

Proactive approaches to reduce human fatigue in aviation operations

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PVT lapses: Deficits accumulate with sleep debt

CHRONIC SLEEP RESTRICTION

One week of chronic sleep restriction of 6 hours or less per night equates to 1 full night of total sleep loss.

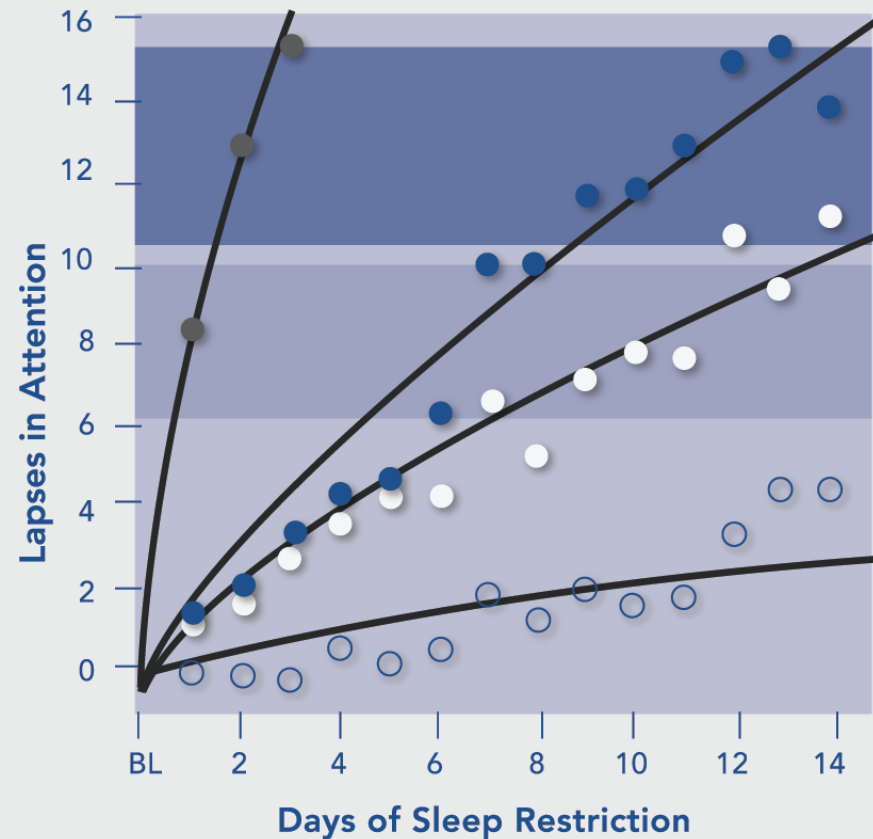
Two weeks of chronic sleep restriction of 6 hours or less per night equates to 2 full nights of total sleep loss.

ONE WEEK
6 hours or less of sleep each night = up to 1 night of total sleep deprivation

TWO WEEKS
6 hours or less of sleep each night = up to 2 nights of total sleep deprivation

This means that even relatively moderate sleep restriction seriously impairs function in healthy adults. Studies show that people are largely unaware of increased deficits and this may be why the impact of sleep restriction is often assumed to be benign.

(Van Dongen et al., 2003)



ABOVE FIGURE:

Lapses in attention across 14 days of chronic sleep restriction 8h ○, 6h ●, 4h ●, and 0h ● sleep per day. The mean ± s.e. of PVT lapses for 1 and 2 days of total sleep deprivation are shown as light and dark gray bands, respectively —see Van Dongen, et al. 2003 for more details.

