Credit: Chelsea Thompson, NOAA

USOS Monthly Meeting #2

February 21, 2024

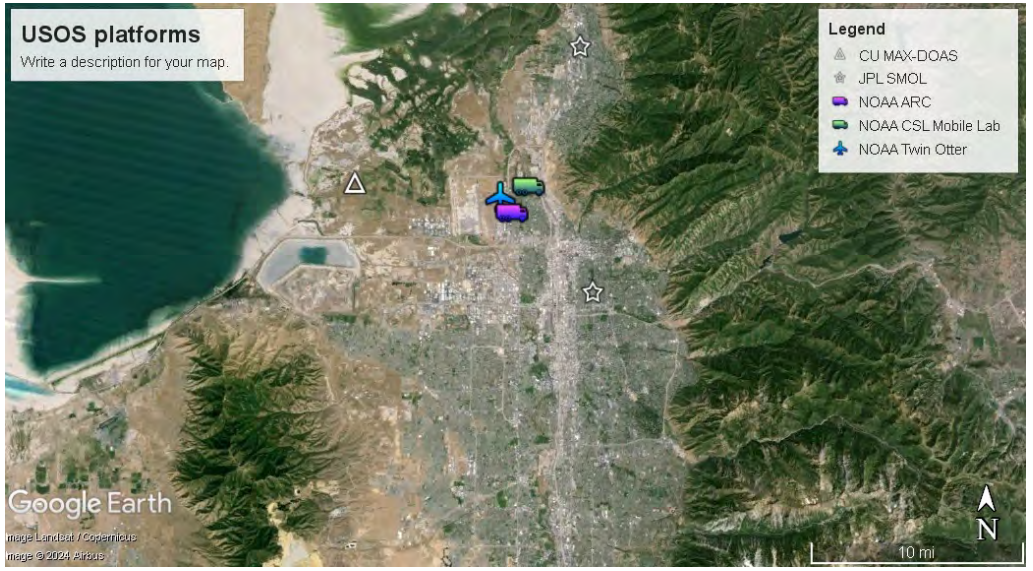
Next meeting: March 20, 1pm Mountain Time
To be added to email list: email caroline.womack@noaa.gov

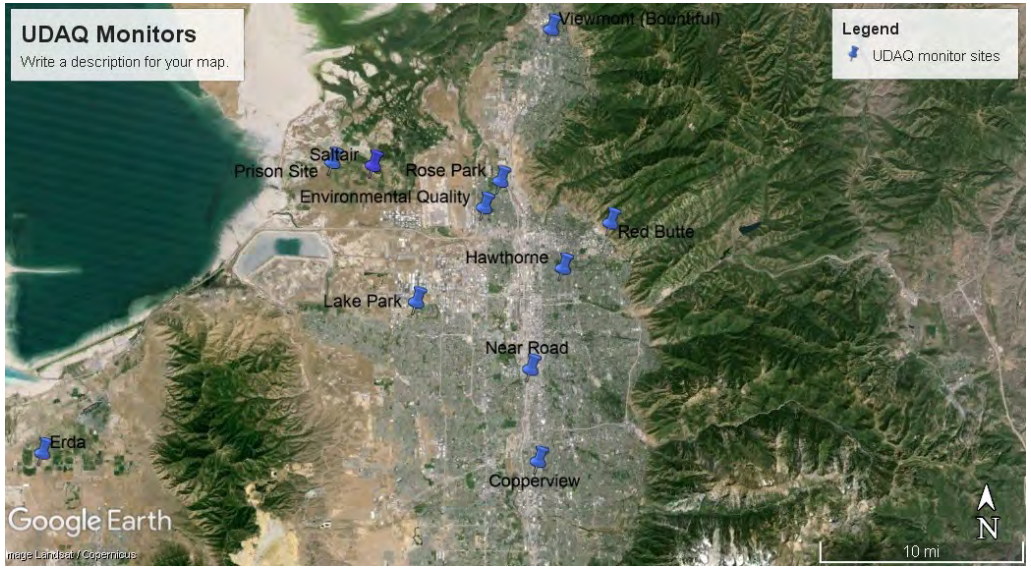
Agenda

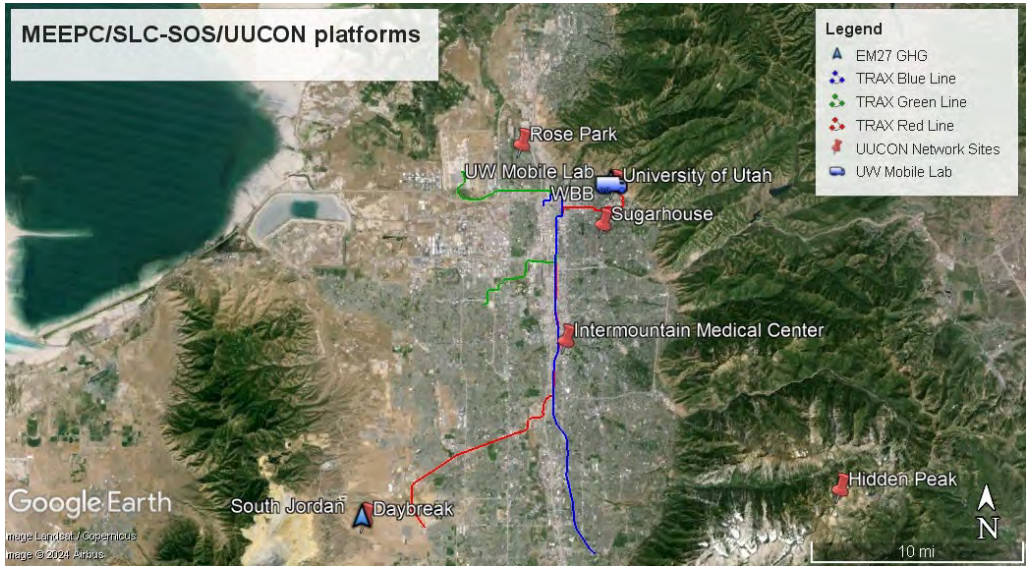
- Payload updates (5 min)
- MethaneAIR introduction from Jasna Pittman (10 min)
- Hotels and travel (5 min)
- Preliminary Twin Otter payload + flight planning (15 min)
- Preliminary Mobile Lab payload + drive planning (15 min)
- Open discussion (10 min)

Payload updates

- One JPL SMOL moving to Bountiful
- AMAX-DOAS *likely* added to aircraft
- MAX-DOAS *likely* to stay at Inland Port site
- .kmz files available!



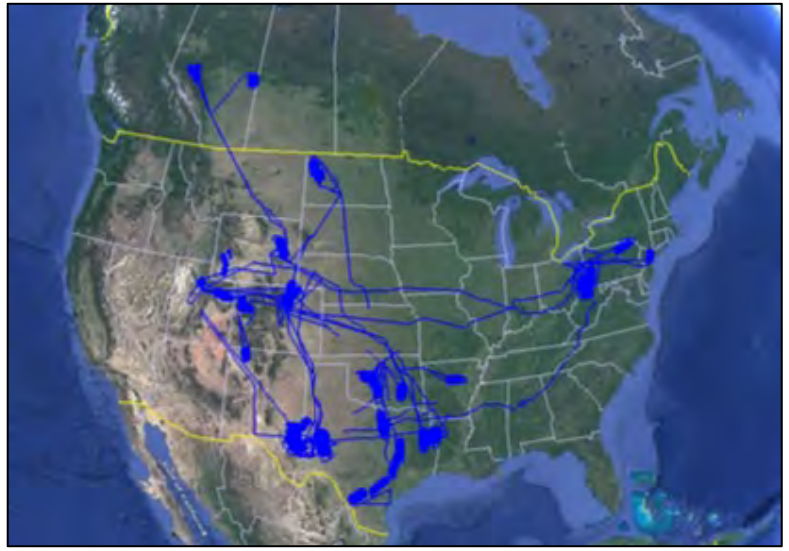




MethaneAIR

Wofsy, Cheimets, Sargent, Daube, Franklin, Samra, Hawthorne, Kostinek, Pittman, and the Data Processing Team

