Custom Designs

Custom Made Simulators and Test Rigs
to Customer Specifications

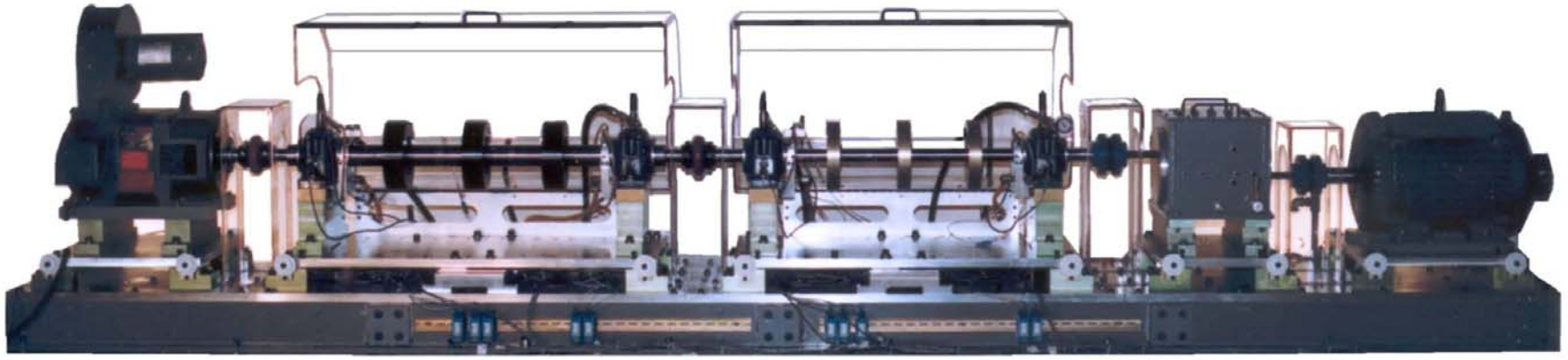
SpectraQuest, Inc.
8201 Hermitage Road, Richmond, VA 23228 U.S.A.
TEL +1-804-261-3300/FAX +1-804-261-3303
www.spectraquest.com

SpectraQuest Custom Designs

- SpectraQuest has a long experience in making custom machinery to meet our customers' exact needs. From small modifications to our standard simulators to complete custom designs weighting more then ton, we will provide you with the test rig that you need for your research, development, or training requirements. This brochure provides a sample of the custom designs we have delivered to date.

Complete Rotordynamics

- This rotor dynamics test rig has been specifically designed to simulate different rotor dynamics phenomena for experimental and educational purposes.
  - Fluid film bearing research
  - Balancing/Alignment studies
  - Gearbox dynamics and noise study
  - Two rotor assemblies with different dynamic characteristics
  - 14-ft long, 4500 lb, 20 HP



High Temperature Blade Crack Propagation

- This high temperature (1000F), high speed (10000rpm) disk and blade crack propagation test system was designed for NASA to develop new techniques for crack detection of turbine blades and disks.

Transmission Diagnostics / Prognostics

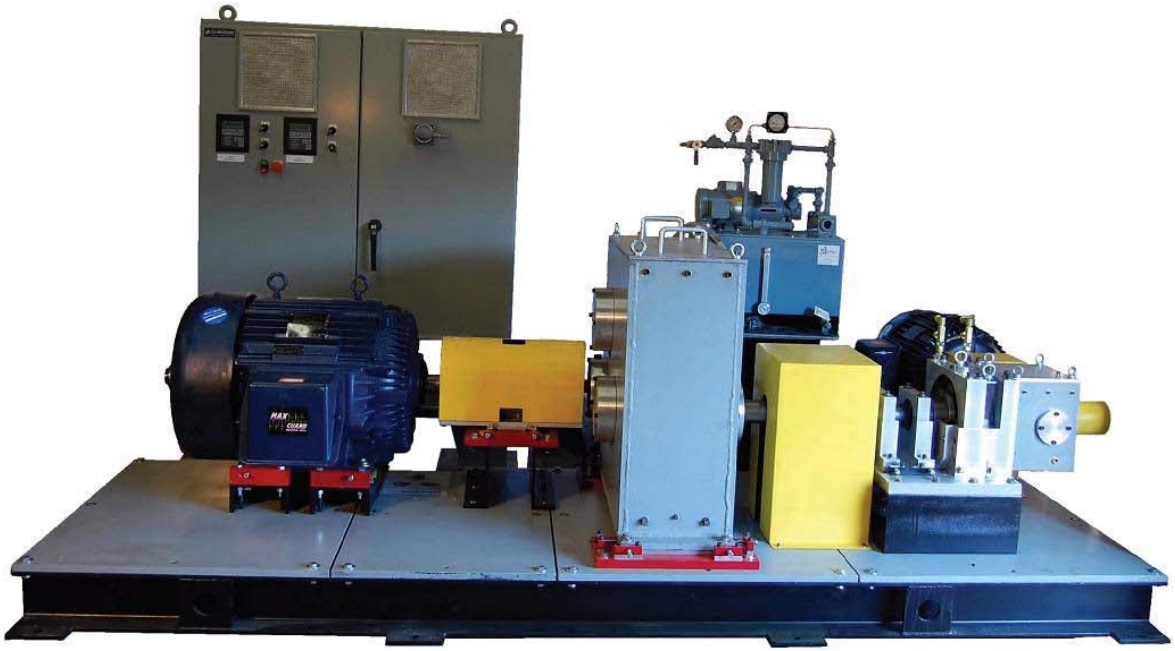
- The have delivered several variations of this heavy-duty transmission test rig for several customers. Each turnkey system enabled our customer to study large scale transmission diagnostics-prognostics and gearbox dynamics. Most of the common gear faults and configurations can be research though the versatile, modular, and easily instrumented simulator. With seeded fault tests, quantitative performance predictions can be modeled for every piece of the gearbox. Each custom design is configurable with different gear types and sizes, convenient instrument mounting, and drivetrain alignment.

