

FedEx Express FRMS Journey Continued..



April 2016

Agenda

- **FedEx Operations and Evolution**
 - Building the FRMP Program
 - Why Data Collection
- **Acting on Data Collected**
 - Strategic
 - Tactical
- **Continuing Innovation/Lessons Learned**

FedEx Express Flight Operations

By Numbers, Fleet and Operating Statistics

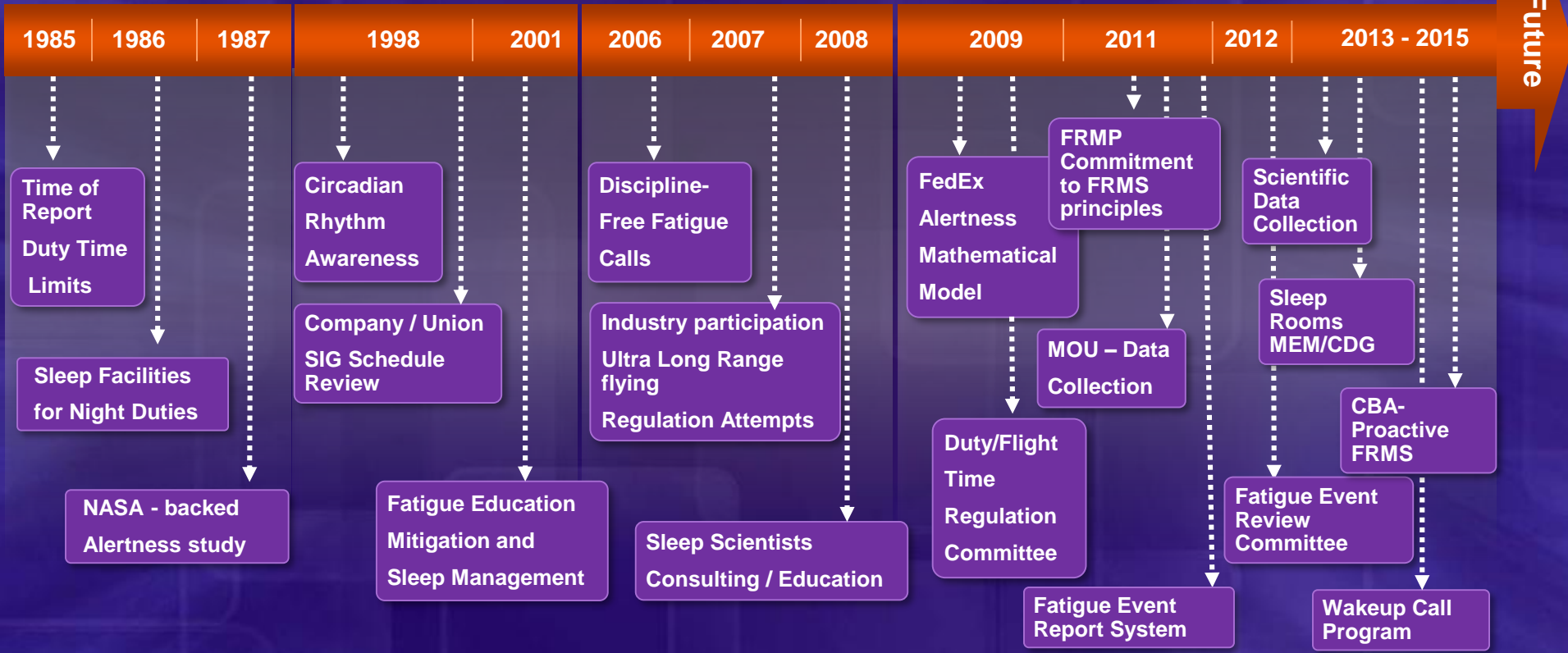


* Passenger carriers only have U.S. bases.

