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Anniversary

Ten years of exploration with the AWI's research aircraft Polar 5

Geophysicists, atmospheric researchers and sea-ice physicists can gather data in even the most remote regions

[29. September 2017] The 1st of October 2017 marks the ten-year anniversary since the Alfred Wegener Institute, Helmholtz Centre for Polar and Marine Research (AWI) research aircraft Polar 5 began service. In that time, the Basler BT-67 has flown more than 1.3 million kilometres to fulfil essential scientific and logistical duties. In the course of 48 measuring campaigns, predominantly for atmospheric research and geophysics purposes, the airplane has landed on the Arctic sea ice near the North Pole, and at the South Pole.



Polar 5 is tailor-made for polar research: in the span of eleven months, the 65-year-old plane was essentially rebuilt from scratch. The Basler BT-67 is based on a modified Douglas DC-3 (which became famous as "raisin bombers"). The rebuild also provided the perfect opportunity to install the special-purpose equipment needed for survey flights. As a result, Polar 5 can lower the ice-thickness-measuring device EM-Bird and tow it through the atmosphere, while a special port in the hull allows probes to deploy sondes in flight. Thanks to her combination skid-and-wheel landing gear system, the plane can take off and land in even the most remote regions.

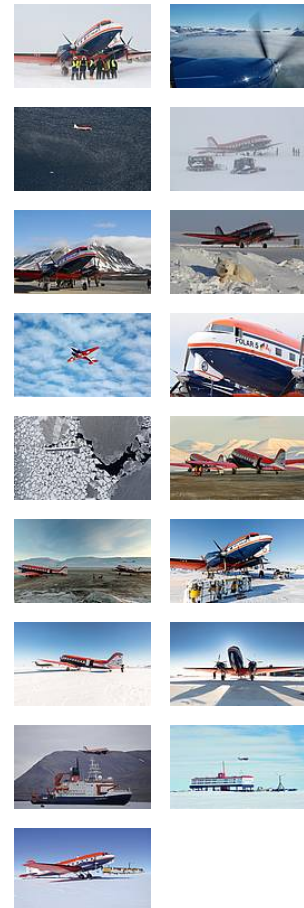
Upon being commissioned, Polar 5 - supported by 8.1 million Euros of funding from Germany's Federal Ministry of Education and Research (BMBF) - embarked on her maiden flight to the Antarctic. She first landed on Antarctica on 9 November



Polar 5 at Kohnen Station, Antarctica (Photo: © S. Müller-Marks)




2007 and reached the Neumayer Station on 15 November. In the meantime, the plane has flown 14 scientific recording campaigns in six Antarctic summers - not to mention her passenger and logistics flights in the context of the




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"A special highlight was a recording flight at an altitude of 4,700 metres, which took us over Dome A, located on the Antarctic Plateau, 4,090 metres above sea level," recalls Dr Daniel Steinhage, a geophysicist at the Alfred Wegener Institute and one of Polar 5's 'frequent flyers'. Dome A is one of several key sites for drilling ice cores in East Antarctica. Radar measurements taken on board Polar 5 allow e.g. glaciologists to investigate the layering and flow behaviour of the ice, and help them work together with climate researchers to find the ideal sites for gathering ice cores, which in turn offer valuable insights into greenhouse-gas concentrations throughout our planet's history.



Polar 5 with sonde for ice thickness measurements (Photo: Christian Haas)

Polar 5 also makes flights to the Arctic, and brings researchers to the Greenlandic glacier, where they not only extract ice cores, but also gather data on atmospheric aerosols and trace gases, as well as the distribution of sea-ice thickness, at regular intervals. Yet what AWI

atmospheric researcher Dr Andreas Herber remembers best is a very different aspect: "As part of the International Polar Year 2007/08, we picked up one of our colleagues from a glacier in the Central Arctic that was home to Russia's drifting ice station 'North Pole 35'. The landing strip on the sea ice was a brand-new experience for us. But it worked so well that we visited the Russian researchers at 'North Pole 36' with Polar 5 the following year, to pick up fuel."

Since beginning service, Polar 5 has travelled to Antarctica six times and yearly to the Arctic, where it has contributed to 34 research projects. All told, she has completed 48 campaigns in both polar regions and flown more than 1.3 million kilometres - the equivalent to 32



Both AWI aircraft in Longyearbyen, Svalbard (Photo: Stefan Hendricks)

trips around the Equator. For nearly six years now, she has also been supported by her sister ship Polar 6, which began service on 28 October 2011. "The excellent track record we had with using this type of craft for scientific and logistical work in the polar regions is what moved us to purchase Polar 6. As a result, we can now use both planes simultaneously, and can, for instance, collect data on the same cloud from above and within at the same time," says Dr Uwe Nixdorf, Head of the Operations and Research Platforms Division at the Alfred Wegener Institute. "That gives us a unique infrastructure for scientific research in the polar regions - due in part to the fact that, with two essentially identical planes, we can easily transfer measuring systems from one to the other as needed."

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Wegener
Institute pursues

research in the polar regions and the oceans of mid and high latitudes. As one of the 19 centres of the Helmholtz Association it coordinates polar research in Germany and provides ships like the research icebreaker Polarstern and stations for the international scientific community.

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The NETCARE team of the German research aircraft Polar 5 (Photo: Stefan Hendricks)

The Alfred Wegener Institute has operated research aeroplanes since 1983. Before Polar 5's day, the planes were Dorniers, most recently two Do228-101 models. "When equipped with the same instruments, the Basler offers us two more hours in the air than the Dornier," explains Daniel Steinhage. That means e.g.

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geophysical cartography flights can be extended much closer to the North and South Poles. In addition, the current aircraft offers substantially more room for survey equipment and passengers alike. Citing a further advantage, the AWI geophysicist adds, "As a result, many more working groups can participate in campaigns, and we can collaborate with several national and international partners."

Polar 5 (registry C-GAWI) is currently at Lake Central Air Services in Muskoka, Canada, where she's being prepared to receive new measuring instruments. Once the new gear is in place, pilots and engineers from the Canadian company Ken Borek Air Ltd. will fly the craft back to Bremen Airport, Germany, tentatively on 21 November. Once Polar 5 is back home, AWI engineers and scientists will install and test new sensors. In March 2018 she'll leave for northern Greenland, where PAMARCMIP, her next major polar campaign, awaits.

Video