INVISIO

Tactical Communication and Hearing Protection Systems
INVISIO Tactical Communication and Hearing Protection Systems

The Modern Soldier
Faces Many Challenges

Increasing Mission Success
Efficient communication

On today’s military battlefield, efficient communication is essential for reducing risk for the soldier and ensuring mission success. INVISIO systems support full radio functionality for different mission scenarios, for both the mounted and dismounted soldier. Radio communication and hear-thru are separate with continuous and unimpeded hear-thru in both ears, even when transmitting. Transmission using the radio’s internal push-to-talk or wireless remote push-to-talk is possible as well as radio sidetone, radio warning tones, full duplex and multi net functionality.

The modern soldier is faced with a significant burden - both cognitively and physically. The soldier’s mobility, sustainability and ability to communicate are adversely affected by this burden. INVISIO systems addresses today’s soldier systems challenges of size and weight reduction, integration, power optimisation battlefield situational awareness by simplifying the system down to what the soldier needs and only what he needs. The user interface is reduced to face the real issue of mission critical communication and supplying state-of-the-art hearing protection to the soldier. As a consequence of this simplification, size and weight are significantly reduced, and the power supply is centralized. Soldier efficiency, safety and mobility increases.

Preventing Hearing Damage
Intelligent hearing protection

For soldiers, the ability to communicate clearly in high noise environments while protecting their hearing and still retaining situational awareness, is a tactical advantage and can be a life saver. Soldiers in the field often experience very high noise levels that can impede mission critical communication and damage the soldier’s hearing. Hearing impairment is the most common injury of soldiers returning from active duty. Combine this with the risk of short term hearing damage due to explosions and the risk of mission failure increases. The INVISIO systems provide certified hearing protection solution rated at SNR 32 dB and NRR 29 dB to meet the needs of demanding users in high noise environments and is available with both universal fit and custom fit headsets.
Improving Safety and Efficiency
INVISIO comfort and fit

Soldier safety and efficiency is severely reduced by inadequate fit and uncomfortable equipment. INVISIO headsets offer unsurpassed performance, comfort and fit to professional users and are available in universal fit or custom fit versions. INVISIO Universal Fit headsets utilize a form factor that has been researched and refined over the past decade. The INVISIO Soft Spring adapts perfectly to the contours of any ear offering maximum comfort and a secure fit. INVISIO Custom Fit headsets are the ultimate headsets for fit and comfort. Made to fit the ear of the individual user and manufactured from an actual impression of the user’s ear. All INVISIO headsets are compatible with helmets, eyewear, breathing apparatus and ear muffs. INVISIO X5 is the ultimate tactical communication headset for performance, versatility, comfort and fit.

Enhancing Situational Awareness
INVISIO 360° hear-thru

Full situational awareness with the ability to communicate and hear the surroundings at all times is critical. Soldiers need to maintain natural hearing and still have protection from potentially damaging impulse noises, such as gunshots or explosions, as well as continuous noise from vehicles and aircraft. INVISIO systems use advanced digital signal processing, miniaturized audio components and ergonomic headset design to provide the most natural hearing possible - even in extreme conditions. The INVISIO hear-thru microphone is positioned within the external contours of the outer ear, utilizing the outer ear capability of detecting the origin of sounds and providing full 360° degree situational awareness. Advanced miniaturized speakers and microphones reproduce the sound naturally. Digital signal processing not only improves hear-thru quality by compensating for the inherent loss of ear canal resonance to improve situational awareness, but also protects the user with instantaneous compression of audio signals that exceed a dangerous threshold.

Enabling Crystal Clear Communication
INVISIO Bone Conduction Technology

Clear communication in the heat of battle can mean the difference between life and death. INVISIO systems utilize the patented INVISIO Bone Conduction Technology. Instead of traditional sound wave technology, a small, comfortable in-ear microphone picks up vibrations from the user’s jawbone. The vibrations are converted into speech, delivering crystal clear communication under extreme and noisy conditions, even when whispering.
INVISIO Tactical Communication and Hearing Protection Systems

INVISIO Soldier System

INVISIO’s tactical communication and hearing protection systems are based on simplicity, modularity and flexibility to fit the communication needs of the mounted and dismounted soldiers, regardless of operational requirements. With headset options including in-the-ear and over-the-ear hearing protection, immersion to 20 meters and lightweight patrol headsets, as well as integration to most military communication equipment, INVISIO is the communication hub for the modern soldier. All INVISIO control units allow for communication on multiple talk-groups on a single radio, as well as multiple audio inputs to enable full compatibility with modern team and combat net radios.

