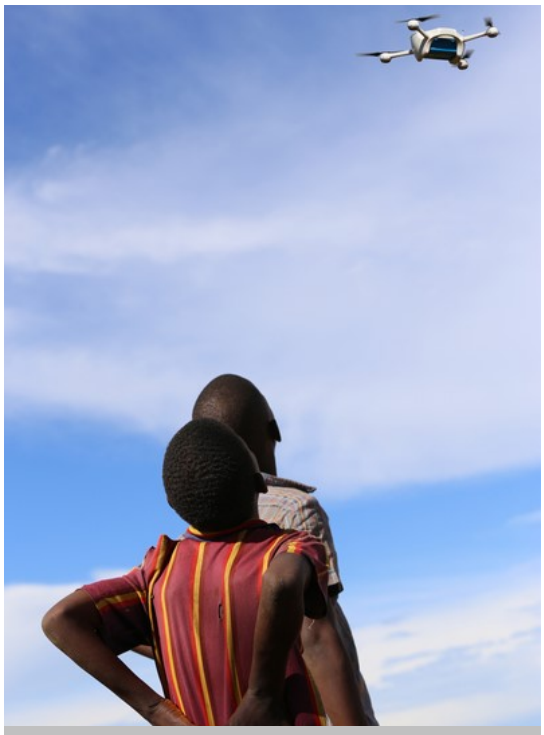
Interagency Supply Chain Group

Addressing Adoption and Sustainability of Unmanned Aerial Systems (UAS) in Public Health

About the ISG

The broad purpose of the Interagency Supply Chain Group (ISG) is to share information and seek greater alignment across supply-chain investments to bring more impact to individual agency supply chain strategies. The group promotes coordination both globally across programs, and locally through national leadership -with the overall aim of improving the efficiency and effectiveness of in-country supply chains. The ISG is an informal partnership of 15 major actors involved in providing supply chain support to countries: Bill and Melinda Gates Foundation, DFID, Global Affairs Canada, the Global Drug Facility, KfW, the Global Fund, Gavi, NORAD, UNDP, UNFPA, UNICEF, USAID, World Bank, WFP and WHO.



In March 2016, children in Malawi look on amazed at a demonstration of UAS flying in Lilongwe. The Ministry of Health and UNICEF launched the first 10km auto programmed flight to speed up the testing and diagnosis of HIV in infants. ©UNICEF/Khonje

There has been an increasing interest in the use of Unmanned Aerial Systems (UAS) to address public health supply chain challenges. Their use however, remains a new concept and little is known to date on how to successfully implement them as a sustainable and integrated part of the current system[1]. For UASs to work as intended and to reach their full potential, they need to be an integrated part of the whole chain, and not simply used on an ad-hoc basis[1].

Recent reports on UAS adoption[1,2] document use cases in a developing country public health context. These reports summarize technical use cases and identify challenges and next steps; however, the paucity of actual flight experience means it does not address many operational issues related to the use of UASs.

More work is still needed on understanding specifically how services might be provided, by whom and how they would be funded, and the potential for cost savings.

The cost of deliveries is often underfunded, either with traditional or UAS transported goods. In many settings, the organization of regular deliveries is handicapped by a lack of operational funding or broken down transport equipment. These challenges affect efforts to insource and outsource deliveries.

Without Government buy-in, there is a risk of a “zero sum game dynamic”, where the additional costs of UAS will be deducted from conventional transport. Conversely, UAS introduction can also be a catalyst for a discussion with Governments on the cost and benefits of higher service levels, whether in terms of faster and more frequent deliveries, or in fulfilling emergency orders. What are Governments and donors willing to pay to avoid stockouts of key commodities? The dynamics and economics of using drones to reach previously unreachable populations (e.g. remote settings or following natural disasters) also need to be considered.

