

Abstract Submitted
for the DFD12 Meeting of
The American Physical Society

LES Investigation of instabilities in cavity flow with a top boundary AARTHI SEKARAN, GERALD MORRISON, Texas A&M University — The effect of the influence of a top boundary on cavity instabilities is studied using Large Eddy Simulations (LES). The motivation for the geometry was the flow over the cavities of a hole-pattern seal, where sudden changes in instability modes could lead to large variations in the rotordynamic stability of the system. A single, two-dimensional cavity is modeled at different conditions to study the occurrence of phenomenon such as the shear layer instability and the wake mode instability. The simulations are successfully able to capture both modes and this is verified via a spectral analysis of the data. The study also details the occurrence and development of each instability mode and discusses its physical effect on the overall flow behavior in the system. Qualitative comparisons are then made with cavities without top boundaries in order to determine particular differences due to the presence of the same.

Aarthi Sekaran
Texas A&M University

Date submitted: 08 Aug 2012

Electronic form version 1.4