



# Protecting the JSF's Most Valuable Asset

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COMPANY CONFIDENTIAL

# 100 Years of Innovation

As a global leader in personal protection and situational awareness solutions for defense, security, emergency responders and industrial safety personnel, our products are designed, engineered and manufactured to protect and allow wearers to successfully perform their duties, while enduring the most extreme conditions.



**1894**  
*Silk Fiber  
Manufacturing*



**1914**  
*Silk Cartridge Bags*

**1948**  
*Hard Shell Helmets*



**1914 - 1918**  
*Cargo Parachutes  
and Containers*



**1935 - 1945**  
*High Performance Textiles*



**1969**

*Respiratory Systems*



**1969**

*Helmet Mounted Sights and Display Integration*



**1980**

*Ballistic Protection*



**1960**

*Aluminized Textiles*



**1970**

*Precision Polycarbonate Lenses  
(Acquisition of Omnitech, Inc.)*



**1980**

*Laser Eye Protection*



**1977**

*Communication Systems  
(Acquisition of JMR Systems)*





**1999**

*Vehicle  
Intercom  
Systems*



**2005**

*Advanced Helmet  
Vision System*



**2008**

*Advanced Laser Eye Protection  
(Acquisition of Holographic Optics)*



**2014**

*Active Noise  
Reduction  
(Acquisition of Sound  
Innovations)*



**2015**

*Hearing &  
Comms  
(Acquisition of  
Aegisound)*

**1985**

*Chemical and Biological  
Protective Fabrics*



**2006**

*Chemical Biological  
Radiological Nuclear Masks*



**2014**

*Integrated  
Helmet Systems  
(Acquisition of HISL)*



**2011**

*Integrated Ground Helmet Systems  
(Acquisition of Ops-Core, Inc.)*



*Innovative Design & Engineering  
(Acquisition of Artisent, Inc.)*



We are dedicated to continuously investing in our capabilities and technologies to ensure the growth of our business, and ability to provide the game-changing innovations our people have made for over a century.



# Long History of Supporting Key Helmet Programs

- Joint Helmet Mounted Cueing System (JHMCS)
- Helmet Mounted Integrated Targeting (HMIT)
- Apache Block III Rotary Wing



# Protecting the JSF's Most Valuable Asset

## Personal Protection Capabilities:

- Head (impact) protection
- Respiratory (O<sub>2</sub>) protection
- Chemical and Biological protection
- Laser eye protection
- Hearing protection and communications
- Test equipment
- Custom fitting services
- Sustainment and Support





# JSF Helmet System

- Modular and lightweight helmet platform for integration with HMD and other personal protective equipment
- Based on the ALPHA helmet design incorporating a ratcheting nape strap with tensioning earcups to optimize fit and stability
- Design improvements implemented for JSF are being actively considered for next-generation fixed wing helmet concepts



# JSF Oxygen Mask

- MBU-23/P style mask with Gentex Anti-Suffocation Valve (ASV) allowing unconscious or disabled aircrew to breathe in the event the mask is not removed from the face
- Provides Pressure Breathing for G (PBG) capability and 600 KEAS windblast protection
- ASV also available for Gentex MBU-20/P and HA/LP oxygen masks to enhance aircrew safety in other airframes



# JSAM-JSF Chem-Bio Flight-Kit

- Provides 16+ of protection from chemical, biological, radiological, and nuclear threats
- Tested extensively versus live agents Quantitative Fit Factor (QFF) exceeding 100,000
- Integrates with the JSF helmet and oxygen mask, with additional configurations available for the Gentex HGU-55/P and HA/LP on F-15, F-16, and F-22 airframes



# SF2-C JSF Laser Eye Protection

- Provides protection against specified laser devices while maximizing visible light transmission
- Low profile spectacle frame designed to fit optimally under the JSF helmet to minimal hot spots and compromise to passive noise attenuation
- Prescription outsets can be added easily
- One example in a line of Gentex laser protective lenses that can be deployed for a wide range of laser threats that aircrew may encounter





# Active Noise Reduction

- Lightweight ANR earcup with combined passive and active noise attenuation for superior hearing protection
- Clear, high-fidelity presentation of incoming communications
- Rigid composite earcup housing can be deployed in other helmet systems to reduce headborne weight while providing advanced noise attenuation



# DANR DHPC Ground Maintainer Headset

- Triple hearing protection solution for extreme noise fields up to and exceeding 140 dB
  - **High volume passive earcups**
  - **Custom-molded earplugs**
  - **In-ear active noise reduction (ANR)**
  - **Digital noise cancelling microphone**
- Two-way digital communications exceeding JSF speech intelligibility requirements at 140 dB
- Range of appropriate product configurations available for other noise fields in the 105 - 130 dB range



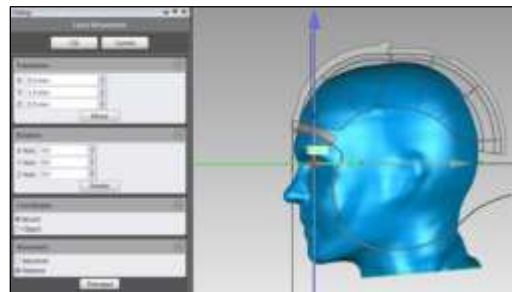
# JSF Test Kit

- 9 and 16 inches water gauge pressure breathing test capability
- Comprehensive communications test capability for multiple microphone / communications systems
- Self-contained air source for provides high portability for deployment close to the flight line
- Compatible with Gentex MBU-20/P and HA/LP oxygen masks to provide advanced test capability for non-JSF aircrew



# Custom Helmet Fitting

- Laser head scanning and 3D image processing used to optimize helmet fit and proper HMD eye position
- Processed scan data is used by Gentex to mill custom helmet fitting pads that are delivered to the Pilot Fit Facility (PFF) to fit the helmet and mask to the individual
- Opportunities exist to leverage the PFF model and infrastructure to provide similar custom fit capabilities to non-JSF aircrew around the world





# Sustainment and Support

- Aircrew helmets in service in over 70 countries
- Uniquely positioned to provide local sustainment/support services to JSF and non-JSF customers
- Ability to provide local spare parts supply and logistics management
- Local technical experts work directly with customers to customize products and ensure proper fitting and maintenance

# Headborne Weight Reduction

## Supporting overall weight reduction efforts by:

- Removing up to 100 grams of mass from the JSF helmet
- Replacing ratcheting nape system
- Relying solely on the custom fit liner process to produce required stability
- In-use nape adjustability less required given the integrated day/night capability of the HMD



Rear of JSF helmet shell showing removal of knob of the standard ALPHA ratcheting system

- Gentex protects the JSF's most valuable asset by providing a complete line of pilot protective equipment solutions
  
- As the advanced technologies deployed for JSF reach maturity and full operational capability, they will be deployable by non-JSF aircrew to:
  - **Reduce headborne weight**
  - **Enhance mission endurance**
  - **Improve situational awareness**
  - **Provide increased hearing protection in the air and on the ground**
  - **Optimize equipment fit, stability, and comfort**
  
- Committed to the sustainment and support of the equipment we design and produce

