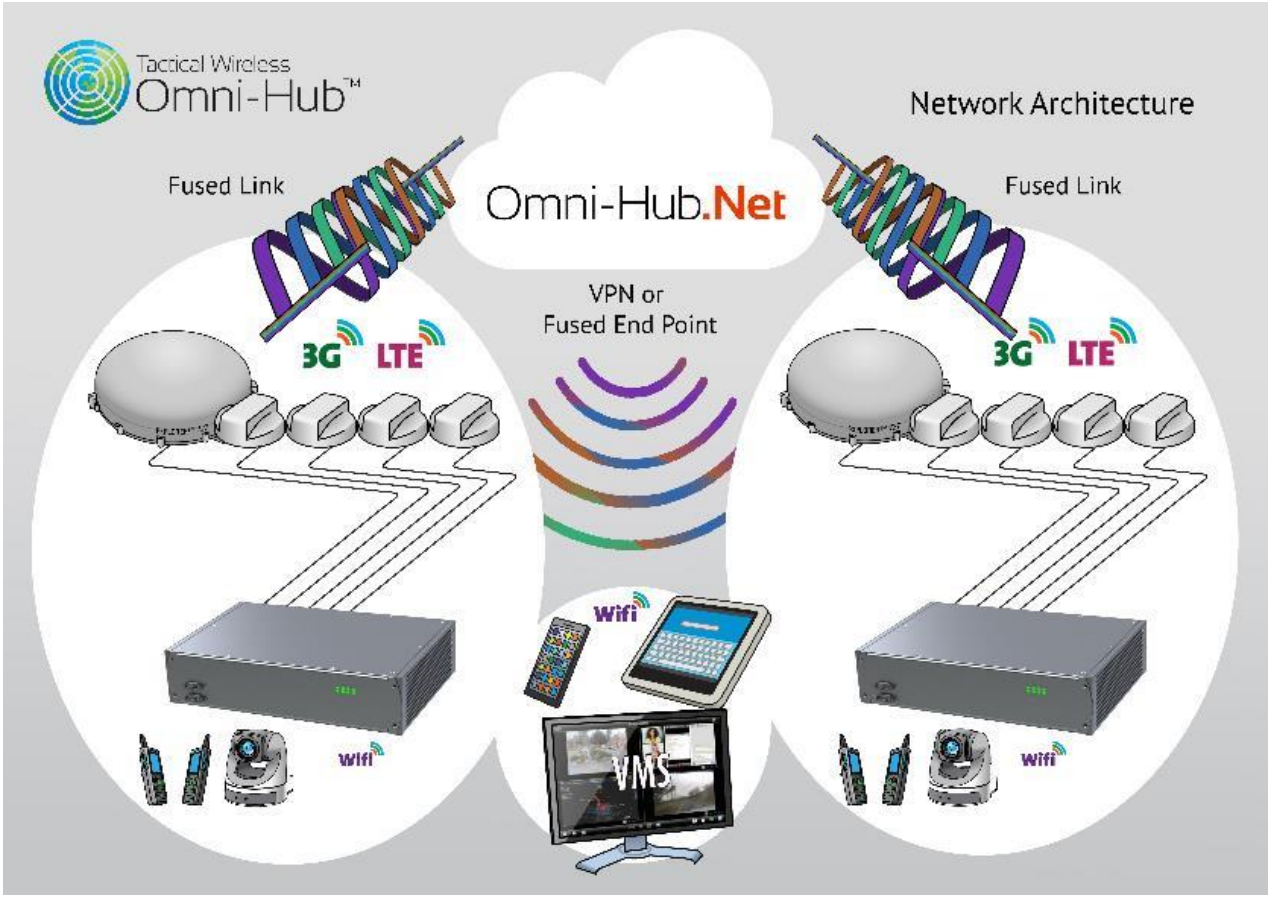
Tactical Wireless
Omni-Hub™

Tactical Wireless Ltd (TWL) has developed Omni-Hub™ - the award winning technology that provides secure, resilient communications in difficult and remote areas.

Introduction:

Omni-Hub™.Net technology delivers an intelligent and dynamically bonded network, using cellular, WiFi, satellite and cable networks. The Omni-Hub™'s which are linked to it manage voice, video and data communications - cost effectively. The overall system provides a secure, resilient, high quality service in remote and difficult areas.



