NextGen CRM:
A New Look at Crew Resource Management
**NextGen CRM:**
*A New Look at Crew Resource Management*

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“The world is full of obvious things which nobody by any chance ever observes.”  
*Sherlock Holmes: The Hound of the Baskervilles, A. Conan Doyle*
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**Situational Awareness**
- Thorough Pre–Flight Preparation
- Stays Ahead & Updates Plans
- Makes Contingency Plans
- Keeps a Broad Perspective

**Workload**
- Recognizes a High Workload
- Takes or Makes Time
- Deals With Overload & Prioritizes
- Avoids Distractions & Distracting

**Professional Style**
- Relaxed and Professional Tone
- Aspires to High Performance
- Conscientious and Flexible
- Self–Aware and Seeks Feedback

**Aircraft Handling**
- Safe/Efficient/Comfortable
- Automatic/Manual Flight
- Non–Normals/Emergencies
- Threat & Error Management

**Decision Making**
- Identifies Problems & Issues
- Involves Others If Needed
- Evaluates the Outcome
- Uses Structure In New Situations

**Applied Knowledge**
- Technical and Operational
- Use of Checklists
- SOP’s/Policies
- Commercial/Customer Awareness

**Situational Awareness**
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**NextGen CRM:**
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**Safety Standdown, 2015**
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A New Look at Crew Resource Management

AGENDA

ACTIVE MONITORING and SITUATION AWARENESS

DISTRACTION and SITUATION AWARENESS

COMMUNICATION and SITUATION AWARENESS

PLANNING/BRIEFING and SITUATION AWARENESS
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Industry Growth:
- Speed
- Seats
- Range
- Engines
- Altitude
- Pressurization
- Systems
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Active Monitoring

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"The Active Monitoring of Trends"

Boeing 307

Boeing 747
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The 1980s

Analog yields to Digital
Limited Trend Data

The Rise of Passive Monitoring
The Automated Flight Deck and the Clarification of Roles

Boeing 707

FAR 91.3
(a) The pilot in command of an aircraft is directly responsible for, and is the final authority as to, the operation of that aircraft.

Challenger 605

Boeing B-17

The Way We Were
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Active Monitoring

Actively Monitors & Supports
1. “Monitoring has not been elevated to a Primary Task within aviation. ‘PNF’ is still used instead of the preferred ‘PM’.”

2. “Industry promotes the efficiency of the flight (Money and Time) while the safety of the flight is assumed.”

3. “Monitoring is an acquired skill. It must be taught, it must be practiced, and it must be learned.”

4. “The rate of the critical significance of an error is disproportionate to the flight deck crew’s opportunity to experience it.”

NTSB Member Robert Sumwalt
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...Break
The History of Situation Awareness:

The Psychology of SA
- SA is a product of the human mind. (Endsley, 1988, 1995)
  - Perception
  - Integration
  - Predictive Benefit
- Sarter & Woods, 1991
  - SA and System Automation considerations
  - SA and Workload considerations

The Engineering of SA
- Jenkins, et al., 2009
  - Engineered Instrumentation
- Sorenson, et al., 2011
  - Cognitive observation and cooperation
  - Taking care of SA is instrumentation’s primary role
- Stanton et al., 2010
  - Cognitive cooperation with one’s environment

The Distributed Cognition of SA
- Stanton et al., 2010
  - Coordination within a collaborative system
  - SA as a harmony of teamwork

Human Computer Interaction and SA
- Automated device becomes electronic cohesion
Defining Situation Awareness?

WHAT
SO, WHAT
NOW, WHAT
WHAT IF

(Perception)
(Integration)
(Predictive Benefit)
(Contingency thinking)

A Shared methodology
A Team collaboration
An Active Continuum
So!!! --What are the Distractions to Situation Awareness?
Are they preventable?

- Ambiguity or Discrepancy
- Fixation or Preoccupation
- Confusion
- Departure from S·O·P’s
- Complacency

- Failure to Communicate
- Failure to Monitor
- Failure to Decide
- Failure to Plan (Briefings)
- Failure to Lead

Go to Safety, regain composure, begin again
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A New Look at Crew Resource Management

Communication and SA

Sender (PM)

Thinks

Understands

Notices

Receiver (PF)

Thinks

Understands

Notices

“Looks like a bit of tail wind”

“Yes, it does”

Clear, Concise, Precise, Unambiguous
P1: I’m looking at Chart 13–1 Apr 07 VOR 07L date April 07. MSA is 4300’ – expecting radar from TAUNUS to pick up the inbound course 072 FFM. Descent begins at 15.5 DME – we have DME height checks down to minima of 830 + 50 and 1200m RVR required. Missed approach is climb straight ahead to 10 DME or 5000’ and left turn back to TAUNUS VOR. We know the runway is long, good lighting and we can take a high speed turn. For nav we’ll have the VOR and the NDBs. Any questions?

P2: No questions

P1: Tell ATC we are ready for the approach
Non-Precision Approaches

- 50% of accidents occur on Approach and Landing
- 75% of those are on NPA
- Most occur on the centre-line
- Most are following a 3 degree slope
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A New Look at Crew Resource Management

NPA - Plot

Legend:
- Tracks where a map display would have probably helped flight crew(s) identify and correct problem
- Fatal accident track
- Incident track

• 5-year period: 1986 to 1990

Runway threshold
5 nm
10 nm
15 nm

Safety Standdown, 2015
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Safety Standdown, 2015 Briefing and SA

NPA - Plot

- 5-year period: 1986 to 1990

Altitude (ft)

Distance to runway threshold (nm)

Average time (sec)
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Briefing and SA

What are the differences between an ILS and a Non Precision Approach?

✓ Different Modes
✓ High workload
✓ More risk
✓ Maybe offset
✓ Maybe off centerline when we break cloud – visual manoeuvre required
✓ Pilot interprets tracking
✓ Pilot interprets glidepath – more communication required
✓ Significance of DME tuning / position
✓ Minima different (significance of visibility)
✓ Possibly non radar environment / less approach lighting
✓ Different configurations
✓ Increase likelihood of GA / Diversion
✓ 500’ calls get in the way of minima calls - causing confusion
✓ Nav aids selection
Non Precision Approach

- 50% of accidents occur on Approach and Landing
- 75% of those are on NPA
- Most occur on the centre-line
- Most are following a 3 degree slope
- Most are un-briefed or briefed like an ILS!!

What can we consider as ‘Standard’?
What are the differences?
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Next Gen CRM - Conclusions

Next-Gen CRM:

1. Mentoring-based Role Model development
2. Active Monitoring without offense
3. Distraction Awareness as urgent as SA
4. Non-Mitigating Communication to avoid unnecessary words
5. Differences-based Briefings to capture vital information
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A New Look at Crew Resource Management
## Workload
*(Right Brain/Left Brain)*

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TAKE IT TO THE JET

Thank you!