

Beagle in the Clouds

by Tony Wills



VH-UNL at Emerald, probably in early December 1969. (Photo by Tony Wills)

The Queensland Air Museum's Beagle 206S was briefly employed on a cloud seeding operation in Queensland in 1969. Queensland had experienced a series of dry years in the mid-1960s. The Commonwealth Scientific and Industrial Research Organisation (CSIRO) had done some seeding around Mackay but it was only reconnaissance in nature. Eventually, the Queensland Government decided a proper operation was needed. The bureaucracy was underwhelmed by the idea, but took measured steps to make the politician's dreams come true.

The mission devolved to the Queensland Department of Primary Industries' Division of Development Planning and Soil Conservation, headed up by Jasper Ladewig who passed on the management of the operation to his deputy in Development Planning Branch, Jack Hegarty. Development Planning was mainly involved in the Brigalow Development Scheme but also tended to acquire odd jobs that didn't fit into QDPI's mainstream activities. Cloud seeding came into this miscellaneous category.

To learn something about cloud seeding, the department selected people and sent them to train as cloud seeding officers (CSOs) with the CSIRO's Division of Radiophysics at Epping, North Sydney. The first student was Frank Skinner, a senior soil conservationist based in Toowoomba, who took part in the Mackay operation. The second inductee was Barry White, an economist in Development Planning Branch who had a special interest in statistics, a very useful skill in objectively assessing the many and varied claims made for cloud seeding around that time. I came along late in the piece, in 1968, as a draftsman but with some previous flying experience in the RAF and Adastra Aerial Surveys.

Jasper's chief clerk, George Thompson, had served with the RAAF and seemed to harbour a deep mistrust of anything related to aviation. Cloud seeding was to him a very suspicious activity involving lots of money for which he was responsible. He was not comforted by the free and easy attitude of Frank, Barry and myself, and became worried when he learned we were to be entrusted with a phone credit card so that we could talk to the Brisbane Met Bureau every morning. Only the Director-General and one other had such cards. He took us aside individually and warned us not to lose it or abuse it. By the time he had finished, I had an inkling of what it must have been like to be in US bomber crews who had to swear an oath never to reveal the secret of the Norden bombsight.

We all attended, at different times, a two-week training course at Epping and later gained some exposure to operations thanks to the New South Wales Department of Agriculture which was conducting seeding from Cobar. They were using Jack Masling's Cessna 310s one of which (VH-REK) is now at the Historical Aircraft Restoration Society's base at Albion Park south of Sydney. Under the leadership of radar pioneer, E.G. (Taffy) Bowen, the courses at CSIRO were exceptionally well conducted and gave us a good theoretical grounding as well as an appreciation of the practical issues which could arise in the field.

Silver iodide nuclei in freezing conditions are physically similar to natural ice crystals in the atmosphere. Ice crystals attract unfrozen water above the freezing level and eventually build and become heavy enough to fall through the freezing layer to melt and become raindrops. If ice crystals are absent rain is unlikely to form.

The introduction of AgI nuclei is intended to make up for any deficiency in natural ice nuclei that might exist. In 1969, it was impossible to determine whether such deficiencies existed and it was assumed that, over the long run, AgI seeding would add to naturally occurring rainfall. The process was convincingly demonstrated in the laboratory but there was no means of assessing its effectiveness under natural conditions. Today, cloud seeding aircraft carry sensors which measure liquid water content and help the CSO decide whether a particular cloud mass will respond to AgI seeding.

By mid-1969, drought conditions in Queensland were putting pressure on the government to explore all possibilities to alleviate the crisis. A contract was let to Western Air Navigation Ltd for a three-month operation. Westernair had a Beagle 206S, VH-UNL, which they rigged for cloud seeding. This involved fitting a tank in the cabin to accommodate the silver iodide (AgI) seeding agent in acetone solution, and connecting it by copper tubing in the wings to burners under each wing tip. The operation was relatively simple involving an on/off switch at the tank and magnetos activated to ignite the solution in the burners. The result was a near-invisible flame that dispersed AgI nuclei into the atmosphere behind the aircraft.

The operation started officially on 15 September 1969 with the aircraft deploying to Rockhampton. Frank Skinner was the CSO in charge, with CSIRO's Arthur Tapp, a former RAAF Mosquito navigator, along as adviser. The pilot was Darcy Williams who had had some previous cloud seeding experience. The first three days were disappointing as weather throughout the state was unsuitable for seeding, although some marginal clouds were seeded north of Rockhampton. On 18 September, acting on reports from graziers, aircraft and postmasters of large Cumulus clouds developing,

Frank investigated cloud formations in the Emerald area. Because of an inversion layer capping cloud vertical development, conditions were still unsuitable.

