Webinar: African Drone Forum 2020 Recap
March 18, 2020
Agenda

Introduction to the African Drone Forum
Catalina Ochoa and Roza Vasileva, World Bank

Recaps from the ADF Symposium Tracks
Technology
Antoine Beyeler, senseFly
Connected Skies
David Guerin, World Bank and Barbara Pareglio, GSMA
Logistics
Olivier Defawe, VillageReach
Regulations
Harrison Wolf, World Economic Forum

Discussion: Moving forward together
Edward Anderson, World Bank and above mentioned speakers
PROBLEM Rural Africa lacks Maps & Mobility

- Only 34% of Africans live within 2 km of an all-weather road compared to over 90% in East Asia.
- Critical Supply Chains are failing
- Road Safety became Africa’s 3rd biggest killer in 2018 after HIV and Malaria. 16% of road fatalities worldwide with only 2% of the world’s vehicles
- Only 3% of Africa’s Land is Digitally Mapped at local scale compared to over 90% in Europe

SOLUTION Autonomous Aerial Vehicles

- Harness **Autonomous Transport, Digital Fabrication, and AI Mapping** technologies with potential to impact health, agriculture, and cargo supply chains in the Lake Victoria basin – and East Africa region
- Drone Technology is evolving fast and offers a **leapfrogging opportunity in Africa** to develop new markets and boost rural economic opportunity
Symposium & Expo

1000+ registered participants from 53 countries including 60+ regulators from 26 African countries

50 exhibitors incl. 2 Government (Rwanda and South Korea)
8 Development Partners
40 companies
40+ drone displays

Over a three-day program
100+ speakers on technology, regulations, business & applications

Live drone displays for
250+ participants to Zipline Muhanga operations & Doosan Mobility demonstration

4 breakout tracks:
Regulations, Technology, Logistics, Connected Skies
Skills & Opportunities

The African Drone Business Challenge
10 Finalists from 9 African Countries
(selected from 148 applications)

200+ Rwandan Youth delegates & World Bank African Drone Youth Scholarship
for 21 Scholars from 11 countries (selected from 400+ applications)

Start-up mentoring, networking & USD 60,000 in prizes

60 Regulators and 250+ students at Rwanda Integrated Polytechnic Regional College in Karongi received Introduction to Drones Hands-on-Training from African Flying Labs

Dronemasters Academy launched in Africa to introduce youth and adults to drone technology
Lake Kivu Challenge

10 teams from 7 countries

3 flying competitions based on African use cases

400k USD in prizes + prequalification for pilot service contracts

68 Automated Flights Beyond Visual Line of Sight Electric

3500+ Safety expert hours implementing state-of-the-art Concept of Operations

Live showcase of UTM technologies for Africa
Roza Vasileva
Sr. Urban Data & Innovations Specialist,
World Bank Group
Overall, how would you rate the ADF2020?

125 responses

![Graph showing ratings from 1 to 5]

- 0 (0%) 1
- 0 (0%) 2
- 6 (4.8%) 3
- 43 (34.4%) 4
- 76 (60.8%) 5

#ADF2020
Was attending the ADF useful for your work?

125 responses

1 (0.8%)
0 (0%)
5 (4%)
33 (26.4%)
86 (68.8%)
How would you rate the venue of the event?

125 responses

- 95 (76%) rated 5
- 26 (20.8%) rated 4
- 3 (2.4%) rated 3
- 0 (0%) rated 2
- 1 (0.8%) rated 1
How would you rate the organization of the event?

125 responses

1: 3 (2.4%)
2: 6 (4.8%)
3: 8 (6.4%)
4: 38 (30.4%)
5: 70 (56%)
How was the ADF useful to you?

"Coming from the regulator the symposium enlightened me on the pivotal role the Regulators play in the drone operation ecosystem. This changed my mindset as far as handling the prospective drone operators vis a vis taking cognisance of the potential role of drones in economic development and addressing challenges especially in the African context."
- Regulator

"It was of great assistance to the review of my national regulations, policies and the procedures. It was an excellent mechanism of sharing information and most important harmonisation."
- Regulator

"Helped me align my National program next steps with best practices worldwide."
- Regulator
How was the ADF useful to you? (cont’d)

"ADF2020 helped me to understand the technology behind different drones model and usages including Fly duration, Payload, Mapping, etc... This enabled me to have ideas on what I can improve in my work."
- Government User Agency

"I wanted to learn about how drones are useful to agriculture sector. I can say that I gain knowledge and contacts so I will keep learning and I am planning to adopt the technology"
- Startup