PVT (Psychomotor Vigilance Test)

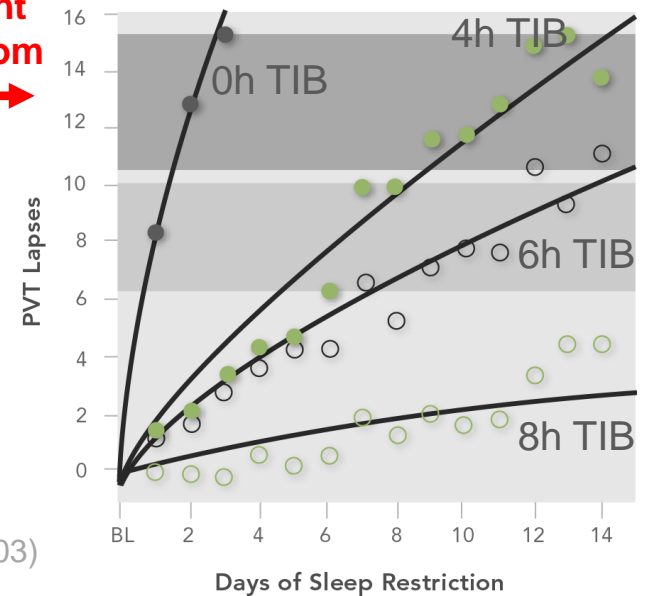
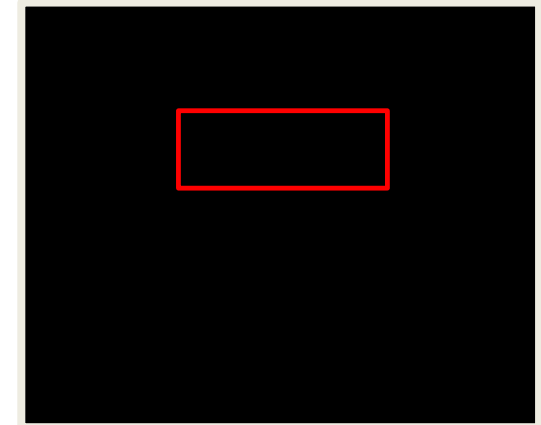
Psychomotor Vigilance Test (PVT)

- Measures vigilant attention and psychomotor speed
- No learning effects
- Unaffected by aptitude differences

Validated to be sensitive to:

- Total and chronic partial sleep deprivation
- night work
- sleep inertia
- drug effects

Objective measurement sensitive to deficits from restricted sleep →



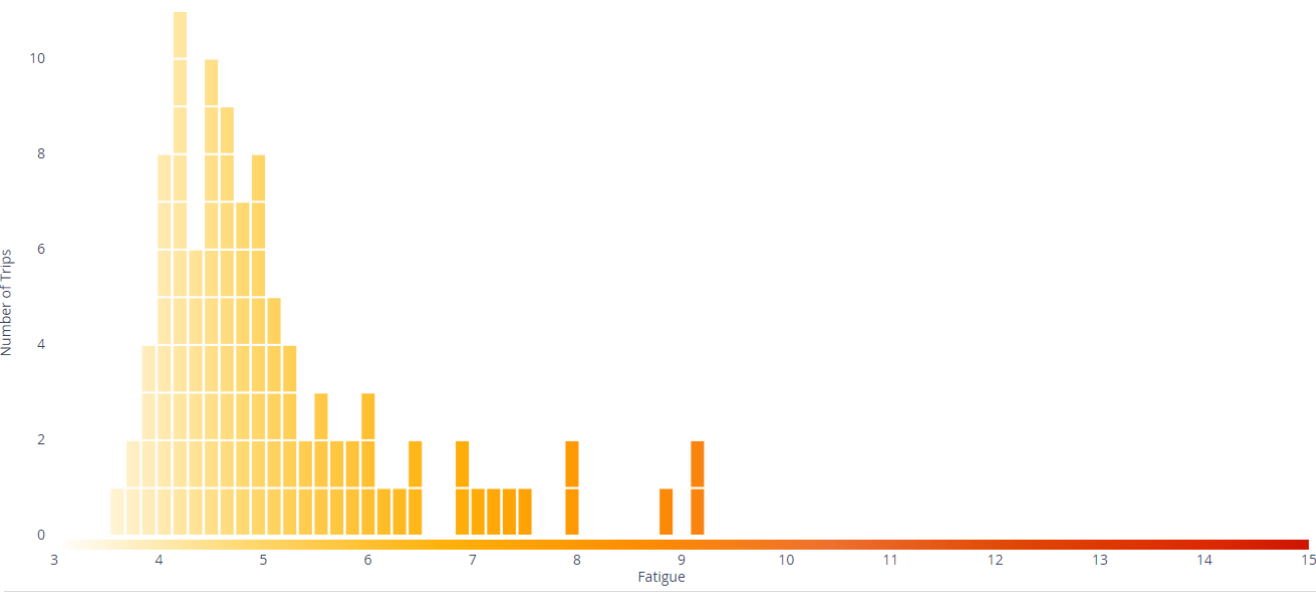
Van Dongen et al (2003)

