



Fatigue: From A to Zzzz

DAVE STRASSBURG
BOMBARDIER DEMO PILOT
SAFETY MANAGER | KARAOKE ENTHUSIAST

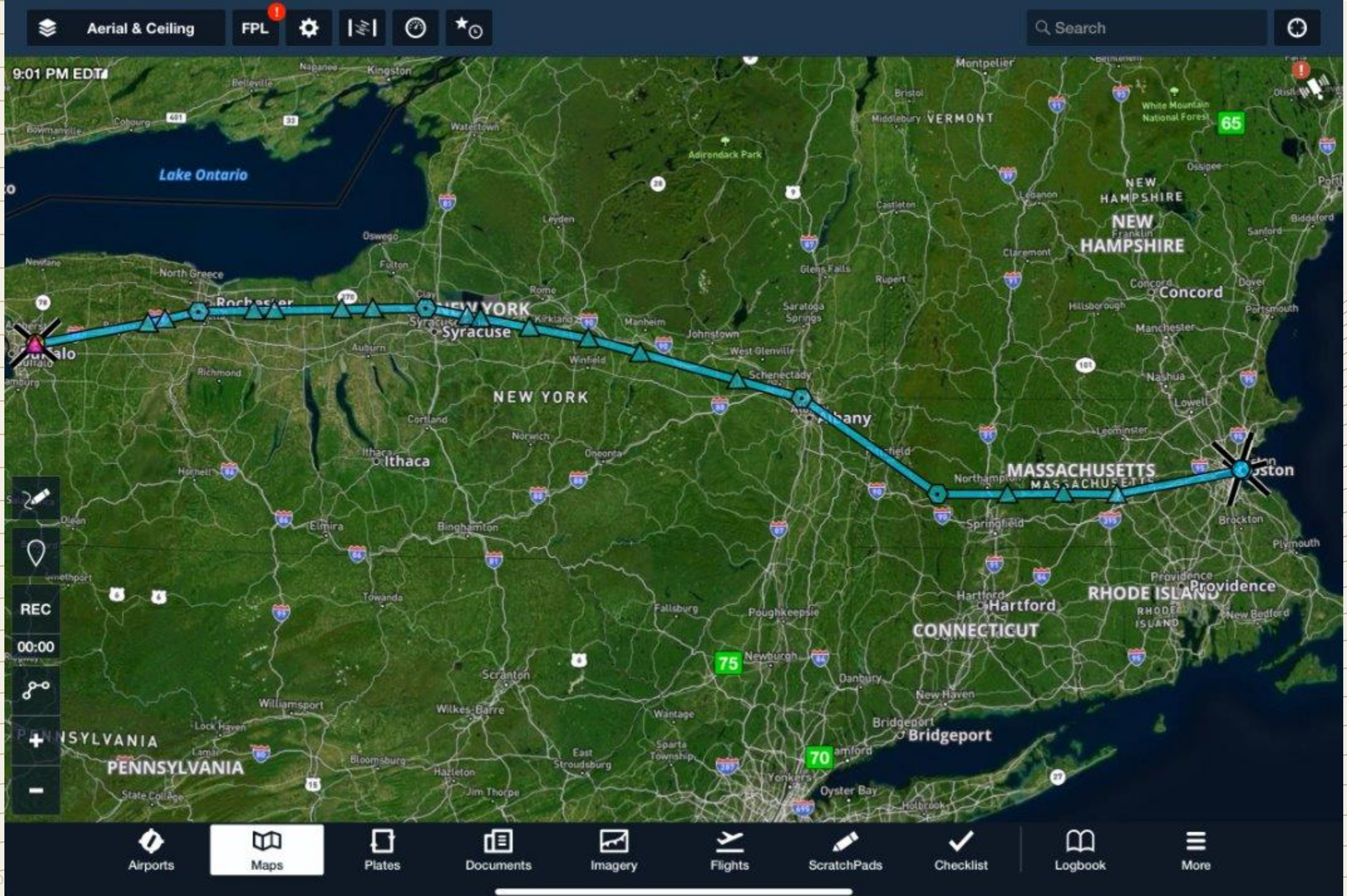
Flight Attendant Safety Summit



“Sometimes you will never know the value of a
moment
until it becomes a memory.” - Dr. Seuss



My Moment.





Bombardier



“Look, if you had one shot or one opportunity to seize everything you ever wanted in one moment would you capture it, or just let it slip. Yo. (And something about Mom’s Spaghetti.)”

-Captain Marshall Mathers

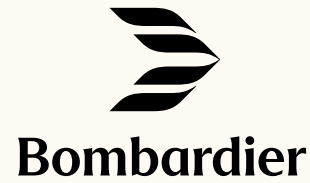


Bombardier

Top Gun

Who was the real star?





Flight Attendant Readiness



Flight Attendants may be called upon to fulfill many roles:

- Medical Assistance
- Chef
- Cabin Safety / Evacuation
- White Glove Service
- Firefighter

Will they be ready?



Pharmacy Student Life

- LONG DAYS AND NIGHTS STUDYING
- FRIENDS WERE STILL PARTYING
 - NOISY CITY ENVIRONMENT
 - HOSPITAL ROTATIONS
- LOTS OF STRESSFUL EXAMS





Pharmacist Life

- 12-HOUR DAYS
- MULTIPLE DAYS IN A ROW
 - WEEKENDS
- NO DEDICATED BREAKS
- NO DEFINED LUNCH PERIOD
- SAFETY CRITICAL TASKS
- INSURANCE BATTLES
- MINIMAL STAFFING
 - READINESS



*Dave Strassburg
'Pharmacist of the Year'*

Photo by Steve Smola

Longmeadow Pharmacist Wins National Award

The award came as a complete surprise, Dave said. "I was at the Cape on vacation." Frank Buonaconti, who had been filling in for Dave while he was away, was the first to see Dave Strassburg's name in the list of award winners.

When Dave got back, Hillary Skinner, Bay Path student and pharmacy tech, called to tell him he'd won. Hillary is one of a new wave of technicians who are, Dave said, becoming more highly trained than ever; they are "becoming like nurse practitioners are to medicine."

Her opening words were: "Congratulations, pharmacist of the year! She said to take the magazine and open it up ... and there it was plain as day!"

LONGMEADOW — Based on a learning about the award and how he had been chosen 'Pharmacist of the Year.' *Drug Topics* had opened nominations this year to its readers, Dave related the story of his. Dave Strassburg of Longmeadow has been named 'Pharmacist of the Year' in the August 7th issue of *Drug Topics*, asking them who they thought was

and Dave was nominated.

Criteria included practice of pharmacy, difference in people the past year. With especially for the customers and pharmacy tech, most-mentioned dedication to the field.

When asked how the honor, Dave said it was very rewarding, but tiring, rewarding, but tiring.

"A lot of times so hurried, medication don't get the time for their patients. I've seen the people who care just our patients, but not neighbors.

"Sometimes people here are really under the he continued. "We brighten up their



Fatigue Factors

- 1) Sleep Deprivation – College Student
- 2) Extended Wakefulness – Pharmacist
- 3) ????



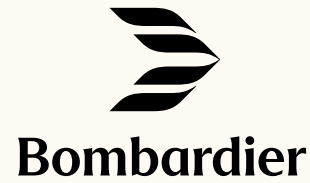
Sleep Deprivation



Sleep is...

Probably the single most effective thing you can do to reset your brain and body health





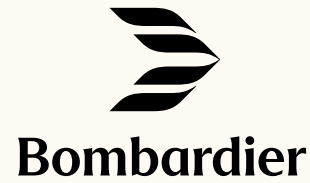
Sleep Stages

- **Stage 1 (N1)** is the lightest stage of sleep and occurs as a person first falls asleep.
- **Stage 2 (N2)** is where the body starts to relax more deeply. Body temperature drops, muscles relax, and heart and breathing rate slow.
- **Stage 3 (N3 or deep sleep)** is the deepest and more restorative sleep, allowing the body to recover and grow.
- **Stage 4 (REM Sleep)** is where most dreaming occurs, brain activity increases, and the body becomes temporarily paralyzed.



