

## **ROTOR DYNAMICS SIGNATURE FOR EMBEDDED SYSTEM**

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## **ABSTRACT**

The availability of powerful Digital Signal Processor (DSP) leads the present research aimed to develop an embedded system capable to perform typical monitoring task for rotordynamic signature. The CSPP-LIM's Actuator Kontrol Unit (AKU) can easily perform task such as driving a motor while performing signal conditioning, time or angular (most suitable for rotordynamics proposes) triggered acquisition and on-line computation (offset nulling, FFTs, synchronous filtering, order tracking). The present work shows the theoretical background of the angular triggered acquisition and how it can be implemented on a DSP based system. All the algorithms have been validated by means of a test campaign performed both on an experimental test rig and on its relative dynamics simulator (which include all the technological models of the subsystem present in the test rig). Using these algorithms on-line monitoring can be performed on a rotating machine simply adding (to the usually available encoder to motor driving) some sensors to measure the rotor lateral displacements, velocity or acceleration. Results are stored in the control unit, then available for further analysis. The availability of an host computer allows to interact with the AKU for parameters setting and results post processing to plot common rotordynamics graphs such as waterfall in order domain, orbits and orbital tubes. The AKU – host interaction is then extended to the experimental validation of a FEM/Simulink rotordynamic model.

**Keywords:** Rotordynamics, Embedded, Signature, Monitoring, DSP