The CCGG group’s aircraft program has been dedicated to collecting air samples in vertical profiles higher in the atmosphere than can be reached by the Tall Tower Network. This program’s mission is to capture seasonal and inter-annual changes in trace gas concentrations throughout the boundary layer and free troposphere.

Most aircraft flights collect 12 air samples at different altitudes up to 13,279 m/43,555 ft. The samples are stored in glass flasks for later analysis at the Boulder Central Facility.

The Programmable Compressor Package (PCP) contains 2 pumps, a first-stage pump and a second-stage pump that are plumbed in series in order to increase the pumping power, a rechargeable battery, a control board, and a flow meter.

The pilot display is a digital LED screen and a toggle switch that communicates sampling in the PCP.

The Programmable Flask Package (PFP) contains 12 glass flasks for storing air samples, a flexible stainless steel manifold system connection the flasks, a data logging system, and a control system.

Inlets: The sample air comes into the plane from tubes run to the outside of the plane, wither below the wings or right out the side of the aircraft’s cabin. This eliminates aircraft exhaust from the air sample.

Aircraft sampling allows us to see where CO₂ and other greenhouse gases go after being emitted at the surface because the gases emitted at the surface mix their way up into the free troposphere over time and are blown wherever the winds are moving.

Data from aircraft sampling are used to verify computer models, like CarbonTracker, that model CO₂ concentrations across the globe.

The GPS system allows for precise positioning of the aircraft and universal time to be recorded along with the air samples. The position and time is recorded by the data logger within the PFP.