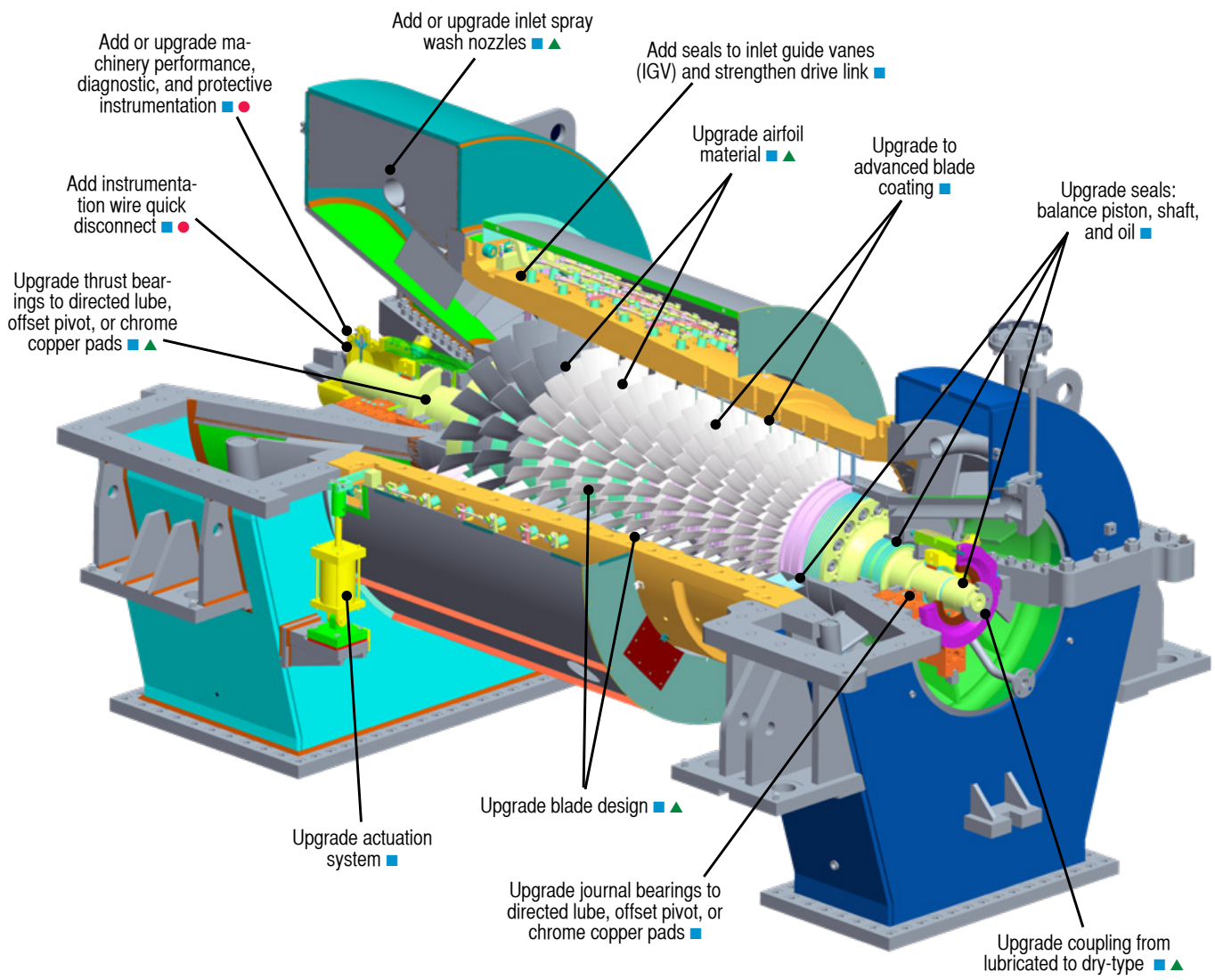




Axial Compressor Modifications and Rerates

Highly reliable Elliott axial compressors are well suited for high-flow, medium-pressure applications beyond the flow capacity of centrifugal compressor designs. Typical applications for axial compressors are to supply combustion air for the fluid catalytic cracking (FCC) process, synthetic flue processing, aerodynamic testing, blast furnace applications air, and wide usage in air separation and nitric acid plants. Axial flow compressors have high efficiency levels over broad operating ranges, which provide significant energy savings.

