



Request for Proposal (RFP):

Drone technology for vaccine transport demonstration flights in the Democratic Republic of the Congo (DRC)

March 2019



I. Organization Overview

VillageReach is an international non-governmental organization, with headquarters in Seattle, Washington, that works closely with governments to address the challenges of providing health care in low-resource settings. VillageReach’s mission is to save lives and improve public health by increasing access to quality health care for the poorest communities at the last mile, or the point at which services are delivered.

VillageReach has been working in the Democratic Republic of the Congo (DRC) since 2015 supporting the improvement of the healthcare supply chain. Currently, VillageReach is working with the DRC government and Gavi, the Vaccine Alliance to test and potentially introduce the use of unmanned aerial vehicles (UAVs) into the vaccine supply chain in the province of Equateur.

II. Project Overview

Vaccines have the potential to save lives, but in low-resource environments such as the DRC, they are frequently delayed or don’t reach people living in hard-to-reach or geographically isolated areas. Equateur province is among the lowest-performing provinces in the DRC when it comes to immunization rates. As of May 2017, only 67% of children received the third dose of pentavalent, a vaccine which protects children against five life-threatening diseases, the second lowest rate in the country. A VillageReach supply chain assessment conducted in 2015 found stockouts of vaccines and other health products at all levels of the supply chain in Equateur.

Equateur is crossed by the Congo River and many of its tributaries, limiting access to the most remote health centers. Some health centers are accessible only by boats, bicycles, or even by foot, resulting in a high cost of transport, delivery delays, and inaccessibility during the rainy season. The introduction of UAVs as one component of a responsive and resilient transportation network has the potential to overcome these difficulties, while also reducing infrastructure costs, enabling communities living at the last mile to access life-saving vaccines. VillageReach is currently working with the government of the DRC to test such an introduction of UAVs.

III. Schedule of Events

VillageReach will evaluate all responses to this Request for Proposal (RFP). The current estimated timetable for the selection process is summarized below.

Milestone	Completion Date
Release RFP publicly	March 19, 2019
Vendors submit proposals to VillageReach	April 9, 2019
VillageReach pre-selects Vendor(s) based on completed application (including on-board videos)	April 23, 2019

In-person evaluation by technical expert (at Vendor's headquarters or in DRC)	April 24 - May 22, 2019
VillageReach finalizes Vendor selection	May 24, 2019
Contract signed by all parties	May 31, 2019

In addition to submitting an application in response to this RFP, prospective Vendors should submit on-board videos that show the drone covering the same distance and similar topography as described in this RFP. VillageReach may reach out with clarifying questions regarding application materials or proposed technology. Pre-selected Vendor(s) will then participate in an in-person evaluation led by an independent technical expert. The in-person evaluation will take place either at the Vendor's headquarters, or, preferably, in Equateur, DRC, where the demonstration flights will occur. During the in-person evaluation, the pre-selected Vendor(s) will demonstrate vehicle specifications as described in this RFP.

VillageReach reserves the right to make any changes to the events and schedule at their discretion.

IV. RFP questions

Questions regarding this RFP are encouraged and should be submitted through e-mail to the address listed below in advance of the submission deadline. Should a prospective Vendor perceive any material ambiguity, conflict, discrepancy, omission, or other error in this RFP, the vendor should send a question to confirm or clarify the information in question. The Vendor may request a meeting or conference call with VillageReach to clarify the requirements of this RFP.

Email: procurement@villagereach.org

V. Evaluation criteria

All proposals will be evaluated based on standardized criteria, summarized as follows¹ and described in further detail below:

- Platform: Capabilities and design of the UAV and required infrastructure
- Flight system: Ease of use and robustness of the flight software system
- Flexibility: Vendor's willingness to make adjustments to meet project's needs
- Evolving technology: Vendor's vision and ability to innovate and improve on their technology
- Level of service offered: Ability of Vendor's business model to assure long-term sustainability in future phases of implementation
- Staff availability: Vendor's availability to participate in the various phases of the project (regulatory approval, set up, training, flight operations, etc.) within the required timeframe
- Shared values: Alignment of organizational missions and values

¹ Evaluation criteria are drawn from the USAID Global Health Supply Chain Program - Procurement and Supply Management (GHSC-PSM) "Unmanned Aerial Vehicle Procurement Guide," 2018.