Sleep Deprivation - Mitigations

- Sleep Quantity - Varies but approx 7-9 hours is ideal
- Sleep Quality - Use sleep ap or device for personal awareness
- Create a environment conducive to sleep
- Sound, Light, Temperature, Quality hotel with a comfortable bed
- Limit caffeine later in the day if sensitive
- Alcohol helps you get to sleep but not stay asleep. Fragmented.
- Alcohol fragments sleep and blocks REM sleep



Sleep Quality Awareness

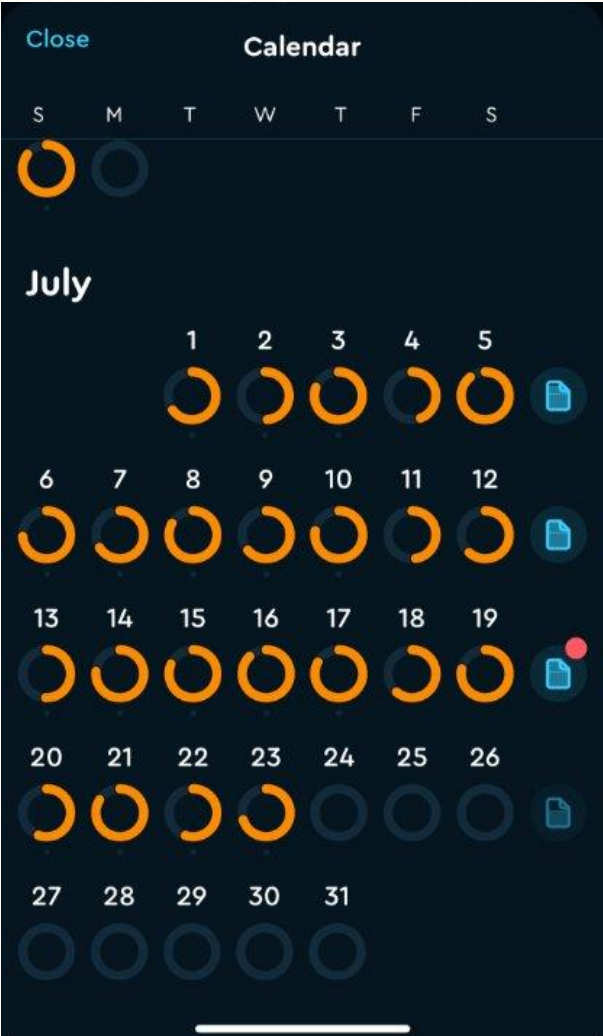
Good Quality



Bad Quality



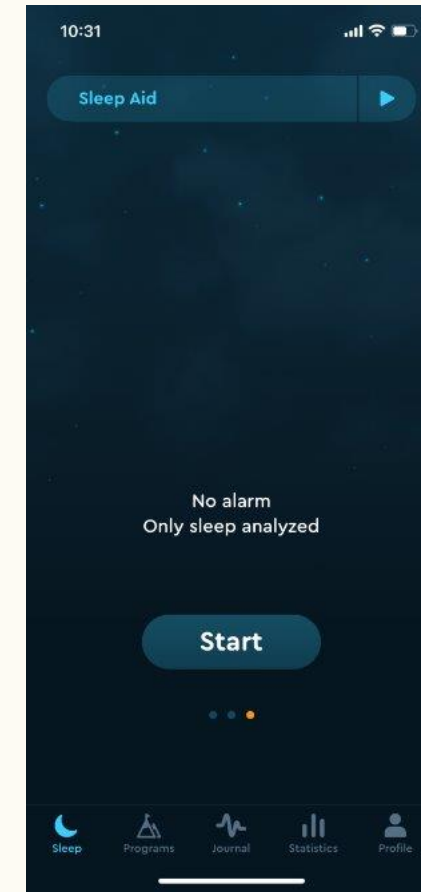
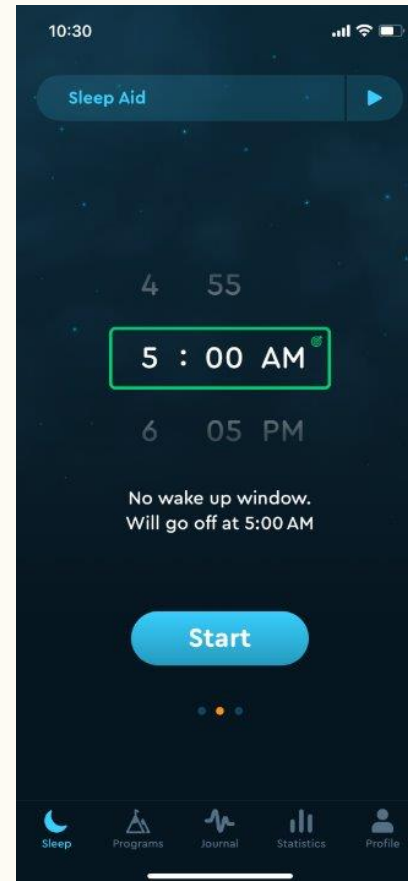
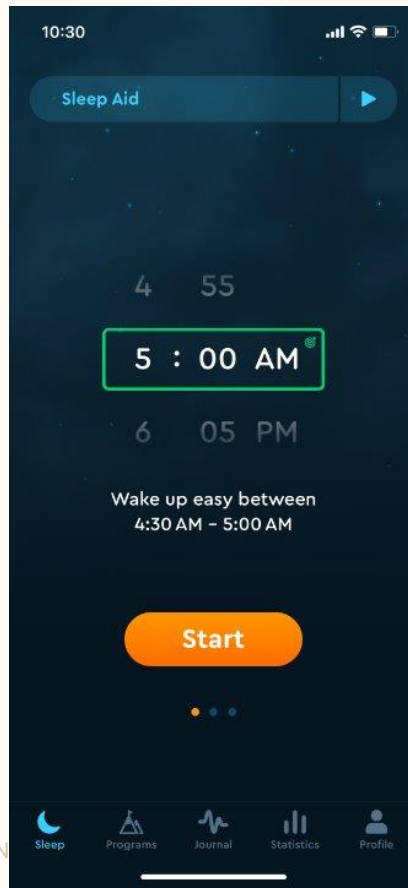
Identify Trends





