1. Data Generators

2. Data Integrators

3. Air Quality Information Systems
   Using machine learning and AI to combine:
   - Observational data
   - Satellite data
   - Modeled outputs
   Other data (traffic, weather, health etc)

4. Air Quality Information Outputs
   Web and mobile applications
   (often part of weather packages)
Communications summit with key conveyors of air quality data (state and local agencies, federal partners, private sector) to discuss the increasing amount of “conflicting” information being shared by various public and private entities.
Confusion exists because data is being generated for different purposes, needs, and users.

- Strong desire to be more aligned in messaging air quality to the public.
- Companies are developing global solutions.
- Demand from consumers for trusted, real-time, localized, actionable information.
  - Resulting in what look like “EPA AQIs”.
- Standardized terminology desired (e.g. current conditions, real-time air quality, air quality alert, air quality action day).
- Need for transparency in the “source” of the data including uncertainty in the output.
- Include more people in the conversation.
Data Quality

- Current Work
  - EPA’s First Workshop on Deliberating Non-Regulatory Performance Targets for PM$_{2.5}$ & O$_3$
    - June 2018 workshop completed*
    - September 2018 literature review publication*
    - April 2019 journal publication of workshop discussions*
    - Developing ORD EPA interim report with performance targets, evaluation protocols, and best practices for sensors
  - EPA’s Second Workshop on Deliberating Performance Targets for Air Sensors
    - July 2019 workshop on additional pollutants - NO$_2$, SO$_2$, CO, and PM$_{10}$
    - Developing ORD EPA interim report with performance targets, evaluation protocols, and best practices for sensors
  - Coordinating public/private partnership in evaluation of sensors

*https://www.epa.gov/air-research/deliberating-performance-targets-air-quality-sensors-workshop
SME debate – should the performance target and test protocol focus on…

• The OEM sensing component?

• An offline device?

• A device with online connectivity?

• A network of sensor devices?

…and what would be the test protocol implications?
Emerging Evaluation Complexities

- “Learned environment” prior to evaluation
- Temperature and relative humidity assumptions
- Algorithm adjustments during and after testing
- Hacking online sensor networks
- Operation and maintenance of consumer devices
- Real-time data versus published health studies over longer time periods
- Ownership
- Who is verifying assertions or outputs?
Other Sensors Projects

- EPA developing outreach materials (e.g. short video clips, FAQs, and factsheets) to promote understanding of regulatory vs. sensor data – Late 2019 release
- Responding to requests from Local, State, or Tribal agencies to submit sensor data to EPA
- Facilitating responses to public inquiries on why AirNow conditions differ from weather applications on smartphones
- Examining data algorithm adjustments and assumptions, including published verification of claims
- Intensive study of air quality websites in late summer 2019
THANK YOU