



Marco Giulio Barone

Commcrete: how spies and Special Forces communicate behind enemy lines

Operating in the shadows of modern conflict zones, where conventional communications infrastructure lies in ruins or under hostile surveillance, intelligence operatives and Special Forces depend upon technologies that previous generations could scarcely imagine.

Israeli defence technology firm Commcrete has emerged from the clandestine corridors of military intelligence to deliver what may represent one of the most significant advancements in covert tactical communications since the advent of satellite technology itself. Founded in 2022 by three veterans of Unit 81, an elite Israeli military intelligence unit specialising in cutting-edge technologies for combat soldiers and spies, Commcrete has developed ultra-compact satellite communication systems that weigh merely 150 grams yet deliver capabilities previously requiring vehicle-mounted terminals weighing hundreds of kilograms. The company's emergence coincides with

a period of unprecedented demand for resilient communications technologies, driven by conflicts that have exposed the vulnerabilities of traditional military communications infrastructure.

The technology: narrowband SATCOM for the tactical edge

At the heart of Commcrete's innovation lies a fundamental reimagining of satellite communications architecture. Unlike broadband systems such as Starlink, which prioritise high-speed internet connectivity, Commcrete's de-

Commcrete product lineup displayed. The company's core offerings span multiple form factors to address tactical satcom requirements across dismounted and vehicle-mounted platforms. Visible left to right: the STARDUST multi-channel handheld terminal with omni-directional antenna; the SD-100 narrowband handheld variant; the SD-200 professional handheld with extended interface controls; the BITTEL vehicle converter module; the HTS-100 handheld tactical satcom unit; and the FLIPPER series converters in blue and tan variants. (All pictures courtesy of Commcrete if not differently indicated)

vices employ narrowband satellite communications operating on GEO L-band frequencies. This architectural choice proves decisive for covert operations, where the priority lies not in streaming video or downloading large files, but in maintaining reliable, encrypted voice and data links from anywhere on Earth without detection, thanks to a tiny, imperceptible radio beam. The company's proprietary technology achieves an unprecedented link budget of up to 32 decibels, representing performance approximately ten times greater than competing systems. This engineering achievement translates into operational capability that fundamentally alters what is possible for personnel operating behind enemy lines. Where traditional tactical satellite communications require precise line-of-sight positioning and directional antennas, Commcrete's omnidirectional systems maintain connectivity even when operators are crawling through dense jungle, sheltering in urban canyons, or unconscious following aircraft ejection.

The systems leverage GEO L-band satellites without requiring dedicated heavy infrastructure or clear sky access. This architecture delivers immediate, secure, and energy-efficient multi-channel SATCOM that functions reliably in forests, deserts, urban environments, and extreme weather conditions where conventional systems typically fail. The technology incorporates advanced encryption and stealth signal profiles characterised by Low Probability of Intercept and Low Probability of Detection (LPI/LPD) capabilities. Critically for covert operations, Commcrete devices do not emit keep-alive signals

when idle, rendering them effectively invisible to electronic surveillance.

Demo in Washington DC

During AUSA defence exhibition in Washington, DC, FW MAG had the exclusive privilege of assisting to a rooftop demonstration atop a Viasat building downtown. Commcrete's operational showcase illustrated the coherence of its architectural approach across dispersed nodes and real-world movement constraints. The company had positioned a dismounted operator on the open-air rooftop platform wearing a tactical harness carrying a FLIPPER converter module alongside STARDUST radio hardware, which served as the terrestrial access point into the satellite link. From this elevated vantage, the operator's line-of-sight radio transmissions were being uplinked through the FLIPPER's L-Band modem to a private channel riding on geostationary satellites orbiting overhead, establishing a reachback path that would remain available whether the operator remained rooftop-bound or descended into the dense streetscape of the capital. In parallel, company handlers had dispatched a mobile team driving through DC's downtown grid aboard a vehicle, simulating the movement phase that frequently occurs during actual operations



Dismounted operator kit showing Stardust and Flipper devices in field configuration. A tactical backpack carries both a dedicated Commcrete STARDUST satcom terminal (dark blue, left) and a FLIPPER converter module (tan, right), each equipped with omni-directional L-Band antennas. This configuration preserves native radio discipline within the patrol whilst extending command reach via satellite. The modest weight and pocketable form factor allow operatives to maintain organic communications security whilst gaining persistent uplink capability independent of terrestrial infrastructure.

