AQRP Monthly Technical Report

PROJECT TITLE	Source-sector NOx emissions analysis with sub-kilometer scale airborne observations in Houston during TRACER-AQ	**PROJECT #**	22-023
PROJECT PARTICIPANTS	George Washington University Ramboll	**DATE SUBMITTED**	11/9/2022
REPORTING PERIOD	**From:** October 1, 2022 **To:** October 31, 2022	**REPORT #**	3

A Financial Status Report (FSR) and Invoice will be submitted separately from each of the Project Participants reflecting charges for this Reporting Period. I understand that the FSR and Invoice are due to the AQRP by the 15th of the month following the reporting period shown above.

Detailed Accomplishments by Task for reporting period

Task 1: Simulate NO_2, HCHO, O_3 at 444 × 444 m^2 spatial resolution using WRF-CAMx
The WRF-CAMx 444 × 444 m^2 grid has been defined and WRF has been run for 5 days, for all of the domains (36, 12, 4, 1.333, and 0.444 km). It has been decided that WRF-CAMx will be run for the August 20, 2021 - September 27, 2021 timeframe to coincide with the TRACER-AQ measurements and provide adequate model spin-up.

Task 2. Process the GCAS measurements
Preliminary comparison between GCAS and Pandora NO_2 and HCHO in the TRACER-AQ domain has been completed. This is assuming the NASA GEOS-CF simulation *a priori* profiles. GCAS agrees with Pandora to within ± 21% for NO_2.

Task 3. Process the satellite NO_2 data
The satellite data has been processed to the WRF-CAMx grid.

Task 4. Calculating NO_X from NO_2 airshed measurements
Processing of the GCAS data for this analysis has begun.

Task 5. Comparison of NO_2, HCHO, O_3 between model, aircraft, and satellite
Task 5 has not yet been initiated.

Task 6. Use of machine learning to estimate emission factors for individual sectors
Task 6 has not yet been initiated.

Preliminary Analysis
None.

Data Collected
None.

Identify Any Problems or Issues Encountered and Proposed Solutions or Adjustments
Project approvals are occurring later than anticipated and we will adjust task schedules as needed.

Goals and Anticipated Issues for the Succeeding Reporting Period
Continue developing WRF-CAMx modeling platform by simulating meteorology for the entire modeling period and processing biogenic, line-source (on-road mobile, rail and shipping) and EGU emissions.

The GCAS measurements will be re-processed in two manners: 1.) to more explicitly account for missing data, and subsequently 2.) re-gridded to the WRF-CAMx grid.

Detailed Analysis of the Progress of the Task Order to Date
None.

Do you have any publications related to this project currently under development? If so, please provide a working title, and the journals you plan to submit to.

☐**Yes** ☒ **No**

Do you have any publications related to this project currently under review by a journal? If so, what is the working title and the journal name? Have you sent a copy of the article to your AQRP Project Manager and your TCEQ Liaison?

☐ **Yes** ☒ **No**

Do you have any bibliographic publications (ie: publications that cite the project) related to this project that have been published? If so, please list the reference information. List all items for the lifetime of the project.

☐ **Yes** ☒ **No**

Do you have any presentations related to this project currently under development? If so, please provide working title, and the conference you plan to present it (this does not include presentations for the AQRP Workshop).

☐ **Yes** ☒ **No**

Do you have any presentations related to this project that have been published? If so, please list reference information. List all items for the lifetime of the project.

☐ **Yes** ☒ **No**

Have any personnel changes occurred that were not listed in the original proposal? If so, please include a detailed description of the personnel change(s) below.

☐ **Yes** ☒ **No**

Are any delays expected in the progress of the research? If so, please include a detailed description of the potential delay below.

☐ **Yes** ☒ **No**

Describe any possible concerns/issues (technical or non-technical) that AQRP should be made aware of.
None.

Are you anticipating using all the available funds allocated to this project by the end date? If not, why and approximately what is the amount to be returned?

☒ **Yes** ☐ **No**

Submitted to AQRP by Daniel Goldberg

Principal Investigator Daniel Goldberg