Prandtlplane ARchitecture for the Sustainable Improvement of Future AirpLanes

Results

Project Information

**PARSIFAL**

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Coordinated by UNIVERSITA DI PISA

Italy

This project is featured in...

RESEARCH*EU MAGAZINE

The future of aviation: The only way is up

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Deliverables

Documents, reports (9)

Report on operational and economic assessment
Analysis of the economic and logistics impact for transport operators (This document is accessible to Advisory Board members too.)

Advanced flight control concepts for the PrandtlPlane to increase safety and passenger comfort
Exploration of the potential for advanced flight control concepts (e.g.: direct lift control and direct side-force control) and evaluation of possible expansion of the flight envelope

Aircraft performance analysis and mission profile optimization
Definition of optimum mission profiles for PrPs whilst taking into account actual constraints (air traffic control, block time, etc.)

Report on socio-economic scenarios and expectations
Forecasting of air passenger demand for identifying the relevant and deriving future demand prognostics (This document is accessible to Advisory Board members too)

Preliminary design of the reference PrandtlPlane
Conceptual design of the PrP configuration, including a preliminary analysis of system integration

Requirements for the adoption of the PrandtlPlane as mean of transport
Definition of Top Level Aircraft Requirements according to the identified reference Air Transport System (This document is accessible to Advisory Board members too)

Aerodynamic and acoustic analysis of the baseline PrandtlPlane
Aerodynamic analysis of the reference PrP in cruise, low-speed conditions (including acoustics), longitudinal stability and control surface effectiveness.

Feasibility study on the use of very large bypass ratio turbofan engines for the PrandtlPlane
Feasibility study on the use of very large bypass ratio turbofan engines for the PrandtlPlane (TUD, M30)

PrandtlPlane performance analysis and scaling procedures
Performance analysis from both Aircraft and the Air Transport System perspectives and definition of criteria for the performance prediction the of different size PrP
Websites, patent filings, videos etc. (1)

Project Website
Project website which will be used both for dissemination purposes and to provide partners with any time access to project documents. This will be made possible including a reserved area to the area.

Publications

Conference proceedings (12)

PRELIMINARY TAKE-OFF ANALYSIS AND SIMULATION FOR A PRANDTLPLANE COMMERCIAL AIRCRAFT
Author(s): K. Abu Salem, G. Palaia, V. Cipolla, V. Binante
Published in: AIDAA 2019 Conference Proceedings, 2019

A Hybrid, configuration-agnostic approach to aircraft control surface sizing
Author(s): C. Varriale, A.Raju Kulkarni, G. La Rocca, M. Voskuijl
Published in: AIDAA 2019 Conference Proceedings, 2019

Aerodynamic and Acoustic analysis of a preliminary PrandtlPlane configuration within the framework of the PARSIFAL project
Author(s): Carini, Marco; Méheut, Michaël; Sanders, Laurent
Published in: AIDAA 2019 Conference Proceedings, 2019

Aerodynamic design and preliminary optimization of a commercial PrandtlPlane aircraft
Author(s): ABU SALEM, Karim; CIPOLLA, Vittorio; CARINI, Marco; MEHEUT, Michael; KANELLOPOULOS, Stylianos; BINANTE, Vincenzo; MAGANZI, Marco
Published in: EUCASS 2019 Conference Proceedings, 2019
DOI: 10.13009/EUCASS2019-741

Comparative Design and Sensitivity studies on box-wing airplanes
Author(s): R.J.M. Elmendorp, G. La Rocca
Published in: AIDAA 2019 Conference Proceedings, 2019
On the preliminary design of PrandtlPlane civil transport aircraft

Author(s): Frediani Aldo, Vittorio Cipolla, Karim Abu Salem, Marco Picchi Scardaoni
Published in: EUCASS 2017 Conference Proceedings, 2017
DOI: 10.13009/EUCASS2017-546

Conceptual design of a box-wing aircraft for the air transport of the future

Author(s): Vittorio Cipolla, Aldo Frediani, Karim Abu Salem, Marco Picchi Scardaoni, Alessio Nuti, Vincenzo Binante
Published in: 2018 Aviation Technology, Integration, and Operations Conference, 2018
DOI: 10.2514/6.2018-3660

Overall Preliminary Sizing and Optimization of the Metallic Structures of a PrandtlPlane Civil Transport Aircraft

