

RICHARD A. BAKER

**FLIGHT TEST ENGINEER
FLIGHT ANALYST
INSTRUMENTATION ENGINEER**

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Flight test engineer/flight analyst having strong technical and leadership skills with 17 years of experience in the design, implementation, and management of flight test programs on more than 37 aircraft types, including light reciprocating engine aircraft, seaplanes and amphibians, single and multi-engine turboprops, very light jets, jet transports, and multiple special missions aircraft. Formally trained aerospace engineer from the University of Kansas.

Capable of carrying out research and development, flight envelope expansion, and engineering evaluations related to aircraft performance, flight characteristics, powerplant operating characteristics, powerplant cooling, installed power and thrust, high speed characteristics and flutter, flight control systems, autopilot/autothrottle, pilot compartment evaluations, fuel systems, avionics (including navigation and highly-integrated electronic display systems), caution/warning systems, hydraulic systems, and electrical systems.

Extensive experience designing, installing, calibrating and using PC and UNIX-based data acquisition systems in a flight test environment.

Business owner with a highly developed sensitivity to the complexity and economic factors affecting aircraft certification, mission requirements, and aircraft sales/marketing. Have developed an extensive network of leading aviation industry experts and airworthiness authority advisors to assist with aircraft development and certification.

EXPERIENCE

2003 - Present

Baker Aviation Services, LLC – Flight Test Consultant

Consultant offering fixed wing aircraft flight test support services, including preparing Compliance Programs, developing Certification Flight Test Plans, identifying instrumentation and aircraft configuration requirements, collecting flight test data, performing review and engineering analysis of flight test data, preparing Certification Flight Test Reports, preparing Airplane Flight Manuals and Flight Manual Supplements, preparing Issue Papers, and flight test program coordination/management.

1991-2003

Baker Aviation Services Ltd. – Flight Test Engineer

Flight test and instrumentation engineer responsible for supporting multiple CAR 3, FAR 23, and FAR 25 certification flight test programs.

1999 - 2003

Bombardier Aerospace, Bombardier Flight Test Center – Flight Test Engineer

Flight test engineer responsible for planning and implementing development and certification flight testing on multiple jet transport aircraft types. Worked with engineering test pilots and other engineers to evaluate aircraft performance, flight characteristics, and systems performance leading to airworthiness approval. Flight test experience included evaluation of aircraft performance, flight characteristics, flutter, powerplant operating characteristics, autopilot/autothrottle/flight director inner and outer loop gains and mode development, hydraulic systems, fuel systems, environmental control systems, flight controls, electrical systems, avionics, heads-up display symbology development and evaluations, and Category D simulator model development.

CAPABILITIES

Capabilities related to flight testing include, but are not limited to, the following:

- Aircraft Performance - Extensive experience with flight test and data analysis related to FAR23 and FAR25 position error determination, stall performance, climb performance, level flight performance, and field performance flight testing and data analysis, including

takeoff performance, accelerate-stop performance, landing performance, braking performance, brake maximum kinetic energy testing, Vmca/Vmcl/Vmcg determination, and Vmu demonstration.

