joseph

NASA : T. McGee, B. Gentry, F. Schmidlin

NWS: J. Facundo; J. Fitzgibbon, C. Bower, J. Ashby, R Ryan

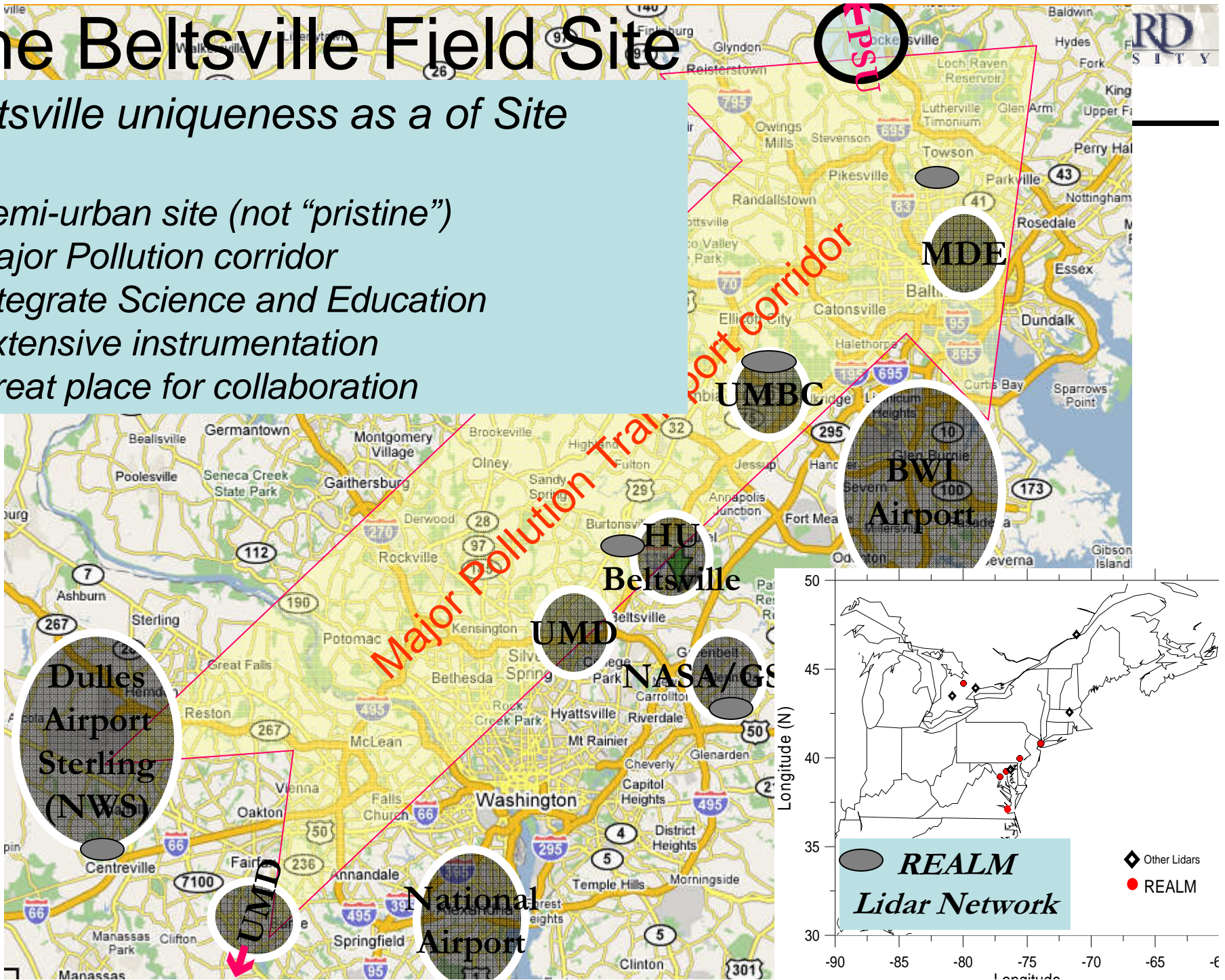
NCAR (L. Miloshevich)