- References: Positive assessment of previous work performance
- Proposed budget: Cost-effectiveness of budget proposed

VI. Location of Services Required

VillageReach seeks the short-term services of an individual or company to provide the technology and associated services needed to conduct demonstration flights to transport and deliver vaccines from a local distribution site to a remote health facility in Equateur province, DRC, while maintaining the cargo at a controlled temperature between 2 and 8 degrees Celsius. Annex A presents illustrative payloads.

The distribution center is proposed in Mbandaka, the capital of Equateur province, with demonstration flights to be conducted within a radius of approximately 75 kilometers. Equateur has a tropical climate, with 80-210 mm of monthly rainfall. Most rain falls between March and May and between August and December. **The demonstration flights are planned to occur between these two rainy seasons (July-August 2019).** UAV flights will occur when weather conditions permit, and all flights will occur during daylight in open spaces. Even on rainy days, it is expected that there will be at least 4-6 hours or more without rain.² Wind speeds are expected to be low. The terrain is mostly flat, with an altitude of around 300 m above sea level. However, the flight may cross the Congo River or one of its tributaries. Annex B includes a map of a 75-kilometer radius around Mbandaka.³

Access to electricity is limited, even within Mbandaka, but VillageReach will ensure electricity is provided by diesel generators or solar panels. Mbandaka has mobile telephone networks, but coverage is unreliable in the city and poor outside the city. The successful firm will be able to operate using satellite navigation and will not rely solely on 2G/3G connectivity. Mbandaka has an airport with flights occurring 2-3 times per week, and VillageReach will facilitate meetings with the DRC Civil Aviation Authority and the local Air Traffic Control station in Mbandaka.

VII. Technical Specifications

An independent technical expert will conduct an in-person evaluation of each finalist prior to final selection. VillageReach seeks UAVs that meet or exceed the following specifications, which will be demonstrated during the in-person evaluation:

<i>Design</i>	<ul style="list-style-type: none"> • Hybrid design preferred (but not required) • Meet professional standards for reliability and minimize human and technological error
<i>Payload</i>	<ul style="list-style-type: none"> • Capable of carrying a minimum of 1 kg payload • Payload compartment offers flexibility of weight disbursement and balance • Payload compartment must satisfy DRC Expanded Program on Immunization (EPI) requirements, including cold chain conditions (for example, be able to include an ice pack in compartment); Vendor will work with EPI and VillageReach on a packaging solution that meets these requirements. • Enable temperature monitoring (between 2 and 8 Celsius), either embedded or

² See weather.com for overview of monthly temperature, precipitation, and other information for Mbandaka.

³ You may consult Google Maps or Google Earth for more detail on the topography of the area.

	<ul style="list-style-type: none"> with data logger inserted into payload compartment Removable payload compartment preferred
<i>Range</i>	<ul style="list-style-type: none"> With at least a 1 kg payload, able to deliver vaccines up to 75 km (aerial distance) by direct or multi-stop flight
<i>Power</i>	<ul style="list-style-type: none"> Rechargeable batteries or fuel preferred
<i>Flight pattern</i>	<ul style="list-style-type: none"> Vertical take-off and landing is preferred (but not required) Fully autonomous take-off, flight, and landing along GPS way-points is required Route selection, pre-flight checks, dispatch, flight monitoring, and troubleshooting must be available through a logical user interface on a laptop, tablet or phone device Automatic collision avoidance function for fixed obstacles is preferred (but not required) Fail-safe functions that avoid high speed impact to the ground (such as parachute) are required
<i>Climate robustness</i>	<ul style="list-style-type: none"> Robust for general environmental conditions, including ability to fly in reasonable weather conditions (for example, winds of 5 m/s and slight rain)

VIII. Specific Roles and Responsibilities

Demonstration flights will be conducted in Equateur, DRC in July or August 2019, over 1-2 weeks, carrying vaccines round-trip. In preparation for these flights, an initial site visit and several pre-demonstration test flights will be conducted in May or June 2019 to ensure reliability of the technology. Any time UAVs are flown, the vendor will work closely with the Civil Aviation Authority and all other relevant authorities in DRC to ensure that aircraft safety regulations and requirements are met or exceeded at all times.