- Aircraft Handling Qualities - FAR23 and FAR25 longitudinal control, lateral control, trimmability, minimum control speed, static longitudinal stability, static lateral-directional stability, dynamic stability, stick-force-per-g, stall characteristics, vibration and buffeting, high speed upsets, and out-of-trim flight testing and data review/analysis, including the determination of Vmcg/Vmca/Vmcl, Vh, Vno/Vne, Vmo/Mmo, Vd/Md, Vdf/Mdf, and Vfc.
- Aircraft Modifications - Experience with special missions and modified aircraft flight evaluations, including radome/FLIR installations and fire fighting aircraft.
- Powerplant Testing – Experience with reciprocating engine, turboprop, and turbofan engine operating characteristics, powerplant cooling, and installed power and thrust evaluations. Experience with turboprop conversions, including ground and flight evaluation of engine operating characteristics, powerplant cooling, installed power flight testing to determine intake, exhaust, and accessory losses, and propeller vibration surveys. Familiar with reduced thrust (FLEX) takeoff requirements and certification testing.
- Electrical Systems Testing - Experienced with electrical distribution system testing, including the use of load banks.
- Avionics Testing - Extensive experience with autopilot, autothrottle, and flight director flight testing, including all vertical and lateral mode tracking performance evaluations and simulated failure characteristics and annunciations. Good knowledge of CAT2 and CAT3a approach and landing certification requirements. Have been involved with major block avionics changes on multiple aircraft, including HUD all-phases-of-flight symbology development.
- Environmental Control System Testing - Experienced with aircraft pressurization and environmental control system ground and flight development and certification testing.
- Fuel Systems Testing – Experienced with unusable fuel determination, fuel quantity gauging system development and certification testing, and fuel system performance testing.
- Acoustics – Can perform the FAR 36 Appendix G Handbook analysis to make a recommendation of no acoustical change or identify the requirement for noise testing for small and propeller driven aircraft. Experienced with constructing reference profiles for FAR23 and FAR25 aircraft noise measurements and/or corrections to noise data. Experienced with operating noise measuring equipment to measure flight deck noise levels for Category D simulator certification.
- Instrumentation - Developed the first differential GPS system to be used for measuring takeoff performance, accelerate-stop performance, landing performance, and Vmcg in Canada. Hands-on experience with installation and calibration of data acquisition systems on multiple aircraft and employing sensors of all types.
- Experience with Airworthiness Authorities - Have worked directly with TCCA, FAA, and JAA flight test and engineering specialists on multiple certification flight test programs. Excellent working knowledge of the civilian aircraft certification process.
- Flight Test Program Management - Extensive experience with flight test program coordination, liaison with vendors, other engineering specialists and the airworthiness authorities, identification of flight test requirements, and aircraft weight and balance and configuration tracking and control.

FLIGHT TEST EXPERIENCE

Flight test experience includes, but is not limited to, the following programs.

- CL-604 - Avionics midlife upgrade (evaluation of autopilot vertical and lateral mode improvements, FMS and EDS enhancements), fuel quantity gauging system improvement, fuel system modification to address fuel migration during takeoff.
- CRJ-200 - Avionics midlife upgrade, midlife structural fatigue survey, abused landing

evaluation of landing gear loads, final approval of HUD for CAT3a approaches and landings (including zero visibility takeoff and landing demonstrations, autopilot coupled and manual approaches in limiting conditions, and all-phases-of-flight symbology validation).

- CRJ-700 - Autopilot certification flight testing, function and reliability testing.
- BD-700 Global Express - Autopilot/autothrottle development and certification (including TCCA, FAA, and JAA acceptance demonstrations), electrical system block 3 upgrade, engine fan disk and blade in-flight strain survey, RVSM certification, developed procedures and carried out performance testing required for reduced thrust (FLEX) takeoff approval, cold weather certification, increased takeoff weight performance certification, fuel scavenge system certification including the determination of unusable fuel, cabin pressurization system certification, CAT2 approach certification (including autopilot hardovers to determine the autopilot minimum engage and disengage heights), HUD symbology development and HUD CAT2 all-phases-of-flight demonstration from initial simulator evaluation through final certification, plus many more miscellaneous sustaining and development projects covering virtually all aircraft systems.
- BD-700 Global Express ASTOR Special Missions Aircraft - Aerodynamic validation from first flight through final customer acceptance. The assessment included envelope expansion flight testing, all FAR 25 performance and flight characteristics requirements and support for the customer operational evaluation.
- Bombardier Global 5000 - Initial flight envelope expansion and performance evaluation (including position error determination, opening of angle of attack envelope to pusher activation and angle of sideslip envelope to full rudder).
- Increased gross weight DHC-3 Otter with Walter turbine engine – Developed compliance program and certification flight test plan. Managed flight test program and executed all flight testing in cooperation with other engineering specialists. Performed installed power and thrust calculations and position error, stall performance, climb performance, takeoff performance and landing performance flight test data reduction and expansion. Determined reference speeds for takeoff and landing. Prepared performance and flight characteristics certification flight test reports and Airplane Flight Manual Supplement.
- Increased gross weight DHC-3 Pezetel Otter seaplane (2 propeller configurations) - Developed compliance program and certification flight test plan. Performed installed power calculations and position error, stall performance, climb performance, takeoff performance and landing performance flight test data reduction and expansion. Determined reference speeds for takeoff and landing. Produced performance certification flight test report and Airplane Flight Manual Supplement. Developed the takeoff reference profile for FAR 36 Appendix G noise testing and analysis.
- Increased gross weight DHC-3 PT6A-34/34AG Turbo Otter seaplane - Developed compliance program and certification flight test plan. Performed installed power and thrust calculations and position error, stall performance, climb performance, takeoff performance and landing performance flight test data reduction and expansion. Determined reference speeds for takeoff and landing. Produced performance certification flight test report and Airplane Flight Manual Supplement. Demonstrated compliance with the FAR 36 noise requirements using the method of the FAR 36 Appendix G Handbook.
- Increased gross weight DHC-3ST Garrett Turbine Otter seaplane – Developed compliance program and certification flight test plan. Fully instrumented the test article. Managed flight test program, including management of engineering test pilots, company pilots, additional flight test engineers, and maintenance personnel. Executed all flight testing and collected all test data. Completed all performance and flight characteristics flight test data reduction and expansion. Worked with structures engineers to demonstrate compliance with the structures airworthiness requirements. Produced performance and flight characteristics certification flight test reports and Airplane Flight Manual Supplement. Created and managed through airworthiness authority acceptance multiple Issue Papers to make findings of equivalent safety.