Seamless plug and play integration between control units, PTTs, headsets, interface cables and accessories is key to the versatility of the INVISIO system, as it allows for deployment of new equipment without the need for updating existing INVISIO equipment. All INVISIO systems feature INVISIO IntelliCable®, a unique identification that enables all equipment to be interchangeable across current and future INVISIO systems. In addition to seamless integration, INVISIO offers industry leading hearing protection with both in-the-ear and over-the-ear headsets combined with state of the art situational awareness.

The INVISIO X5 in ear hearing protection headset is established as the in-ear headset of choice for future soldier programs today, due to comfort, reliability, hearing protection and superior audio quality that gives natural sounding situational awareness and accurate directionality. The INVISIO TS over-the-ear hearing protection headset is a significant improvement over traditional cup headset design, as it removes weight and complexity from the headset by centralising operation of the headset to the INVISIO control unit. This removes the batteries from the headset and reduces on head weight to below 250 grams.

INVISIO Systems Complete Interfacing Solution

Multi-Headset Interface
Adapts to legacy and future headsets

INVISIO systems have the ability to operate multiple types of headsets including dual in-ear, submersible in-ear, ear-cups with boom mics, lightweight and throat mics. Multiple adapter cables are available so an existing installed base of headsets can be utilised.

INVISIO IntelliCable®
Automated exchange

INVISIO systems enable automatic detection of hot-swap devices such as radios, intercom systems, mobile phones, computers and remote PTTs to set the audio and system parameters instantaneously. A key benefit is being able to deploy new equipment without having to reprogram the INVISIO system.

Multi-Com Interface
From Single to Tri com

Connect either a radio, intercom system, mobile phone, computer, remote PTT or power supply to any of the com ports and the system will automatically sense it and change the settings. Control units are available with one to three com ports to meet any operational requirement.

Centralized Power
Simplified with no internal battery

INVISIO systems require no internal battery and can power directly from an attached radio, intercom system or other central power supply. This not only reduces the size and weight of the system, it also reduces the system’s complexity, and the number of batteries to be changed during or after missions.
**Open Microphone**

In-ear headset with hot-mic

INVISIO systems can operate with all radio communication microphone lines open at all times – even to multiple com sources. This makes it possible to maintain full radio functionality like full-duplex communication, radio sidetone, priority voice, VOX and keeping the radios onboard PTT buttons.

**Independent Audio Streams**

Four separate audio streams

INVISIO systems have up to four separate and independent input audio (Rx) streams that can be directed to either ear with different audio amplification. Up to three output audio streams (Tx) are also separate and independent with different audio amplification for each device connected.

**Split Ear Audio**

Dynamic assignment to both ears

INVISIO systems feature split ear received audio so that different talk groups can be assigned between left and right ear to improve intelligibility and battlefield situational awareness. Received audio is automatically and dynamically assigned when connecting or disconnecting a radio.

**Advanced Mode Settings**

User configurable

INVISIO systems can be configured to meet different operational requirements through preset key combinations, enabling users to set up the system as required for their mission.

**Hear-Thru Control**

Simplified volume control

INVISIO control units use a single button volume control for hear-thru that reduces the number of buttons required and makes it simpler to get the amplification required for a situation. The hear-thru starts automatically when the radio is turned on and can be turned off by pressing and holding the hear-thru controller. A short press of the hear-thru controller then scrolls between different hear-thru levels.

**Automatic Start-Up**

Starts with radio - no calibration

INVISIO control units start automatically when the first connected radio is turned on and then shuts down again when the last connected radio is turned off. Once the system is turned on, the communications and hear-thru are fully functional and there is no need for any calibration of the system.

**Reduced Size and Weight**

Reducing the burden on the soldier

INVISIO control units are the world’s smallest and lightest, with volumes and weights reduced by more than half compared to most other multi-com control units on the market. The V20 control unit measures 64 x 40 x 25 mm and weighs 99 grams.

**Submersible to 20 Meters**

Resistant to water, dirt and sand

INVISIO systems are submersible to 20 meters. The control unit can be cleaned in fresh water to remove dust, dirt and sand. The INVISIO V60 is so light it even floats.

