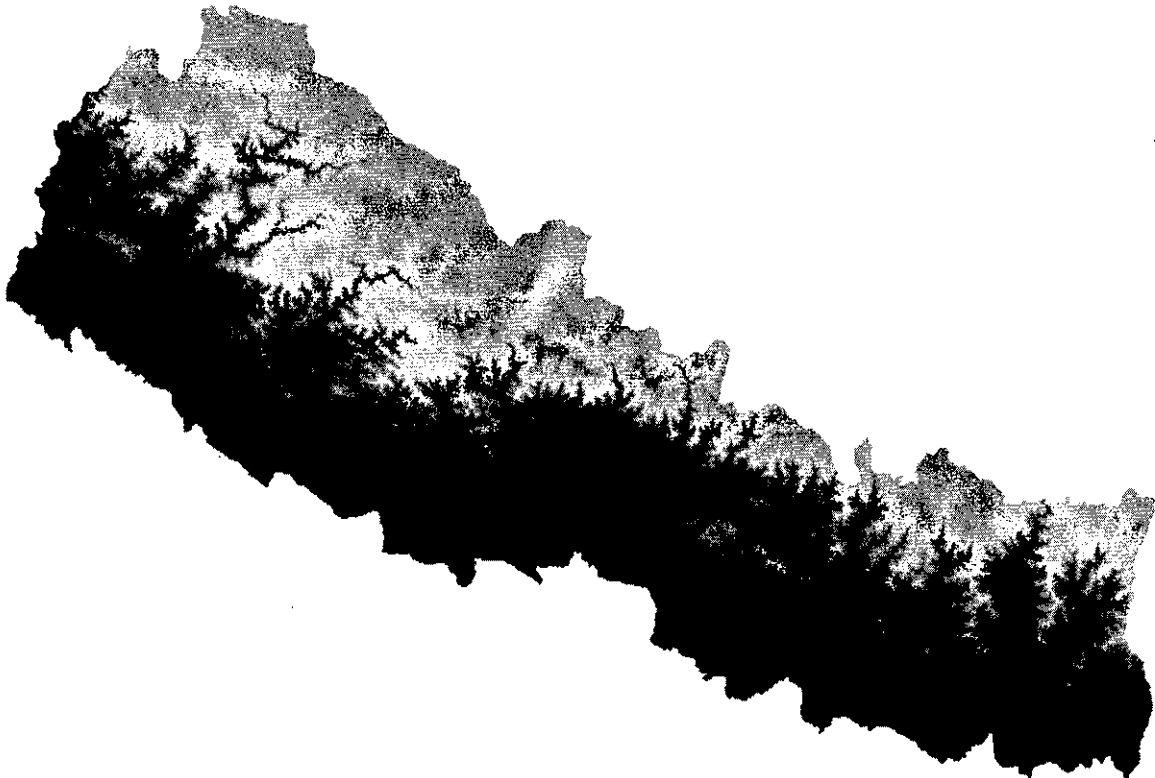


Stony Brook University - WeRobotics

Memorandum of Understanding

**Nepali Drone Observed Therapy Systems Pilot: Improving
Tuberculosis Case-Finding and Diagnostics with Drones**



Parties

This Memorandum of Understanding (MoU) is an agreement made between the following parties:

Party A

The Research Foundation for SUNY on behalf of Stony Brook University / Global Health Institute (referred to as SBU)

Party B

WeRobotics / Nepal Flying Labs (referred to as WR/NFL)

This agreement makes reference to activities, materials, roles, and budgets of other organizations (Birat Nepal Medical Trust, Nick Simons Institute, National Tuberculosis Center, Ministry of Health and Population). These references are for informational and contextual purposes only. This agreement is made only between the two parties listed above; the roles and budgets for other parties may not be fully accurate, up-to-date, and should not be considered part of this agreement.

The effectiveness of this MoU is contingent upon approval from the Institutional Review Board (IRB) of Stony Brook University (SBU). Without/until said approval, the terms herein are subject to change insofar as the SBU IRB requires changes.

Project period between SBU and WeRobotics: 2018-10-01 through 2019-09-30

Purpose

Approximately 44,000 Nepalis get sick with tuberculosis annually, and 5,000-7,000 die. An estimated 12,000-13,000 incident TB cases go undiagnosed every year (Marahatta 2013). The government has identified “a need to intensify efforts to identify the missing cases in the community”. The National Tuberculosis Centre’s Strategic Plan for 2016-2021 aims to find an additional 20,000 cases relative to the 2015 baseline (Narsingh 2016).

To reach this goal, innovative means are required, particularly in isolated and hard-to-reach communities. This pilot project aims to improve case finding by linking community health workers (CHWs) with state of the art diagnostic tools (GeneXpert) via unmanned aerial vehicles (UAVs) (aka “drones”). The aim of this project is to assist the MoHP by generating the data necessary to assess the suitability of the approach for nationwide expansion. This MoU outlines a

cooperation framework between the institutions which will oversee, implement and evaluate the pilot programme.

