

***Countermeasures to Mitigate Effects of  
fatigue among Flight attendants: to  
improve transportation safety and  
productivity.***

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CSSRT

*“Flight attendant fatigue is a chronic problem in the aviation industry and it continues to jeopardize the ability to fulfill important safety and security roles”*

(International President of the AFA-CWA)



*“The attempts of those valiant flight attendants onboard United Airlines flight 93, serve as alarming reminders that the cabin crew is essential to the safety of the aircraft and passengers.”*

***Flight Attendants as  
“Frontline  
responders.”***

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At many carriers, flight attendants are being forced to work to the point of exhaustion because of:

- Lack of flight time limitations like Pilots
- Poorly scheduled duty time
- Lengthened duty days
- Reduced rest and time changes
- Commuting

■ Eight hours rest is really 5 hours!

■ Compounded by additional post 9/11 “stressors”



# Fatigue and Stress Effects on Communication

- Viewed from “both sides of the fortress door”

Errors have been documented which illustrate the convergence of barriers in information transfer between the flight attendants and pilots and the anticipated stress related effects on communication. (Chute 1996)



# Stress Effects on Communication

- Fortress door
- Interphone system can be disabled as in 9/11 and "operation atlas"
- Lack of discreet wireless communication System



There is no "fatigue" test for humans and we are poor judges of our own state of fatigue

- NASA research reported that flight crews felt at their highest state of alertness just six minutes before they fell asleep.
- On the scientific scale, these crewmembers qualified as having a severe sleep debt, yet they felt very alert.

- **ACN: 736520 Synopsis**

BESET WITH FATIGUE DUE TO LONG DUTY DAYS AND FIVE CONSECUTIVE DAYS OF FLYING, CABIN ATTENDANT FAILS TO DISCONNECT SLIDE GIRT BAR ON B737-300 PRIOR TO CRACKING DOOR TO SIGNIFY IT WAS SAFE TO BE OPENED.

- **ACN: 734261** A FLT ATTENDANT DESCRIBES CREW MEMBERS SHOWING FATIGUE DURING ROUND TRIP ASSIGNMENTS TO THE HAWAIIAN ISLANDS.

- **ACN: 726607** FLIGHT ATTENDANT REPORTS DEBILITATING FATIGUE EXPERIENCED DURING ALL NIGHT FLIGHT TO ZZZ1 AND RETURN TO ZZZ.

- B757 FLT CREW BOTH FALL ASLEEP DURING ALL-NIGHT FLIGHT. THEY AWAKEN BEFORE ANY PROBLEM OCCURS.

# Some of the signs that may be caused by fatigue are:

- forgetfulness,
- poor decision making,
- slower reaction time,
- decreased vigilance,
- communication difficulties,
- fixation, lethargic, and moodiness.  
\*Similar to intoxication
- If any of these signs are apparent, the individual can employ an alertness strategy.

# Fatigue Risk Management System

*Measure*

*Model*

*Manage*

*Mitigate*

*Reassess*

*What does your FRMS look like?*

## Modeling to Minimize the Effects of Fatigue on Cognitive Performance

- The System for Aircrew Fatigue Evaluation (**SAFE**) a program used to assess the fatigue implications of aircrew schedules and uses the QinetiQ alertness model.
- The Fatigue Avoidance Scheduling Tool (**FAST**) is a fatigue assessment based on the amount of sleep and allows users to determine the best schedule to avoid fatigue. This allows airlines additional risk management, and can be used as a safety and accident tool, training tool, and to predict performance for various work schedules

# Operational Strategies

- Used during flights to maintain alertness and performance to mask sleepiness and help you maintain a level of alertness until you can get sleep.
- Strategic caffeine consumption,
- Stay hydrated and be sensible about nutrition.
- Move, stretch, exercise.
- Artificial indoor lighting

# Preventative Strategies

- Those used before flying or between flights to reduce the effects of fatigue, sleep loss, and circadian disruption.
- At home: try to get at least 8 hours of sleep and use strategic naps
- Diet, hydration, high lux lights
- These techniques can help to decrease the likelihood of the crewmember starting the trip with a sleep deficit.

# Herbal Countermeasures

- Valerian Root –insomnia, relaxation
- Kava Kava- insomnia, relaxation
- Melatonin- jet lag, fatigue, stress
- \*However, not much is known about long-term side effects, so any use of melatonin should be under a medical doctor's supervision.