These far from optimal conditions were normal for that time of year, which is what the government had been advised when QDPI suggested a start later in the season. The logic that rain cannot be conjured up out of clear skies was lost on the politicians who felt they had to demonstrate to their constituencies they were 'doing something' about the drought. Frank was the man for the time. Because of his extensive contacts in the regions and outgoing personality, he was able to take advantage of the seeding downtime to give interviews to local media and convince them that the department was indeed 'doing something'.

The first serious day of seeding fell on 19 September with official forecasts of suitable cloud expected north and south of Rockhampton and up to 150 miles inland. The team carried out three sorties: Rockhampton – Theodore, Theodore –Rockhampton and Rockhampton – Rockhampton. Icing and turbulence encountered on the third sortie indicated that conditions had been favourable for seeding. In 5 hours 15 minutes of flying, 2 hours 9 minutes seeding had been conducted.

From 20 to 23 September, the weather reverted to ideal holiday conditions and the aircraft returned to Brisbane for maintenance. Frank went back to Toowoomba, and Barry White and I teamed up with Arthur Tapp for our operational conversion as CSOs. Darcy Williams also took on the conversion of a new pilot, Noel Humphries - a former RAAF P-40 pilot and ex-Swissair Caravelle captain, who would fly the Beagle for the rest of the operation. On 24 September, the new team repositioned again to Rockhampton to await suitable weather. Idyllic conditions persisted resulting in many rounds of golf, anxious calls to the Meteorological Bureau and, in my case, a chance to catch up on university assignments.

The next major phase of seeding covered the four days 30 September to 3 October. A trough centred between Rockhampton and Longreach was creating unstable conditions east of a line from St George to St Lawrence. In 23 hours 10 minutes of flying, 4 hours 35 minutes of seeding were conducted in 26 separate cloud complexes throughout the

region. On 3 October, the Beagle again repositioned to Brisbane and Barry White took over the CSO role.

On 2 October, we stopped at Mackay to refuel and I checked with the Met Office for the latest weather reports. The observer was outside doing his midday observations so, while I waited, I went to the snack bar to order some sandwiches. At the same time, an apparition in the shape of Frank Thring, a well known entertainer of the time, arrived – also in search of sandwiches. He was on the way to Hayman Island and was already dressed up for a dramatic arrival by helicopter. He wore a cape, leotards, Robin Hood boots and had lurid face paint. At that moment, The Met man emerged from his office, took in the scene and in an unnecessarily loud voice, asked,

'OK, which one of you is the rainmaker?'

Seeding conditions were unfavourable until 9 October when Barry and Noel departed Brisbane for Toowoomba, Charleville and Roma where they followed an eastwards moving trough seeding the St George area and the fringes of the Caernarvon Ranges. The following day, still tracking the trough, they seeded the Bundaberg subcoastal areas, encountering some icing, and returned to Brisbane as the Beagle's 50-hour service was due.

From 11 to 20 October, there were few seeding opportunities. Out of a total of 29 hours 35 minutes flown, only 3 hours and 2 minutes were seeded on 18 separate occasions. The seeded areas included Longreach, Barcaldine, Millmerran, Warwick, Kingaroy, Moura and Theodore. On 21 October, Frank had taken over from Barry and launched for Longreach where the Met Bureau had forecast the chance of storms developing and increasing into the following day. Three days of good seeding conditions followed, i.e. 9 hours flying with 4 hours 31 minutes seeding on 20 occasions.

From 24 to 29 October, seeding conditions were limited with, for example, temperatures at 16,000ft as high as –2C. Operating from Longreach and Charleville, Frank seeded

suitable Cumulus builds around Quilpie and Windorah but the prevailing high temperatures suggested little result. Conditions improved on 30 October and, because of turbulent Cumulus formations, Frank carried out cloud base seeding in the Miles, Condamine, Chinchilla and Wandoan areas.

It was about this time a mysterious direction came down from the D-G's office to double the life insurance cover for CSOs. Only when Frank returned to base did we get a vague account of the reason.

Frank often preferred to seed straight into the optimal area of the cloud at about the -6C level. This required flying on oxygen and one day the lead into his oxygen mask became detached. He started to feel groggy and told Noel he was going into the cabin to lie down. When he rose out of the right hand seat and turned, he fainted and sat on the control column. The Beagle dived and, with surprising strength, Noel managed to heave Frank off the wheel and pull the aircraft out of its descent. He quickly realised what the problem was and got Frank back on to oxygen.

At another time, after checking cloud top temperatures, it was decided to descend and start seeding at cloud base. Perhaps out of boredom, Noel put the Beagle into a power dive and, at a safe height, started to pull out while changing pitch from coarse to fine. The change to fine pitch took a very long time to have effect and Frank reckoned they came very close to the mulga. It seems the oil in the prop mechanism had stiffened up in the cold temperatures and hadn't had time to warm up in the rapid descent, so the change of pitch happened very slowly.

