

Of FLAT and SHARP Pilots



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Disclosure Information

Ries Simons, M.D.

I have no financial relationships to disclose.

I will not discuss off-label use and/or investigational use in my presentation



Of FLAT and SHARP Pilots



- Pilot Fatigue
- Mental Health / Depression



- How to become / keep sharp
- Too sharp pilots ?

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Rules of Thumb in “normal” society

- 8 hours work during the day
- 8 hours sleep during the night
- 8 hours other activities
-and 2 days off per week



- Pilots are working when the normal society sleeps
- Pilots are sleeping when the normal society works
- Pilots have irregular working hours

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Airlines OPS:

- Economic pressures and strong competition of airlines
- Demanding rosters with night flights, early starts, extended duties, time zone crossing
- High density of air traffic
- Frequent delays
- Unstable airlines
- Atypical employment

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Snore-tomatic pilot: Half of aircraft skippers have fallen asleep at the controls

19 Nov 2012 00:00

The alarming figures show that most pilots admit they have made mistakes because of tiredness



Reuters

Half of airline pilots polled in Britain admit they have accidentally fallen asleep at the controls of a jet.

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Half of airline pilots report fatigue which could jeopardise passenger safety



Half of airline pilots have reported that fatigue is not taken seriously by airlines, in the first large-scale survey of pilots' perceptions of safety within the European aviation industry.

The survey was conducted by The London School of Economics and Political Science (LSE) and EUROCONTROL, an intergovernmental organisation committed to delivering safe and efficient air traffic management performance.

Among the key findings of the work, 51 per cent of pilots surveyed reported that fatigue was not taken seriously by their airline, and 28 per cent of pilots felt that they had insufficient numbers of staff to carry out their work safely. In a further notable finding, less than 20 per cent of the pilots surveyed felt that their airline company cares about their well-being.

A total of 7,239 pilots from across European nations participated in the *European pilots' perceptions of safety culture in European Aviation* survey, approximately 14 per cent of Europe's total commercial pilot population, in the largest ever survey of commercial pilots on safety culture.

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In case of adverse circumstances fatigued crew . . .

- may choose wrong priorities
- may ignore alarm signals
- may neglect normal checks and procedures
- **may choose risky options**
- may become irritated: bad team work

[Petrie & Dawson, 1997; Co et al., 1999; Caldwell & Gilreath, 2002]



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European Committee on Aircrew Scheduling and Safety (ECASS)
Consensus Report 2007

European Transport Safety Council (ETSC)
Position Paper 2013

A. Gundel, M. Vejvoda, P. Cabon, S. Folkard, R. Mollard
K. Robertson, B. Stone, M. Spencer, R. Simons, P. Valk, T. Åkerstedt

ECASS / ETSC position:

The complexity of the new EU FTL rules may result in them being misinterpreted and incorrectly implemented.



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Scientific Studies

- ECASS scientists have studied >4000 pilots during various rosters and operational conditions.
- Data of 41 studies of ECASS/NASA-Ames/Massey University have been used to answer FTL questions of EASA.
- Scientific data provide 'hard' evidence that alertness and performance impair due to fatigue and circadian factors
- Science calculated the increase of risk due to FTL issues

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Time on Task - Alertness



	alertness score (%)						
	80	70	60	50	40	30	20
hours before level reached; FDP start at 10:00	6.1	8.4	10.7	12.9	15.2	17.5	19.7
hours before level reached FDP start at 18:00	1.2	3.5	5.7	8	10.3	12.6	14.9
equivalent level BAC (‰)	0.00	0.03	0.14	0.27	0.42	0.62	0.85

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Consistent conclusions from clear scientific evidence

The provisions of EU OPS for the maximum basic FDP of 13 hrs (extending up to 14 hrs) are not in keeping with the body of scientific evidence.

Overnight: FDPs for minimum crew should never exceed 10 hrs

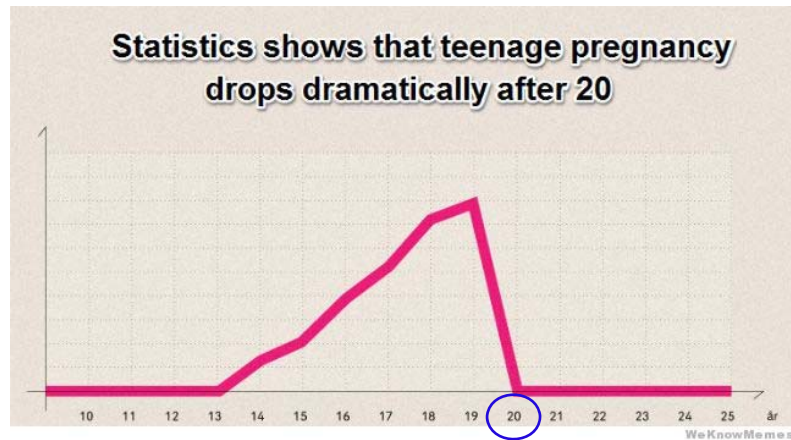
Day: a single FDP should never exceed 13 hrs
and is only acceptable under specific conditions:

- opportunity for long prior rest period
- single sector
- favourable duty start time

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These research results, are robust but not as hard as:



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Scientific studies of pilot fatigue will never provide 100% 'hard' evidence that accidents will occur below a certain alertness level



Therefore, stakeholders continue to negotiate acceptable safety risk levels against the money side and passenger interests
(pilot health seems to be no issue yet)

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Outcome of negotiations is often:
"More Research is Needed"

This offers:

- Respite and delay for authorities / airlines
- Hope for pilots
- A job for researchers



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Do we need more research to tackle pilot fatigue ?

1. Fatigue can be reduced and many rosters can be improved
based on what is already known and common sense
 2. Pilot Fatigue to be monitored in context of FRMS/SMS
- + Studies of 'headache' dossiers, such as the impact of standby on fatigue
 - + Studies to improve and fine-tune models to predict fatigue hazard

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Life stress can form part of any pilot's
emotional "carry on luggage"

- work related problems
- financial worries
- health concerns
- bereavement issues
- relationship / family difficulties
- separation from family
- social demands

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Job stresses of pilots are increasing

- more demanding schedules/rosters:
 - ➔ increase (cumulative) fatigue and sleep loss
 - ➔ more often away from home base
- increasing density of air traffic and delays
- decreasing prestige and status of pilots ≈ self esteem
- increasing number of 'unstable' airlines
- increasing frequency of 'atypical employment' in the EU

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Subjective Effects of Chronic Stress

- anxiety
- aggression
- depression
- fatigue
- sleep problems
- irritability
- apathy
- moodiness
- tension



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Hammen C. (2005). Stress and Depression (Review). *Annu. Rev. Clin. Psychol.* 2005. 1:293–319



Convincing evidence for a robust and causal association between stressful life events and major depressive episodes.

“Overall, the recent evidence based on sound methods of stress assessment and novel designs strongly suggests that most episodes of major depression are preceded by stressful life events (although most people do not become depressed even if they experience a negative life event)”.

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Pilots are only human

27% of the adult EU population (aged 18–65) had at least one mental disorder in the past year: substance use, psychoses, depression, anxiety [Wittchen et al., 2011]



Pilots are adult humans

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Depression: Work and Home Functioning

[Bender, 2011]

Cognition: decreased efficiency, increased errors, poor decision making, impaired working memory, not meeting targets



Physical: poor sleep, fatigue, neglect of duties, substance abuse, agitation



Thoughts: withdrawal, poor motivation, high-risk behavior, helplessness, suicidal thoughts



Mood: irritability, sadness, anxiety, conflict, unexpected reactions, avoidance

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The most frequent factors associated with suicidality:

[Cox et al. 2011]

- hopelessness
- perceived burdensomeness
- thwarted belongingness



Antidepressants ?



Approved for pilots:

Sertraline, citalopram, escitalopram

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Approved for pilots: Sertraline, citalopram, escitalopram



Note:

citalopram, escitalopram, and sertraline carry warnings about aggressiveness, agitation, hostility, impulsivity and irritability.

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Antidepressants ?



- Antidepressants can be beneficial in the context of a supportive treatment programme
- Pilots using antidepressants for depression should be critically followed
- Be aware of non-effectiveness
- Be aware of suicidality during first month of treatment
- Be aware of side effects when medication is discontinued and ground pilot

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Alertness Management & Fatigue Countermeasures



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**Fatigue best prevented by sufficient
good-quality SLEEP**



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The best method to guarantee sufficient alertness is
sufficient good-quality SLEEP

