ALP
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ADVANCED SLEWING
BEARING

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ADVANCED SLEWING BEARING

Company: ALP AVIATION (Eskişehir-Türkiye)
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E-Mails: eburuk@alp.com.tr & murat.saglam@alpata.com
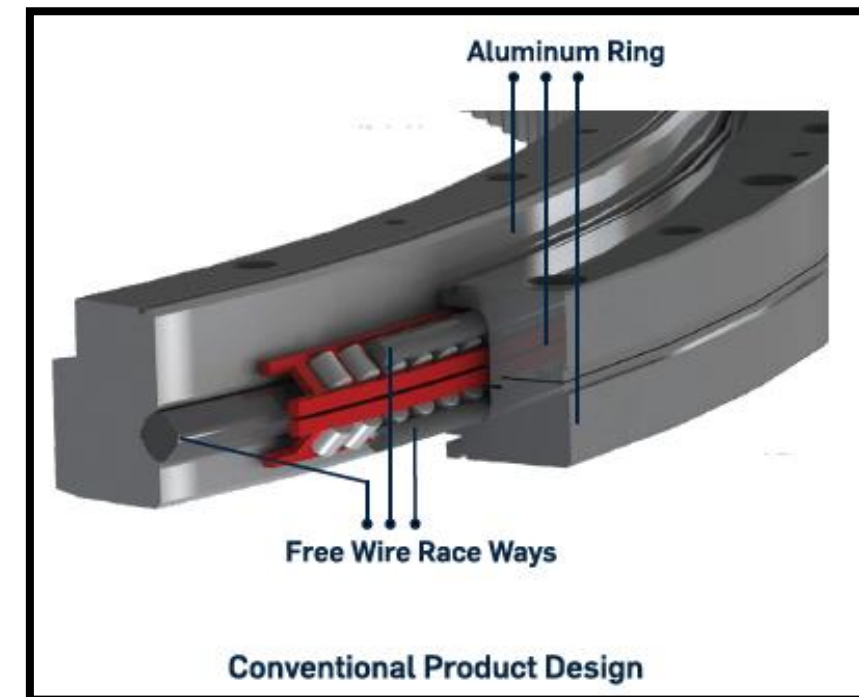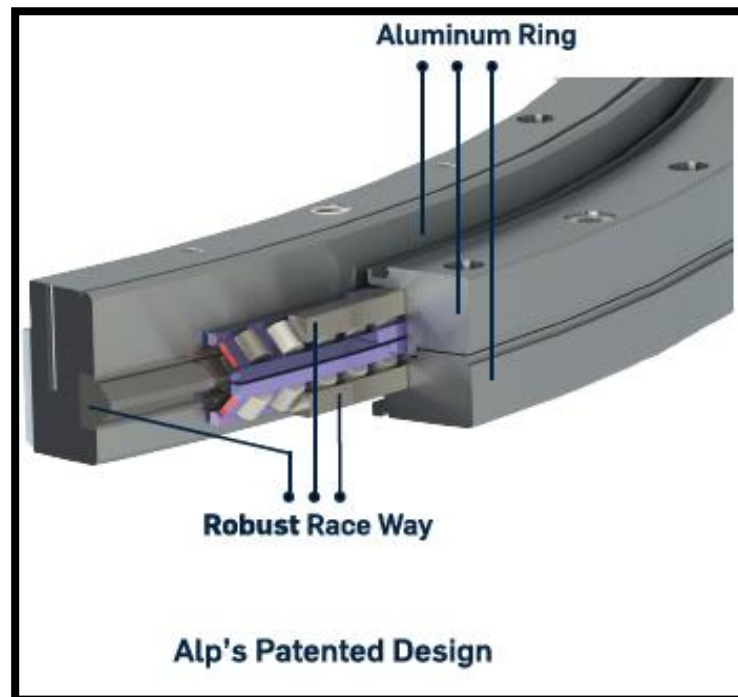**Telephone Number:** +90 222 211 73 80

Problem Description

- Traditional slewing bearings are often heavy, prone to wear, and require frequent maintenance.

- Their weight can limit usage in applications where mass efficiency is critical, such as aerospace, space or mobile robotics etc.