- Imaging spectrometers in the SWIR: 1.65 μm for CH_4 / 1.61 μm for CO_2; 1.21 μm for O_2 (Staebell et al., AMT, 2021)
- 4.5 km swath, maps ~10,000 km^2 per day
- 10m x 10m resolution
- 67 flights in 2023, 4 flights in 2022, 9 flights in 2021
- Sampled >80% of US onshore oil and gas production, along with landfill, agriculture, and coal targets, 2 flights in Canada



Lear-35a , June-Sep 2023

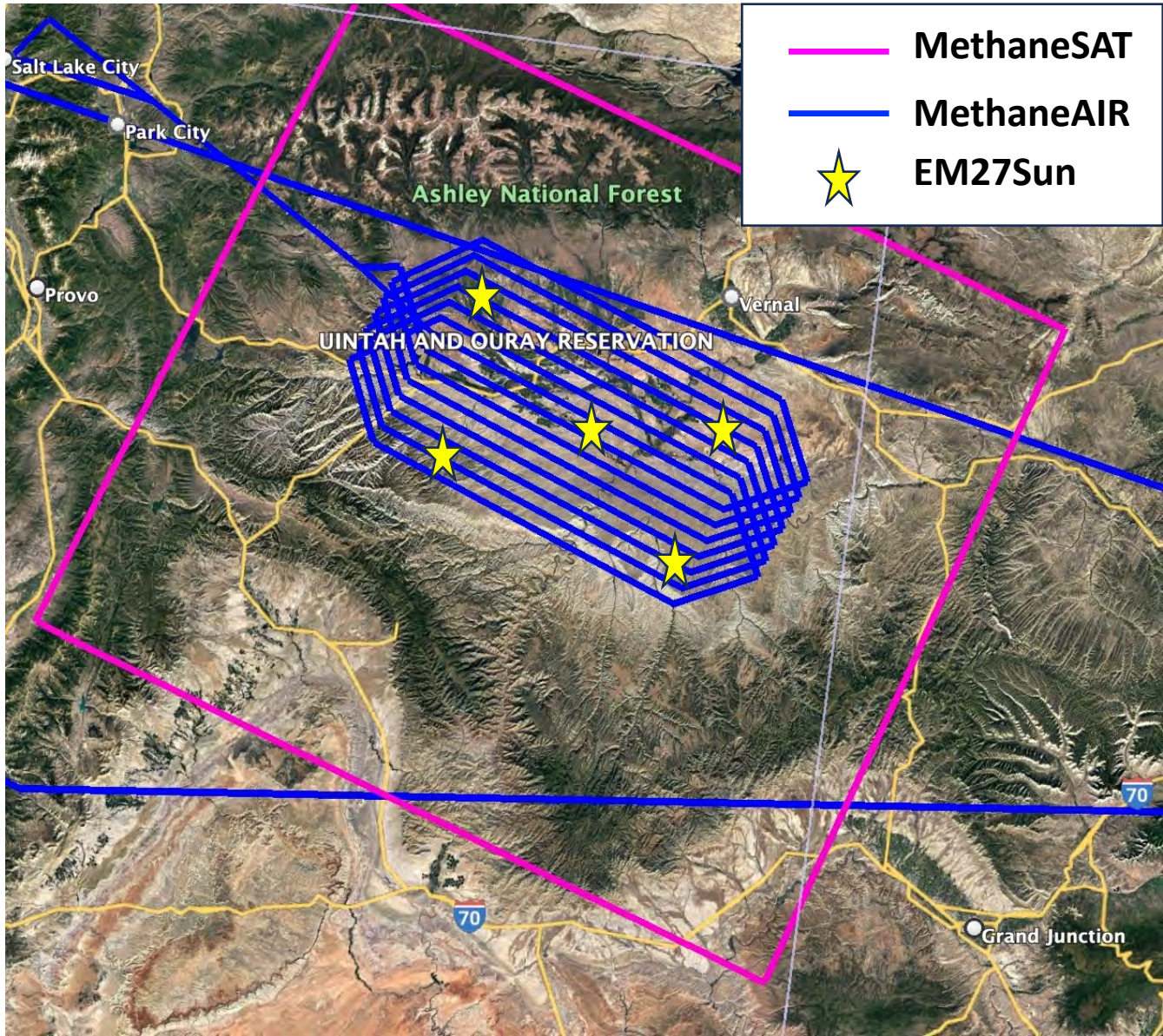
NSF G-V

IO-SYS/EDF Lear-35a

MethaneAIR Jul 20 - Aug 16, 2024: Benchmarking Top-Down Models of Emissions

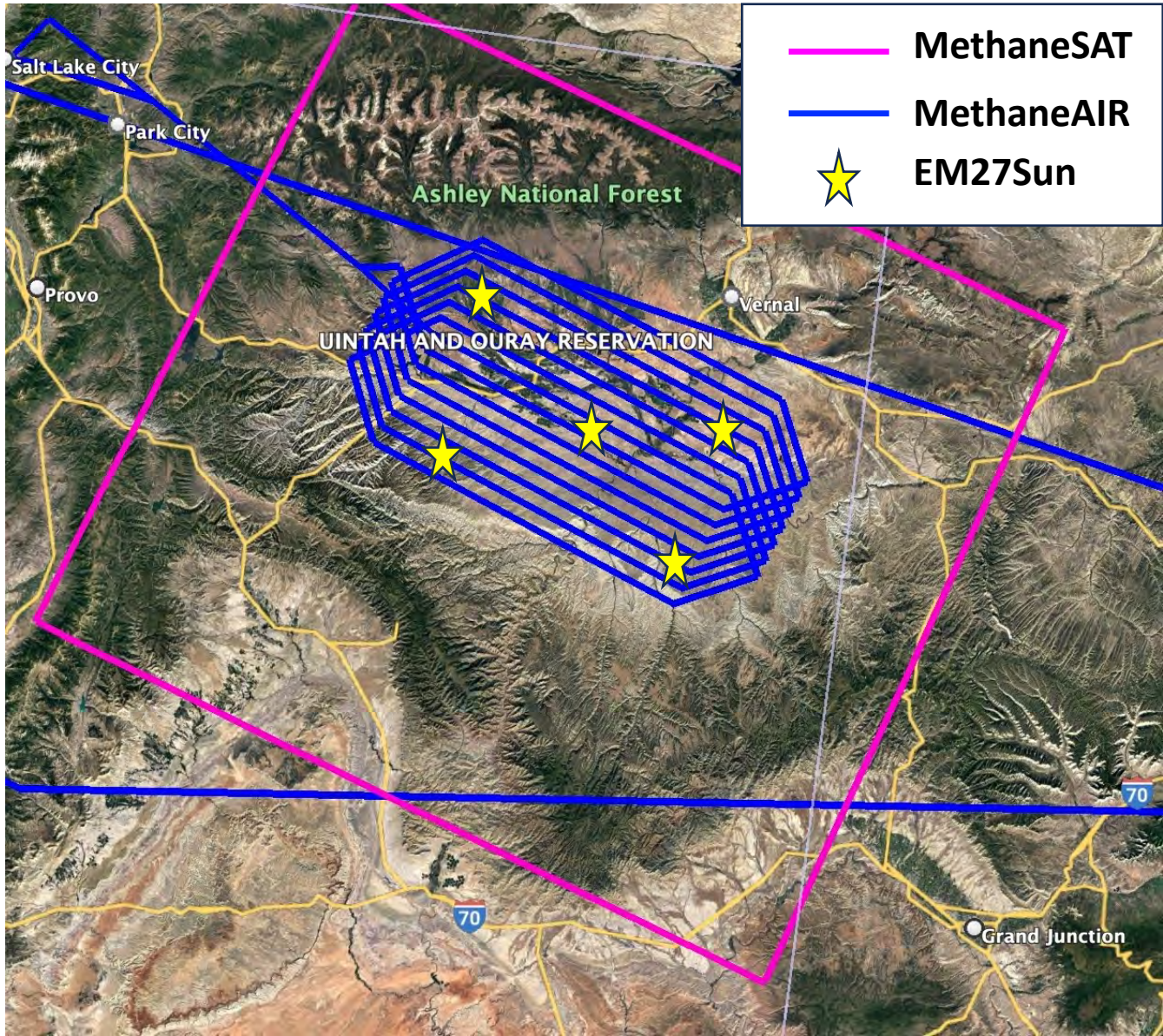
Goal: Provide rigorous test of "top down" regional area flux models

