

# Application Handbook

# Aerospace

## Harmonic Drive LLC Passenger Aircraft

- Lightweight component set

Harmonic Drive® strain wave gearing is used extensively in measuring devices. This position pick-up unit is used to measure the position of control surfaces in the wing of a commercial aircraft. A high reduction ratio, excellent accuracy, and, above all, a light weight and small envelope are the key requirements dictating the use of this unique gear principle.

In this design example, a FB component set is used to drive two brushless resolvers. This gear type is used because of the limited torque requirement and most importantly because of the limited space available. A splined input shaft is connected via a bevel gear to the drive shaft driving the control surface. This input shaft is connected to the Wave Generator. The Circular Spline is the fixed gear element; the Dynamic Spline drives the resolvers via a spur gear and split pinion arrangement. Consequently, the gear is used in combination with the spur gear stage to reduce the angle of rotation of the drive shaft to an angle of less than  $360^\circ$  (at the input to the resolvers). In this critical application, safety measures require the resolvers to be mounted in parallel fashion.

The component set, which includes special grease for low temperature operation, is manufactured from stainless steel so as to avoid corrosion.

