EXPRESSION OF INTEREST
FOR
MEDICINE FROM THE SKY PROJECT

A Joint Initiative of Government of Telangana,
World Economic Forum and Healthnet Global

HealthNet Global
Enabling Connected Health

WORLD ECONOMIC FORUM
COMMITTED TO IMPROVING THE STATE OF THE WORLD

EXPRESSION OF INTEREST

Medicine from the Sky

Drone-Based Medical Delivery

March 14, 2020

CONTENTS

1 BACKGROUND

As India makes strides in regulating its low-altitude air space for unmanned systems, the Government of Telangana, World Economic Forum and HealthNet Global have signed a collaboration agreement for “Medicine from the Sky”, stewarded by leaders in medicine, technology and research. A feasibility study is being conducted to look at how delivery drones can be used to improve medical supply chains, followed by a pilot implementation in Telangana. The project includes a comprehensive study of drone-based deliveries for blood, vaccines, medical samples and long tail medicine.

While plenty of tests and some at-scale implementation in Africa have increased awareness of the opportunities provided by drones, service providers, government officials and local communities must consider how their populations will be affected and what policies need to evolve for people to reap the benefits. As it stands, it is still difficult to find trusted sources of data, real economic analysis or comparisons between operational models beyond what appears in the press or is offered by the service providers; The Government of Telangana and The World Economic Forum’s Medicine from the Sky project and the subsequent pilot will assist policy-makers and health systems in analysing the opportunities and challenges of drone delivery as well as competing delivery models and technologies.

2 OBJECTIVE OF EXPRESSION OF INTEREST

To assess the capability of Drones service provider in providing safe, accurate and reliable pickup and delivery of Health care items (medicines, vaccines, units of blood, diagnostic specimens and other lifesaving equipment) from distribution centre to specific location and back, by using Drones.

3 SCOPE OF POC

The detailed scope of work includes:

- Proof of Concept (PoC) Demonstration
- An examination report which provides insights from the telemetry data collected during PoC Demonstration (duration of each flight, distance travelled, battery voltage at launch and landing, operational flight range, safety case, cargo temperature logs, etc.),
- Proposing an Operating Model for integration with current health supply chain, and make a business case for cost effectiveness and better health outcomes.
- Cold Chain Requirements and Cargo Characteristics

The detailed scope along with the responsibility of the service operator will be detailed in the Request for Proposal (RFP) at the later stage.

4 DEMONSTRATION GUIDELINES

Vendors shall follow the guidelines mentioned here while carrying out the POC:

a) Vendors would be given the opportunity to visit and analyse the field parameters at PoC sites and start preparation 5 days before conducting the pilot test run.
b) The vendors may generate a flight path for the drone.
c) Vendors may set-up their base station/charging stations at the sites, if required.
d) Basis the flight plan approvals from DGCA, vendors may start demonstrations.

The vendor shall showcase a fully operational system at the sites. The Drones will pick up healthcare items from a central facility, and deliver to specific PHCs and pickup test samples from PHC to deliver back to the central facility. The location would around Hyderabad near Sangareddy District. The exact location would be shared later.

The healthcare items could include, and not be restricted to:

- Components of Blood
- Vaccines
- Diagnostic medical samples
- Long tail medicine

General Functional Guidelines:

1. Design

a) Hybrid design (VTOL) preferred (but not required)
b) Meet professional standards for reliability and minimize human and technological error

2. Range

a) The drone should be able to cover about 30 km (aerial distance, subject to DGCA clearances) or demonstrate the minimum distance (aerial distance) that the drone is capable of with the mounted operational payload of a minimum of 1kg without having to change batteries. Drone companies with advanced capabilities are welcome to demonstrate higher operational range, subject to DGCA clearances.

For each test run from point A to point B and back, the Drone will carry maximum permissible payload at least in one leg of the trip. The timings for test run may be staggered throughout the day. As a minimum, each service provider at the end of POC test run would have to undertake one pickup and one drop off.