History of Continuous Improvement

- 1 FedEx – Operations and Evolution
- 2 FedEx - Acting On Data Collected
- 3 FedEx – Continuing Innovation/Lessons Learned

Fatigue Mitigation at FedEx Express

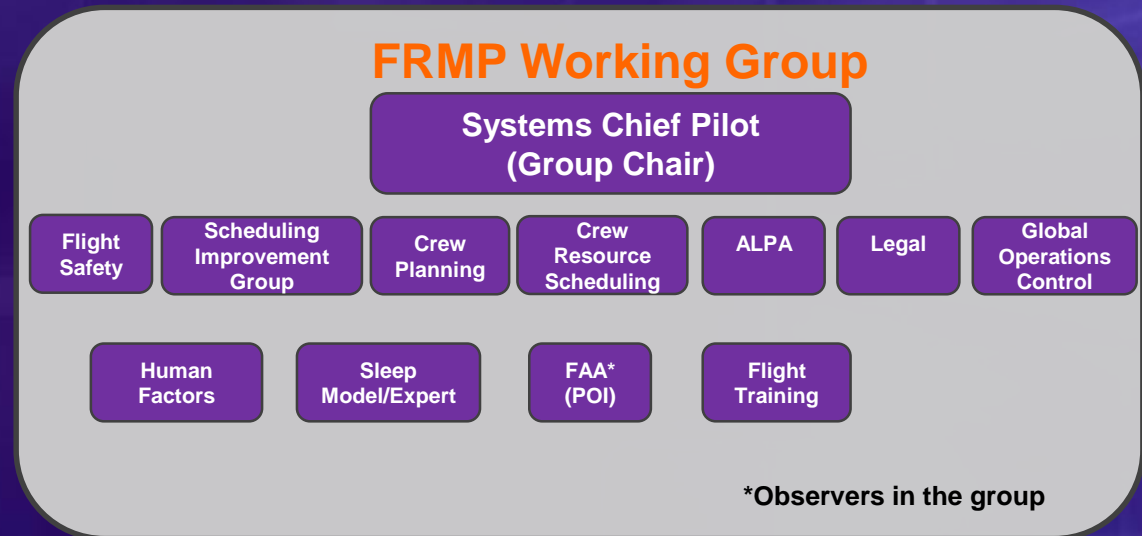


Fatigue Risk Management Plan Elements and Working Group

1	FedEx – Operations and Evolution
2	FedEx - Acting On Data Collected
3	FedEx – Continuing Innovation/Lessons Learned

Elements

- Education and Training
- Scheduling Improvement Group
- Prescriptive Rules
- FedEx Alertness Model
- FedEx Mitigation
 - Crew Rest Facilities
 - Recommended In-flight Sleep Patterns
- Pilot Fatigue Reporting
- Pilot Performance Data Collection
- FERC members/processes

