



Aircraft icing research makes a splash

Challenge

When an aircraft is flying through clouds in cold temperatures, water droplets in the cloud can impact upon it and turn to ice.

If this ice is left to grow unhindered (particularly on the wings or engine intake) it can dramatically affect the efficiency, control and ultimately the safety of an aircraft.

Existing models of the process do a reasonable job of predicting ice growth when the clouds contain small droplets. However, for larger drops the models are not so good, considerably over-predicting the amount of ice and inaccurately predicting its location. This discrepancy is thought to be mostly due to the splashing of the impacting droplets, which tends to be ignored in existing models.

Solution

Mathematicians at the University of East Anglia are trying to better understand how much splash is generated when a high-speed droplet impacts onto a thin film of water. The University is working in collaboration with University College London and Cranfield University, along with industry partners including Aerotex UK LLP, to identify how much water is splashed away due to a droplet impact. They also seek to determine which parameters and influences are important - for example, ice roughness, oblique impacts, temperature, distorted droplets, etc.

Findings from this fundamental research into droplet impact will feed into industrial models of the entire icing process, helping to improve existing computer models and ultimately provide a clearer understanding of the impact process, resulting in more efficient and safer aeroplanes in the future.

