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AIRBUS RESEARCH & TECHNOLOGY

Since the introduction of jet engine aircraft, the air transport industry has achieved enormous improvements in economic efficiency and environmental performance of aircraft. For instance, in the last 40 years, the aviation industry has cut fuel burn and CO_2 emissions by 70%, NOx emissions by 90% and noise by 75%. During that time, innovation has been a key driver in Airbus' success. From the A300 to the A350 XWB, Airbus has been continually implementing new ideas.

Environmental and safety considerations have long been an integral part of the company's activities at all levels, and are a key priority in the development of all new techniques, products and processes. Through innovation, and out-of-the-box thinking, Airbus will continue to meet its eco-efficiency goals, and ensure that air travel continues to be one of the safest and most eco-efficient means of transportation. That's where Research and Technology (R&T) comes in. Innovation is the backbone of Airbus' ongoing success and the key to its future.

Working together with governments, industries, research institutes and universities around the world, Airbus is focused on finding the best solutions for some of aviation's most important questions and hence meeting and even going beyond our customers' and society's needs. To satisfy these, the technologies and innovations need to deliver a significant improvement, a step-change, in efficiency and performance and will benefit and contribute to the growth of the industry on a global scale.

More than 3,000 people at Airbus are working either directly or indirectly on over 100 major R&T projects. Airbus invests around two billion euros every year in Research and Development (R&D). More than 500 patent applications are filed by Airbus each year.

Over the next 40 years, R&T cooperation and investment will be even more crucial because energy sources are set to become increasingly scarce and expensive, yet fuel remains the single biggest element of airline operating costs (30% for Single Aisle / 40% for Long Range aircraft), so reducing consumption (and therefore emissions) and finding new alternative sources remains a key industry driver. The aeronautic industry needs further step-changes in economic and environmental performance throughout the aircraft lifecycle to address the challenges.

Airbus' R&T efforts are achieved on a global scale. Not one single party or nation working on its own could have achieved what we have collectively achieved. R&T investment stimulates economies: It is estimated by governments and institutions alike that a €100M investment in aeronautic R&T raises GDP by €700M over 10 years, and has a spin-off effect spurring breakthroughs in many other industries. Secondarily R&T ensures stability: investments drive economic growth, creativity and education by reaching the younger generations and encouraging them to choose the science and engineering fields.

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CleanSky and ACARE

As part of the European Union's Joint Technology Initiative *CleanSky*, Airbus is currently co-leading with Saab a seven-year (part of the European Framework Programme 7: 2007 – 2013) Smart Fixed Wing Aircraft (SFWA) Integrated Technology Demonstrator (ITD) project, which aims to develop a range of fuel-efficient, low-emission vehicle sub-systems. CleanSky's objectives are closely linked to the Advisory Council for Aeronautics Research in Europe's (ACARE) Vision 2020, which seeks to reduce fuel consumption and CO_2 emissions by 50 percent, reduce perceived external noise by 50 percent and reduce NO_X by 80 percent, all by the year 2020 compared to year 2000 levels.

As 2020 approaches, Airbus and 15 industrial and research partners have renewed their commitment for continued and increased investment in research and technology on a European level. Industry foresees a continuation of the current CleanSky programme in the next European Research Framework Programme *Horizon 2020* to run from 2014 to 2020. The Letter of Intent (LoI) on the Clean Sky 2 (CS2) programme signed in September 2012, highlights industry's and research partners' commitment to increase R&T investment. In June, CS2 partners submitted to the European Commission their Joint Technical Proposal (JTP). The LoI and the JTP foresee investment of 3.6 billion euros (1.8 billion euros in funding) from public and private sectors for Clean Sky 2 within *Horizon 2020*. Horizon 2020 will allow Airbus and its partners to ensure the maturity and integration of new step-changing technologies that have been developed within the previous Framework Programme 7.

Beyond 2020, Airbus believes that there is a real need to work towards even wider-ranging R&D development goals, which are laid out in ACARE's "Flightpath 2050". This long-term vision places future R&D development at the heart of meeting aviation-related societal and market needs, maintaining industrial leadership as well as protecting the environment and the energy supply. To this end, Airbus fully supports ACARE's Strategic Research and Innovation Agenda (SRIA), a strategic roadmap for aviation research, development and innovation designed to ensure that Flightpath 2050's goals can be met through adequate public and private support and funding. Moreover, for its part, CS2 will work towards making available by 2050 the technologies and procedures which allow for reductions of CO_2 emissions by 75%, NOx emissions by 90% and noise pollution by 65% compared to 2000 levels – in line with the goals of Flightpath 2050.

In short, Airbus places, and will continue to place utmost priority on R&T topics that it identifies as game-changers in the area of large commercial aircraft for the future of air transport.

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