

# DEVELOPMENT OF A FIRE RETARDANT SHIRT FOR APACHE AIRCREW



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# BACKGROUND

- Military rotary crews require flying clothing that:
- Is functional and integrates
- Provides protection from fire
- Generates minimal physiological burden
- Allows carriage of survival aids
- Provides ballistic protection
- Non signature design



# IN THEATRE/ON OPS/DOWN RANGE

- Aircrew adapt and adopt equipment
- Changes and advances in soft and hard armour
- Initiatives to reduce thermal burden
- Upgraded clothing
- Experimental cooling systems
- Same pattern
- Non FR clothing
  
- UBACS



# Why FR



# REQUIREMENT

- Urgent Operational Requirement
- FR Under Body Armour Combat Shirt
- Reduce thermal burden



# IMPLEMENTATION

- JHC/PJHQ
- Requirement Manager
- Project teams; engineers  
safety managers,  
procurement, logistics
- Industry
- Av Med
- Users



# CHALLENGES

- Satisfy UOR
- Reduce thermal burden
- Improve functionality for aircrew
- Improve protection
- Time



# DESIGN FEATURES

- Av Med Concerns
- Flash fire
- Compliance-single vs double layer
- Sleeve rolling
- Physiological burden
- Existing industry contract
- Fast Prototype
- Burn trials
- In theatre surveys of aircrew opinions on AEA
- Pen Pockets
- CAT/Morphine auto injector
- Fire protection with minimal thermal burden
- Single layer to torso
- Engineered double sleeve layer
- Yoke ?
- Armpit



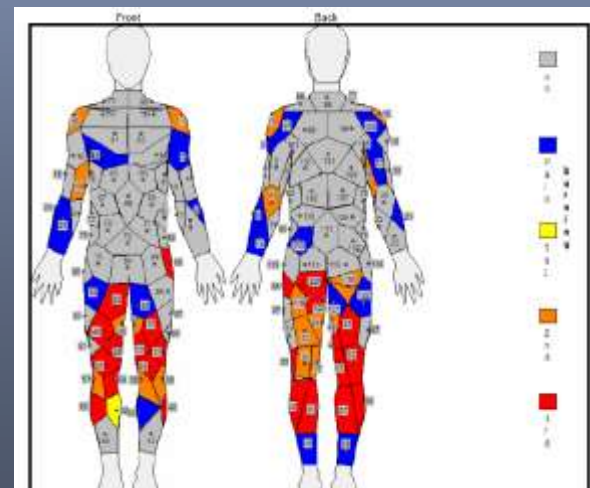


# RESULT



- FR Sleeve (170 gm KV Rip stop Desert DP) with knitted FR(220 gm KV beige knit) liner
- Single FR layer to torso
- Double FR at collar and yoke
- Pen and Equipment pockets
- Elbow pads
- Cuff velcro closures

# BURNS TEST RESULTS



# ROLL OUT AND FOLLOW UP

- Integration and user trials results positive
- User Feedback-OEUS
- Year 1-Generally well received, Felt to be the most significant improvement in AEA. Issues with neck chafing and uniform appearance in mess halls. Some crews unaware of double lining to sleeve for FR performance.
- Year 2-Universally well received (higher collar to reduce chafing). Fraying at seams.
- Production now in Multi Terrain Pattern.

# Future Aircrew Clothing Systems

- Complete suite of clothing- FJ, Rotary and multi.
- Fabric improvements: Defender M (less shrinkage) based on research studies 1 from 7 from 18 (vertical flame and whole mannequin testing).
- Nomex improvement (slight weight increase- 170gsm less shrinkage) based on mannequin testing.
- Garment design: Pockets, closure, coverage



