The crack-detection experiments involved introducing a defect (a notch) on a subscale engine disk and measuring its vibration response using externally mounted blade-tip-clearance sensors as the disk was operated at speeds up to 12000 rpm. Testing was accomplished on both a baseline disk and a disk with a simulated crack: a 50.8-mm- (2-in.-) long introduced notch. The disk's vibration responses were compared and evaluated against theoretical models to investigate their applicability and success towards detecting cracks. The data sets that were acquired from these experiments were also shared with researchers from Ames Research Center for analysis using their data driven anomaly detection techniques. The results of this additional analysis will be presented in future papers. This work is being supported by the Aviation Safety Program, Integrated Vehicle Health Management (IVHM) Project