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SAFE Europe 2011 F-35 Lighting II Pilot Flight Equipment update

Wednesday 6th April 2011

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PFE Design Philosophy

- First fully integrated PFE solution for US Platform
- Interoperability with F-35 Partner Nations
- By design, compatible with US Legacy aircraft
- Fully qualified with aircraft life support and escape systems
- Single Design Solution Modular System
- Designed, Manufactured, Fitted and Supplied by OEM
- Multi Layer Protection
- Improved Technical Fabrics
 - Comfort
 - Thermal management
 - Protection
 - Durability





Garments	Summer (Land/Sea)	Summer CB	Winter Sea	Winter Sea CB
Socks	Required	Required	Required	Required
Underwear Lower, Male & Female	Required	Required	Required	Required
Underwear Upper, Male & Female	Required	Required	Required	Required
Underwear Upper Crop Top, Female	Optional	Optional	Optional	Optional
Cooling Garment (replaces Underwear upper)	Optional	Optional	Optional	Optional
Thermal Garment	-	-	Required	Required
Light Weight Coverall with ARS	Required	-	-	-
Cold Water Immersion Garment/Socks	-	-	Required	Required
Flight Use CB Protective Layer (worn in all CB scenarios)	-	Required	-	Required
Lower G Garment, Skeletal	Required	Required	Required	Required
Lower G Garment, Full Coverage	Optional	Optional	Optional	Optional
Sleeved Flight Jacket/LPU/ARS	-	Required	Required	Required
Sleeveless Flight Jacket/LPU	Required	-	-	-
Breathing Gas Hose Assembly (non CB)	Required	*	Required	*
Boots	Required	Required	Required	Required
Summer Gloves	Required	Required	Required	Required
Winter/Sea Gloves	-	-	Required	Required
Transit Use CB Protective Layer	-	Required	-	Required

* CB version supplied by Gentex



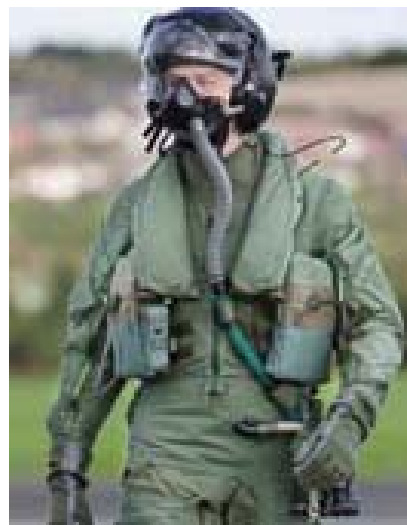
Providing F-35 PFE in all Environmental Configurations



Summer



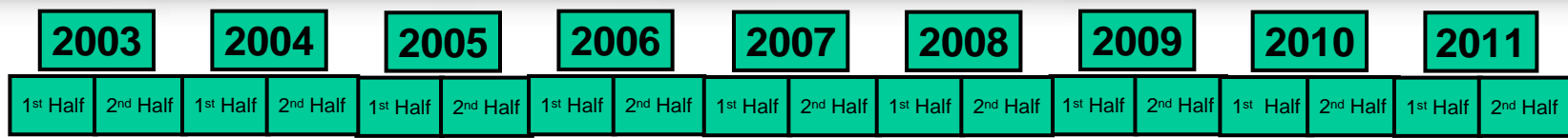
Summer CB



Winter



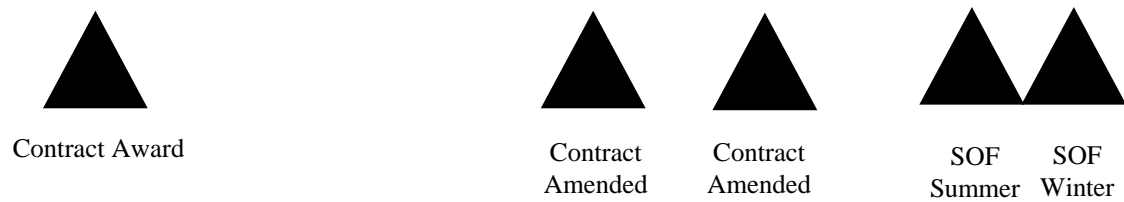
Winter CB



Initial Standard (Block 0)



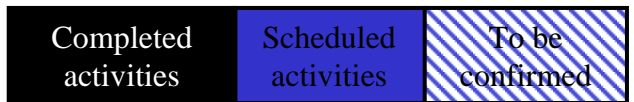
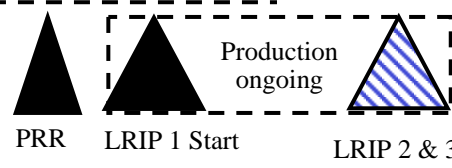
Final Standard SDD (DASH 2.8)