1. *Provide necessary documentation and information upon final Vendor selection*

- Participate in the review of standard operating procedures around flight safety, payload delivery, and any document required for successful implementation of the demonstration flights
- Provide to VillageReach any customs documentation needed for VillageReach to obtain permission to import the UAV
- Provide to VillageReach any documented of the technology needed to secure permission to fly the UAV in-country
- Provide photographs or other collateral materials for use in educational materials about UAVs for community outreach
- Provide sharable cost information including leasing costs and operational costs

2. *Conduct initial site visit in DRC, in May 2019, if conducted as part of pre-selection process, otherwise June 2019*

- With support from VillageReach, acquire the necessary permissions and insurance, for both the aircraft and for personal liability, to fly in the DRC, per Civil Aviation guidelines.
- Conduct initial site visit to Equateur, DRC, for **2 weeks** to meet with in-country stakeholders and regulators, and **conduct pre-test flights** to ensure familiarity with

flying conditions in DRC, and have time to make any necessary adjustments before the July-August flights.

3. *Conduct demonstration flights in DRC, in July or August 2019*

- Conduct second site visit to Equateur, DRC, for approximately 2 weeks total
- Ensure availability of all equipment necessary to conduct demonstration flights in-country, including two cargo aircrafts, packaging for vaccines, batteries, chargers, and any other necessary equipment
- **Conduct demonstration flights** in Equateur, DRC for **1-2 weeks**, including additional pre-demonstration test flights as needed, carrying vaccines between the distribution center and selected health center(s), during daylight hours and in reasonable weather conditions.
- Conduct maintenance and repair as needed during the flight period
- Provide all data and metrics mutually agreed upon for analysis, which is expected to include performance and telemetry data (duration of each flight, distance travelled, speed of flight, battery voltage at launch and landing, operational flight range, safety data, etc.)

IX. Proposal Submission Instructions

A prospective vendor should prepare any offer simply and economically, giving a straightforward, concise picture of that vendor's ability to satisfy the requirements of the RFP. Expenses incurred in the preparation of the vendor's Information in response to this RFP are the vendor's sole responsibility.

Interested vendors are requested to submit an application, which includes a description of how the applicant will adhere to the above, as well as provide:

- UAV manufacturer (legal name, address, contact, and any certifications)
- Proposed UAV type and model
- Pictures, design, and dimensions (including drawings) of the UAV and payload compartment
- Payload weight and volume capacity, maximum distance, and key metrics of performance
- Plan to achieve distance of up to 75 km, whether through direct or multi-stop flight, from Mbandaka, DRC, to a more remote site across the Congo River or its tributaries
- Physical dimensions of the UAV and the box used to transport UAV
- Number and type of batteries or amount of fuel required for the distance proposed
- List of other equipment needed for flight operations in addition to UAV aircraft
- Weight of UAV in-flight, including batteries
- Required distance for take-off and landing, as well as mechanism for take-off and landing
- Software used and data transmission from the flight system
- Flight safety mechanisms (including fail-safe functions that avoid high-speed impact to the ground)
- History of past work and references
- Key personnel to be assigned to this project and their CVs or qualifications

- Itemized budget for the work proposed, including 2 trips to DRC of approximately 15 days each, as described above
- Any other information that responds to the requirements outlined in this RFP

Each prospective vendor shall include a statement in the documentation that the entire document (including scope and prices) contained therein are firm for not less than three months from the date of the quotation.

All submissions will be accepted electronically in advance of the date listed in the schedule of events at the following address:

Email: procurement@villagereach.org

X. General Conditions

This RFP is not an offer to contract. The issuing of this RFP does not commit VillageReach to award a contract to any vendor, even if all requirements stated in this RFP are met, and will not limit our right to negotiate in our best interest.