- There is currently no way to validate inverse models
- Designed to provide a way to tightly constrain inverse models by spatially and temporally resolving mass balances
- Create a high-resolution map of methane over several large (80 x 120 km) regions, oversampling in time spanning several days
- Make a "movie" of the total atmospheric burden of methane as it sets up and evolves over a 2-day period
- Repeat experiment twice at 2 sites (e.g. SLC, Uinta, Eagle Ford, Haynesville)



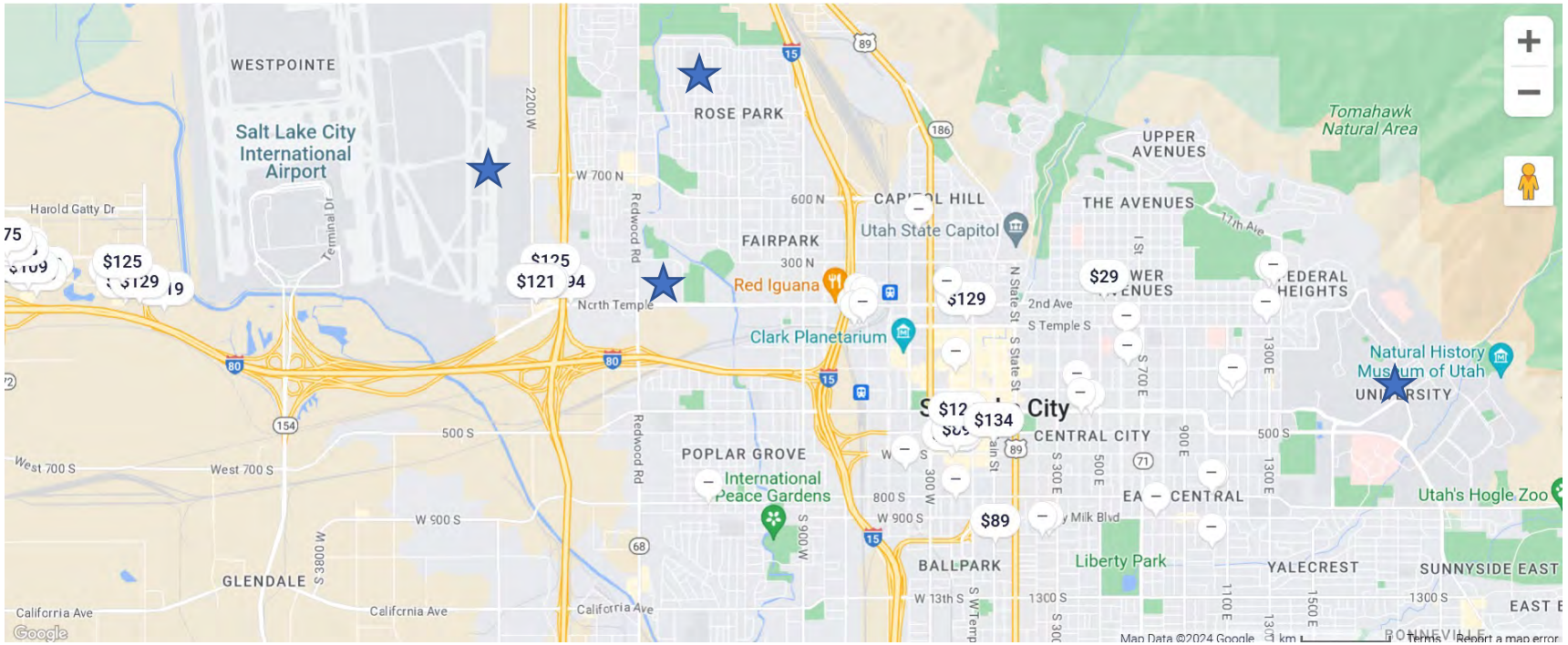
MethaneAIR Jul 20 - Aug 16, 2024: Benchmarking Top-Down Models of Emissions

- MethaneAIR on GV will fly two sorties covering target region (80 x 120 km) each day
- MethaneSAT will target same region (200 km x 200 km)
- A network of EM27Sun spectrometers distributed around study area for additional ground truth and temporal variability
- Aiming for at least 2 consecutive days of measurements in SLC, 3 maps of SLC/day
- Extensive ground CH_4 data and wind profiles in SLC will be invaluable in testing models



Logistics: Hotels in SLC

Gov’t per diem: $139/night



CSL: ~10 people (1/3 feds?)
ARL: ~4 people (Airbnb)
JPL: 2 people for setup only?
CU: 2 people for setup only?
CSU/UW: 5 people?

→ Bottom line: No hotel block, unless people request that I set one up. Consider booking soon!
→ NOAA folks: Stay tuned for updated travel schedule discussion

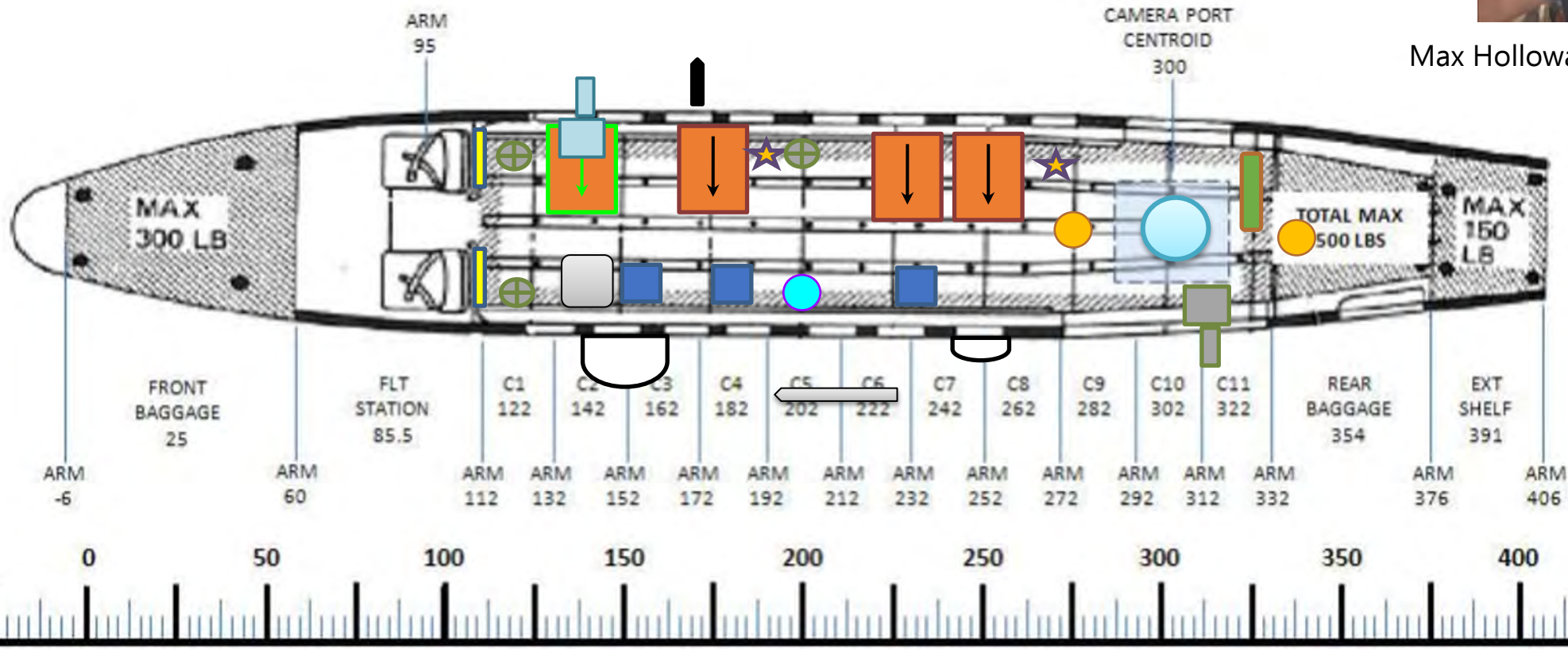
Modified OSUS Configuration FY24

(Please review/edit/provide input as needed!)

