

# BEECHCRAFT CASE STUDY



## Aircraft for flight inspection in Europe

### King Airs help airports worldwide meet safety regulations

Around the world, pilots rely on a myriad of communications, navigation and surveillance systems to fly safely. To ensure operational readiness, companies like FCS Flight Calibration Services GmbH of Germany routinely measure and calibrate the airways using turboprop aircraft equipped with sophisticated flight inspection technology. The combination provides a nimble, reliable, cost-effective platform for certifying airport navigational aids to incredibly precise tolerances.

In 1993, when Germany switched from heavy, expensive aircraft to lean turboprops, the country improved the efficiency of its flight inspection services while significantly reducing costs. More than 20 years later, the Beechcraft® King Air® 350 is still the aircraft of choice.

## FCS Flight Calibration Services GmbH

Braunschweig, Germany

### Keeping nav aids on target in Central Europe

At Baden-Baden Airport in Germany, a twin turboprop flies another approach, its fifth of the morning, at the busy international airport. The flight inspection crew is testing the instrument landing system, specifically checking the frequencies that show pilots whether they're on course. Over the next four hours, the crew will circle the airport, monitoring, measuring and calibrating the navigational aids used by hundreds of pilots every day.

Based in Braunschweig, a small, historic city in northern Germany, FCS Flight Calibration Services



The central component of Aerodata's AeroFIS Automatic Flight Inspection System is a complex hybrid positioning system that combines several sensors. Its data is accurate to a few centimeters.

„Choosing a King Air for flight inspection is a low-risk decision. It has the ideal blend of performance data, operational cost and good maintenance support.“

- Christian Hintz, financial director for FCS Flight Calibration Services GmbH

GmbH uses two identically-configured Beechcraft King Air 350 aircraft for its flight inspection and flight validation services. The company is a joint venture of DFS Deutsche Flugsicherung GmbH and two other European air navigation service providers created after Germany privatized its air navigation services in 1993. Today it flies each of its aircraft nearly 1,000 hours a year, inspecting navigation systems in Germany, Switzerland and Austria.

The new organization began with two King Air 350 aircraft, FCS Flight Calibration Services GmbH purchased two more in 2006 and 2009. The company flies each of its two King Air 350 aircraft nearly 1,000 hours a year in Germany, Switzerland and Austria.

“Our company, previously known as Flight Inspection International, bought its first King Air 350s back in 1993, replacing the HS748s that had been used for flight inspection in Germany until then. After a service life of more than 12 years, it was a natural decision to go for King Airs again when replacing the first aircraft,” Rüdiger Schmidt, managing director of FCS Flight Calibration Services GmbH, said.

“We have a couple of airports with short runways and steep approaches in Switzerland. These are the main reasons we opted for the King Air 350,” Mathias Steenbuck, director flight of operations for FCS Flight Calibration Services GmbH, said.

Each King Air is equipped with leading avionics, including a Rockwell Collins Pro Line 21 Integrated Avionics System, FMS-3000 Flight Management System and ADS-B solution as well as Honeywell’s EGPWS Enhanced Ground Proximity Warning System.

“The main equipment we rely on is the flight inspection system (FIS) supplied by Aerodata, who also handled the system’s integration. The FIS is responsible for measuring and recording all parameters of interest. It also provides its own positioning solution, using differential phase GPS augmentation for ILS and APV SBAS calibrations where we need the highest precision,” Markus Schwendener, director Continuing Airworthiness Management Organization for FCS Flight Calibration Services GmbH, said.

Aerodata’s flight inspection systems are in operation in more than 60 countries around the world. The modular architecture and open system software provide the flexibility to add future expansions, if needed. The AeroFIS Automatic Flight Inspection System onboard uses a Windows-based interface that can be operated by one crewmember. For operators who use their aircraft for other missions, mobile AeroFIS configurations can be removed from the aircraft in less than an hour.

“Modifications to the airframe mainly comprised of installing the flight inspection system with all its interfaces and mounting the large number of flight inspection antennas we needed. In the avionics compartment, we wanted to make sure all of the systems stay as up-to-date as possible, so we installed the WAAS/RNP upgrades as soon as they were available to us,” Schwendener said.

Flight inspection missions in Germany typically take a week to complete. In Austria, it’s two weeks. The company bases the aircraft in Vienna and shuttles the crew back to Germany, if necessary.

“Typical parameters we check are DDM for ILS, bearing errors for DVOR and, of course, coverage and field strength. We calibrate a



The company flies each of its two King Air 350 aircraft nearly 1,000 hours a year in Germany, Switzerland and Austria.



Enabling precision evaluations, the company’s flight inspection aircraft are outfitted with high-tech capabilities and equipment, such as autopilot coupling and calibrated 3D antennas necessary for measuring field strength within stringent International Civil Aviation Organization (ICAO) tolerance limits.

„We choose the King Air 350 due to its performance envelope, including range and endurance. We have a couple of airports with short runways and steep approaches in Switzerland. These are the main reasons we opted for the King Air 350.“

- Mathias Steenbuck, director flight operations for FCS Flight Calibration Services GmbH

#### Typical ICAO standards

- ILS inspections every 180 days
- VOR/DME and NDB calibrations annually
- Flight validation of GPS RNAV/RNP procedures prior to first publication or for changes
- GBAS (LAAS) and APV SBAS (WAAS) commissioning and annual checks

number of airport sites by night to avoid interfering too much with the heavy metal traffic. As part of our safety management system, we adopted new fatigue management guidelines for night work, an important issue,” Steenbuck said.

