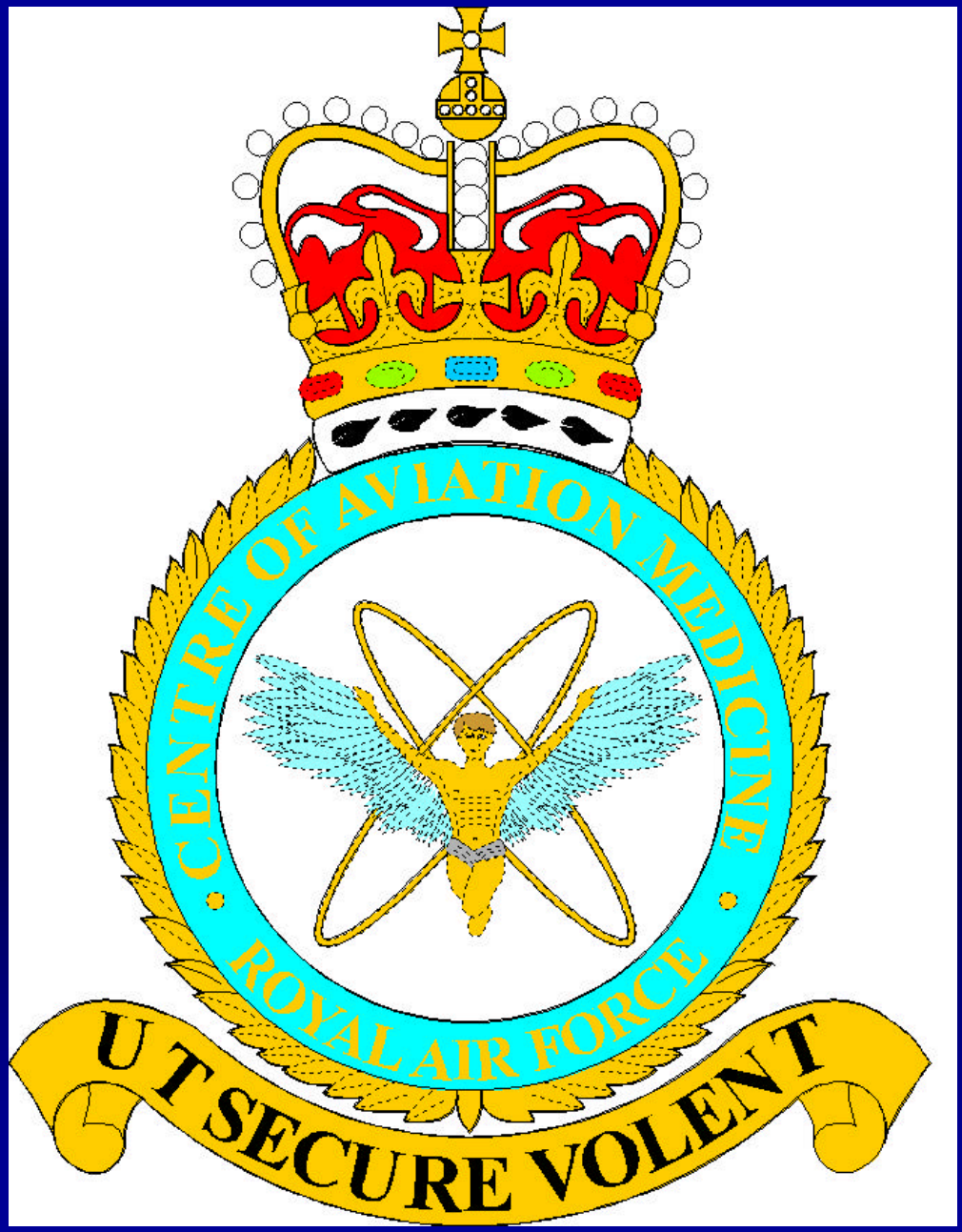
CENTRE OF AVIATION MEDICINE
ROYAL AIR FORCE
UT SECURE VOLENT

Where-the-Heck-Am-I?
Trends in SD Training and Research

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SD: An Abiding Problem

- SD accounted for 19.4% of USAF Class A mishaps FY91-99*
- Cost: >$1.4 billion
- The trend is an increasing slope

*Davenport: USAF Safety Center

Factors Contributing to SD*

- Attention Management
- Judgement and Decision Making
- Mission Demands

Cognitive Issues

*Davenport: USAF Safety Center

The Great Need and the Greater Challenge

- Integration of cognitive factors in a comprehensive aircrew training program

Building a Comprehensive SD Training Program

- Inflight SD demonstration sortie
- Simulator training in tactical scenarios
- Research and train to new technology
  - Agile aircraft, HMD, PNVG, 3D audio, DVI

Inflight SD Demonstration

- Hawk T Mk 1 aircraft
- Subject in back seat
- Eyes closed, visor cover as sunshield

Inflight SD Demo Profile

- Elevator Illusion
- Pitch Change with Acceleration
- False Climb in Turn
- Leans
- Tilt with Skid
- Post Roll Effect
- Coriolis
- Diving During Turn Recovery

Inflight SD Demonstration

- The purpose is not to teach recoveries from unusual attitudes
- The purpose is to
  - experience the insidiousness of SD
  - understand that the human body is a poor substitute for an ADI
  - extrapolate the end result of unrecognized SD

Inflight SD Demonstration

- Incorporate in elementary and advanced flying training
- Continuation training in operational units
  - Determine currency requirement
  - Unit level or centralized location
- Tailor demo to operational mission

Simulator SD/SA Training

- Simulator training obviates the risk of SD/SA training during actual missions
- Concerted effort to build a mission-specific SD syllabus for simulators

Simulator SD/SA Training

- Develop training scenarios based on
  - Previous accidents or incidents
  - Known high risk phases of flight, system anomalies, anything that can degrade SA
- Include multitask, high workload scenarios
- Instruct in maintaining ongoing orientation

Simulator SD/SA Training

- Currency requirements:
  - Advanced flying training
  - Operational flying training units
  - Upgrade to flight lead, instructor pilot
  - Converting to new aircraft
  - Stan/Eval checks

Simulator SD/SA Training

- Utilize infrared eye tracker during simulator sortie
  - Scan pattern critical to SD/SA
  - Scan affected by experience, skill, workload, fatigue
  - Eye tracking provides objective evidence of missed SA cues

Eye Tracking Example*

*Courtesy: PA Wetzel

SD Research

- Super-agile aircraft are on the horizon
  - Advanced avionics
  - Advanced sensors
  - Expanded operating envelope
- It is vital to do the research now; during an accident investigation is too late

SD Research

- UK Areas of Interest*
  - Hyperstereopsis due to NVD design
  - Effects of fatigue/workload on SD
  - HMDs and cockpit frame-of-reference
  - Consequences of switching between infrared and I^2 sources inflight
  - NVD currency requirements

*DERA: Dr. Sharon Holmes

SD Research

- RAF CAM Aviation Medicine Flight
  - Two instrumented Hawk T Mk 1 aircraft available for inflight SD research
  - Proposal to upgrade to NVG compatible glass cockpit supporting HMD

SD Research

- Objective research will reduce SD incidents
  - through knowledgeable design and procurement of NVD/HMD
  - through appropriate SD education and training for aircrew

Summary

- RAF CAM Comprehensive SD Training
  - Inflight SD Demonstration Sortie
  - Dedicated SD Simulator Training
  - Application of SD Research to Systems Acquisition and Aircrew Training

Questions?

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