Bihrle
APPLIED RESEARCH INC

STALLBOX

Excellence in Aeronautics

STALLBOX®

StallBox®

FAA Directive 2, EASA Issue 2
FSTD Update Solutions

Why StallBox?

Stall Models

Exemplar stall models provide realistic upset prevention and recovery training and meet regulatory requirements for stall modeling.

Instructor Displays

Bihrle-developed Instructor Feedback Displays for UPRT are available for integration with an existing IOS or as add-on displays for Windows OS-based desktop or tablet devices.

No OEM Data Required

Bihrle-developed stall models based on predictive and empirical data & validated by Subject Matter Experts (SMEs) are available in the absence of OEM data.

Easy Installation

Typical installations can be accomplished in a couple of days with minimal impact to training schedules.

Optional Models & Scenarios

Bihrle offers additional models including in-flight icing, crosswind gusts & bounced landing models as well as instructor control options such as pitch-up, pitch-down, and bank upset scenarios.

Low Computational Load

Since enhanced models are executed on the STALLBOX hardware, minimal additional computational load is placed on the existing simulator.

Fail Safe Design

In the event that the STALLBOX is taken off-line, the simulator automatically and seamlessly reverts to the baseline flight model.

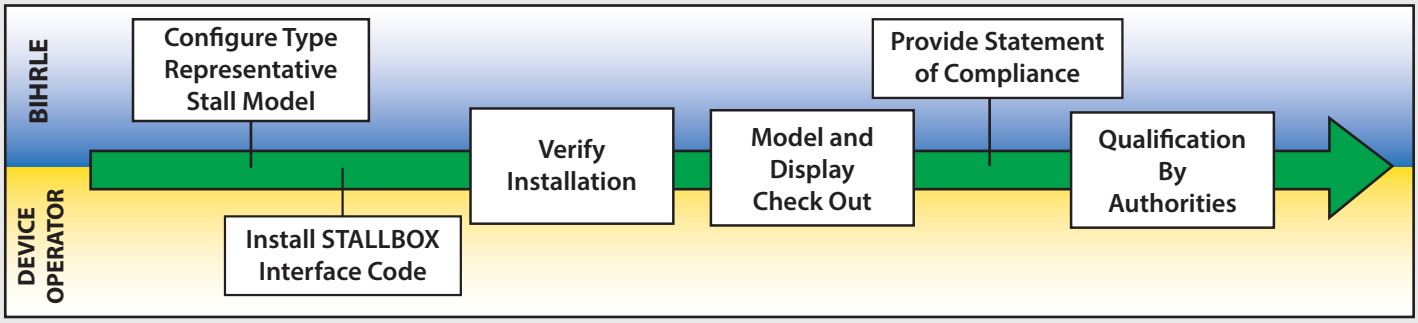
Future Expansion

The STALLBOX platform provides the ability to easily incorporate additional models for future training enhancements.

More information available at

www.stallbox.com

The STALLBOX Process



Common Questions

Which directives under 14 CFR Part 60 does your solution address?
STALLBOX solutions provide stall model enhancements for full-stall training and instructor feedback displays under 14 CFR Part 60 Change 2, Directive 2. Consulting and engineering services to address UPRT scenarios, airframe icing, crosswind gusts, and bounced landing are also available.

Does your solution meet EASA CS-FSTD(A) Issue 2 requirements for UPRT and Stall Modeling?
Yes, STALLBOX solutions have been integrated with A320, B737 Classic, B737NG, 757, and 767 full-flight simulators and have been qualified for UPRT, including recovery from full stall, by the UK CAA and DGAC.

Has your solution been installed and qualified by the FAA?
Yes. On April 28 2016, Alaska Airlines' B737-800 simulator became the first Part 121 training device qualified by the FAA for Full Stall Training under Part 60 Change 2, Directive 2. Since then, STALLBOX solutions have been part of over 25 FAA qualifications. Airplane types include: B737-400, B737-700, B737-800, B757-200, B767-200, A330, A320, A300, A310, MD/DC-9, MD/DC-10, SAAB 340, ATR 42, ATR 72, and Q400. Full stall models for other configurations can be developed by BAR upon customer request.

How much simulator down time is required for installation?
For typical installations, the STALLBOX team will require approximately two to four, 4-hour simulator sessions.

