NOAA Teacher in the Air
Todd Toth
Onboard NOAA Plane G-IV ("Gonzo")
March 9 - 15, 2006

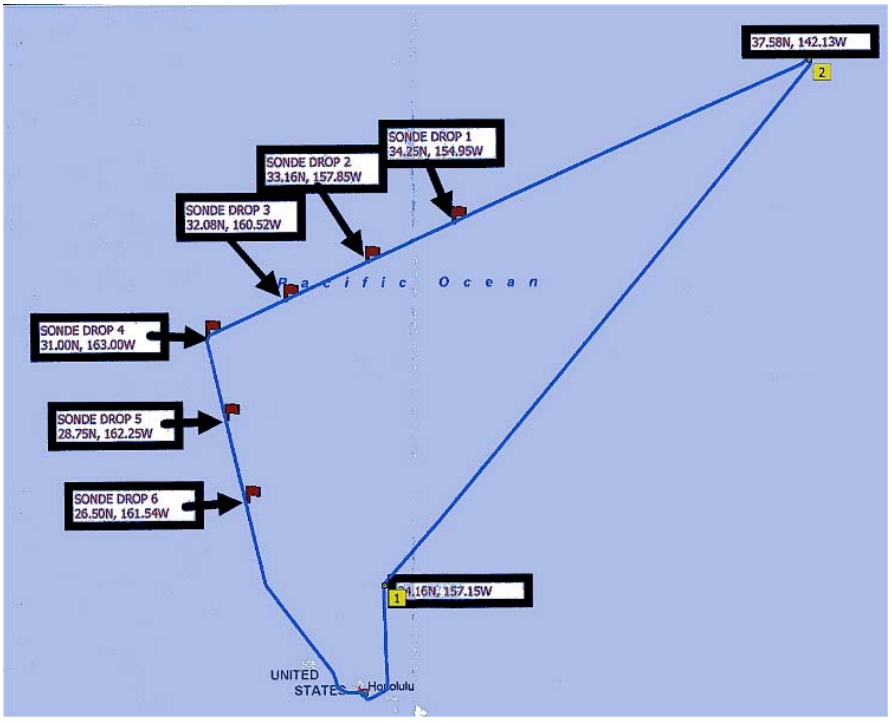
Flight Two Log
3/14/06
Honolulu, Hawaii
Todd Toth
Aboard '**Gonzo**' NOAA Gulfstream IV

Weather Conditions
Overcast, 100% humidity
72 ˚F, light rain
Air pressure of 1014.63

Aloha!

8:30 am

During the crew briefing of today's flight, meteorologist, Marty Maymeaux, stated that the flight would be classified as a "hazard duty flight" due to the extreme high winds that we would be encountering. Hazard duty flights are classified as flights with wind speeds over 100 knots. Today's flight would be encountering wind speeds between 110 and 120 knots (approximately132 mph to 144 mph). Flight Commander Michele Finn stated that the flight would be a long one – 7 1/2 hours to complete. Due to the distance being traveled and wind speed, the trip would be separated into three legs. The first leg we would be flying at 41,000 feet over commercial air space so pilots would have to watch for other airplanes. Leg two would be flown at 43,000 feet



and include three dropsondes locations. Leg three would be flown somewhere between 44,000 and 45,000 feet or as high as we could get. The three-leg approach was needed to get to the desired location, burn off enough fuel to get to the appropriate altitude and deploy the dropsondes. I learned that due to the weight of the plane's fuel we could not go directly to 45,000 feet. The air is too thin and a totally fueled plane too heavy – not enough lift to get that high.

9:30 am

Flight Commander Michele Finn gave the orders to start pre-flight activities. We took off at 9:50 am.

Current conditions:
Light rain and drizzle (again)
72˚ F
Relative Humidity 100%
Barometric pressure was 1014.63 mb

Leg One

We took off heading southeast this time but turned northeast quickly, traveling at a speed of 491 mph and an altitude of 21,592 feet, climbing as quickly as possible to 41,000 feet. At 10:20 am, we had attained an altitude of 29,073 feet and were cruising at a speed of 545 mph. Our bearing was 0˚N toward Anchorage, Alaska. My next location mark was at 10:36 am. We experienced a very thick cloud deck having climbed to 40,318 feet to get above the clouds. Cruising speed was 502 mph at a bearing of 358˚N. The majority of the first leg was spent getting to our location and burning off enough fuel to get to 41,000 feet.

Since there were no dropsonde locations during leg one I talked to the visiting atmospheric scientist Eric Ray. The main aim of his research was gathering information on the ozone levels throughout the atmosphere. Eric is part of NOAA's chemical science division in Boulder, Colorado.

After talking to Eric I was able to spend about an hour and a half up in the cockpit talking with Will and John. They again explained much of the instrumentation in the cockpit area and helped me with some ideas for lessons to use back in class. I noticed the fuel tank temperature was - 9˚C and Will mentioned that due to the altitude of this flight and most flights an additive is added to the fuel. The aviation fuel they use is good to – 40

˚C. When we landed Will showed me the under side of the wings where the fuel tanks are located. Since the fuel gets so cold at 40,000 to 45,000 feet and we land so quickly in warm, humid conditions the fuel does not have time to warm up. Rapid condensation occurs under the wings and it appears to be raining until the fuel warms up.