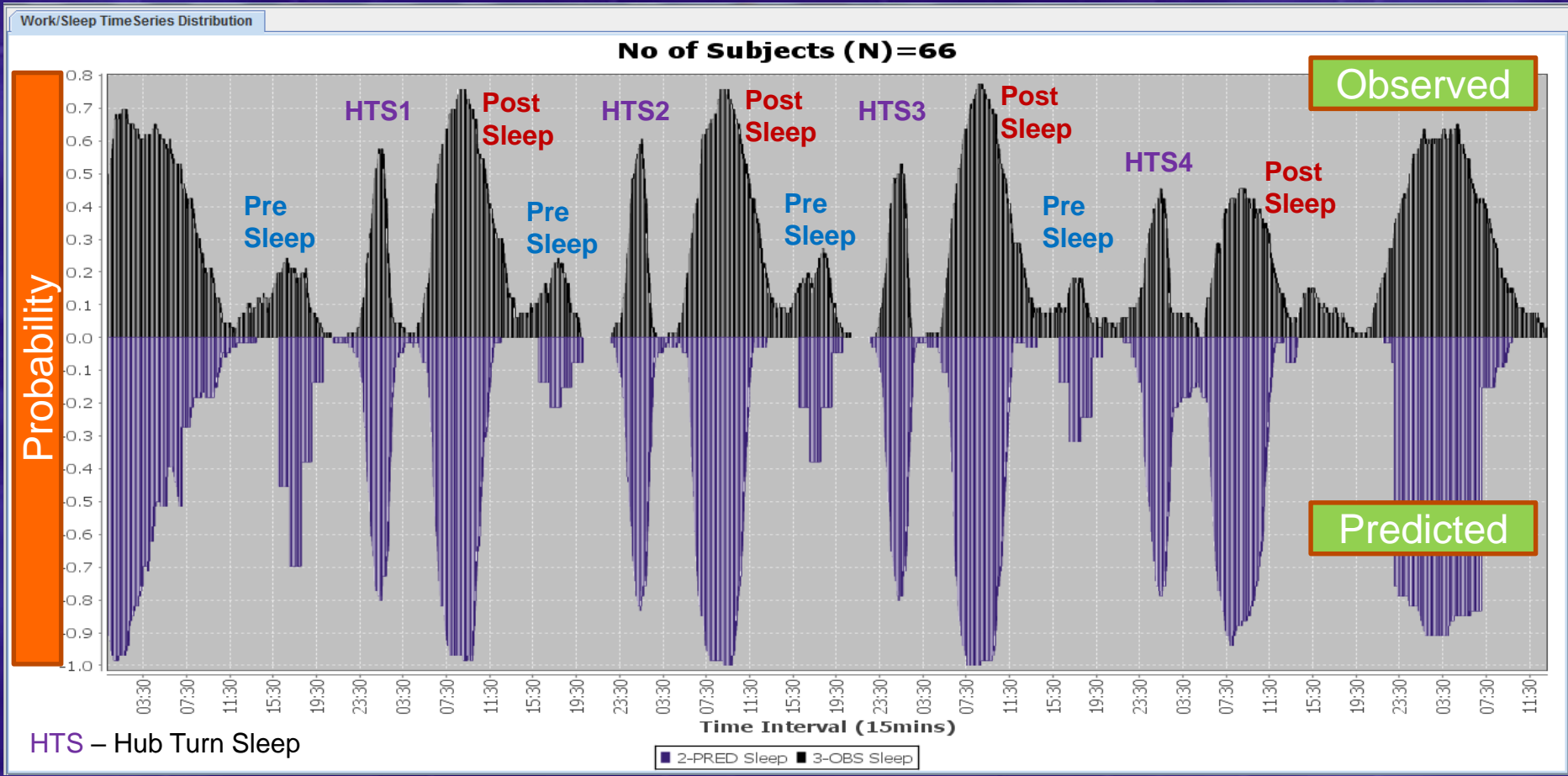


Why Data Collection

- **Model Disconnects**
 - Sleep profiles, mitigations
 - Did not represent our experience
- **Sleep Baselines**
- **More Precise Risk Identification**
 - Informs training, scheduling guidelines and prescriptive rules
- **Continue to build a culture based on trust**
 - Objective Data takes emotion out of decision making
- **AMOC**

