



Emprise Corporation

Gearbox Test Stands





Emprise Overview

- Founded in 1981
- Specialists in the Design of Test Facilities
 - Aerospace
 - Automotive
 - Alternate Power
 - Industrial Power
- Commercial Clients
 - Ten Fortune 100 companies
 - Repeat clients
 - Preferred supplier status





Emprise Clients

BALLARD

CATERPILLAR

UNITED

DELPHI

Honeywell

THE NORDAM GROUP

Ford



CURTISS WRIGHT

Delta Air Lines



INTERNATIONAL



BOEING

RICARDO

BORG-WARNER AUTOMOTIVE

AlliedSignal

Hamilton Standard
A United Technologies Company

YANMAR Diesel
America Corp.

Pratt & Whitney
A United Technologies Company



NORTHSTAR
aerospace™





Emprise Capabilities

Emprise's staff includes experienced, highly skilled, licensed engineers in specializing in:

- **Mechanical Engineering**
- **Electrical Engineering**
- **Aerospace Engineering**
- **Software Engineering**
- **Project Management**



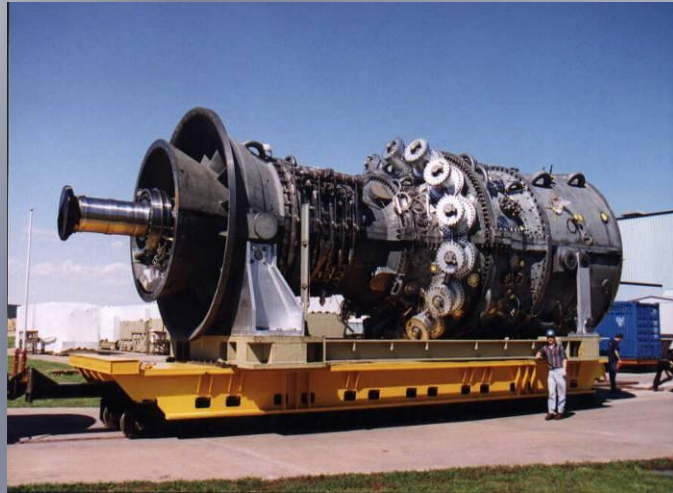
Emprise Fabrication Shop

- 12,000 sq/ft air conditioned shop
- Machine shop, paint booth, welding, and other capabilities for construction of test equipment in-house.





