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Counter rotating open rotor flow field investigation using stereoscopic Particle Image Velocimetry ERIC ROOSENBOOM, ANDREAS SCHROEDER, REINHARD GEISLER, DIETER PALLEK, JANOS AGOCS, DLR - German Aerospace Center, KLAUS-PETER NEITZKE, Airbus Operations GmbH — Counter rotating open rotor (CROR) propulsive systems are again considered as fuel efficient alternatives to conventional propulsion systems. In the present paper details of dedicated experiments on a generic CROR model are studied using stereoscopic Particle Image Velocimetry. The CROR model has 10 front blades and 8 aft blades, with blade design similar to modern propellers for high disk loadings. Recent progress in Particle Image Velocimetry applications to propeller flow analysis is used to further develop the technique for application to CROR systems. Stereoscopic Particle Image Velocimetry (SPIV) has been applied for the flow field investigation behind a counter rotating open rotor (CROR) model in order to enable experimental insight in the complex flow phenomena of multiple vortex structures. The paper discusses a dedicated triggering strategy for the determination of the phase positions of both propellers using the phase delays and revolution periods. Results of the PIV measurements are presented and the topological events of the rotor-interactions are discussed.

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