Assessing climatology and wind shear risk for a new airport

**Challenge**

St Helena is a unique, small volcanic island located in the South Atlantic Ocean. It is one of the most remote locations in the world. In 2011, the St Helena Government contracted for the design, construction and operation of an airport to provide air access to St Helena for the first time from 2016.

Any new airport has to provide meteorological services in compliance with International Civil Aviation Organisation (ICAO) standards and recommended practices defined by the ICAO. This includes the provision of wind shear reports and forecasts at an airport where it is considered to be an operational factor. The St Helena Government sought consultancy from the Met Office to carry out a detailed assessment of the climatology at the airport, focussing on wind speed and direction along the proposed runway and approaches.

**Solution**

We liaised with the St Helena Government to make an assessment of surface and upper level winds to identify the potential for wind shear at the new airport. For aviation purposes, strong winds are most important to consider, with the crosswind component of wind gusts being of particular concern. As a result of this risk we analysed the typical wind conditions as well as the frequency of crosswind threshold exceedance that would affect aviation.

Data was compared over a 12 month period from the two weather observing sites on St Helena – from the Met Office Integrated Data Archive System (MIDAS) station at an inland site and output from an automated weather station set up at the airport. Radiosonde data was also used to assess high level winds up to 2,000 ft.

**Benefits**

Assessment of the wind shear risk was found to be relatively low. However we were able incorporate other findings arising from our analysis to highlight other risks that were not previously anticipated. This included crosswind risks and the potential of wind shear close to the surface, due to possible effects on localised air flow from the wind coming up off the steep coastline.

Analysis provided bespoke information for St Helena Airport, including a range of crosswind thresholds associated with specific aircraft types that are planned to be operational at this airport, in both dry and wet conditions.

Recommendations were made for the need for more observational equipment in close proximity to the runway to fully understand the more localised wind risks near the surface. The first would be to install an additional anemometer or windsock at the centre point of the runway as well as a windsock within sight of the Air Traffic Control tower to help identify if turbulent flow is evident.