Shortly after, at a party in Charleville, Frank happened to mention these tense moments to the Minister for Primary Industries. Hence the top-level direction.

On 31 October, the Beagle returned to Brisbane for a 100-hour service and other maintenance. A long gap of eleven days unsuitable weather followed, during which Frank deployed to Rockhampton and Longreach in search of seeding opportunities. However by 12 November, weather patterns had changed quite quickly with the development of another inland trough in central Queensland. Between Longreach, Roma and Charleville, Frank found ideal operating conditions, seeding for 1 hour and 33 minutes out of a total flying time of 5 hours 15 minutes. Good seeding weather continued until 16 November as the trough moved east, and areas around Blackall, Emerald and Mount Morgan were seeded.

Another short spell of seeding opportunities occurred around Clermont and west of Rockhampton on 20-21 November, but no major seeding was conducted until the Beagle had to return to Brisbane for maintenance. The operation picked up again when yours truly took over as CSO from Frank. Joining the tail end of the operation at a time when informed opinion suggested it should have been started; the long-term weather patterns indicated that seeding opportunities should have been more plentiful.

On 27 November, Noel Humphries and I deployed to Longreach. On a transit trip of 3 hours 50 Minutes, we seeded suitable clouds along the Arcadia Valley for 21 minutes en route. After overnight at Longreach, the forecast suggested a trough between Rockhampton and Normanton could produce suitable weather for seeding. This didn't happen and, because of artificial horizon problems, we decide to recover to Townsville for maintenance and to await better weather reports.

Weather forecasts were negative over the following three days and we returned to Longreach in the hope that southerly influences would produce more business for us. Artificial horizon problems continued and excessive play in the port propeller was detected requiring downtime - in the original Qantas hangar!

While Noel and Paul, the local LAME, tackled the problem of the faulty artificial horizon, I had nothing else to do so I took on the simple task of removing the port propeller. As I recall, there were over 30 small nuts from which locking wire had to be removed. They were then unscrewed

and placed into a container so they didn't get lost. When I reached about the eighth from last, I noticed they were getting harder to rotate as I tried to loosen them. I mentioned it to the pair in the cockpit and, after a second or two of silence, Paul said in a calm but tense voice, 'Stand back and don't try to unscrew any more.'

It seems the prop should have been in the feathered position before attempting to take it off; otherwise a massive spring would have sheared the last few nuts, taking the prop and part of me through the hangar wall. They didn't teach us that at Epping.

The Beagle was unserviceable awaiting spares from 1 to 6 December. Fortunately the weather was generally unsuitable during this period. On 7 December, a depression over southeast Queensland produced some opportunities, and we seeded suitable clouds between Emerald and Roma. The CSIRO cloud seeding aircraft, a Cessna 411 VH-BBV, was also operating in the area and was able to give us real-time weather reports. The following day we seeded some large Cumulus over the Boyne River catchment. On 9 December, we did almost two hours seeding between Rockhampton and Charters Towers until the burners went out because of clogged filters. The following day there were good opportunities in the Aramac – Lake Galilee area but again the filters clogged after one and a half hours of seeding.

On what was arguably the best seeding day of the operation, 11 December, we seeded 3 hours 18 minutes out of 4 hours 35 minutes flying. The area covered was around Longreach, Muttaborra, Barcaldine and west towards Winton. There were so many opportunities to seed that I decided to seed along a creeping-line-ahead pattern. There was roughly a half hour between tracks so we were able to observe lightning and rain development along the track seeded earlier. The consistency of this progression was, to my eyes, convincing 'evidence' of the ice-crystal process working although, as explained above, it would not have been accepted under scientific criteria.

To top off the day, we emptied our tanks under a small Cumulus cloud over Longreach airfield. The cloud was similar to many others in the sky at the time. After landing, we

observed it build in size and a faint rainbow appeared. It then glaciated and disappeared. An F-27 pilot flew below it on approach and was surprised to have to put on his windscreen wipers. Unseeded clouds behaved normally and dissipated into the evening.

For the last three days of the operation good seeding conditions were exploited in the Longreach – Winton area and on the return trip to Brisbane. The Beagle's last seeding flight was on 14 December and the aircraft returned to airline flying two days later.

Out of a total of 169 hours flying, 38 hours and 11 minutes were seeding. The most concentrated phase was in the last week at the start of the wet season. The operation stopped when there was the best chance of adding significantly to rainfall and boosting Queensland's water storages. Barry White prepared a feasibility study for a follow-on operation/experiment at a modest cost of \$72,000, but the rains had returned and dissolved the last vestiges of political interest.

Beagle VH-UNL lost its seeding gear and went back to normal services. I thought I'd seen the last of it but it appeared on my horizon again at Lismore as VH-UNI. Owner, Russell Broadbent, intended to get it operational again and flew it to Archerfield for refurbishment. However this proved impracticable and he generously passed it on to the Queensland Air Museum.

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