Transmission Diagnostics / Prognostics

- User configurable three-stage planetary gearbox mimics helicopter gearbox
- Custom designed parallel shaft gearbox can be configured as single/double stage increaser/reduction
- Instrumented self-contained lubrication system
- Load torque provided by two vectors AC drives in a power sharing configuration
- 12-ft long, 45 HP drive, 75 HP load

Transmission Diagnostics / Prognostics

- Three-stage transmission using one bevel and two planetary stages
- Separate oil lubrication for each stage
- Transmission ratios: output planetary stage 4.4:1, input planetary stage 4.5:1, bevel stage 2:1, total 40:1
- May be operated with two-stage gear train bypassing the bevel gear stage
- 12-ft long, 40 HP drive, 100 HP load



Transmission Diagnostics / Prognostics

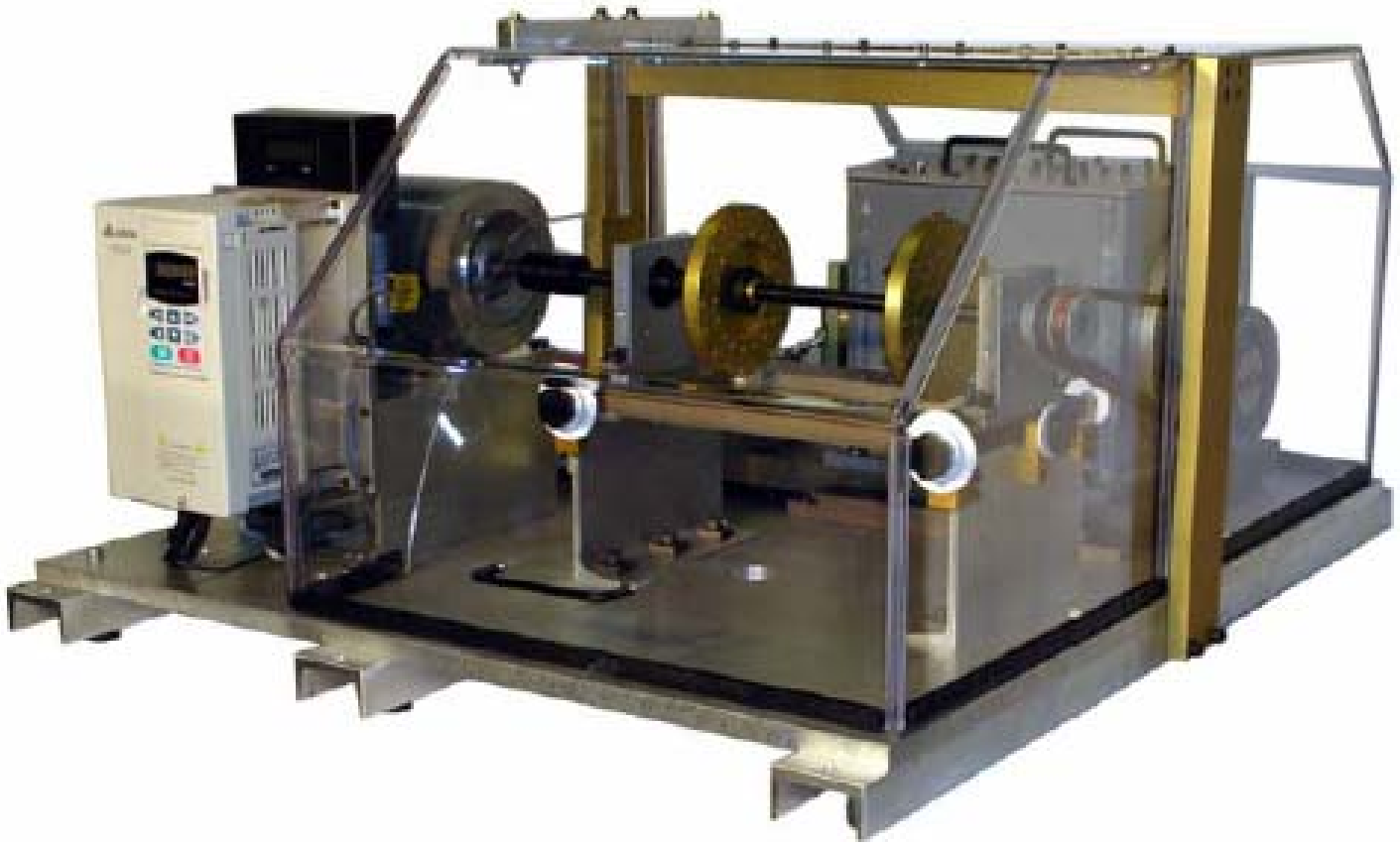
- Two or three stage transmission using bevel-planetary gear train
- Custom designed parallel shaft gearbox can be configured as single/double stage reduction/increaser
- Instrumented self-contained pumped lubrication system.
- Load torque provided by two vectors AC
- 12-ft long, 45 HP drive, 75 HP load