The biggest challenge for FCS Flight Calibration Services GmbH has come over the last couple of years while adapting to new processes for flight validation of GPS-required navigation performance procedures (RNP); ground-based augmentation systems (GBAS); and Approach Procedures with Vertical Guidance (APV) Satellite-Based Augmentation Systems (SBAS).

“This is a pretty complex issue, as handling avionics and flight inspection equipment upgrades, juggling databases, qualifying staff, and keeping the ‘QM OK’ stamp on it all, including certification, all need to go hand in hand. But, we started early in Germany with procedure validation more than 10 years ago. The new ICAO 9906/Vol. 5 document did not come as a big surprise to us,” Schmidt said.

“GBAS and APV SBAS checks are now more or less routine for us. The King Air 350 aircraft certainly helped with that because we had the upgrades and technical support we needed. Overall, we are very pleased with the performance and reliability of our King Airs.”

## FLIGHT INSPECTION IN AUSTRALIA AND ASIA

### AeroPearl, Brisband, Queensland, Australia

#### Covering the distance in Australia and Asia

Across the globe, pilots flying in and out of international and regional airports rely on a collection of communications, navigation and surveillance systems to operate safely. The crews and technicians who ensure those systems are working properly are pilots and passengers themselves, because its aircraft equipped with sophisticated flight inspection technology that measure and calibrate the airways.

AeroPearl's crews fly in one of three Beechcraft® King Air® 350 turboprops to help keep civil and military navigational aids on track. Since 1997, the Brisbane-based company has provided flight inspection services for Airservices Australia, a government-owned corporation that oversees the country's airspace.

Today, AeroPearl goes beyond Australia's borders, conducting routine flight inspections in several countries throughout Asia, including Singapore, Cambodia and Vietnam, as well as the French islands of New Caledonia and French Polynesia that lie east of Australia. Other flight services missions have taken the company to Brunei, Nepal, India, The Maldives, Sri Lanka and the Middle East.



In addition to the Middle East and French Polynesia, AeroPearl also serves Australia, Singapore, Cambodia, Vietnam, New Caledonia, Brunei, Nepal and India, The Maldives and Sri Lanka.

“Our missions take us to all different regions: the southern coastal regions of Australia, the desert around Alice Springs in Central Australia, tropical places such as Darwin, Cairns or Singapore, and all the way to the mountains of the Himalayas,” said Thomas Schachtner, business development manager for AeroPearl.

„Overall, the King Air 350 is a very economical choice for flight inspection.  
The aircraft are true workhorses for these missions.“

- Michael Bitzer, general manager for AeroPearl

AeroPearl is a joint venture between the Australian Paspaley Pearls Group, producers and suppliers of South Sea pearls, and Germany's Aerodata, experts in Flight Inspection Systems and special mission aircraft modifications.

The company utilizes two King Air 350i aircraft and one King Air 350 equipped with fixed installations of Aerodata's AeroFIS Automatic Flight Inspection System. The system includes onboard satellite communications, which help support the crew's tasks and offer easier mission management from AeroPearl's home base in Brisbane.

“We place a high level of importance on redundant systems, both in the primary avionics, as well as in the flight inspection equipment. A great feature is the autopilot coupling of the flight inspection equipment with a digital map for the flight crew. This reduces workload in a safety-sensitive environment, enhances crew coordination and improves the accuracy of the flight profiles,” said Mr. Schachtner.



**AeroPearl's three King Airs fly a total of more than 1,200 hours every year.**

The aircraft are often dispatched on long and remote deployments. The flight inspection missions last from one to eight weeks with new crews swapped in every two weeks.

“On a typical mission, we often complete the navaid at an airfield in the morning and then position the aircraft at the next airport in the afternoon. The traffic at airports such as Sydney requires calibration on weekends, and the navaid at Singapore Changi Airport are calibrated at night,” said Mr. Schachtner.

Some 25 specialists support the flight inspection missions. A network of sister companies and other partners provide AeroPearl access to ancillary facilities wherever needed.

“The aircraft perform well and efficiently, both at low-level and at higher altitudes. They are fast enough during the approach so as to avoid unnecessary loss of landing slots, and they can quickly climb and turn after completion of a measurement run if required.” said Michael Bitzer, general manager for AeroPearl.

„We operate in a large and remote area. We find robust support services for the King Air everywhere we go.“

- Thomas Schachtner, business development manager for AeroPearl

For AeroPearl, operating in and from Australia presents special challenges. The continent is vast with a relatively small population and few airfields.

“The King Air performs very well to cross those distances without compromising efficiency at low level. Over the past 15 years, it has proven to cope with the heat and humidity, too,” said Terry Flynn, general manager for AeroPearl.

“In short, the King Air 350 offers us all we could ask for in a flight inspection aircraft. Its payload, range and speed envelope match the flight inspection mission very nicely. The fuselage offers plenty of area for antenna installations, and the pressurized, quiet cabin provides a good work environment for our flight inspectors.”



AeroPearl has flown King Airs since it began providing FIS in 1997.

Beechcraft has been crafting and supporting globally renowned business aircraft, including King Air turboprops and piston-engine Baron and Bonanza models, since 1932. Since then, we've built more than 54,000 aircraft, with more than 36,000 still in use today. Let us show you how business aircraft can save your company money and make you and your team more productive. Check out our complete line at [www.beechcraft.com](http://www.beechcraft.com) or call 800.949.6640 for more information on which business aircraft could help meet your goals.