Can you provide a Subject Matter Expert (SME)?
Yes. We maintain a network of qualified stall-modeling Subject Matter Experts (SMEs).

Why Bihrle?

Since 1973, Bihrle Applied Research Inc has established its reputation as the industry leader in data acquisition, analysis and modeling of the most complex flight behaviors. Beginning with ground breaking work in the acquisition and application of dynamic test data for the prediction of aircraft spins, BAR has guided the commercial and military aircraft communities in the application of these data in high-fidelity, physically representative simulations of aircraft stall and post-stall behavior.

STALLBOX Solutions Meet Industry Needs Globally — 2019-2021

- STALLBOX solutions have been qualified by international authorities including UK CAA, DGAC, CASA, and GACA
- Bihrle now supports over 15 airplane types
- Continually working with training providers and expanding STALLBOX's role in flight simulation updates

FAA Publishes Final Rule on UPRT & Full Stall Training (14 CFR Part 60 Change 2) — 2016

Bihrle Introduces STALLBOX Simulator Update Solution — 2014

- Bihrle B737NG STALLBOX solution installed at FAA center in Oklahoma City
- P-8A STALLBOX solution demonstrated on P-8 trainer

14 CRF Part 121 Change Requiring UPRT and Full Stall Training — 2013

FAA Selects Bihrle for Stall Research — 2011

Bihrle selected by FAA to investigate development of a type representative stall model for the B737NG

Bihrle Demonstrates Full Stall Model to the FAA — 2010

Bihrle demonstrates full stall model on a B737 full-flight simulator at the FAA Mike Monroney Aeronautical Center

ICATEE is Formed Bihrle is an Original Member — 2009

Air France, Colgan Air Accidents — 2009

Navy Selects Bihrle for Research Contract — 2001

"A System for Modeling the Effects of Unsteady Aerodynamics in Flight Simulations"

High Angle-of-Attack — 90s/2000s

Bihrle Develops High Angle-of-Attack Models for Use in Military Flight Training

Pioneering Aeronautical Research & Development — 1970s/80s

William Bihrle Leads Rotary Balance and Spin Analysis Research -- Military and Commercial

Ultimately leads to the development of a wind tunnel test capability that provides insight into the driving aerodynamic forces and moments that produce the stall and post-stall behaviors.

Bihrle Applied Research Inc. was founded in 1973

2016 STALLBOX is Industry-Proven Solution for Military & Commercial Applications

- Bihrle B737NG STALLBOX installed on Alaska Airlines B737-800, receives first FAA qualification under Part 60 Dir 2
- Bihrle P-8A STALLBOX solution installed on P-8A training device and accepted by the US NAVY
- Bihrle A320 stall model implemented and demonstrated at FAA center in Oklahoma City

2015 STALLBOX Demonstrations

- Bihrle A330 STALLBOX solution installed & demonstrated at FAA center in Oklahoma City
- Bihrle G450 Stall Model Demonstrated

2013 Bihrle Continues Full Stall Research

- Bihrle participates in FAA study of aerodynamics models for full stall training
- Bihrle awarded FAA BAA research contract to investigate the development of "Type Representative Models" for commercial full stall training

2010 Congress Mandates UPRT & Stall Training

Public Law 111-216, Airline Safety and FAA Act of 2010 – Mandates UPRT and Stall Training for Part 121

2009 RAeS Silver Award Winner

Bihrle presents award-winning paper "Aerodynamics Modeling for Training on the Edge of the Envelope"

2008 Navy Selects Bihrle for Research Contract

"Total Envelope Modeling Application for Transport Aircraft"

1995 Navy Selects Bihrle for Research Contract

"Dynamic Wind Tunnel Testing and Modeling of Non-linear Unsteady Aerodynamics"

1980s/90s Pioneering Aeronautical Research & Development

Bihrle Leads Industry in High Angle-of-Attack Modeling R&D for Military Applications

Bihrle develops high angle-of-attack aerodynamics databases, facilitates engineering and pilot training simulation applications for over 150 aircraft configurations.

STALLBOX®

Features & Capabilities

- Compliant stall model solutions for full-stall recovery training
- UPRT tools including instructor displays
- Minimally intrusive implementation
- Easily incorporate future add-on models/updates

info@bihrle.com
+1 757.766.2416
81 Research Drive | Hampton VA | 23666
www.bihrle.com

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