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Predicted vs Actual Sleep

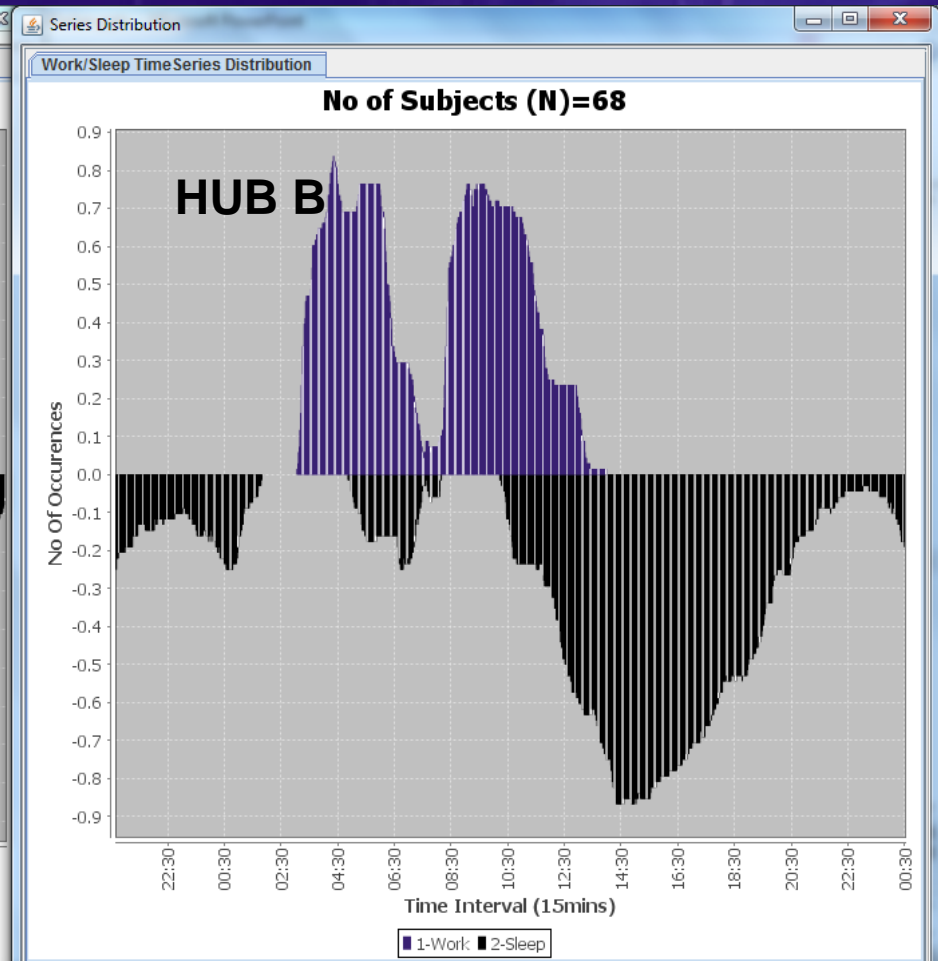
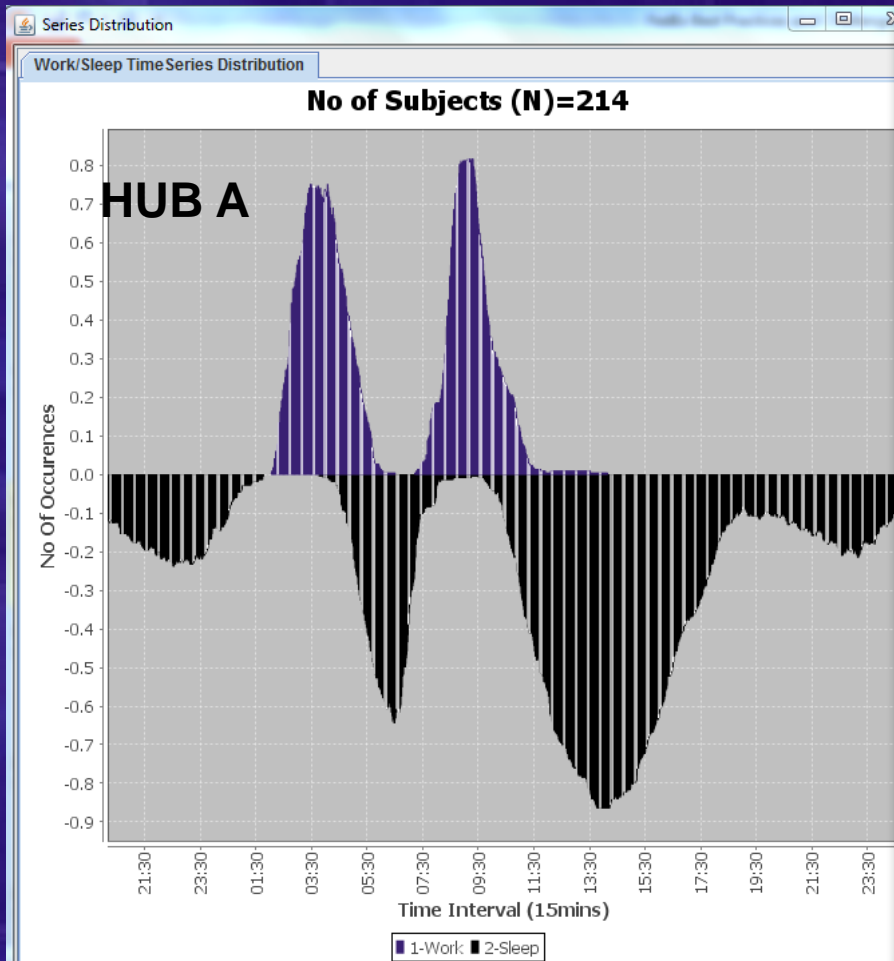


