

WeRobotics – Annual Report 2018

March 2019





Organization

WeRobotics is registered as a legal entity in both the USA (501C3) and in Switzerland (tax-exempted association). These two separate legal entities share their resources depending on expertise and availability in order to achieve the overall mission of the organization: Building aid, health, development and environmental solutions by sustainably localizing robotics technologies.

Activities - Programs

WeRobotics' focuses on 3 main activities:

- Localize: incubate a global network of Flying Labs
- Accelerate: sector-oriented program tracks and trainings
- Share: facilitate open sharing and convene stakeholders through our global community



1. Localize – Global network of Flying Labs

Incubate and enable a network of Flying Labs, local knowledge hubs, in Africa, Asia, Latin America and Oceania to localize the use of robotics technologies such as drones and AI by communities to address local social challenges.

In March 2018, we introduced our new Flying Labs strategy. Based on our proof of concept and prototyping over 18 months in 2016 and 2017 with Nepal Flying Labs, Tanzania Flying Labs and Peru Flying Labs. Before our POC, we believed that WeRobotics would support the setup of all of its Flying Labs with funding and be directly involved in co-creating each lab, including in their setup and legal structure. The POC has given us great insights on how the most effective way of scaling up our Flying Labs network will be to create two types of Flying Labs: Regional Flying Labs and Affiliate Flying Labs.

Regional Flying Labs have the need to be funded for a 2–3 year period in order to create a strong regional expert hub with a permanent staff of 3–4 people. Regional Flying Labs are extensively trained and supported by WeRobotics and are exposed to an intense knowledge transfer process so that they can become the regional experts that then in turn can train and support the Affiliate Flying Labs in their respective region. In order to choose the best locations for Regional Flying Labs and understand the local and regional environments, WeRobotics organizes Co-Creation workshops with stakeholders. In 2018, 2 such workshops were held in Benin (June 2018) and Panama (October 2018).

Affiliate Flying Labs are set-up and self-sustained from their very beginning by local organizations and entrepreneurs. They receive access to various resources (technical and business trainings, technology partners, communication support, etc.), have direct access to the collective knowledge of the Flying Labs network and give back to this network by sharing their experiences in blog posts, webinars and through direct interaction with other Flying Labs.



The massive global demand from highly competitive organizations who seek direct affiliation with the rapidly growing network of Flying Labs is very real. This affiliate model is based on the franchise business model and our customized version builds directly on more than 10 years of lessons learned from the highly successful and distributed TEDx model.



Since launching the Affiliate Program in March, we have added a total of 13 new Flying Labs in 2018, bringing the total number of Flying Labs at the end of the year to 17 (5 more are currently under review and will be added in Q1 2019). As such, in just 9 months we have expanded the global Flying Labs network by 400% by the end of 2018. More specifically, we have added 7 African Flying Labs in Kenya, Uganda, La Reunion, Benin, Cameroun, Côte d'Ivoire and Morocco. In Asia, we have added 3 Flying Labs in the Philippines, Japan and India. In the Latin American region, we have added 2 new Flying Labs in Chile and the Dominican Republic. In short, the Flying Labs franchise is really taking off.

At this rate, we expect to double the number before 2020 to 40 Flying Labs. This unique, global network of Flying Labs offers a wide range of new and exciting opportunities that were simply not available just one year ago as every new Flying Labs brings to the network its own expertise, experience, use-case and technology solutions.

One of the many stories of our growing Flying Labs network: Building Robots and Training Youth to Solve Local Challenges



Dessap is 21 years old. He wakes up every day to fine-tune Dessbot, a terrestrial robot he built to detect landmines, collect gas leakage data and help climate prediction for better decision-making in case of disaster. He is one of the youngest engineers in our <u>Cameroon Flying</u> <u>Labs</u>' team.

As many kids his age with a passion for electronics, he used to dismantle toys to understand how they worked but it wasn't until he built from scratch his own electric car that his mother, impressed by his natural talent, started worrying about Dessap's future. Robotics are for white privileged people, she thought, and encouraged him to pursue a career in medicine instead.

A hard-core robot maker, Dessap never gave up his dream to become an engineer, making that his goal in life. At 13, he built his first robot in-between classes and after school, straight through University

where a teacher, inspired by his work, gave him an opportunity. Together, they started training other students to build robots for robotics competitions.