Bombardier

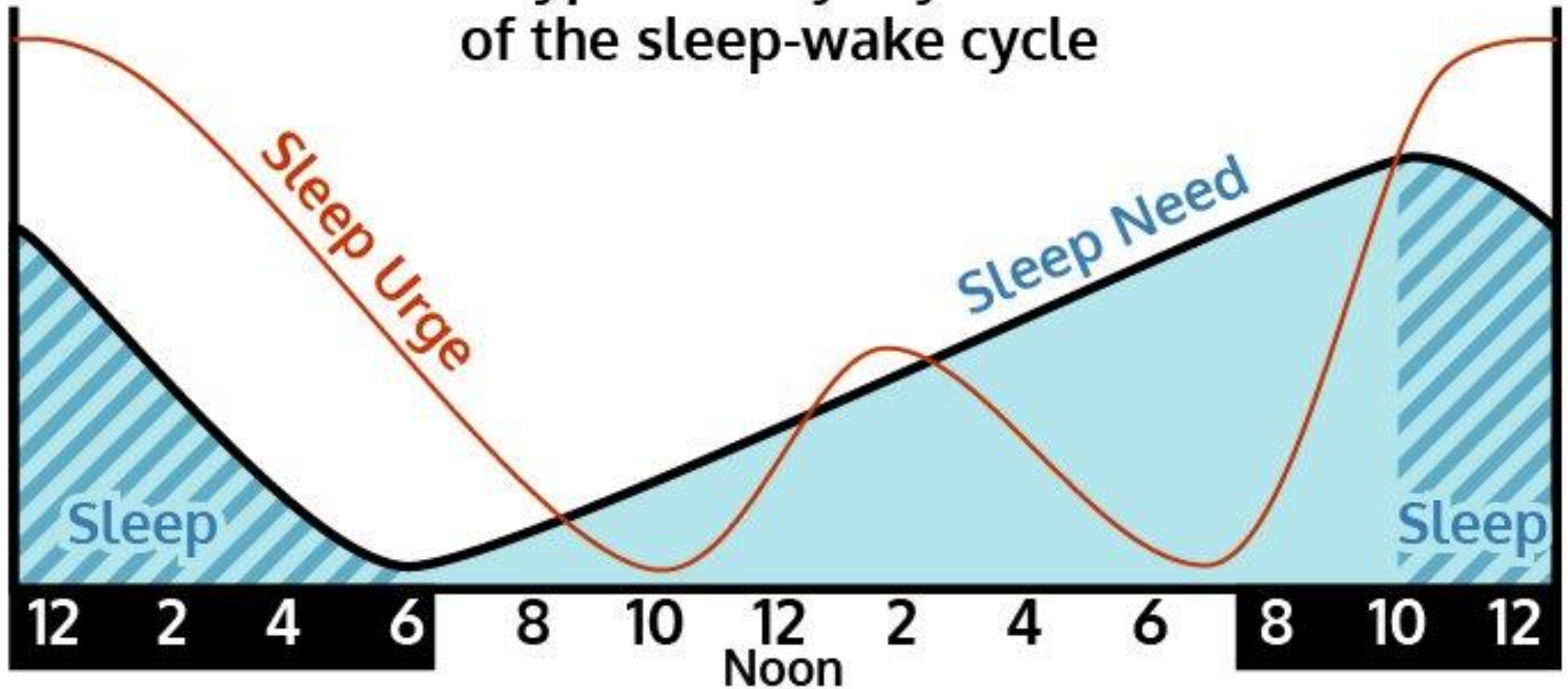
Optimizing Alarm Options



“My mind clicks on and off...I try letting one eyelid close at a time while I prop the other open with my will. But the effort’s too much. Sleep is winning. My whole body argues dully that nothing, nothing life can attain, is quite so desirable as sleep.”

Extended Wakefulness - Adenosine

Typical daily rhythm
of the sleep-wake cycle



Fighting Fatigue

“My mind clicks on and off...I try letting one eyelid close at a time while I prop the other open with my will. But the effort’s too much. Sleep is winning. My whole body argues dully that nothing, nothing life can attain, is quite so desirable as sleep.”

– Charles Lindbergh, describing the fatigue that struck him nine hours into his 33-hour solo Atlantic crossing.



Extended Wakefulness

- ADENOSINE BUILDS UP OVER TIME CAUSING SLEEP HUNGER.
- CAFFEINE BLOCKS ADENOSINE RECEPTORS TEMPORARILY, THEN COMES THE CRASH. WAIT A BIT AFTER WAKING UP.
- CAFFEINE TOLERANCE BUILDS UP OVER TIME. SAVE IT.
- NAPS ARE BENEFICIAL BUT CAN REMOVE SLEEP URGE
- SHORT NAPS ARE GOOD IF NO INSOMNIA PROBLEMS AND DON'T GET SLEEP INERTIA
- NAPS OF ABOUT 26 MINUTES IMPROVED MISSION PERFORMANCE BY 34% AND IMPROVED DAYTIME ALERTNESS BY 50%. NASA NAP





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Circadian Misalignment



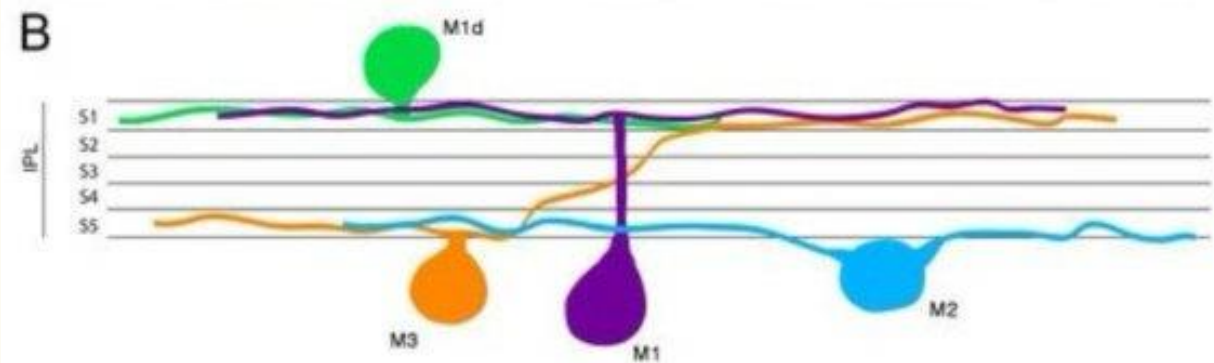
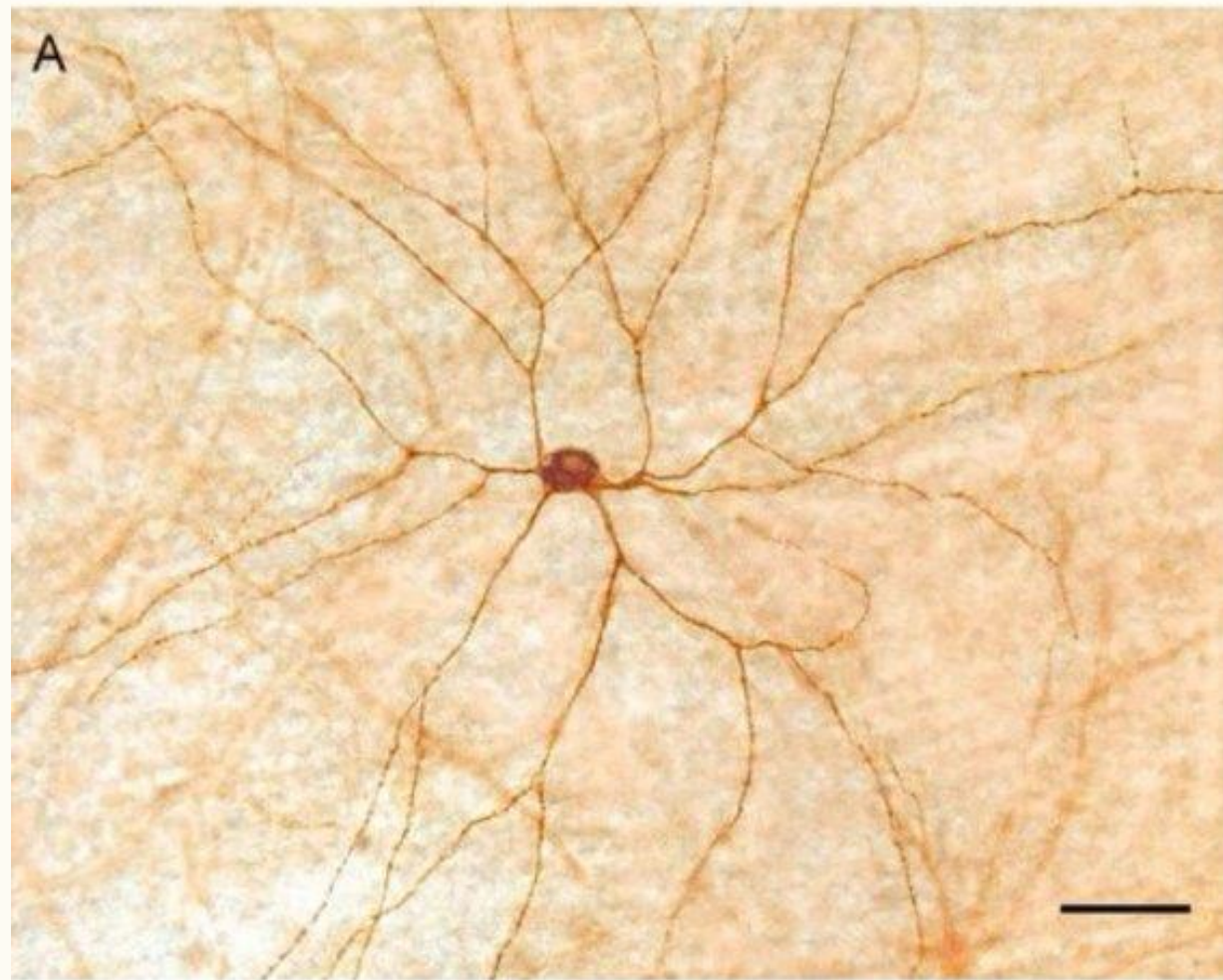
Bombardier