Roles

The Ministry of Health and Population (MoHP) will provide oversight, technical guidance, and regulatory compliance consulting. It will ensure all activities are in line with the national strategic plan and objectives for tuberculosis and provide access to national programme data as necessary to analyse and interpret project outputs.

The Birat Nepal Medical Trust (BNMT) will be the primary implementing partner. BNMT will coordinate and implement operations. Recruitment and training of supervisory and field staff specific to this project will be made through the BNMT. Materials procurement supplementary to those provided programmatically by the global fund and NTC, such as laboratory supplies, will also be managed by the BNMT. The BNMT will provide subject area expertise, and work closely with Stony Brook University on strategy and evaluation. The BNMT will be the main research partner, and be at the core of all activities.

The Nick Simons Institute (NSI) will provide technical consulting and engage with the project as a thought partner. The NSI supported district hospital in Pyuthan will provide the district hub for the project. The Institute will provide particular guidance on how to take the pilot's activities to scale.

WeRobotics / Nepal Flying Labs (WR/NFL) will handle matters related to UAVs flight and human resources for technical maintenance of UAVs. This covers not only directly-related activities (vehicle procurement, training, piloting, maintenance and repairs), but also secondary but prerequisite activities such as importation duties, applying for legal clearance, national and local government permissions, etc.

Stony Brook University, through its Global Health Institute, will handle coordination between groups, fund those activities which fall outside of any partner's normal scope, provide data management and analysis, and carry out evaluative research.

Activities

The **BNMT** will:

- Oversee the hiring and training of a cadre of CHWs as well as community mobilisers for the period of July - December 2018.
- Oversee the procurement of non-UAV materials.
- Oversee and manage all issues related to laboratory testing and diagnostics.

- Coordinate with the NTC and MoHP on all medical and clinical issues.
- Liaise with relevant stakeholders to ensure co-ordination with global fund related case finding and ensure no duplication of activities.
- Carry out active case-finding under the BNMT model in the pilot district.
- Integrate drones into the transportation chain in the pilot district.
- Engage with SBU on matters of research and evaluation.
- Submit quarterly progress reports to SBU on budgetary and implementation matters.
- Submit the audit report to MoHP after the completion of the project.
- Make all data regarding diagnostics available in anonymized form to project partners in this MoU.
- Adhere to the general principles, policies and best practices for TB case finding and holding, as per the BNMT's MOU with the MoHP in regards to IMPACT TB and TB REACH.
- Generate quarterly progress reports for the MoHP and NTC.

The **NSI** will:

- Review and provide feedback on project operating procedures.
- Monitor and provide feedback on the progress of the project
- Coordinate with relevant government authorities to facilitate the procedure for bringing in required materials and logistics for project work.
- Provide technical guidance and suggestions when required.

WR/NFL will:

- Build engineering foundations for cargo delivery flights in Nepal
- Apply for local and national permissions required for autonomous flight (outside of line-of-sight) including, but not limited to, the importation and purchase of vehicles, Ministry (Home, Defense, etc.) approvals, etc.
- Build local capacity for cargo UAV flights by training local Nepali pilots
- Provide on-demand piloting services for "phase 2" (the 3 month period from April-June 2019).
- Provide on-demand repair/replacement services for "phase 2"
- Make all data from all flights available to the project partners.

SBU will:

- ☐ Provide the role of "project manager" and take overall responsibility for the project.
- ☐ Fund all necessary and agreed upon activities outside of partners' normal scope of funded activities.
- ☐ Manage and oversee regular coordination meetings between project partners.
- ☐ Enact all services and materials procurement contracts with BNMT and WR/NFL.
- ☐ Oversee research and evaluation of all project activities.

- ② Generate knowledge dissemination products for the international research community.

Policies

- ② Projects implemented under this MoU must adhere to the guidelines and rules of the MoHP.
- ② All parties will conform to international standards for data confidentiality and participant respect.

Amendments

This MoU can be amended on mutual agreement between all parties during the project period.

Breaches

- ② In case of non-compliance on the commitments from the signatory parties, MoHP may terminate this MoU with 90 days written notice to BNMT.
- ② If applicable, the MoHP will provide the reasons for terminating the MoU in writing to all parties.
- ② The MoHP will not provide any compensation in the case of a violated MoU.
- ② Failure to comply with the MoU will constitute violation of agreement and lead to automatic termination with 90 days written notice.
- ② No party shall be liable to the other for any special, consequential, incidental, punitive, or indirect damages arising from or relating to any breach of this agreement.

②

Termination

- This Agreement may be terminated by either party, with or without cause by giving thirty (30) days written notice to the other party. The thirty (30) days written notice period shall commence on the date contained within the written notice to the affected party.
- Foundation may suspend this Agreement for cause upon ten (10) days written notice; provided, however, that Vendor will have not more than thirty (30) days from the date of such notice to remedy or cure any default or breach upon initial notice from Foundation. Foundation may withhold payments to Vendor for the purpose of set-off until such time as the exact amount of damages may be determined.
- If the Vendor shall fail to fulfill in a proper manner its obligations under this Agreement or violates any of the provisions of this Agreement, Foundation shall have the right to terminate this agreement in whole or in part, by

sending written Notice of Termination to the Vendor which shall take effect thirty (30) days from the date contained in the written notice.