The first global competition in 2017 in Washington DC was a pivotal moment for Dessap's career: he discovered robotics could be used to solve local challenges in his community. That's when Dessbot came about — an exploratory robot for data collection and for visualizing, analyzing and predicting air pollution and climate warming. Dessbot is equipped with a camera, a 5-degree robotic arm and sensors for temperature, humidity, air quality, UV light, atmospheric pressure and soil moisture. The control range is 1km LOS and all of the data collected is transmitted to the main station and visualized locally through a dashboard via internet. Dessbot can have multiple applications: in the army, for inspection and detection of explosive landmines and gas leakage; in agriculture, to help farmers collect data on their plants' health conditions and soil composition; in robotics research and in schools for educational purposes, workshops and training.



Today, Dessap is a TME (Transfer Multisort Elektronik) Education Ambassador in Cameroon engaged in promoting and democratizing electronics and technology-related knowledge across Cameroon, especially in regions where access to proper training is limited. After graduating from the National Advanced School of Posts, Telecommunications, Information and Communications Technologies, he obtained his Bachelor's degree in Radio Communications and founded Robot Save, a start-up for the deployment of Dessbot.

In November 2018, Robot-Save won the Start-up AI Challenge 2018 for its innovative implementation of AI for problem-solving. Dessap's dream, is to see the first exploratory robot in Africa

help vulnerable communities solve local challenges. It was his goal in life, it's now his higher purpose.

Activities in 2018

All project and program related activities supported by WeRobotics staff can be found under the various program tracks of "2. Accelerate" here after. In addition to these activities, WeRobotics' main investment for Flying Labs can be summarized in following activities:

- Selection process of new Affiliate Flying Labs
- Set-up of new Affiliate Flying Labs (webpage, communication, admin and IT resources)
- Curation and publishing of Flying Labs' blog posts and Social Media posts
- Creation and implementation of training resources (powerpoint presentations for technical trainings)
- Creation and implementation of project management resources
- Creation and implementation of communication guidelines and resources and mentorship to help Flying Labs becoming strong communicators



- On-site trainings for Flying Labs (organized in Regional Flying Labs for all Flying Labs of the respective regions): technical drone trainings, certification trainings, GIS and actionable analytics trainings, business model trainings
- Partnership negotiations for in-kind donations of software, discounted hardware and free access to online certification courses
- Facilitation and negotiation of international projects and opportunities
- Technical support for projects for Flying Labs projects and trainings organized by Flying Labs
- Business and project management support and mentorship for Flying Labs projects and trainings organized by Flying Labs
- Organization and facilitation of Co-Creation workshops to identify local needs & challenges and define value robotics technologies can add



2. Accelerate – Sector-oriented Programs & Trainings

Create program tracks that build best practices and ethical guidelines for the use of robotics technologies in humanitarian aid, global health, conservation, agriculture and development.

AidRobotics – Robotics for Humanitarian Aid

Activities include national-level workshops for drone imagery coordination during disasters, experimentation of VR/AR and 360-degree drone panorama imagery for fast response, experiments in small package delivery during disasters, and the creation of a fast-response capacity throughout the Flying Labs network for deployment during disasters.

Highlight of the Year: AI Challenges, Humanitarian Trainings and Thought Leadership



Using Artificial Intelligence to automatically to assess the impact of humanitarian disasters on local food security

Open AI Challenges

Aerial data is a Big Data problem. In just 20 minutes, a drone can capture some 800 high-resolution aerial images. Research at Texas A&M University shows that a professional analyst will take 60 seconds (on average) to analyze one such image. As such, capturing 800 aerial images in 20 minutes requires over 13 hours of manual analysis. The vast majority of projects that Flying Labs are engaged in require multiple if not dozens of drone flights. This Big Data challenge makes it difficult for Flying Labs and others to produce analytical results and data-driven recommendations in a timely manner.

This explains why WeRobotics has created and led a coalition of partners around a series of Open AI Challenges. The first focused on automatically assessing the impact of disasters on food security in the South Pacific from aerial imagery. The winning algorithm was made open source and are also available on our partner's platform, Picterra.

The second challenge focused on automatically identifying individual buildings in Tanzania for disaster preparedness and response projects. Over 120 data scientists participated including data scientists from Cameroon, Ethiopia, Kenya, Namibia, Nigeria, South Africa, Sudan, Tanzania, Uganda, Zambia and



Zimbabwe. Again, the winning algorithm was made open source and is available on Picterra. These algorithms allow Flying Labs and their partners to offer timely analytical solutions to decision-makers.

Humanitarian Trainings

WeRobotics has gained unique expertise and experience in the use of drones for humanitarian action. This explains why WeRobotics has trained multiple UN agencies, Red Cross societies and other humanitarian organizations in over a dozen countries. These professional, in-person trainings don't scale easily, however.

