**Project Description**

**Objectives**
- Utilize mechanical, nonlinear bi-stable structures or absorbers to mechanically dissipate vibration modes in bladed disks
- Utilize the hysteresis in nonlinear vibration to harness and repurpose energy to dissipate targeted modes

**Impact**
- Reduce/eliminate concerns of primary modes within operating conditions
- Extend life cycle
- Increase efficiency

**Approach**

- Show that switching stiffness can be used to dissipate resonances
- Create a reduced order model of a bladed disk to identify primary modes
- Design bi-stable element and apply to reduced order model to create an augmented model
- Scale back to complex, bladed-disk model to see impact and check design
- Manufacture and test

**Discussion**

- Design bi-stable structures to target particular modes
- Reduce Bladed Disk Model to manageable size
- Beam Discretization Investigation
- Check Design

- Feasible, design targets are now needed
- Reduced Order Model (ROM) reduce 15000 DOF to 10 DOF
- Application of Bi-stable spring/absorber to bladed disk ROM
- Scale back to physical size to apply to practical system

**Results**

- Exploiting nonlinear, bi-stable structures to mechanically dissipate targeted vibrational modes within turbomachinery.