Track flights and trips that have increased fatigue risk.



Mitigation approaches 5-11-15

	Trips	Crew	Alerts	Avg. Fatigue	Fatigue distribution			
					Med.	75%	90%	Max.
	102	3	9	5.2	4.8	5.5	6.9	9.2
All trips	102	3	9	5.2	4.8	5.5	6.9	9.2



Save Close

All filters



Crew ALL

Aircraft types Select all Challenger CL-604 Gulfstream G600

Start time (Local) From 12:00 AM To 12:00 AM

End time (Local) From 12:00 AM To 12:00 AM

Locations Orig. Airport c ICAO Dest. Airport c ICAO

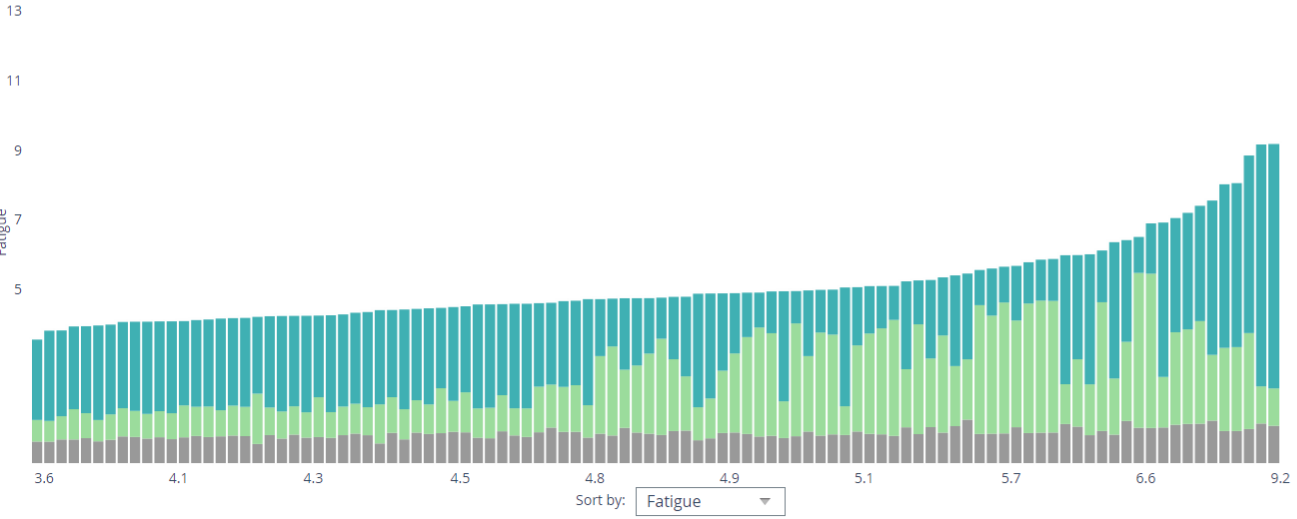
Identify the root causes of increased fatigue risk.