So WeRobotics launched an Online Training Academy and offered a 7-week online training on drones in humanitarian action. Close to 150 individuals from over 30 countries took the training, with the majority of participants being from developing countries. Given the success of this first online training, and the need to continue building the capacity of the growing network of Flying Labs, WeRobotics will be introducing additional online trainings in the use of drones for public health and agriculture, for example.

Thought Leadership

Given that WeRobotics is still one of the few organizations to have expertise and experience in the use of drones in humanitarian efforts, we are actively sharing our lessons learned and best practices, particularly with other humanitarian organizations and policy makers, both in the US and in Geneva, Switzerland.

For this reason, WeRobotics has teamed up with a range of partners to organize a series of experts meetings on the use of drones in humanitarian action. These partners have included swissnex and the Geneva Science-Policy Interface at the University of Geneva. Well over 60 participants from leading aid and development groups have taken part in these meetings and opened up new dialogues and solution discussions that will influence the humanitarian sector on a global scale. Follow-up actions of these meetings are planned for 2019.



We have also given a number of keynote presentations and talks at important public events such as the recent UBS Global Philanthropy Forum in St. Moritz. These high visibility events are key to promote the expertise that WeRobotics has in humanitarian aid.

Activities in 2018

 January 2018 - Amsterdam - Drones in Disaster Management Training This training took place over three days with representatives from 8 international humanitarian organizations. The focus was on drone imagery for disaster management



workshop that focused on the use of large datasets in damage/needs assessments. The workshop included a table-top simulation exercise.

March 2018 - Tanzania - Drones in Disaster Management Training

This training was organized by the Tanzania Flying Labs. It hosted 8 participants for a 3-day training course on drone piloting for disaster management purposes. The training concluded with a participant project that involved a disaster response exercise.

- March 2018 South Pacific Flying Labs (Fiji)
 In-country drone disaster response training on new software technologies including Hangar and Survae and a disaster risk reduction project for hazard-prone informal settlement.
- April 2018 Seychelles Drones in Disaster Management Training

Over the course of one week, representatives from 34 Seychellois organizations participated in a crash course on drone technology for disaster management purposes, and a select group received practical technical training from regional experts on this topic. The training consisted of two focus tracks: (1) mapping and (2) disaster, both of which covered knowledge required for drone-related mission preparation, data collection, data processing, and data visualization/use.

• May 2018 - Open Al Challenge

Completion of first Open AI Challenge, which focused on food security in the South Pacific. Machine learning classifiers for the automated identification of crops were crowdsourced through an open competition. The winning team and runners up were Simon Fraser University (SFU) and the Technical University of Zurich (ETH).

May 2018 - Experts Meeting: Drones in Humanitarian Action

Co-organized and ran WeRobotics Experts Meeting hosted by swissnex Boston. Full day workshop focused in the morning on updating the International Humanitarian UAV Code of Conduct (UAVcode.org) to take into consideration recent developments in the field. The afternoon session focused on best practices in the use of machine learning (AI) in automatically analyzing aerial imagery after major disasters. A consortium of organizations was formed along with a decision regarding methodology -- namely the combination of crowdsourcing and AI for automated feature detection.

- June 2018 Online Training: Drones in Humanitarian Action
 The WeRobotics Online Academy launched a 7-week professional training course on the use
 of drones in humanitarian action. This training covers best practices, lessons learned, codes
 of conduct, coordination, localization, data analysis, regulations and more. Well over 150
 participants from over 40 countries (with the majority from developing countries) are
 engaged in this two-month training, which is the first of its kind.
- July 2018 Peru Drones in Disaster Management Workshop & Simulation: This event, hosted by the Peruvian Government and facilitated by Peru Flying Labs will bring together a diverse group of actors in disaster management workshop the use of drones in various use cases, and afterwards to test them in a live simulation.
- November 2018 Lesotho "World Vision & Red Cross Lesotho" Training: Tanzania Flying Labs trained project teams of World Vision Lesotho and Red Cross Lesotho in a "Disaster Management with Drones Training" on how to use multi-rotor drones to acquire data (photos and 360° images) to support their disaster relief efforts, especially in high mountain areas that are difficult to access on foot
- December 2018 2nd Open AI Challenge:

This 2nd challenge focused on identifying and classifying all building footprints into one of three construction status classes: foundation, unfinished and completed. Participants were given a set of very high-resolution images collected with drones over the island on Zanzibar, Tanzania. The evaluation criteria were based of the SpaceNet metric which is scored from 0 to 1 with 1 being perfect. A total of 126 individuals participated in Open Al Tanzania,



including numerous African data scientists that were connected to this challenge by our partners from Black in AI and DataKind. The two winning finalists were formally announced on December 6, 2018.

