

Abstract Submitted  
for the DFD12 Meeting of  
The American Physical Society

**Transitions to chaos in the wake of an axisymmetric bluff body<sup>1</sup>**

YANNICK BURY, THIERRY JARDIN, ISAE, DAEP TEAM — This work aims at understanding the dynamical process that leads to the onset of chaos in the flow past a blunt-based axisymmetric bluff body. On the basis of direct numerical simulations, conducted for Reynolds numbers ranging from 100 to 900, we show that the flow undergoes multiple transitions, successively giving rise to the SS, RSPa, RSPb, RSPc and RSB wake states. In particular, the RSPc state, revealed in this work via long-term computations, is characterized by intermittent vortex stretching denoting the onset of chaos and the potential occurrence of a third instability that superimposes to the first and second instability associated with state RSPa and RSPb respectively. Interestingly, the reflectional symmetry that characterizes the RSP states is still retained. Hence, chaos is triggered before the symmetry breaking and the occurrence of the RSB state.

<sup>1</sup>The authors acknowledge the French Ministry of Defence and DGA for funding this work.

Yannick Bury  
ISAE

Date submitted: 12 Jul 2012

Electronic form version 1.4