- Upon notification that this Agreement has been terminated or suspended as provided above, the Vendor shall immediately stop all work under this Agreement on the date and to the extent specified in the Notice of Termination. Foundation agrees to compensate the Vendor for all work performed pursuant to this Agreement prior to termination, provided termination is not a consequence of Vendor's breach, default, or failure to perform pursuant to this Agreement.

Rights in Work Product

- Material or work produced under this Agreement shall be considered "work for hire," and owned exclusively by Foundation. VENDOR shall not claim or assert any interest, proprietary or otherwise, in any materials or work required to be produced or delivered under this Agreement. VENDOR assigns all rights, title, and interest to such materials and work to Foundation. VENDOR will cooperate and take all necessary action to facilitate such assignment to Foundation.
- VENDOR warrants that any material produced pursuant to this Agreement shall be original except for such portion from copyrighted works that: (i) may be included with the copyright owner's permission; (ii) contain no libelous or unlawful statements or materials; and (iii) will not infringe upon any copyright, trademark, patent, statutory or other proprietary rights of others.
- The publication and dissemination of the knowledge gained from this project will be a shared responsibility of the involved parties; accordingly, the content and authorship of publications will be discussed and agreed upon by all parties in advance of publication.
- VENDOR will retain ownership of intellectual property that has been independently developed by VENDOR without Foundation financial support. With respect to this VENDOR-owned intellectual property required to be delivered under the scope of work, VENDOR grants to Foundation a royalty-free, non-exclusive irrevocable license to use such intellectual property in accordance with the Foundation's obligations to Sponsor.

Assignment

- VENDOR shall not assign, transfer, contract or otherwise dispose of VENDOR's rights or duties hereunder, in whole or in part, to any other person, firm or corporation without the express written consent of the Foundation. Any such assignment if granted shall be made subject to and consistent with this agreement and Foundation's agreement with the sponsor.

Status of Parties

- The relationship of the parties shall be that of principal and Vendor and not of an employer-employee relationship. VENDOR hereby warrants that it is: (i) in compliance with all tax filings and similar requirements imposed on it; and (ii) solely responsible for paying income taxes, FICA taxes, and other taxes and assessments which arise from receipt of payments under this Agreement.
- This Agreement shall not be construed to contain any authority, either express or implied, enabling the VENDOR to incur any expense or perform any act on behalf of Foundation without express written consent.

Ethical Conduct

- The Foundation strives to maintain the highest ethical standards in all of its operations. All parties acting pursuant to this Agreement will establish standards, policies and procedures of ethical conduct that address, but are not limited to, the areas of conflict of interest, misconduct in science, fraud, abuse and waste.

Compliance with Laws and Regulations

- The parties agree to comply with all applicable laws and regulations in performing the obligations under this Agreement. This includes, without limitation, the Sponsor policies and the express terms of Foundation's agreement with Sponsor, are incorporated by reference herein as a material part of this Agreement even if not specifically set forth in this document.
- VENDOR and Foundation also agree to comply with the Foundation's Purchase Order requirements, as applicable.

Protected Information

- The parties acknowledge that they may possess certain proprietary or confidential information which may be utilized in performance of the Project. "Protected Information" shall mean all such proprietary or confidential information provided by the disclosing party in writing and marked "confidential" or if disclosed orally summarized in writing and marked "confidential" and transmitted to the non-disclosing party within thirty (30) days of oral disclosure.
- Protected Information will only be disclosed to the employees, consultants, students or agents (if applicable) who require the same to fulfill the purposes of the research or a need to know and who have read and are obligated to be bound by this clause. The receiving party shall protect the disclosing party's Protected Information with the same standard of care with which the receiving party treats its own Protected Information. Protected Information shall be used by the receiving party only within the scope of this Agreement.
- Each party shall, for a period of three (3) years after the termination or expiration of this Agreement, maintain the same level of care to prevent the disclosure of a party's Protected Information, unless otherwise required by law. Upon expiration of the three (3) year period, or upon the request of the disclosing party, whichever is first, the receiving party will destroy all copies

- of such Protected Information and so certify the same in writing within thirty (30) days. Only one extant copy of such information shall be kept by the receiving party for archival or purposes of audit.
- Neither party shall be liable for disclosure or use of the information of the other party if said information was:
 - known by the receiving party at the time it was acquired from the disclosing party;
 - already generally available to the public, or subsequently becomes so available without default of the receiving party;
 - received by a party to this Agreement from a third party who did not acquire it directly or independently from a party to this Agreement in confidence;
 - independently developed by the receiving party without the use or reliance on Protected Information, or;
 - required to be disclosed by applicable law, court order or regulations of any applicable governmental agency provided that the disclosing party shall give advance, written notice to the other party of the compelled disclosure.