"The ADF opened my eyes to how much embracing drones can change Africa and positively impact the African economy. How Rwanda has included the young people in the innovation process and created drive is inspiring for youth scholars from other parts of Africa. We can start where we are and not only wait for our communities to embrace drones but help in educating them about drones."
- World Bank African Drone Youth Scholar
How was the ADF useful to you? (cont’d)

“The ADF is extremely informative for my research, in that I was exposed to the global drone community whereby a wide scope of debates about drones are being discussed about - ranging from the technicalities of the drone technology, to the various applications of it, and to regulations and airspace management around it. I am very happy to have gained comprehensive insights from my participation in the ADF 2020.”
- Academia

“Networking, raising funds, opportunity to exchange ideas and develop partnerships.”
- Startup

“Not only did it help us make connections with those in our space (NGO-health-government) but we also learned so much more about what others are doing that we don't usually interact with.“
- Non-Profit Organization
Which track did you participate in?
114 responses

- Technology: 42.1%
- Logistics: 26.3%
- Connected Skies: 17.5%
- Regulations: 14%

How would you rate your track’s discussions?
115 responses

- 1 (0.9%)
- 2 (0.9%)
- 3 (12.2%)
- 4 (56.5%)
- 5 (29.6%)

#ADF2020
Which other tracks would you like to see?

- Training/Education/Skills
- Safety/Social Impacts/Ethical Implications
- Drone Innovations & Businesses in Africa
Which other **activities** would you like to see?

- Interactive & Hands-on Sessions/Training & Practice/Workshops
- Drone Demonstrations/Lake Kivu Challenge
- Startup/business pitching
How many valuable connections did you make?
122 responses

How satisfied are you with the number and diversity of the Expo exhibitors?
122 responses
Should the African Drone Forum be repeated?
125 responses

- 63.2%: Yes, every year
- 32.8%: Yes, every 2 years
- 1.5%: Yes, every 3 years
- 1.0%: No, one was enough
- 0.8%: Seen the quick evolution of the drone world, I think that, now, every year I good
- 0.4%: Definitely every year. We operate in a "fast paced" industry that requires regular updates

In your opinion, the three-day ADF program was:
125 responses

- 73.6%: Too short
- 13.6%: Just right
- 8%: Too long
- 5.2%: The length of the ADF was just right but the delays made the days and the program...
- 2.7%: Overloaded
- 2.4%: Too few breaks, and often behind schedule
- 2.4%: Just right but that will depend on the question
- 2.4%: The three days was good, but ending...
- 2.4%: I think 4 days might be too long but th...
How likely are you to recommend the ADF to your contacts to attend?

125 responses

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<thead>
<tr>
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Recaps from the ADF Symposium Tracks

Antoine Beyeler, senseFly
David Guerin, World Bank
Barbara Pareglio, GSMA
Olivier Defawe, VillageReach
Harrison Wolf, World Economic Forum
Technology Track - African Drone Forum
Antoine Beyeler - Co-Founder, senseFly

Photo Credit: African Drone Forum
Technology Track

Drone manufacturer – Service Providers – Engineering Services

Wingcopter
German Drones
Zipline
Venturi
FineVT
Phoenix Wings
senseFly/Drone Adventure
Trends and Discussion

• Hardware: ubiquitous VTOL, several payload release strategies
• Software: real-world applications require increasingly complex software stack
• Manufacturing: transition to local design & manufacturing needed to reduce cost and increase service provider capabilities
• Safety & Security: in everyone’s mind but not a cause for worry

Photo Credit: African Drone Forum
Challenges and Outlook

Technology is mature, Design Objectives aren’t

- Total Cost of Ownership targets?
- Legal framework – is SORA the future in Africa?

→ Focus on building “business” cases
Connected Skies - Africa Drone Forum

David Guerin - ADF Safety and Airspace Integration Advisor, World Bank

Barbara Pareglio - Technical Director Drone Interest Group, GSMA
CONNECTED SKIES - What was about?

Most of the commercial drones will access low level airspace and will numerically dominate our skies. The session explored the need and role of connectivity and how to safely and efficiently share the airspace.