Max Holloway, CIRES/CSL

LEGEND

- Single Seat
- Table
- Monitor (27" Vertical)
- Bubble Window
- AC Power strip
- Bulkhead seat
- Side Facing 504 Rack
- Side Facing 503 Rack
- Doppler LIDAR/ Side Scanner
- Up-looking radiometer
- Downlooking camera package
- GPS Drop
- Chem Inlets
- AIMMS Probe
- Down-looking radiometer
- Size 50 Gas Cylinder
- MAX DOAS

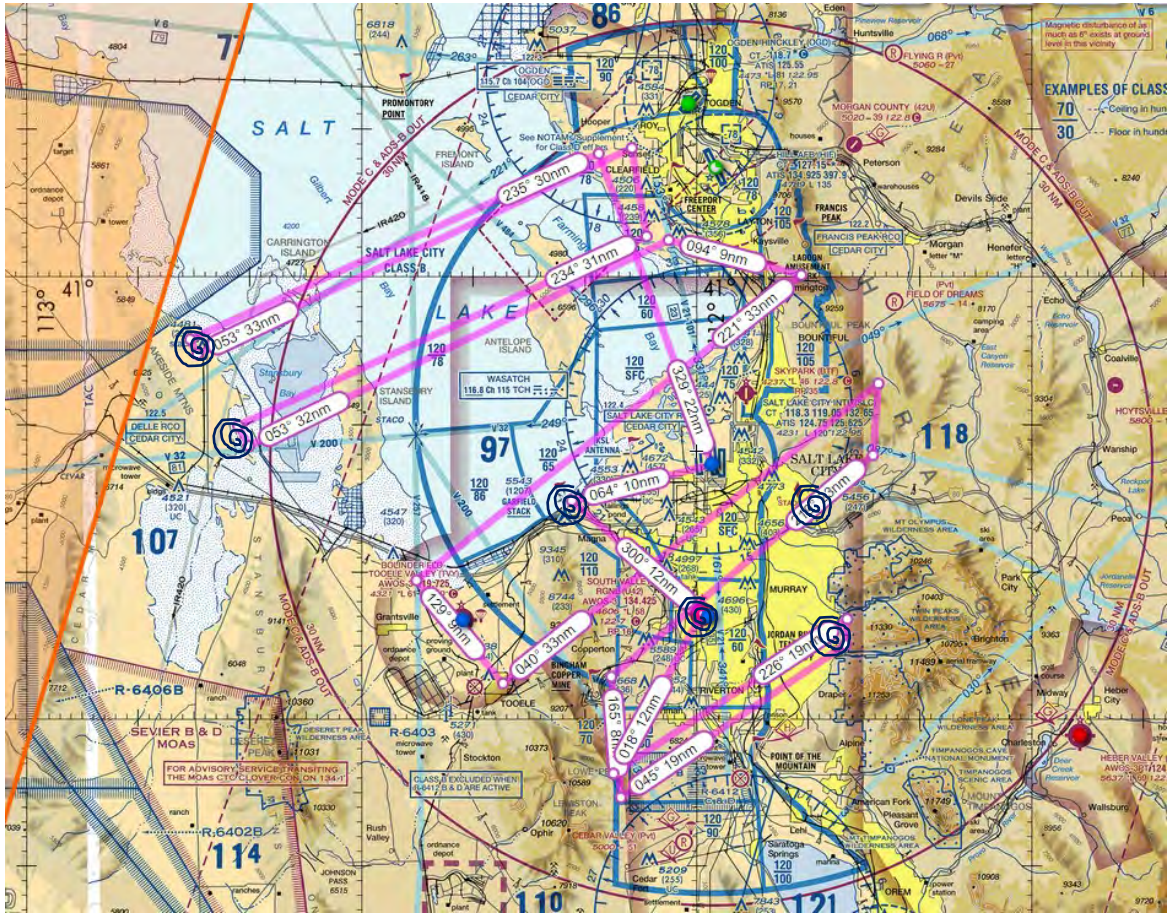


USOS Flight Plan # 1

Objectives:
- Lake Breeze
- Urban Emission/Transport
- TEMPO validation

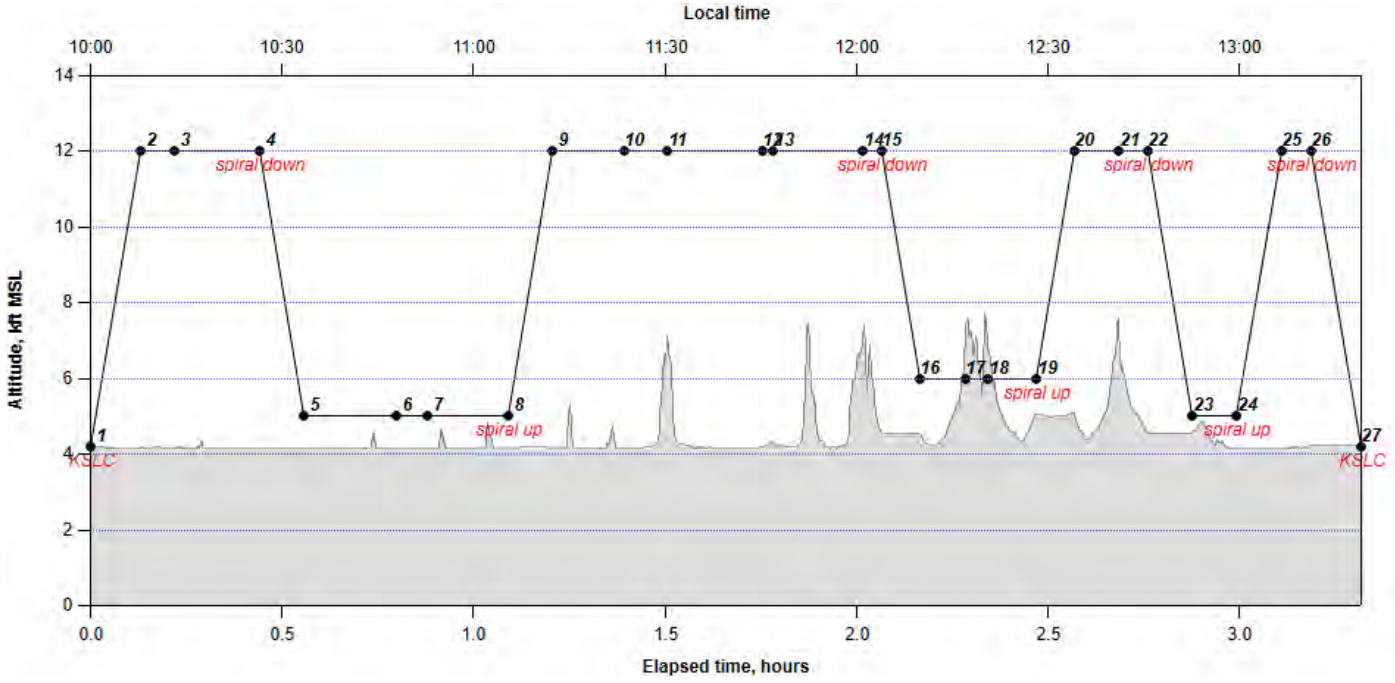
Altitudes:
Above BL: 12000 ft
Inside BL: 300-500 ft AGL over water,
1000 – 1500 ft AGL over land