Export Controls

- This Agreement shall be subject to all applicable government export and import laws and regulations. The Parties agree to comply and reasonably assist the other party, upon request by that party, in complying with all applicable government export and import laws and regulations. The Parties acknowledge that they may not directly or indirectly export, re-export, distribute or transfer any technology, information or materials of any value to any nation, individual or entity that is prohibited or restricted by the International Traffic in Arms Regulation (ITAR), the Export Administration Regulations (EAR), the Office of Foreign Assets Controls (OFAC), the United States Department of State's State Sponsors of Terrorism, or by any other United States government agency without first obtaining the appropriate license.
- VENDOR confirms that the confidential information it discloses does not contain export controlled technology or technical data identified on any US export control list, including but not limited to the Commerce Control List (CCL) at 15 CFR 774 and the US Munitions List (USML) at 22 CFR 121. In the event VENDOR intends to provide Foundation's Project Director with export controlled information, VENDOR will inform Foundation's Administrative Contact in writing thirty (30) days prior to the release of export controlled technology or technical data. VENDOR agrees not to provide any export controlled information to Foundation's Project Director, or others at Foundation or the State University of New York without the written agreement of Foundation's Administrative Contact. If the U.S. Government imposes a fine or penalty upon Foundation due to VENDOR's failure to notify the Foundation as described above, VENDOR will indemnify and hold

Foundation harmless from any resulting fines and penalties from such omission.

Liability; Indemnification

- VENDOR agrees, to the fullest extent permitted by law, to indemnify, hold harmless and defend the Foundation and its directors, officers, employees, consultants, agents and representatives against all claims, causes of action, damages, losses or expenses, including without limitation attorneys' fees, arising out of or resulting from the VENDOR's performance or failure to perform under this Agreement provided such claims are not based upon the negligence or willful misconduct of Foundation.

Records

- Vendor shall maintain appropriate and complete accounts, records, documents, and other evidence showing and supporting all costs incurred under this agreement. Vendor will insure that appropriate internal controls are in place and properly functioning for the accounts, records and other evidence showing and supporting all costs incurred under this agreement. All accounts and records relating to this agreement shall be subject to inspection by Foundation or its duly authorized representative(s). All accounts and records shall be preserved by the Vendor for a period of six (6) years after final settlement of this agreement. At any time, the Foundation may have vouchers and statements of costs audited by Foundation or Sponsor, or other parties authorized to audit Foundation activities and any payment may be reduced for overpayments or increased for underpayments based on such audit. The system of accounts employed by the Vendor shall be in accordance with the accounting principles required under Foundation's agreement with the Sponsor

Insurance

- Vendor shall, at its own expense, maintain insurance of the types and in the amounts specified below.
- Commercial General Liability: Bodily injury, Personal Injury, and Property Damage with minimum limit of \$1,000,000 per occurrence and \$2,000,000 aggregate. Limit may be provided through a combination of primary and umbrella/excess liability policies;
- UAS/UAV/Drone Liability: Limits of liability greater than \$1,000,000 for each claim and \$3,000,000 aggregate. WeRobotics/Negal Flying Labs will also maintain physical damage coverage on any drones utilized for this project for full replacement cost.
- Vendor shall notify Foundation (30) days prior to termination or material change of any policy.
- If Vendor fails to maintain Insurance, Vendor shall promptly notify Foundation and Foundation reserves the right to issue a stop-work order until Vendor is in compliance with the above requirements.

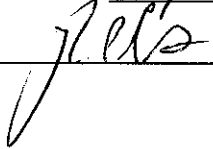
- Vendor shall provide evidence of such in the form of Certificates of Insurance upon request. If self-insured, these certificates should note any self-insured/deductible amounts for each policy.
- Vendor waives all rights of subrogation to the extent damages are covered by the above described policies.

Signatures

The parties affirm to know, understand and agree to all articles of this MOU as negotiated together.

The Research Foundation for SUNY on behalf of Stony Brook University

Name and Position: Lyle P. Gomes, V.P. Finance

Signature:  Date: 9-13-18

WeRobotics

Name and Position: _____ Patrick Meier, Executive Director _____

Signature: -  Date: Sept 11 2018

Appendix 1: Project Agreement

Proposal submitted by

Birat Nepal Medical Trust (BNMT Nepal)

Lazimpat-2, Kathmandu, Nepal

Phone : +977 01 4441918

Fax : +977 01 4439108

Email: segurung@bnmt.org.np

Contact person: Suman Chandra Gurung

Name of the project

Nepali Drone Observed Therapy Systems Pilot: Improving Tuberculosis Case-Finding and Diagnostics with Drones

Name and address of supporting party

Stony Brook University, Stony Brook New York, USA

Background

Approximately 44,000 Nepalis get sick with tuberculosis annually, and 5,000-7,000 die. An estimated 12,000-13,000 incident TB cases go undiagnosed every year (Marahatta 2013). The government has identified “a need to intensify efforts to identify the missing cases in the community”. The National Tuberculosis Centre’s Strategic Plan for 2016-2021 aims to find an additional 20,000 cases relative to the 2015 baseline (Narsingh 2016).

