

Preface

Aircraft icing is a widespread phenomenon in flight practice and has been recognized as a significant hazard to flight safety. Accidents caused by icing have shadowed the development of aviation since the birth of airplanes. Aircraft safety in icing conditions has become a crucial requirement for airworthiness certification, and icing hazard assessment and protection design have grown into one of the most important tasks in aircraft development. However, considerable scientific issues on aircraft icing still need to be clarified due to the complex icing process, and new technological breakthroughs on aircraft icing protection are urgently required to tackle the safety and economy challenges posed by modern aviation.

Chinese scholars seldom devoted to aircraft icing until 2000, but accompanied with the blooming of China's aviation industry in the 21st century, research on aircraft icing and anti-icing has made great progress. The most powerful force came from the launch of a series of key projects: the Major Project of Large Aircraft in 2007, as well as various projects for unmanned vehicles, transport aircraft, helicopters and aero-engine models. This force's effects are compelling: The world's largest icing wind tunnel (FL16) was established by China Aerodynamic Research and Development Center in 2013; the novel regional aircraft ARJ21 went through the natural icing test in 2014; the large aircraft C919 successfully passed the icing airworthiness certification in 2022.

The huge achievements in China's aircraft icing and anti-icing research fall into four directions: (1) A complete icing wind tunnel test system has been built; (2) the capabilities of numerical simulation have been significantly improved; (3) fundamental research results on aircraft icing have been fruitful; (4) diversified new anti-icing and de-icing technologies have been explored and developed.

In 2022, the first national academic group in the field of aircraft icing in China, the Icing

and Anti/De-icing Branch of the Chinese Society of Aeronautics and Astronautics (CSAA), was established. Nowadays, this branch, together with Transactions of Nanjing University of Aeronautics and Astronautics (TNUAA) present a special issue of “Progress in Aircraft Icing Research in China” to highlight the latest research achievements of Chinese scholars in the field of aircraft icing. This issue includes 11 papers that cover studies on icing mechanism, numerical simulations, wind tunnel tests, and anti-icing methods.

I believe this issue, coinciding with the 5th National Conference on Icing and Anti/De-icing, the largest academic arena for icing and anti/de-icing scholars in China and to be held in Changsha, China in May 11th, 2023, will provide valuable references and inspirations for scholars and engineers around the world.

Prof. YI Xian

Chairman of Icing and Anti/De-icing Branch of CSAA

April 30th, 2023

(Translator: ZHANG Bei; Editor: ZHANG Bei)