- Increased gross weight DHC-2 Piston Beaver on floats and wheels - Developed compliance program and certification flight test plan. Performed installed power calculations and position error, stall performance, climb performance, takeoff performance, and landing performance flight test data reduction and expansion. Determined reference speeds for takeoff and landing. Produced performance certification flight test report and Airplane Flight Manual Supplement.
- DECA Aviation Aerostar 600/601 - FLEX takeoff feasibility study.
- Geoterrex DeHavilland Dash 7-102 Electromagnetic Survey Aircraft - Performed position error, stall performance, climb performance, takeoff performance and landing performance flight test data reduction and expansion. Determined reference speeds for takeoff and landing. Developed all AFMS performance charts, including WAT limits for all takeoff and landing flap and gear configurations and compressibility correction to indicated OAT.
- Field Aviation Dash 8-202 Australian Coastwatch Maritime Patrol Aircraft - Baseline and modified aircraft performance and flight characteristics evaluation. Position error, stall performance, cruise performance and climb performance flight test data collection, reduction and expansion and flight characteristics spot-check. Determined change in aerodynamic drag due to the external modifications and generated performance factors for the AFMS, including analytical determination of takeoff performance factors. Generated revised WAT limits and climb ceiling information for presentation in the AFMS.
- Timberline Air Beech 100 with extended nose baggage compartment - Performance and flight characteristics flight testing. Position error, stall performance, climb performance, cruise performance, takeoff performance and Vmca/Vmcl flight test data reduction and expansion.
- MIT Lincoln Laboratory Special Missions Gulfstream GII - Takeoff performance modeling. Produced takeoff and accelerate-stop (balanced field length) performance information for the AFMS and operating supplement.
- Conair Aviation Boeing 737 Air Tanker feasibility study - All engines operating and one engine inoperative takeoff and accelerate-stop performance modeling, expansion to heavier weight, and comparison to mission requirements.
- Bombardier Defense Systems Division CL-600 Special Missions EST Challenger - Baseline and modified aircraft climb performance flight test data reduction and expansion.
- U.S. Army DHC-7 Special Missions intelligence gathering aircraft - Developed aircraft AFMS performance charts.
- Viking Air DHC-2 increased gross weight piston beaver seaplane - Performance and flight characteristics flight test data collection. Flight test program weight and balance control. Developed AFMS performance charts.
- Viking Air DHC-2 increased gross weight turbine beaver amphibian – Performance and flight characteristics data collection. Flight test program weight and balance control. Developed AFMS performance charts.
- Kohlman Systems Research Cessna 208 - Simulator data collection flight testing. Supported instrumentation installation, flight test planning, and data collection.
- Airdyne R&D, Inc. Cessna A185F Helix Special Missions Aircraft - Developed compliance program and certification flight test plan.
- Cascade Aerospace Dash 8 Q400MR Multi-Role Airtanker / Freighter – Planned and implemented the certification flight test program from inception through completion. Instrumented the test airplane to collect all required flight test data. Demonstrated that all customer mission requirements were satisfied. Developed Airplane Flight Manual Supplement, including the engineering data analysis required to produce a complete replacement AFMS performance section.

