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Bracer™

Secure communications for assured PACE planning (Primary, Alternate, Contingency, Emergency)

Designed for the realities of modern operations

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The challenge of assured communication

Military personnel are familiar with the PACE concept – a structured approach to assuring communications through Primary, Alternate, Contingency and Emergency systems. The principle is simple: when Primary and Alternate systems fail, there must be resilient fallbacks in place to ensure that critical information can be transmitted and received.

The greatest challenge lies in providing communications systems that are both reliable and secure for the Contingency and Emergency layers. It is common practice to rely on mobile phones to cover this gap. While this may be acceptable in certain contexts, it assumes the presence of functioning fixed infrastructure – an assumption that often does not hold where military forces operate. Further, depending on the adversary's technical abilities, mobile phones can introduce security vulnerabilities.

The key issue is that many defence organisations around the world experience a sharp drop in communications capability, security and reliability outside the Primary and Alternate tiers. This 'cliff edge' leaves forces exposed at precisely the moment they need resilience most.

Bracer™ capabilities overview

Military personnel are familiar with the PACE concept – a structured approach to assuring communications through Primary, Alternate, Contingency and Emergency systems. The principle is simple: when Primary and Alternate systems fail, there must be resilient fallbacks in place to ensure that critical information can be transmitted and received.

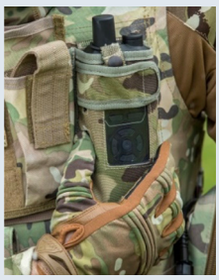
QinetiQ has developed Bracer™ – a communication device and service that delivers secure, beyond-line-sight (BLOS) communications through end-to-end encryption (FIPS 140-2 Level 3 Certified). It combines one-to-many satellite push-to-talk (PTT) radio, with Position Location Information (PLI) tracking, offering a single system for assured communications and rapid situational awareness.

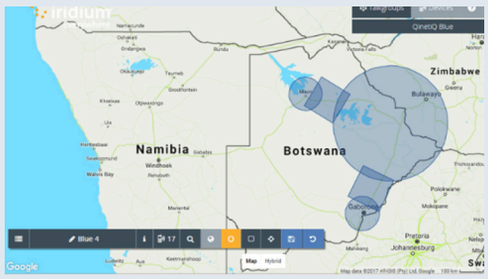
Bracer™ operates over the Iridium PTT service, enabling secure Command and Control (C2) from virtually anywhere. As a satellite-delivered capability, it removes the need for expensive range extension equipment – significantly reducing the planning, training, manpower, logistics and physical security associated with deploying traditional systems.

The device is engineered for extreme environments and high-tempo scenarios. At just 450g, it offers a low size, weight and power (SWaP) profile and is simple enough for use by non-specialist operators, minimising training requirements and avoiding skill fade.

Unlike many legacy systems, Bracer™ places control in the hands of the user. Talkgroup coverage areas are defined and adjusted in real time by the operator, not the service provider.

This allows rapid configuration in line with evolve mission demands, giving commands the autonomy and responsiveness most organisations have never had before.





[1]Coverage is controlled by the end user through the Iridium Command Centre. Antennas must be outside and have clear view of the sky.

The system is also highly cost-effective. Airtime costs are significantly lower than other satellite radio communication systems, making Bracer™ a financially viable option for organisations that may have previously ruled out BLOS communications on cost grounds.

Bracer™ enhances C2 efficiency by reducing unnecessary voice traffic. With accurate and timely PLI, headquarters staff can monitor a unit's location and movement against plan, without needing to request updates. This leaves radio channels clear for mission-critical communication.

Bracer™ in a PACE framework

When applied to the PACE methodology, Bracer™ can be employed across all levels – as a Primary communications system, an instant failover for other systems or to enhance resilience and situational awareness alongside
existing infrastructure.

It can also be used to complement Primary and Alternate systems as part of link engineering, while running situational awareness functions in the background to extend operational capability.

Primary

Early entry/advance forces: Advance Forces often require agility to enable speed of deployment, typically travelling light and sometimes using commercial transportation. Bracer™ can be deployed rapidly and installed in vehicles or platforms within minutes to support C2 and coordination while providing global reach-back communications. This enables troops to deliver timely ground truth and supports the development of a more accurate and effective plan for follow-on forces.