Primary Markets Served



Power Generation



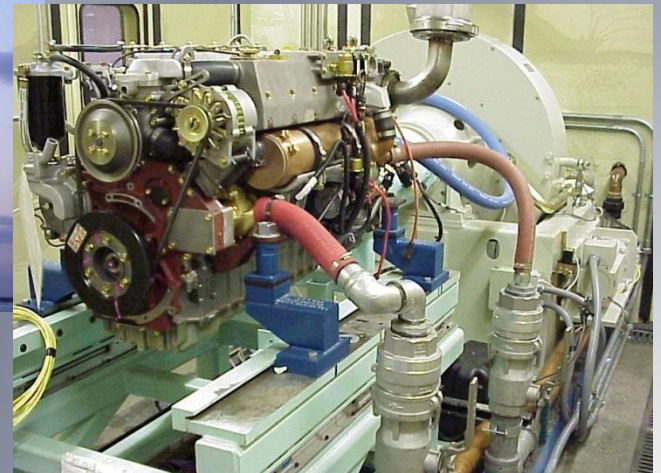
Alternate Power



Aerospace



Industrial



Automotive



Gearbox Test Stand Types

Open Loop

- 👍 Lowest initial cost
- 👍 Most flexible design
- 👎 No energy recovery

Electrically Regenerative

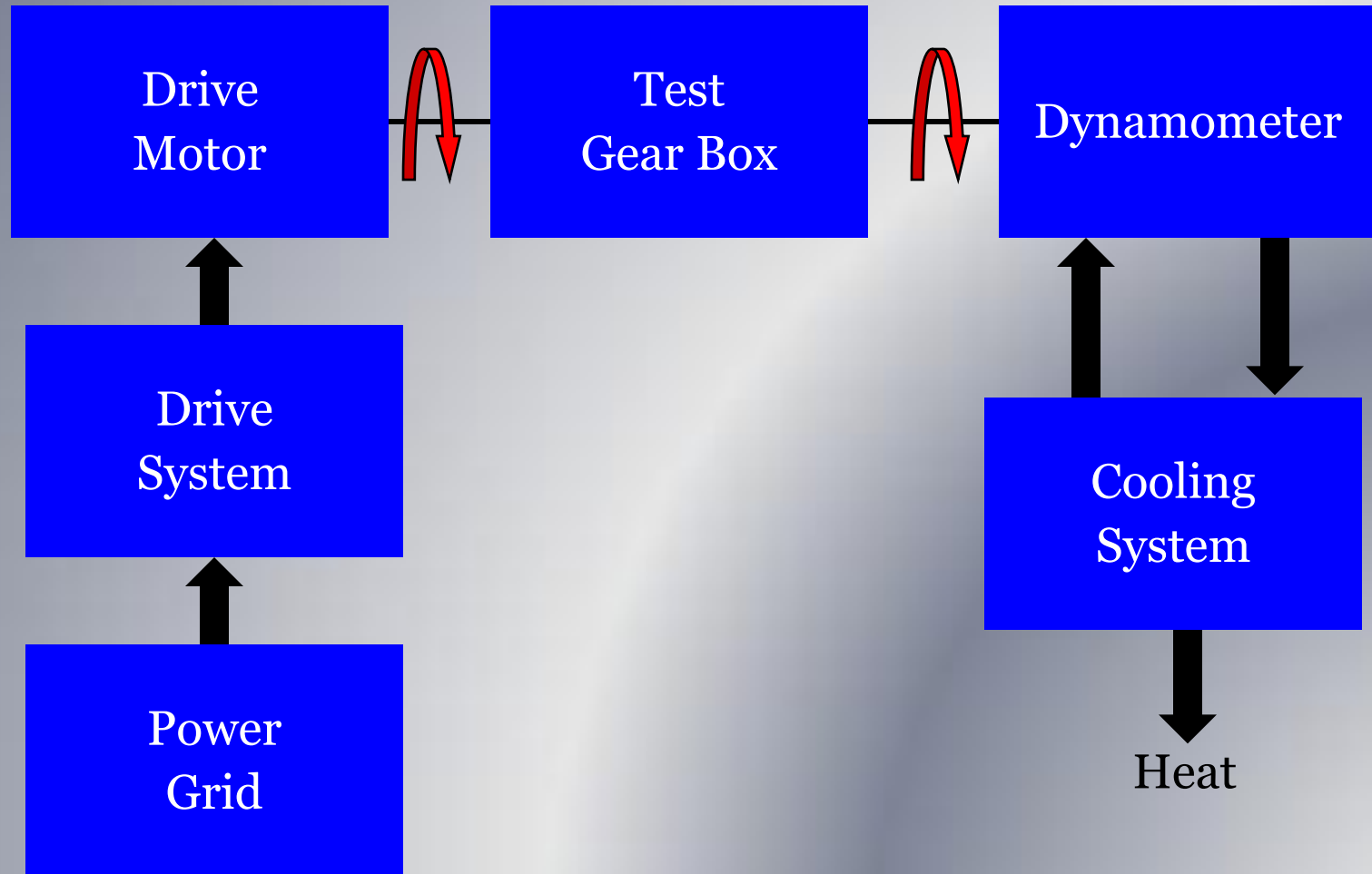
- 👍 Mechanically simple
- 👍 Flexible design
- 👎 High initial cost

