NCAR Earth System Laboratory
Atmospheric Chemistry Division (NESL/ACD)
Atmospheric Chemistry Instrumentation

Timeline

- **May 2011: NSF review Site Visit Team (SVT) report to NCAR Earth System Laboratory (NESL)**
- **February 2012: Community workshop**
- **October 2012: Implementation**

May 2011 NSF Review of NESL: SVT report

- Deployment of ACD atmos. chem. instruments is prominent scientific leadership activity. Well planned and executed and leveraged role of national center. Strong linkages between NESL model development and in situ measurements.

- Expressed a concern that decreased staff and resources threatens one of NCAR's core capabilities.

- NESL has an opportunity to reshape and reinvigorate the diverse suite of chemical measurements projects currently housed in ACD into a more vigorous and visible program that would enhance NESL's strategic planning and funding allocation processes.

NSF objectives for February 2012 workshop

- Prioritize among and within components
  - Challenging budget environment
  - Define the desired inventory
  - Rank: Dispensable ↔ Indispensable
  - Appropriateness for ***the*** national center vs. elsewhere
- Produce backbone of draft Implementation Plan
  - Annotated outline
  - Includes management plan
  - Consider timetable and review/revision schedule

Workshop participants

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University: 24
Federal agency (NSF, EPA, DOE, NASA, NOAA, NEON): 11
NCAR: 21
Total: 56

Captive audience after Feb 3 storm

Workshop General Recommendations

1. Prioritization based on scientific needs
2. No consensus on activities to eliminate
3. Focus on scientific capabilities rather than facility
4. Maintain world-class scientists: people are valued by the community – more than the instruments.
5. Need flexibility: added bureaucracy for ACD collaborations/resources is not desired.
6. Annual meeting: scientific priorities, initiate community studies, training, working groups
7. Communicate importance/accomplishments.

Workshop Prioritization: Maintain/strengthen activities in these 4 areas

1. World-class science that should be at a National Center: Emerging topics in atmos. chemistry.
2. Core measurements that should be at a National Center: highly accurate "routine" measurements that are critical for community field studies.
3. Instrument development and characterization facilities
4. Data management and integration with satellite/ modeling

Schedule for Implementation Plan

- **Draft IP complete – *mid-April***
- **Community review – *to end of May***
- **Revised Draft IP – *end of June***
- **Review by NCAR Mgmt & NSF – *end of July***
- **IP goes public – *end of August***
- **Implement for FY2013 (October 1, 2012)**

- **"Living" document**
  - **Review/revision schedule**

Draft Implementation Plan

Section 1: Overview: What is it? What will it do?

Section 2: Working group descriptions

- **Emerging topics in Atmos. Chemistry**
- **Core measurements**
- **Instrument development and characterization**
- **Data Management and Integration**
- **Community Field Study Working Groups (as needed)**