Long range insertion (including logistics): Military units may need to travel hundreds or even thousands of miles to reach the area of operations. VHF/UHF systems are limited to a local range (30-40km) and convoys are often dispersed well beyond that. HF radio could be used but mobile use typically limits it to 50-70kms due to surface wave propagation. Bracer™ overcomes these constraints with Talkgroup coverage areas ranging from 100,000 km2 to 2.5 million km2 per polygon. Coverage can be divided into up to 10 beams, allowing reach-back to any part of the world or the creation of a corridor of operations.

Fig 1. Medium Talkgroup Coverage set-up with a UK HQ, port of entry in Holland, a corridor of operations through Germany and Poland, and an area of operations in Belarus and Ukraine.

Small team land operations: Many defence organisations now conduct multiple small-scale deployments. Limitations in UHF TACSAT capacity, the infrastructure required to extend VHF/UHF range and the performance of HF (especially at night or over long distances) often leave Primary and Alternate systems unfit for purpose. Bracer™ addresses this gap whilst adding position reporting and an emergency alert system.

Maritime communications: The maritime environment presents unique challenges, particularly for small vessels. Beyond 12 nautical miles, land-based infrastructure diminishes and users must rely on short-range VHF/UHF or HF systems, both of which are limited in range or antenna suitability. High sea states further complicate communication. Bracer™ provides a stable, secure solution in these conditions, supporting situational awareness and emergency alerting even when vessels are rolling and pitching in heavy seas.

Initial deployment: When Signals units move to predesignated sites to establish C2 infrastructure, they often travel without reliable communications during transit from the base location. Bracer™ provides a secure, easy-to-install solution for this phase. It can be fitted to vehicles in seconds and its position reporting function allows headquarters to track the movement and progress of deploying detachments.

Alternate

Engineering: Primary and Alternate military radio systems are often complex and require some form of communications to support their initial set-up. Bracer™ offers a simple, reliable means of enabling that process. Once he Primary and Alternate links are established, Bracer™ can be stood down to serve in a Contingency or Emergency role. Alternatively, it can continue to run in parallel, contributing persistent position reporting to support wider operational awareness.

Foot patrols: Alternate systems typically rely on HF radios, which are heavy (9–15 kg), bulky and require multiple spare batteries – adding significantly to the overall load. This reduces the soldier's ability to carry other critical supplies such as food, water or ammunition. A typical foot soldier's upper load-carrying limit is around 36–55 lbs, depending on individual fitness and endurance. Heavier loads increase fatigue and reduce effectiveness over time.

Bracer™ radically reduces this burden: It offers a **97% weight saving compared to most HF systems**, even before accounting for spare batteries. This allows for the soldier to increase their endurance and resupply intervals. The system is also power-efficient: it can be recharged multiple times using a high-capacity USB power bank (c. 0.5 kg) or via mains or 12V DC where available.

Note: Batteries for most alternate HF systems last c. eight hours. Bracer™ typically delivers 19–24 hours of operational battery life.

Vehicle communications: Bracer™ can be installed in a vehicle in seconds, with no specialist tools or technical skills required. The system tolerates movement up to Mach 2.0, making it suitable for fast platforms. Many Primary and Alternate systems are fully integrated into military vehicles, which presents a challenge if a vehicle breaks down –the equipment is often non-transferrable or time-consuming to remove. Additionally, operational deployments frequently involve commercial vehicles, either for administrative support or discreet or covert activity. Bracer™ provides these platforms with secure and effective communications without the integration overhead.

Contingency

Bracer™ is exceptionally well suited to fulfil the 'Contingency' tier of a PACE plan. It provides a highly reliable fallback when Primary and Alternate systems are unavailable – addressing a critical capability gap that is often obscured by over-reliance on mobile phones.

While mobile phones can be effective in some environments, they depend on fixed infrastructure that may not be present or functioning in operational theatres. They can also security risks, especially when facing a technically capable adversary.

Bracer™ resolves both issue in a single device. It delivers secure, always-available communications, while simultaneously providing PLI in the background. This combination enhances resilience without adding user complexity, making Bracer™ a robust and secure alternative where mobile phone use would be risky or impossible.