Author(s): PICCHI SCARDAONI, MARCO CIPOLLA, VITTORIO BINANTE, VINCENZO
Published in: EUCASS 2019, 2019
DOI: 10.13009/eucass2019-802

Aerodynamic design and preliminary optimization of a commercial PrandtlPlane aircraft

Author(s): ABU SALEM, KARIM CIPOLLA, VITTORIO BINANTE, VINCENZO MAGANZI, MARCO
Published in: EUCASS 2019, 2019
DOI: 10.13009/eucass2019-741

Trim for Maximum Control Authority using the Attainable Moment Set

Author(s): Carmine Varriale, Mark Voskuijl, Leo L. Veldhuis
Published in: AIAA Scitech 2020 Forum, 2020
DOI: 10.2514/6.2020-1265

Preliminary design and performance analysis of a box-wing transport aircraft

Author(s): Vittorio Cipolla, Karim Abu Salem, Marco Picchi Scardaoni, Vincenzo Binante
Published in: AIAA Scitech 2020 Forum, 2020
DOI: 10.2514/6.2020-0267

Aerodynamic analysis and optimization of a boxwing architecture for commercial airplanes

Author(s): Marco Carini, Michael Meheut, Stylianos Kanellopoulos, Vittorio Cipolla, Karim Abu Salem
Published in: AIAA Scitech 2020 Forum, 2020
DOI: 10.2514/6.2020-1285
Preliminary Take-Off Analysis and Simulation of PrandtlPlane Commercial Aircraft

Author(s): K. Abu Salem, G. Palaia, M. Bianchi, D. Zanetti, V. Cipolla, V. Binante
Published in: Aerotecnica Missili & Spazio, Issue 99/3, 2020, Page(s) 203-216, ISSN 2524-6968
DOI: 10.1007/s42496-020-00056-0

A general global-local modelling framework for the deterministic optimisation of composite structures

Author(s): Marco Picchi Scardaoni, Marco Montemurro
Published in: Structural and Multidisciplinary Optimization, 2020, ISSN 1615-147X
DOI: 10.1007/s00158-020-02586-4

Multi-scale optimisation of thin-walled structures by considering a global/local modelling approach

Author(s): Michele I Izzi, Marco Montemurro, Anita Catapano, Daniele Fanteria, Jérôme Pailhès
Published in: Proceedings of the Institution of Mechanical Engineers, Part G: Journal of Aerospace Engineering, 2020, Page(s) 095441002093933, ISSN 0954-4100
DOI: 10.1177/0954410020939338

PrandtlPlane wing-box least-weight design: A multi-scale optimisation approach

Author(s): Marco Picchi Scardaoni, Marco Montemurro, Enrico Panettieri
Published in: Aerospace Science and Technology, Issue 106, 2020, Page(s) 106156, ISSN 1270-9638
DOI: 10.1016/j.ast.2020.106156

Blending constraints for composite laminates in polar parameters space

Author(s): Enrico Panettieri, Marco Montemurro, Anita Catapano
Published in: Composites Part B: Engineering, Issue 168, 2019, Page(s) 448-457, ISSN 1359-8368
DOI: 10.1016/j.compositesb.2019.03.040

Multi-scale Least-Weight Design of a Wing-Box Through a Global/Local Modelling Approach

Author(s): Enrico Panettieri, Marco Montemurro, Daniele Fanteria, Francesco Coccia
Published in: Journal of Optimization Theory and Applications, 2020, ISSN 0022-3239
DOI: 10.1007/s10957-020-01693-y
New blending constraints and a stack-recovery strategy for the multi-scale design of composite laminates

**Author(s):** Marco Picchi Scardaoni, Marco Montemurro, Enrico Panettieri, Anita Catapano  
**Published in:** Structural and Multidisciplinary Optimization, 2020, ISSN 1615-147X  
**DOI:** 10.1007/s00158-020-02725-x

Preliminary stability analysis methods for PrandtlPlane aircraft in subsonic conditions

**Author(s):** Vittorio Cipolla, Karim Abu Salem, Filippo Bachi  
**Published in:** Aircraft Engineering and Aerospace Technology, Issue 91/3, 2019, Page(s) 525-537, ISSN 1748-8842  
**DOI:** 10.1108/AEAT-12-2017-0284