when reconnaissance elements must shift positions under time pressure or transition between holding positions and rally points. The vehicle-borne element maintained persistent blue-force

tracking telemetry and voice capability across the satellite channel despite traversing cluttered urban corridors, broken line-of-sight and the frequent electromagnetic noise of the city's

The product range: FLIPPER, STARDUST, and BITTEL

Commcrete's operational portfolio comprises three distinct yet complementary systems, each engineered for specific tactical scenarios. The FLIPPER represents perhaps the most transformative innovation, functioning as a universal radio-to-SATCOM converter that instantly transforms any radio, from military-grade hardware to commercial walkie-talkies, into a satellite-enabled system. Weighing just 150 grams and measuring 95mm by 57mm by 14mm, the Flipper converts multi-band frequencies from 50 to 950 MHz to L-Band whilst maintaining the original radio's encryption and operational characteristics. This capability proves invaluable for Special Forces teams already equipped with tactical radios, eliminating the need to carry additional dedicated satellite terminals. The STARDUST represents Commcrete's flagship standalone device, integrating a complete tac-

tical communications suite into a 137-gram package. Built around a proprietary chipset, Stardust simultaneously supports encrypted voice, text messaging, file transfer, location tracking, and distress signalling over the same satellite network. The device integrates seamlessly with tactical command and control systems including ATAK (Android Tactical Assault Kit) and WinTAK, providing blue force tracking and situational awareness capabilities that previous generations of Special Operations forces could only dream of. Battery endurance extends to nearly 30 hours in tracking mode, ensuring operators can maintain communications throughout extended missions deep in denied territory. The BITTEL chipset-based concept, designed to integrate with a wide range of platforms, extends these capabilities, providing multi-channel satellite communications for ground ve-

hicles, maritime vessels, and aircraft. BITTEL expands on STARDUST's capabilities, providing continuous, secure connectivity in motion while in a more compact form. From unmanned aerial, ground, and maritime systems, to commercial vehicles and fleet management solutions, BITTEL acts as a satellite gateway that can connect different technologies and partners seamlessly. Though not yet officially launched, it will go live soon, unlocking civilian applications such as fleet coordination, remote platform control, and reliable connectivity for travellers or adventurers operating far from existing networks. In the military sector, this versatility will ensure that entire Special Operations task forces, from dismounted reconnaissance teams to supporting helicopter assets, can maintain seamless communications across the operational area using compatible systems.

cellular and commercial satcom emissions. A command node, stationed on the rooftop as well, received concurrent feeds from both the dismounted operator and the moving vehicle, displaying their positions, relay-chain status and message logs on tactical mapping overlays visible via the STARDUST application suite running on standard military tablets and laptops. The control station monitored signal quality, automated failover logic between terrestrial and satellite uplinks, and handled data dissemination to higher echelons and supporting assets whose own communications remained on indigenous nets. Throughout the demonstration window, messaging latencies between operator, mobile team and command remained in the low single-digit second range, permitting coordinated tasking updates, imagery transmission requests and situational status reports to flow without artificial delay.

The rooftop setup validated that a handheld operator with a small backpack-integrated converter could sustain the satellite link even when standing still and without active antenna tracking, whereas the vehicle demonstrated that satcom-on-the-move function persisted across turns, acceleration and the electromagnetic clutter of dense urban corridors. Commcrete's handling of the demonstration underscored a deliberate architecture choice: the company had avoided both the high-latency, store-and-forward pattern of



Command node display showing real-time tactical mapping integration. The Commcrete STARDUST application suite renders blue-force tracking, messaging logs and situational reporting across a geospatial interface. The display captures positioning data, acknowledged transmission status, and geographic context necessary for command staff to coordinate fielded teams relying on the satellite link.

earlier-generation tactical satcom and the high-power, broadband requirements of contemporary MILSATCOM terminals, instead targeting the niche between continuous voice and position-only reporting where small tactical units, intelligence elements and clandestine teams operate.

The control node's operators noted that the system could be reconfigured in real time to lock down emissions discipline,

restrict teams to text-only messaging when jamming or hostile SIGINT activity was anticipated, and shift between direct-to-satellite and relay-via-aircraft modes should airborne nodes become available. The demonstration, conducted over a warm autumn afternoon with intermittent cloud cover and DC's normal atmospheric absorption, offered practical validation that narrowband L-Band satcom could maintain link continuity and throughput in conditions where commercial satcom would falter or where legacy military terminals would demand vehicle-mounted generators and parabolic dishes unsuitable for field deployment.