Turbine Blade Crack Research

- Study blade crack propagation, diagnostics/prognostics
- Other mechanical and motor faults
- Generator used as a braking mechanism
- Telemetry system
- Weights to change mass moment of inertia
- An adjustable blade rub excitation attached to the base plate at the circumference of the blades

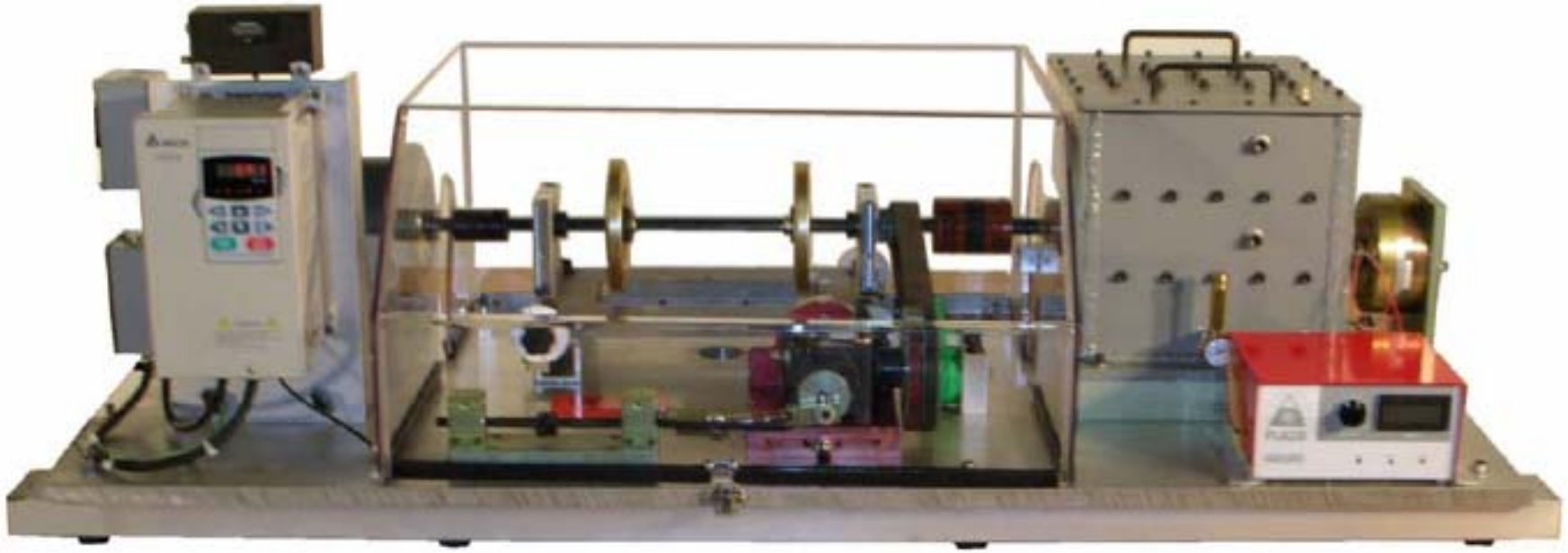
Modified Machinery Fault Simulator (MFS)

- Belt driven gearbox.