3. Power

a) Rechargeable batteries preferred (but not required)

4. Flight

a) Pre-programmed flight plan and real time visibility of adherence to flight plan.
b) Dynamic reconfiguration of flight path from Ground Control Station.
c) Vertical take-off and reverse pickup capability are recommended but not necessary
d) Fully autonomous take-off, flight, and landing along GPS way-points is required, subject to permissions from DGCA.
e) Multiple Fail-safe options available.
f) Third party insurance is recommended for the duration of the PoC

The examination report should be submitted in the prescribed format in Annexure-V.

Basic Equipment Guidelines:

Drones should follow DGCA's CAR Section 3 Series X or the latest version of the regulations, and the revised DGCA RPAS Guidance Manual. Indicative equipment required shall be:

- UAV (Use template in Annexure-V to furnish UAV technological details.)
- Ground control station (GCS),
- At least one transceiver device (radio) operating in the airband frequencies,
- Cold-chain capable, active (electric operated) or passive (containing icepacks),
- Portable electricity generator,
- The necessary replacement parts and spare parts to minimize downtime and guarantee uninterrupted operations.

These guidelines are indicative, please feel free to choose your own design.

Basic Payload Guidelines:

a) Primary receptacle (sample containers) and secondary packaging shall be capable of withstanding without leakage, – free of holes, tears, cracks etc.

b) Absorbent material should be placed between the primary receptacles and secondary packaging.

c) The outer packaging shall be rigid and the entire packaging solution to have passed the 1.2 m drop test

d) Suitable cushioning material should be added to prevent movement within the package.

e) Transport containers used for blood should not hold more than 10-15 units of whole blood.

f) Sufficient coolants for initial using and subsequent storage should be provided. These quantities are best decided by validating the potential systems under local conditions.

g) Cargo compartment must always meet cold chain requirements during the flight operations. For reference, these details can be found in Annexure – VI.

h) Enable temperature monitoring either as part of the cargo compartment or by using external data logger inserted into cargo compartment

Operational Guidelines:

a) Safe, accurate and reliable pickup and delivery of Health care items (medicines, vaccines, units of blood, diagnostic specimens and other lifesaving equipment) from distribution centre to specific location and back, by using Drones.
b) Department is looking for end to end solution providers, where a solution provider is expected to manage project planning, logistics, flight data processing, other technology components, capacity building, etc. The EoI may explore the engagement of consortia including drone vendors / operators, UTM service provider, healthcare subject matter expert, supply chain subject matter expert and a project coordinator given the nature of the project. Details of the team are required to be furnished in the form attached in Annexure- II.
c) Vendors will submit a safe, reliable and efficient operating model for delivery of healthcare items using drones from distribution centre to specific location and back. (Use form in Annexure-V)
d) Vendors are free to choose any suitable operating model to demonstrate their solution, which will be examined based on the PoC Demonstration Parameters.

e) The vendor shall be required to execute “PoC” on No Cost No Commitment Basis. The cost incurred towards carrying out the “PoC” exercise shall be borne by the participating vendors themselves. *Infrastructure, Network and any damage occurred to property or life during operations would be the responsibility of the service provider during PoC.*

5 EOI SUBMISSION GUIDELINES

5.1 *EOI Proposal Preparation*

a) The Response to the EOI shall be prepared in accordance with the requirements specified in this EOI and in the format prescribed in this document for each of the above-mentioned qualifying criteria as proof of having the minimum requirements.

b) Information Technology, Electronics & Communications Department will not accept delivery of response in any manner other than that specified in this EOI. The response delivered in any other manner shall be treated as defective, invalid and rejected.

5.2 Forms

a) Applicant shall fill all attached forms to provide relevant information. If the form does not provide space for any required information, space at the end of the form or additional sheets shall be used to convey the said information.
b) For all other cases the vendor shall design a form to hold the required information.

5.3 Right to Terminate the Process

Information Technology, Electronics & Communications Department may terminate the EOI process at any time and without assigning any reason. Information Technology, Electronics & Communications Department makes no commitments, express or implied, that this process will result in a business transaction with anyone.