Recent conflicts

According to company statements, Commcrete's first real milestone arrived in 2023 when its systems enabled communications during a natural disaster that had wiped out all communications infrastructure. Since then, the technology has supported extensive missions worldwide, from North America to the Pacific, proving itself as tactical SATCOM that works anywhere, under any condition. The company's systems are currently operational in 28 countries, with more than 2,000 units deployed globally across military forces conducting land, naval, and air operations. While Commcrete maintains operational security regarding specific deployments, the company has confirmed that its technology has been called into service during regional conflicts where air, land, and sea forces required seamless coordination. The systems have proven their worth when conventional communications infrastructure broke down, being deployed in military operations that demanded secure, resilient connectivity under the most challenging conditions. The 2023 to 2025 period witnessed unprecedented military operations across multiple theatres simultaneously. Recent campaigns demanded precisely the capabilities that Commcrete delivers, including coordination across mountainous terrain where line-of-sight communications proved unreliable or dense urban environment, where buildings create radio shadows and conventional infrastructure are systematically destroyed, demanded communications systems that could function without terrestrial support. To give another example, air operations, including strikes on strategic facilities deep within defended airspace, require communications systems that could maintain contact with operators penetrating heavily monitored territory whilst evading electronic warfare capabilities.

Commcrete equipment kits prepared for operational deployment. Multiple Pelican cases contain complete Commcrete systems ready for fielding across different mission sets. Each case houses antennas, cabling, power supplies, spare batteries and configuration documentation tailored to specific user profiles and operational theatres. This staging photograph underscores the company's emphasis on rapid deployment and unit-level self-sufficiency, allowing teams to unpack, configure and activate satcom connectivity within minutes of arrival at an operational location.



Special Forces employment scenarios

The operational employment of Commcrete technology for Special Forces missions reveals capabilities that previous generations of operators would have considered impossible. Consider a reconnaissance team infiltrating mountainous border regions to establish observation posts monitoring enemy force movements. Traditional tactical radios provide line-of-sight communications extending perhaps 20 kilometres under ideal conditions, forcing teams to position relay stations or risk communications blackouts. With STARDUST devices integrated into their load-out, the same team maintains direct satellite communications with higher headquarters from positions deep in denied territory, transmitting imagery intelligence, grid coordinates for precision strikes, and real-time updates on enemy dispositions without revealing their presence through detectable radio emissions. The technology proves equally transformative for direct action missions. A Special Operations task force conducting a hostage rescue operation in hostile urban terrain faces the perpetual challenge of maintaining communications as teams move through buildings, tunnels, and subterranean facilities where conventional radios fail. Commcrete devices, with their omnidirectional antennas and superior link budget, maintain connectivity even when operators move through structures that would completely block traditional communications. The integration with ATAK provides real-time blue force tracking, ensuring assault teams maintain awareness of friendly positions during dynamic entries whilst preventing friendly fire incidents in the confusion of close-quarters battle. Maritime Special Operations present their own unique communications challenges. Consider a combat dive team conducting underwater infiltration to surveil enemy port facilities or emplace surveillance devices on hostile vessels. Traditional communications cease the moment operators submerge, creating dangerous communications blackouts during the most vulnerable phases of operations. With Commcrete devices integrated into their equipment, teams can maintain communications immediately upon surfacing, transmitting imagery intelligence and calling for extraction without the lengthy process of establishing communications using conventional equipment. The 32-decibel link budget ensures connectivity even when operators surface in confined harbour areas surrounded

by buildings and vessels that create radio shadows. Finally, counter-terrorism operations in complex environments particularly benefit from Commcrete's capabilities. Hostage rescue teams operating in remote locations or failed states often face complete absence of communications infrastructure. A possible scenario may involve Special Operations forces deployed to rescue hostages held in a remote compound. The assault force, infiltrating via parachute insertion at night, would carry FLIPPER devices connected to their tactical radios. Throughout the infiltration, approach, and assault phases, the force maintains encrypted voice communications and real-time position updates transmitted via satellite directly to the tactical operations centre coordinating air support and quick reaction forces hundreds of kilometres distant. The ability to coordinate precision airstrikes whilst simultaneously transmitting blue force tracking data prevented fratricide whilst delivering overwhelming firepower against defending forces.