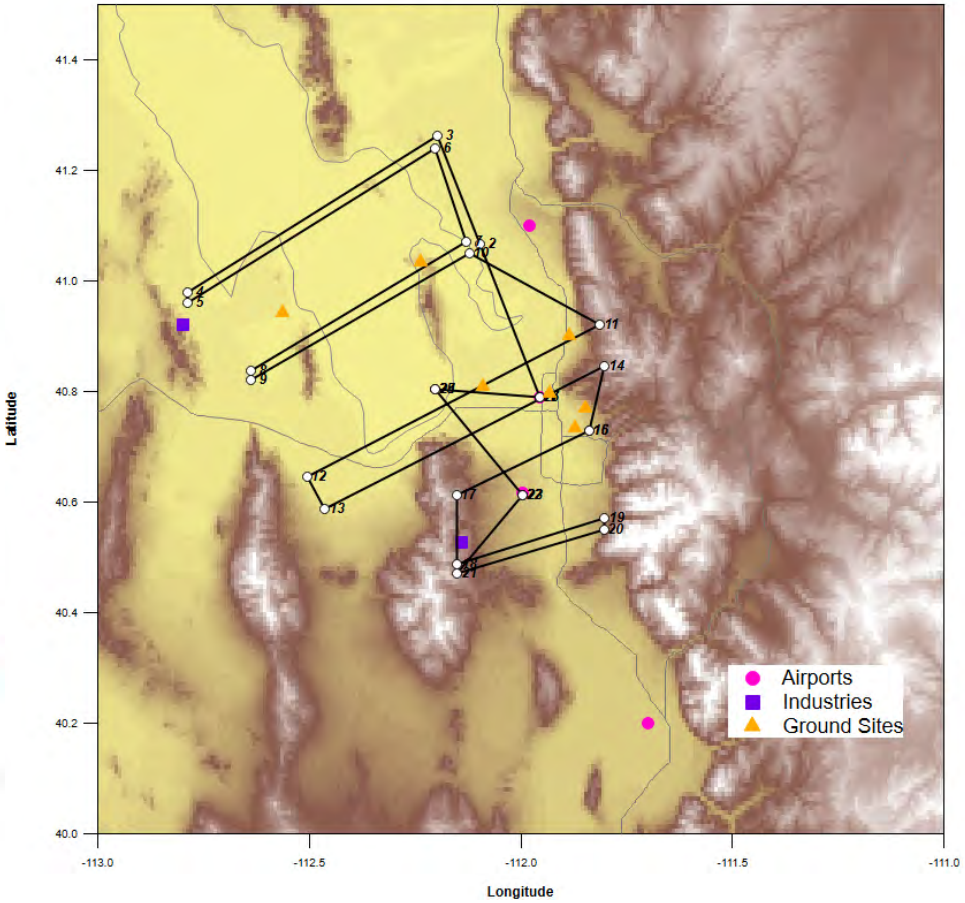
Profiles:
- US Magnesium
- U of Utah
- GSL Coast
- South Valley Regional Airport



Spiral

USOS Flight Plan # 1





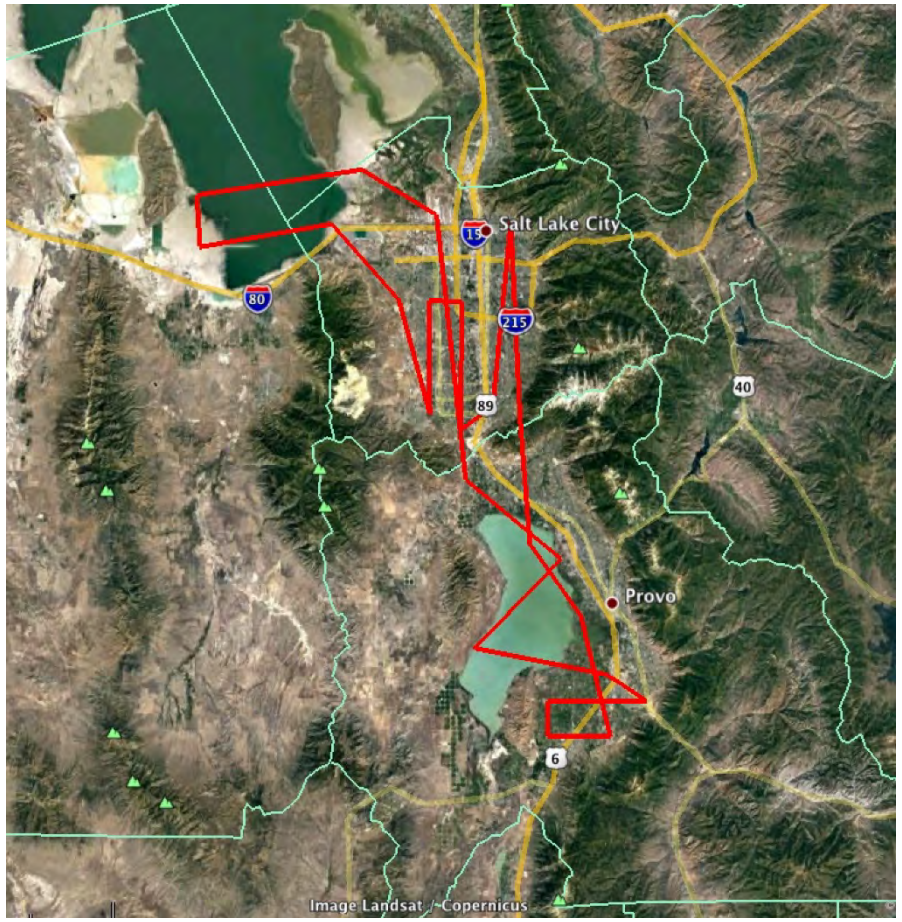
USOS Flight Plan # 1

- Extend the legs to Tooele Valley?
- Too many profiles?

