



OPERATIONAL PERFORMANCE

# The Boeing Alertness Model



LIFECYCLE  
SOLUTIONS



# FATIGUE RISK MANAGEMENT

**Boeing delivers LIFECYCLE SOLUTIONS,** products, services, and support that will help you achieve success and maximize the value of your Boeing fleet through its lifetime. And Boeing has a set of LIFECYCLE SOLUTIONS focused on operational performance that can help your maintenance, engineering, and flight operations personnel perform their work in the most effective manner possible, increasing efficiency and profitability.



As a Boeing LIFECYCLE SOLUTION the **Boeing Alertness Model (BAM)** brings scientific predictions of crew alertness into the crew management process and your Fatigue Risk Management System (FRMS). Unlike many other biomathematical models of alertness, BAM has been built from the

## **BUILDING VALUE AND SAFETY INTO YOUR OPERATION**



ground up to support the crew scheduling process, from time-table planning to day-of-ops. As part of an approved FRMS, BAM enables operators to predict and control crew fatigue from a scientific point of view. Together with scheduling solutions having scenario-

building capabilities, BAM enables operators to provide data requested by regulators when or if discussing FTL alleviations. When compared with current FTLs, BAM within an FRMS can yield a several percent increase in crew efficiency while improving crew alertness.

### **Built for Transparency.**

Boeing recognizes that sleep research is developing and evolving and that FRM regulations and labor relations require a clear understanding of the science being applied.

BAM is built on a foundation of openly published research for maximum transparency. The underlying science in BAM can be discussed and scrutinized with employees and regulatory authorities.

Boeing will work with BAM customers to benchmark performance and prediction quality. Boeing is committed to ensuring that BAM is the most effective model for commercial aviation and will invest a portion of the revenue from BAM into advancing the basic sleep science on which BAM is based.

### **Built for Integration.**

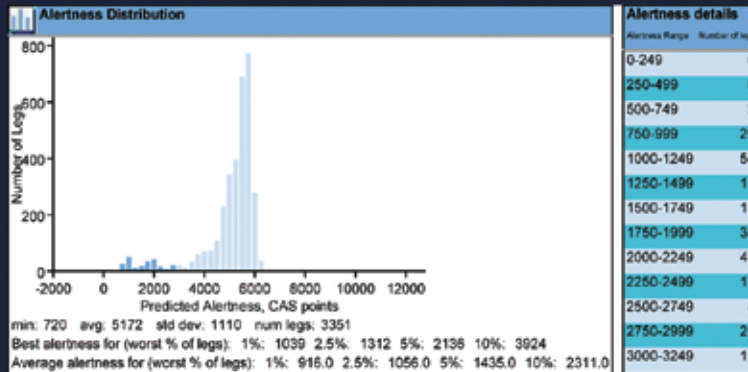
Crew management is a complex process—often automated with optimization software. BAM was built with optimization in mind and is particularly well suited for constructing crew schedules in large calculation jobs. From construction of pairings, rosters—and ultimately from manpower planning to day-of-ops—BAM is fully compliant with Jeppesen's Common Alertness Prediction Interface (CAPI), ensuring seamless integration with the Jeppesen crew management products.



*BAM is integrated into the CrewAlert iPhone application from Jeppesen.*

BAM has been tested to meet the extreme performance demands during the pairing/roster optimization process and returns over 100,000 predictions per second in a production environment—making sure that schedules

are published on time. With the Jeppesen CrewAlert app, available from the Apple iTunes store, BAM is available to all members of your organization.



*BAM can be used to control alertness in the construction phase of crew scheduling.*



### Built for Your Operation.

BAM makes it possible to take the realities of your operation into account. For example, BAM can consider commuting times, diurnal type (morningness/eveningness) and habitual sleep length, and key other individual factors affecting alertness. BAM also has the ability to use a mixture of actual and predicted sleep for its predictions. Support for augmented operations is built into BAM to ensure correct adjustments for in-flight relief. BAM will continue to grow to accommodate customer needs and to integrate into your FRM and SMS systems.

### Built for Improvement.

BAM has built-in mechanisms to learn from collected data. BAM is designed to autotune and to validate its predictions. As part of the initial BAM product offering, operators who agree to provide operational sleep/alertness data will be offered a competitive license price with a significant discount from the non-collaborative license.

**Please inquire for more details.**

**For more information visit**  
[www.boeing.com/commercial/flightops/bfrm.html](http://www.boeing.com/commercial/flightops/bfrm.html)

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