Intelligence operative scenarios

For intelligence operatives conducting human intelligence collection in denied areas, Commcrete technology offers capabilities that fundamentally alter the tradecraft of espionage. Traditional clandestine communications methods, from dead drops to shortwave number stations, required elaborate procedures, created vulnerabilities, and imposed time delays that could prove fatal to operations. The advent of com-

pact, covert satellite communications transforms what is possible. Consider an intelligence officer operating under non-official cover in a hostile nation conducting recruitment operations against targets with access to sensitive strategic intelligence. Traditional communications with handlers might involve elaborate dead drop procedures, requiring the operative to physically travel to predetermined locations to deposit intelligence material in concealed containers whilst simultaneously executing surveillance detection routes to identify hostile counterintelligence surveillance. Each communication sequence creates vulnerability windows extending over hours or days, during which the operative remains exposed to potential compromise. With a STARDUST device concealed within innocuous personal effects, the same operative establishes secure satellite communications from virtually any location. The device transmits encrypted intelligence reports, receives tasking updates, and maintains location tracking for emergency extraction scenarios, all whilst remaining undetectable to electronic surveillance due to the absence of keep-alive signals. The communications occur directly between Commcrete devices via satellite, without relying on commercial satellite services that might create trackable digital signatures. Agents handling scenarios in hostile environments present particular challenges. An intelligence officer meeting recruited assets in denied territory faces constant surveillance pressure from competent counterintelligence services. Traditional agent meetings required elaborate counter-surveillance procedures, cover for action, and pre-

Military personnel and company representative discussing operational integration at the AUSA demonstration. A US military officer speaks with a Commcrete representative holding a STARDUST handheld terminal. Behind them, tactical displays show real-time mapping and command-and-control interfaces, illustrating how the company's equipment integrates into existing military workflows and force synchronisation protocols.





The operator maintaining a satcom link whilst monitoring tactical display during rooftop demonstration in Washington DC. The demonstration illustrated satcom-on-the-move resilience in an urban environment, where dense building geometry and electromagnetic clutter typically degrade conventional narrowband satcom performance.

cise timing that created numerous opportunities for detection. The ability to maintain secure communications without physical meetings fundamentally alters the operational calculus. An agent equipped with another STARDUST device connected to a commercial radio transmits intelligence via satellite burst

transmissions that appear as brief static to any monitoring service, delivering photographed documents, location data for targets of interest, and requests for emergency support without exposing either agent or handler to the risks inherent in physical meetings. Lastly, denied area operations, where

intelligence operatives must function completely isolated from friendly support, particularly benefit from Commcrete's capabilities. Consider an operative conducting technical surveillance operations against priority targets in a nation with sophisticated counterintelligence capabilities. The operative, travelling under business cover, carries surveillance equipment concealed within commercial electronics. Using a STARDUST device integrated into personal effects, the operative transmits collected intelligence via encrypted satellite link to handlers in friendly territory, receives updates on emerging threats identified through signals intelligence, and maintains emergency beacon capability should the operation be compromised. The entire communications architecture functions independently of any infrastructure the hostile service might monitor or control.

Full-body operator kit worn during the rooftop operational demonstration in Washington, DC. An operator equipped with complete Commcrete satcom integration stands ready for live communications testing. The harness carries both FLIPPER converter and STARDUST terminal with external L-Band antennas, alongside standard tactical radio and headset for intra-team coordination. This loadout represents a realistic field configuration for reconnaissance patrols, CSAR teams and clandestine elements requiring assured reachback whilst maintaining compact profile and rapid deployment capability across contested terrain. (Photo: Marco Giulio Barone)



Operational security and electronic warfare resistance

The electronic warfare environment of modern conflict zones presents perhaps the most significant challenge to tactical communications. Sophisticated adversaries deploy comprehensive signals intelligence capabilities designed to detect, locate, and disrupt enemy communications. Traditional tactical radios broadcasting on VHF or UHF fre-

quencies creates distinctive signatures that hostile direction-finding systems rapidly locate, bringing artillery or air strikes onto exposed positions within minutes. Commcrete's architecture fundamentally reduces this vulnerability through multiple technical characteristics. The absence of keep-alive signals means that when operators are not actively transmitting, their devices emit nothing detectable.