- Conair Aviation Rockwell Commander 690 FLIR installation - Developed compliance program and certification flight test plan, performed installed power and thrust calculations and position error, stall performance, climb performance and Vmca flight test data reduction and expansion. Produced performance and flight characteristics certification flight test reports.
- Field Aviation increased gross weight DHC-8-202 - Analytical expansion of all AFM stall performance, reference airspeed, climb performance, obstacle clearance, takeoff run/distance, and accelerate-stop distance charts to support a 1000 lb increase in maximum takeoff weight. Developed the takeoff reference profile and flight conditions for ICAO Annex 16, Volume 1 Chapter 10 noise analysis.
- International Aeroproducts Thrush SR2T660 Fire Fighting Aircraft on Amphibious Floats - Developed compliance program and certification flight test plan.
- Sealand Aviation PZL-104M Wilga-2000 seaplane with smaller diameter 4-bladed propeller – Developed compliance program and certification flight test plan covering all FAR23 Subpart B airworthiness requirements. Managed flight test program. Participated in the resolution of multiple flight characteristics problems (stall characteristics, elevator control force reversal). Performed all performance flight test data analysis and prepared performance flight test report. Prepared Airplane Flight Manual Supplement.
- Sealand Aviation PZL-104M Wilga-2000 seaplane/amphibian with larger diameter propeller - Developed compliance program, certification flight test plan, and test cards. Identified the requirement to reduce maximum continuous propeller RPM to satisfy the FAR 36 Appendix G noise requirements. Identified the instrumentation, instrument calibration, weight and balance, flight control rigging, and system check requirements to prepare the aircraft for certification flight testing.
- DHC-3 Turbine Otter modified wing strut vibration testing – Developed test plan and instrumentation requirements. Executed flight and ground testing and provided cognizant engineers with the required test data to demonstrate compliance with fatigue airworthiness requirements.
- Cessna A185F Helix – Prepared compliance program, certification flight test plan, and all test cards. Performed flight test data reduction and expansion of all performance data. Prepared performance flight test report and Airplane Flight Manual Supplement.
- Piper PA-23-250 Aztec Nomad – Prepared compliance program, certification flight test plan, and all test cards. Performed flight test data reduction and expansion of all performance data. Worked with customer to resolve multiple flight characteristics discrepancies. Prepared performance flight test report and Airplane Flight Manual Supplement.
- Viking Air DHC-3 PT6A-34/35 Turbine Otter – Lead flight test engineer/flight analyst responsible for implementation of all aspects of the certification program leading to airworthiness approval of the subject aircraft with two replacement engine types, modified electrical system, modified fuel system, improved cockpit layout, and four landing gear configurations (wheels, wheel-skis, straight floats, and amphibious floats).
- DHC-3 Otter Aerodynamic Enhancement Kit – Designed and implemented STC installation on the subject aircraft type to improve low speed handling characteristics, enhance stall identification, and allow increased gross weight while retaining positive structural margins by tailoring stalling speeds in the landing flap configuration. The STC is owned by Viking Air Limited and consists of outboard wing leading edge flow energizers, modified inboard wing leading edge stall strips, and repositioned wing fences.
- Lear 60XR Rockwell Collins ProLine 21 Avionics/Autopilot Installation – Consultant flight test engineer responsible for documentation of test results for demonstration of compliance with airworthiness requirements. Collected required data on each test flight. Participated with engineering test pilots in flight planning and documentation of test results and squawks for each test flight. Participated with cognizant engineers and

avionics technicians in squawk resolution.

- Harbor Air DHC-3 9000 lb gross weight increase – Prepared compliance program, certification flight test plan, and all test cards. Performed flight test data reduction and expansion of all performance data. Worked with customer to resolve multiple flight characteristics discrepancies. Prepared performance flight test report and Airplane Flight Manual Supplement.
- AeroMech King Air B300 Instrumentation – Instrumented and provided flight test engineering services for the subject aircraft in a military special missions configuration. Prepared test cards and post-flight reports for each flight. Worked with the project engineering test pilot and cognizant engineers to resolve multiple problems related to vibration and buffet, including open cavity issues.
- Adam Aircraft A700 – Lead Flight Test Engineer, Flight Sciences Lead Engineer. Development program leading to certification.
- Nextant BeechJet 400A Engine Change – Instrumented the test article and performed baseline flight testing to determine engine bleed air, engine and wing anti-ice, ECS, pressurization, and air conditioning characteristics for the subject aircraft with Williams FJ44-4AP engines and Rockwell Collins ProLine 21 engines installed. This is a project in progress.

EDUCATION

Education applicable to engineering flight test includes:

- B.Sc. Aerospace Engineering - University of Kansas
- Introduction to Fixed Wing Aircraft Flight Testing - National Test Pilot School
- FAA Functions & Requirements Leading to Airworthiness Approval – University of Kansas