Mechanically Closed Loop

- 👍 Moderate initial cost
- 👍 Flexible design
- 👎 Mechanically complex



Open Loop Transmission Testing





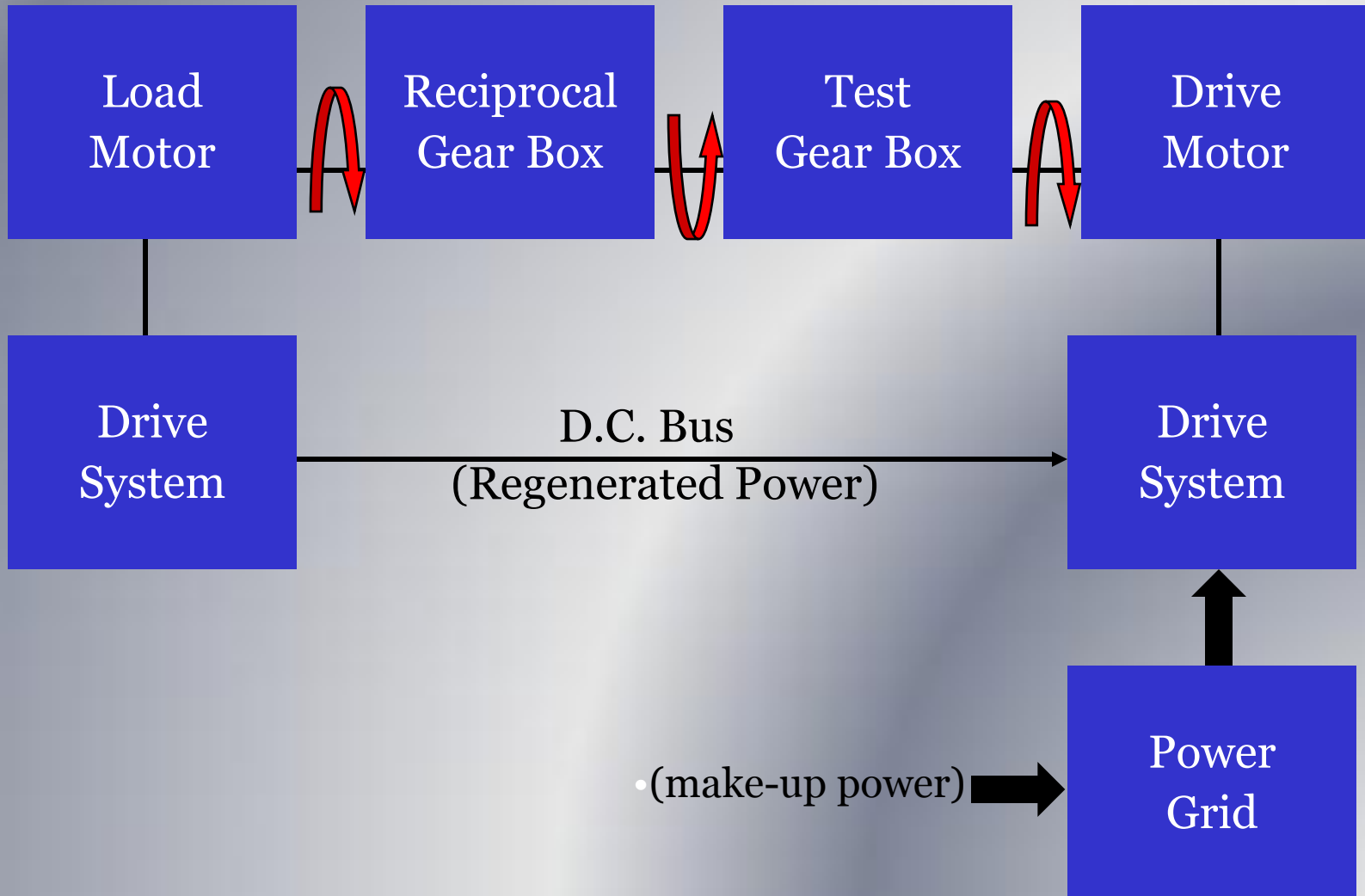
