**An experimental setup for the characterization of combined total-pressure / swirl distortion generators**

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Abstract

Innovative combined total-pressure / swirl distortion generators have been designed and tested within the ASTORIA European Project. The experimental characterization was carried out in the VKI R4 closed loop rig by means of 2D-3C Particle Image Velocimetry (PIV) measurements and multi-hole pressure measurements. The present paper focuses on the description of both experimental setup, highlighting the limitations linked to the application of both measurement techniques and the synergies resulting by their combination.

Each measurement technique is described in detail, providing the results of the preliminary DoE study supporting the final design. Calibration and operating procedures are then described together with the final expected uncertainty. The paper also details the pre-processing and post-processing methodologies adopted for successful reconstruction of the velocity fields.

In the final part, a comparison between the results from multi-hole pressure measurements and PIV measurements is provided for an open-literature distortion configuration and an outlook on the combined exploitation of the information is also discussed.

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