Mitigation approaches 5-11-15

	Trips	Crew	Alerts	Avg. Fatigue	Fatigue distribution			
					Med.	75%	90%	Max.
	102	3	9	5.2	4.8	5.5	6.9	9.2
All trips	102	3	9	5.2	4.8	5.5	6.9	9.2

- ▲ Extended Wakefulness
- Circadian Misalignment
- Sleep Deprivation



Save Close

All filters



Crew ALL

Aircraft types Select all Challenger CL-604 Gulfstream G600

Start time (Local) From 12:00 AM To 12:00 AM

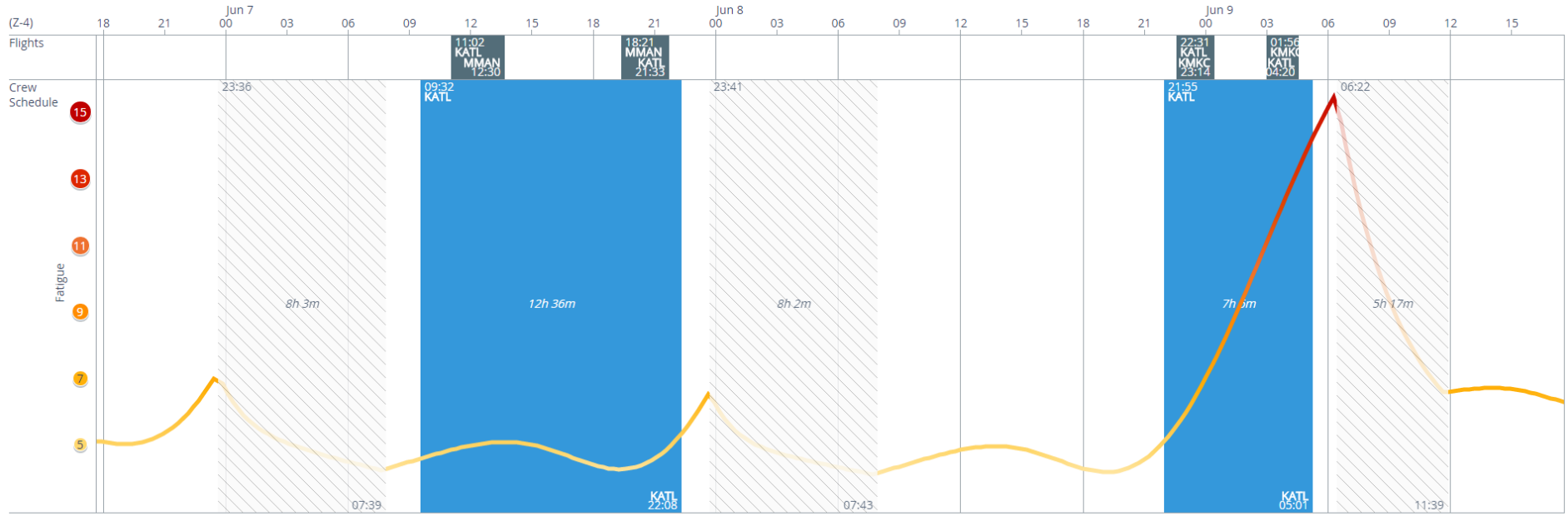
End time (Local) From 12:00 AM To 12:00 AM

Locations Orig. Airport c ICAO Dest. Airport c ICAO
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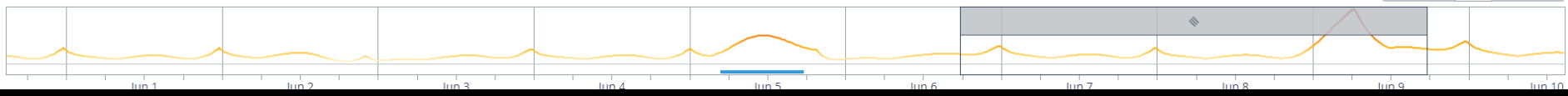
Aid in the selection of fatigue mitigation strategies.