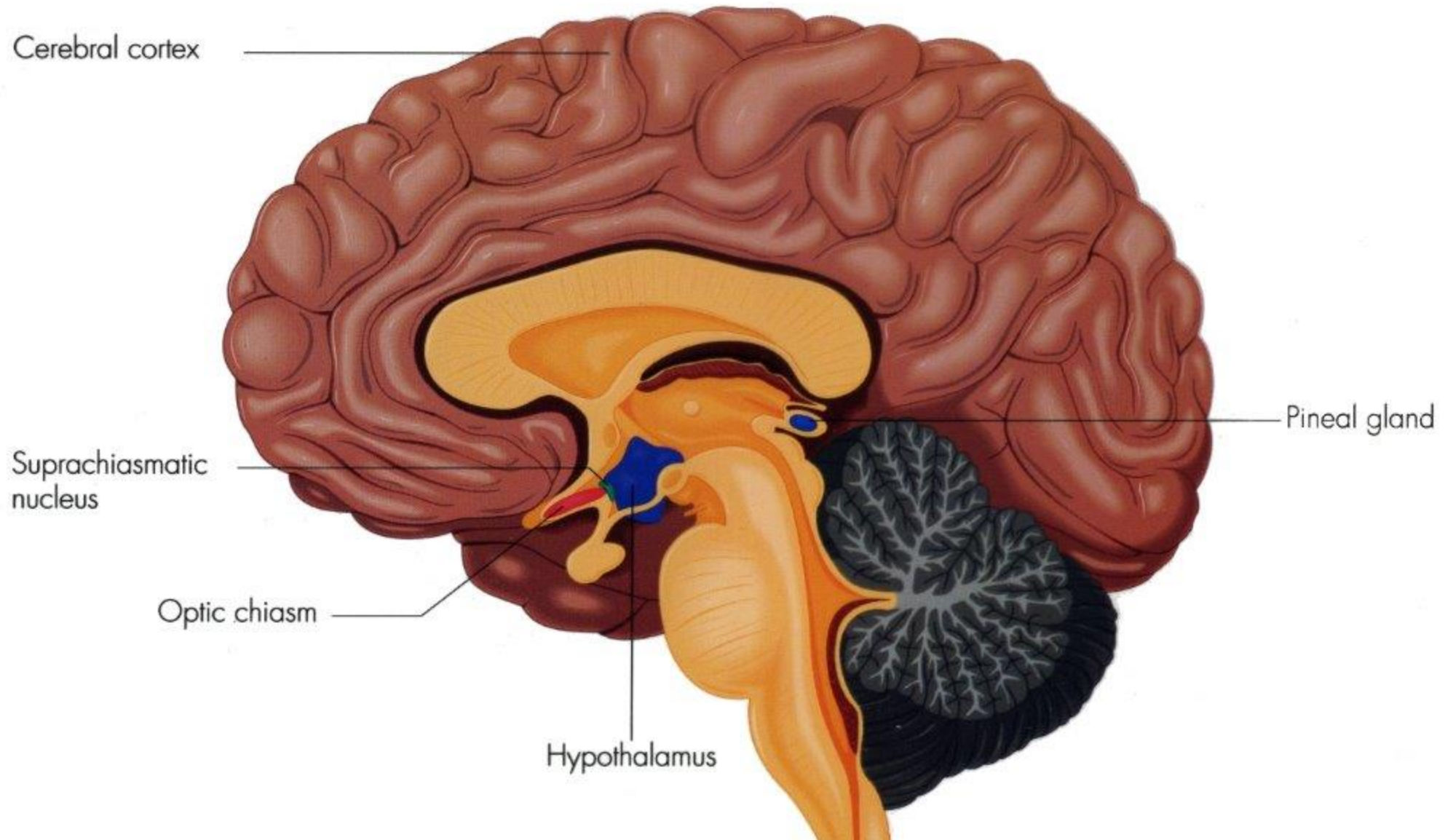
Circadian Rhythm (Body-Temperature Cycle)