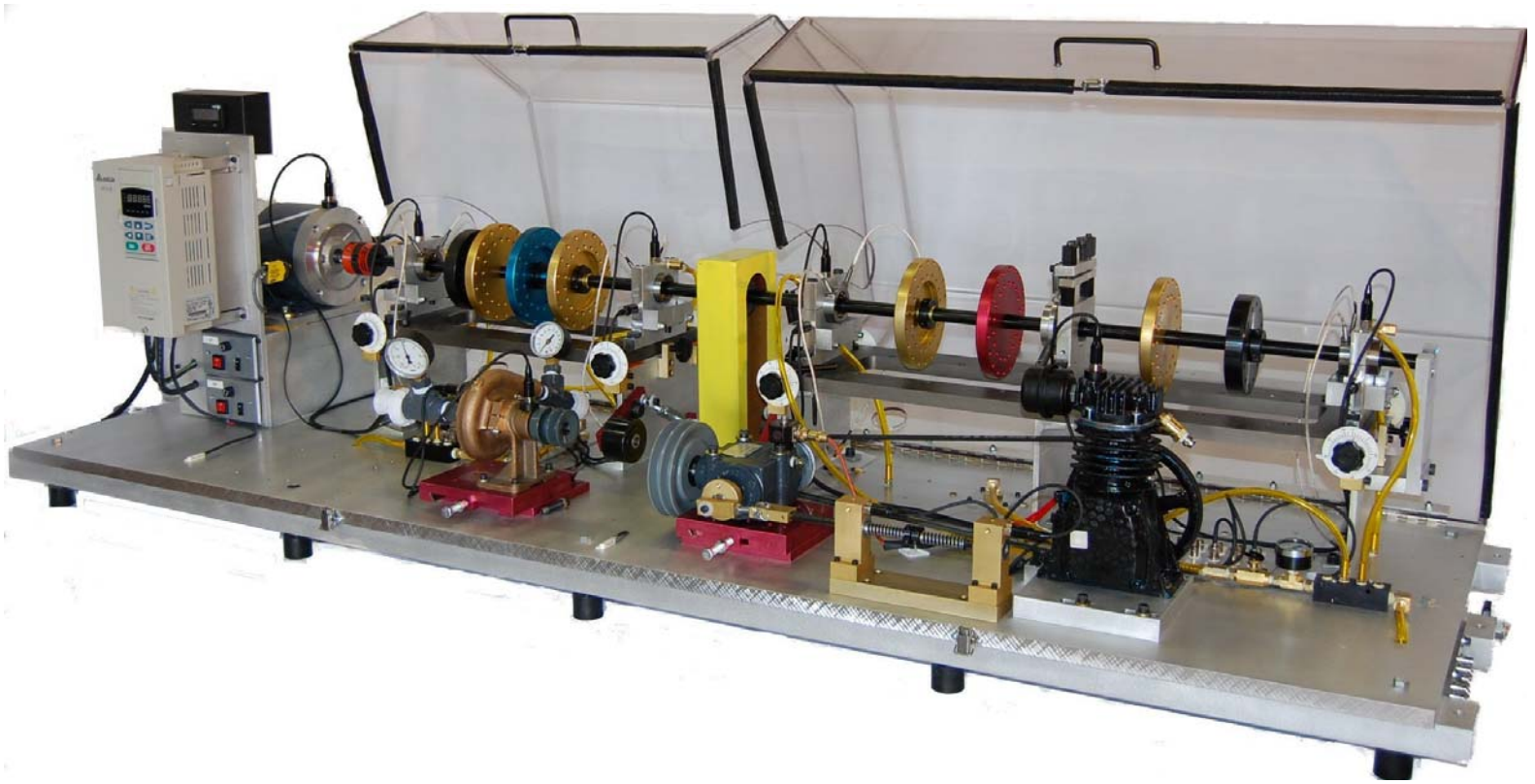
Modified Machinery Fault Simulator (MFS)

- Shaft driven gearbox.



Twin Rotor Simulator

- Motor: 3HP HP AC Motor, 3 phase, 2-pole
- Max. motor speed: 5000 RPM



Aerodynamics Test Rig

- This test machine combines a standard simulator, in this case a MFS Magnum, and a shrouded axial fan. The shroud allows for variable aerodynamic loading of the fan blades. The fan shaft is driven from the MFS rotor shaft and is fitted with an encoder and tachometer.
- The axial fan is located at the drive train end for easy access. The blade pitch is adjustable and the blades may be instrumented with strain gages.