Open Loop Test Stand

ZF AWD Backhoe Transmission





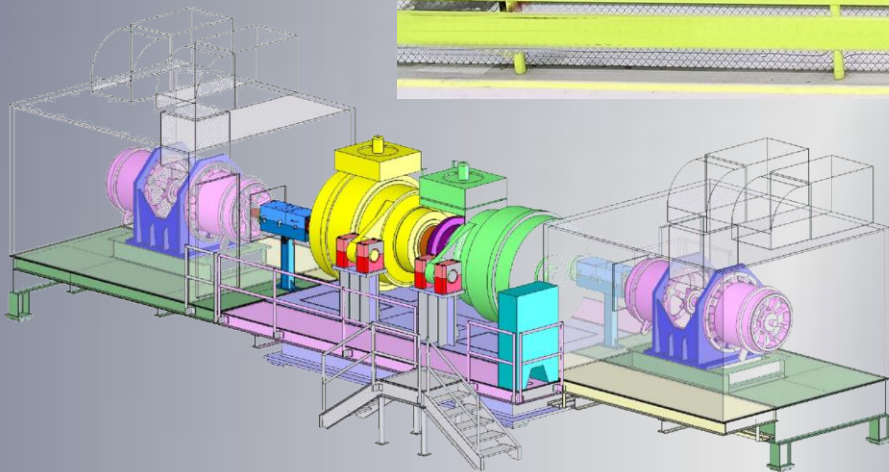
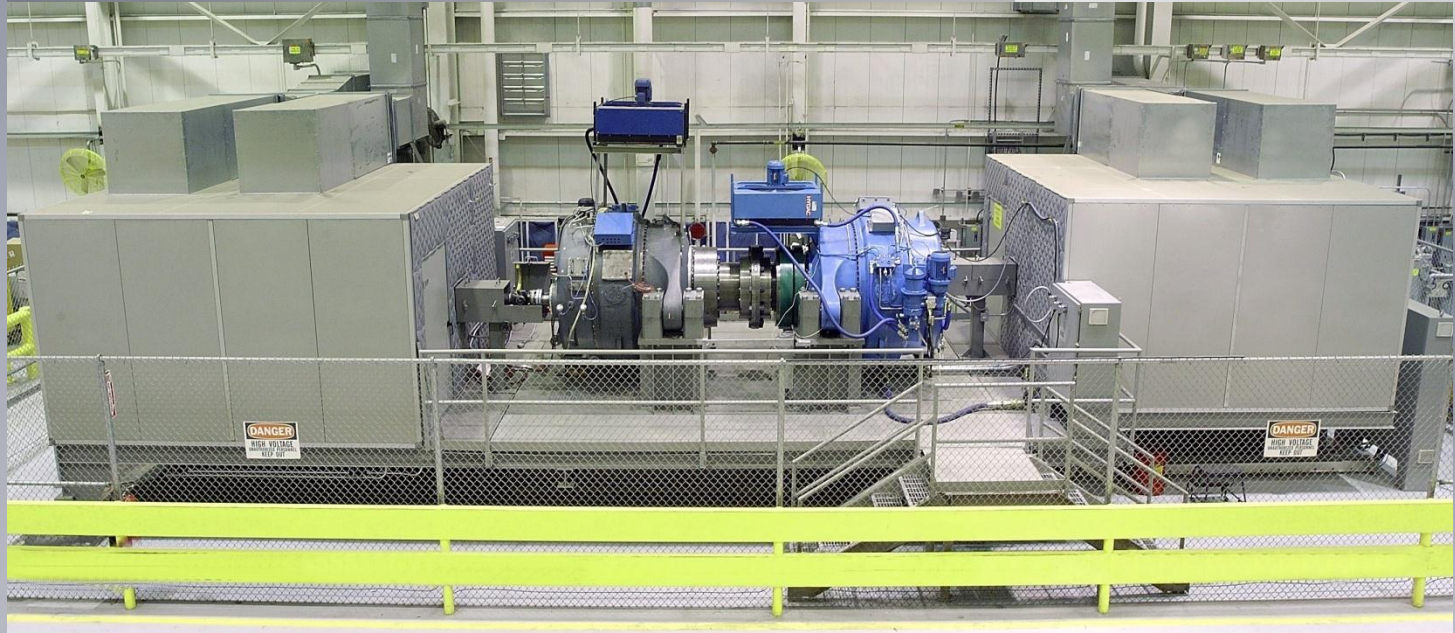
Electrically Closed Loop Design