To reach this goal, innovative means are required, particularly in isolated and hard-to-reach communities. This pilot project aims to improve case finding by linking community health workers (CHWs) with state of the art diagnostic tools (GeneXpert) via unmanned aerial vehicles (UAVs) (aka “drones”). The aim of this project is to assist the MoHP and NTC by generating the data necessary to assess the suitability of the approach for nationwide expansion. This MoU outlines a cooperation framework between the institutions which will oversee, implement and evaluate the pilot programme.

Objectives

Primary objectives

The objectives of the Nepal DrOTS program are three-fold:

- ⑦ Establish an “on-demand” drone service in the mountainous/hilly area, which includes an appropriately equipped and staffed base camp and a cadre of health workers who are able to request a drone when appropriate, manage the drone and related technology upon arrival, and launch the drone for its return flight.
- ⑦ Remotely Diagnose TB: The same cadre of health workers will be trained to recognize TB symptoms in people, explain to them the need for testing, and safely obtain quality sputum samples to be flown via drones for TB diagnosis with rapid molecular diagnostics.
- ⑦ Remotely Observe TB Therapy and improve case holding– By combining conventional health provider interaction and innovative technologies, we will monitor patients during their TB treatment for adverse drug reactions, ensure medication adherence, and assess trends in symptoms. We will implement patient-centered care for the entire follow-up period, so as to reduce case loss during the period after which a patient feels better.

Secondary objectives

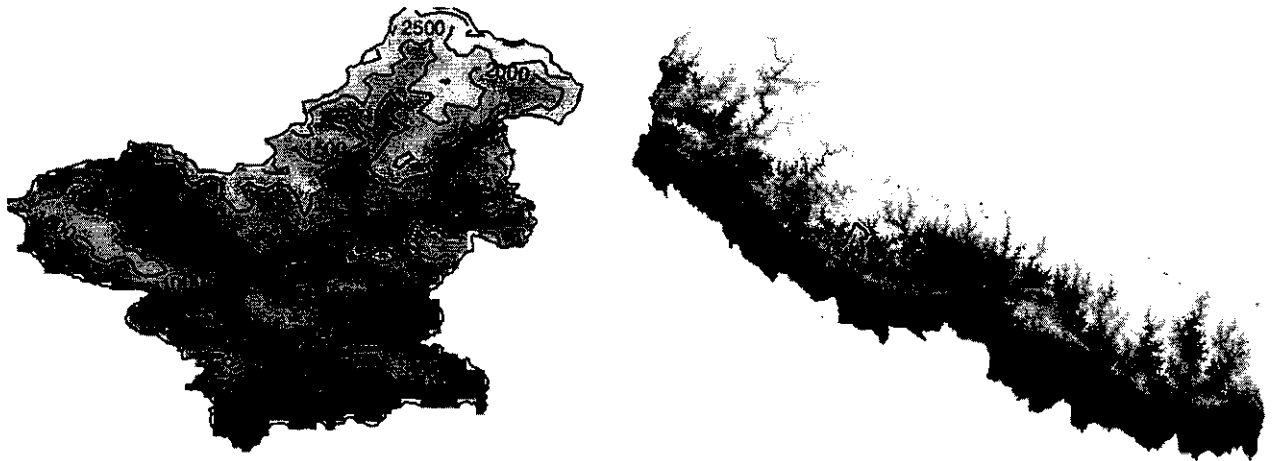
Our secondary objectives are (i) to educate and empower local partners to assume full ownership of the DrOTS program, so as to ensure its sustainability after the project ends; and (2) to generate evidence regarding the feasibility, acceptance, and cost-effectiveness of the DrOTS program, with a focusing on informing an eventual scale-up of its services nationwide.

Vision

Assist and empower the National Tuberculosis Programme in identifying an additional 20,000 patients annually with TB by 2021, reducing TB incidence to 1 per 1,000,000 by 2035, and eliminating TB transmission in Nepal by 2050.

Project location

This MOU and project proposal covers the period only through the end of March 2019, during which there will be only one site for the pilot: **Pyuthan district**. Depending on the effectiveness and suitability of the project, it is foreseeable that there will be an expansion phase (April 2019 and beyond) in which additional districts are covered. However, in this case, all work will be covered in a separate MOU and project proposal, developed in conjunction with the MoHP and BNMT.



Project period

The pilot project will take place during the 12 month period from 1st October 2018 through 30 September 2019.

Project phases, activities and deliverables

Phase A1: Approvals and engineering foundations

1 October 2018 - 15 January 2019 (3 months)

Phase A1 commences after the signing of contracts, and the establishment of funding mechanisms for the various partners. This phase has two main purposes:

1. Build engineering foundations for cargo delivery flights in Nepal
2. Seek flight permissions and related government approvals

Engineering activities for cargo flights will be led by WeRobotics Global team.

Communication, and administrative work related to flight permissions will be carried out by Nepal Flying Labs.

At the end of Phase A1, all partners will take stock of progress:

- Flight permissions secured?
- Engineering on track?
- Strategy on track?

If the objectives of Phase A1 are met, the partners will move to Phase A2. If the objectives are not met, the partners will collectively determine whether the project should be phased out or whether the timelines need to be updated.