This RFP will be sent to multiple vendors. VillageReach reserves the right to enter into separate contracts with multiple vendors if it desires to do so.

VillageReach shall not be responsible or liable in any manner for any risks, costs, or expenses incurred by any prospective vendor in responding to this RFP, including but not limited to the selected vendor(s).

XI. Right of Rejection

VillageReach reserves the absolute right to reject any and all offers for any reason or for no reason whatsoever. We reserve the right to reject any response either completely or in any part. Without limiting the generality of the foregoing, VillageReach may reject any offer which fails to follow the RFP Information outline, which is submitted on forms that contain printed terms of stipulations, which is conditional, qualified or incomplete in any manner or which contains any irregularities of any kind.

XII. Right of Modification or Withdrawal

VillageReach reserves the absolute right to withdraw this RFP at any time or to modify this RFP by one or more addenda issued through the same methods as the original RFP release to whom VillageReach issued this RFP. VillageReach shall incur no liability whatsoever to prospective vendors by reason of such withdrawal or modifications.

We reserve the right at any time to discontinue the RFP process, and enter into discussions and/or negotiations with any one vendor if such action is in our best interest.

VillageReach reserves the right to modify any estimated requirements prior to signing the Agreements with the selected vendor(s). No prospective vendor shall have a claim on VillageReach in the event any estimated requirements are modified for whatever reason.

Any quantities of equipment or other information referenced herein are estimates and do not constitute a commitment.

XIII. Confidentiality of Proposals

VillageReach routinely handles all information submitted in response to an RFP with care, uses it only for evaluation purposes, and restricts access to a minimum number of persons. VillageReach assumes no obligation and shall incur no liability regarding confidentiality of all or any portion of a quotation or any other material submitted in response to this RFP unless VillageReach has expressly agreed in writing to protect specifically identified information.

In the RFP Response, the responses must be clearly stated. The evaluation team will not search for answers and explanations.

XIV. Prerequisites for Doing Business

All vendors responding to this RFP must understand and accept the following VillageReach requirements:

Any vendor entering into a business partnership with VillageReach must:

- Be stable and financially healthy
- Have adequate personnel to provide responsive service and quality maintenance and support
- Provide adequate warranties or other legal recourse upon product or service failure
- Vendor payment will be linked to performance according to achievement of project milestones.

Annex A: Illustrative payload

This annex presents illustrative payloads of vaccines and diluents. The table presents all vaccines, diluents and materials needed for one vaccination event in an average health center within a 75 km radius of Mbandaka, but the demonstration flights described in this RFP would transport only a few of these items per flight, totaling at least 1 kg.

Vaccine	Doses needed per vaccination session (based on doses per vial)	Volume per unit (cm ³)	Volume required per vaccination session (cm ³)	Weight per unit (grams)	Weight required per vaccination session (grams)
<i>Vaccines and diluents</i>					
BCG	20	2.4	48	0.24	4.8
BCG diluent	20	1.4	28	0.14	2.8
DTC-HepB-Hib	40	7.8	312	0.78	31.2
Pneumococcal	36	15.7	565.2	0.16	5.7
OPV	50	1.1	55	0.11	5.5
IPV	20	2.5	50	0.25	5.0
Measles	20	2.6	52	0.26	5.2
Measles diluent	20	2.5	50	0.25	5.0
Yellow fever	20	3.5	70	0.25	5.0
Yellow fever diluent	20	3.6	72	0.36	7.2
Tetanus	30	3.0	90	0.30	9.0
<i>Vaccine products</i>					
0.05 ml syringe	20	37.5	750	3.7	74
0.5 ml syringe	166	56.67	9407.2	5.6	930
2 ml syringe	1	66.25	66.3	6.6	6.6
5 ml syringe	4	33	132.7	6.6	26.5
Sharps container	2	27.75	55.5	13.1	26.1

Annex B: Map of 75-km radius within Mbandaka

