

Model Based Collaborative Design & Optimization of Blended Wing Body Aircraft Configuration : AGILE EU Project

Prajwal Shiva Prakasha¹, Pier Davide Ciampa¹, Pierluigi Della Vecchia², Danilo Ciliberti³, Mark Voskuij⁴, Dominique Charbonnier⁵, Aidan Jungo⁵, Mengmeng Zhang⁶, Marco Fioriti⁷, Kirill Anisimov⁸, Artur Mirzoyan⁹,
AGILE EU Project, German Aerospace Center, Hein-Saß-Weg 22, 21129 Hamburg

Novel configuration design choices may help achieve revolutionary goals for reducing fuel burn, emission and noise, set by Flightpath 2050. One such advance configuration is a blended wing body. Due to multi-disciplinary nature of the configuration, several partners with disciplinary expertise collaborate in a Model driven ‘AGILE MDAO framework’ to design and evaluate the novel configuration. The objective of this research are :

- **To create and test a model based collaborative framework using AGILE Paradigm for novel configuration design & optimization, involving large multinational team. Reduce setup time for complex MDO problem.**
- **Through Multi fidelity design space exploration, evaluate aerodynamic performance**
- **The BWB disciplinary analysis models such as aerodynamics, propulsion, onboard systems, S&C were integrated and intermediate results are published in this report.**

Nomenclature

AGILE	= Aircraft 3 rd Generation MDO for Innovative Collaboration of Heterogeneous Teams of Experts
MDO	= Multi Disciplinary Optimization
CPACS	= Common Parametric Aircraft Configuration Scheme
BWB	= Blended Wing Body
KA	= Knowledge Architecture
CA	= Collaborative Architecture
CMDOWS	= Common Multidisciplinary Design Optimization Workflow Schema



Figure 1. BWB Design Concepts for AGILE EU Project

Agile Paradigm is used for BWB design. The Design approach is stated as below using a Model Based Agile Framework and Central Data model CPACS:

¹ Research Scientist, Institute of System Architectures in Aeronautics, DLR, Hamburg, Germany

² Assistant Professor, University of Naples “Federico II”, 80125, Naples, Italy

³ Post-Doc Researcher, University of Naples “Federico II, 80125, Naples, Italy

⁴ Faculty of Aerospace Engineering, TU Delft, Kluyverweg 1, 2629 HS Delft, the Netherlands

⁵ Senior Scientist, CFSE, EPFL Innovation Park, 1015 Lusanne, Switzerland

⁶ Research scientist in aerodynamics, CEO, Airinova AB, Stockholm, Sweden

⁷ Assistant Professor, Aerospace Department, Politecnico di Torino, Torino 10129

⁸ Research Scientist, TsAGI, 1, Zhukovskiy, Moscow Oblast, 140180

⁹ Head of Department, CIAM, 2, Aviamotornays Str, Moscow, 111116