Phase A2: Training, preparation, ground operations, and trial flights

January 2019 - 31 March 2019 (3 months):

Phase A2 has several main activities:

1. The training of community health workers via BNMT
2. Complete engineering foundations
3. Confirm 6 villages for flight deliveries, plan flight missions
4. Confirm flight permissions, administrative work related to flight activities
5. Import cargo drones and supporting tech

The training of community health workers (CHWs) via BNMT will ideally begin in January, so as to capitalize on an already existent 30 person network of CHWs on-site. Purchase of equipment for data collection and information dissemination (tablets and phones) and of laboratory and medical equipment for specimen collection and transport will be carried out.

Continuation of engineering activities for cargo flights will be led by WeRobotics Global team.

Communication, and administrative work related to flight permissions will be carried out by Nepal Flying Labs.

Concurrent to training and administrative work, flight plans will be developed, as well as SOPs and contingency plans.

Deliverables

1. WeRobotics: complete drones and supporting tech for cargo deliveries.
2. WeRobotics: handle all importations of tech.
3. WeRobotics: prepare flight mission plans for 6 villages to be operated, checklists, SOPs.
4. NFL: Apply for approval by relevant ministry(ies) to import drones and fly autonomously (BVLOS - beyond visual line of sight).

5. BNMT: Detailed preparation of internal planning documents and protocols for standard operating procedures for CHWs.
6. BNMT: CHWs trained and ready to engage in on-demand sputum transport.
7. BNMT/SBU/NFL: Procurement and importation of materials.
8. BNMT: Ethical approval for Phase 2 operations from NHRC.
9. BNMT: Hiring of staff, associated planning meetings, and all budget items associated with phase 1.
10. SBU: Development of data collection tools.

Phase B: Combined ground-air operations

1 April 2019 - 30 June 2019 (3 months):

Phase B is intended as a “Pilot” phase to take time to ensure that all individual components of the program work at one site: that the drones fly, that the mechanisms for making payments to partners and paying wages in-country work, that the laboratories perform their duties, that the data collection tools are functional, that educational technology (phones+tablets with video curricula) are programmed and deployed, and that our legal status is solid, etc. In other words, all the activities in this phase are geared towards achieving one thing: the production of a Nepal DrOTS Minimal Viable Product (MVP), ie a bare-minimum (but fully working) program at one site (Pyuthan district).

Carrying out the MVP will be iterative, and highly contingent on the successes and failures of prior sub-processes, as well as the ongoing input of the supervisory, consultative and implementing partners. That said, in a general sense, pilot will require the following activities:

- Establishment of an in-country presence (office, etc.) by program manager.
- Purchase of resources (both physical and virtual) for data collection, management, and real-time analysis. - Training of staff involved at each step of the DrOTS process (flying, suspect case identification, laboratory diagnostics, data management).
- On-the-ground recruitment of partners/champions from local communities.

Deliverables:

1. WeRobotics: Train local drone pilots on cargo flight operations.
2. WeRobotics: Carry out 3 months of cargo drone flights to 6 selected villages.
3. WeRobotics: Ensure local drone pilots sufficiently trained and experienced to continue.
4. BNMT: Acquisition and establishment of an on-site office (shared).
5. SBU: All main roles receiving funding either directly (through employment/grants) or indirectly (through partnership contracts).
6. SBU: Data collection and educational software deployed, tested, re-deployed.

7. BNMT/SBU/NFL: Successful “full cycle”: remote flagging of suspect TB case, drone call, specimen transport, diagnosis, treatment initiation, remote treatment monitoring.
8. BNMT: Hiring of staff, associated planning meetings, and all budget items associated with phase 2.
9. NFL: Provision of on-demand flying services (piloting, route planning, data collection, delivery) from Pyuthan Hospital to all suspect TB cases in the district.
10. SBU: Write-up of SOP / protocol for proposed expansion within government programs.

Phase C: Combined ground-air operations

1 July 2019 - 30 September 2019 (3 months):

This is a continuation of Phase B, but different in two ways: (i) WeRobotics will no longer manage air operations (they will be transferred to local staff fully), and (ii) all operations should be systematized sufficiently that they no longer require substantial tweaking, experimentation, or major changes.

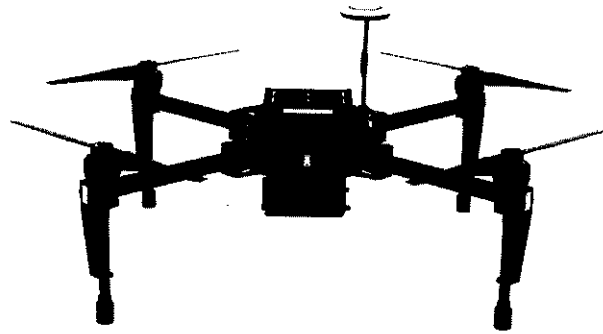
Technical details

Phase B (April-June 2019) will involve on-demand drone flights for the transport of sputum to the District Hospital from 6 village sites. The details of these operations are as follows:

Drone to be tested

Due to the highly mountainous terrain and the extreme weather conditions of Nepal, WeRobotics will be testing the use of a very robust and established drone that can land in small areas. For the distances and cargo required in these tests, WeRobotics proposes to use the following:

The “DJI Matrice 100” or M100, is a commercially-available heavy-lift multicopter (4 rotors) produced by the Chinese drone company DJI. The drone is designed primarily for the imaging industry able to carry up to 1 kilogram of cameras for imagery and video capture. It is industry proven, stable and reliable, robust to wind and challenging weather. This drone is not specifically designed for cargo delivery or Beyond Visual Line of Sight (BVLOS) flight, so it will be adapted to work outside of radio range during deliveries. More information on the M100 can be found at <https://www.dji.com/matrice100>



WeRobotics is currently advancing on the M100 for cargo delivery and BVLOS flight.

Routes, frequency and cargo

For these trials, WeRobotics will focus on **6 flight routes** between a central hospital and remote villages. While the exact routes still need to be considered and confirmed, it should comply with the following operational parameters:

- For all routes: fixed route between 1 fixed take-off location and 1 fixed landing location
- Flight routes can only be modified upon agreement with WeRobotics Global team
- Start and landing zones: a minimum of a flat **15x15m** take-off and landing zone with no nearby obstructions is required
- Range: Maximum flight range of **15 km** including both horizontal and vertical distance. Range can possibly be extended by using a hybrid approach using a motorcycle, or by introducing battery recharging/swapping locations.
- Cargo weight: Maximum **100g** including cargo box
- Cargo volume: Maximum **100mL**
- Cargo type: Sputum or pills. Possibly other types of cargo, as long as within weight/volume requirements and classified as non-hazardous.
- Frequency: on demand, minimum 1 flight per week, maximum 1 flight per day
- Flight frequency and cargo specifications are modifiable upon agreement with WeRobotics Global team
- Environmental conditions:
 - Max. wind speed: 10 m/s
 - Rain/Clouds: flights cannot be operated in case of limited visibility and rain

- Tech repairs: WeRobotics will provide remote support from abroad, while any maintenance will be done via Nepal Flying Labs.
- Risk assessment

The main risks to the project are outlined in the table below:

Owner	Risk Event	Entities at Risk	Probability of occurrence (H/M/L)	Impact of occurrence (H/M/L)	Mitigation Plan	Overall Risk Profile (H/M/L)
WeRobotics	Collision with other flying subjects (aircraft, birds)	Other subjects and people, property and environment over flown	- Low for aircrafts because of low flying altitude above ground - Low for birds, depends on local bird population	Low, as we will avoid as much as possible to fly over populated areas. We will also add a safety parachute in case of unscheduled landing	- Plan flight route to minimize flying over houses, streets, etc. - Safety parachute on drone	Low
WeRobotics	Unscheduled landing due to technical failure	People, property and environment over flown	Low, as chosen platform is proven to be very stable, reliable and robust.	Low, as we will avoid as much as possible to fly over populated areas. We will also add a safety parachute in case of unscheduled landing	- Plan flight route to minimize flying over houses, streets, etc. - Safety parachute on drone	Low
WeRobotics	Drone Landing Vertically outside of designated landing site	People, property and environment over flown	Low, as chosen platform is proven to be very stable, reliable and robust.	Low, as we will avoid as much as possible to fly over populated areas.	- Plan flight route to minimize flying over houses, streets, etc.	Low
WeRobotics	Drone Landing Vertically in a secure rally point	People, property and environment over flown	Medium, as this is an implemented safety feature that will secure the drone in case of unexpected situations (e.g. strong winds)	Low, as rally points are predefined landing points in open areas.	Plan rally points every 2-3 km in open areas.	Low
WeRobotics	Drone technical failure at takeoff or landing	People and property at take-off/landing sites	Low, as chosen platform is proven to be very stable, reliable and robust.	Low, as drone is low above ground and in visual line of sight.	- Follow strictly checklist and SOPs - Safety parachute on drone	Low
WeRobotics	CAA does not grant flight permissions	Overall project	Medium, as WeRobotics has already worked in Nepal and	High, without flight permissions, drones will not	Initiate flight permissions process as first step of	Medium

			previously secured flight permissions, but not for cargo operations	be able to fly	the project	
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Training/capacity building

Local capacity building through local hands-on trainings is central to the mission of WeRobotics. The drones will be prepared and enhanced in Switzerland and then brought to Nepal where local pilots will be selected and trained on how to operate the drones safely, responsibly and effectively. This will also include trainings on local repairs and maintenance. A first week of trials will be run to establish checklists and standard operating procedures. Cargo will be carried in both directions. Once the infrastructure is in place, the local pilot team will continue operations for the rest of the trial period.