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The Beltsville Field Site

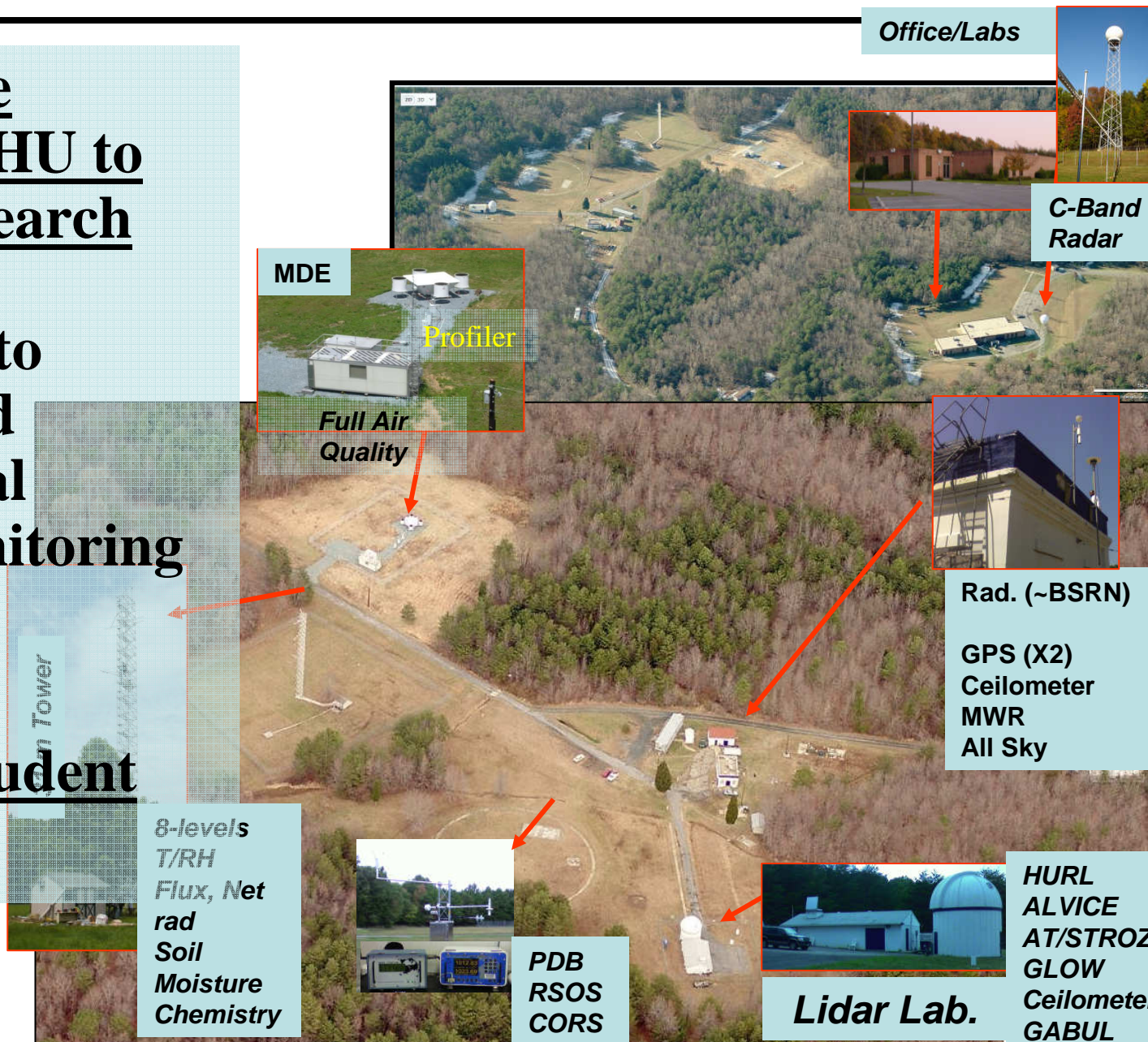
Beltsville uniqueness as a of Site

- *Semi-urban site (not “pristine”)*
- *Major Pollution corridor*
- *Integrate Science and Education*
- *Extensive instrumentation*
- *Great place for collaboration*



Broad Goals

- Enhance the capacity of HU to conduct research
- Contribute to national and international climate monitoring activities
- hands-on student training



GRUAN: Priority 1

a) What is the site status with respect to the requirements outlined in GCOS-121 and GCOS-112 (priority 1 and 2)?

– Standard surface variables (*NIST traceable/NWS*)

- Temperature – *available (NWS) + redundancy*
- Humidity – *available + redundancy*
- Wind – *available + redundancy*

Development of pre-launch calibration box

– Balloon based observation of Wind

- Temp. Water vapor and wind
- **CFH, RS92, Modem**, *RRS (NWS), LMS/SW (NWS)*

– Ascent and Decent?

- YES: *Need clarification on usage from GRUAN.*

GRUAN: Priority 1

a) What is the site status with respect to the requirements outlined in GCOS-121 and GCOS-112 (priority 1 and 2)?

– 3-RH sensitivity regions?