• December 2018 – Humanitarian Experts Meeting on Aerial AI in Geneva, Switzerland:

In collaboration with Swissnex Boston and the University of Geneva, we co-organized this Experts Meeting to discuss advances, needs and challenges of Aerial AI with 30 formally invited experts from leading NGOs and UN organizations such as WHO, IOM, ICRC, UNHCCR, UNICEF, Doctors without Borders, etc.

• December 2018 – Tanzania – Actionable analytics training:

Over a one-week period, Flying Labs in Eastern Africa (Tanzania Flying Labs, Kenya Flying Labs, Uganda Flying Labs) have received an in-depth training from WeRobotics on how to create actionable insights and easily shareable outputs from drone data products such as orthomosaics and 3D models. During 2 days, external participants from government agencies and incubated "Drones as a Service" companies have joined the training.



HealthRobotics – Robotics for Global Health

Activities are focused on medical cargo delivery using drones – platform development, field trials in rural and road-deprived regions, thought leadership through reports and conferences. A second activity track revolves around vector control through the release of sterile or genetically-modified mosquitoes that decrease transmission of Zika, Dengue and other tropical diseases.

<image>

Highlight of the Year: Our "Mosquito Drone Release" project with WMP

Release mechanism mounted to drone and in flight in Nakasi, Suva, taking off for a fully autonomous mosquito release mission.

Project Summary

WeRobotics is partnering with World Mosquito Program (WMP) to engineer and field test a mechanism for the aerial release of Wolbachia-infected mosquitoes to combat mosquito-borne diseases such as dengue, Zika and chikungunya. Over the last 9 months, WMP and WeRobotics staff managed to develop and lab test a release mechanism (hardware, software & ground station) and integrate it to a UAV platform to perform the first aerial field releases of Wolbachia-infected mosquitoes in a 1km2 village, Nakasi located in Suva, Fiji. First results of the field tests confirmed the high quality of the mosquitoes released by the mechanism via air and the potential of the release mechanism/UAV system for large scale expansion.

Development of the release mechanism

First, we defined the target mosquito release mechanism parameters that serve as objectives for the development of the new release system:(*i*) store and release capacity up to 200'000 mosquitoes; (*ii*) chilling & drying onboard (6-10 deg C and relative humidity less than 60%) as constant variables for at least 1h, (*iii*) reliable and constant dosage system if around 150 per release points.

Given the above criteria, we investigated different concepts for a new release mechanism. After going through several iterations, we selected the most promising concept, featuring:

• 2 stage dosing mechanism for dosing accuracy



- The first dosing stage is done by a cylinder separator, designed to dispense about ~1500 mosquitoes from a canister filled with 40'000 mosquitoes
- Second dosing stage is achieved by dropping the mosquitoes onto a treadmill with 10 compartments, enabling a dose of ~150 mosquitoes
- Mosquitoes in the compartments are ejected one compartment at a time through an output via air flow

Based on this concept, we implemented several prototypes including control electronics and software. Throughout the year, we optimized several mechanical parameters to achieve consistent dosing quantity, as well as added separate airflow circuits for controlling temperature and humidity inside the release mechanism. The mechanism was tested comprehensively and we demonstrated that the release mechanism was dosing an average of 200 mosquitoes and the cooling was stable for 1 hour. Health check on the ejected mosquitoes showed that mosquitoes remained good qualities.

Given the positive results of the lab tests, we decided to prepare and setup all necessities for field tests over a 1km2 area in the South Pacific in Fiji in November-December 2018.

For this, we optimized the mechanics for drone integration, user-handling and robustness, and we further developed all control electronics as well as embedded software including the interface to the drone to enable a fully autonomous release system. In addition, we also further developed our ground station software that allows a user to plan and launch automatic aerial mosquito release missions.



World Mosquito Program Team and WeRobotics Team Fiji 2018



Activities in 2018

- January 2018 WeRobotics Global (Switzerland)
 Started new 2-year grant with new partner World Mosquito Program (WMP) for development of next-generation mosquito release mechanism
- March 2018 Petrolina, Brazil
 Field trials of WeRobotics mosquito release mechanism resulting in biggest ever release of
 sterilized mosquitoes from a drone, with final report issued and USAID grant concluded with
 the development of our first mechanism.
- April 2018 Dominican Republic Flying Labs Cargo delivery training with Dominican Republic government agencies and local pilots and medical cargo delivery trials around Hato Mayor hospital
- July 2018 Australia and South Pacific Flying Labs (Fiji) Testing of 2nd generation mosquito mechanism at labs in Melbourne with WMP and community engagement around future mosquito release sites in Fiji
- November 2018 South Pacific Flying Labs (Fiji)
 First mosquito release field trials in select communities around Suva, Fiji using 2nd generation release mechanism
- December 2018 Papua New Guinea (PNG) Secured contract with the Center for Disease Control (CDC) to build local capacity on the use of cargo drones for medical deliveries in PNG. This training, which included flight demos, was carried out in February 2019.