Final Standard LRIP (DASH 4.2)



LRIP Planned Deliveries





SDD Closure - Key Milestones completed since 2009

- SDD Winter Sea SOF
- RFDB Final Standard Equipment Level Qualification completed
(18+ test categories including combination & sequential testing for optimised integrity)
- RFDB Final Standard System Level Qualification completed
(14+ test categories including Chem Bio schedules)
- 27+ Final Standard Escape System Tests completed with LRIP Final Standard PFE (including 3 x Chem Bio schedules)
- Fully Integrated Size Rolls generated in accordance with the CAESAR Anthropometric Database and Wright Patterson AFB Aircrew Survey



Going Forward - SDD Closure

- Final Escape System Tests 2nd Qtr 2011
- RFDB Delta Chem Bio Qualification
(additional POL & Glove testing) 2nd Qtr 2011
- Chem Bio Man Rating 1st Half 2011

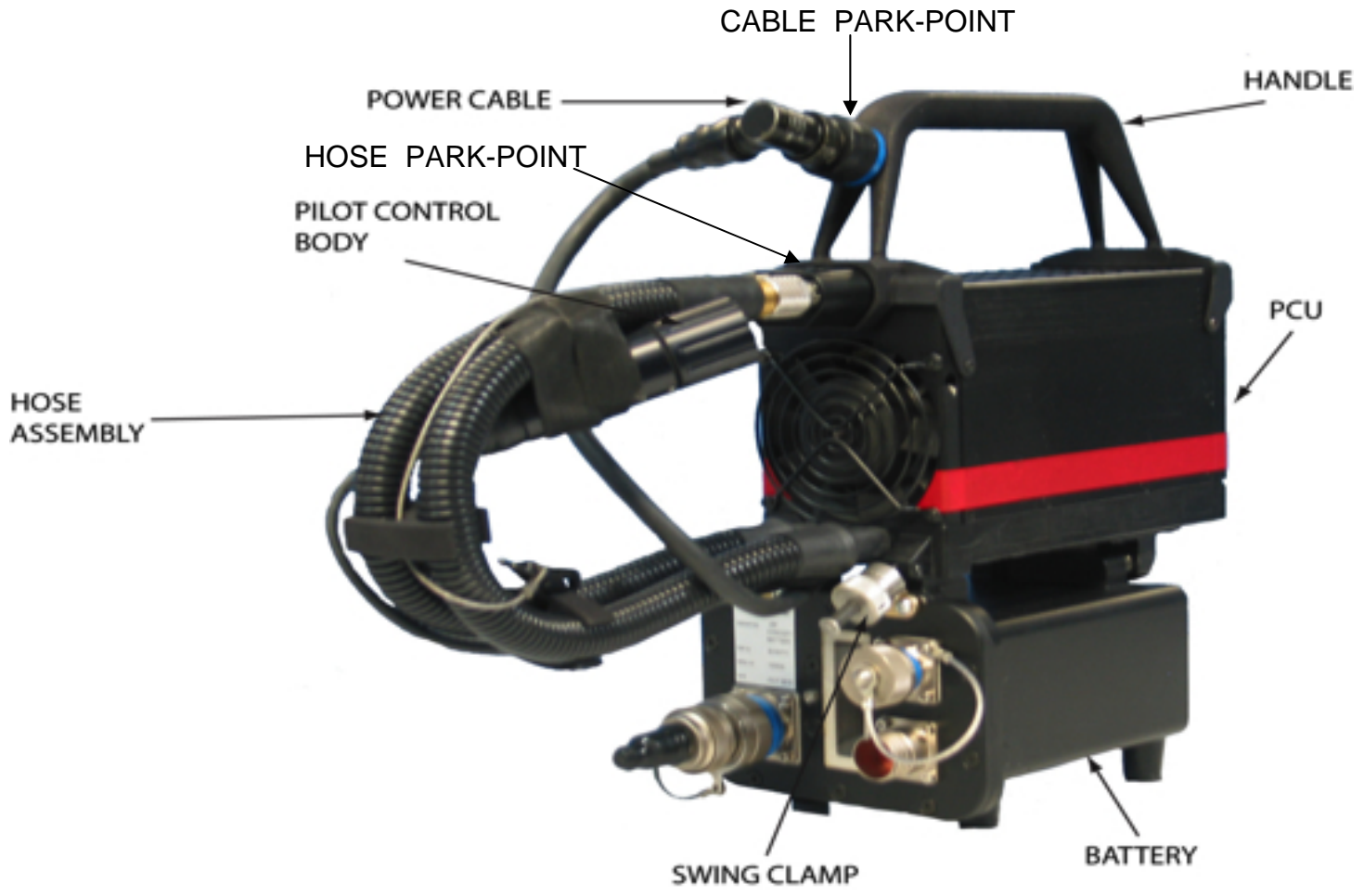


F-35 Pilot Cooling Unit Design Philosophy

- Provide compact, lightweight, portable cooling capability for F-35 Pilot in Chem Bio PFE
- F-35 PCU compact designed for pre-flight ground use, easily mounted in the cockpit.
- PCU utilises reduced flow rate, high inlet temperature, with low power requirement
- Reduced mass makes this PCU suitable for many platform applications
- Fully integrated with PFE Cooling Garment, the system is optimised to deliver maximum efficiency and benefit
- Provides effective cooling allowing improving Pilot comfort and performance
- Designed for multi mission roles



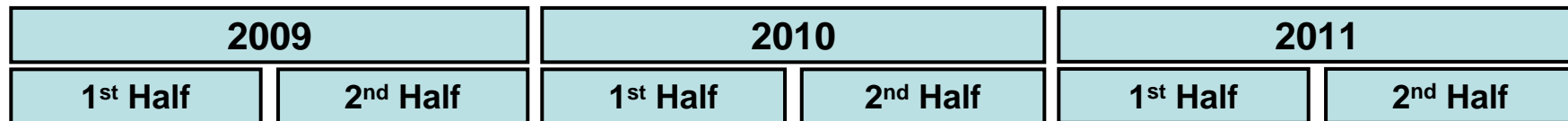
PCU and Battery Assembly





PCU SDD Progress

- PCU and associated equipment progressed through PDR and CDR
- IFP PCUs Battery Charger and Ground Support Equipment supplied
- 2 x PVI events held at LM DFW in 2010 with IFPs
- Pilot feedback positive
- PVI feedback incorporated into design update for FS units
