Rapidly delivering war-winning capability

NDIA Conference
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Joint Service
Aircrew Mask
(JSAM)

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CONTRACTED DEVELOPER

Dominant Air Power: Design For Tomorrow...Deliver Today

AVOX Systems

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JSAM PMs report directly to JPM-IP
Mr. Jim Nelson/Mr. Brooks

HSG Commander (HSG/CC)
Col Donahue

CBRN Defense Sys Division (TB)
LTC H. Tran

Lead Engr
Lan Ninh

IS/Colpro/Med
Maj (Sel) Stewart

JEM
JOEF +
JWARN
JCPE
CP-SSS/EMEDS
JBAIDS +
JECP +

Individual Protection
Mrs. B. Haass

JSAM
Capt Hanks
Capt Blumke

Decontamination
Maj Tullier

JSSED
JPID *
M100 Support
MDS Support

JSPDS
JSTDS

Contamination Avoidance
Mr. Stermer

JCAD +
JSLNBCRS +
JSLSCAD
JBPSD
ARTEMIS
JBSDS

* USAF is System Manager
+ IPT Assignments
What is JSAM?

- The Joint Service Aircrew Mask (JSAM) is a lightweight, aircrew respirator that provides head, eye, and respiratory protection in both fixed and rotary wing aircraft.

- JSAM will be compatible with below the neck CB ensembles, it will provide flame and thermal protection, and will reduce heat stress imposed by existing CB protection masks.

- For Type II, JSAM will incorporate both CB protection and Anti-G (9+G)
Key Features

- Detachable faceplate
- Man-mounted system
- Improved CB filter
- No neck dam
- Compact lightweight blower
- Replaceable lens
- Commonality with JSAM designs for application in other platforms
Advantages

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- Improved Comfort - Detachable faceplate means that full protection need only be worn when faced with a hazard and NOT the threat of a hazard
- Improved CB protection
- Improved FOV
- Compact man-mounted supply system – no aircraft/LSE modifications
- Can be worn un-helmeted
- Commonality in design approach, materials and manufacture processes with JSAM for other platforms
JSAM Types

- Type-IA IHADSS
- Type I
- Type II

Currently in Source Selection
JSAM Type IA – IHADSS Apache

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JSAM Type I – Rotary Wing

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**JSAM Aircraft Priority List**

**Priority 1**
- **USA**
  - AH-64A/D
  - CH-47D/E/F
  - MH-47D/E
  - UH-60A/L/M/Q
  - MH-60K/L
  - HH-60L/M
- **USN**
  - MH-53E
  - MH-60R/S
  - SH-60 B/F
  - HH-60H
- **USAF**
  - MH-53J/M
  - CV-22
  - UH-1N
  - HH-60G
  - CH-53D/E
  - CH-46E
  - MV-22B
  - UH-1N/Y
  - AH-1W/Z

**Priority 2**
- **USA**
  - OH-58D
  - AH/MH-6, LRA, LUH
  - MC-130E/H/P
  - F-22A
  - AV-8B
- **USAF**
  - AC-130H/U
  - C-130E/H/J/J-30
  - EC-130E/H/J
  - LC-130H
  - HC-130N/P
  - WC-130E/H/J
  - F-35A
  - KC130/R/J/T
  - F-35

**Priority 3**
- **USN**
  - C-130T
  - F/A-18A/B/C/D/E/F
  - USAF
  - F-16A/B/C/D/CG/CJ
  - O/A-10/A
  - USMC
  - F/A-18A/B/C/D

**Priority 4**
- **USN**
  - F/A-18A/B/C/D/E/F
  - USAF
  - F16A/B/C/D/CG/CJ
  - O/A-10/A
  - USMC
  - F/A-18A/B/C/D

**Priority 5**
- **USAF**
  - C-9A
  - C37
  - E-4B
  - C-12C/D/F/J
  - C21A
  - C26B
  - C32A
  - C-9A
  - C37
  - E-4B
  - C-12C/D/F/J
  - C21A
  - C26B
  - C32A

**Priority 6**
- **USN**
  - EA-6B
  - EA-18G
  - P-3C
  - EP-3E
  - USMC
  - EA-6B

**Priority 7**
- **USAF**
  - F-117
  - B-52H
  - B-2A
  - B-1B

**Priority 8**
- **USA**
  - C-20/D/G
  - USN/USMC
  - C-2A
  - C9A
  - C-9
  - C-12
  - C-20
  - C35
  - E8C
  - E-3B/C
  - RC-135S/U/V/W
  - KC-10A
  - E-10A/B/C
  - C-767

**Priority 9**
- **USAF**
  - C-20/D/G
  - USN/USMC
  - C-2A
  - C-9
  - C-12
  - C-20
  - C35
  - C-9A
  - C37
  - E8C
  - E-3B/C
  - RC-135S/U/V/W
  - KC-10A
  - E-10A/B/C
  - C-767

**Priority 10**
- **USN**
  - HH-1N
  - E2C
  - E-6B
  - HH-1N
  - USAF
  - Aeromedical
  - HH-1N
## Key Performance Parameters
### Type I, IA, and II

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<table>
<thead>
<tr>
<th>Protection (O)</th>
<th>Challenge (O)</th>
<th>Challenge (T)</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protection (T)</td>
<td>Duration O=24hrs</td>
<td>T=16hrs</td>
<td></td>
</tr>
</tbody>
</table>