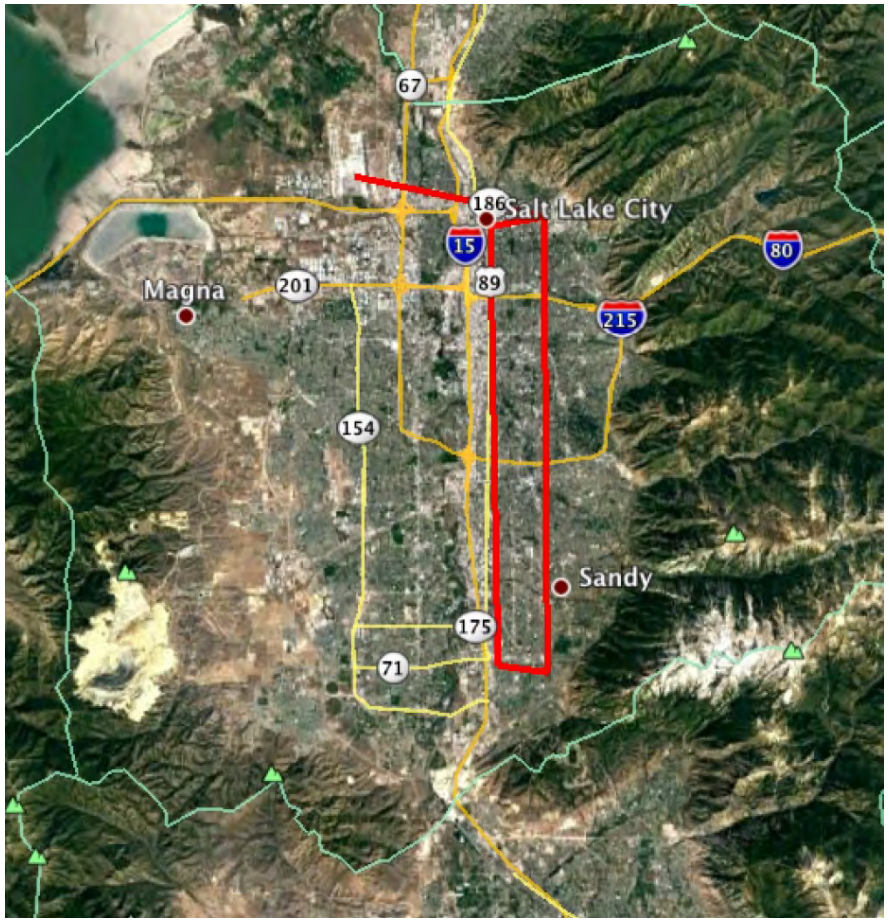
UWFPS 2017

Cache Valley

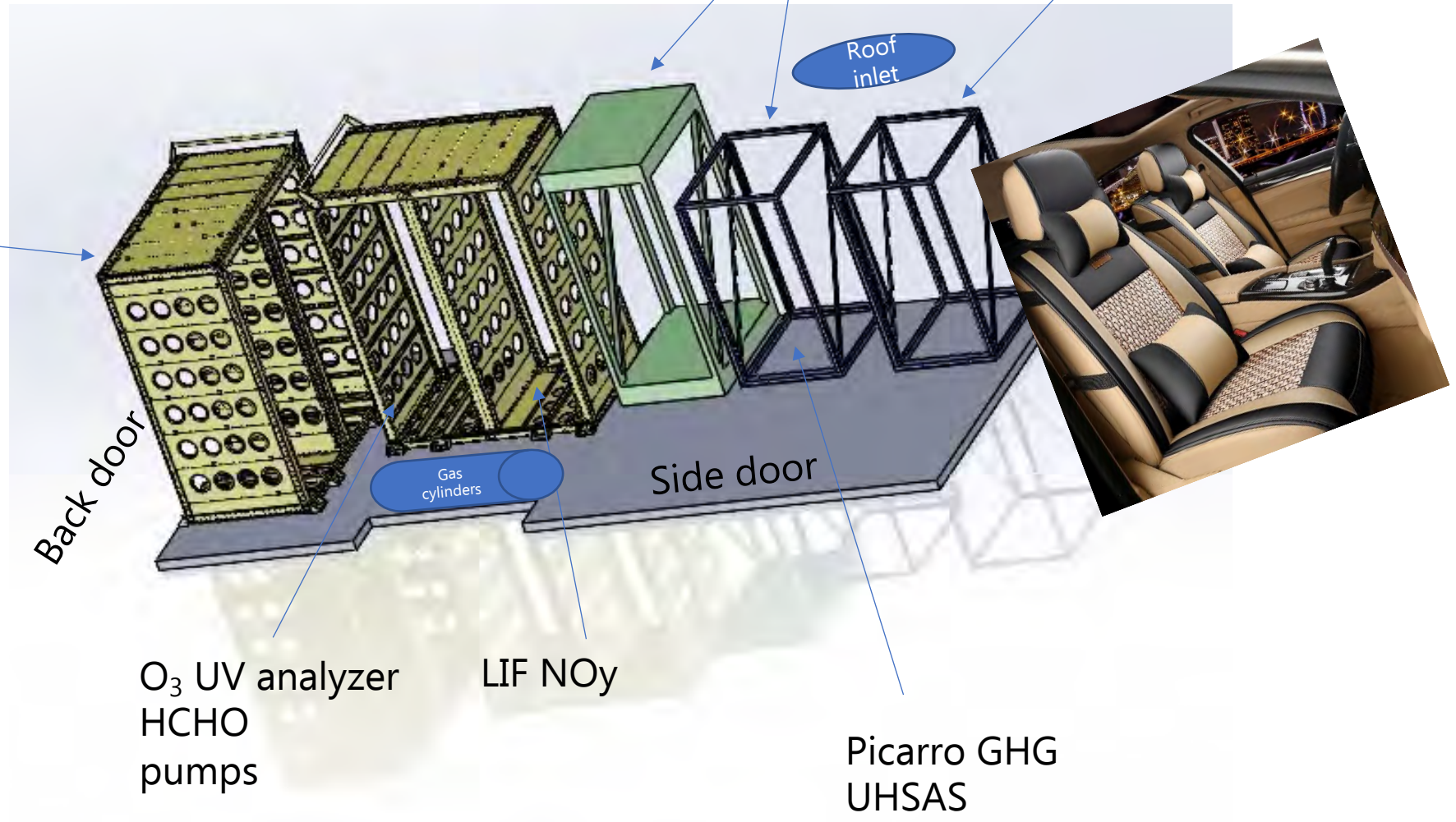
Utah Valley



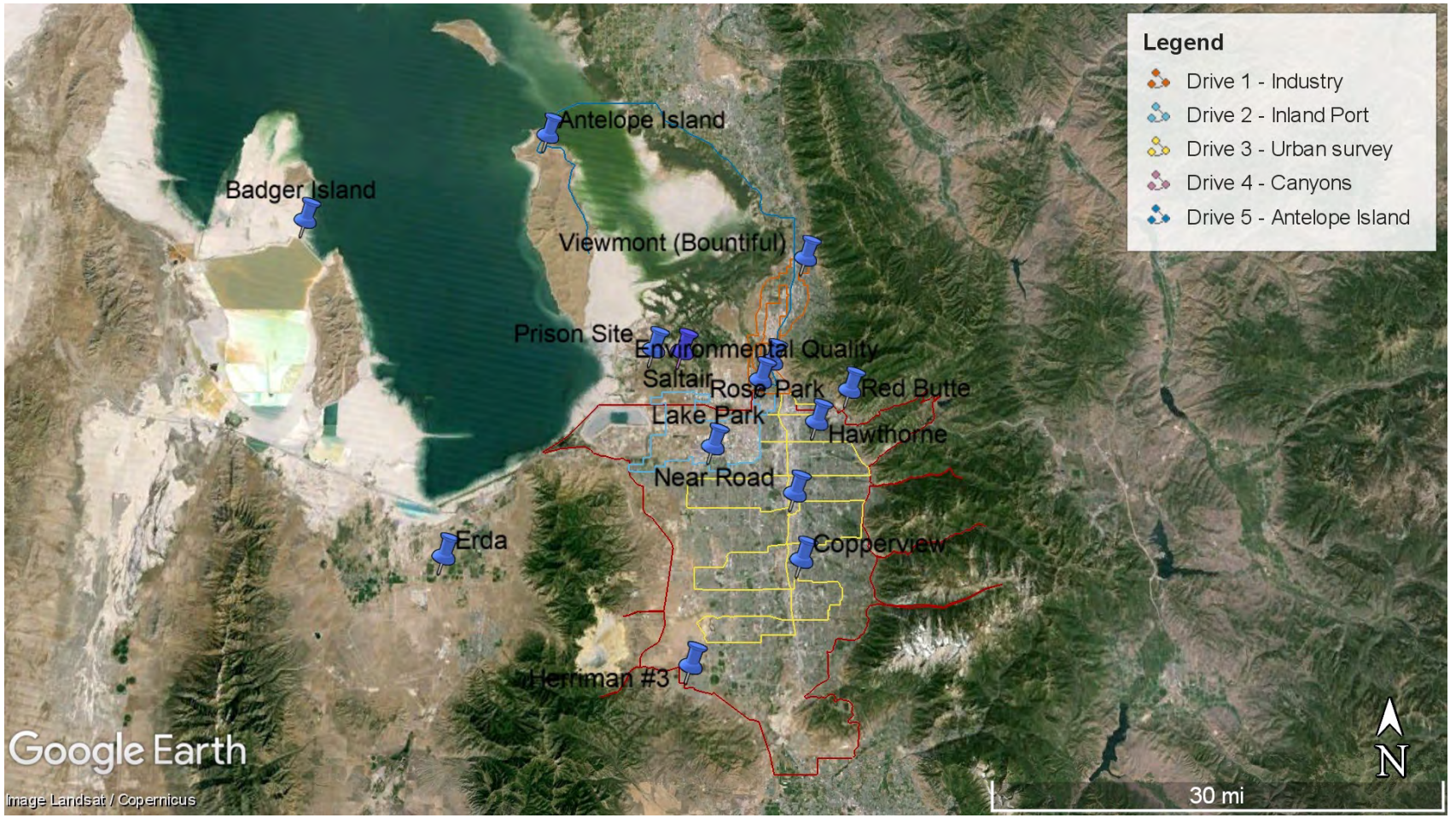
Salt Lake Valley



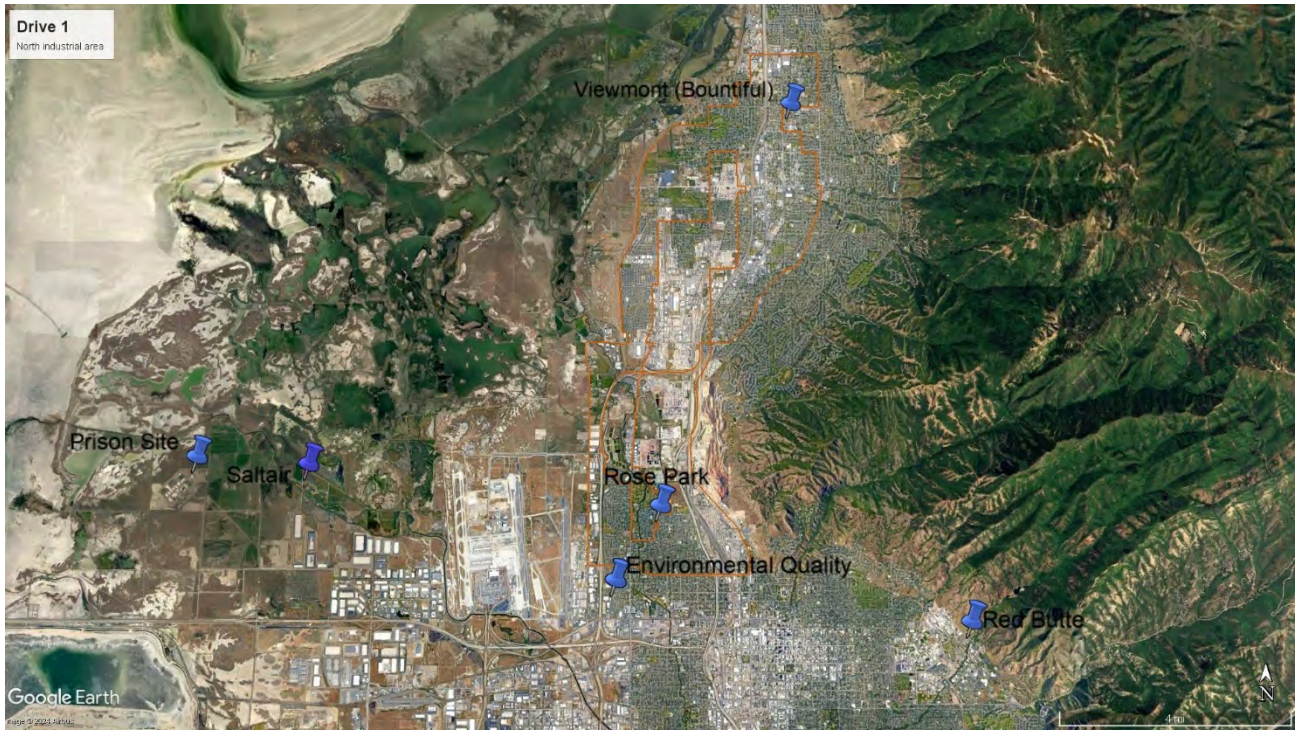
CSL Mobile Lab



Preliminary mobile lab drives



Drive 1 – North industrial area

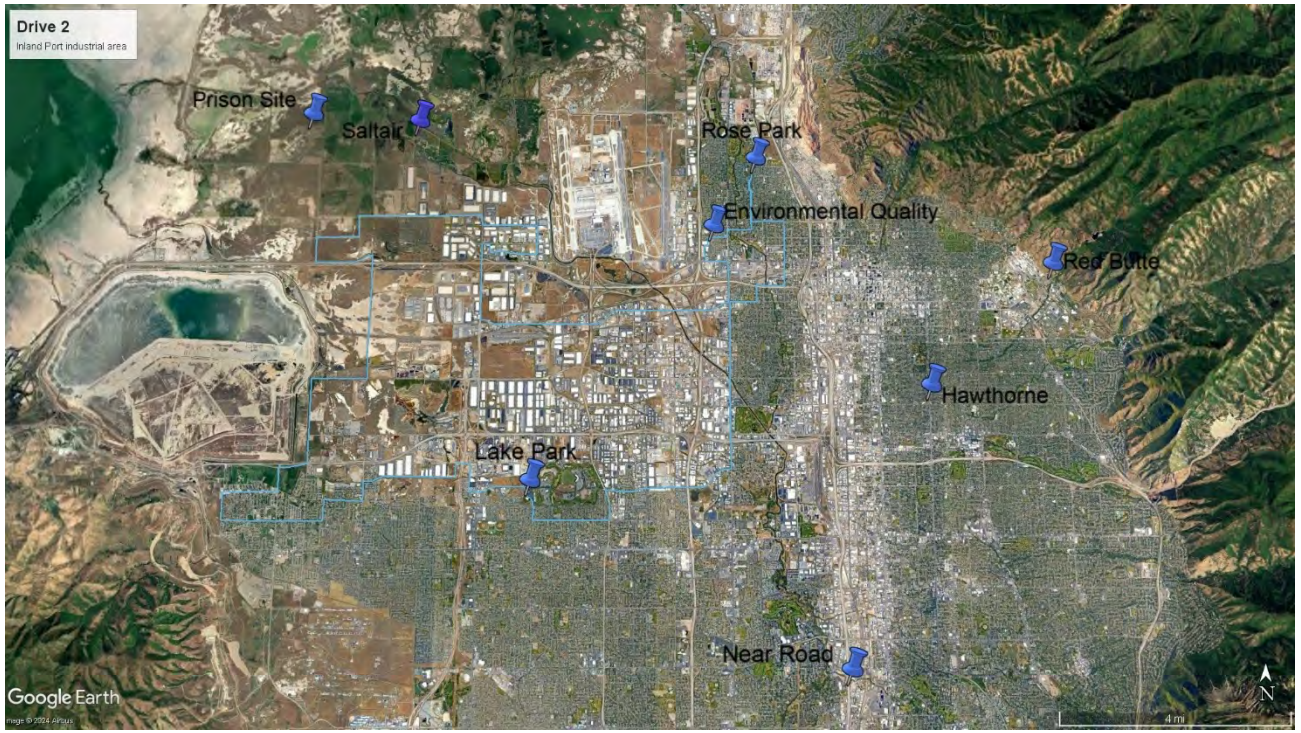


Length: 50 miles

Description: Inner loop + outer loop around industry

Purpose: Characterization of VOC profiles of point source

Drive 2 – Inland port industrial area

