



**CROWN AGENTS**

ACCELERATING SELF-SUFFICIENCY & PROSPERITY

# **ARE DRONES A “LEAPFROGGING” TECHNOLOGY OR AN ILL-ADVISED INVESTMENT?**

**A case study of the potential for  
drone use in Sierra Leone**



## What is the health context of Sierra Leone?

Sierra Leone has one of the highest **maternal** mortality rates in the world

Estimated **1,360** maternal deaths per 100,000 live births in 2015

The **under-five mortality** rate stands at 156 deaths per 1,000

Women in Sierra Leone have a **1 in 17 risk** of dying due to pregnancy

Maternal deaths accounted for **36%** among women ages 15-49 according

**54%** of pregnant women and **80%** of children ages 6-59 months in Sierra Leone are anaemic

Sierra Leone is one of the worst countries in the world to be a mother or a child



# Why are these health statistics so dire?

Issues are complex & systemic



Facility based birth rate does not reflect the statistics



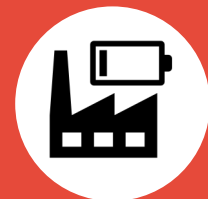
Infrastructural problems with supply - access



Topographical & Meteorological challenges



Archaic and outdated national power grid – cold storage



# The current status quo of the medical supply chain in Sierra Leone



## Freight Forwarding



## Freetown



## Districts



## Last Mile



- Unavailability of vehicles due to maintenance issues
- Human capital issues in selection of correct health commodities
- Poor stock record keeping of requests and storage
- Stock management capacity and commitment of staff
- Inconsistent power threatens integrity of cold chain
- Lack of monitoring and evaluation to assess the effectiveness of supply chain
- High levels of stock outs, obsolescence & pilferage

# Can the introduction of drones improve this situation?



Drones are not a silver bullet – they are just a tool – not end goal



Sierra Leone is uniquely round, one drone port, 95% of the country, 90 minutes away



Select medical commodities only



Step change - On demand, push to pull

**1**<sup>st</sup>

First time access for many communities



Centralised storage





# What are the benefits of centralised medical storage

Consolidated high quality stock management

Fails safe power supply - guaranteeing integrity of cold chain

Economies of scale of centralised versus decentralised huge cost savings

Low risk transport route from port to laboratory & drone port

Partnership other vehicles – further cost savings

Hidden gem of drones is not the tech...

It is the cost savings from economies of scale through centralisation from going to an on-demand / pull system