Data Collection Status

Study Design	# Of Volunteers	Status of Study
IND 4 Consecutive Nights Baseline	54 Pilots	Scientist Review Complete
AFW 4 Consecutive Nights Baseline	17 Pilots	Scientist Review Complete
CDG 4 Consecutive Nights Baseline	33 Pilots	Data Collection Complete
International Go Around the World – Westwards	94 Pilots	Data Collection – In Progress
International Go Around the World – Eastwards	81 Pilots	Data Collection – In Progress
Sling Shot Designs (Fly to Theater and come back)	25 Pilots	Data Collection – In Progress
Memphis – AM Out and Backs	45 Pilots	Data Collection – Analysis in progress
International – Any Augmented Operations	20 Pilots	Data Collection – In Progress
5 Night Sequence	15 Pilots	Data Collection – In Progress

Sleep Distribution – Two similar hub designs

- 1 FedEx – Operations and Evolution
- 2 FedEx - Acting On Data Collected
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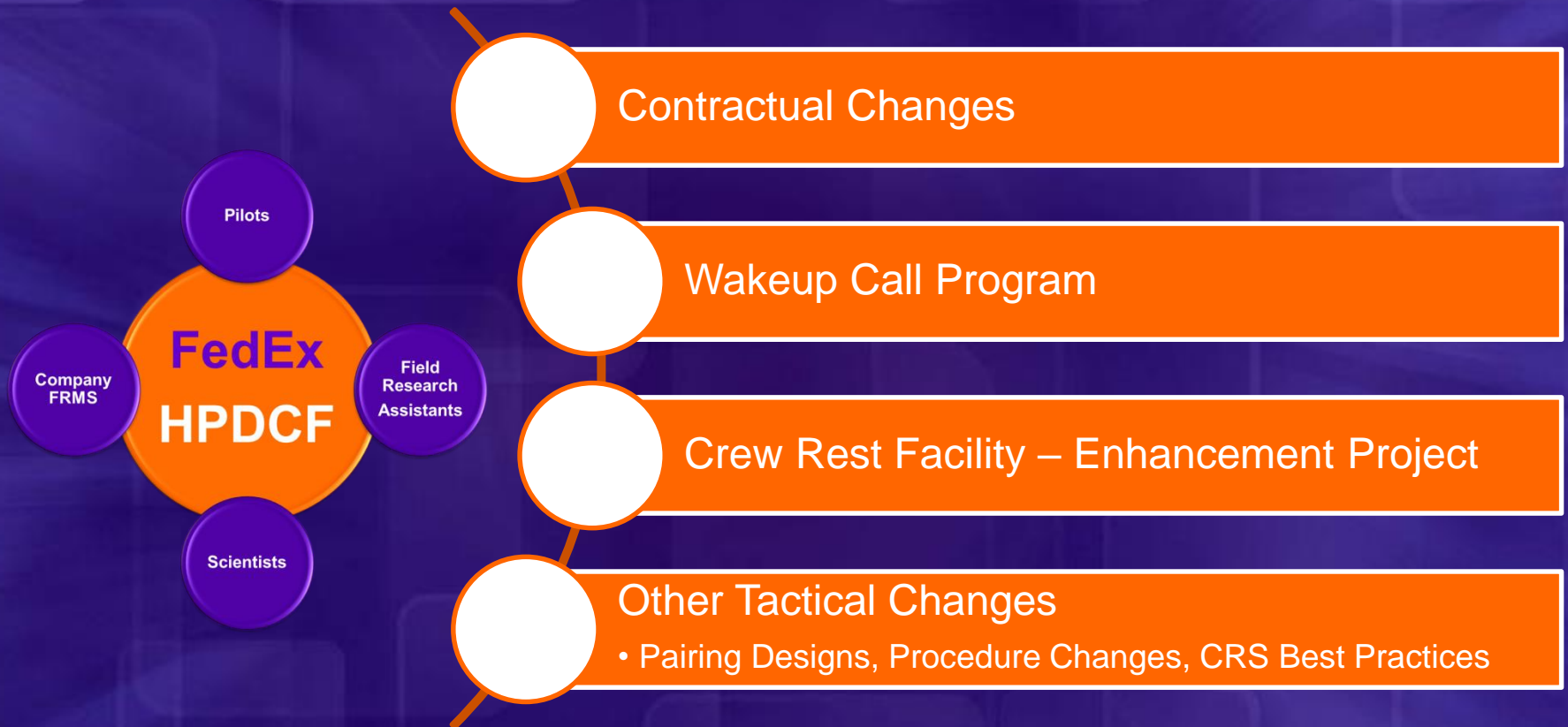