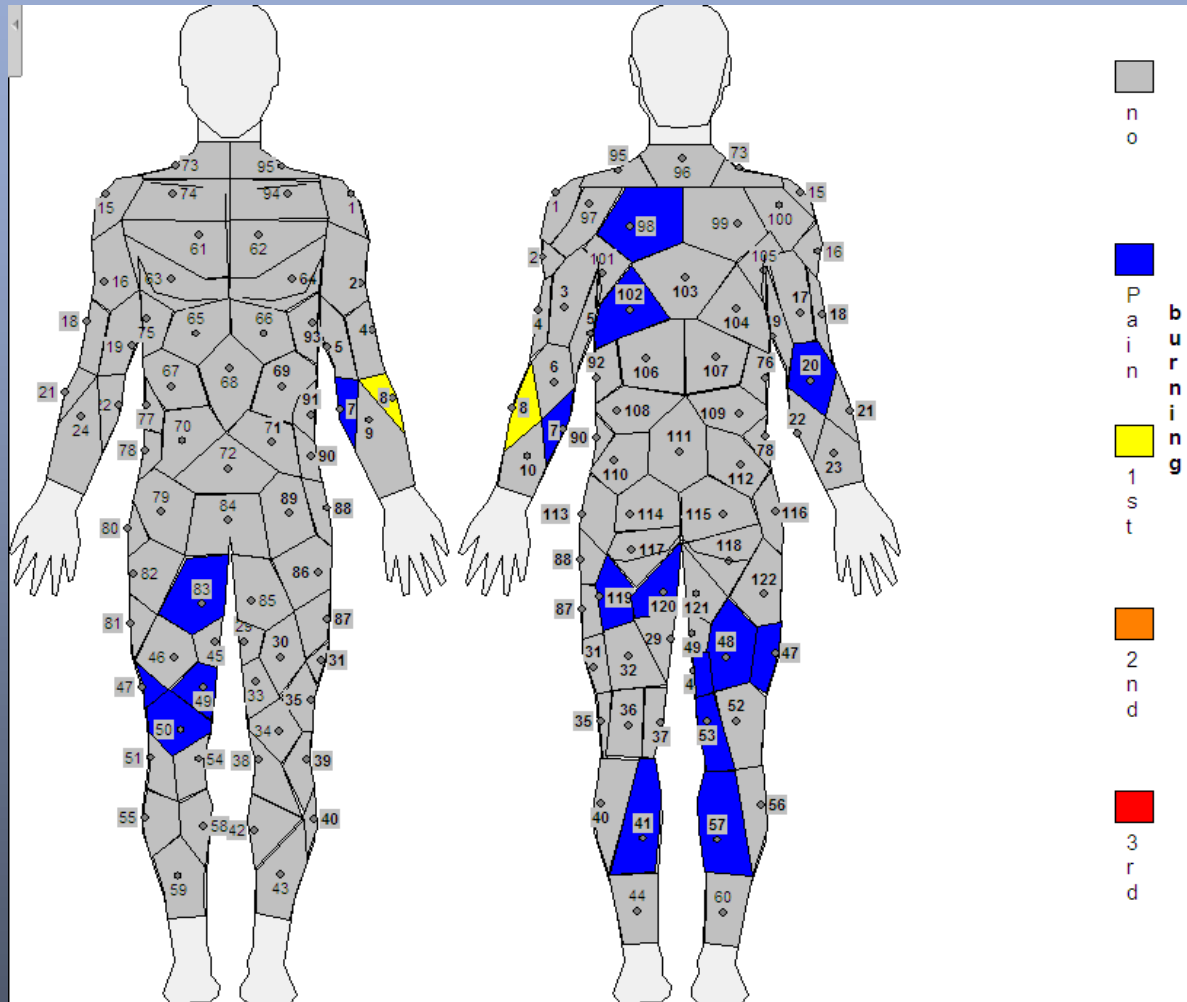
# Future Aircrew Clothing

- Use of non FR mid layers (modified in exposed areas)
- Developed by steering groups
- Special thanks to Maj John Canham
- SAFETY
- Integration by design completed
- Burns- whole mannequin EN compliant ( 60 )
- In service trial commences next month!

# Breaking news!

- Probably the most significant enhancement of PPE for aircrew seen in recent years
- Levels of protection achieved exceed expectation
- Target severe burn less than 30%
- Legacy systems 20-25%
- FACS less than 10% - many ensemble zero burn or pain

# FACS Coverall + Mid Layer



# Questions?