Key technical features:

The Omni-Hub™ range of communications systems is based on the integration of selected, market-leading, tried and trusted technologies. Omni-Hub™'s design has been optimized for operation in remote and difficult areas, where the availability and use of bandwidth requires all of the advanced features that have been built into the system:

. **Operational**

- Store and forward continuously balances bandwidth, latency, frame rate, compression and resolution, to ensure that available capacity is utilised to maximum effect. No data is lost.
- In higher bandwidth areas, the video management system (VMS) enables the client to control airtime costs, by transmitting what is needed, rather than what is possible.
- Store and transmit frame rates are set independently. When bandwidth is restricted, this allows the client to store and view high quality HD video but to stream at lower frame rates and resolutions. All transmitted data can be stored at the server, the End Point or locally, via on-board or removable encrypted storage – SSD or USB.

. **Connectivity**:

- Omni-Hub™ uses packet level, double-ended bonded routers and can utilise:
  - ❖ up to 4 cellular,
  - ❖ up to 3 satellite,
  - ❖ WiFi,
  - ❖ ADSL.
- Cellular connectivity is enhanced by TWL's integrated multiple input/multiple output (MiMo) antennas (2 per cellular modem). TWL's antenna technology accesses cellular options that are not normally available. TWL's own bespoke antenna pod has up to 13 antennas:
  - ❖ 4 WiFi,
  - ❖ 8 Cellular at 2 per modem, with diversity
  - ❖ 1 Global Positioning System (GPS).
- Omni-Hub™ enhances cellular and satellite communications modes, to enable end users to have a real choice between cellular and satellite in remote areas.
- Long range WiFi meshes created around Omni-Hub™, can link to cameras, audio and medical devices. This hotspot has a standard range of 100 metres but can be extended up to about 3 kms.
- Packets are split across multiple VPN tunnels. Each tunnel is encrypted to AES 256. Access to devices requires knowledge of the IP address. The packets are recombined at a central master hub/router, to create Omni-Hub™.Net.
- All peripheral devices either have or are given an IP address. Any device can be seen from anywhere in the network, at any Omni-Hub™ or via a secure VPN link and

authorised Apps.

- A range of portable devices – smart phones, tablets, and laptops – can connect via a VPN tunnel. These and any device within the Network can use authorised Apps, to allow clients to review any part of the Network via a secure route.
- A Voice Over Internet Protocol (VOIP) system has also been integrated.

. **System:**

- Omni-Hub™ systems use a high performance PC running Windows 7 Pro. There is a standard 128GB SATA SSD, which can be optionally expanded to 2TB. Optionally, 64GB encrypted USB drives are available.
- The PC also runs an advanced VMS, Crossfire, which allows local or remote adjustment of compression, frame rate and resolution, to minimise bandwidth requirements. Crossfire is approved under US Federal evidence rules.
- Omni-Hub™'s open architecture enables the integration of a range of hardware and software packages, including a software codec for efficient video Compression.
- Omni-Hub™'s are networked via a central router/server, installed in the clients' facilities.

UK testing:

Omni-Hub™ systems have been subjected to over 60,000 miles of testing in the UK, with most of this being in the Highlands and Islands of Scotland. During these trials Omni-Hub™ successfully transmitted live audio, data and video on the move, via multiple bonded cellular modems on routes, and in areas, where cellular communication was known to be poor or non-existent.

An important result from these Omni-Hub™ system tests was the successful transmission of data from portable HD ultrasound diagnostic instruments to the Centre for Health Sciences at Raigmore Hospital in Inverness, from Kinlochewe, over bonded cellular networks. 94.4% of all transmitted images were of diagnostic quality.

Similar excellent results were also achieved in poorly connected area of Kent, Surrey and Sussex Air Ambulance Trust's area of operation.

Awards and recognition:

TWL won the 2014 Scottish Enterprise Life Sciences Award for Innovation, partly because of Omni-Hub supplies a unique communications solution to essential medical and other services in remote areas. It was also one of 3 finalists in the Innovation Collaboration Award, partnered with Aberdeen University, for the same project.

TWL is also one of 3 finalists in the Innovation Collaboration Award for 2015, based on home consultation technology for diabetic patients who are suffering from severe foot ulcers, partnered with NHS Highland and the University of the Highlands and Islands.

Product Range:

A range of Omni-Hub™'s is available, with different processors, storage capacity, routers and form factors; form factor and on-board router define the products.