**MIL Tested and Proven**

Compliance and safety

INVISIO systems have been tested extensively to meet MIL-standards and has total EMC shielding from the metalised housing and connectors. INVISIO systems use breakaway connectors to improve safety especially for the dismounting soldier or in case of entanglement.
**INVISIO V20**

The INVISIO V20 control unit is designed for soldiers with a single radio with one or two talk-groups. It is the smallest and lightest control unit available and powers from the connected radio. The INVISIO V20 is very intuitive and simple to use. The control unit is fully compatible with other INVISIO systems and offers state of the art situational awareness and integration to other communication devices.

**Specifications:**
- 1 Com Port
- Powers From Comms
- 2 PTT Buttons
- Multiple Headsets
- 99 Grams
- Com Auto-Sensing
- 64 x 40 x 25 mm
- 20 Meter Submersible

**Simple and lightweight**
Control unit for soldiers with a single radio.

---

**INVISIO V50**

The INVISIO V50 control unit is designed for soldiers and commanders that require an internal power supply and two communication devices, such as team radio, combat net radio or vehicle intercom system. The control unit can handle multiple talk-groups and can also power from any of the connected communication devices. Lightweight and small, the control unit offers state of the art situational awareness and is fully compatible with other INVISIO systems.

**Specifications:**
- 2 Com Ports
- Powers From Battery or Comms
- 4 PTT Buttons
- Multiple Headsets
- 140 Grams
- Com Auto-Sensing
- 70 x 63 x 30 mm
- 20 Meter Submersible

**Scalable soldier communication hub**
With built-in power.
**INVISIO V60**
Tri Com Control Unit

The INVISIO V60 is designed to be the ultimate communications hub and capable of connecting into practically any type of communication device, such as multiple net radios, smart phones, a broad range of audio devices, headsets (tactical, covert and commercial) and intercom systems for land, sea and air vehicles.

**INVISIO S10**
Team Radio Control Unit

The INVISIO S10 is an in-ear hearing protection and communication system for use on a single radio that includes electronic hear-thru and impulse noise protection. The system consists of an in-ear hearing protection headset with a cable mounted control unit housing the electronics for hear-thru and impulse noise protection. The radio remains as the push-to-talk, with the INVISIO S10 controlling the hear-thru only.

---

**INVISIO V60**

- **3 Com Ports**
- **Powers From Comms**
- **4 PTT Buttons**
- **Multiple Headsets**
- **145 Grams**
- **Com Auto-Sensing**
- **70 x 63 x 25 mm**
- **20 Meter Submersible**

**INVISIO S10**

- **1 Com Port**
- **AA Battery**
- **No PTT Buttons**
- **Hardwired Headset**
- **150 Grams**
- **Hardwired Radio**
- **65 x 58 x 20 mm**
- **2 Meter Submersible**

**Ultimate tactical communication hub**
for the soldier to specialist user.

**Simple and easy**
to use control unit where common team radio controls Tx.
**INVISIO X5**

**Dual In-Ear Headset**

- **Cable Retainer**
- **Hear-Thru Microphone**
- **Speaker**
- **Hearing Protection Plug**

**INVISIO X5**

The INVISIO X5 headset is designed exclusively for INVISIO’s range of advanced control units and is fundamental to the INVISIO hearing protection system. It is a dual sided in-ear hearing protection headset with state of the art external microphones for natural hear-thru and six sizes of exchangeable foam plugs for market leading hearing protection and comfort. The INVISIO X5 is the in-ear headset of choice for future soldier programs today. The headset is fully compatible with other INVISIO systems.

**Market leading in-ear**

hearing protection headset with natural situational awareness.

---

**INVISIO T5**

**Over-the-Ear Headset**

- **Over-the-Ear Headset** 1 Meter Submersible
- **Hearing Protection** Dual Sided
- **Boom Microphone** 250 grams

**INVISIO T5**

The INVISIO T5 over-the-ear hearing protection headset is powered and controlled by an INVISIO control unit, making it easy to use and lightweight without the need of internal battery or buttons. With an on head weight of less than 250 grams, the INVISIO T5 significantly reduces the burden on the mounted or dismounted soldier whilst featuring industry leading situational awareness.

**Lightest and simplest**

tactical over-the-ear hearing protection headset.

---

**INVISIO M3s**

**In-Ear Submersible**

- **In-Ear Headset** 20 Meter Submersible
- **No Hearing Protection** Left or Right Version
- **Bone Conduction Microphone** 18 grams

**INVISIO M3s**

The INVISIO M3s in-ear headset enables the INVISIO system to be submersible to 20 meters. This lightweight headset is ideal for use as both a dive solution under the water and for land operations where a lightweight and comfortable single sided patrol headset is required. The entire INVISIO M3s headset is encased with no openings, making it extremely robust and easy to maintain.