An aerodynamic rerate of an axial compressor is an economical way to increase a plant's flexibility, capacity, and efficiency. Equipment modernization can also improve a refinery's safety rating and significantly increase reliability. Elliott Engineered Solutions identifies, designs, and installs effective upgrades to axial compressors from any original equipment manufacturer. Elliott equipment modifications extend time between planned shutdowns, abbreviate turnarounds, and reduce unplanned outages.



Other Modifications

Perform site audit ■ ▲ ●

- Reliability
- ▲ Efficiency
- Safety Controls

Precisely accurate measurement of new axial compressor components is essential to ensure reliable operation and to achieve required run times between planned maintenance outages. Using the digital shape sampling and processing technology of a laser-equipped FARO® coordinate measuring machine, Elliott's skilled engineers obtain accurate dimensioning of axial compressor components from any manufacturer.

Working closely with the customer to evaluate process requirements, Elliott can provide in-kind components and mechanical and metallurgical enhancements that improve the reliability of critical axial compressor parts. Elliott parts are manufactured by our ISO 9001 registered Service Parts organization, using the same computer-controlled multi-axis machine tools we use to manufacture new equipment.

Elliott Engineered Solutions

Elliott Engineered Solutions has one focus – to help customers obtain the highest value from their critical rotating equipment. Elliott has more than 100 years of experience in engineering, manufacturing repairing, and modifying all types of turbomachinery. Elliott Engineered Solutions specializes in the following areas:

- ♦ Modifications and rerates of turbomachinery to increase the operational life and value of your investment by optimizing performance and reducing downtime.
- ♦ Reverse engineering and comprehensive analytical studies such as lateral and torsional rotor analysis, root-cause failure analysis, mechanical evaluation analysis, finite element analysis (FEA), and aerodynamic analysis.
- ♦ Reapplication of previously owned equipment for emergency installation or cost-effective replacement.

Enhancement	Category	Benefit
Add instrumentation wire quick disconnect	Reliability. Safety	Reduce chance of oil leak; reduce maintenance time
Add or upgrade inlet spray wash nozzles	Reliability. Efficiency	Reduce fouling to prevent performance degradation
Add or upgrade machinery performance diagnostic, and protective instrumentation	Reliability. Safety	Improve machinery performance, health monitoring and protective instrumentation
Add seals to inlet guide vanes (IGV) and strengthen drive link	Reliability	Eliminate binding of IGVs; reduce risk of IGV failure
Perform site audit	Reliability. Safety. Efficiency	Identify areas to upgrade for peak performance
Upgrade actuation system	Reliability	Improve process control
Upgrade airfoil material	Reliability. Efficiency	Reduce the effect of corrosion and erosion to help maintain overall compressor efficiency and reliability
Upgrade blade design	Reliability. Efficiency	Optimize flow, pressure, efficiency, and mechanical strength
Upgrade coupling from lubricated to dry-type	Reliability. Efficiency	Eliminate oil requirements; improve rotor dynamics
Upgrade journal bearings to directed lube, offset pivot, or chrome copper pads	Reliability	Improve rotor stability at running speeds
Upgrade seals: balance piston, shaft, and oil	Reliability	Ease of maintenance; reduce maintenance
Upgrade to advanced blade coating	Reliability. Efficiency	Reduce the effect of corrosion and erosion to help maintain overall compressor efficiency and reliability
Upgrade thrust bearings to directed lube, offset pivot, or chrome copper pads	Reliability. Efficiency	Reduce oil requirements, bearing temperature, and bearing heat loss



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T H E W O R L D T U R N S T O E L L I O T T



COMPRESSORS ■ TURBINES ■ CRYODYNAMICS ■ GLOBAL SERVICE