Strategies for global coverage and applications:

1. Network objectives.

The objectives for establishing a global ground based network (to be filled in by Len B from WMO existing documents ? WMO 142 section 5.6).

Issues identified as important by the working group included:

- long-term trends, from regionally-representative sites
- a need to cover different aerosol regimes
- climate studies
- provision of data sets for model validation, independent of satellite measurements
- satellite validation
- regional air quality modeling
- night-time measurements

enhancement of the value of lidar measurements

2. Status of global long-term networks

The working group discussed the current status of existing global networks. The GAW strategic vision is a for long-term (multi-decadal) and globally distributed AOD network. The criteria adopted by the working group for including existing stations as being long-term is that they have a continuous record for the past 4 years with a coverage of 75% of available sunlight hours. A substantial fraction of existing networks satisfy these criteria, and are included in Figure 1 (to be included in final report, also to be included as an Appendix which gives locations). The identified national and international networks that comply with these criteria are

a) international

AERONET, including AEROCAN, PHOTONS

BSRN

GAW-PFR

Skynet

b) national (alphabetically)

- US networks including ARM, SURFRAD, CMDL, USDA
- Australia BOM
- JMA
- China
- KNMI (Netherlands, Surinam)
- FMI
- DWD Germany

Further criteria for accepting data relate including meeting DQOs (automated operation, etc) were discussed by the second working group (see -----)

3. Where are the gaps and how can they be filled?

The working group identified several types of gaps.

- *A) spatial gaps*

Regions that the working group considered to have insufficient coverage included:

- Russian Arctic
- south China
- Africa
- India
- Middle East

- SE Asia
- Oceans (potentially "fillable" by ship-based monitoring but must document methods, also use selected coastal locations to monitor)

b) Operational gaps

missing collocation
temporal gaps (night, polar night, instrument downtime)
ancillary measurements e.g.:
column measurements of gas species affecting AOD
aerosol properties (chemistry, microphysics, optical properties)
vertical profiles
meteorology
radiation budget
reporting of measures of data quality with data

c) user related gaps

need one-stop shopping
An inventory of potential user communities and their requirements. Daedalus has done one inventory (de Leeuw, Boucher), Len B to contact, also contact Hal Maring to determine if NASA has evaluated requirements of AOD data users)

- Data management/analysis tools
- need linkages between archives for different species and ancillary data

d) historical data. There may be value in considering some specific historical multi-decadal records, however the data quality would need to be considered before including these data into a historical archive. Data quality indicators would need to accompany these data. Some original data may need to be digitized

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Some gaps are clearly research topics, others could be filled with adequate funding.

4. Overlapping sites

There was wide agreement that all networks should have a minimum of one site that is collocated with another network. The working group decided that a complete list of overlapping sites was required. An initial list will be included as an Appendix in the final report.
New methodologies need to be compared with existing instruments/networks
Short-term intercomparisons and traveling standards may add value to overlapping sites.

5. Coordination of existing global AOD networks

There was wide agreement that current international coordination of the global AOD networks was inadequate. After considerable discussion the preferred option was for a federation of diverse networks, coordinated under the WMO/GAW umbrella. Endorsement by ICSU would substantially assist some networks that currently are not affiliated with the WMO/GAW family. The meeting also agreed that such coordination should be brought about by establishing a standing sub-committee of WMO/GAW Aerosol SAG, consisting of expert representatives from the networks. Some of the initial tasks for this group would include:

development of a data policy agreements for federation (noting that some WMO policy already exists for use of data in WDCA)
development of technical standards for the federated network

development of the strategy for filling gaps in the spatial coverage

6. **Coordination of data archives**
The meeting agreed that a major benefit of a federated network will be in facilitating end-user access to multiple network archives. Issues to be discussed include

- dynamic linking
- Protection of intellectual property
- Timeliness of data supply and data embargoes

7. AOD and lidar coordination
The meeting identified the need for an inventory of sites with both AOD and lidar measurements. These sites need to be operated on a fixed schedule. The working group recognized that the point of contact with the lidar community is Dr. Boesenberg, who is the committee chairman on lidar networks of the International Coordination Group on Laser Atmospheric Studies of the International Radiation Commission

8. **Real-time data access (emerging issue)**
Current forecast models addressing issues such as biomass burning, dust, urban air quality could use AOD as an input. One requirement is that data are available on the order of 3 hrs after measurement. The precise requirements of the modeling community need to be established. A number of operational issues will need to be addressed, these include:

cloud screening
the preliminary nature of rapid access data
data communication

9. Criteria for accepting stations
A final list of criteria for accepting networks into the federated network needs to be prepared by the GAW Aerosol SAG AOD committee. These should included

long-term commitment
acceptable DQO's Data Quality Objectives
demonstrated capability for attaining DQO's

Acceptable types of measurement techniques will also need to be finalized. This could include...

- automated, direct sun photometer
- shadowband radiometer
- stellar photometer (spectral transmissometer)
- sun/sky radiometer.
- exclude manual instrumentation
- define acceptable width of spectral bands
- exclude broadband
- (see working group 2 report)

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