6 SPECIFIC ROLES AND RESPONSIBILITIES

Information Technology, Electronics & Communications Department will provide a corridor for the Proof of Concept demonstration. The corridor will be a low traffic densitv, uncontrolled (Class G) airspace below 400 ft AGL, preferably in sparsely populated areas to reduce the risk of collateral damage and with sufficient safety buffer. Such airspace will be identified by Information Technology, Electronics & Communications Department in consultation with Executive Director (Airspace Management), Airport Authority of India (AAI).

Vendor shall ensure, permissions and security clearance are obtained from the authorized Government Agencies, under DGCA guidelines like UIN, UAOP, VLOS, BVLOS before UAV operation as a pre-requisite of POC.

However, for all other permissions, vendors are expected to obtain such permission on their own at no cost basis to Govt of Telangana.

7 GENERAL TERMS

7.1 EoI Issuing Authority

This Expression of Interest (EOI), is issued by Information Technology, Electronics & Communications Department, Government of Telangana, India to assess capability of UAV. Information Technology, Electronics & Communications Department's decision with regard to the short-listing of vendors through this EOI shall be final. Information Technology, Electronics & Communications Department reserves the right to reject any or all the responses without assigning any reason.

Item	Description
Project Title	**Drone Based Medical Delivery**
Project Initiator Details	**Sri Jayesh Ranjan, IAS,** **Principal Secretary to Govt** **Mail to: Secy_itc@telangana.gov.in**
Department	**Information Technology, Electronics & Communications Department** 5th Floor, Burgula Rama Krishna Rao Bhavan, NH 44, Hill Fort, Adarsh Nagar, Hyderabad, Telangana 500063
Contact Details (For Pre-EOI Queries & EOI Submission)	**Smt. L. Ramadevi** **Officer on Special Duty (OSD)** Information Technology, Electronics & Communications Department Ph: 040-23450560 **copy to:** osd_itc@telangana.gov.in
Contact Persons (Alternate)	Mr. Satya, SeMT, ITE&C Dept Mobile No. +91 8977662266, **copy to**: **s.edelli@semt.gov.in** Mr. Devansh Pathak, Consultant, ITE&C Dept, Mobile No. 7054125536, **copy to: consultant-itc@telangana.gov.in**
Website	**https://it.telangana.gov.in/**

7.2 Tentative Calendar of Events

The following table enlists important milestones and timelines for completion of bidding activities:

#	Milestone	Date and time
1.	Release of Expression of Interest (EoI)	**14-03-2020**
2.	Pre-EoI Meeting	**04-04-2020; 15:00 hrs**
3.	Due Date for Submission of Queries to EoI	**10-04-2020; 17:00 hrs**
4.	Response to the Queries	**24-04-2020**
5.	Last Date for Submission of Response to EoI	**06-05-2020; 16:00 hrs**
6.	Opening of EoI Responses	**07-05-2020; 16:30 hrs**
7.	**Declaration of Short Listed Firms**	**To be informed later**

7.3 Availability of the EoI

The EOI will be available on the website mentioned in Section 7.1

7.4 Venue and for submission of EoI

a) The response, in its complete form in all respects as specified in the EOI, must be mailed to as mentioned in Section 7.1

7.5 Conditions Under which this EOI is Issued

a) This EOI is not an offer and is issued with no commitment. Information Technology, Electronics & Communications Department reserves the right to withdraw the EOI and change or vary any part thereof at any stage. Information Technology, Electronics & Communications Department also reserves the right to disqualify any vendor, should it be so necessary at any stage.
b) Conducting this PoC will be on no-payment basis, which means the entire expense of demonstration of technical competency will be borne by the vendor. Government of Telangana may provide appropriate weightage to those parties who have participated and successfully demonstrated as per the evaluation criteria, on non-exclusive basis, as and when the request for proposals are invited.
c) Information Technology, Electronics & Communications Department serves the right to withdraw this EOI, if determined that such action is in the best interest of the Government of Telangana.
d) Neither the vendor nor any of the vendor's representatives shall have any claims whatsoever against Information Technology, Electronics & Communications Department or any of their respective officials, agents, or employees arising out of, or relating to this EOI or these procedures (other than those arising under a definitive service agreement with the vendor in accordance with the terms thereof).

