



Law Enforcement Requirements for Respirator Systems

Brian Montgomery, Physical Scientist
Operational Technologies Division

brian.montgomery@usdoj.gov



NIJ's Mission

- NIJ's principal authorities are derived from the Omnibus Crime Control and Safe Streets Act of 1968, as amended (see 42 USC § 3721-3723) and Title II of the Homeland Security Act of 2002 as it relates to NIJ's Office of Science & Technology (OS&T)
- Research, development and evaluation arm of the Department of Justice
- Advances scientific research, development, and evaluation
 - to enhance the criminal justice (CJ) system
 - to increase public safety
- Emphasis on State and local practitioner needs
- Committed to scientific process of open competition, peer-reviewed, published reports and archived data

Mission of the Operational Technologies Division



- Manage Research and Development efforts in various technology areas.
- Identify technology requirements.
- Manage the development of standards, testing methods, and guides and operation of NIJ's Compliance Testing Program.
- Administer, Manage, and Coordinate efforts with the National Law Enforcement and Corrections Technology Center System
- Provide technology information and assistance.

Law Enforcement Requirements

- **Criminal Justice users may need operationally specific requirements:**
 - Mission Utility
 - Stealth operations, weapons usage
 - Operational environmental
 - Fire, hydration
 - Interoperability
 - equipment
 - Environmental
 - Weather and storage
 - Heads-up Display
 - Filter



Mission Utility

- **Mode Switching**
 - Manual vs. Automatic switching
 - Automatic – System failure concerns
 - Sensor failure
 - Switching failure
 - Automatic Switching when air is depleted
 - Manual – Training/ User Failure
 - Increase Operational Duration
 - Improved stealth (noise reduction)
 - One mask/system for every mission (increased operational readiness)
 - Change protection mode (SCBA, PAPR, APR) as mission changes dynamically

Mission Utility



- **Noise considerations**
 - Reduced noise level for entire system (PAPR and SCBA)
 - Inhalation/Exhalation valve noise reduction
 - Alarms (use HUD, vibration,)
- **Weapons Sighting**
 - Smooth cheek weld for long gun sighting
 - Filter must be side mount
 - Can be switchable or produced as a left or right handed mask
- **Optics**
 - Visual Field Score may need more research
 - Fragmentation protection
 - Must accept optical modifications for correcting vision
- **Speech**
 - Ability to be fitted with voice actuator
 - Consider low volume 360 degree (1-2 feet)



Operational Environment

- **Flame Resistance**
 - Full system needs to meet requirements (including harness)
 - Flash over absolutely needed
 - Need flash protection to mitigate meth lab explosions, riots
 - Is the 400 degree bake excessive?
- **Hydration**
 - Withstand contamination throughout the hydration system
 - In field or down range usage
 - Hydration capability is required
- **Flow Rate**
 - Is research needed to determine if need for LE specific requirement



Interoperability

- **Communications**
 - Radios
 - Squad communications
- **Helmets**
 - Proper fitting, avoid hard points in harness
 - Does not inhibit each others operation
- **Body Armor**
 - Shoulder straps and waist belts
- **Tactical Tools**
 - Vests, pockets, and pouches
 - Breaching tools and other LE equipment



Interoperability

- **Weaponry**
 - Sighting and carrying
- **Hearing**
 - Hearing Protection
 - Hearing enhancement
- **Range of Motion**
 - Perform typical operational functions
 - Does not inhibit each others operation



Heads-up Display

- Used for SCBA or PAPR – not necessary for an APR yet
- Not visible to others than the user (reflection on visors, etc.)
- Can have alarm indicator for air level or possible future filter indicators
 - Field of vision considerations
 - Potentially adjustable for user preference
- Power easily replaceable and obtainable



Environmental Considerations

- **Storage**
 - Heat
 - Face shields falling off after being stored in a trunk
 - Cold/freezing
- **Salt Water and Sand**
- **Altitude**
 - Breathing
- **Static Discharge**



Filter

- **Profile**
 - Accessibility to the suspect
 - Equipment interoperability
 - Field of vision
 - Platform stability (weight distribution)



Contact Information

Brian Montgomery

NIJ Officer Safety and Protective Technologies

Program Manager

brian.montgomery@usdoj.gov

202-353-9786