Emergency and position location reporting

Many organisations rely on emergency beacons operating on the non-secure international distress frequency (406 MHz – Cospas Sarsat). Bracer™ is not intended to replace these devices, which remain essential as a last-resort signally option – especially when Search and Rescue (SAR) support is expected from local authorities.

However, when a 406 MHz beacon is activity, it alerts the entire world, including hostile actors. Bracer™ provides an additional layer of emergency capability: a secure alert function that remains entirely within the control of the owning organisation. It also supports voice communications, enabling teams to clarify the situation and respond with measured action using organic resources.

For example: a patrol boat capsizes and sinks, leaving six personnel adrift at sea. A Bracer™ emergency alert is triggered and received at headquarters in under a second via end-to-end encrypted satellite link. Voice communications are established, the situation is assessed and rotary platform is launched to recover the personnel. If a rescue is not feasible, the team still has the option to activate a 406 MHz beacon, initiating internal SAR response as a final measure.

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Position location reporting and situational awareness

Bracer™ provides Position Location Information (PLI) as a broadcast service, with each handset functioning as both transmitter and receiver. Every device within a Talkgroup can be configured to receive PLI from all other devices in that group, with positional data viewable directly on the handset screen.

For more advanced situational awareness, users can tether a laptop or tablet running using Windows 10/11 or an Android device to the handset. By using the Bracer™ Situational Awareness application in combination with a compatible mapping system (e.g. WinTAK/ATAK or Google Earth), PLI data can be visualised as icons overlaid on a map – offering an intuitive display of troop disposition. This approach differs from many existing situational awareness systems, which typically rely on a separate communications link to a central web server in order to retrieve location data. Bracer™ enables visibility of the tactical picture directly at the edge, without the need for a persistent back end.

In addition to push updates, each handset can pull PLI data from the Talkgroup on demand. Bearing and distance to any distant caller can also be displayed on the handset screen, giving users immediate position awareness. This ensures that updates are available both passively and interactively – all at the touch of a button.

Telephony and PTT fallback

To complete its role in the PACE framework, Bracer™ includes standard Iridium satellite telephony capability. This allows users to make voice calls from anywhere in the world – not only to other Iridium handsets but also to phones on other satellite constellations, GSM networks and fixed-line infrastructure.

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Key technical specifications

FEATURE	SPECIFICATION
Form factor	Handheld satellite push-to-talk (PTT) radio
Network connectivity	Iridium Push-To-Talk + optional Iridium telephony mode
Encryption standard	End-to-end encrypted (FIPS 140-2 Level 3 certified)
Weight	Approx 450 grams
Battery life	19 to 24 hours average
Power and charging	USB (incl 0.5kg power bank), mains or 12V DC
Durability	Designed for extreme environments; tolerates platform movement up to Mach 2.0
Talkgroup coverage	User-defined: 100,000 kms² to 2.5 million km² per polygon; up to 10 coverage beams
Position location reporting (PLI)	Broadcast and on-demand; visible on handset or via external mapping (WinTAK/ATAK)
Situational awareness integration	Compatible with WinTAK, ATAK and Google Earth (Windows 10/11 or Android)
Emergency alerting	Secure internal alerting plus fallback 406 MHz beacon option
Telephony capability	Switchover to satellite voice calling in about 5 seconds
Installation	Quick-fit to vehicles in seconds; no specialist tools required
Air time cost	Low, compared with alternative satellite radio systems

Summary

Bracer™ is a secure, reliable and user-friendly communications system that supports every level of the PACE framework. It increases responsiveness, enhances situational awareness and improves the flow of information – all of which contribute to faster and more effective Command and Control.

Designed for the realities of modern operations, Bracer™ enables assured communication in austere, denied and high mobility environments. Whether used as a primary system or as a secure fallback, it delivers simplicity without compromise and resilience without overhead. Bracer™ is a communications tool that truly enables the full potential of a well-structured PACE plan.

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Choosing QinetiQ

At QinetiQ, we proudly protect lives by serving the national security interests of various nations. Using mission-led innovation we create and deliver tangible solutions that effectively fulfil the requirements of our customers.

Our goal is to be the chosen partner around the world, helping shape the future of defence by solving real-world problems.

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