Personnel roles

Key personnel from WeRobotics and Nepal Flying Labs:

- Patrick Meier, Executive Director, WeRobotics
- Andrew Schroeder, COO, WeRobotics
- Jürg Germann, Head of Engineering, WeRobotics
- Uttam Pudasaini, Coordinator of Nepal Flying Labs

Required support from MoH/BNMT

WeRobotics will need support on the following:

- Cargo type to be transported Precise GPS coordinates of the takeoff/landing site, to be provided by SBU
- Images and/or videos of takeoff/landing sites, ideally seen from the air using a drone, to be provided by SBU
- Measure of 3G and telephony services available at the takeoff/landing sites, to be provided by SBU
- Weather prognostics for the routes - average wind speed, rain during the trial period, to be provided by SBU

Project funding

Source of funding

All funds will be provided by the Global Health Institute of Stony Brook University.

Fund-flow mechanism

Funding will be through direct implementation. The funder (SBU) will make pre-agreed, deliverable-linked payments to the implementing partner (BNMT) and drone partner (Nepal Flying Labs).

Total amount:

BNMT will receive \$193,290.80 from SBU to cover project activities and materials.

WeRobotics will receive \$106,909 from SBU to cover project activities and materials. In addition, WeRobotics will provide \$73,388 in “in-kind” contributions (salary support, etc.) to the project.

Details:

The breakdown of project expenditures for BNMT and WR is at the end of this document in the “Itemized Budgets” section.

Payment dates:

Payments to BNMT will be dispersed 4 times.

1. October 1, 2018: \$39,179.20 to BNMT
2. December 1, 2018: \$50,000 to BNMT*
3. February 15, 2019: \$50,000 to BNMT*
4. May 15, 2019: \$54,111.60 to BNMT*

Payments to WeRobotics will be dispersed 2 times:

1. October 1, 2018: \$33,760 to WR
2. January 15, 2019: \$73,149 to WR*

* Payments may require prior approval from the SBU IRB or other internal SBU accountability/approval mechanisms, as well as approval from the funder. Though payments are expected to be carried out on time, delays are possible. In the case of delays, SBU will make every effort to carry out the payment as soon as possible after the intended dates.

* Payments will be carried out upon the satisfactory completion of deliverables and budget items, or satisfactory progress towards their timely completion.

The final payments are conditional upon project funds remaining. Though the current budget should allow for all project activities, unforeseen expenditures or over-spending in any area may require that the final payments be adjusted.

In the case of delays or non-completion of project deliverables, payments may be withheld or reduced following discussion and agreement by both parties on revised budget and deliverables. Likewise, in the case of unforeseen expenses or greater than expected project scale and speed, payments may be increased in size or advanced in timing in order to support partners' needs.

All project related expenditures (salaries, purchases, etc.) should be itemized and tracked, for auditing and accountability purposes.

Funding associated with budget items which are not executed, deliverables which are not carried out, or purchases which are not made, will be returned to the funder.

Reporting requirements

All reports will be made available to all partners. Progress reports will be prepared and submitted quarterly. This final project report will be prepared and submitted after completion of the whole project, and will incorporate outcomes, expenditures, and recommendations.

Publications, press, and publicity

Publications: The parties agree to full and open collaboration with co-authorship on relevant papers according to international authorship norms, specifically the ICMJE recommendations regarding the roles of authors and contributors.¹

Press and publicity: In interactions with the press, on social media, and in publicity materials, the parties will make reasonable efforts to coordinate and attribute credit to the implementing organizations (SBU, BNMT, NFL), funders (NSF), and government partners, to the extent that the aforementioned wish to be acknowledged. If in doubt or in disagreement regarding how or whether to attribute credit in certain cases, the parties will explicitly seek input from one another and work to ensure that appropriate credit is given.

Exit plan

During project implementation BNMT Nepal will strengthen the health service system through capacity enhancement of health personnel. Similarly, local drone services (through NFL) will be funded and capacitated, as well as linked to health services. Upon the completion of the pilot, and during the intended post-pilot expansion phase, results of the pilot will be disseminated and discussed with policy makers and relevant stakeholders in the community and governance, to devise a locally-led continuation/expansion strategy if appropriate.

¹<http://www.icmje.org/recommendations/browse/roles-and-responsibilities/defining-the-role-of-authors-and-contributors.html>

Signatures

The parties affirm to know, understand and agree to all articles of this project agreement as negotiated together.

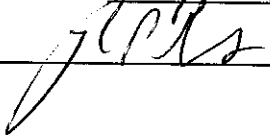
WeRobotics / Nepal Flying Labs

Name and Position: Patrick Meier, Executive Director

Signature:  Date: Sept 11, 2018

The Research Foundation for SUNY at Stony Brook University

Name and Position: Lyc P. Gouss

Signature:  Date: 9-13-18

Itemized Budget

See <https://docs.google.com/spreadsheets/d/1wYJ-yuZ3gmCr39dO3Gef0wv8R5pistgP0tOs8FbEcQI/edit#gid=0>

References

Marahatta, Sujan. 2013. "Epidemiology of Tuberculosis in Nepal." *Conference Paper*.

Narsingh, Kedar. 2016. "National Tuberculosis Program, Annual Report." Government of Nepal, Ministry of Health. <http://nepalntp.gov.np/wp-content/uploads/2018/03/Final-Annual-Report-NTPN-2018.pdf>.