

# StallBox<sup>®</sup>

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.

## Easy Installation

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

## Fail Safe Design

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

## Instructor Displays

Bihrlé-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.

## Optional Models & Scenarios

Bihrlé 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.

## 23 Future Expansion

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

## No OEM Data Required

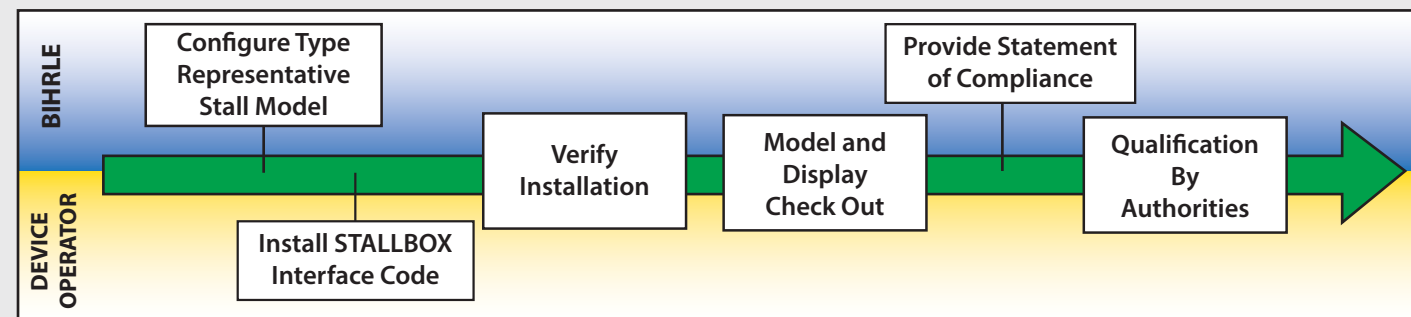
Bihrlé-developed stall models based on predictive and empirical data & validated by Subject Matter Experts (SMEs) are available in the absence of OEM data.

## Low Computational Load

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

More information available at [www.stallbox.com](http://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, the STALLBOX solution meets EASA requirements for instructor feedback as well as optional stall modeling.

### 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 Bihrlé?

Since 1973, Bihrlé 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 Meets Industry Needs 2019 ↑

- Bihrlé works with airlines and training centers to meet FAA's 2019 UPRT training deadline
- Bihrlé supports numerous additional aircraft types
- Bihrlé enhances UPRT instructor displays

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

## Bihrlé Introduces STALLBOX Simulator Update Solution 2014

- Bihrlé 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 Bihrlé for Stall Research 2011

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



## Bihrlé Demonstrates Full Stall Model to the FAA 2010

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

## ICATEE is Formed Bihrlé is an Original Member 2009

## Air France, Colgan Air Accidents 2009

## Navy Selects Bihrlé for Research Contract 2001

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

## High Angle-of-Attack 90s/2000s

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

## Pioneering Aeronautical Research & Development 1970s/80s

William Bihrlé 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.  
Bihrlé Applied Research Inc. was founded in 1973

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

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

## 2015 STALLBOX Demonstrations

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

## 2013 Bihrlé Continues Full Stall Research

- Bihrlé participates in FAA study of aerodynamics models for full stall training
- Bihrlé 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

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



## 2008 Navy Selects Bihrlé for Research Contract

"Total Envelope Modeling Application for Transport Aircraft"

## 1995 Navy Selects Bihrlé for Research Contract

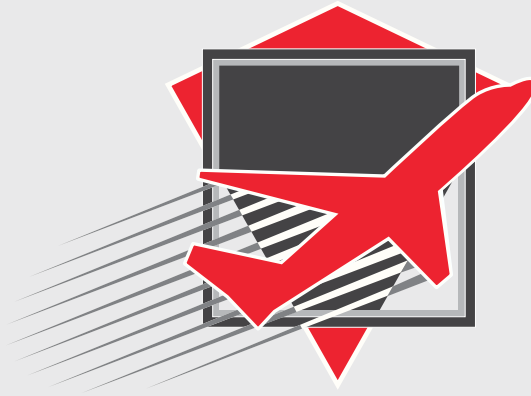
"Dynamic Wind Tunnel Testing and Modeling of Non-linear Unsteady Aerodynamics"

## 1980s/90s Pioneering Aeronautical Research & Development

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

Bihrlé 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 UPRT full-stall recovery training
- Compliant display solutions for UPRT instructor feedback
- Minimally intrusive implementation using external “black box” approach
- Easily incorporate future add-on models/updates

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