Electrically Closed Loop

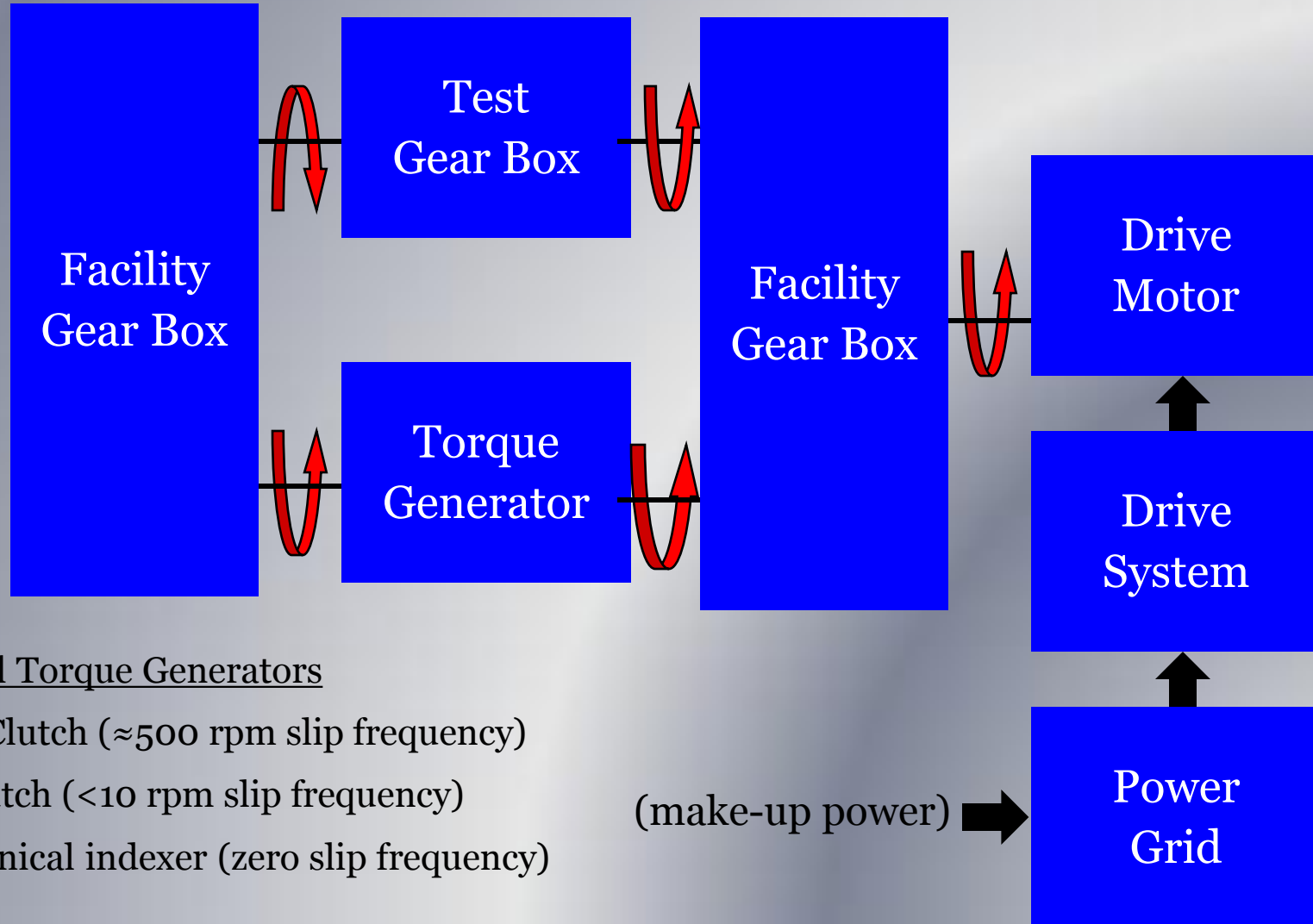
1.5 MW Wind Turbine Gearbox



Wind Energy



Mechanically Closed