- Harness deleted for improved portability
- Direct coupling to the battery via dagger pins & swing clamps



Contract Award



CDR
IFP
Assets
& PVI 1



PVI 2



FS assets
and
Validation
Programme



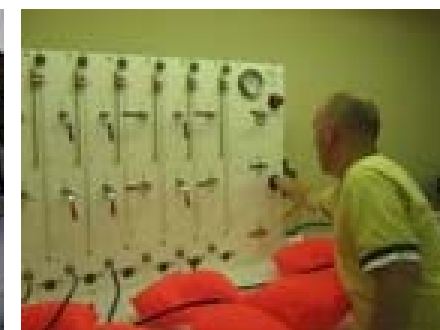
Qualified
assets
Full
Qualification
Flight
Clearance





Manufacturing Update RFD Beaufort, Inc – Ohio

- Successful Technology Transfer from UK to Ohio
- 100% Berry compliance for textiles
- 100% made in the USA
- Operator Training program - August 2009
- Successful LM Production Readiness Review - Oct 2009
- Successful First Article Inspection – June 2010
- First LRIP delivery to Eglin Afb - 4th July 2010
- Stage increase to workforce to support RAMP
- Multi disciplined LEAN manufacturing process
- Manufactured and delivered 1,100+ LRIP assets to date
- Deliveries against LRIP 1, LRIP 2, LRIP 3 since July 2010





Eglin PFF Concept of Operation PFE

- Overall 2-day process for PFE (Below the Neck)
- Conduct predicted fit of each item of PFE
- Complete PFE fit validations and fit map scoring with pilots
- Record Anthropometric Data onto Survitec PFE Asset Control System





European Dimension

- Potential Aircraft Build / Deliverables
- 9 Partner Nations
 - USA
 - Canada
 - Australia
 - UK 2011-2017 = 19
 - Italy 2014-2017 = 40
 - Netherlands 2011-2017 = 20
 - Norway 2015-2017 = 20
 - Turkey 2015-2017 = 24
 - Denmark (2018)

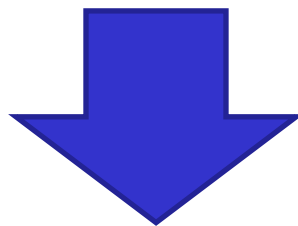


Partner Nations :Norway

- Qualification data can be used for existing programs
- Backwards compatibility on F-16
- New technologies availability eg Explosive free Operating Mechanism



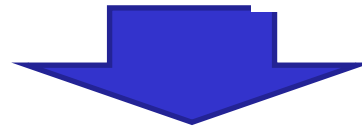
- RFID





Netherlands

- Rationalise Inventory by maximising compatibility between platforms
- Reduce logistic burden





