



McMurdo Station, Antarctica

United States Geological Survey

# Coming in from the cold

## REGION ANTARCTICA

**Flight Sergeant Russell Clarke, flight paramedic with the Royal New Zealand Air Force, has experienced first-hand the challenges of operating in sub-zero temperatures**

After over twenty years of completing aeromedical evacuations around Australasia, the South Pacific and around the world, nothing is more challenging than Antarctic medical retrievals. Its geographical location and extreme environment make any medical retrieval a very dangerous mission.

New Zealand has sovereignty over the Ross Dependency, established in 1923, which is defined as all the islands and territories south of 60 degrees south latitude and between the 160th degree of east longitude and the 150th degree of west longitude, and is constitutionally part of New Zealand.

There are three scientific research facilities well established within this area: McMurdo Station (US), Scott Base (New Zealand) and the Mario

Zucchelli Base in Terra Nova Bay – an Italian research station. McMurdo base alone has 1,650 scientists, researchers and support staff during the summer period and Scott base has 85 personnel. During the winter months, these numbers are reduced to mainly support staff and a few

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researchers. The station has a well-established medical clinic and staff, including a flight nurse, flight paramedics and a flight surgeon, and provides medical support for the New Zealand and Italian base personnel. Altogether, there are around 30 countries that maintain research stations in the Antarctic region, bringing the total number of people stationed there to around 4,000 in the summer months, reducing to around 1,000 during the winter.

The New Zealand, US and Italian Antarctic programmes are all co-located at Christchurch Airport in New Zealand, and all three programmes work together when a medical evacuation from Antarctica is needed. Regarding the aircraft that are used in the area, the Royal New Zealand Air Force (RNZAF) and the US Home Guard both fly C-130 Hercules in support of their Antarctic programmes. Re-supply flights are generally carried out during the summer period, from August until late February as, during the winter months, there is no daylight. The RNZAF normally carries out 10 to 15 flights each summer. This also allows the RNZAF flight crews to maintain skills and train new staff to land on the ice runway – a task that cannot be underestimated in its difficulty. Landing in the Antarctic is very demanding and extremely hard due to the lack of visual references for the pilots – not to mention the slippery runway.

### Point of no return

On average, between 20 and 30 aeromedical evacuations are carried out every summer season from bases in Antarctica. These can range from evacuations for routine tests and procedures that cannot be completed in Antarctica, to a full intensive-care transfer of a critically ill or injured patient. Every evacuation is thoroughly planned from start to finish and there are numerous things to consider.

Flight time from NZ to Antarctica is between 10 and 11 hours, depending, of course, on the weather conditions. The long flight time means two sets of Antarctic qualified aircrew must be



RNZAF

available to complete the flight. All crew, including medical crew, are fitted out in special cold weather clothing before they depart from Christchurch. One of the most vital parts of the flight is called 'the point of no return', which is about eight hours into the flight. This is where the captain contacts Antarctica to ensure weather conditions are appropriate to land. If conditions are not suitable, this is the last point where the aircraft can still turn back to Christchurch. If the crew decide to carry on from that point, they must land in Antarctica and re-fuel, as there would not be enough fuel to return to Christchurch. It is

not unusual to get to the point of no return and find the weather has closed in at Antarctica, so the plane is forced turn around, fly back to New Zealand and try again the next day.

**Brief encounter**

Once at Antarctica, the medical crew only has around an hour on the ground to assess the patient and receive a handover. While this is taking place, the plane is hot refuelled – with the temperature reaching -30°C (-22°F) the engines are kept running so they don't freeze. Medical equipment will also freeze and some equipment becomes unreliable in these extreme temperatures. It is important for any medical crew operating in extremely cold regions to include extra medical equipment in their bags in case this happens. The RNZAF has adapted an operating theatre warming mattress and uses the thermal angel fluid warmer for IVs to maintain patients' core temperature.

**Flexibility is key**

One of the most important things I have learnt about Antarctic retrievals is to be flexible, to think on my feet and outside the box. For example, the RNZAF carried out an aeromedical evacuation for four sick Americans just before winter closed in. There was a small window of about of one hour of daylight to land and take off in before total darkness for the next six months.

The primary mission was to uplift one patient with a serious heart condition and we ended up flying out eleven patients with various conditions. The aircraft took off in fading light using drums of burning fuel to light the runway.

Antarctica is a beautiful country and definitely one of the true natural wonders left in the world. Tourism has really increased to this part of the world, but there are currently no aeromedical services based in this area, and most insurance companies will not cover clients travelling to this region. There have been a number of tourist ships that have hit icebergs in the area recently, however, which poses the reality of a mass casualty incident in the Antarctic, which would be a real challenge for the international community to manage successfully.



An RNZAF P3-Orion lands on the ice runway at McMurdo Station, Antarctica

**Flight Sergeant (F/S) Russell Clarke** is a flight paramedic with the Royal New Zealand Air Force (RNZAF) and has over 20 years' experience in completing aeromedical evacuations and retrievals for the New Zealand Defence Force and the New Zealand Government. He has completed a bachelor's degree in health science paramedic and a post-graduate certificate and diploma in health sciences endorsed in aeromedical retrieval and transportation and is currently completing his Masters in health science.



WAYPOINTS

**Five foreign cadets from New Zealand, UK and Canada have visited Civil Air Patrol cadets in the US area of Greenville/Spartanburg as part of the International Air Cadet Exchange Program, designed to promote international friendship and understanding through a common focus on aviation.**

**The Malaysian Maritime Enforcement Agency's (MMEA) southern region's Dauphin helicopter recently made a mercy flight from a cargo ship when one of the ships officers suffered injuries after falling down the stairs. Meanwhile in Kuala Lumpur, a Royal Malaysian Air Force C-130 aircraft flew two babies suffering from heart complications from Raja Perempuan Zainab II Hospital to the National Heart Institute.**

**Spain's Salvamento Maritimo has launched its new Helimer 201 search and rescue helicopter based in the Balearic islands. The aircraft will provide a quicker response than the helicopter stationed in Valencia on the mainland, a 20-minute flight away.**

**Luxembourg is providing the Armed Forces of Malta's Air Wing with a leased CASA 212 maritime patrol aircraft for use during the ongoing Frontex operation Nautilus. The aircraft is equipped with a search radar, thermal imaging and homing equipment.**

**Royal Air Force (RAF) Boulmer search and rescue radar/winch operator Ron Webb has reached a momentous milestone in his career, recording 10,000 flying hours in a Sea King helicopter, the equivalent of one year, one month and 20 days in the air.**

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