7.6 Rights to the Content of the EoI

For all the responses received before the last date and time of submission, the response and accompanying documentation of the response to the EOI will become the property of Information Technology, Electronics & Communications Department and will not be returned after opening of responses to the EOI. Information Technology, Electronics & Communications Department is not restricted in its rights to use or disclose any or all of the information contained in the EoI and can do so without compensation to the vendors. Information Technology, Electronics & Communications Department shall not be bound by any language in the EoI document indicating the confidentiality of the EoI document or any other restriction on its use or disclosure.

a) This request for EOI is open to all vendors both from within and outside India, who are eligible to do business in India under relevant Indian laws as is in force at the time of bidding subject to meeting the Qualification criteria.
b) Consortium/Joint Venture is allowed to participate in the EoI Process. Consortium of maximum of four (4) partners is allowed including the prime vendor. The consortium, may consist of drone vendors / operators, UTM service provider (coordination with ATC and situational awareness), healthcare subject matter expert, supply chain subject matter expert and a project coordinator given the nature of the project.
c) Vendors marked to be ineligible by Information Technology, Electronics & Communications Department, Telangana; for non-satisfactory past performance, corrupt, fraudulent or any other unethical business practices shall not be eligible.
d) Vendor debarred/ blacklisted by any Central or State Govt. / Quasi –Govt. Departments or organizations as on bid calling date for non-satisfactory past performance, corrupt, fraudulent or any other unethical business practices shall not be eligible.
e) Breach of general or specific instructions for bidding, general and special conditions of contract with Information Technology, Electronics & Communications Department, Telangana or any of its user organizations may make a firm ineligible to participate in bidding process.

7.7 Confidentiality

a) Data Agreement: As part of the EoI trials, aerodynamic, operational, cold chain and health related attributes (qualitative and quantitative) will be recorded. These details will have to be furnished by the operator.
b) Information relating to evaluation of EOIs shall not be disclosed to the vendors who submitted the EOIs or to other persons not officially concerned with the process, until the completion of the EoI evaluation process.
c) The vendor must maintain absolute confidentiality of the documents/maps/tools collected in any form including electronic media and any other data/information provided to him for the execution of the work.

7.8 Corrupt Fraudulent practices

a) Defines, for the purpose of this provision, the terms set forth below as follows.
b) “Corrupt practice” means the offering, giving, receiving or soliciting of anything of value to influence the action of a public official in the process of Contract execution and “fraudulent practice” means a misrepresentation of facts in order to influence EoI evaluation process.
c) Information Technology, Electronics & Communications Department, Telangana will reject the EOI proposal if it determines that the Vendor has engaged in corrupt or fraudulent practices in during the course of EoI evaluation.

7.9 Acknowledgement of Understanding of Terms

By submitting a response to this EOI, each vendor shall be deemed to acknowledge that it has carefully read all sections of this EOI, including all forms, annexure hereto, and has fully informed himself/herself as to all existing conditions and limitations.

8 FORMATS FOR SUBMISSION

S No.	Annexures
1	Annexure I: Format of Covering Letter
2	Annexure II: Details of Applicant
3	Annexure III: Details of the experience of the Applicant
4	Annexure IV: Details of Financial Capacity of the Applicant
5	Annexure V: Detailed Responses
6	Annexure VI: Medical Aides - payload and Temperature Details

Annexure I: Format of covering letter

(To be submitted on the letterhead of the applicant)

Date:

To,

NEED TO ADD

Subject: EOI for Selection of UAV Operator for UAV based delivery system of blood,

blood products & drugs at select locations in Telangana State on Public Private Partnership (PPP) mode

Dear Sir/Ma'am,

With reference to your EOI reference no EOI No: /ITE&C DEPARTMENT services /2020 _____..dated _____, M/s_____ hereby submit the EOI application for

the subject project.

