

PERSPECTIVES FOR AERONAUTICAL RESEARCH IN EUROPE



Introduction

Final Report

WWW.PAREPROJECT.EU



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 769220. This publication [communication] reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

Introduction

The principal aim of the project PARE (Perspectives for Aeronautical Research in Europe) is to consider the progress made towards the achievement of each of the 23 Flightpath 2050 goals defined by ACARE and make recommendations on how to close the remaining gap.

The PART I of the PARE Report is thus structured in the five chapters that mirror the ACARE overarching aims: (Chapter 2) Meeting Societal and Market Needs; (Chapter 3) Maintaining and Extending Industrial Leadership; (Chapter 4) Protecting the Environment and the Energy Supply; (Chapter 5) Ensuring Safety and Security; (Chapter 6) Prioritising Research, Test Facilities and Education. Within each of these chapters, the relevant ACARE goals are considered in detail using past progress and current status as the precursors to the possible future evolution.

In consonance with the call for proposals the PARE project also addresses five special focus areas, corresponding to the chapters in the PART II of the report: (Chapter 7) Aircraft Markets; (Chapter 8) Emerging Aviation Technologies; (Chapter 9) Cooperation beyond Europe's Borders; (Chapter 10) Attracting Young Talent; (Chapter 11) Increasing the Participation of Women. The methodological approach adopted in PART I applies equally well to PART II taking the past and present as precursors to the future.

In response to a request from the European Commission, the PARE Project prepared a set of recommendations for Aeronautics Research in the forthcoming Framework Program FP9 "Horizon Europe". Each recommendation consists of the following items: (i) statement of the recommendation; (ii) rationale as brief explanation; (iii) stakeholders able to contribute to implementation; (iv) relevance as concerns potential impact; (v) priority on a scale with 4 levels; (vi) justification in detail by reference to the PARE Report. The 58 PARE Recommendations for Aeronautics Research in Horizon Europe consist of two sets: (i) the first 23 Recommendations concern the ACARE goals as a comprehensive set of vertical integration aims for the European Aviation; (ii) the last 35 Recommendations concern 35 PARE Objectives as a complementary set of horizontal initiatives supporting the aviation sector. Some of the PARE Recommendations have multiple items leading to 68 Priorities. The PARE Recommendations provide a good summary of the PARTS I and II of the PARE Report and are included in the Introduction (Chapter 1) as a precursor.

The PARE Recommendations for Aeronautical Research in Horizon Europe are the basis of an illustrated brochure as a concise dissemination of PARE Results among the professional community. Since aviation serves the citizen it is equally important to inform the general public and the decision makers. With this objective, the PARE Project produces a set of articles, corresponding to the chapters in the PARE Report, and reporting using a language accessible to the non-specialist. Each article reports on "Key Findings", which suggest "Key Actions", preceded by an introduction and followed by a conclusion. The ensemble of PARE Articles (Chapter 20) may be collected in a brochure "PARE findings and actions on aviation challenges and developments in Europe" as a non-specialist counterpart to the brochure of the "58 PARE Recommendations for Aeronautics Research in Horizon Europe" (Chapter 1).

Chapters 2 to 6, in PART I, and 7 to 11, in PART II, have a similar structure:

- (i) A baseline generic text gives a balanced coverage of the subject, and identifies specific critical issues or key points;
- (ii) In order not to break the flow of basic text, each key topic is treated as a separate article with its own illustrations and references.

PART III consists of five chapters (Chapters 12 to 16), each containing extensive detailed case study led by one partner and supported by the consortium as appropriate. Among the multiple interesting subjects for case studies that emerged during the preparation of PARTS I and II of the first yearly report, five were chosen for their current impact and/or future implications.

The Evolution of the Chinese Aircraft Industry (Chapter 12), still at an early stage may eventually lead to a strong competition playing by the rules different from an open market. The Boeing Middle of the Market Aircraft (Chapter 13) or business case has been the subject of much discussion, justifying an objective market assessment. The case for the MMA or a Boeing B737 replacement or both as a family becomes more critical to the future of Boeing in the single-aisle market after the two Boeing B737 Max Accidents and Consequences (Chapter 14) that have shaken the public and aerospace community alike. The biggest crisis in the history of aviation, COVID-19, started in the last year of the PARE project and become the inescapable subject of two case studies: (Chapter 15) a factual account of the implications of COVID-19 on partner airline SATA with both regional and international routes; (Chapter 16) a broader global assessment of the context of the COVID-19 pandemic and its consequences on activities in aviation sectors, including airlines and related services (airports, air traffic and maintenance) and industry and the supply chain, and related government actions.

PART IV relates to another major event in the last year of the PARE project, namely the publication of the New Green Deal of the European Union. The greater emphasis on the environmental effects of aviation justifies supplementing the earlier chapters with three more chapters focused on the green challenges for the future of aviation: (Chapter 17) advances in efficient propulsion for low noise and emissions; (Chapter 18) the prospects and initiatives leading to the decarbonisation of aviation by 2050; (Chapter 19) the merging choices of possibly synthetic sustainable alternative fuels for the greening of aviation.

For chapters 2 to 11, the basic text originates with the coordinator and the key topics with the individual partners, as a collective effort in which each partner can contribute to improving all texts. The basic text is self-consistent whereas the Key Topics can reflect different views on the same subject looked at from different angles. The report does not presume to be a final assessment and aims only to give a valid contribution to the issues relating to perspectives for aerospace research in Europe.

The Figures, Tables and Key Topics are numbered by Chapter, e.g. Key Topic T2.5 in Chapter 2. The references are numbered by order of appearance.

The report is based entirely on open sources of information upon which are superimposed multiple layers of interpretation and assessments using the expertise of the consortium.