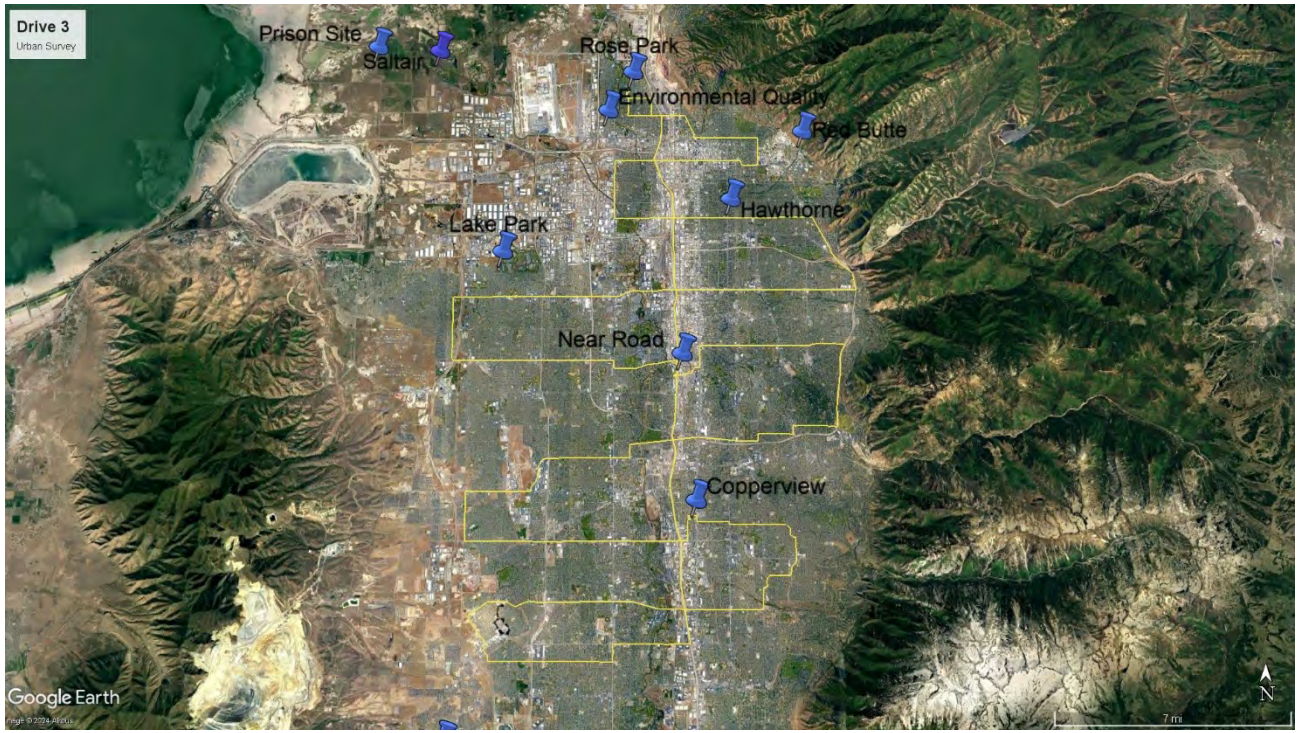


Length: 43 miles

Description: Loop around proposed Inland port area + existing industry

Purpose: Characterization of VOC profiles of point source, lake breeze

Drive 3 – Urban survey

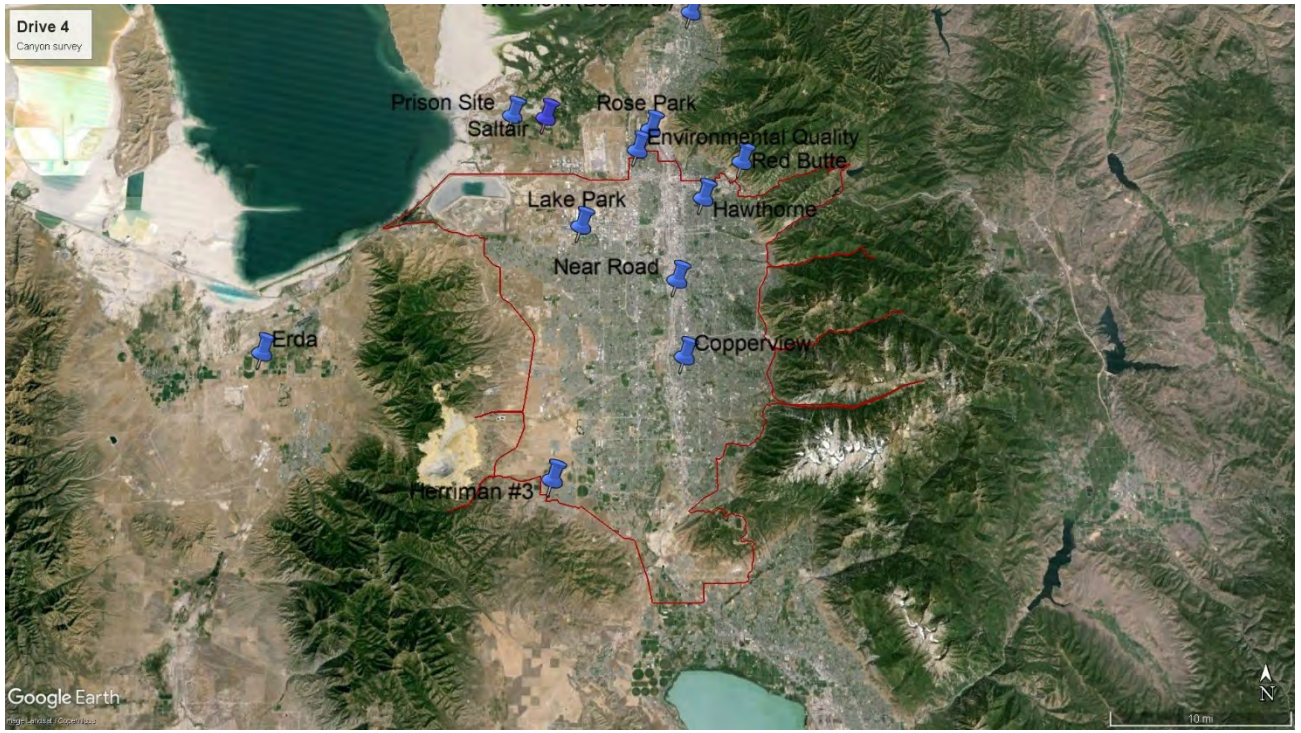


Length: 118 miles, repeated throughout day

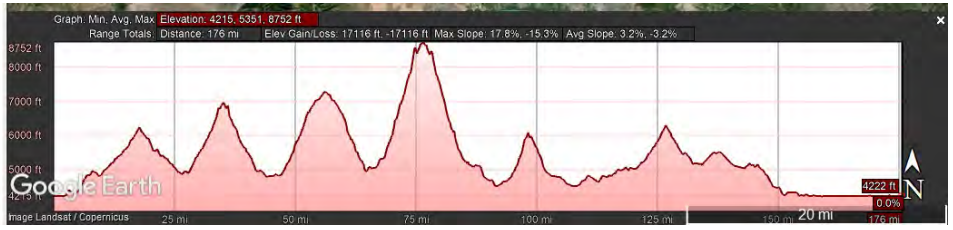
Description: Lawnmower pattern through valley, with a focus on residential areas, minimal highway driving

Purpose: Spatial distribution of O3, diurnal evolution, side-by-side comparisons with UDAQ sites