EcoRobotics – Robotics for the Environment

Activities include agriculture initiatives, climate-change studies nature and wildlife conservation projects and evidence-based monitoring using aerial imagery.



Highlight of the Year: Our first major agriculture research project

While drone usage in agriculture is still very new and sometimes experimental, a certain number of interesting use cases have been identified over the last 3 years and are being used to a certain extent already in the Global North. Use cases include soil and field analysis, crop and irrigation monitoring, plant health assessment as well as planting and crop spraying. For the Global South, it is foremost important to establish use cases that are adapted to the agriculture needs and fit the value chains and value propositions specific to each area and country. For example, the African Union published a <u>decision</u> in February 2018, requesting the AU and Member States to harness drones for agriculture as one of three emerging technologies of relevance for African development. While this decision opens up many opportunities, it is important for solutions to take into account the local needs, context and value chains.

We were therefore very happy to team up with one of the world's leading research food protection institute, IFRI, and their <u>Food Security Portal team</u> as a partner of the <u>NASA's Harvest Consortium</u>, a new, multidisciplinary program commissioned by NASA and led by the University of Maryland to enhance the use of satellite data in decision making related to food security and agriculture domestically and globally. The pre-harvest loss assessment using satellite data requires the collection of detailed ground-truth data over the growing season. One of the main empirical methods to measure ground-based yield is based on farmer-reported measures of either production or plot area (or both).

Between February and September 2018, Tanzania Flying Labs and Agrinfo (for more information, see "DevRobotics" highlight) supported directly by WeRobotics have acquired drone and ground-truthing data in 3 data acquisition cycles, gathering over 60'000 multispectral images and boundary information of over 300 small-holder farms, covering 1'200 hectares of farm land. Normalized



difference vegetation indexes have been produced for each of the 4 areas of interest. The local data is now integrated in the analysis undertaken by University of Maryland and first results are expected for the end of the year.



Example of orthomosaic and NDVI integrating farm boundaries of one of the area of interest

Activities in 2018

- January September 2018 Tanzania IFPRI Pre-Harvest Loss Research Project "Pre-Harvest Loss" Research Project in collaboration with IFPRI, University of Maryland, WeRobotics, Tanzania Flying Labs and Agrinfo. TFL was in charge of all data acquisition and data products of both RGB and multispectral data to create a base layer of high resolution drone data to understand if high-resolution multispectral drone data can be used to calibrate satellite data with a lower resolution. First research results expected by mid 2019.
- March 2018 South Pacific Flying Labs (Fiji)

Training on new underwater drones with disadvantaged youth from the region. Youth were trained on two types of underwater drones to capture high resolution footage to study the health of coral reefs and marine life around Fiji. Youth were subsequently trained on how to study this footage to identify and count different types of coral species and fish.

- July 2018 Tanzania Local NGO training
 In collaboration with Tanzania Flying Labs, we organized a training of "Community Forest Pemba" to enable the local NGO to use drones for their conservation projects and acquire their own data to support their GIS base.
- August 2018 Zanzibar CGIAR Drones in Agriculture Training Course

 participants from countries like India, Pakistan, China, Rwanda, Senegal, Nigeria, Kenya
 and USA learned in this four-day hands-on training course given by WeRobotics and
 Tanzania Flying Labs in collaboration with our technology partner Pix4D and their latest
 Agriculture software Pix4D Fields how to gather their own geospatial data and how to create
 data products to solve their various challenges.
- August 2018 Tanzania Knowledge Sharing day of "Drones in Agriculture"
 Organized in collaboration with CGIAR, 20 participants discussed open Knowledge Sharing event their experiences, learnings, challenges and opportunities of drones in agriculture.



DevRobotics – Robotics for Development

This program focuses on the use of drones for the development sector (urban planning, land rights, etc.) as well as high-tech job creation through business plan competitions, business incubation programs for robotics-as-a-service startups and training around the use of robotics technology.