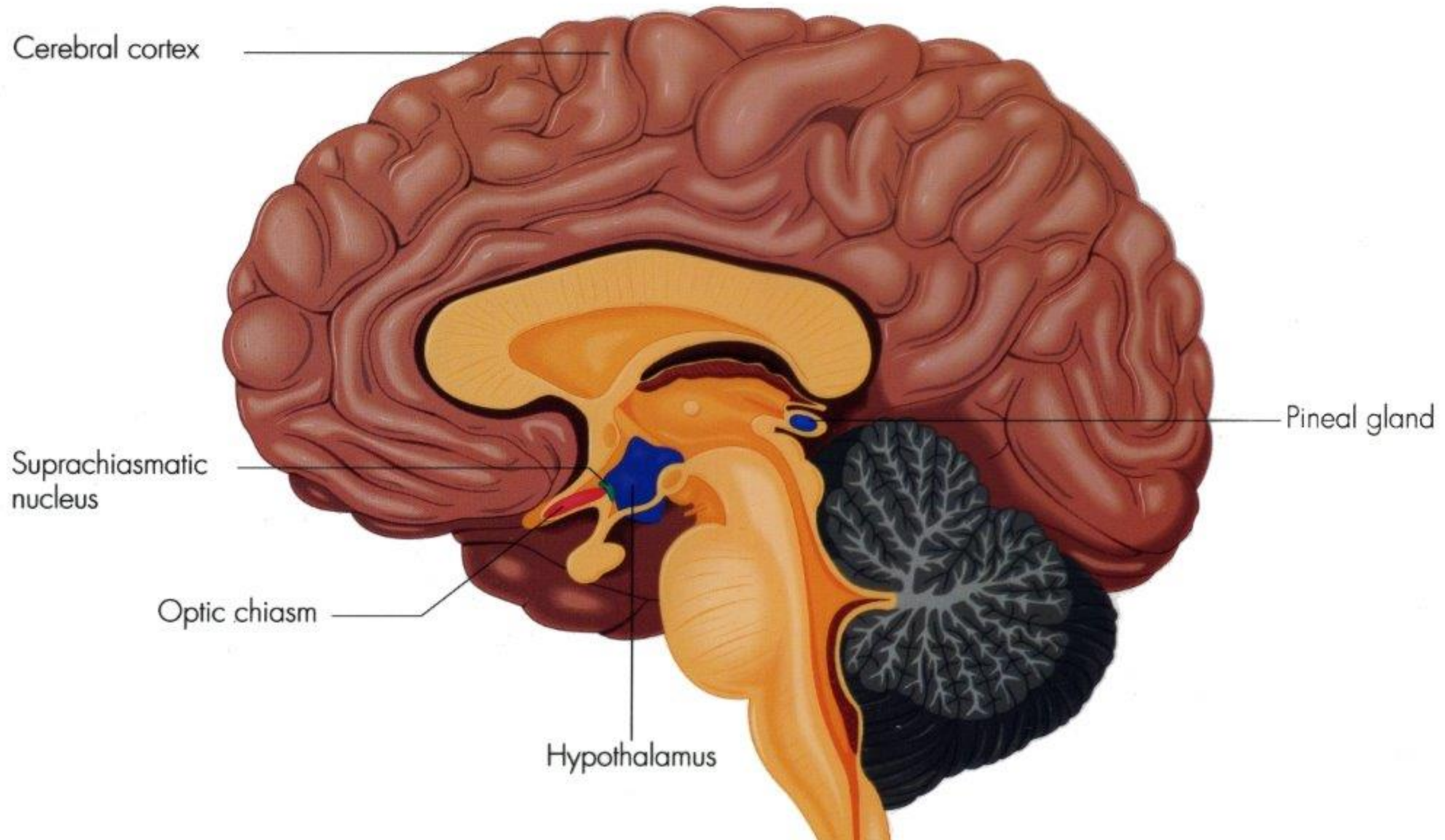
Temperature and Biochemical

Melanopsin Retinal Ganglion Cells





Suprachiasmatic Nucleus = The Body Clock



Suprachiasmatic Nucleus -> Pineal Gland -> Melatonin

Melatonin

- LOW LEVELS – TIME TO BE AWAKE
- HIGH LEVELS - TIME TO SLEEP





Melatonin is the Sleep
Starting Gun



Or the Puck Drop CA?

Melatonin Supplements?

One study showed:

- AN AVERAGE INCREASED SLEEP TIME OF JUST 3.9MINUTES
- SLEEP EFFICIENCY SCORE INCREASE OF 2%

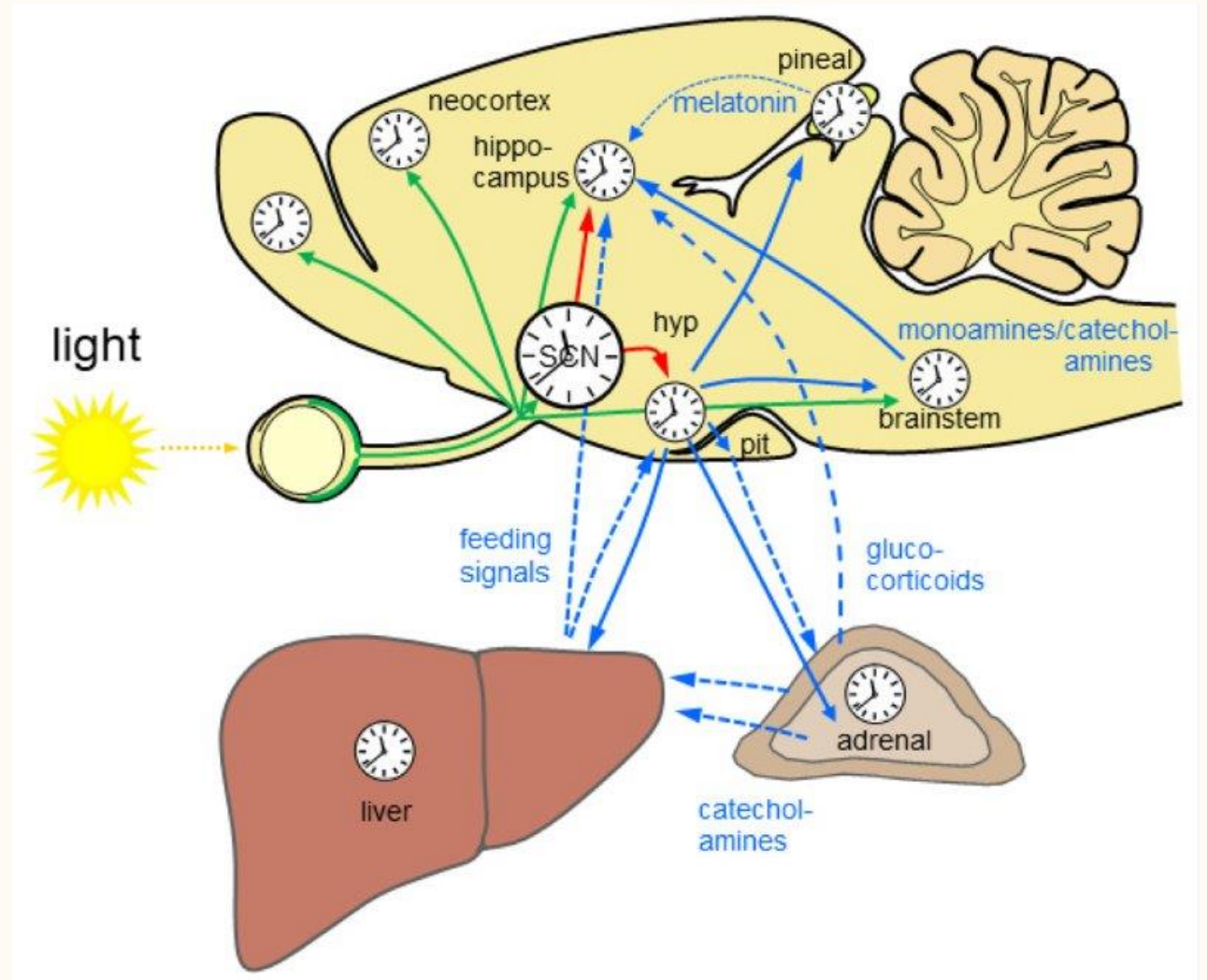


More beneficial for Getting to sleep than Staying asleep



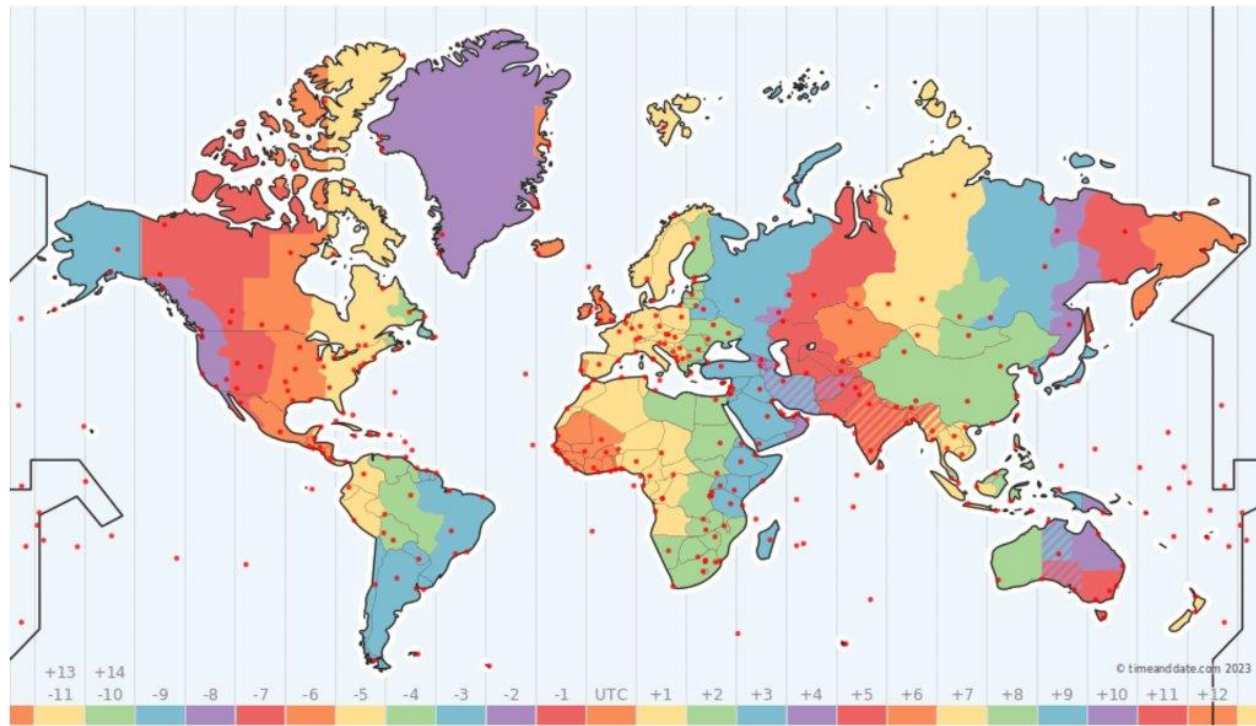
Biochemical Components

- INCREASES CORTISOL – STRESS HORMONE
- INCREASES DOPAMINE – REWARD HORMONE
- INCREASES SERATONIN – HAPPY HORMONE



Time Zone Acclimation – Window of Circadian Low

Time Zone Map



- WESTBOUND (PHASE DELAY) IS EASIER THAN EASTBOUND (PHASE ADVANCE)
- FULL ACCLIMATION TAKES ABOUT 1 DAY PER TIME ZONE
- WITH A FEW TOOLS YOU CAN INCREASE THAT UP TO 3 ZONES PER DAY



Sunlight Exposure



Circadian Rhythm (Body-Temperature Cycle)



Get low angle sun light in your face in
the first 4 hours when you wake up
If you want to wake up



Light Comparison



Inside



Through Window



Outside

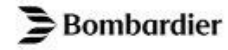


Lux Light Meter & Photo...

Lightmeter for Photo & Plant

★★★★★ 113

Global 7500/8000 - Soleil Lighting System



Lights on. Jet lag off.

Introducing Soleil, aviation's first circadian rhythm-based cabin lighting system fully integrated to the aircraft's Flight Management System. Soleil features a revolutionary Dynamic Daylight Simulation to help combat jet lag and is available exclusively on the Global 8000 and Global 7500 business jets.

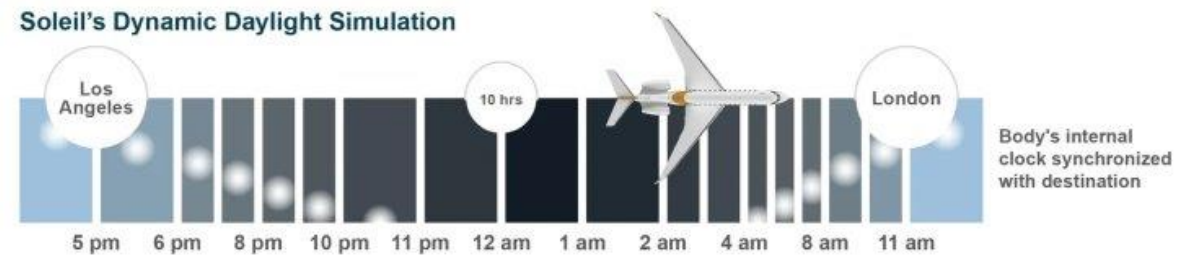
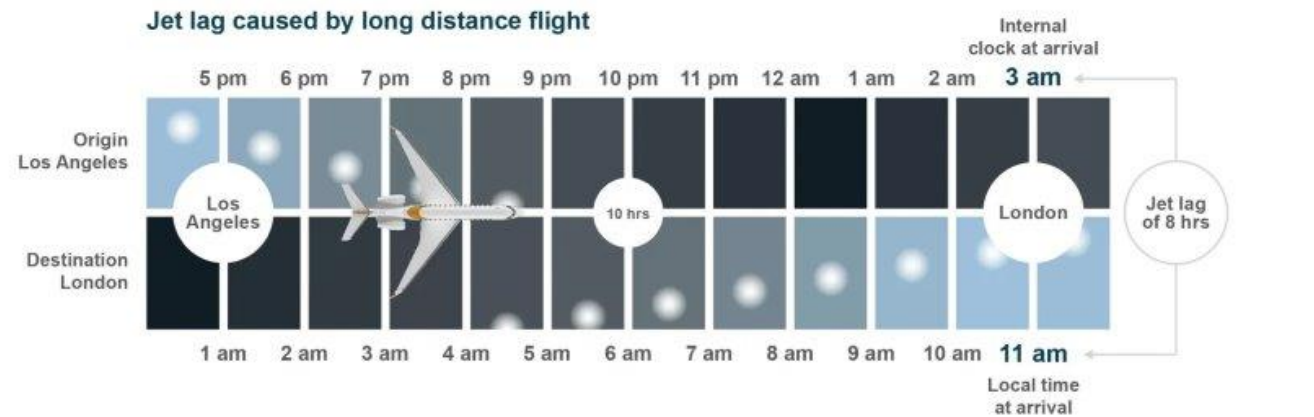


The first ever Dynamic Daylight Simulation in aviation

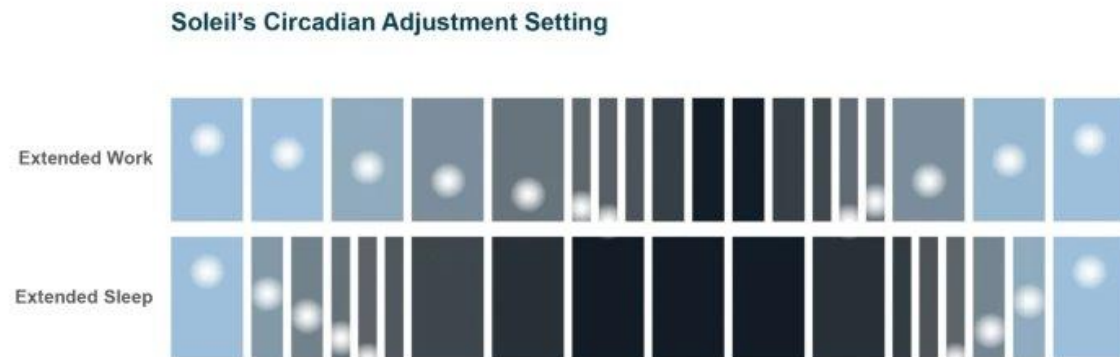
The Soleil's Dynamic Daylight Simulation is a first in aviation. Fully-integrated with the aircraft's Flight Management System, Soleil automatically adjusts the cabin lighting to aid in stimulating or suppressing the production of melatonin which can help synchronize a traveler's circadian rhythm to the time at their destination.



Customizable: More Work or More Rest



Highly intelligent and adaptable, the Soleil lighting system also features a customizable circadian adjustment setting, which personalizes the lighting sequence to a traveler's preference for either extended work or rest.