– CFH

– *available + redundancy*

– RS92/MODEM/LMS

– *available + redundancy*

– *Requires clarity from GRUAN on the “regions” definitions.*

– “Redundancy” throughout the profile for T/RH.

- MWR profiler (T, RH); Sonde/RS92; Lidar (when needed)

– State-of-the-art:

- RS92, CFH, MWR-Profiler, Lidar (Wind/RH)
- *Requires clarity and agreement.*

GRUAN: Priority 1

a) What is the site status with respect to the requirements outlined in GCOS-121 and GCOS-112 (priority 1 and 2)?

– Pressure/GPS/radar height on balloons?

- RS92/Modem are GPS - **available + redundancy @ surface**
- **Accuracy is limited by manufacturer.**

– Ground-based GPS for IWP?

- NOAA-net GPS - **available**
- Suominet GPS - **available**

– Additional IWP

- MWR (2-channell) - **available**
- MWR (39-channell) - **available**

GRUAN: Priority 2

BSRN quality surface radiation instruments.	Available but need <u>“certification”</u> and we are working on platform issues
MWR based T and Moisture	Available
AERI:	<i>Not available</i>
LIDAR (Raman)	Available
Trace gas measurements	Available in collaboration with MDE and balloon/Ozone launch site.
Column aerosol measurements from Sunphotometer	<i>MFRSR + the site is 9-km (as the crow flies) at GSFC</i>

GCOS-121:

Needed at Initiation: (*Green* → *possible*)

1. 1 x weekly production radiosonde with the best technology currently available at the site
2. 1 x monthly radiosonde capable of capturing moisture signal in the UT/LS and all other priority 1 variables to the best level possible with current technology, launched together with weekly radiosonde; (*Cost may be a limiting factor*)

Desired:

1. ****Regular 00 and 12 LST** (as a preference over UTC) launches of a production radiosonde with best technology currently available;
2. Dual launches of sondes with highest quality humidity sensing capability in the UT/LS (flying the monthly radiosonde together with a second sonde capable of measuring water vapor in the UT/LS)
3. Periodic intercomparison of a large range of sonde types

**** Proximity to NWS/Sterling – can that be adequate?**

Data: procedures and use

b) Which guidelines/manuals do you use when taking measurements, if any?

Our guidelines/procedures are a combination of the following

- Adhere to manufacturers suggestions
- Best practice from NWS/Sterling and
- Beltsville has not been a part of an organized network and we have had latitude to experiment with what works best.

c) What is your data dissemination practice?

Since we have many collaborators (including NASA/NOAA), we have used the AVDC data base in the past. *No restrictions beyond 1-yr on who will use the data.*

Need/Clarification

2. What do you need from the Lead Centre / working group / secretariat?

- *Data storage – centralize!*

GCOS terms/definitions: *Need clarification on the following*

- *Ascent/Descent data collection*
- *Altitude “regions” definitions*
- *Clarity on def. of state-of-the-art*
- *Accuracy is limited by manufacturer (GPS/Wind).*
- *ATM capability and operation needs a lot of “care”*
- *Clarify procedures for operating CFH*

Update

3. Are there any scientific or organizational developments we should be aware of?

- WAVES-2006, 2007, 2008: A water vapor experiment
 - *Snow White, RS92, Lidar were compared*

- A new NASA/URC grant to help with GRUAN
 - *Will provide “seed” money for starting GRUAN*

- Lidar winds experiment:
 - *Comparison of aerosol and molecular wind lidars*

- N-WAVES 2009 (NDACC - Water Vapor Validation Experiments):
 - *Raman lidar UT/LS water vapor measurement technique development, testing and validation using CFH and corrected RS-92 radiosondes.*

- SurfTRHRef station: (*in collaboration with L. Miloshevich*)
 - *Development of a NIST traceable reference station for T/RH*

Beyond Initial GRUAN

- Accurate Temperature Measuring Sonde:
 - *In collaboration with Frank Schmidlin (NASA/GSFC) and NWS, we plan to develop and implement this technology at Beltsville in the future*
- Development of a Roaming Calibration:
 - *In collaboration with NASA/GSFC, UT/LS water vapor profiling from Raman lidar is being validated for use as mobile referencing within NDACC*
- Consensus referencing: (with J. Facundo of NOAA/NWS)
 - Assumption:
 - *No one technology is viewed as absolute truth*
 - *Each instrument contributes some “truth”*
 - *A suite of instruments are used to converge on a statistical and repeatable set of acceptable thresholds/truths*
- Satellite validation:
 - *Collaboration with NOAA/NASA/JPL/GSFC/AER.*