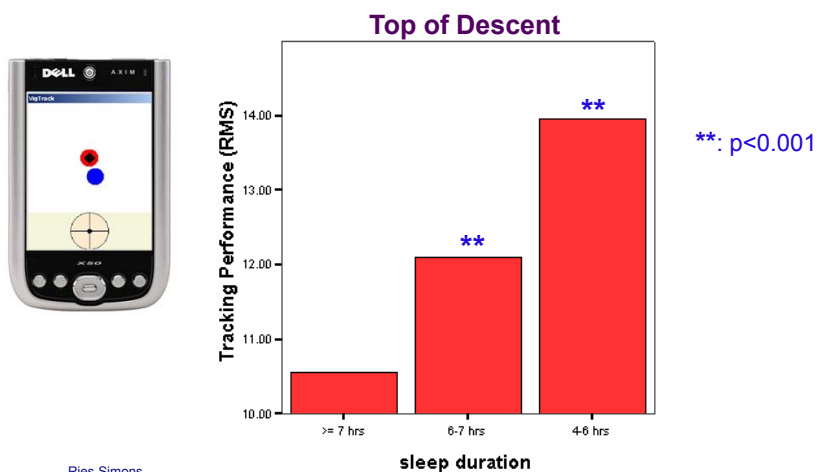


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Pre-flight sleep quality and duration is a major determinant of
alertness at TOD

(Carskadon & Dement, 1982; Rosekind et al, 1992; Pascoe et al. 1994; Simons & Valk, 1998; Valk et al., 2003; ECASS group, 2007; Simons & Spencer, 2007; and many others)

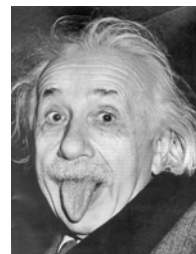


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How much Sleep do we need?

- Individual differences
- Most people need 7 – 8 hours night sleep
- Sleep <6 hrs: impaired alertness and performance



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Fatigue Risk Management by Safety Action Group

[ICAO-IFALPA-IATA Initiative]

- ✓ Identify potential fatigue hazards
- ✓ Assess fatiguing rotations / rosters
- ✓ Estimate risk associated with identifiable hazard
- ✓ Redesign rosters/rotations in conjunction with stakeholders
- ✓ Monitor reduction of risk
- ✓ Provide procedures and training

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FRMS to reduce fatigue risk

Air New Zealand: an FRMS can be implemented and make a real difference with the percentage of pilots self-reporting fatigue “at least once a week” falling from 70% in 1993 to below 40% in 2010

[Powell, 2011]

Concern of misinterpretation of FRM within the EASA FTL that the use of FRMS is to justify going beyond the FTL requirements: “FRMS compulsory if an operator wishes to reach the maximum FDPs or being a “useful tool to demonstrate compliance”.

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Boost Alertness and Performance with Stimulants ?

Benzedrine Inhaler
is available to
High Altitude Flying Personnel!

Benzedrine Inhaler is now an official item of issue in the Army Air Forces.

It is available to Flight Surgeons for distribution to high altitude flying personnel, for relief of nasal congestion.

Benzedrine Inhaler

A Volatile Vasoconstrictor . . . Outstandingly Convenient, Fast, First and Foremost, A Highly Effective Therapeutic Agent.

Each Benzedrine Inhaler contains 0.05 gm. (0.0015 oz.) of Benzedrine Hydrochloride (C₁₀H₁₂N₂ · HCl) in 0.5 cc. of solvent.

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Increased social acceptance of smart drugs and party drugs

nature

Vol 456 | 11 December 2008

COMMENTARY

Towards responsible use of cognitive-enhancing drugs by the healthy

Society must respond to the growing demand for cognitive enhancement. That response must start by rejecting the idea that 'enhancement' is a dirty word, argue **Henry Greely and colleagues**.

"We should welcome new methods of improving our brain function."

"Many kinds of employee may benefit from enhancement."

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Tactical use of stimulants to boost performance of pilots

- D-amphetamine as 'escape and evade pills' in military survival kits
- Modafinil (Provigil®, Modiodal®) used in Air Forces
- Caffeine 200-600 mg used in Air Forces (and at home)

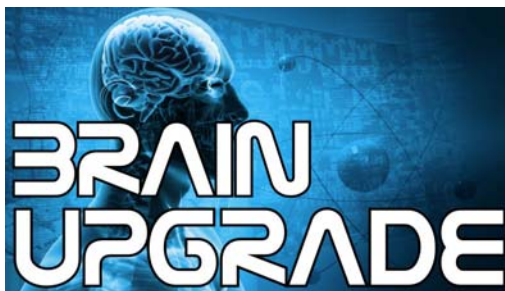


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Anecdotal evidence: European 'New Age' Pilots using Psychostimulants – 'Smart Drugs' – 'Neuroenhancers'

- Modafinil
- Adrafinil
- Methylphenidate
- Amphetamines
- Ephedra
- Piracetam
- Noopept
- Phenibut
- Pitolisantand what next?