# What medical commodities could drones delivery in Sierra Leone?

**Stabilisation**  
(speed, cold chain & access)



**Blood to PHU**



**Oxytocin**



**R.A.S**

**Time Critical**



**Artesunate**



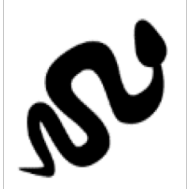
**Blood transport Hospitals**



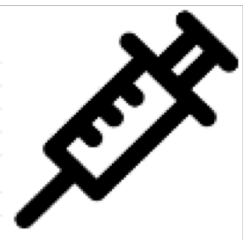
**HIV/Aids PEP**



**Rabies PEP**



**Antivenom**



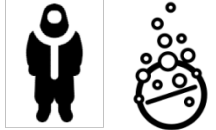
**Vaccines**



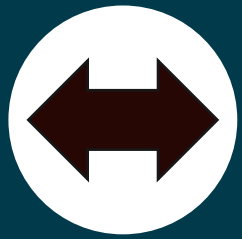
**Remote resupply**



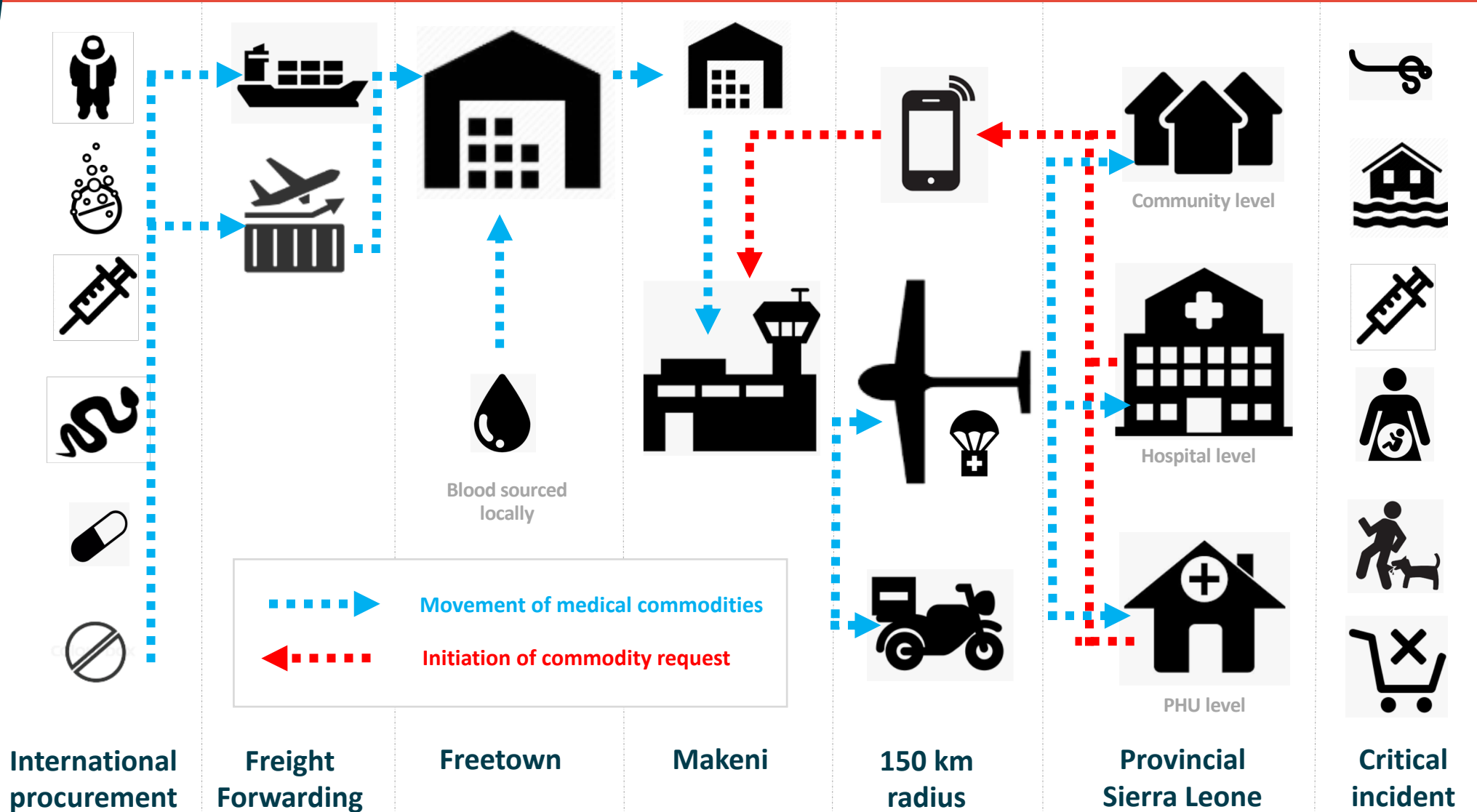
**Sample retrieval**



**PPE & Aqua tabs**



# How would it work?







# What are the risks of introducing drones into Sierra Leone?

Opportunity costs - investing in a district stores with All Terrain Bikes

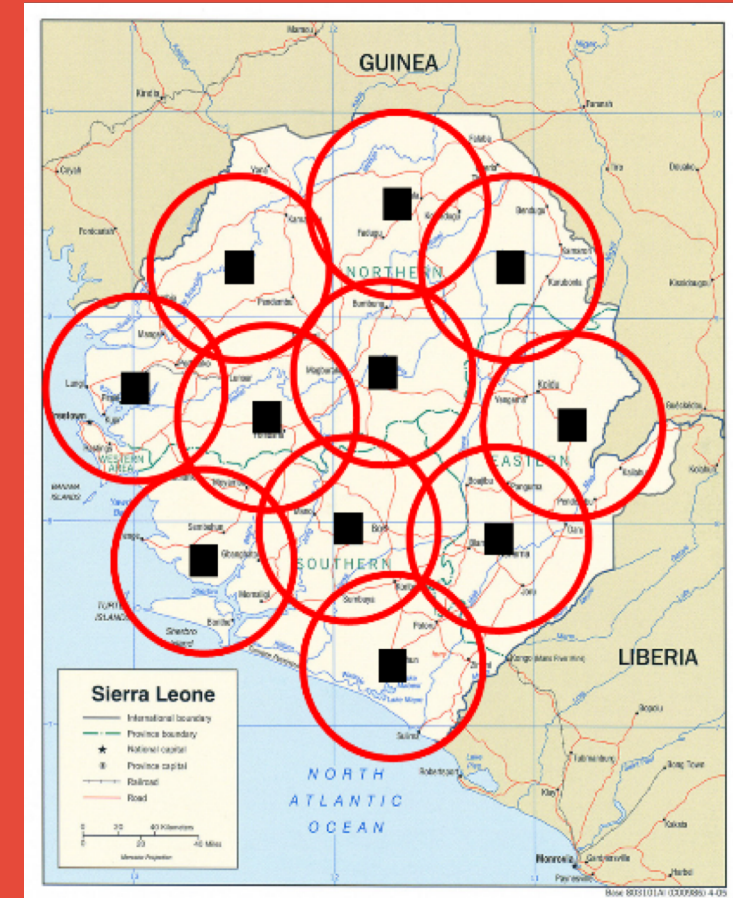
Cultural & Traditional Beliefs - adoption by end user

