

## **Rotorcraft-Pilot Interaction: How to Keep Pilot Biomechanics Out of the Control Loop**

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### **Abstract.**

Adverse Rotorcraft-Pilot Couplings (RPC, in short) may represent a threat to safety of flight. This lecture starts by proposing a definition of Adverse RPCs and providing a motivation for their study based on recent incidents and accidents. For this purpose, a taxonomy of RPCs is introduced, highlighting the differences between rigid-body and aeroelastic RPCs. The focus of the lecture is on the latter type, where pilot biomechanics plays a fundamental role. The notion of pilot Biodynamic Feedthrough (BDFT) is introduced, with the main parameters that may influence it. Particular attention is dedicated to highlighting how it may depend on muscular activation, which in turn is task dependent. The importance of biodynamics modeling is discussed, with recent advancements on the topic achieved by our research group. Recent numerical and experimental results are presented, creating a link between muscular activation, its task dependence, and their influence on BDFT.

### **Pierangelo Masarati's short bio**

Pierangelo Masarati is full professor of Aeroelasticity and Structural Dynamics at Politecnico di Milano (POLIMI), Department of Aerospace Science and Technology, where he received his M.Sc. in Aeronautical Engineering in 1996 and his Ph.D. in Aerospace Engineering in 2000.

He is the Coordinator of the PhD programme in Aerospace Engineering and the International Affairs delegate of POLIMI's Ph.D. School.

His main teaching and research activities are in the areas of rotorcraft aeromechanics and multibody system dynamics.

Among other duties, he is a member of the International Committee of the European Rotorcraft Forum (ERF) since 2016 and the chairman of the Rotorcraft Technical Committee of the Council of European Aerospace Societies (CEAS) since 2018.