Loop (Aka "Four Poster")



Typical Torque Generators

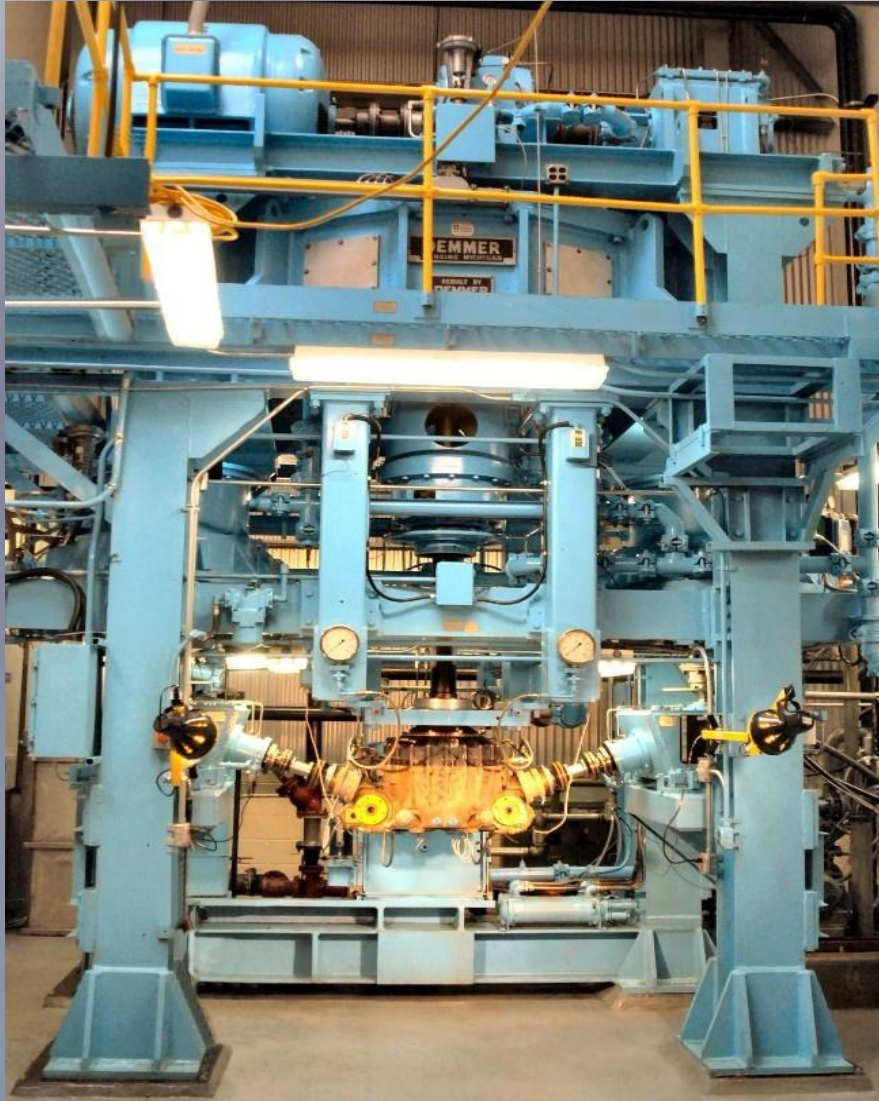
Eddy Clutch (≈ 500 rpm slip frequency)

