FUTURE OF PHARMACEUTICALS

DRONES

Rising above delivery delays

Hospitals and clinics in congested urban areas and remote locations are trialling deliveries of urgent medical supplies by drones and mini-planes

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The traffic-clogged highways of major cities and forbidding terrain of remote districts presents the ultimate challenge to urgent medicine, but the skies could soon be alive with salvation.

Drones and small fixed-wing mini-planes are proving they have the reliability to match technological promise in a series of trials ferrying medication, blood supplies and laboratory samples to isolated communities.

But pilotless flights also have the potential to impact urban areas and a recent feasibility study found that the rapid transport of medical supplies between hospitals, which need frequent and time-sensitive deliveries, is feasible.

It focused on the potential of connecting London's 34 hospitals and 28 accident and emergency departments with a drone flight grid to soar above the capital's congested roads where traffic speeds can be as slow as eight miles per hour.

The urban proof of concept has been established in the Swiss cities of Bern and Lugano, which have a prototype drone courier service between hospitals that is two-and-a-half times faster than bikes or vans.

The Flying High study, compiled by innovation charity Nesta, modelled the use of drones with a two-kilo payload making two to four-minute flights between neighbouring London hospitals Guy's and St Thomas' which, although less than two miles apart, are on hugely busy roads.

It highlighted the need to redraft legislation, work through logistical challenges and ensure safety, but concluded: "We find this use-case technically feasible; economic feasibility of a small-scale service would be challenging, but could be compelling at larger scale."

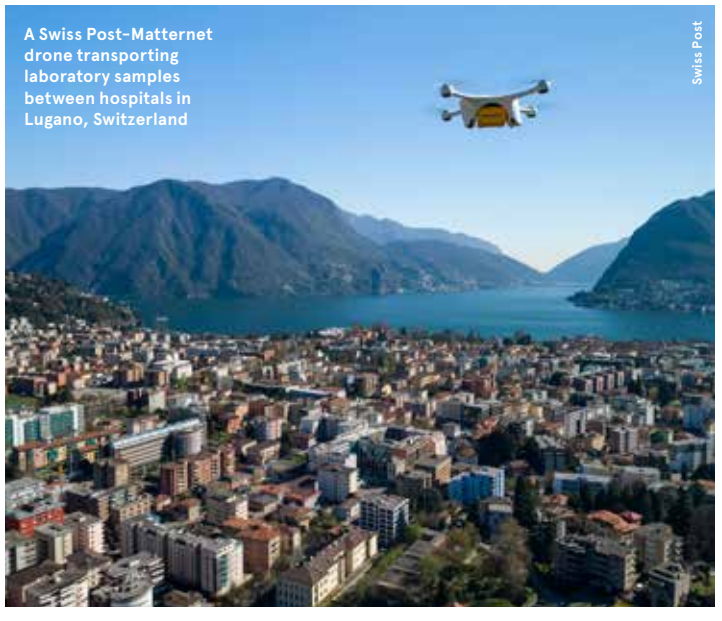
Taking to the skies to transform public health is already well advanced in Africa with DHL's Parcelcopter, which can carry loads of up to four kilos, completing 180 take-offs and landings, and logging 2,000 flying minutes in the Deliver Future project.

It has been able to reach a remote island district of Lake Victoria, in Tanzania, in less than an hour compared to the six-hour journey time via road.

Zipline, a small GPS-guided fixed-wing-style airplane capable of cruising at 80 miles per hour, has also proved its worth in Rwanda, central Africa.

The service takes text or WhatsApp orders from doctors in remote areas and loads up its craft, which is catapulted into flight from a metal rail at its central base. It flies at an altitude of 500 feet before descending to around 20 feet to release its package attached to a parachute that floats to pinpoint delivery sites.