Highlight of the Year

In 2017, our two "Drones as a Service" Business Incubation Programs of 2017 organized in Nepal and Tanzania incubated 6 local service companies. Our main focus in 2018 was to see these companies grow and we do this through ongoing mentoring support from WeRobotics and facilitation of joint project opportunities. But why is this local business incubation key to WeRobotics and the Flying Labs strategy? As for WeRobotics, the goal of Flying Labs is not to become vast organizations but to help create and facilitate a local drone ecosystem, to then be able to collaborate with the incubated companies in pilot projects and training courses to further their skills and create a strong and skilled local workforce that can then help address the market needs. We are especially proud of seeing following 3 local companies thrive in 2018:

DroNepal (Kathmandu, Nepal)



In collaboration with Nepal Flying Labs, DroNepal has contributed on several projects this year, including a reconstruction project in the village of <u>Shermathang</u> that still has not received any official help on rebuilding their village after the 2015 earthquake. The team supported the local community with high-resolution maps and 3D models to support their reconstruction efforts, actively implicating the community in the mapping process to make it a learning experience in addition to providing the village

with much needed maps to start to redesign the village and make it more attractive and resilient.

Drone Wings (Zanzibar, Tanzania)

Counting 8 staff today, the company has been created in early 2018 on a decision to merge the Zanzibari Business Incubation winner "Zanzibar Drone Academy" and finalist "Disaster Management Society" into one organization to give it a better chance to grow and be more impactful. This decision proved to the right one, seen that Drone Wings have been busy with close to 20 local projects since January 2018. In addition, they have supported Tanzania Flying Labs for their work in the 10-day Drone Tour in



the Seychelles. Drone Wings also continue the important education work of Tanzania Flying Labs locally in Zanzibar, becoming an important local partner for Tanzania Flying Labs.

Agrinfo (Dar es Salaam, Tanzania)

Our work with local service companies does not stop once they are incubated. Our collaboration with Agrinfo is a very fitting example on how we keep on mentoring and supporting our Business Incubation Finalists. And we are very proud that Agrinfo has become the main local contractor for our



"Pre-Harvest Loss" project in collaboration with IFPRI and University of Maryland (see highlight under "EcoRobotics" for more details). Agrinfo has been included from the very beginning in this project and has learned through the project how to negotiate with international clients, how to set up and revise offers and how to follow international project management standards and project communication. Through the participation in such projects, Agrinfo also gains



important references for future projects and has been invited to speak at the UN World Data Forum in October 2018 together with the other project partners.

Activities in 2018:

- All year: Ongoing support TZ startups from last year in agriculture (Agrinfo) and humanitarian (Dronewings) projects
- All year: Inclusion of DroNepal in our upcoming Drone Cargo project in Nepal
- September December 2018, Tanzania Flying Labs:
 - Pilot project for land certification using drone-derived data and analysis in 3 villages of the Meatu District, Northern Tanzania, in collaboration with the regional government and ESRF, a local think-tank and partner of Tanzania Flying Labs. Project is ongoing.



3. Share – Global Community

Facilitate open sharing and convene stakeholders through our global community.

Through our two first activities, the creation and support of a growing global network of Flying Labs and our program tracks that allow for building sector-oriented best practices, we are in a unique position to gather knowledge, insights and highly valuable applied learnings in an important variety of geographical and social contexts. Sharing these insights and learnings with a wide global community is of importance to further the application of robotics in the social sector. So is the convening of stakeholders from the robotics industry, the civil society, local governments and financial partners. By convening and facilitating the exchange between these various stakeholders and our Flying Labs and project partners, we allow for example the robotics hardware, software and platform industries to bring their solutions to the local markets of low-income countries. And we allow the local stakeholders of these markets to drive new applications and solutions based on their needs by looping their feedback and experiences back into the global community. By creating and facilitating both a global ecosystem as well as local ecosystems through Flying Labs, all involved will be able to actively collaborate and find solutions for the numerous social challenges created by climate change and food security.

Activities in 2018

- Online Training Creation of our first online training course:
 - WeRobotics launched an Online Training Academy in April 2018 and ran the first ever 7week training on Drones in Humanitarian Action in June and July. The strong demand for this online training was remarkable, with over 150 participants from over 40 countries (majority in developing countries) actively involved in the training. Even though 50 participants from developing countries received scholarships to take the training for free, we still created a revenue of USD 15,000 from this one training. What's more, the feedback from these participants was especially positive, with many requesting that WeRobotics offer additional trainings on the application of robotics in other sectors such as health and agriculture.
- Blog posts (https://blog.werobotics.org):

In 2018, we have published 120 blog posts, all of them written either by WeRobotics staff or Flying Labs collaborators.