The stealth signal profiles, incorporating LPI/LPD characteristics, ensure that even active transmissions prove extremely difficult to detect or intercept. The satellite relay architecture means that hostile forces attempting electronic attack must target satellites in geosynchronous orbit rather than vulnerable ground stations or relay aircraft. The technology has demonstrated particular value in environments where conventional systems fail due to electronic warfare. During operational deployments where hostile forces employed sophisticated jamming against tactical communications, Commcrete systems maintained connectivity by operating on frequency bands and transmission protocols that hostile electronic warfare systems were not configured to disrupt. The integration with existing tactical radios through the FLIPPER converter means that Special Operations forces retain their preferred communications equipment whilst gaining satellite connectivity that bypasses terrestrial jamming entirely.

Future development and AI integration

Commcrete's development roadmap includes artificial intelligence capabilities expected to roll out within 18 months from autumn 2025. Whilst specific details remain classified, the integration of machine learning algorithms could optimise frequency selection, automate threat detection, and enhance signal processing to extract maximum performance from available bandwidth. The company's founders acknowledge developing "things that are hard to even imagine right now," suggesting significant advances beyond current capabilities. The strategic expansion into commercial telecommunications markets awaits partnership with major operators, with company leadership noting that all significant industry players have already conducted evaluations. The estimated 200-billion-dollar global SATCOM market over coming years presents substantial opportunities, though Commcrete remains focused on tactical applications where its technology delivers decisive advantages.



Operational impact and strategic significance

The emergence of ultra-compact, covert satellite communications represents a fundamental shift in what becomes possible for Special Operations forces and intelligence operatives operating in denied territory. Where previous generations of operators faced communications blackouts lasting hours or days, creating vulnerability windows and limiting operational flexibility, contemporary forces equipped with Commcrete technology maintain persistent connectivity with higher headquarters from virtually any location on Earth. This capability transformation extends beyond mere convenience to fundamentally alter operational planning. Mission profiles previously considered too risky due to communications limitations become viable when operators can maintain encrypted voice and data links throughout infiltration, target exploitation, and exfiltration phases. The integration with tactical command and control systems including ATAK provides shared situational awareness across distributed forces, enabling synchronisation of complex operations that previous command structures could not coordinate. For intelligence collection, the ability to transmit gathered intelligence in near-real-time rather than waiting for secure communications windows or physical dead drop servicing means that time-sensitive intelligence reaches decision-makers whilst still actionable. An agent photographing documents revealing imminent military operations can transmit that intelligence via satellite within minutes rather than days, potentially enabling pre-emptive action that disrupts hostile plans before execution. The technology's proven performance

Close-up of a dismounted operator's harness carrying Flipper and Stardust modules. The tan FLIPPER converter (left, HTS-100 variant) and dark blue STARDUST SD-100 handheld terminal (right) are mounted side-by-side on a tactical vest's front panel, with dual omnidirectional antennas extending upward. This configuration demonstrates the integrated architecture that allows a small team to maintain organic PTT radio security whilst simultaneously uplinking encrypted satellite traffic to headquarters. The modest form factor and low impedance to movement illustrate Commcrete's design philosophy for dismounted operations in austere environments. (Photo: Marco Giulio Barone)

in recent conflicts validates its operational utility under the most demanding conditions imaginable. As modern warfare increasingly features urban combat, denied areas, and sophisticated electronic warfare, communications systems capable of functioning reliably when conventional infrastructure fails represent not merely advantages but necessities for operational success. To sum up, Commcrete's emergence from Unit 81's clandestine development programmes to global commercial deployment illustrates broader trends in defence technology, where capabilities once restricted to the most elite forces rapidly proliferate across conventional military organisations. The company's technology, born from operational requirements identified by intelligence specialists and Special Operations veterans, now equips forces worldwide with capabilities that redefine what becomes possible for personnel operating behind enemy lines in the contested battlespaces of the 21st century.

Disclaimer: The author would like to extend sincere thanks to Commcrete for their support and willingness to engage in detailed discussions concerning their technology and its deployment. For reasons of security and operational confidentiality, it was not possible to disclose specific theatres or missions in which the equipment has been employed, though the company did provide general insights and discussed operational environments. Readers are kindly asked to understand these limitations, which are necessary to protect sensitive information and ongoing operations.