Meteorological risks – anticipation of bad weather

Appropriate capacity at health units - eg antivenom

Political & Ethical – repurposing of technology

Sustainability – financial stability and commitment from stakeholders



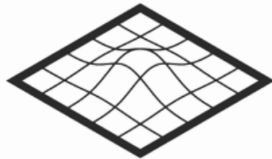
# Evolution of the development drone model & increasing sustainability?



Strong case for further investigation – more quantitative data is needed – especially on incidence rates



Much of the investment is front loaded into set up & fixed cost - Will not change with one flight an hour or one flight a week



Opportunity for inclusion of mapping and inspection capabilities for social benefit – at low incremental cost



Commercial opportunities in agriculture, mining & construction



Opportunity for cross subsidisation, against relative low running costs under a PPP model

# Social and Commercial applications of the drone



## CONSERVATION



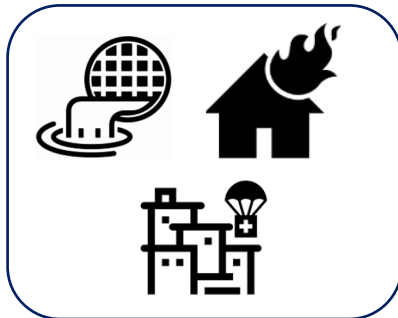
Protection of National Parks,  
ID of illegal deforestation &  
monitoring timber industry  
Bushfire & coastal erosion

## EMERGENCY RESPONSE



Search & Rescue  
Landslide & Soil  
density  
Prepositioning PPE

## URBAN HEALTH



Informal Settlement  
access, Drainage  
planning, "Slum fires"  
management



Monitoring of Environmental  
Impact Assessments, border  
patrols, property mapping for  
tax base

## TAX REVENUE GENERATION

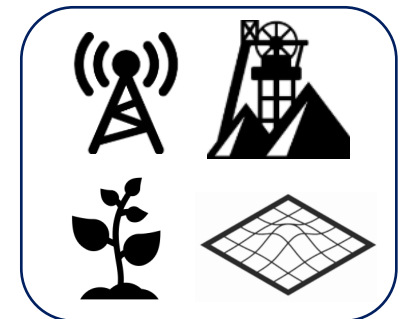


## CIVIL SERVICE



Marine search &  
rescue, civil unrest,  
surveying of  
wetlands, school  
mapping

## COMMERCIAL



Commercial opportunities in  
agriculture, mining  
construction & telecoms



# Are drones in Sierra Leone a leapfrogging technology?

**No!** Not a substitute for an effective road & power network

This is achievable in Sierra Leone but will take many years

Therefore may be not “leapfrogging” but potentially “**bridging tech**”

Significant **financial** advantages in centralisation **offsetting** the risk of high **opportunity costs**

**Providing 1<sup>st</sup> time access** to select medical commodities

**Cross subsidised** through inclusion of mapping capabilities at relatively low incremental cost

## **Why is now the appropriate time:**

DDMS transitioning to NMSA is an opportunity

UK Aid, GF & WB: high donor appetite to improve SC

Newly created DSTI as Government stakeholder with capacity

New Director of NBSA conducting an overhaul

GF/WB investing in upgrading blood banks, interested partner

WHO approval of RAS and introduction by PMI

**Conclusion: warrants further investigation – partners wanted!**



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