Each Omni-Hub™ has:

- Long-range, high gain antennas for WiFi, cellular and GPS.
- An on-board CPU with Windows 7 Pro
- A solid state drive – minimum 128 Gigabytes
- A cellular router that can also manage satellite, WiFi and ADSL links, via WAN connections.
- Multiple USB, USB WAN, WAN and LAN connections
- Crossfire video management system
- Compression software

Form Factors:

Available configurations:

	Single Modem with 2 SIM's	2 - modem router with one SIM per modem	4 - modem router with 2 SIM's per modem
Omni-Hub™ 1 based on a 1U rack case	Yes	Yes	No
Omni-Hub™ 2 based on a narrow 2U rack case	Yes	Yes	Yes
Omni-Hub™ R based on a Peli Storm 2200 case	Yes	Yes	Yes

Omni-Hub™ 1:

- 1U rack version, for internal use:

  Size: 483mm x 367mm x 44mm

Omni-Hub™ 2:

Size 360mm x 300mm x 88mm

Omni-Hub™ R:

Robust

Resilient

Rugged

Reliable

- Portable version – based on Peli Storm 2200 case

Size: 411 x 322 x 168 mm

The moulded ABS case version has on-board batteries and an integrated screen and keyboard and can be used in all weathers, in the open position.

For further details or a quotation, please contact:

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Specifications

Product form factor	**Omni-Hub™ 1 - 1U rack**	**Omni-Hub™ 2 Vehicle mount**	**Omni-Hub™ R - hardened case**
Size (mm)	483 x 367 x 44	360 x 300 x 88	411 x 322 x 168
Weight (Kgms)	Specification dependent but approx. 8 Kgs		11 Kgs
Operating Range:	Minimum spec per product -10 to +50°C and up to 90% relative humidity		
Power requirements:	Wide range DC input (10.5-36V DC) up to 45 Watts power usage.		
Antennas	External: 2 per cellular modem plus 4 WiFi plus GPS		Internal: 2 per cellular modem plus 4 WiFi plus GPS
Processor	i3	i3	Embedded Quadcore Atom
Software operating system	Windows 7 Pro	Windows 7 Pro	Windows 7 Pro Embedded
Video management system	Crossfire Server	Crossfire Server	Crossfire Server
Storage	Minimum 128 Gigabyte SSD SATA, + 2x SSD USB Drives	Minimum 128 Gigabyte SSD SATA, + 2x SSD USB Drives	Minimum 128Gigabyte SSD SATA + 2 off 64 Gigabyte USB encrypted
Available Routers	Omni-Hub™ Lite - single modem with 2 SIM failover	Omni-Hub™ Lite - single modem with 2 SIM failover	Omni-Hub™ Lite - single modem with 2 SIM failover
	Omni-Hub™ Standard - 2 bonded modems with one SIM per modem plus a third SIM via USB WAN	Omni-Hub™ Standard - 2 bonded modems with one SIM per modem + ext via USB WAN	Omni-Hub™ Standard - 2 bonded modems with one SIM per modem
		Omni-Hub™ Ultima - 4 bonded modems with 2 SIM's per modem. + ext via USB WAN	Omni-Hub™ Ultima - 4 bonded modems with 2 SIM's per modem.
SIM's:	Omni-Hub™s use standard cellular data SIM's from any network or APN provider for 3G, 4G (LTE)		
Bonding:	Omni-Hub™ Standard and Ultima have packet level, double ended bonding, via VPN tunnels		
Security:	Multiple VPN's each with AES 256 encryption - optional encrypted onboard storage		
Connections:	Can be configured to customer requirements but the standards are:		
WiFi WAN	1 x 802.11b/g/n 300 Mbps WiFi WAN		
WiFi AP	1 x 802.11b/g/n 300 Mbps WiFi AP		
GPS	GPS Tracking of Omni-Hub™ is integrated through cloud based software, external antenna provided		
WAN	2	2	1
LAN	3	3	1
USB PC	1	3	1
USB WAN	1	1	
DVI input	optional	optional	optional
HDMI in/out	0/1	0/1	opt/0
Audio Out port		1	
Display	External HDMI/USB as an optional extra	External HDMI/USB as an optional extra	Internal 800 x 600 pixels 10.4" at 400 NITS - accessed when case is open
Keyboard	External as an optional extra	External as an optional extra	Internal IP66 rubber keyboard - accessed when case open
Power options	12v or external Mains PSU and optional extra external LiPo batteries	12v or external Mains PSU and optional extra external LiPo batteries	External wide range 12v DC + Internal - 2 off 8 Ah LiPo batteries with external chargers + external Mains PSU and cigar vehicle lead.
Optional Extras	Encrypted SSD HDMI or USB Screen Keyboard and mouse External LiPo Batteries Additional ports Satellite connectivity via WAN & Wifi WAN ports	Encrypted SSD HDMI or USB Screen Keyboard and mouse External LiPo Batteries Additional ports Satellite connectivity via WAN & Wifi WAN ports	VGA or HDMI PCIe frame grabber or 4x analogue video PCIe input Compression software and server for above Larger External LiPo Battery packs Wireless Cameras Satellite connectivity via WAN & Wifi WAN ports