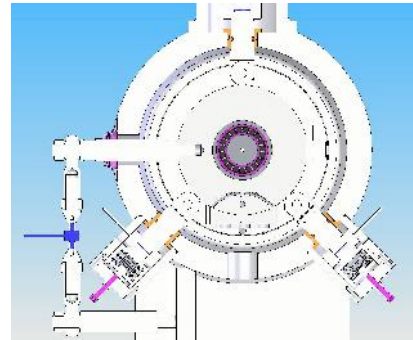




# High Speed Bearing Rig Design

## Description

The design of an innovative high speed bearing test rig, to significantly extend the performance of bearings that operate up to a maximum speed of 5.5 million Ndm. The design of the rig consists of a main baseplate supporting a 50kW motor, high speed gearbox and bearing test housing.



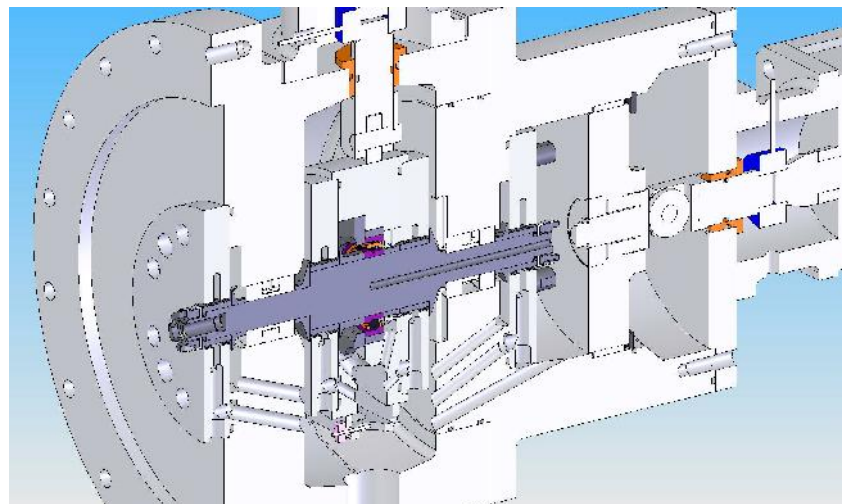
*End Section View*

This was integrated with the gearbox and bearing system lubrication / scavenging system. The housing contained the main support rotor for testing and loading a 40 mm bore bearing. This was supported by two packs of two smaller bore, tandem and back to back high speed angular contact bearings, allowing axial and radial loads to be applied to the bearing under test.

A high level of instrumentation was also integrated into the main test housing. The control and data acquisition systems were housed in a separate control cabinet that could be located remotely from the main rig if required.

## Specification Summary

- Max test rig speed = 102,000 RPM
- Max motor power = 50 kW
- In-line gearbox ratio = 34:1
- Max axial and radial load = 7.5 kN
- Test bearing bore = 40 mm
- Test & support bearing oil flow = 280 l/min
- Oil cooling requirement = +20 kW
- Bearing instrumentation: speed, temp, loads, torque, oil flow, vibration etc.



*Bearing Test Housing Section*

## Disciplines Used

- Conceptual mechanical & electro-mechanical design, heat transfer, fluid mechanics analysis, stress & vibration finite element analysis, rotordynamics analysis.