Strategic Implementation Team Actions
SITTWS- 2017-18

The AC-VC to produce a position paper on OSSE capabilities that could efficiently enable joint AQ/GHG satellite constellation studies. CEOS agencies to coordinate existing AQ and GHG OSSE capabilities that could be used to fulfill this goal.

Rationale: International objectives for both AQ and GHG observations could be achieved more effectively through coordinated planning, and agencies should be encouraged to coordinate existing AQ and GHG Observing System Simulation Experiment (OSSE) capabilities to efficiently enable joint AQ/GHG satellite constellation studies.

Objective

- Develop a coordinated CEOS-AC-GHG-VC OSSE that will enable quantification of
  - Aerosols, Greenhouse and Reactive Gases co-benefits for societal benefits and scientific advancement
  - observational impact of near-term and potential satellite missions within the context of the virtual constellation

Implementation

- Integrate "bottom-up" historic and future decadal-scale trajectories of reactive and passive trace gas and aerosol emissions consistent with anthropogenic processes.

- Integrate "bottom-up" surface-atmospheric exchange of carbon and reactive biogenic fluxes consistent with biogeochemical processes.

- Produce a collection of high-resolution global "nature" runs at time slices that sample trajectories with natural variability.
  - Ensemble should draw from different models, e.g., IFS, GEOS, to account for differences in transport, chemistry, and biogeochemical assumptions.

- Sample nature fields at CEOS-VC geo-locations and apply observations operators representing either simulated radiances and/or and retrieved geophysical parameters with rigorous characterization of observation errors.

Analysis

- Retrieval/Assimilation Error Characterization:
  - Characterize errors in retrieval algorithms against theoretical estimates.
- Detection:
  - Assess whether a given CEOS-VC simulated observables can distinguish between trajectories
  - Assess change in detectability for potential satellites.
  - Assess sectoral detection from multiple species
- Attribution:
  - Quantify fluxes from CEOS-VC using multiple species
  - Disaggregate sectoral drivers of carbon emissions from multiple species