1. I/We certify that all information provided in the application is true and correct.

2. I/We understand that this EOI is non-binding in nature. ITE&C DEPARTMENT reserves the right to follow an alternative bidding process for selection UAV Operator at its own discretion.

3. I/We acknowledge that the right of ITE&C DEPARTMENT to reject our application without assigning any reason or otherwise and hereby waive, to the fullest extent permitted by applicable law, our right to challenge the same on any account whatsoever.

4. I/We understand that ITE&C DEPARTMENT reserves the right to modify, cancel, suspend or terminate any aspect of the EOI process at any time, for any reason, without giving prior notice and ITE&C DEPARTMENT (including their officers, employees, consultants) will not be bound by this EOI.

Yours faithfully,

(Signature, name and designation of the Authorized signatory)

(Name and seal of the applicant)

Annexure II: Details of the applicant

i. Details of the Applicant:

Name of the Applicant	
Constitution of the applicant (e.g. public limited, private limited, etc.)	
Year of Incorporation	
Registered Address	
Head Office Address	
Name, designation and contact details of Authorized Signatory	Name: Designation: Mobile Number: Email Id: Address:
Name, designation and contact details of point of contact of the applicant	Name: Designation: Mobile Number: Email Id: Address:

ii. Team Composition:

Job Profile	Job Description	Number of resources
Drone Operator	Licensed individual who is compliant with aviation safety norms and well aware of risk mitigation measures in case of emergencies	
UTM Service Provider	Entity that provides situational awareness to the UAS operator in coordination with the Air Traffic Controller	
Healthcare Expert	A medical professional who can oversee the efficient packaging and maintenance of contents to be delivered using the drone	
Cold Chain Expert	A supply chain professional who is responsible for creating and maintaining a conducive environment for medical payloads that will be mounted on the drone	
Consultant	An individual who can prepare a safety case and collate all outputs and learnings from the drone mission	
Any other		

iii. Brief description of the applicant including details of the lines of business, current activities, the background of promoters and management structure etc.

(Signature, name, designation of the authorized signatory of the applicant)

(Name and seal of the applicant)

Date:

Place:

Annexure III: Details of the experience of the applicant

Name of the Applicant:

Experience of the applicant

Particulars	Experience since	
	From	To
Years of experience in UAV operations		

Details of relevant experience in providing UAV based service in India and other countries (Commercial/ Pilot Projects)

#	Name of the Assignments/ Projects	Name of the Client and Sector	Description/ Nature of Services (include operational range)	Duration of the Services (years)	Location of Services (State, Country)	Number of UAV operated on daily/monthly basis	Estimated Project Cost (INR cr.), if any	Service Fee/ Payment Model (INR cr.)	Any other details of project

Annexure IV: Details of Financial Capacity of the Applicant

I. Net worth of _____ *(Name of Applicant)* as on last Financial Year

S.No.	Particulars	Net Worth as on…….. (in INR)
1	Last three consecutive years financial statements	
2	Profit and loss statement	
3	Net worth of the Company (Prime Bidder and others)	
4	Similar line of business turnover for the last (2) consecutive years	