I asked again why my workstation speed varied from the cockpit speed. Will mentioned that my workstation computer uses speed in miles per hour (mph) and the cockpit computers, as in all planes and boats, uses knots per hour. A knot is how the speed of aircraft and boats is measured. Miles per hour and knots measure a speed that is the number of units of distance that is covered for a certain amount of time.

John stated that this is why my computer and the cockpit computer vary slightly. Below are the formulas:

1 knot = 1 nautical mile per hour = 6076 feet per hour
1 mph =1 mile per hour = 5280 feet per hour

* Definitely a classroom lesson here!

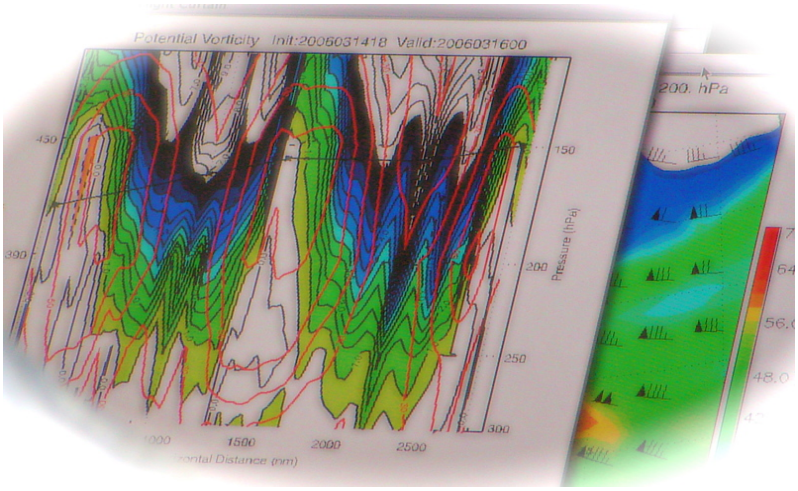
Other points that the plane factors in are headwinds, tailwinds and wind shear (winds hitting the plane from the side). For example, today we have a 40-knot tail wind and an 80-knot wind shear that will affect true air speed.

While in the cockpit Will and John pointed out a strange phenomenon to me. As we were flying high above the cloud deck a dark gray line could be seen approaching us. It was another plane at a lower altitude but still above the clouds. As we got closer and closer, what I was seeing was the shadow of a contrail from the other plane on the clouds below – this was really neat! You couldn't see the other plane until it was almost underneath you – just this gray line coming at you.

Second Leg

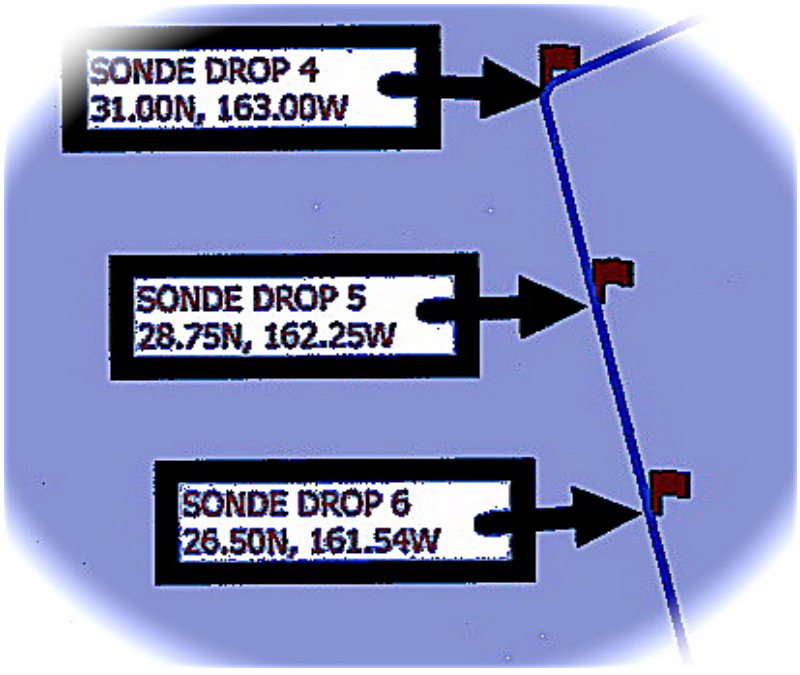
At approximately 37˚N and 142˚W we made a sharp turn toward the southwest. We were now at an altitude of 43,044 feet and cruising at a speed of 417 mph. The picture above shows where we would be dropping the three dropsondes as we crossed through the very strong jet stream. (picture below)

110 to 120 knot per hour winds



As we approached the third leg of the trip the plane was finally able to gain the high altitude that Eric needed to maximize his ozone study. For this trip the higher the better for ozone sampling and study.

Leg 3



Leg 3 started us on a southeast return trip back toward Hawaii. At this point we had burned enough fuel to reach an altitude of 46,151 feet and a cruising speed of 508 mph. Bill, Dave and Mark were again experiencing some problems with the dropsondes. They had experienced another "fastfall" – a dropsonde where the parachute failed to open. Below are some pictures of them discussing the problems, re-wrapping the ribbon and double-checking the calibration of each dropsonde.

As we released the last dropsonde Gonzo had attained an altitude of 46,522 feet and a speed of 515 mph. As we landed back in Hawaii the weather was the same as when we left – rainy.

Later as I was watching the news, Hawaii was experiencing quite a few flood-related problems. A small dam and two reservoirs had burst, power lines fallen and a number of major highways closed.

The picture to the right shows the view from the plane in the middle of a cloud sandwich.