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Lizards, Dust and Vaccinations

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ICT is vital to the success of disaster relief operations. However, its implementation is fraught with some unusual challenges, especially for Medair, one of the world's handful of ISO 9001-certified humanitarian aid organisations.

Alongside the banks of the Nile in southern Sudan, Medair's Mattias Liesch carefully aims his satellite phone aerial into a cloudy sky. Overcast conditions hamper satphones, but Mattias persists until he receives a reasonably strong signal. His purpose is urgent: to contact UNICEF and coordinate receipt of thousands of measles vaccines for an emergency response. It should be so simple - just one phone call. But this is ICT in the world of humanitarian aid, where little is straightforward.

In much of the developing world, electricity is rare and ICT infrastructures virtually non-existent. A humanitarian NGO like Medair faces staggering challenges to deliver the robust, high-quality ICT capabilities required from an organisation with ISO 9001 quality certification.

Medair's Swiss international headquarters (HQ) are its hub for coordinating field operations, finance, HR, marketing, and ICT. The ICT infrastructure at Medair HQ is similar to those of most international companies in Europe: a managed high-performance network and servers, VOIP telephony, and a Virtual Private Network (VPN).

Despite limitations at field locations, reliable IT equipment and communication is crucial because staff work in areas spread over large regions, and often face dangers to personal safety. Field staff make time-sensitive decisions, communicating both with the Medair team as well as other NGOs and government agencies, reporting to donors, receiving flight schedules and getting up-to-date situation reports. And, of course, staff are thousands of miles away from family and friends, thus relying on emails for personal support.

The best field ICT infrastructures are found in the main country offices, usually in the capital city or a relatively developed hub. They coordinate all field site activities and are generally equipped with broadband internet, and sometimes a landline phone system and mobile coverage. Many, however, face erratic electricity supplies.

Half-Human, Half-Device

In remote field sites, the ICT infrastructure is a different story altogether. With no grid electricity, diesel generators or solar power provide intermittent supply. However, generators rarely supply sufficiently stable power, while UPS devices, requiring four hours of good quality supply to charge internal batteries, remain unreliable.

As a result, an array of different ICT tools are employed. Visitors to Medair's compound in Payuer, Southern Sudan, might be astonished to see solar panels mounted atop small mud huts, with dust-filled IBM T43 laptops inside and people walking outside with Thuraya satellite phones. As Medair's East Africa ICT manager Willem van Amerongen said, "Sometimes I really feel like I am 'I Robot.' I walk around with a QMAC,

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Thuraya, Motorola radio, and laptop. I'm halfhuman, half-device, and this in a developing country!"

Internet connection is only available via satellite, with connection speeds painfully slow. Satellite phones are also expensive. One tip from Willem: "Don't leave 'Automatic Updates' on. Your bills could be several thousand dollars a month!"

Landlines are virtually non-existent in most remote field sites, and the occasional mobile networks unreliable. While VHF radio frequencies are often allocated to humanitarian NGOs in crisis countries for short-range communications in populated areas, they are open (and therefore insecure) channels.

The environment also poses severe challenges. In a country like Sudan, very high temperatures and frequent dust storms cause havoc. "It is amazing to see how much dust can be stored in a laptop," said Willem.

The types of ICT problems one encounters can be truly unusual. A few weeks ago, Willem received a broken desktop computer from a remote field office, with reports of a big bang followed by smoke coming out of it. "After checking its insides, I saw nothing burned," said Willem. "But I saw that one cooling fan wasn't working anymore. I opened the protection covers and found the problem: a burnt lizard, caught by the blades of the fan. Upon removing the lizard, the computer worked fine again."

The Khaldak Measles Outbreak: Unique ICT Challenges

In August 2007, a deadly measles outbreak struck Khaldak, Southern Sudan, and the Medair team mobilised a response. From an ICT standpoint, there are unique challenges with mobile emergency interventions, due to a raft of unknown, unpredictable variables. The five-person Medair team launched a vaccination campaign, targeted at children from six months to 15 years old. This required extensive logistical coordination, because Khaldak consists of four different villages, with a total population of 19,000.

The communications needs on this project were high, and the stakes nothing short of life and death. "The entire area needed to be mapped," said Heather Dunlop, Medair's team leader. "Local staff needed training to conduct the vaccinations, existing patients needed to be treated, and we needed reliable communications with our management and logistical base in Malakal."

The base in Malakal has good ICT infrastructure, but in Khaldak, there was neither electricity nor generators, ruling out the use of laptops. The team needed to rely on voice communications for all its logistics, with access to an HF radio, a VHF radio, and a satphone, each of which came with its own specific challenges.

A QMAC HF-90 radio was deployed for daily security radio checks, and for transmitting non-confidential messages. It worked just once. Thick clouds and trees in the compound made it impossible to get reasonable connectivity, while its weight and seven-metre-long antenna made it difficult to move to open spaces.

The lightweight Motorola GP380 VHF is designed for short-range communications, but it was useless at Khaldak, as Medair staff were spread out over large distances. In addition, the Motorolas could only be used for one day, because there was no way to recharge their batteries.

That left the Thuraya SO-2510 satellite phone as the only functional communication device for the Medair team. It had a solar charger and a spare battery. However, the batteries had low capacity and could only be charged in the daytime. Though lightweight and permitting secure communications, the Thuraya is expensive to operate, and must be used outdoors to get decent reception.

Careful Planning and Processes = Results and Rewards

Medair's ICT Specialist Michael Nonweiler reflected on the rewards of doing this kind of ICT work -- which can sound extremely frustrating to outsiders. "We have careful processes that lead to professional results, despite the obstacles. We use good equipment, and make sure there is plenty of redundancy. We also keep the setup and operation of equipment very simple."

"It also helps that all field staff are briefed and trained in ICT before their first assignment. They take direct responsibility for equipment and data, managing power and back-ups on-site, not at HQ or in the country office."

Despite the routine unpredictability of field ICT, it plays such a vital role in ensuring that aid effectively reaches the most vulnerable and helps save lives. In Khaldak, prudent use of the Thuraya helped facilitate coordination of the entire Medair campaign.

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“In under two weeks, 3,800 vulnerable children received a potentially life-saving vaccination,” said Michael. “Those kinds of results are their own reward.”

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