Exercise and Eating



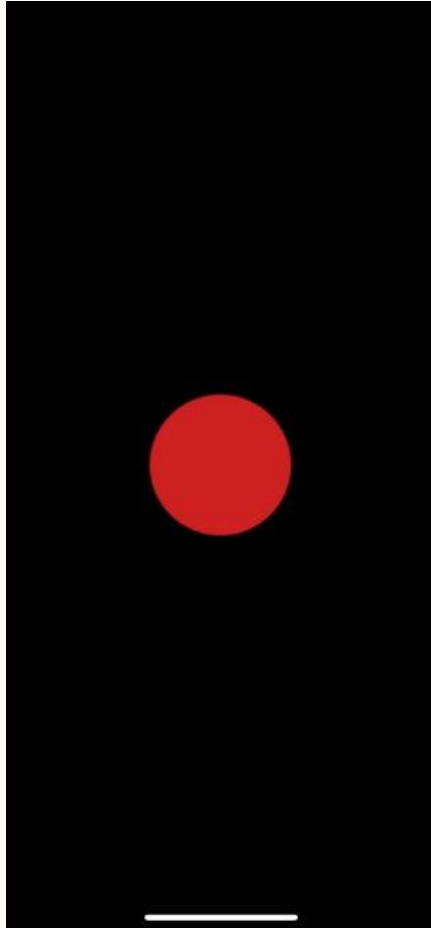


Measuring Fatigue



Measuring Fatigue

Psychomotor Vigilance Test - PVT



NASA PVT+

Jun 3, 2023

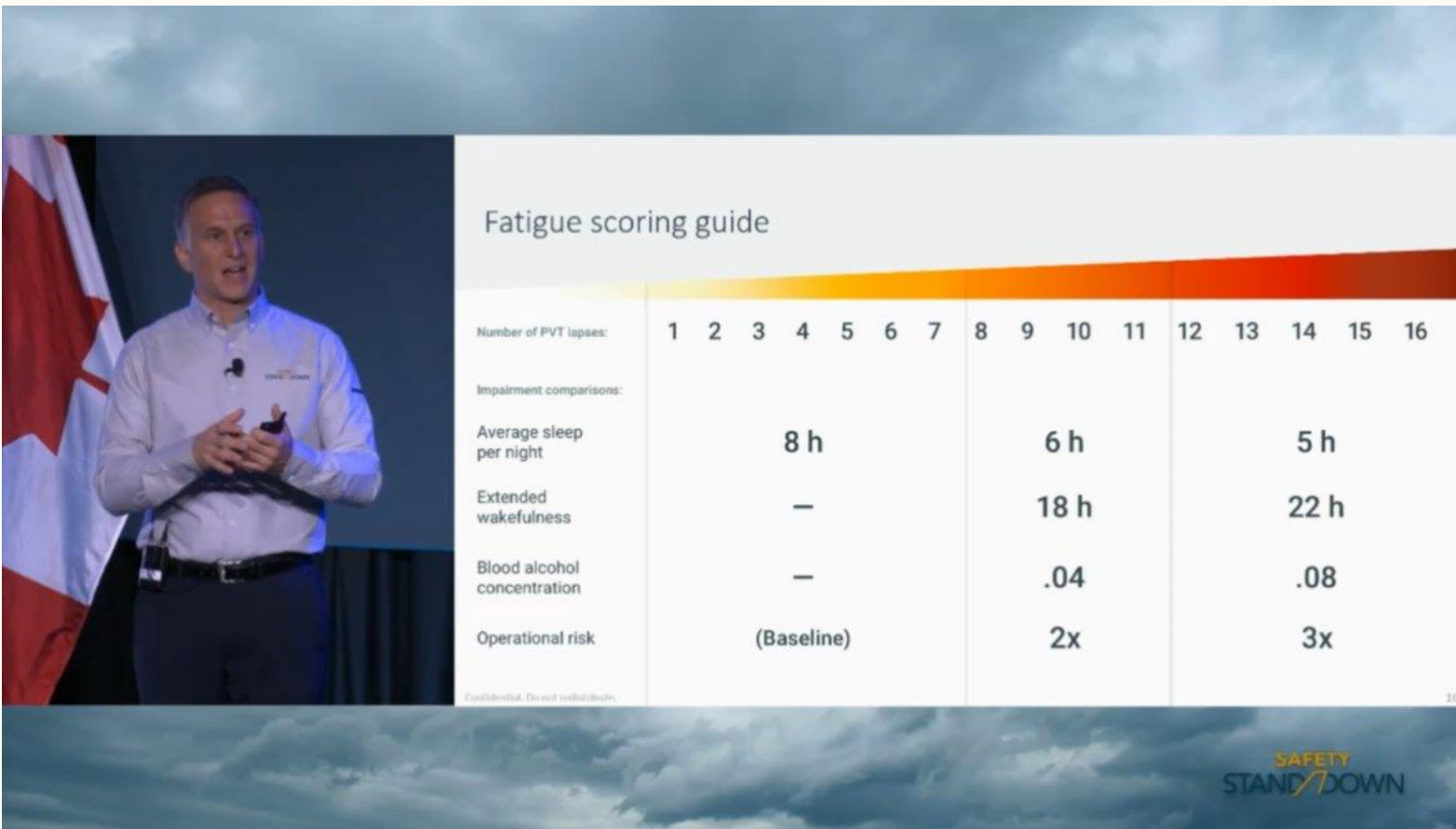


PVT Research Tool

Feb 26, 2023



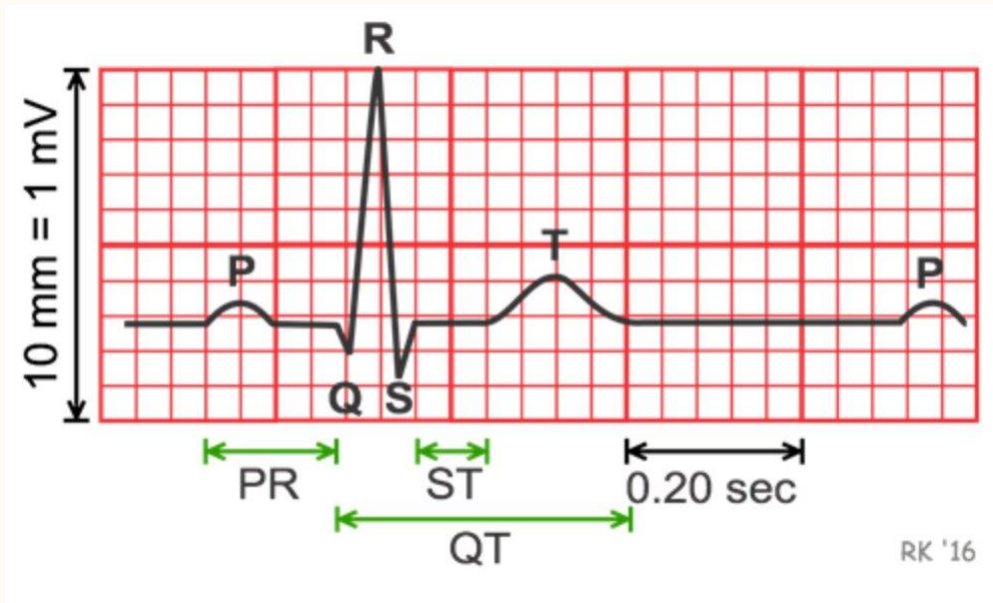
Proactive Fatigue Risk Management



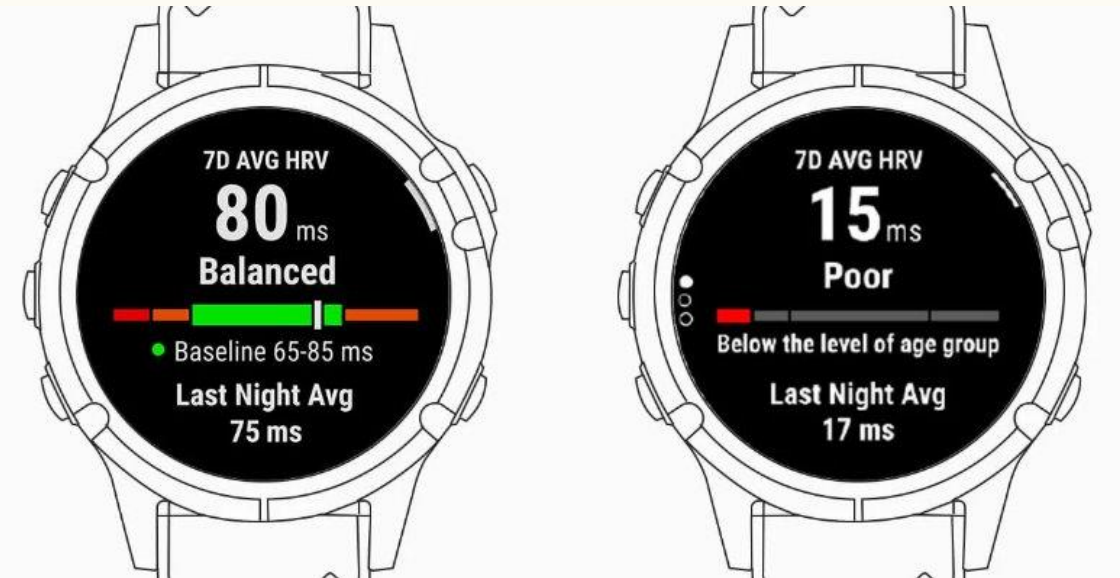
Safety Standdown
2019
Daniel Mollicone



Heart Rate Variability



Heartbeat is not a regular pattern. Variable.
HRV measures the difference between R peaks



More Variability = Less Fatigue
“Rest-and-Digest Mode”





Predicting Fatigue



Risk Assessment

New Risk Assessment

Schedule

Trip Search

Assessment Search

Scenario Planner

Waivers

Insights

Post Flight

Airfield Data

Community

FlightRisk Setup

