

Stratoprobe Project (1975-6)

By Steve Ricketts

In April 1975, while preparing for final exams at university, I got a phone call from the Public Service Commission, asking me if I was interested in a summer job working for Environment Canada.

I was all set to work in a mine in Northern Ontario. I thought about it for a moment (doing science in Toronto versus working underground in the wilds of Northern Ontario?) and said yes. I didn't know it at the time, but that decision would steer the rest of my life.

The Atmospheric Environment Service (or AES, as it was known at the time) of Environment Canada was engaged in an international project to study stratospheric ozone, which was being depleted by the release of chlorofluorocarbons (CFCs) and hydrochlorofluorocarbons (HCFCs).

This involved flying a large (120 m or 350-foot diameter) balloon at 30,000 m (100,000 feet), carrying a payload of instruments and experiments. It was one of several such projects being done around the world. It was ground-breaking work that led to a better understanding of the impact of CFC and HFCs on the ozone layer and eventually resulted in legislation to ban their use.

My job as a summer student was to assist the AES project. We worked in the labs at Downsview, and I worked alongside many very smart people.

- Dr. Wayne Evans, project lead
- Dr. Dave Wardle
- Dr. Tom McElroy
- Dr. Jim Kerr
- Dr. Jim Williamson (on Sabbatical leave from Oxford, UK)
- Rick O'Brien (post-doc, Australia)
- Greg Blair
- Pat King, onsite meteorologist (1975)
- John Stutchbury, onsite meteorologist (1976)
- Bill Clark, electronics technician
- Clive Midwinter electronics technician (deceased)
- Jerry Jordison, EG
- Archie Asbridge, EG (radiosonde launches)
- John Bellefleur, EG (radiosonde launches)
- Bob Hoogerburg, EG (radiosonde launches)
- Garry Vail, Bomem
- Dale Summerfeldt, SED Systems
- Judy Selmes (the admin assistant or secretary for the ARPX group)

We spent several weeks in Downsview preparing for the flights. I helped with assembling circuit boards (I learnt how to solder), testing and calibrating experiments (that had to be cooled by liquid nitrogen, placed in a vacuum chamber—a section of thick metal pipe).

We then went to Saskatoon to spend a week or so at SED Systems, getting the instruments (and communications?) set up, before heading to the wilds of Yorkton to fly the balloons.

In Yorkton, we set up in part of old hanger at the airport just north of town that had been built during WW2 as part of the British Commonwealth Air Training Plan (BCATP). The rest of the hangar held a collection of antique cars, in which we had fun playing.

The day was spent modifying and testing the experiments and securing them to the payload frame.

Launch day was a big deal. Given the fragility of the balloon, surface winds had to be near zero. A semi-trailer with huge helium tanks would arrive and slowly fill the balloon (which was tethered to a small trailer) with helium. The payload was clamped to a modified truck ("Tiny Tim") down the runway with a long lead to the balloon.

When everything was ready, the trailer would release the balloon, which would rise slowly. "Tiny Tim" would manoeuvre itself to keep the payload directly under the rising balloon, and then, when the slack in the lead was taken up, release it. The balloon would rise to 100,000 feet, a process that took a few hours.

At ground level, the helium filled only a small pocket of the balloon. As the balloon rose, the helium would expand in the reduced atmospheric pressure, and at altitude the fully inflated balloon was 150 m in diameter (roughly the size of the moon). At dusk and dawn, it was a brilliant object in the sky, thus generating many concerned calls wondering what it was.

On one of the first launches, the payload rose to only 30 m or so and then slowly sank back to the tarmac. Someone has miscalculated the weight of the payload and/or the amount of helium needed, or perhaps the balloon ripped (I don't recall). At any rate, it was an expensive lesson.

During the summer months, the winds at 100,000 feet reverse direction, and the balloon would drift slowly westward. It would stay aloft for several days, generally until the liquid nitrogen that several experiments needed evaporated.

