Unmanned aerial vehicles mark robotic first for British Antarctic Survey

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Scientists at British Antarctic Survey (BAS) in collaboration with the Technical University of Braunschweig (TUBS), Germany have completed the first ever series of flights by autonomous unmanned aerial vehicles (UAVs) in Antarctica. This is the first time that unpiloted UAVs have been used in the Antarctic and the successful flights open up a major new technique for gathering scientific data in the harshest and remotest environment on Earth.

Dr Phil Anderson of BAS says, “This is a huge technological achievement for BAS and TUBS. Apart from take-off and landing, when the UAVs are controlled by radio, the aircraft are completely autonomous, flying on their own according to a pre-programmed flight plan. Each flight lasts for 40 minutes, covering around 45 km and taking 100 measurements a second, so waiting for the UAV to return safely after its research mission was very exciting. Seeing the first UAV come back successfully was a real heart-in-the-mouth moment.”

Following trials during the austral winter of 2007, the UAVs successfully completed 20 flights between October and December 2007, including four over the Weddell Sea. They were fitted with instruments to record the exchange of heat between the lower atmosphere and sea ice. During the Antarctic winter, the Weddell Sea freezes, and because of its bright white colour, the ice reflects heat and helps to cool the planet. However, sea ice is a major unknown feedback mechanism in the Earth’s climate system and scientists need to discover more about it and its sensitivity to climate change.

Using UAVs to gather this kind of data is a major step forward, allowing scientists to study areas that are too costly to reach using ships or conventional aircraft. According to Anderson, “UAVs allow scientists to reach the parts others cannot reach – the future of much atmospheric research will be robotic.”

Despite the enormous physical and technical challenges BAS’s UAV team had to overcome – not least learning how to keep batteries operating at very low temperatures and how to operate radio controls for take off and landing in thick gloves and mitts – the Antarctic is actually an ideal place to pioneer UAV technology. “UAVs are physically harder to operate in the Antarctic, but far easier in safety terms because there is virtually nothing sensitive to hit. Our next challenge will be to operate UAVs in the depths of the Antarctic winter,” says Anderson.

Source: British Antarctic Survey