**Dive headset**

that allows for use whilst submerged to 20 meters.
INVISIO Accessories

**Connectivity Options**

**Radio**
Connect to any radio, including full-duplex and multiple networks simultaneously.

**Computer**
Allows situational awareness information from soldier-worn computer.

**Smart Phone**
Use mobile or smart phone simultaneously with tactical communication equipment.

**Intercom System**
Connect to any platform intercom, with full operation of the intercom’s platform radio.

**Mine Sweeper**
The mine sweeper audio response is heard in the headset and not transmitted to the surroundings.

**Music Player**
Audio playback from audio devices for mission notes. Alternatively music playback for headset training.

**Medic Cable**
Medic to soldier cable for direct and unimpeded communication.

**Power Supply**
Use a centralised power supply or an optional INVISIO power pack, connected to the control unit.

**Other Headsets**

**Dive Headset**
20 m dive headset with noise cancelling boom microphone that is designed to fit under a helmet.

**Light Patrol**
Single-sided, low profile and lightweight headset with a high comfort ear pad.

**Peltor ComTac**
Hearing protection headset with situational awareness. Fully independent dual earphone system for talk through and external radio signals.

**Accessories**

**Kit Pouch**
Carry bag for complete INVISIO system.

**Headset Pouch**
Molle pouch for any in-ear headsets.

**Headset Case**
Hard protective case for any in-ear headsets.

**Ear Fitting Tool**
Used to measure the correct foam plug sizes.

**Foam Tips**
There are six foam plug sizes:
- Two lengths - Original & Short
- Three diameters - Slim, Standard & Large

**PS30 Power Supply**
Power supply for mounting on radio cable or direct connection. Uses AA battery.

**M30 Finger Mounted PTT**
Remote PTT for finger mounting. Submersible down to 2 meters.

**M80 Remote Wireless PTT**
Remote wireless PTT for rifle mounting. Submersible to 2 meters.

Photos courtesy of The Royal Danish Air Force photo service
Technical Specifications

**Control Units**

<table>
<thead>
<tr>
<th></th>
<th>S10</th>
<th>V20</th>
<th>V50</th>
<th>V60</th>
</tr>
</thead>
<tbody>
<tr>
<td>COM Ports</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>PTT Buttons</td>
<td>0</td>
<td>2</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Hear-Thru Button</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Size</td>
<td>65 x 57.5 x 20 mm</td>
<td>64 x 40 x 25 mm</td>
<td>70 x 63 x 30 mm</td>
<td>70 x 63 x 25 mm</td>
</tr>
<tr>
<td>Weight (Control Unit only)</td>
<td>218 grams</td>
<td>99 grams</td>
<td>140 grams</td>
<td>145 grams</td>
</tr>
<tr>
<td>Colour</td>
<td>Tan</td>
<td>Black or Tan</td>
<td>Tan</td>
<td>Black or Tan</td>
</tr>
<tr>
<td>Immersion</td>
<td>2 meters</td>
<td>20 meters</td>
<td>20 meters</td>
<td>20 meters</td>
</tr>
<tr>
<td>Power</td>
<td>Internal Battery</td>
<td>From Comms</td>
<td>Internal Battery</td>
<td>From Comms</td>
</tr>
</tbody>
</table>

**Headsets**

<table>
<thead>
<tr>
<th></th>
<th>M3s</th>
<th>X5</th>
<th>T5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Style</td>
<td>In-The-Ear (ITE)</td>
<td>In-The-Ear (ITE)</td>
<td>Over-The-Ear (OTE)</td>
</tr>
<tr>
<td>Hearing Protection</td>
<td>None</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Tx Microphones</td>
<td>Bone Conduction</td>
<td>Bone Conduction</td>
<td>Boom</td>
</tr>
<tr>
<td>Size (Earpiece only)</td>
<td>13 x 11 x 24 mm</td>
<td>13 x 11 x 24 mm</td>
<td>8 x 110 x 40 mm</td>
</tr>
<tr>
<td>Weight (Incl. Connector)</td>
<td>18 grams</td>
<td>69 grams</td>
<td>250 grams</td>
</tr>
<tr>
<td>Colour</td>
<td>Black</td>
<td>Black or Tan</td>
<td>Tan</td>
</tr>
<tr>
<td>Immersion</td>
<td>20 meters</td>
<td>2 meters</td>
<td>1 meter</td>
</tr>
</tbody>
</table>

