New Aircraft, Airworthiness and its impact on Aeromedical operators

Mick Kaesler, CPEng, CASR Part 21M AP - Engineering Manager - Adelaide

August 2011
Introduction
New rules for modification, what are they?
Changes that effect Aeromedical Personnel
Issues of increasing Complexity
Case Study – Pilatus PC12
Case Study – EC145/BK117
The way forward and lessons learnt
New Rules

Changes to Modification/Installation Rules

Updated Guidance from AC21 46.

CAR 35/36 to CASR Part 21M 21.009, .006 and 21.437

How do these differ?

Applicant responsibilities.

Authorised persons don’t have to sign

Mandated “Safe for its intended purpose”
New Rules

Rules now specifically define the roles
Customer/Applicant/Approver/Approval Holder

Applicant: becomes the ‘Approval Holder’ once approval has been granted.

Customer: Design Organisation licences the design to the customer.

Approval Holder: The ‘Approval Holder’ has the responsibilities specified in CASR 21.455 to 21.460, and 21.003.

Approver: The authorised person from the design organisation.
New Rules

FLIGHT TESTING
CAR 35(3) function no longer exists.

CASA has amended EX11/11 Exemption – maintenance on limited category and experimental aircraft, for this purpose.
Pilatus PC12

Progressing equipment from PC-12/45 to PC-12/47E

Defibrillator

Type design

PC-12/45 23 Jun 06

PC-12/47E 28 Mar 08

FAA Part 23 amendments 23-1 thru 23-42 elected thru to 49
6 elected requirements and 10 special conditions

FAA Part 23 amendments 23-1 thru 23-42 elected thru to 50.
40 elected requirements and 15 special conditions
Pilatus PC12
Progressing equipment from PC-12/45 to PC-12/47E
PC-12/45 23 Jun 06                        PC-12/47E 28 Mar 08
Pilatus PC12
Progressing equipment from PC-12/45 to PC-12/47E
Defibrillator
Pilatus PC12

Progressing equipment from PC-12/45 to PC-12/47E

• Restricted Storage and Operation Locations
• Further restricted Use
• Extra Placard
• Addition of Flight Manual Supplements
• Extensive EMI/EMC Testing

These have impact on Aeromedical Operations and Installation cost.
Pilatus PC12

Process for communicating

THIS UNIT HAS BEEN APPROVED FOR INSTALLATION AND USE IN RFDS CENTRAL PC-12/45, PC-12/47, and PC-12/47E AIRCRAFT I.A.W. AERONAUTICAL ENGINEERS AUSTRALIA ENGINEERING ORDER EO14907.213/1.

REFER UNDERSIDE OF UNIT FOR INSTALLATION DETAILS.

PILOT MUST BE INFORMED PRIOR TO USE.

THE UNIT MUST BE FULLY SECURED WITH THE HARNESS RESTRAINT STRAP HOOK ENGAGED DURING TAKE-OFF, LANDING, CRUISE AND WHEN INSTRUCTED BY PILOT.

INSTALL UNIT TO FOLLOWING LOCATIONS WITH HARNESS (P/N: AV13027.001E0101/2)

INSTALLED:

TAKE-OFF, LANDING AND CRUISE

STRAPPED TO THE FERNO FW2650 / AFTS 752TA-4 STRETCHER WITH UNIT FLAT ON THE STRETCHER MATTRESS. THREAD STRETCHER HARNESS THROUGH HARNESS LOOPS (PELVIC OR LEG STRAP FOR FW2650 STRETCHERS, FOOT-END STRAP ONLY FOR AFTS STRETCHERS). SECURE AND TIGHTEN STRETCHER HARNESS STRAPS. DISPLAY SCREEN MUST FACE FWD IN AIRCRAFT.

2 ANY AVAILABLE PASSENGER SEAT WITH UNIT FLAT ON THE SEAT BASE CUSHION. THREAD LAP ASSEMBLY THROUGH HARNESS LOOPS. SECURE AND TIGHTEN.
Pilatus PC12
Future

• Increased system reliability
• Increased efficiency and operational capability
• Decreased servicing effort
  • Increased Digital Electronics
  • Standard NVIS
  • HF replaced with SATCom
• Increased Composite structure
• Greater dependence on Commercial transmissions (i.e. WiFi)
BK117

Progressing equipment from BK117 C1 to C2 (EC145)

Geometrically the same.

BK117, C2 (EC145)  

BK117 (A, B, C1)
BK117
Progressing equipment from BK117 C1 to BK117 C2 (EC145)

BK117 A, B ,C1

Aluminum Structure
Low G loading
Low levels of digital electronics

BK117,C2 (EC145)

Aluminum/Fibre Composite
High G loading
Fully digital cockpit
BK117
Case study certifying Oxylog 3000 onto EC145 from BK117
Draeger Oxylog 3000
Installation into the roof for overhead monitoring
BK117

Main Issues

- Structural integrity
- Electronic compatibility EMI/EMC
- W&B
- Electrical loads
- Failure Mode Effects
- Installation Details
Secondary issues

Human Factors

Ingress egress

Head strike
Why buy new aircraft?

- Newer aircraft are generally less expensive to maintain.
- Newer certification basis aircraft have better capability and are safer.
- Newer equipment is more capable and can better look after the patient.
  - Prior Approvals (Road Ambulance etc)
  - OEM certified equipment
  - Understand better ‘Donations’
**Most effective way of assessment?**

- How can I save time/money?
- Encourage suppliers to certify their equipment ‘out of the box’.
- Talk to suppliers about testing they have already carried out. Pass this onto the Design Organisation.
- Think about getting CASR Part 21.009 approved data for your equipment.
- Talk amongst yourselves about pooling resources and test data.
Flowchart of Process

New Equipment

Is Equipment Aircraft Certified? STC, APMA, PMA

Yes → Ok to proceed

No

Has the equipment been certified on the aircraft before?

Yes → Collect Data and proceed

No

Is the Aircraft Similar?

Yes → Collect Data and proceed

No

Any other applicable Medical, AS. CE. standards?

Yes → Collect Data and Call Design Org

No → Don’t Know → Call Design Org
Flowchart of Process

Equipment needs approval

Do you know the target Aircraft?

- Yes → Ok to proceed, see

- No → Is there and applicable aircraft Standard? RTCA, TSO, MIL, BMS

  - Yes → Is there more than 1 type?
    - Yes → Call Design Org
    - No → Collect Data and Call Design Org

  - No → Is there any other Standard? CE, SAE, AS?

    - Yes → Establish Functional requirement.

    - No → Collect Data and Call Design Org

- Don't Know
Thank you
Any Questions?

Mick Kaesler
mick.kaesler@aeroengaus.com.au
Mob 0431633573