Run Risk Assessments Help Advanced

0 Stops

9 Yields

0 Notes

7/23/2025



to

7/28/2025



(All Types)

(All Tails)

Hide Unsubscribed Tails

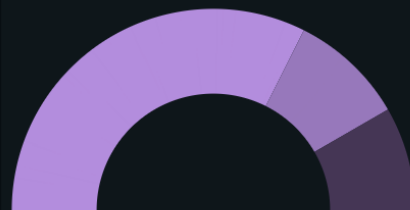
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	1800Z 27 Jul			0	0	0	5.4/5.5		Executive ...	1251Z 24 Jul	Kenn
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5.5

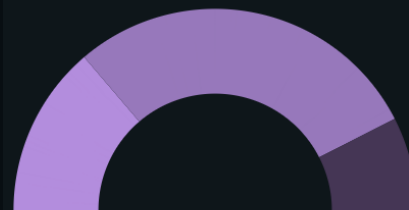
DEPARTURE



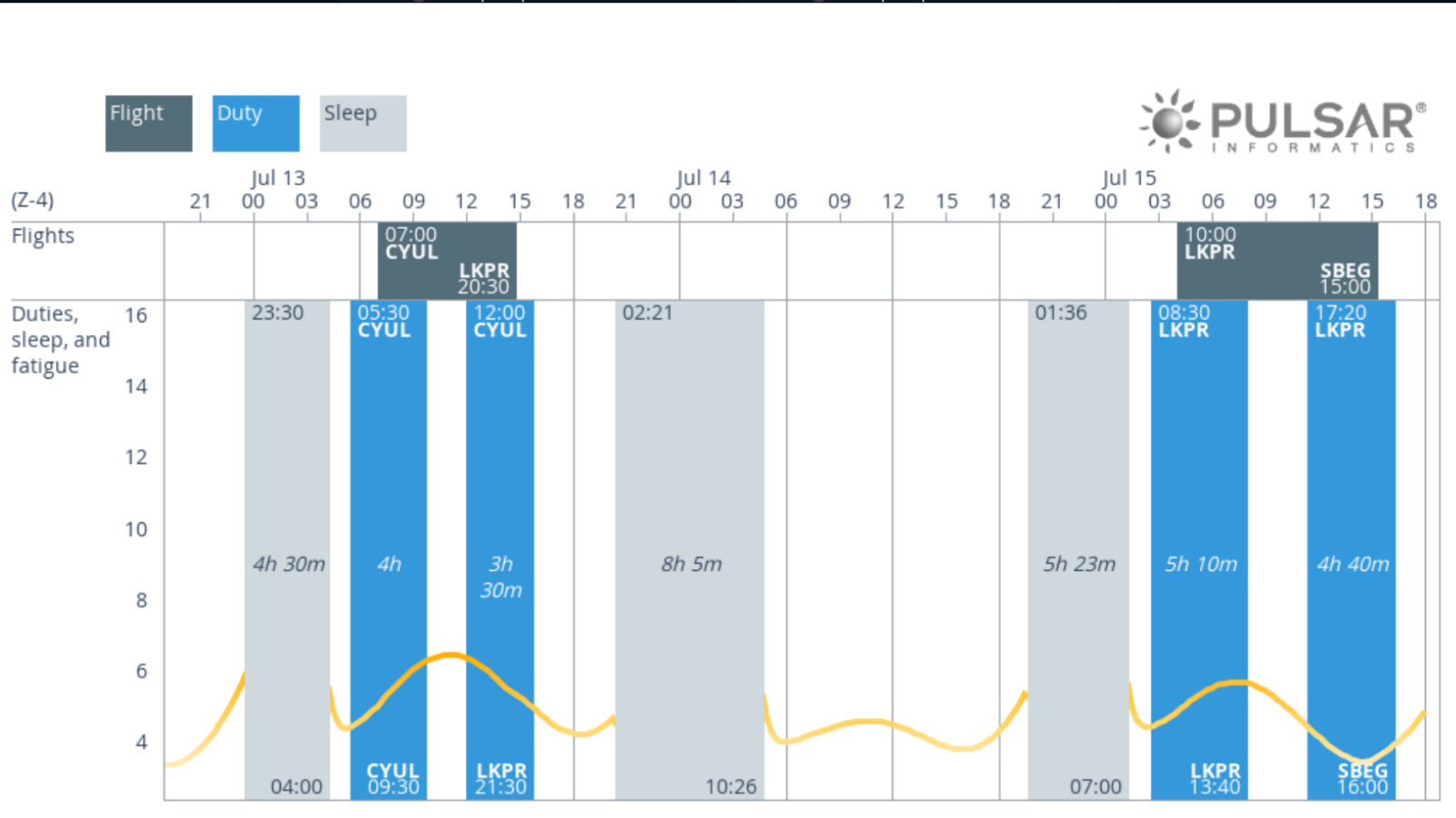
- Circadian Misalignment
- Extended Wakefulness
- Sleep Deprivation

4.1

ARRIVAL



- Circadian Misalignment
- Extended Wakefulness
- Sleep Deprivation



Premium

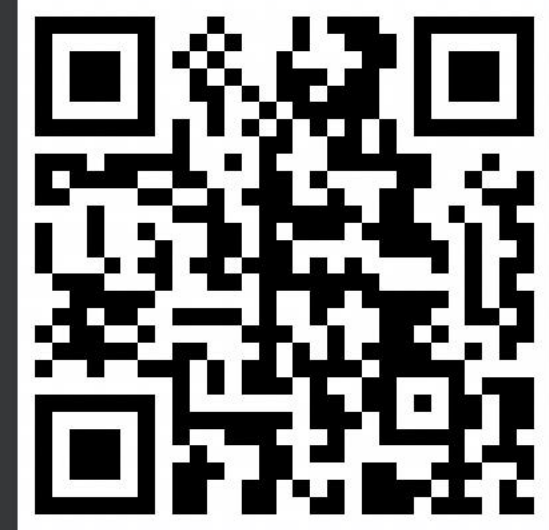


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 **Bombardier**



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