ADVANCED SLEWING BEARING
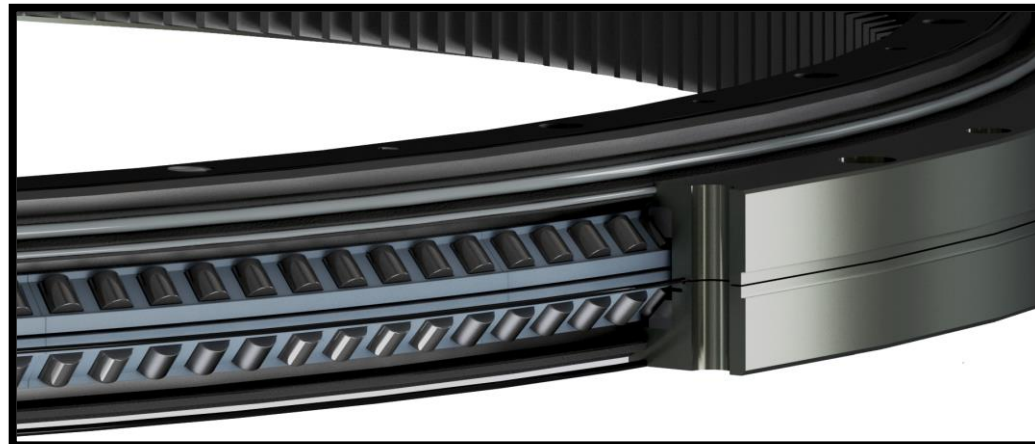
Alp Aviaton's Solution

❖ In our liner-based bearing system, a stainless steel liner is bonded to an aluminum housing using **ultra-thin, high-strength adhesive film**.

❖ Robust construction and unmatched longevity are achieved through **Aerospace Standarts** Metal-to-Metal Bonding Process Technology.

Aluminum Ring

Robust Race Way

Alp's Patented Design

Aluminum Ring

Free Wire Race Ways

Conventional Product Design

Alp Aviaton's Solution

❖ The metal to metal bonding method imparts **high strength and durability** compared to conventional wire race type slewing bearings.

❖ **Uninterruped 360° contact**, eliminating gaps present in the conventional wire race joints, Rolling elements seamlessly interact with the raceway, minimazing friction and maximizing performance.