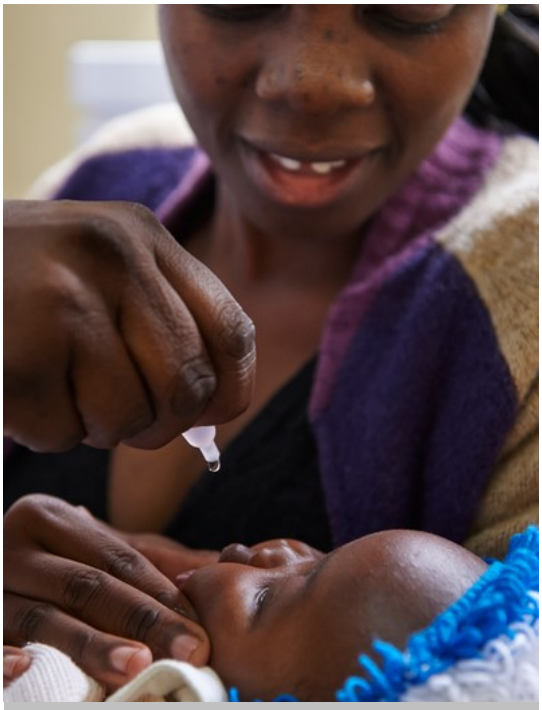
A SWOT analysis of UASs in the humanitarian supply chain[1] is presented in this advocacy paper. A significant advantage of adopting UASs is the reduced reliance on peripheral forecasting, as just in time orders could be placed by text, based on lean replenishment rules. A related potential benefit is the reduction in the need to store expensive products or products requiring cold chain at the peripheral level. This would in turn reduce the likelihood of expiry and lower overall storage costs. This relates to the opportunity to introduce system redesign by holding more inventory at a central hub that can resupply facilities based on actual demand rather than based on an ad-hoc push system.

The introduction of UASs supposes the existence and use of funding either for an insourced or outsourced model. For an insourced model, funding is needed to purchase and maintain UASs to keep them flight worthy and for engineers to operate and maintain them. But the efficient motor pool of some Ministries provides hope that uptake of innovation is possible, and is a stark reminder of the need for basic management investment in any technology.

1. *Dr. One Proof of Concept, Executive Summary, November 2016*
2. *Unmanned Aerial Vehicles Landscape Analysis: Applications in the Development Context, January 2017*

SWOT ANALYSIS OF UASs IN THE HUMANITARIAN SUPPLY CHAIN

STRENGTHS	WEAKNESSES
• Increased access to essential medicine, diagnostics and treatment • Faster transportation of emergency medical supplies and diagnostic services • Contribute to a more responsive and flexible transport infrastructure • Reduced reliance on peripheral supply chain and cold chain capacity	• Limited payload and range • Reliability issues, since many models are prototypes • Need for a funded supply chain either to insource operations and maintain equipment or outsource operations with a 3PL • Lack of extant and experienced funded NGOs or private 3PL operators • Vulnerability to extreme weather
OPPORTUNITIES	**THREATS**
• Additional applications: mapping, data collection, search and rescue, real time surveillance • Potential to increase quality of health service delivery • Potential to reduce cost of public health service delivery • Introduce SC system redesign and contracted services for higher performance • Potential automation & decrease reliance on humans	• Restrictive/unclear regulatory frameworks • Security concerns • Criticism for testing new technology in vulnerable communities • Risk of poor community acceptance • Market failure preventing widespread adoption • Limited data sharing between stakeholders



An infant is administered an oral poliovirus vaccine by a health worker at the Mukuru Health Centre, Nairobi, Kenya, in September 2016. ©UNICEF/Noorani

While donors may be willing to fund an NGO or 3PL to operate a UAS service, the question is how sustainable is this? Is it better for Governments to consider funding part of the operational costs even if donors can subsidize the capital costs?

For example, this is the approach the Rwandan Government is taking with its leadership and ownership with the deployment of UASs. How many other countries are ready or willing to take this approach?

What risks do private UAS operators face of delayed or non-payment? Should donors be adopting a market dynamics approach to reduce the risk for private companies or NGOs from providing UAS services and for Governments adopting them?

There is a need to de-risk both UAS adoption by public health systems, and the provision of UAS services by private and NGO operators. Donors need to be deliberate about how to fund deployments and should avoid repeating the mistakes that have affected mobile technology adoption. Donors must encourage Governments to see UASs as a mean to achieve supply chain redesign that delivers higher performance in service.

The ISG partners are committed to working with all stakeholders to support these recommendations:

1. **Adopt a coordinated approach** to working with national regulatory authorities in countries, to address challenges including flight and aviation restrictions, that represent constraints that UAS experimentation and deployments face.
2. **Develop a common framework** to guide countries with the creation of air corridors to allow deployment of UASs, and advocate for their rapid adoption in key countries.
3. **Partner with other funders** to encourage and enable divergent experimental approaches to generate and share UAS experiences and costs.
4. **Design a simple tool** to determine a country's readiness and willingness to adopt UAS technology.
5. **Link UAS adoption as part of an integrated supply chain system redesign effort** and agree how a market dynamics approach can be adopted.

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