Section 3: Implementation

Implementation Plan

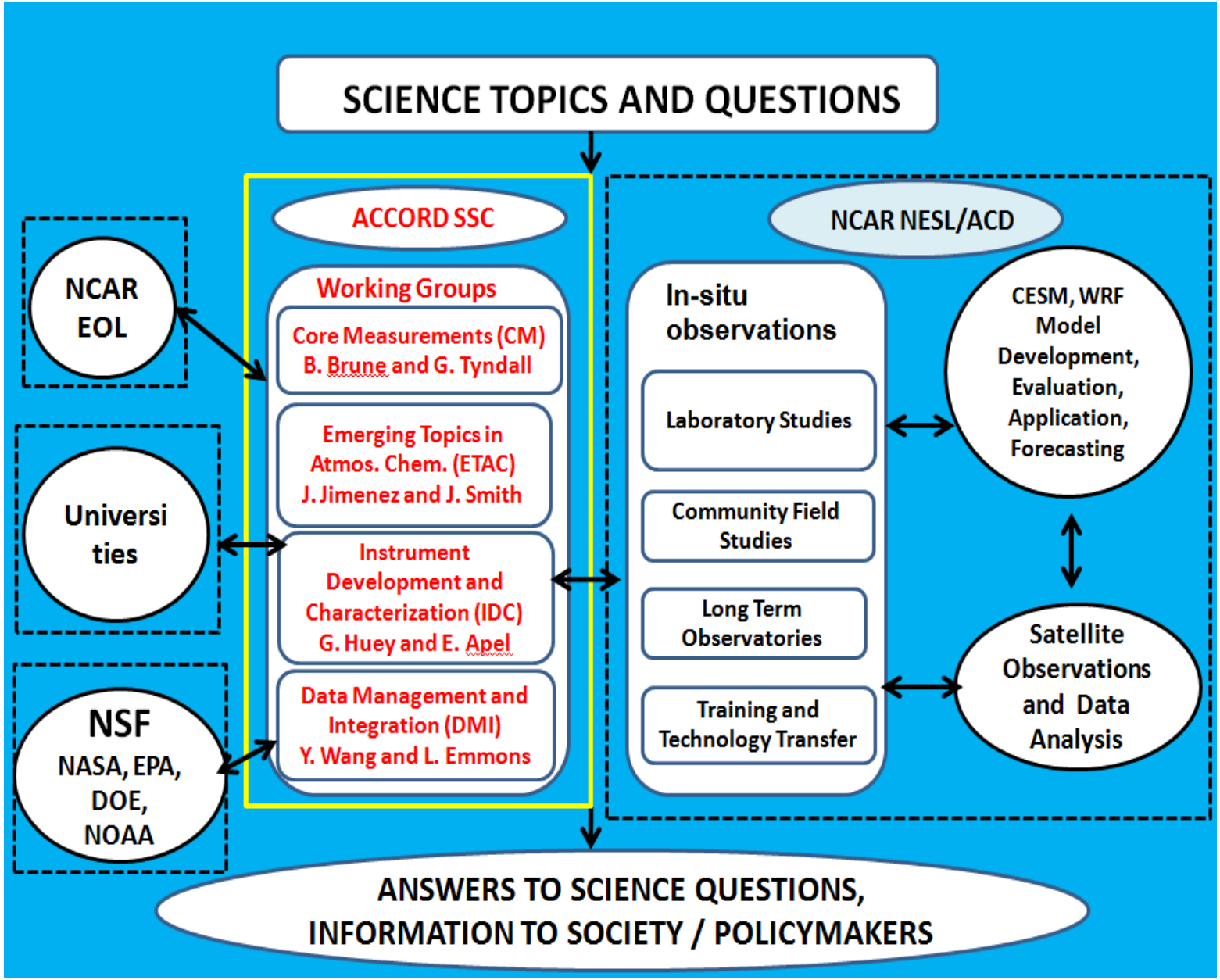
Goals

- foster the development of a strong and linked Atmospheric Chemistry community, that includes NCAR, the University community, and agency partners.

- provide an intellectual meeting ground for the discussion and prioritization of scientific problems, and for the development of community-wide capabilities to address these problems.

- provide vehicle for community guidance into the prioritization of the instruments and facilities maintained and developed within NESL/ACD.

Atmospheric Chemistry Center for Observational Research and Data (ACCORD)



Emerging Topics in Atmos. Chemistry (ETAC) Working Group

Goals

- Identify emerging topics in atmospheric chemistry
- Determine availability of the necessary observational tools
- Facilitate the development of a community research program that addresses specific scientific questions

Initial focus will be on Atmospheric Organics: biogenic and anthropogenic organic emissions, secondary organic aerosol formation, aerosol-cloud interactions

- Requires multidisciplinary expertise (biology, chemistry, hydrology, meteorology, …)
- Chemistry is extremely complex with gas, liquid and particle phase processes, thousands of chemical species, many of them unknown or unmeasured
- Need observations and models working closely together

Core Measurements (CM) working group

Select group of instruments (11) supported for field campaigns through LAOF deployment pool

Name	Measurement	Aircraft	PI
HARP-HAIS	Actinic flux and irradiance	G-V, C-130	Hall
TOGA	Volatile Organic Compounds	G-V, C-130	Apel
2ch-CLD	NO/NO2 or NO/NOy	G-V, C-130	Weinheimer
4ch-CLD	NO/NOx/NOy/O3	C-130	Weinheimer
FO3-CLD	Fast Ozone	G-V, C-130	Campos/Flocke
OPLH	H2O	G-V, C-130	Campos/Flocke
Picarro CRDS	CO2 and methane	G-V, C-130	Campos/Flocke
Aerolaser VUVF	CO	G-V, C-130	Campos/Flocke
SMPS	Particle number and size distributions	G-V	Smith

EOL and NESL/ACD partnership

Core Measurements (CM) working group

Objectives

- Advise on the suite of CM instruments including new CM instrument development and replacement of current instruments.
- Determine suitability of the level of support for effective upkeep and deployment of the CM instrumentation and the overall workload and efficiency of the CM instrument personnel.
- Identify similar instrumentation in the community and discuss whether to propose that (certain) university-based measurements be made requestable.
- Promote the participation of University students and faculty members in projects involving CM instrumentation.

Instrument Development and Characterization (IDC) working group

Objectives

- Determine which atmospheric chemistry community instruments require assessment and validation through inter-calibrations and inter-comparisons in order for them to be "trusted".
- Serve as a resource for determining the best course of action for the inter-calibration of instruments and provide access to high quality calibration standards
- Determine if NESL/ACD instrument development capabilities should be enhanced and if so, which capabilities should this include
- Facilitate community access to ACD engineering services

Data Management and Integration (DMI) Working Group

Objectives

- Develop a data portal and archive and explore ways to make them known to the meteorological and climate modeling communities.
- Connect ACCORD observational scientists with the modeling and satellite groups of NESL/ACD and the broader community
- Improve procedures for combining in situ with satellite observations for model evaluation and improvement.
- Collaborate with community-wide activities to exploit the available observations.

Community Field Study Working Groups

Objectives

- initiate working groups to facilitate the development of specific community field studies.
- bring forward and develop ideas that can be evaluated with regard to addressable scientific questions as well as logistical issues and plans for data access and archiving.
- Identify gaps in instrumentation and expertise and connect working group organizers with these capabilities
- will remain active for only as long as is needed.

Implementation

- Leadership provided by a Scientific Steering Committee including NCAR and university members in equal numbers
- Annual meeting including plenary sessions for all groups and breakout sessions for individual working groups
- More frequent meetings of working groups during initial implementation period
- Establish mechanisms for prioritizing resources
- Develop metrics to evaluate activities
- Conduct Strengths, Weaknesses, Opportunities, and Threats analyses

Implementation: Working Groups

Working Group (WG)	University Co-leader	NESL/ACD Co-leader
Core Measurements	Bill Brune (Penn. State)	Geoff Tyndall
Emerging Topics in Atmospheric Chemistry	Jose Jimenez (U. Colorado)	Jim Smith
Instrument Development and Characterization	Greg Huey (Georgia Tech.)	Eric Apel
Data Management and Integration	Yuhang Wang (Georgia Tech.)	Louisa Emmons