Tactical Wireless
OMNI-HUB®

Real Time Streaming of Secure, Resilient Data from Drones to Mobile Devices

Peter Morton +44 7836 273009
peter.morton@tactical-wireless.com

Examples of data from UAV's, UGV's and unmanned watercraft. (TWL is platform neutral)

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- Video.
- Still photography.
- Ground Penetrating Radar (GPR), where TWL has a partnership agreement with a World-leading GPR supplier and operator.
- Chemical and Radiation & Nuclear sensors.
- Flight data, including GPS.
- Other.

The benefits of real time distribution of images to remote end users are obvious to all – real time data to Gold, Silver and Bronze Commands.

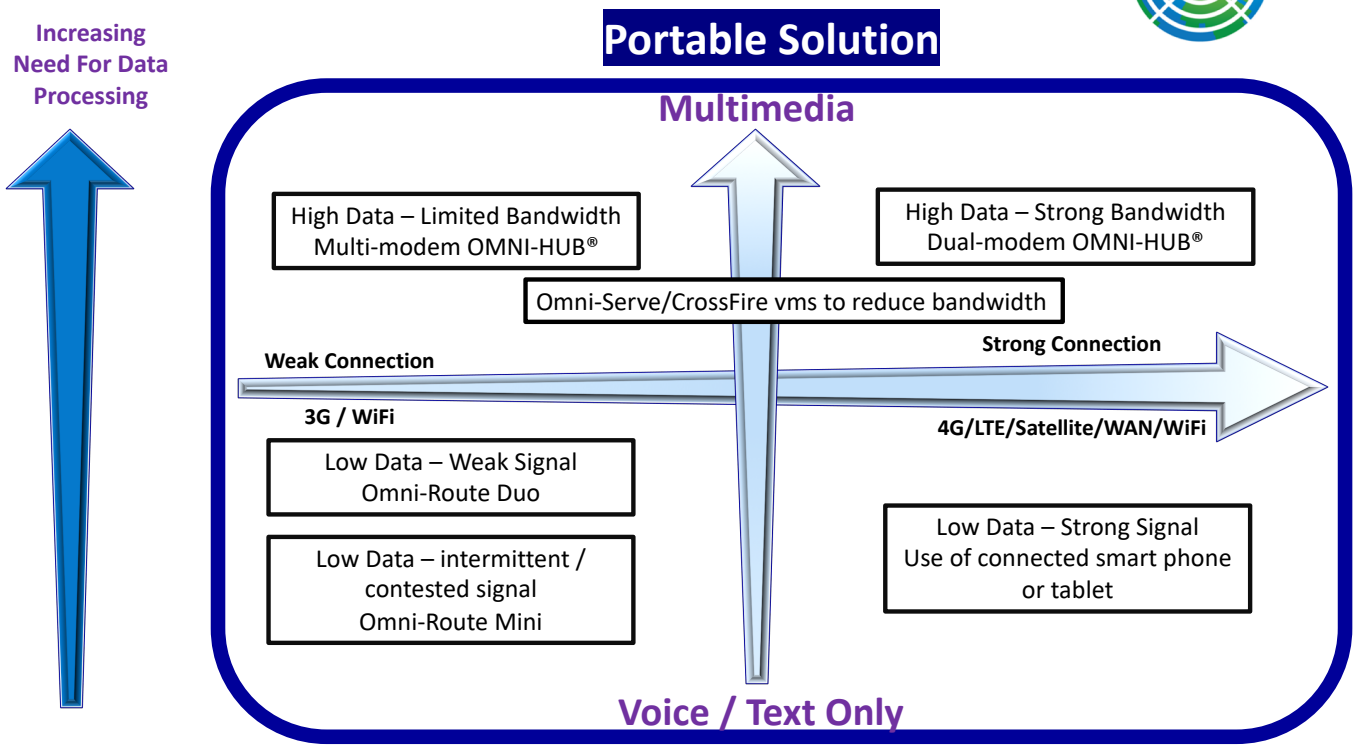
TWL has worked with video, GPR and C and R&N (Chemical and Radiation & Nuclear) sensors but is sensor neutral.

TWL's system streams video and/or replicates a screen as a series of time and date sequenced JPEG's. The key issue is control of framerate, resolution and compression to end user requirements – application specific.

A GPR on a UAV

A Sewer Crawler

Remote Area Operations



Example: GPR data sharing.

- The schematic shows a UAV with GPR and a WiFi link to a laptop with the GPR software.
- The screen can be replicated and loaded onto a secure, private network – Omni-Hub.Net, via multiple cellular, satellite, wired WAN and WiFi WAN options, thro' an encoder (Omni-Serve)/router box – Omni-Route Plus. HDMI in and ONVIF out.
- The central server has TWL's vms, Crossfire, and it can remotely manage the encoder, via a series of end user defined pre-sets.
- Any pc, tablet or smart phone can connect to the central server via an IPSec link or via an Omni-Hub.net connected & configured router and can view any images via Crossfire Apps.
- Alternatively, the drone GPR can use its onboard router to connect to Omni-Hub.Net directly and the GPR software can be centrally controlled.