**Environmental MIL-STD-810G**

**Test** | **Method** | **Procedure**
--- | --- | ---
Low Pressure Storage and Air Transport | 500.5 | I
Low Pressure Operation and Air Carriage | 500.5 | II
Low Pressure Rapid Decompression | 500.5 | III
High Temperature Storage | 501.5 | I, A1 (Hot Dry)
High Temperature Operation | 501.5 | II, A1 (Hot Dry)
High Temperature Tactical standing to operation | 501.5 | III, A1 (Hot Dry)
Low Temperature Storage | 502.5 | LC3 [Severe Cold]
Low Temperature Operation | 502.5 | II, C2 [Cold]
Low Temperature Manipulation | 502.5 | III
Temperature Shock High | 503.5 | I-D
Temperature Shock Low | 503.5 | I-D
Contamination by fluids | 504.1 | II

**INVISIO X5 Hearing Protection Results**

EN 352-2:2003
L=27 dB, M=27 dB, H=34 dB SNR 32 dB

<table>
<thead>
<tr>
<th>Frequency (Hz)</th>
<th>125</th>
<th>250</th>
<th>500</th>
<th>1000</th>
<th>2000</th>
<th>4000</th>
<th>8000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sound Attenuation (dB)</td>
<td>30</td>
<td>32</td>
<td>33</td>
<td>3k7</td>
<td>36.2</td>
<td>40.8</td>
<td>44.7</td>
</tr>
<tr>
<td>Standard Deviation (dB)</td>
<td>7.3</td>
<td>6.1</td>
<td>6.6</td>
<td>5.9</td>
<td>3.6</td>
<td>3.6</td>
<td>5.4</td>
</tr>
<tr>
<td>Assumed Protection Value (dB)</td>
<td>23</td>
<td>26</td>
<td>26</td>
<td>28.8</td>
<td>32.7</td>
<td>37.2</td>
<td>39.3</td>
</tr>
</tbody>
</table>

ANSI S3.19-1974
L=29 dB

<table>
<thead>
<tr>
<th>Frequency (Hz)</th>
<th>125</th>
<th>250</th>
<th>500</th>
<th>1000</th>
<th>2000</th>
<th>4000</th>
<th>8000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sound Attenuation (dB)</td>
<td>31.2</td>
<td>29.7</td>
<td>36</td>
<td>37.5</td>
<td>38.5</td>
<td>40.9</td>
<td>47.4</td>
</tr>
<tr>
<td>Standard Deviation (dB)</td>
<td>8.2</td>
<td>3.2</td>
<td>4.2</td>
<td>4.1</td>
<td>3</td>
<td>3</td>
<td>4.9</td>
</tr>
<tr>
<td>Assumed Protection Value (dB)</td>
<td>26</td>
<td>26.6</td>
<td>31.8</td>
<td>33</td>
<td>36.5</td>
<td>37.5</td>
<td>42.5</td>
</tr>
</tbody>
</table>

AS/NZS 1270:2002
SICBO: 26 dB [Class 5 hearing protector]

<table>
<thead>
<tr>
<th>Frequency (Hz)</th>
<th>125</th>
<th>250</th>
<th>500</th>
<th>1000</th>
<th>2000</th>
<th>4000</th>
<th>8000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sound Attenuation (dB)</td>
<td>23.1</td>
<td>25.8</td>
<td>26.6</td>
<td>27.8</td>
<td>32.7</td>
<td>34.9</td>
<td>40.8</td>
</tr>
<tr>
<td>Standard Deviation (dB)</td>
<td>6.6</td>
<td>5.8</td>
<td>5.5</td>
<td>5</td>
<td>3</td>
<td>4.6</td>
<td>4.4</td>
</tr>
<tr>
<td>Assumed Protection Value (dB)</td>
<td>17</td>
<td>20</td>
<td>20.3</td>
<td>22.8</td>
<td>29.7</td>
<td>30.3</td>
<td>36.4</td>
</tr>
</tbody>
</table>
About INVISIO

INVISIO offers cutting-edge personal communication and hearing protection systems. The systems enable users to operate and communicate safely and clearly in all environments, even under extreme conditions, such as loud noise, heat, and underwater. INVISIO systems consist of headsets and advanced control units that interface to a wide range of communication devices. The systems provide hearing protection while maintaining the natural level of situational awareness. Customers are mainly from the public sector. Sales are made via a global network of partners and to some extent directly to end customers. INVISIO is listed on Nasdaq Stockholm (IVSO).

www.invisio.com