Full Coverage Anti G Protection



Key product benefits

1. Improves pilot performance in High-Gz environments
2. Prevents avoidable GLOC mishaps
3. Far greater durability, reliability and through-life performance equating up to ~2.5x lifespan



- Pilot **fatigue decreased** through **reductions** in:

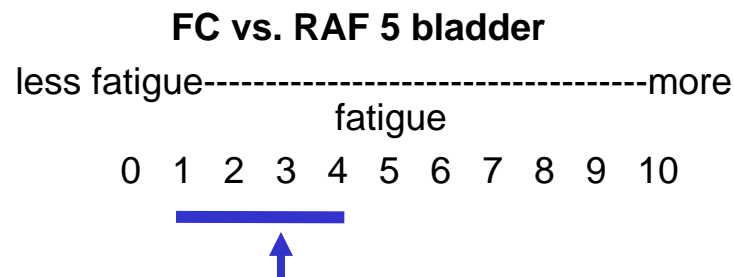
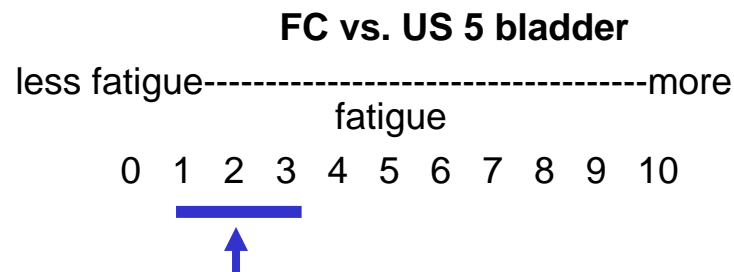
AGSM

Dehydration

- 3% increase in dehydration halves tolerance at 7Gz*

Weight/ thermal burden

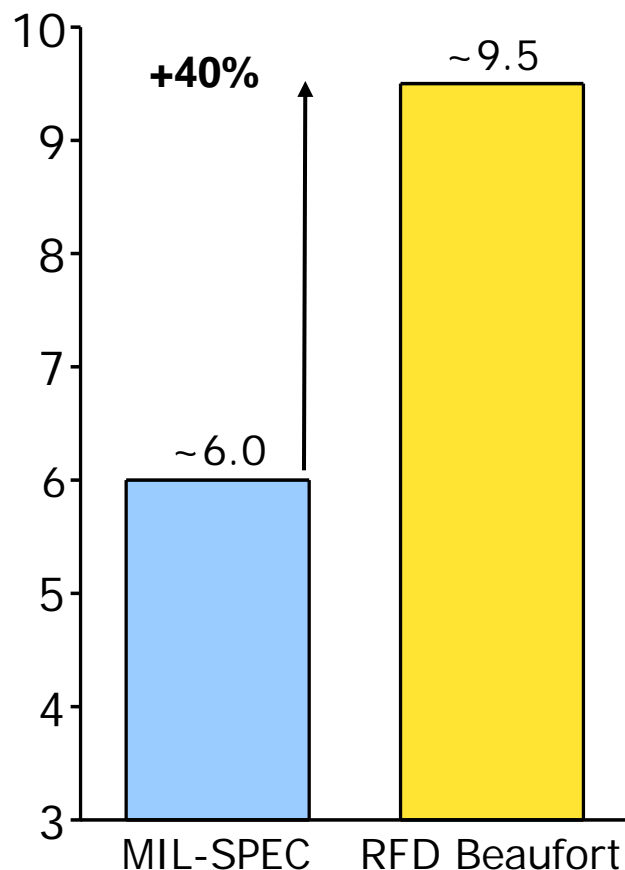
- Ensemble can be zipped up at the aircraft





- **Higher risk of loss of Situational Awareness (SA) and GLOC** in high performance aircraft capable of higher speeds and Gz
- **Full coverage G-suits allow pilots to fly up to 9G+** without AGSM (reducing straining and fatigue)
- **Therefore mission sustainment and training effectiveness is increased**

Acceleration (Gz)





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for
2011

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SURVITEC JSF F-35 AGILE PILOT FLIGHT EQUIPMENT

PROTECTING YOUR MOST VALUABLE ASSET

- Made in the USA
- BERRY Compliant
- Fully integrated, modular solution designed to maximize protection and optimize pilot performance
- Significant performance improvements made over current Legacy PFE leveraging over 90 years experience
- Unvalued commitment to PFE sustainment program reducing maintenance burden
- Fully compatible with US Legacy platforms

Survitec AGLE Pilot Flight Equipment

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when his life
depends on it...**

**The Survitec
Way**