- Webinars: we have curated for and organized 8 webinars that were then freely published on our Youtube channel
- Conferences & Events:
 - WSIS Forum 2018 Geneva: organization of one working session on Drones for Disaster Response, session and keynote speeches by Sonja Betschart in 3 panels, booth in the exhibition area
 - o Solve MIT Boston: keynote speech by Patrick Meier
 - o GIS for Sustainable World Conference Geneva: session speech by Sonja Betschart
 - Humanitarian Drones Experts Meeting, Boston: co-organization of experts meeting with swissnex Boston and MIT
 - WEF Annual Meeting of the New Champions Tianjin: 2 session speeches and panel discussions by Sonja Betschart
 - WEF World Economic Forum's Sustainable Development Impact Summit New York: session speech and panel discussion by Andrew Schroeder
 - UN World Data Forum 2018 Dubai: organization of a session on "Drones for Agriculture" with panel representation from IFPRI, University of Maryland, Texas A&M University,



Stanford University, WeRobotics, Tanzania Flying Labs and Agrinfo

- Tanzania Policy Dialogue Workshop, Dar es Salaam: organized and facilitated a one-day conference in Dar es Salaam for all local government and social good stakeholders (50 participants) to discuss regulatory-related needs of the social good sector and create an official document that was included in the "Drone regulation creation process" of the government
- Experts Meeting on the use of Aerial Intelligence in the Context of International Aid and Development Geneva: co-organization of experts meeting and conference with swissnex Boston and Geneva Science-Policy Interface
- UBS Global Philanthropy Forum, speech by Patrick Meier
- Awards received:
 - Nepal Flying Labs won AUSI XCELLENCE Humanitarian Award
 - Co-Founder Sonja Betschart has been awarded as one of 100 Digital Shapers of the Year in Switzerland.

Other activities in 2018

In addition to the work accomplished for our 3 main activities, 2018 has been a year of consolidation, from an early start-up structure to a more streamlined organization, building a strong backbone that will allow us to grow and expand on solid grounds. We have reinforced our core organization with 3 new amazing staff members (now counting 11 staff of which 7 are working full time and 4 part time), have restructured our finance management to become fully audit-compliant, are currently redefining our brand and positioning and have integrated HR processes and policies to satisfy all donor and public funding requirements. And we have invested resources in finding and adding new income streams all the while reinforcing the current income.

1. Reinforced core organization

- **Engineering:** In addition to our Lead Engineer, Jürg Germann, we have reinforced our Engineering team based in Bern, Switzerland with a Junior Engineer as well as 3 highly dedicated, full-time interns from EPFL and ETH which focus on our Mosquito release project. Two part-time engineers have joined the team in October 2018 to work on our two new cargo drone projects over the coming 8 months.
- **Communications:** Communication is absolutely central to WeRobotics. Given the importance of strategic communications and the commitment required to grow our communications strategy, we decided to create a full-time position that was filled as of August 1, 2018 by Viviana Laperchia, former Communications Manager of drone market leader DJI.
- Drone Data Systems: This new position was filled in October 2018 by Joseph Muhlhausen, the former drone expert of the World Bank in Washington DC. Joseph enables our Flying Labs to further build their capacities around data management and data analysis. In addition, this position includes regular scanning of new industry solutions (both hardware and software) in order to ensure that our Flying Labs have access to a wide range of up-to-date solutions as well as the important responsibility in managing our growing strategic partnerships with industry to ensure those partnerships continue to both grow and benefit our Flying Labs directly.
- **Finance:** Another key priority in 2018 was implementing the necessary professional processes, methods and tools to efficiently forecast our financial situation and guarantee financial compliance. As of July 1, 2018, we reinforced our back office to complement our current Head of Admin and HR with a specialist in strategic finance, forecasting, consolidation and compliance and have been very fortunate to attract for this position a top specialist in this field with Wee Kheng Yuen (previously Head of Financial Compliance at Cisco) on a part-time basis (20%).
- HR/Admin: Joyce Monsees who has been filling this position as well as previously the Head of Finance position on a part-time basis has joined our team on a full-time basis as of October 2018. A number of HR policies and processes have been implemented under Joyce's guidance and allow us to be fully compliant with all our donor and public funding requirements.

2. Strategic realignment and updated Branding

Based on the learnings of our Proof of Concept and with a high number of opportunities and project proposals, we realigned our strategy in early 2018 with a concentration of our efforts on 3 core activities:

- 1. Localize: build local capacity sustainably to scale the responsible and effective use of robotics through our Flying Labs;
- 2. Accelerate: build and scale global solutions through our 4 program tracks and training curricula that engage both offline and online trainings;
- 3. Share: build our thought leadership by actively disseminating our lessons learned while growing a global community that connects local problem owners with problem solvers.