Signature of Authorized Signatory

Name:
Designation:
Seal of the Firm

Annexure V: Solution Details

Please indicate the details of the following

#	Particulars
	UAV details
1	UAV make and hardware specifications
2	DAN, OAN, DIN
3	DGCA compliant (NPNT) certificate (Yes/ No/ In process)
4	Type of UAV (fixed-wing/ multi-rotor/ hybrid)
5	Category of UAV (Nano /Micro / Small)
6	Estimated cost of UAV
7	Maximum aerial distance and coverage area
8	Operating altitude
9	Endurance
10	Maximum wind speed handling limit
11	Capability to operate 24*7 and all weather conditions
12	Maximum and average speed of UAV's
13	Battery charging duration/ fuel capacity
14	No. of batteries required per UAV;
15	Battery Specifications; and
16	Estimated cost of battery
17	Battery voltage at each launch and landing
	Operating Model
1	Takeoff and landing requirements
2	Minimum open space required for operation of Drones up to payload of approx. 3KG
3	Requirement of any other resources such as electricity, Water etc.
4	Number UAV fleets used for payload delivery
5	Payload delivery mechanism
6	Estimated cost of developing IT system for operating UAV
7	Any other technical details w.r.t to operation of UAV
8	Document explaining the **Proposed Operating Model** (less than 500 words)
8.1	Integration with current health supply chain
8.2	Technological/Logistic/Business innovation
8.3	Business case for cost effectiveness and better health outcomes.
	Payload details
1	Payload capacity and commodity delivered
2	Procedures for safe carriage of Payload
2.1	o Blood components
2.2	o Vaccines
2.3	o Diagnostic specimens (medical samples)

2.4	o Long tail medicines
3	Cargo Characteristics:
3.1	Start state of medical packaging – free of holes, tears, cracks etc.
3.2	Sterility, vacuum and leakage proofing
3.3	Temperature maintenance and sensors that communicate with the base station
3.4	Speed / ease with which the payload can be mounted / unmounted
3.5	Speed / ease of packaging medical payloads
3.6	Time to setup base stations / landing points + capability of dynamic starting / ending points
Risk Mitigation	
1	Third Party Insurance (Yes/No/In Process)
2	Geo-fencing return home and flight termination capability (Yes/No)
3	Explain mechanism of safe UAV landing in case of geo-fencing breach
4	Live trajectory information and monitoring features (Yes/No)
5	Flight Logging (Yes/No)
6	Information on 360-degree Collision Avoidance system capability and safety features
7	Information on Radio Frequency (RF), communication and navigation systems
List out specific ground and air risk attributes, depending on the adopted operating model. Elaborate upon strategies adopted to mitigate these risks during proof of concept demonstration. Some of these risks could be, and not limited to the following:	
8	Mitigation methods in case of payload inconsistency e.g. temperature rise, leakage, pressure differences, breakage etc.
9	Track-keeping and altitude keeping abilities of Drones
10	GNSS coverage and impact of GNSS failure on operation
11	Impact of C2 link failure and C2 link interference with ATC
12	Assessment of potential collateral damage involved of person and property
13	Mean time between failure of drone missions
14	Insights on system reliability from historical data, if available.
15	Add on..

- Copy of Artifacts of flight worthiness, No-permission No-take off (NPNT) of the UAV model (if approved by DGCA) need to be submitted as supporting document

(Signature, name, designation of the

Authorized signatory of applicant)

(Name and seal of the applicant)

Date:
Place:

Annexure - VI

MEDICAL AIDS - PAYLOAD AND TEMP DETAILS			
S N	**Specimen description**	**Approx Weight**	**Temperature during transport**
	Diagnostic SampleS		
1	Serum	10 to 20 gm	+ 4ºC
2	Plasma	10 to 20 gm	+ 4ºC
3	Packed cell volume	10 to 20 gm	+ 4ºC
4	Fluids/FNA	10 to 20 gm	+ 4ºC
5	Whole blood in vacutainers	10 to 20 gm	Ambient or + 4ºC
6	Semen	10 to 20 gm	Ambient
7	Urine	35 to 50 gm	+ 4ºC
8	Fecal matter	10 to 20 gm	+ 4ºC
9	Tissue blocks	Depends	Ambient
10	Slides	30 to 50 gm	Ambient
11	Breast Milk	10 to 20 gm	+ 4ºC
12	Saliva	10 to 20 gm	Ambient
13	Saliva in Cryovials	10 to 20 gm	+ 4ºC
	Blood		
1	Whole Blood/PRBC	~ 400 / unit	2° to 6° C
2	Fresh Frozen Plasma	~ 300 gm/ unit	2° to 6° C
3	Platelets (Random Donor)	~ 400 gm/unit	20° to 24° C
	Anti Venum		
1	Anti Venum	~ 50 gm	Ambient
	Vaccines	As prescribed on packaging	