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In NL 2.5 % of young adults (<20yrs) uses psychostimulants, such as methylphenidate, for ADHD [Michielsen et al., 2012]



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10 mg d-amphetamine can significantly improve alertness

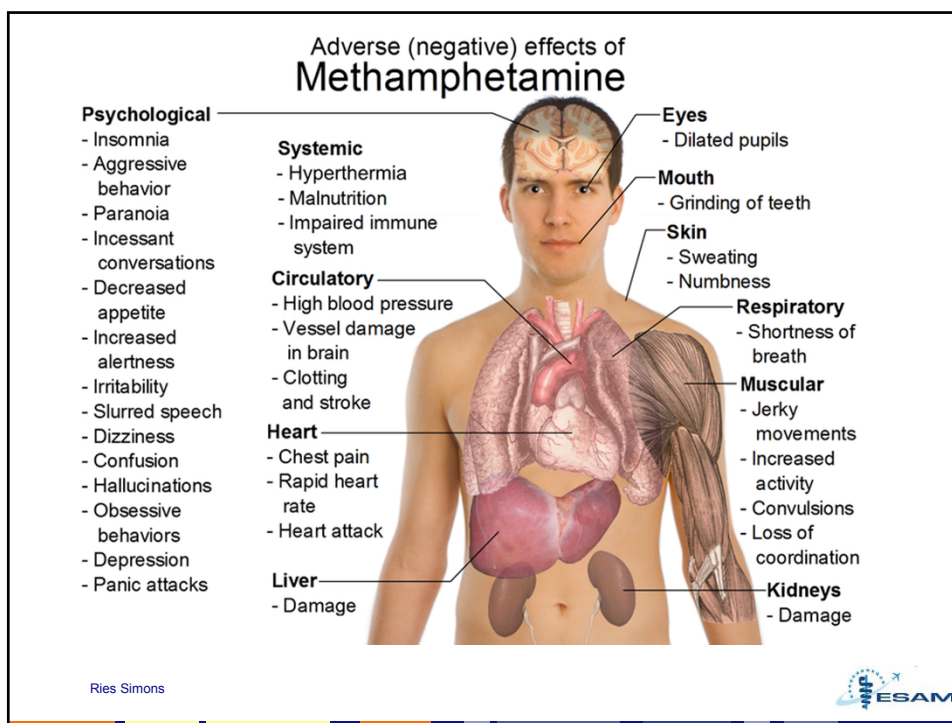
[e.g. Caldwell et al., 2003; Simons et al., 2012]



Tactical use of stimulants may be beneficial under adverse military conditions e.g. critical missions at night (WOCL)

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Commercial pilots should not adapt to their job by using medication.
Instead the job should be adapted to their (coping) capacities



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ESAM

When Modafinil is used instead of sufficient sleep

Is that a problem for flight safety?

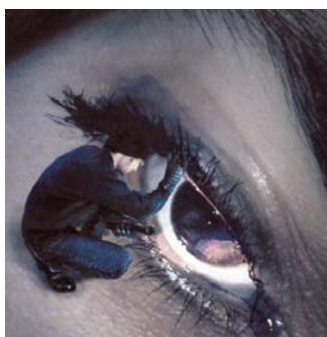
After sleep deprivation modafinil improves vigilance – statistically significant but not operationally relevant. Subjects still had impaired performance compared to non-sleep deprived subjects.



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If commercial pilots use performance enhancing drugs or hypnotics to cope with the demands of their job, a thorough evaluation of these job demands and alternative coping strategies are needed



Make use of smart drugs / stimulants discussible and give guidance how one can cope without drugs and consider referral to **Peer Support**

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Why does ESAM support Pilot Peer Support Programs?

Life stress can form part of any pilot's emotional "carry on luggage"

- Pilots are reluctant to report Mental/Emotional Issues to AMEs
- GP's detection rate of MEI is believed to range from 40 to 60 %
- Pilots are reluctant to seek treatment for MEIs

Early identification and intervention needed to prevent flight safety risks and to guide pilots through their career:

Fly Safe, Fly Well

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Why does ESAM support PSPs?

PSP is key solution to guide pilots towards the proper support and help in case of decrease of mental fitness

Objectives of Pilot Peer Support Programme

- Increase Awareness and Reduce Stigma of MEI
- Improve Mental Health and Reduce MEI Risk
- Early Intervention and Support Recovery and Return into Service

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Fly Safe, Fly Well: Sharp, Safe, and Healthy Pilots

- Rosters should be based on already available scientific data
- Increase Awareness of Pilots, AMEs, and Managers of Mental and Emotional Issues (MEIs; including use of medication and drugs)
- Early Intervention and Support of pilots with MEIs in a Peer Support Programme

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