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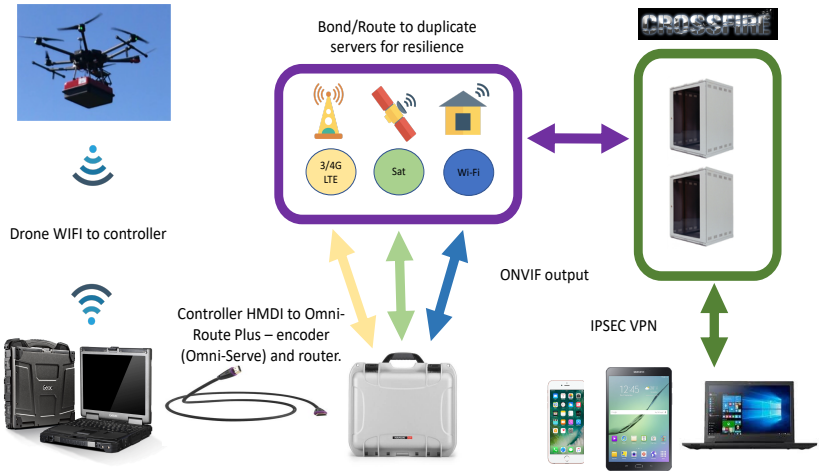
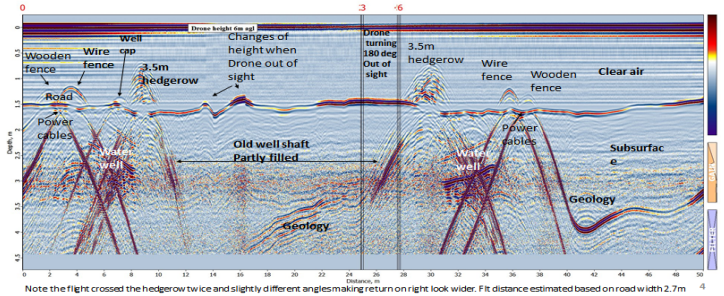
Schematic



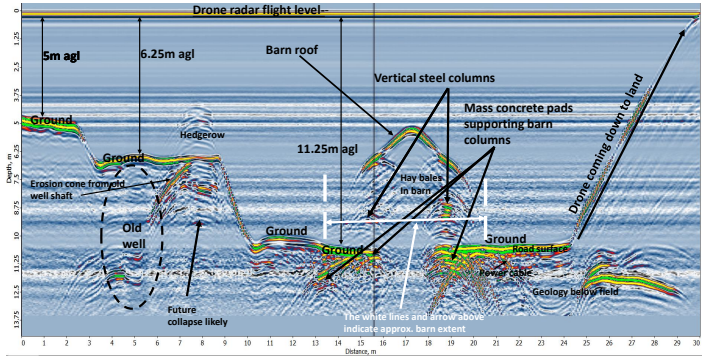
A typical drone GPR mission:

- This were two unplanned missions, at the request of the Army, after a successful planned mission to detect buried objects.
- Mission 1 was across a road and over an uncharted field, where cables and wells can be seen.
- A second mission was flown over a barn. – Details of the structure and foundations can be seen.
- The quality of the images, given the height of the mission, is excellent. The anomalies can be marked in real time and then analysed later.
- In these missions, the analysis was done locally, with the laptop screen output being available to be networked.
- Subsequently, the onboard WiFi router in the GPR unit has been changed to a TWL router, allowing the GPR output to be remotely analysed.
- The principles are the same for video and other sensors – HDMI. HDSDI and Analogue feeds can be sent via an ONVIF compliant stream to a central server and distributed from there.
- The ability to remotely monitor and/or manage the process is a major productivity boost.

Drone radar flight from field across road across small paddock-over 3.5m hedge picking up two wells and power cable.
Flight direction 195 deg out and 15 deg return direction.



Note the flight crossed the hedgerow twice and slightly different angles making return on right look wider. Flt distance estimated based on road width 2.7m



Please note; the drone radar flew at an oblique angle over the barn roof as per picture on previous page.

Other Options:

- Operate in an electromagnetic denied environment:
  - Tethered UAV and long fibre optic cable to TWL's kit in a clear environment.
  - The fibre optic can be in excess of 2.5 Kms.
- Operate in an electromagnetically restricted environment:
  - TWL has integrated Manet into Omni-Hub.Net
  - Successful trials with Trellisware in 2016.
- Use of satellite on drone:
  - TWL is working with a satellite provider that can get the satellite modem into a very small payload.
- Connecting multiple drones for a resilient solution:
  - This work is ongoing and details are available.