Oil Clutch (< 10 rpm slip frequency)

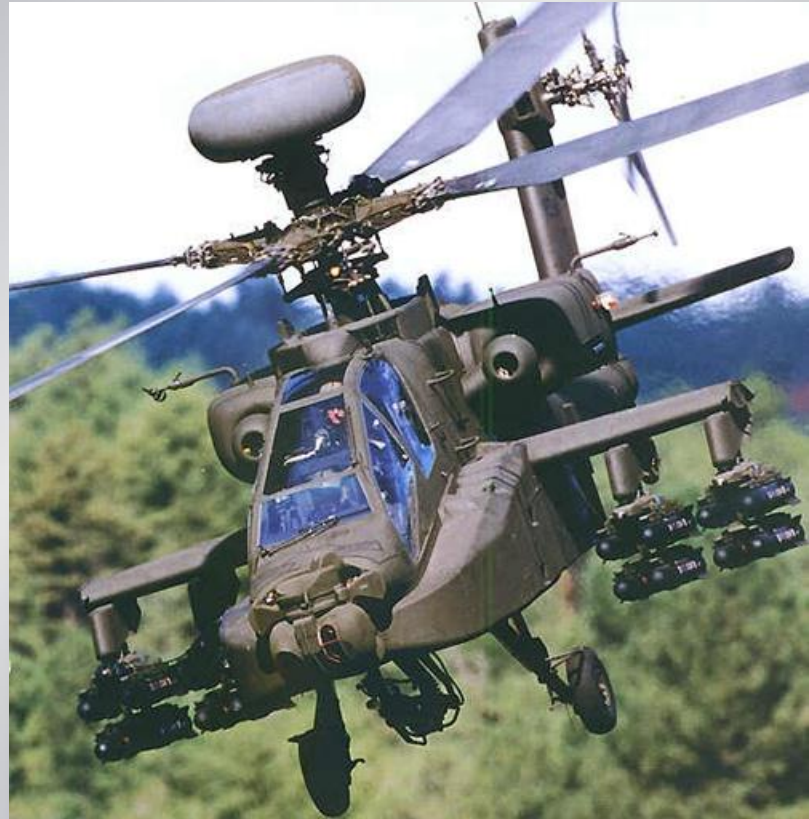
Mechanical indexer (zero slip frequency)



Mechanically Closed Loop



AH-64 Helicopter Gearbox





Why Emprise?

- One source for a complete turn-key solution
- Over 29 years of delivering quality projects on schedule and within budget
- Staff of highly qualified, licensed engineers
- Extensive test stand experience
- Innovative award winning designs



Emprise Awards



ACEC of Georgia Engineering Excellence Awards

2010 Honor Award for Curtis-Wright Joint Strike Fighter OQLS Test Stand

2005 State Award for GE Wind Turbine Gearbox Test Stand
(National Competition Finalist)

2003 Honor Award for Northstar Aerospace Apache Helicopter
Transmission Test Stand

2002 State Award for Ricardo Diesel Engine Analysis System

2001 State Award for Honeywell Turbocharger PET Test Stand

2001 Honor Award for GE Upgrade and Renovation of TS-3

2000 Honor Award for Trane Screw Compressor Test Stand

1999 Grand Award for GE Industrial Gas Turbine Test Facility
(National Competition Finalist)

1998 State Award for Capstone Portable Engine Test Facilities

1997 State Award for CWFS Flap Actuator Testing Suite

1996 State Award for AlliedSignal 60kW Fuel Cell Test Stand

1994 Grand Award for Hamilton Standard Jet Engine Starter Test Facility

R&D Magazine R&D 100 Award

– **2000** Enthalpy Wheel



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