EXPERIENCE BASED TO EVIDENCE BASED THROUGH SCIENCE

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Fatigue is a safety risk in aviation because of performance deficits in flight crews that have been shown to be correlated with decreased levels of alertness. Over decades FedEx Express ("FedEx"), had naturally evolved experientially to deploy mitigations in its operations to proactively manage fatigue. While this served FedEx well the opportunity to understand the science behind schedules became possible resulting in its use as a factor along with experience in discerning fatigue risk in operations.

At FedEx, owing to the around-the-clock and across-time-zones nature of its air operations, adding an evolving science-based approach to tracking and managing fatigue risk to its experience input promises to improve the company's safety margin and operational flexibility going forward.

FedEx has committed to scientifically understand its complex operations and its current mitigations and practices on what is making its crew operate safely. These mitigations include predictive, proactive and reactive processes including fatigue-limiting scheduling policies, world class sleep facilities at the hub, schedule improvement group reviewing 100% of the schedules, wakeup call program, applying science-based rostering, contractual requirements of fatigue risk management, matured fatigue event review process, fatigue reporting policies.

Counterintuitively its direction to embrace science actually emerged after its examination of the use of "validated" models which did not reflect its sleep patterns nor did they correlate well with its experience. This lead to a recognition that the around-the-clock and across-time-

zones nature of FedEx flight operations stretched the boundaries of accuracy and validity of currently available fatigue and alertness models.

FedEx plans to collect (de-identified) field data on human performance and alertness as part of its commitment to fatigue risk management. These data will advance our understanding of fatigue in the field, and will be useful to educate the pilots, schedulers and management about fatigue risks. The field data will also support the continued development of modeling software encompassing the scheduling parameters of FedEx's air distribution network and applicable regulatory requirements. Additionally the resulting sleep baselines across all of its operations will be used as another data point in its discernment of systematic fatigue issues. Data collection and research and development of modeling software are critical aspects of the regulatory environment that will increasingly require airlines to develop science-based fatigue risk management systems. As outlined above, FedEx has already taken several proactive steps to develop tools for generating alertness-friendly schedules that maintain operational integrity. The next major step is to continue understand their operations from scientific perspective and further build the knowledge base that will allow for the prediction and advance mitigation of fatigue (and the resulting improvement in overall pilot alertness) across the many facets of FedEx air operations world-wide.