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Title : FORCE MEASUREMENTS AT LOW SPEEDS ON BODY WING TAIL COMBINATIONS (KAHA MODEL) AT HIGH REYNOLDS NUMBERS AND INCIDENCES FROM -2° TO 70°

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Abstract : Six component measurements were carried out on a slender body model with lifting surfaces (KaHa Model) to study the vortex flows of such configurations at High Reynolds numbers upto very high incidences. The basic body consists of a 105 mm (3D) long tangent ogive nose and a 420 mm (12D) long circular cylinder afterbody with a diameter of 35mm (D). To this slender body cruciform lifting surfaces of 105mm (3D) and 140mm (4D) span and a constant chord length of 35mm were added to realize Body+Wing, Body+Tail and Body+Wing+Tail combinations. The experiments have been carried out in the 0.6m x 0.6m pressurized low speed wind tunnel of the DFVLR in Gottingen. The test Reynolds number, based on body diameter and a test section speed of 31 m/sec, varied from 0.7 million to 5.7 million. The angle of attack was varied from -2° to 70° in two ranges using a straight sting for incidences upto 30° and a 40° cranked sting at higher incidences. With respect to the pitch plane the cruciform lifting surfaces were arranged in "+" and "x" position. In this report the complete test results are given in form of tables and plots with a limited analysis. At high incidences and at higher Reynolds numbers the model entered into severe vibrations. Thus, data could not be obtained for most of the configurations around an angle of attack of 50° .