Flight Duty Sleep

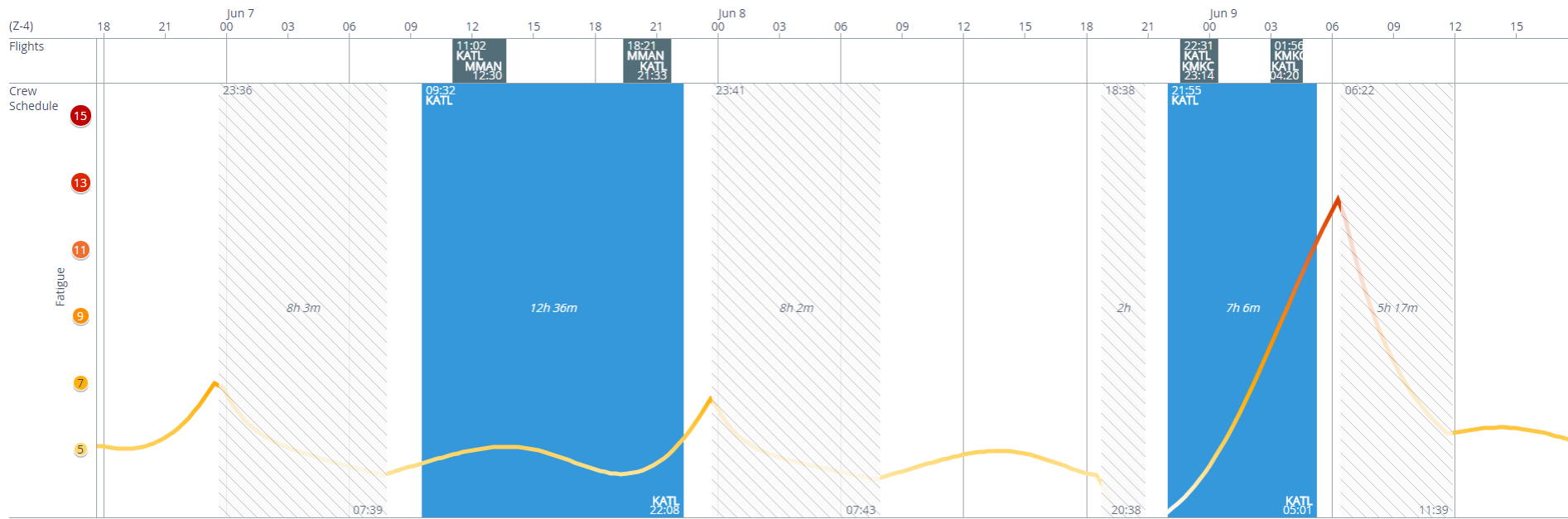


12h 1d 3d 7d 10d



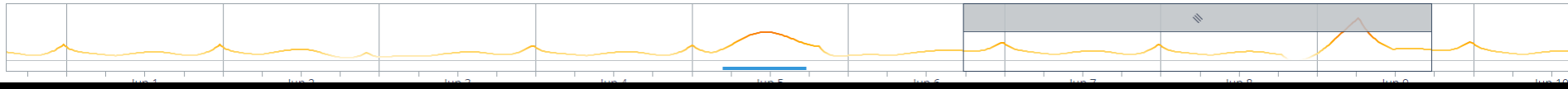


Flight Duty Sleep



Alerts
What's this?

12h 1d 3d 7d 10d



Daniel's team at Pulsar Informatics has developed the Aviation Fatigue Meter Suite of solutions to help operators reduce fatigue related risk.

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www.fatiguemeter.com



Personally take control of assessing your fatigue.

Aviation Fatigue Meter is an iPad optimized web app used by pilots, flight attendants, and maintenance personnel to evaluate the fatigue impact of their flight and duty schedule. It is used as a stand-alone tool or can be integrated with popular SMS and scheduling platforms.



Gain operational insight to run a safer operation.

Fleet Insight is a web app that enables safety managers and schedulers to proactively evaluate fatigue across their entire operation's schedule. It is used to view summary statistics, identify fatigue hotspots in schedules and crew pairings, and design optimal fatigue countermeasures.



Baseline the fatigue health of your operation.

Fatigue Snapshot is a 4-week operational field study. We collect and analyze the sleep and work schedules of your environment to provide a fatigue profile assessment and identify areas to consider for proactive initiatives.