Strategic and Tactical changes

1 FedEx – Operations and Evolution

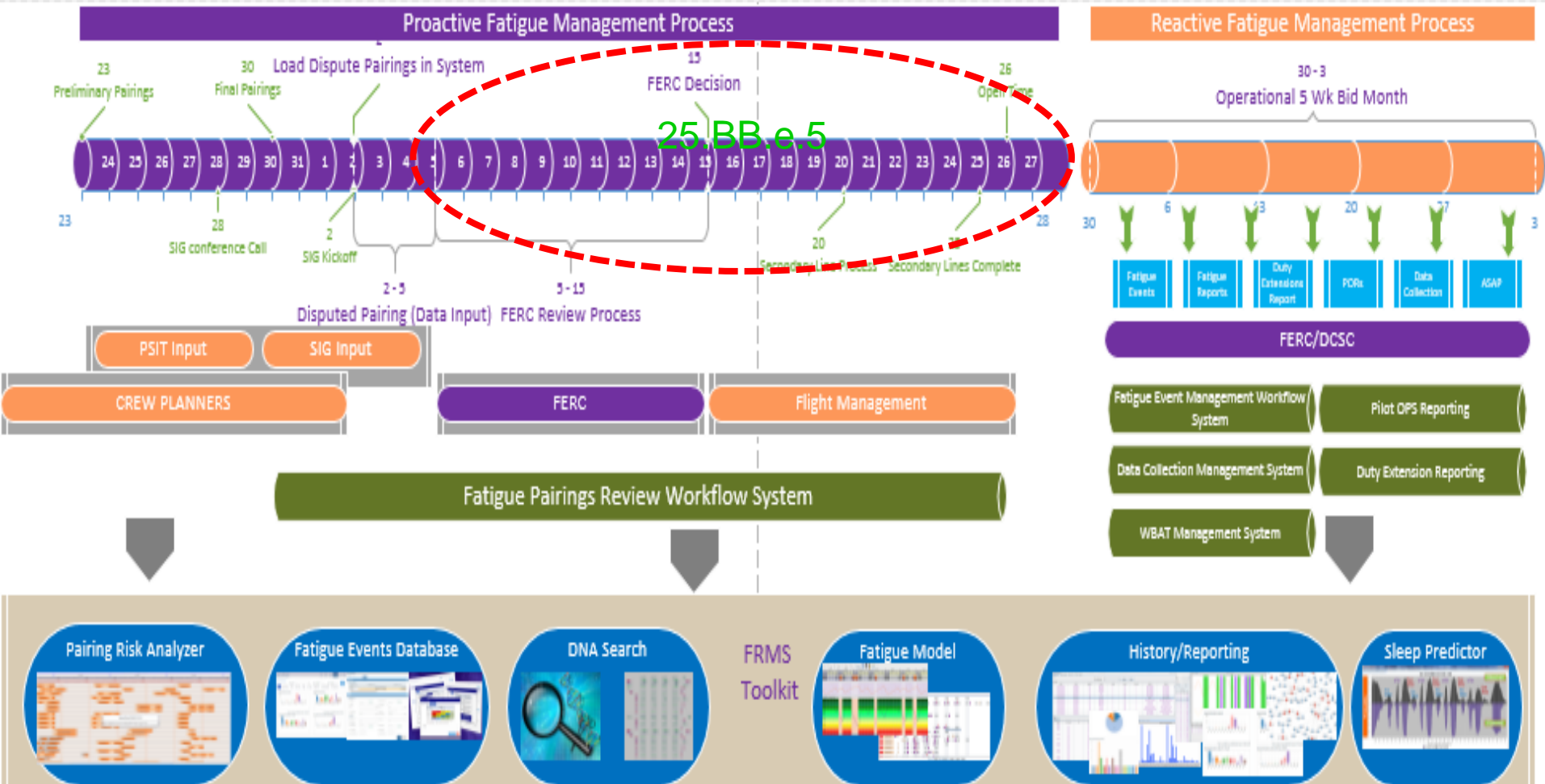
2 FedEx - Acting On Data Collected

3 FedEx – Continuing Innovation/Lessons Learned



Pairing Review Process FRMS Track (Strategic)

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- 2 FedEx - Acting On Data Collected
- 3 FedEx – Continuing Innovation/Lessons Learned



Centralized Fatigue Review Process (Strategic)

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3	FedEx – Continuing Innovation/Lessons Learned

Fatigue Event Management



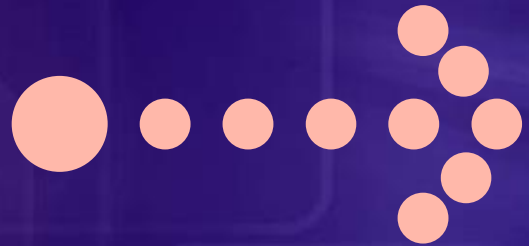
Fatigue Report Review



New Proactive Fatigue Review



Duty Extensions Review



Wake Up Call Program Lost Opportunity (Strategic)

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- 3 FedEx – Continuing Innovation/Lessons Learned