A Generalized Approach to Operational, Globally Optimal Aircraft Mission Performance Evaluation, with Application to Direct Lift Control

**Author(s):** Sam de de Wringer, Carmine Varriale, Fabrizio Oliviero  
**Published in:** Aerospace, Issue 7/9, 2020, Page(s) 134, ISSN 2226-4310  
**DOI:** 10.3390/aerospace7090134

WAGNER: a new code for parametrical structural study of fuselages of civil transport aircraft

**Author(s):** A. Frediani, V. Cipolla, V. Binante, K. Abu Salem, M. Maganzi  
**Published in:** Aerotecnicas, Missili & Spazio, Issue Vol. 96, N. 3, 2017, Page(s) 136-147, ISSN 0365-7442  
**DOI:** 10.19249/ams.v96i3.311

Preliminary transonic CFD analyses of a PrandtlPlane transport aircraft

**Author(s):** Cipolla Vittorio, Frediani Aldo, Abu Salem Karim, Binante Vincenzo, Rizzo Emanuele, Maganzi Marco  
**Published in:** Transportation Research Procedia, Issue 29, 2018, Page(s) 82-91, ISSN 2352-1465  
**DOI:** 10.1016/j.trpro.2018.02.008

Design of a Fuselage-Mounted Main Landing Gear of a Medium-Size Civil Transport Aircraft

**Author(s):** Alessio Nuti, Francesco Bertini, Vittorio Cipolla, Gianpietro Di Rito  
**Published in:** Aerotecnicas Missili & Spazio, Issue Vol. 97, N. 2, 2018, Page(s) 85-95, ISSN 0365-7442  
**DOI:** 10.19249/ams.v97i2.341

PARSIFAL Project: a breakthrough innovation in air transport

**Author(s):** Karim Abu Salem, Vincenzo Binante, Vittorio Cipolla, Marco Maganzi  
**Published in:** Aerotecnicas, Missili & Spazio, Issue Vol. 97, N. 1, 2018, Page(s) 40-46, ISSN 0365-7442  
**DOI:** 10.19249/ams.v97i1.337
Preliminary stability analysis methods for PrandtlPlane aircraft in subsonic conditions

**Author(s):** Vittorio Cipolla, Karim Abu Salem, Filippo Bachi  
**Published in:** Aircraft Engineering and Aerospace Technology, Issue 91/3, 2019, Page(s) 525-537, ISSN 0002-2667  
**DOI:** 10.1108/aeat-12-2017-0284

Conceptual design of PrandtlPlane civil transport aircraft

**Author(s):** A Frediani, Vittorio Cipolla, K Abu Salem, V Binante, M Picchi Scardaoni  
**Published in:** Proceedings of the Institution of Mechanical Engineers, Part G: Journal of Aerospace Engineering, 2019, Page(s) 095441001982643, ISSN 0954-4100  
**DOI:** 10.1177/0954410019826435

Analytical and Finite Element Approach for the In-plane Study of Frames of Non-conventional Civil Aircraft

**Author(s):** Marco Picchi Scardaoni, Aldo Frediani  
**Published in:** Aerotecnica Missili & Spazio, Issue 98/1, 2019, Page(s) 45-61, ISSN 0365-7442  
**DOI:** 10.1007/s42496-018-00004-z

A multi-scale two-level optimisation strategy integrating a global/local modelling approach for composite structures

**Author(s):** Michele Iacopo Izzi, Marco Montemurro, Anita Catapano, Jérôme Pailhès  
**Published in:** Composite Structures, Issue 237, 2020, Page(s) 111908, ISSN 0263-8223  
**DOI:** 10.1016/j.compstruct.2020.111908

A general isogeometric polar approach for the optimisation of variable stiffness composites: Application to eigenvalue buckling problems

**Author(s):** G.A. Fiordilino, M.I. Izzi, M. Montemurro  
**Published in:** Mechanics of Materials, 2020, Page(s) 103574, ISSN 0167-6636  
**DOI:** 10.1016/j.mechmat.2020.103574

Convex or non-convex? On the nature of the feasible domain of laminates

**Author(s):** Marco Picchi Scardaoni, Marco Montemurro  
**Published in:** European Journal of Mechanics - A/Solids, 2020, Page(s) 104112, ISSN 0997-7538  
**DOI:** 10.1016/j.euromechsol.2020.104112

Non-peer reviewed articles (1)