While concentrating our main efforts on these core activities, we do not want to lose our opportunistic approach for new proposals in order to nourish ongoing innovation.

We have updated our company communication, including the launch of our new website as well as the introduction of a specific website for our Flying Labs in summer 2018 and are currently working on realigning our branding (core vision and mission, brand statement, tagline) to reflect this strategic realignment and to continue strengthening the long-term foundations of WeRobotics.

3. Updated Engineering strategy

An important decision taken at the end of Q2 2018 was to realign our engineering strategy to ensure it is fully in line with our vision and mission around localization, acceleration and sharing. Our aim at WeRobotics was never to become a drone manufacturer. Rather, our comparative advantage is the sustainable localization of emerging technologies through our Flying Labs. Industry and academia are better suited to developing core hardware engineering solutions like building the full drone stack for cargo drones. A discussion with and decision from our Board of Directors confirmed that we should not pursue the manufacturing of the full "drone stack" and instead focus on localizing and existing robotics hardware and software solutions in low-income countries. This realignment had consequences regarding our human resources, e.g., the decision of Co-Founder Adam Klaptocz to leave our organization to pursue hardware engineering with his own for-profit company. The realignment also opened up new and clearer possibilities moving forward our "HealthRobotics" program track, including cargo drone solutions. To this end, we expanded our technology partnerships with industry to include cargo drone companies.

We are also very excited about the fact that we have started to partner with our Flying Labs on key engineering projects—particularly with those Flying Labs that already have strong engineering capacity. Our concerted efforts around sustainable localization through must not be limited to "just" localizing skills, technologies and opportunities; we must also localize engineering solutions and help build local engineering capacity as and where needed. To this end, given the ongoing engineering work required under the current grant with the World Mosquito Program (WMP), we have localized a number of engineering work packages within our Panama Flying Labs given that this lab is housed within the School of Engineering at the Technical University of Panama (UTP). Furthermore, given that the WMP deployments in Latin America will take place in neighboring Colombia, Panama Flying Labs will act as an ideal staging ground for testing and training of Colombian drone pilots.

4. Reinforced partnerships

Our organization model calls for an ecosystem approach and partnerships play a key role in the success of our business model. While we already have a number of technology partners, we have set ourselves the goal to reinforce these partnerships with a more active management of our technology partners and implication from their side. Important examples to this end are our strong collaboration with ESRI (and our participation at their Sustainable World Conference), the active implication of Pix4D in our training courses (Drones in Agriculture) as well as the bringing together of Amazon, ESRI, Drone Deploy and Harvard Humanitarian Initiative for a disaster response simulation in Peru. Additional new partnerships signed in 2018 include swissnex, DataKind and Picterra.

5. Income streams

After an initial growth phase in 2017, we have stabilized and continued our growth in 2018 around a few large and often multi-year grants (WMP, Hewlett Foundation, Rockefeller Foundation, IADB), one-year contributions like yours and have complemented our income streams with various project grants and consulting projects. We have qualified leads for 2019 for our various income streams and are currently building up a new income stream with UHNWI/HNWI with UBS as part of their Global Visionary



program. Through this program, we are also being challenged by both UBS and their philanthropic network to work on our long-term financing strategy and sustainability plan as well as a fitting M & E strategy and adapted Key Impact Indicators.

6. Monitoring and Evaluation

In all our activities, we take a "bottom-up" approach, putting local needs and local solutions first, focusing on local application and impact, not particular technologies. This bottom-up approach is one of our main differentiators from other organizations with similar activities. Coupled with our focus on localizing emerging technologies in the Africa, Latin America, Asia and Oceania for a large variety of Social sector applications, our bottom up networked approach makes for a challenging environment to define, monitor and evaluate "Key Impact Indicators." Common evaluation approaches in the social sector are largely defined by approaches focusing on change over time in particular programs. Given our core focus on improving the strength of local technology and business systems, linked to global networks, the most promising indicators for our work will tend to focus on the strength of systems, scale of influence, scope of participation and sustainability of change, all of which tend to be highly challenging to measure.

In order to implement a fitting M&E framework and adapted Key Impact Indicators that allow to capture the innovative approach and activities of WeRobotics, we have signed a partnership in October 2018 with Columbia SIPA to evaluate the most adapted M & E framework and Key Impact Indicators for WeRobotics over a 6-month period. Our M&E framework will be implemented once Columbia's work has been finalized in spring 2019.