Prior to Wakeup call program

Objective human physiology data

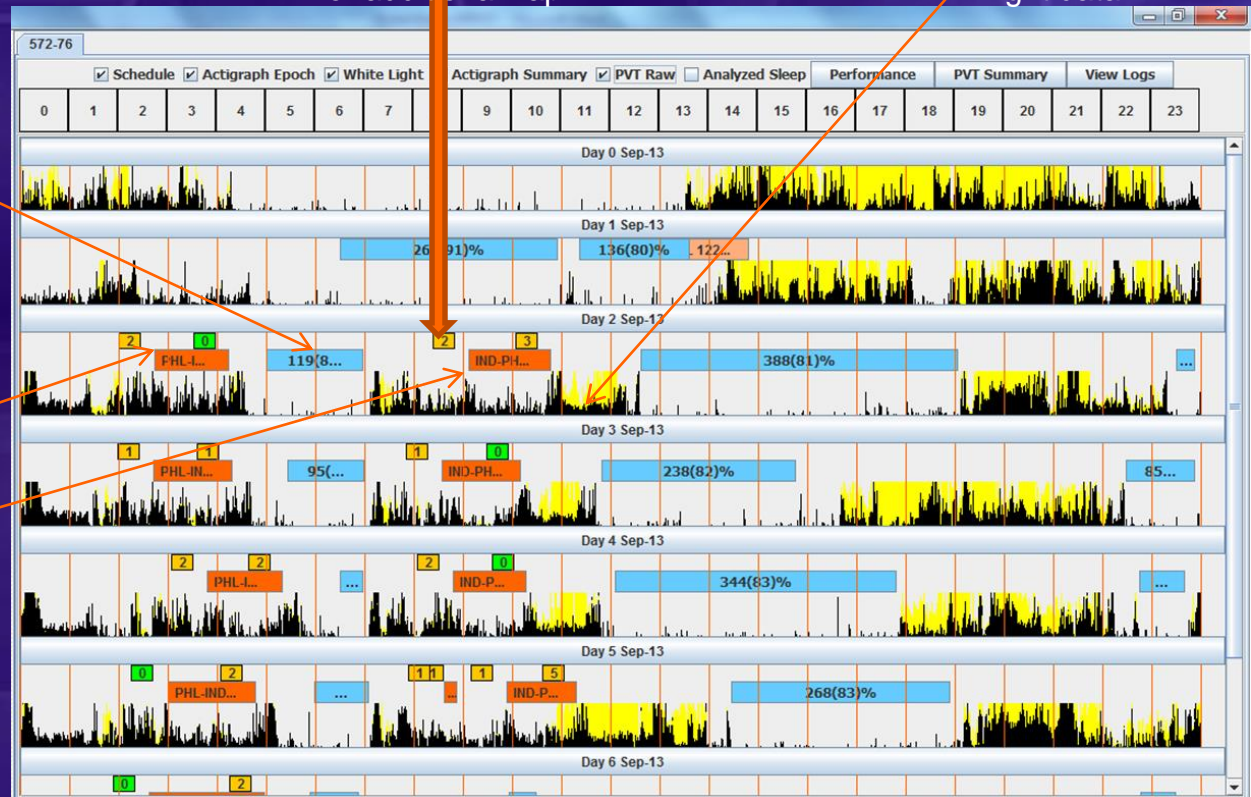
Nap at the Hub

Flight into Hub

Flight out of Hub

Flight delay and Possible opportunity for additional nap

Activity data and light data



Sample crew data for IND night hub turns

Crew wakes up the same time every day (irrespective of flight delays).

Total lost opportunity for this crew = 2 hours for the week

Automated Wakeup Call Program

1	FedEx – Operations and Evolution
2	FedEx - Acting On Data Collected
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- Company taking responsibility to wakeup crews during hub turn naps.
- Increase nap opportunity and reduce anxiety during hub turns.
- Currently implemented in MEM and IND hubs
- Approximately 5000 hours of additional sleep opportunity every month
- First of its kind fatigue mitigation program in any mode of operations.

The FRMS Wakeup call program increases recuperation time between flights whenever the opportunity arises without anxiety of reporting late for the next flight. This improves both safety and efficiency as well as pilot well-being in FedEx Express 24/7 flight operations. With the implementation of this unique program, FedEx has further expanded its role as a global leader in operational fatigue risk management.

Dr Hans Van Dongen,

Director Research Professor, Sleep and Performance Research Center,
Washington State University

Budapest Trip Tactical Solution

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2	FedEx - Acting On Data Collected
3	FedEx – Continuing Innovation/Lessons Learned