Drive 4 – Canyon survey



4500 ft profile

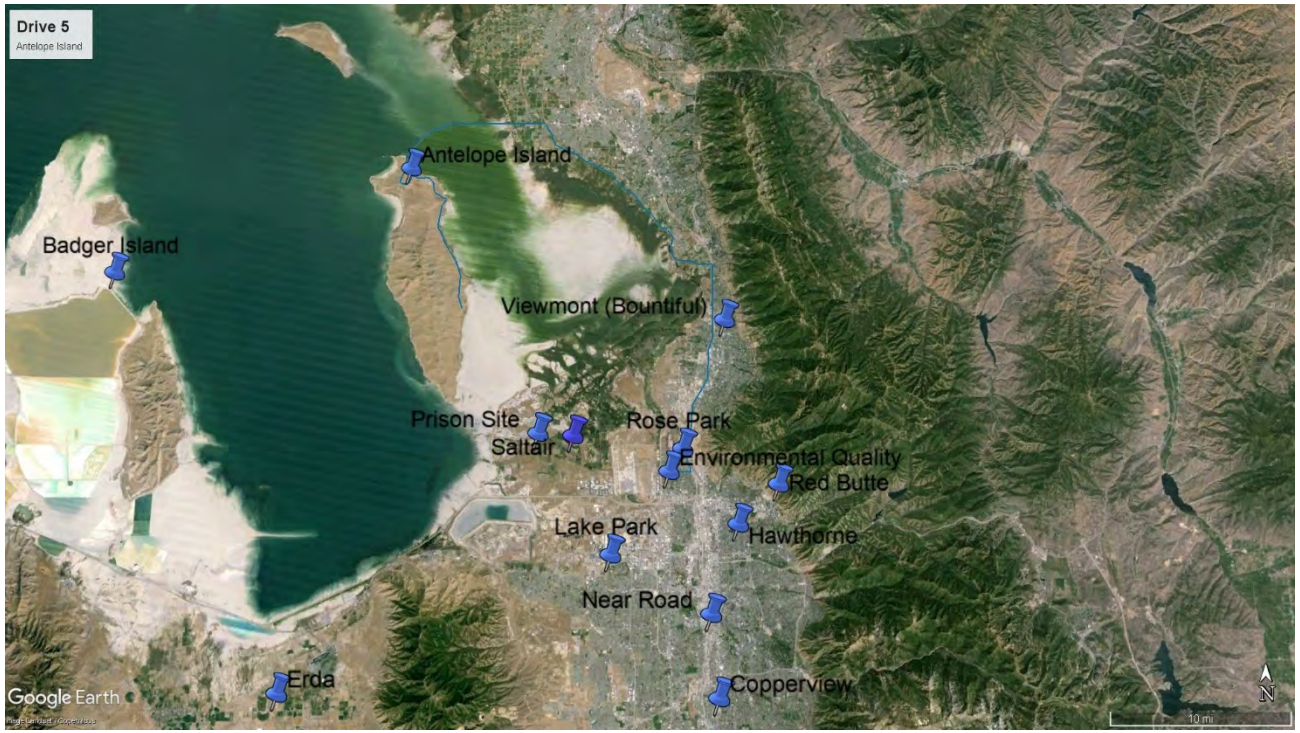


Length: 181 miles

Description: Up and down canyons

Purpose: Vertical distribution of O_3 and precursors, copper mine sampling, lake front sampling

Drive 5 – Antelope Island



Length: 100 miles

Description: Circle Farmington Bay, transverse Antelope Island

Purpose: Upwind sampling from SLC, biogenic VOCs from Farmington Bay, look for signatures of industrial halogens from the west

Open discussion