Alp's Patented Design

Conventional Product Design
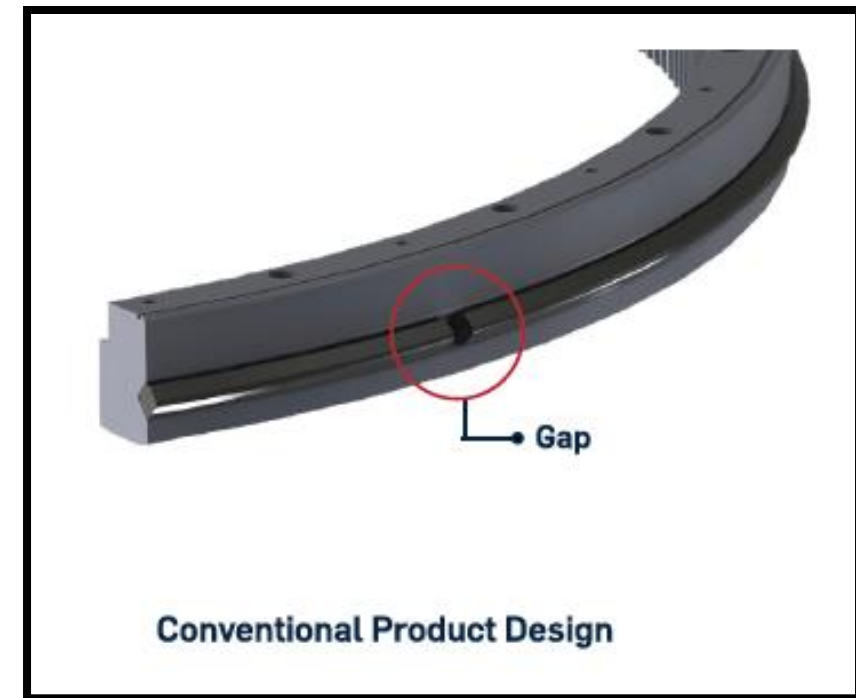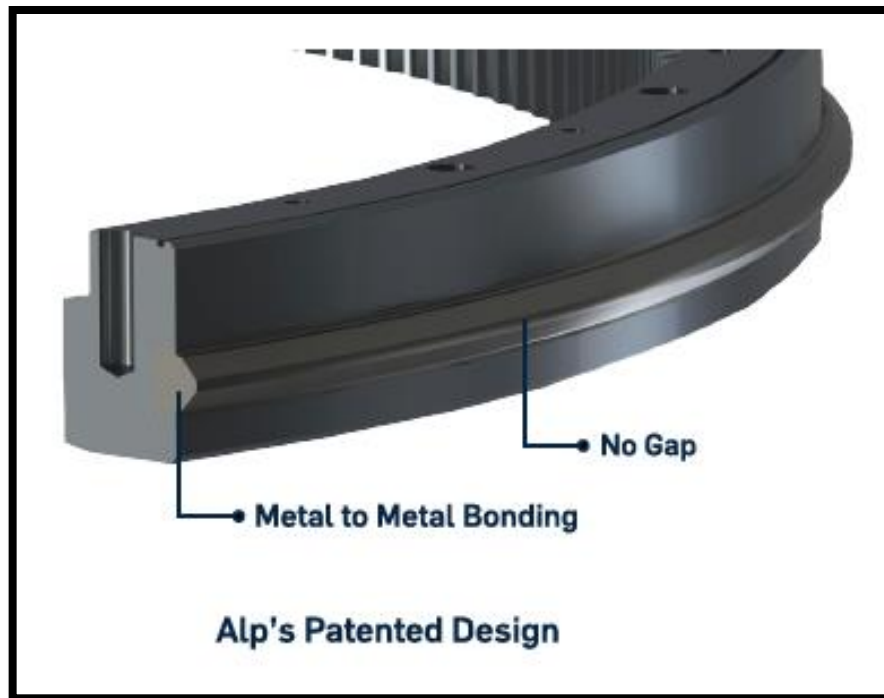
Alp Aviaton's Know-How and Capabilities

Alp Aviation has high mechanical design, manufacturing and testing capabilities. Additionally, Alp Aviation Advanced Slewing Bearings has innovated the metal-to-metal bonding technique for ring gear applications and has filed national and international applications to patent this method in July 2023.

Current Partner: Alpata Technology

As a strategic software partner, Alpata Teknoloji offers advanced Artificial Intelligence (AI) solutions to accelerate product innovation and performance optimization for aerospace and precision engineering industries.

➢ Predictive Maintenance with ML Models
Machine learning models trained on sensor data (vibration, temperature, torque) to predict bearing wear and extend lifecycle with condition-based maintenance strategies.

➢ AI-Assisted Structural Optimization
Deep learning-based surrogate models to simulate structural stress, deformation, and fatigue life – reducing simulation time by 80% compared to traditional FEA.

➢ Quality Control & Anomaly Detection
Vision AI and statistical learning for real-time detection of surface defects, bonding irregularities, or process anomalies in slewing bearing production.

➢ Digital Twin Integration
Real-time AI-enabled digital twin models for slewing systems, allowing virtual testing, failure simulation, and performance prediction under various operational conditions.

➢ Smart Data Acquisition Platforms,
Custom IoT and edge AI platforms to collect, preprocess, and stream performance metrics of slewing systems during bench and field tests.

ADVANCED SLEWING BEARING

We Are Looking For:

➢ Industrial End-Users
Companies using rotating systems (e.g. Wind turbine OEMs, Crane manufacturers, robotic arm develeopers, space systems) that could pilot or adopt the final product

➢ Advanced Sealing Design and Manufacturer
Sealing design and manufacturing partner to develop a robust, low-friction sealing solution for our lightweight slewing bearing. The seal must ensure protection against dust and moisture while maintaining performance under heavy rotational loads.

➢ Bonding Adhesive Developments
A partner to develop a high-performance bonding adhesive tailored for slewing bearing components. The material should offer strong adhesion, durability under dynamic loads, and resistance to environmental factors.

➢ University or Research Center for R&D collaboration
We are seeking a university partner for R&D collaboration on a lightweight slewing bearing system. The scope includes structural analysis, material testing, tribology, and potential development of smart monitoring or sealing solutions.

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