

The mission objectives are largely unchanged, though we have revised the regional scale flight strategy and we now know that the full payload includes AWAS, TOGA, and PRISM. The current objectives are:

- 1) **Large scale.** (45-70 S, 0-14 km altitude) atmospheric O₂ and CO₂ distributions, characterizing the size and temporal growth of the zonal atmospheric O₂ plume, and constraining zonal fluxes on monthly to seasonal time scales.
- 2) **Basin scale.** Vertical atmospheric O₂ and CO₂ gradient ratios through the mid-troposphere and spatial distributions to support estimation of flux ratios and magnitudes over full campaign time period and spatial extent.
- 3) **Regional scale.** Box boundary-layer profiling of pseudo-state fields for localized daily flux estimates and O₂ and CO₂ gradient ratios across the top of the ABL.

Plus:

- 4) **Remote sensing** of hyperspectral ocean color over daily flux regions and along the Antarctic Peninsula.
- 5) **Biogenic reactive gas** measurements to quantify emissions of chemically and radiatively important species.
- 6) **Cloud microphysics** measurements to address large discrepancies in climate models

More detailed notes from the meeting and updates to the overall mission plan:

- 1) **Forecast details.** The large scale synoptic patterns appear to be consistently forecast across models and update cycles, and hopefully this is because they are right and not because of a lack of observations to change them. This should help us plan earlier and with greater confidence, but the details we really care about are subtle and difficult to forecast, so we anticipate learning a lot the first few weeks of the campaign. These include cloud cover for remote sensing, low clouds that could prevent dipping below 1000 feet, supercooled liquid water that the GV would need to divert to avoid, and boundary-layer heights deep enough to sample.
- 2) **Regional study areas.** Providing that we are able to get permission to fly E. of Argentina, we plan to fly nominally 3 single-day regional studies over the productive Patagonian Shelf / Argentine Basin waters. We anticipate that we may need to pick a single flight plan without the ability to revise for this area, and are currently working on such a plan to accommodate a range of wind conditions. We are planning to fly nominally 3 single-day regional studies over productive waters in the vicinity of the South Orkneys and nominally 1 study to the northwest of the Peninsula. These flights will include a combination of boundary-layer sampling and if the clouds permit, remote sensing.

3) **Large scale surveys.** We plan to fly nominally 6 large scale meridional profiling surveys, with 4 of these west of Drake Passage, and 2 of these east of Drake Passage and shifted further south. When possible, the western surveys will include at the southernmost point an overflight of the Gould and/or boundary-layer sampling in Marguerite Bay, and clouds permitting a remote sensing transect over the ship or targets along the Peninsula.

4) **Remote sensing flights.** We plan at least one dedicated remote sensing flight, flying a grid over the Gould. We anticipate few clear days along the Peninsula, so this flight will be carried out at the first opportunity. We will also prioritize overflying the Gould on its transit north at the end of LMG 16-01. On all flights, we will seek out clear areas of opportunity, and in particular hope to get transects over the species gradient from the Patagonian Shelf to open ocean Drake Passage on the eastern surveys or South Orkney regional flights.

5) **Mission pacing.** We are currently targeting 15 flights of 6.5 hours each. If we fly at the end of the arrival week, this only requires flying 3 flights in 2 weeks, and 2 in the rest, but anticipating losing some opportunities to maintenance and weather. We plan to start out flying 3 flights per week. We have decided not to do back-to-back regional Lagrangian studies but do plan to fly back-to-back flight days with the first day being a large scale survey to the west of Drake Passage, and the second day being a regional study or large scale survey to the east of Drake Passage, with the prior day defining the upwind conditions.

6) **Strawperson schedule.** This will obviously change drastically as we shift for weather and other demands, but it gives a sense for the pacing.

Week 1 (2 potential flight days): One large scale survey to the SE

Week 2 (6 potential flight days): One large scale survey to the W, followed by 1-2 regional scale flights with the survey possibly defining the background for the first

Week 3 (6 potential flight days): 2 regional scale flights

Week 4 (6 potential flight days): One large scale survey to the W, followed by 1-2 regional scale flights with the survey possibly defining the background for the first

Week 5 (6 potential flight days): One large scale survey to the W, followed by 1-2 regional scale flights with the survey possibly defining the background for the first

Week 6 (6 potential flight days): 2 regional scale flights

Week 7 (5 potential flight days): One large scale survey to the W followed the next day by one large scale survey to the E

Total = 6 large scale surveys (4 W and 2 E), plus 9 regional scale flights (req. two 3-flight weeks)

15 flights averaging 6.5 hours each = 98 flight hours

8) **Strawperson flight menu.**

SE Large Scale Survey

1. along 55 W, between 70 S and 55 S (nominally 2)

W Large Scale Survey

1. along 80 W, between 45 S and 65 S (nominally 2)
or
1. from 45 S 80 W along a line to the Gould and/or Marguerite Bay (priority when clear) (nominally 2)
 - a. last dip offshore followed by BL transect over ship/bay followed by climb to 30 kft for remote sensing overpass

Regional Scale Flights

1. Patagonian Shelf (nominally 3)
 - a. Single flight Eulerian box profiling 500-5000 ft, with remote sensing inside box
2. South Orkney Islands (nominally 3)
 - a. Single flight Eulerian box profiling 500-5000 ft, with remote sensing inside box
3. Western Antarctic Peninsula (lower productivity offshore) (nominally 1)
 - a. Single flight Eulerian box profiling 500-5000 ft, with remote sensing inside box
4. Dedicated Remote Sensing (nominally 1), selected from
 - a. Grid over ship
 - b. Line from north of to across Drake
 - c. Grid over Patagonian Shelf
5. Student flight (unless they select a large scale survey) (1 flight)

Targets of Opportunity

1. L.M. Gould dip/overflight (priority if clear)
2. Marguerite Bay dip/overflight

3. Western coastal Chile dip (productive, air from further north)
4. Southern coastal Chile dip (high winds)
5. Ice edge BL transect
6. Air from S. Atlantic
7. Western coastal air arriving at SCCI via Strait?