# Light Therapy modality

- Third light receptor in the Human Eye, monitors wave lengths, send signal to brain hypothalamus (regulates sleep, emotional, hormonal functions).
- SAD, low mood, insomnia, fatigue-30 minutes after wakening
- Shift work- 30 minutes prior to work
- Jet lag- Eastbound 30 minutes after awakening, westbound, 30 minutes between 8-9pm

# High lux lights

- Artificial lighting to aid insomnia, fatigue, depression, SAD, and jetlag
- Can be used at home, before a flight, during flight, at hotel.
- Overhead lights can be installed to replace galley or crew room lights

<http://www.naturebright.com/dia/dia-video.htm>

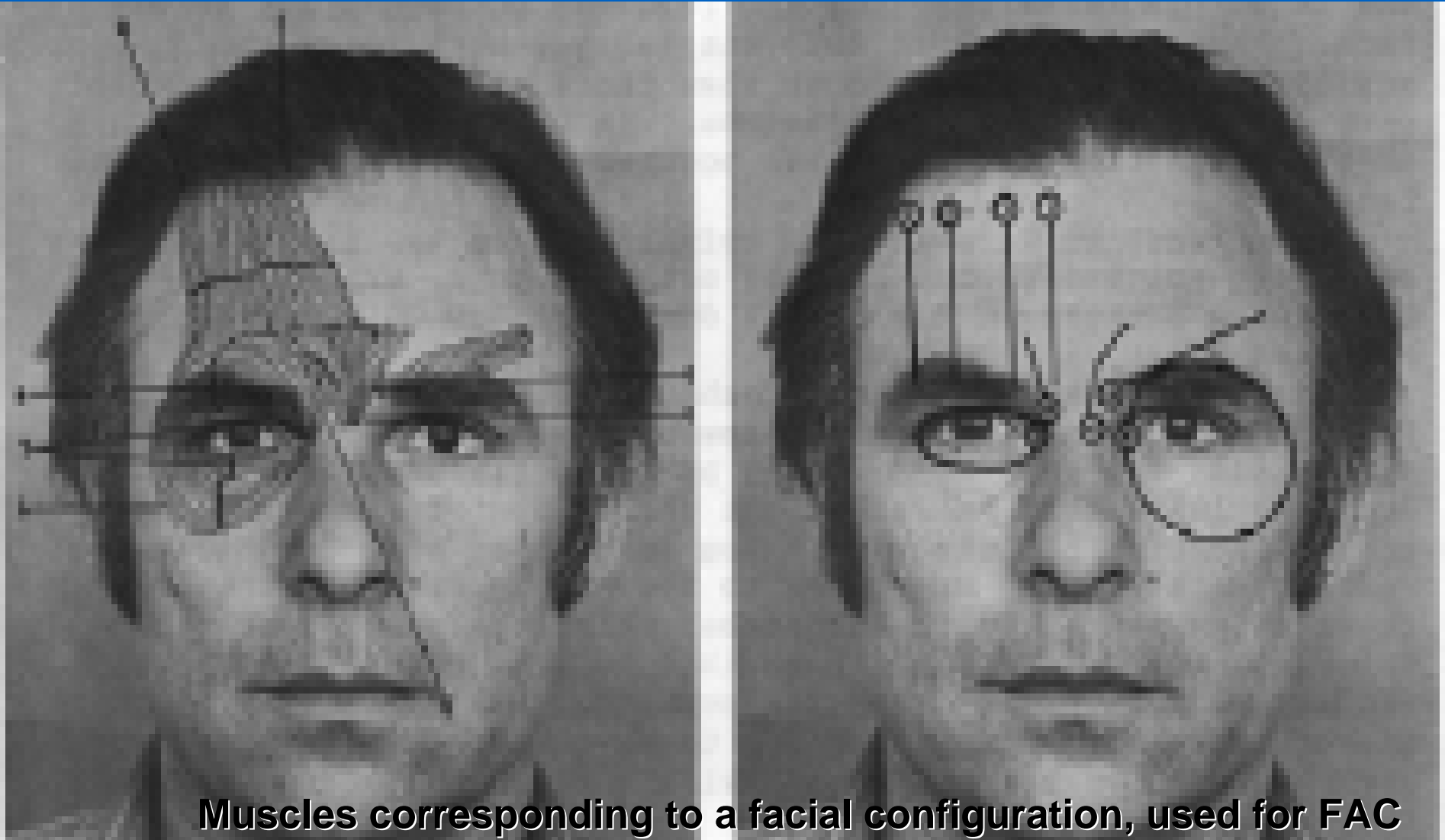


## Sky Effect Lighting™ for Crew Room or Galley

- Increases focus, alertness, and concentration
- Boost performance
- Fends off fatigue
- Reverses Seasonal Affective Disorder, minimizing lost work time and maximizing productivity