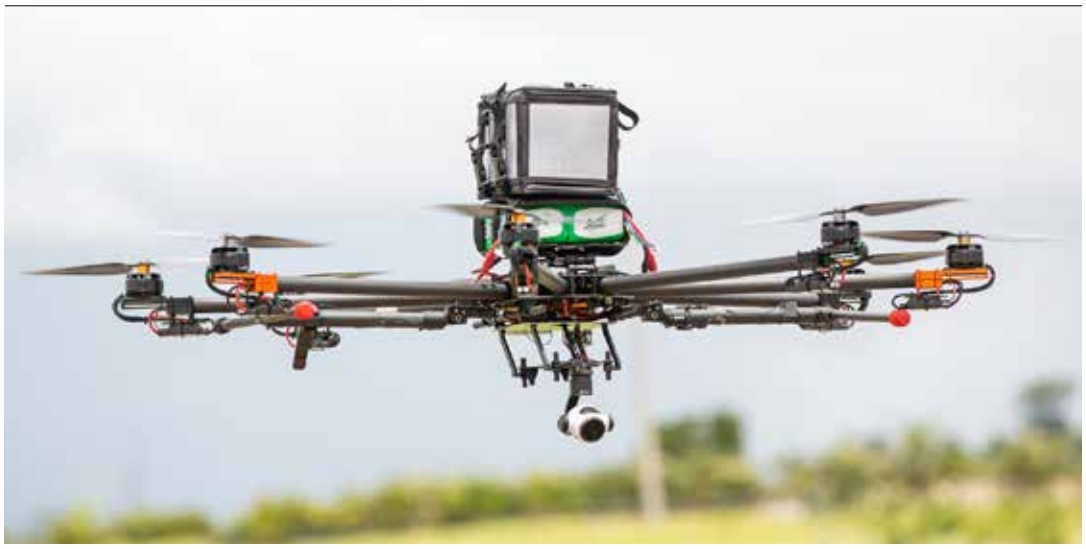
The 15 Zips in Rwanda have flown more than 200,000 miles, delivering 7,000 units of blood in 7,500 on-demand flights. Its future cargos will include HIV medicine, snake anti-venom and drugs for rabies, which kills around 2,000 people, mainly children, a year in Tanzania.◆



A Swiss Post-Matternet drone transporting laboratory samples between hospitals in Lugano, Switzerland

Swiss Post

Commercial feature



Pharmaceutical protection is primed for take-off

Advances in packaging technology are helping to preserve the integrity of pharmaceuticals in transit, saving lives

A raft of recent technological developments in pharmaceutical logistics has enabled global drug manufacturers to move temperature-sensitive consignments around the planet with new confidence. The necessity has arisen from an industry that increasingly turns to biological products to replace blockbuster drugs.

"With next-generation biopharmaceutical products, which are derived from living cells and acutely temperature sensitive, it is more important than ever to ensure the control and visibility of the cold chain during distribution. We must remember that these safeguards are there to benefit us all; it could be our family, friends or co-workers who are receiving these life-saving medications," says Richard Wood, technical director at Softbox Systems.

With the cold chain biopharmaceutical logistics market expected to rise from $13.4 billion this year to $16.6 billion by 2021, according to Pharmaceutical Commerce, the advances in temperature control packaging (TCP) are a welcome fillip.

The material revolution is already in full swing. New TCP systems combine vacuum insulation panels and phase change materials to protect the integrity of biopharmaceuticals. They freeze and thaw in transit to regulate product environments at strictly +2C to +8C or +15C to +25C. Being recyclable and offering high performance, they also satisfy the desideratum of the industry's sustainability initiatives.

Market leader Softbox Systems has leveraged some of these material advances in the production of their new Skypod, a thermally-insulated packaging system designed to be carried by LTE/UAV-connected drones. After successful trials, it launches early next year. A global pharmaceutical giant originally identified the need for a solution in the wake of devastating damage and loss of life from Hurricane Maria in Puerto Rico in 2017.

> With Skypod, pharmaceutical companies will be able to deliver medicines quickly to remote locations and in their correct state for people to use

"The big pharma company we have been working with wanted to find ways of getting medication to desperate people in disaster areas and we developed the Skypod packaging system to carry in medicines that struggled to get through in the aftermath of the hurricane," says Mr Wood. "With Skypod, pharmaceutical companies will be able to deliver medicines quickly to remote locations and in their correct state for people to use."

The package has been designed to house a smartbox powered by internet of things (IoT) technology. It's geared to track the Skypod so data can be transmitted then viewed on a web and mobile app dashboard. This includes its location, near-real time external and internal box temperatures, as well as light exposure data that signals any tampering during daylight. The dashboard app will flash different alerts to prompt appropriate action.

This brainchild is a nod to the future. The combination of new materials and IoT can help form a new frontier for packaging manufacturers. In fact, Statista expects the IoT market, in healthcare and life sciences, to increase from $520 billion in 2014 to $1.335 trillion by 2020.

But it's not just the drones that are taking off; innovation is flying, right across the board. The patient has been the trigger, digitisation the enabler. It is us who will be sitting at the centre of proceedings rather than the pharmacy or hospital, receiving diagnoses and treatments at home. Smart technologies and linked healthcare systems are paving the way for this interaction.

New levels of connectivity, however, need to be accompanied by new levels of security. Serialisation – the practice of assigning unique, traceable numbers to individual units – is already leading the charge against counterfeit and falsified drugs, as well as diversion and theft. Advances in cryptography, where combinations of private and public keys protect data, are also building a robust security layer; similarly, with the rise of blockchain technology, where the entire decentralised user network forms a shield against amendment or tampering.

Pioneering cold chain solution providers are prepped for this new, transparent, super-connected era. They have to be. With the stakes so high, safeguarding medication logistics has become as important as any part of the drug development process itself.

For more information please visit softboxsystems.com

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