### Challenge (O) Challenge (T) Duration O=24hrs T=16hrs

<table>
<thead>
<tr>
<th>Chem Vapor Protection</th>
<th>20,000Ct</th>
<th>5,000Ct</th>
<th>24/16</th>
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<tbody>
<tr>
<td>(HD Mustard)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(GB, nerve)</td>
<td>50,000Ct</td>
<td>20,000Ct</td>
<td>24/16</td>
</tr>
<tr>
<td></td>
<td>Miosis&lt;1Ct</td>
<td>Miosis&lt;1Ct</td>
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</table>

### Chem Liquid Protection

<table>
<thead>
<tr>
<th>Chem Liquid Protection</th>
<th>10g/m2</th>
<th>10g/m2</th>
<th>24/16</th>
</tr>
</thead>
<tbody>
<tr>
<td>(HD Mustard)</td>
<td></td>
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</tbody>
</table>

### Quantitative Fit Factor

<table>
<thead>
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<th>Quantitative Fit Factor</th>
<th>120,000</th>
<th>20,000</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>(QFF Blown mode)-Chem</td>
<td></td>
<td></td>
<td>Verification via Corn Oil, tested Blow&amp;Unblown</td>
</tr>
<tr>
<td>(QFF Blown mode)-Bio</td>
<td>120,000</td>
<td>50,000</td>
<td></td>
</tr>
</tbody>
</table>

*(9G sustained for 15 seconds with 6G per second onset for Type II)*
Technical Performance Results to Date

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Initial SMARTMAN configurations only produced 11-13 hours of HD and GB protection…

Current SMARTMAN
New blend of materials now exceed 24 hour KPP objective requirement for both HD and GB permeation

AND

at the 10g/m2 challenge level!
Technical Performance Results to Date

- **Quantitative Fit Factor**
  - Blown protection factor (PF) KPP results exceeded expectations
    - 100% passed threshold requirement of 50K
    - 88.8% met objective requirement of 100K
  - Unblown PF results also exceeded expectations
    - 93.8% passed threshold requirement of 6,667
    - 93.8% passed objective requirement of 10K
    - 89.6% exceeded 50K
Technical Performance Results to Date

- **Breathing Resistance-** pass
  - Meet dynamic breathing requirement based Air Standardization Coordinating Committee (ASCC) Air Standard 61/112/2B, both blown and unblown
- **Crash Survivability-** pass
  - Crash deceleration testing conducted at QinetiQ shows no adverse impact of JSAM
- **Ability to Valsalva-** pass
  - Effective one-handed capability demonstrated in altitude chamber
  - Demonstrated no adverse impact to CB seal
Technical Performance Results to Date

• Accommodation-
  – Demonstrated accommodation of 98% male aircrew population with current sizes
  – Accommodated all tested females with current sizes

• Comfort-
  – Preliminary results indicate that there were no undue “hotspots” or other severe discomfort as compared to M48

• Thermal burden-
  – Preliminary results indicate that thermal burden may be higher than M48 due to less blower flow required to meet CB filter restrictions
Success Stories

QFF
SMARTMAN GB (VAPOR)
BREATHING
CRASH/DECEL
THERMAL
SMARTMAN HD* (LIQUID PERMEATION)
FILTER QUALIFICATION

LENS DISTORTION
- Evaluating Critical Viewing Area
Current Program Status

- Type IA and Type I completed CDR
- Type IA Design Validation Testing (DVT) completed - results favorable
- Type I DVT currently in progress
- Planning for DTRR in May 06 (Type I and IA)
- Expect DT start in June/July time period (I and IA)
- Type II Source Selection in progress
- Expect fielding for Type I and Type IA to occur 2Q/3Q FY08
Q&A
Key Features

- Detachable faceplate
- Man-mounted system
- Improved CB filter
- No neck dam
- Compact lightweight blower
- Replaceable lens
- Commonality with JSAM designs for application in other platforms
Cornerstones of Design
CB Protection & Physiological Burden

- Minimize burden by minimizing time that full protection has to be worn
- Achieved by a detachable faceplate
- Separation of eyes and respiratory tract from skin of head & neck removes the need for a neck dam
Cornerstones of Design
No aircraft or ALSE modifications

- All JSAM system components, including CB filter and blower, are manned-mounted eliminating need for aircraft and ALSE modifications
- ‘Hands Free’ assists user in performance of duties
JSAM Types

- **Type-IA IHADSS**
  - Non-oxygen
  - AH-64A/D only

- **Type I**
  - Non-oxygen (HOS capable)
  - Rotary Wing (exc. Apache)
Advantages

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- Improved Comfort - Detachable faceplate means that full protection need only be worn when faced with a hazard and NOT the threat of a hazard
- Improved CB protection
- Improved FOV
- Compact man-mounted supply system – no aircraft/LSE modifications
- Can be worn unhelmeted
- Commonality in design approach, materials and manufacture processes with JSAM for other platforms
JSAM Design Cornerstones
CB Protection & Reduced Physiological Burden

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- Improved CB protection over legacy systems (miosis levels)
- Minimize wear burden by minimizing time that full protection has to be worn
- Achieved by a detachable faceplate
- Sealed around facial cavity versus neck dam
70% common items between Types I, IA & II

Optimized for mission requirements of Type I & IA Rotary wing (Airguide Mask) and Type II Fixed wing (Oronasal Mask)
JSAM Test Program Review
Flight Test

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Army
- AH-64D
- UH-60L
- CH-47F
- OH-58D

Navy/Marine
- AH-1W/Z
- CH-53E
- MH-60R
- T/AV-8B
- MV-22
- F-18F
- EA-6B

Air Force
- MH-53
- C-17
- AC-130
- MC-130
- F-16C/D
- F-15E

Fixed Wing

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