# Applying Facial Action Coding System (FACS) paradigm to Alertness Monitoring

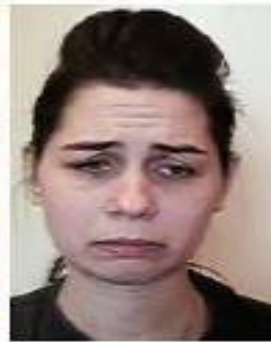




Anger



Surprise



Sadness



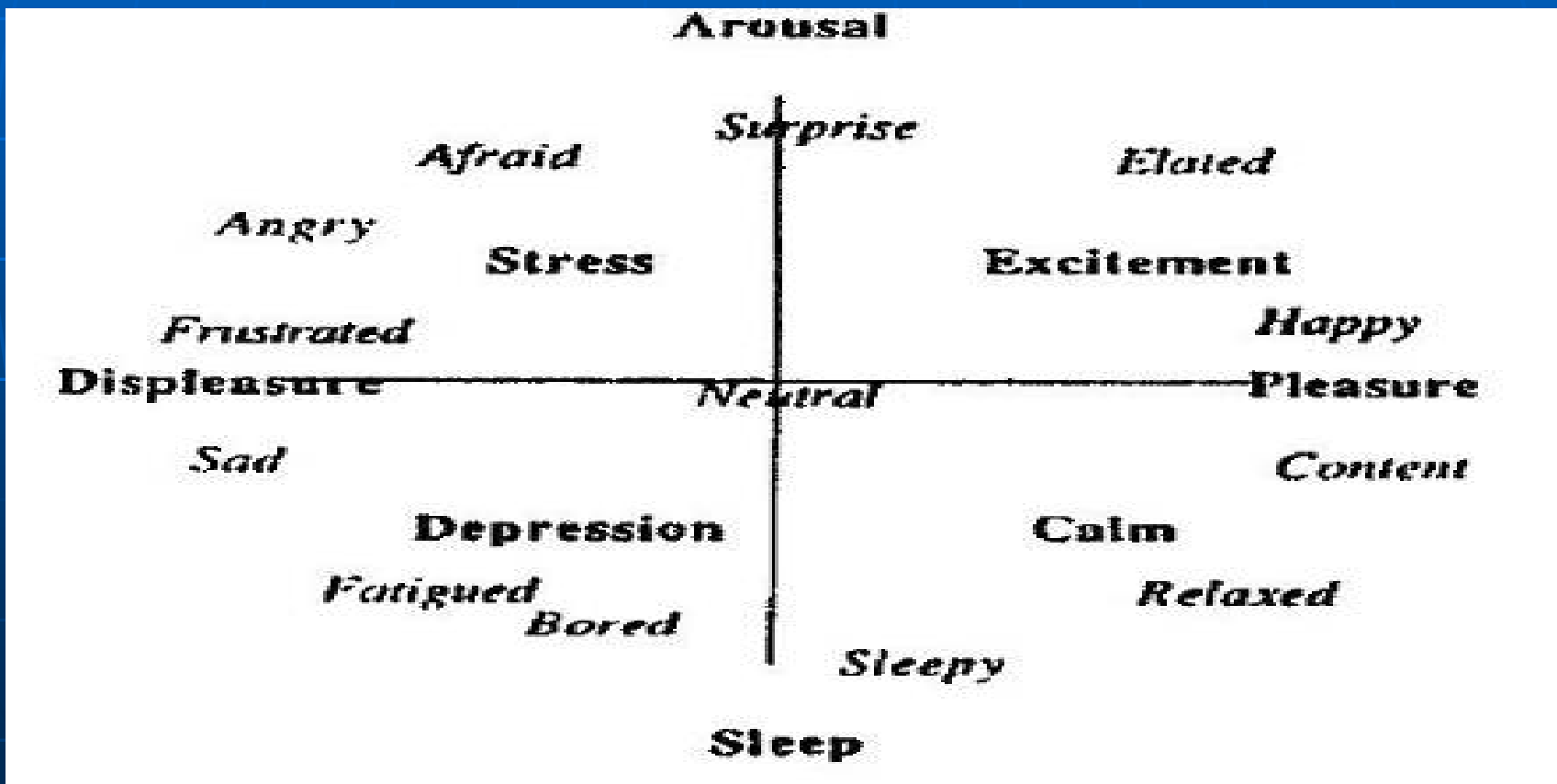
Disgust



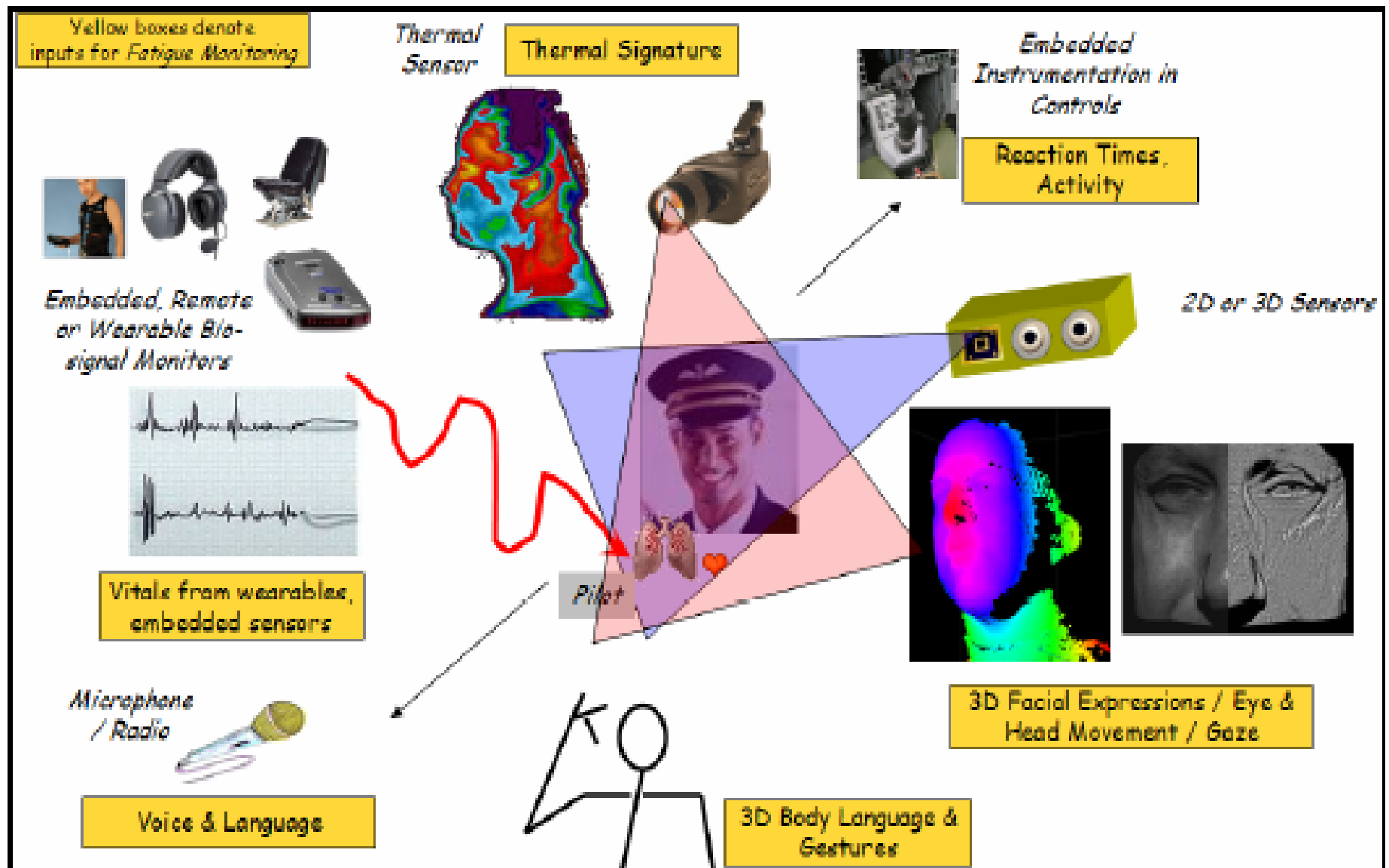
Fear



Happiness



# Future inputs to Crew Alertness System



# CAMS Beta Test

Assessment of functional state, in response  
to Nasa SBIR



Cabin Crews




ATC Applications

Flight Crews

# Global Collaboration

- I invite you to collaborate, creating global solutions to global problems
- ARI
- MAC
- STG
- Nature Bright
- Pilot/Flight Attendant Survey
- NPRM



Although, there has been a tremendous amount of research and measurement of crew states of awareness there has not been a concise process to link this physiology to actual performance.

Thank You

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