- Problem Statement
 - Longer commute to hotel, Short layover
 - Fatigue Reports
 - Winter Ops delays, MX issues, delayed arrival, minimum layover
 - Expensive Fix
- Options considered
 - Explore hotels near the airport
 - Build CDG Sleep Rooms to increase hub turn sleep
 - Suggest Winter and Summer Designs (36 hr layover in BUD)
 - Reduce the short layover frequencies
 - Accomplish Data Collection to understand better
 - Accomplish Flight Safety Analysis (Unstable Approaches)

Continuing Innovation

1 FedEx – Operations and Evolution

2 FedEx - Acting On Data Collected

3 FedEx – Continuing Innovation/Lessons Learned

- Using Automation for Speed, Accuracy
- Documenting
 - Robust data mining (pattern recognition)
- Diagnostic
 - Scientific
 - Experiential
 - Historical
- Learn and Share

Lessons Learned

1	FedEx – Operations and Evolution
2	FedEx - Acting On Data Collected
3	FedEx – Continuing Innovation/Lessons Learned

- Building the right team
- Setting expectations
- Continuous improvement (tools)
- Fatigue Data
 - Collect objectively and accurately
 - De-identify and protect data
 - Objective data builds trust
 - Build knowledge base
 - Data sets you free
- Trust

APPENDIX

Layers of Scheduling Protection

Schedule Improvement Group (SIG)

A cooperative effort between the company and ALPA to provide oversight in the monthly pairing and line construction process

Scheduled Limits – Apply to trips Inside 48 hours Domestic and 96 hours International

Operational Limits – Apply once the duty begins

Federal Aviation Regulations – FARs