The ground team would track the balloon and deploy a chase and recovery team. At the right moment, determined by the desire to avoid populated areas, a signal would be sent that would rip open the balloon and the payload would descend using a large parachute (a leftover from the Gemini project, I vaguely recall?).

On impact with the ground, explosive bolts would fire that would detach the parachute from the payload. The recovery team would pick up the payload, take it back to Yorkton to download the data, repair any damage to the equipment, and prepare for the next flight. The cycle repeated every 4-6 days.

On one flight near the end of the summer, the upper winds had weakened and reversed to become westerly. We had flown to Hanna, AB for the anticipated recovery but had to get up early and drive all day eastward to get to where the payload would land.

On this day, the winds near the ground were strong, the explosive bolts didn't fire, and the parachute wasn't released. The payload landed in the middle of a farmer's field, the parachute bent over and started collapsing, but then the winds hit it. It stretched out horizontally, rose, filled with air, and then started to pull the payload across the farmer's field.

It seemed funny at first: a 4,000-lb payload full of expensive gear being dragged across a field at a walking pace. But it wasn't that funny as we tried to figure what to do.

When the winds died down, the parachute would collapse. We would grab the parachute's shrouds and climb onto the parachute, trying to wrestle it to the ground. But then the winds would spring up, the parachute would fill with air and rise, throwing people in all directions, and the payload would resume its relentless march.

We noticed that it was approaching a road lined with telephone (or electricity) wires. Not good. Luckily, Bill Clark had a pocketknife and he managed to cut enough shrouds such that the parachute deflated.

"I remember going on an expedition to recover the gondola after it came down in a forest. We were in a helicopter and several of the chaps were lowered down on ropes with chain saws to chop down trees to make a clearing for the helicopter to land. That was very scary! Anyway, we rescued all the stuff, and I took my turn in driving the van back to Toronto." (Jim Williamson)

Being in Yorkton meant long days, then going for a late dinner and beers. I had one day off in seven weeks. But I was part of a team and had an absolute blast.

"Among my recollections is how cold it was for July. Wayne got in some trouble with Finance for buying flannel shirts for some people who hadn't brought warm enough clothing. He also got flak for buying some cheap Timex watches instead of an expensive stopwatch; the problem was the watches looked like personal items whereas the stopwatch could be justified for project use." (Pat King)

I vividly recall Wayne Evans. He was a most unlikely-looking scientist: loud, brash, gum-chewing, affable. He was always joking with me "Hey kid, c'mon over here, I want to show you something." Sometimes it was an aspect of science; other times it was a crude cartoon accompanied by a hearty laugh.

During launches, which were quite stressful, Wayne became extremely focused and intense. He'd run or drive around, barking out orders. We learned to listen intently, say little, and resume our work.

At one point, I drew a picture of a whale on a piece of paper it, wrote a title about Wayne being the project manager, and taped it to his car door (to designate it as the command centre). I'm not sure if Wayne noticed it.

"Do you remember the after-dinner escapade when the whole bunch of us, led by Wayne Evans, decided to go skinny dipping at midnight in a local pond close to downtown Yorkton after we had departed the restaurant. Included in that group was Jim Williamson, an atmospheric expert from Cambridge, or maybe Oxford but the identity doesn't matter." (Archie Asbridge)

I returned in the summer of 1976 for another season of the project and then went back to Queen's to complete my Physics degree.

At that point, I knew that I wasn't suited for or interested in grad work, so I looked for a job. The market for physics grads wasn't great, but AES was looking for physics grads to hire and train as meteorologists. I had never thought about becoming a meteorologist, but I had noticed Pat King as the support meteorologist in Yorkton. It intrigued me and so I applied. I think AES received around 200 applicants, interviewed half of them, and only made seven job offers.

I was one of them, and it was because they knew me from working as a summer student. One of life's fortunate events.

And thus, I started a long and enjoyable 35-year career in Environment Canada. And it was all because I spent a couple of summers in Saskatchewan chasing balloons.

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