Need to have a broader conversation also with non-traditional aviation stakeholders, from governments, drone manufacturers, Unmanned Traffic Management service providers, Supplementary service providers, Connectivity providers and research to discuss areas of upcoming needed work.
“...mobile networks will provide an agile, on-demand core network to coordinate an **ecosystem** of heterogeneous, multi-access network infrastructure to provide connectivity...”
CONNECTED SKIES - Government vision and efforts

Government viewpoint of the regulation gap for drones and the a stepwise approach to reach a full UTM/ATM integration

1. Identification of the applications of priority for Rwanda, health with Zipline and agriculture with Charis UAS
2. Identification of the applications of priority for Rwanda, health with Zipline and agriculture with Charis UAS
3. Provided a Performance Based Regulation: Part 27, based on SORA
4. MoU between RURA and CAA
5. Improved infrastructure in Rwanda, both fibre backbone and Mobile Connectivity where they are installing additional 68 Sites to improve coverage in border areas by May 2020
6. Collaboration with other CAA, an overview of the regulation plan by FAA. Korea approach on the regulation
CONNECTED SKIES - Real example from Africa

Medical delivery with Zipline

1. They do not consider themselves a drone operator, but more a medical service
2. Overview of the scale of the service, an average of 40 delivery a day from each station
3. Expansion to neighbouring countries, the challenges with the different environments both from geography and government
4. Close collaboration with the local government (multi stakeholders)

Google Loon and their operation in the stratospheric:

1. LTE connectivity by using stratospheric balloon. A full overview of their operation, safety assessment, interaction with ATCs.
2. They can only serve the equatorial area at this stage, mainly LATAM but also in Africa
### UTM Providers

1. An overview of few UTM providers: Altitude Angel, Exponent and Unifly.
2. Services offered are registration, flight authorization, tracking. Including the availability of transponders.

### Supplementary Services:

3. Aftermarket devices for ID and tracking, examples from Exponent, Unifly and Involi

4. Equipment to capture also transponders type signal (ADS-B, FRLAM, etc) where there is no radar coverage at low altitude presented by Involi

### Others:

1. A manufacturer point of view (DJI), the importance of remote Identification and their solution based on WiFi
2. Safety operation standard for the Lake Kivu Challenge, how to maintain the safety of the operation and how mobile networks are used.
Scope of mobile networks for UTM and the whole ecosystem
CONNECTED SKIES - Outcomes

1. All stakeholders: from aviation and non-aviation need to have constant dialogue for achieving the best safe solution to support BVLOS operation.

2. Regulation is clearly important for giving the right guidance and allow drone operation and UTM to start delivering commercial services.

3. Mobile networks play an important role to support most of the upcoming BVLOS operation.

4. Safety is the primary focus particularly for a full integration of UTM-ATM in the long run.
UAV Logistics Track - African Drone Forum

Olivier Defawe - *Director Health Systems, VillageReach*
No matter how great your technology is, you can't make a delivery without logistics.

The Africa Drone Forum Logistics Track, brought together logistics implementers, drone operators, logistics professionals and regulators to discuss the “how” of integrating drone operations into supply chains.
Logistics track objectives

1. Explore how drone are disrupting last mile delivery, including their benefits, limitations and cost-effectiveness.

2. Understand the contextual realities that affect drone operations.

3. Understand what questions to ask/decisions that need to be made when determining if drones are an appropriate mode of transportation.
Topics Covered

- A journey through Tanzania’s health supply chain
- UAV logistics game & discussion
- UAV integration resources
- Country readiness and operationalization of drones in health supply chains - Ashley Greve, GHSC-PSM
- Transforming logistics with drones - Eric Peck, Swoop Aero
- The case for integrating drones into health supply chains - Catalina Ochoa, World Bank
- Institutionalization of drones into supply chain systems - Abdoulaye Gueye, PATH and Carla Blauvelt, VillageReach

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Key observations - Breakout session

1. The numbers don’t tell the whole story- Real people, real situations & real life challenges affect the potential of the technology to perform.

2. Challenges are not always predictable

3. Drones are not meant to replace but rather bolster the existing systems

4. Drones can only solve a small portion of the problem

5. It is important to take into account the whole ecosystem- political, social, and economic

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Key observations - Plenary

1. Government and stakeholder readiness (including regulators) is key to a successful implementation.

2. Successful operations include a full aviation system that is integrated into the health system.

3. Starting operations takes much longer than stakeholders want/expect.

4. Start thinking now of what the end will look like.

5. Need to identify compelling use cases based on geographical, infrastructure and systems challenges, delivery volume and frequency and health impact.
The case for integrating drones into health supply chains

Findings

#1 When examining medical goods categories individually – if we do the apple to apples - we found that costs are higher to deliver most categories by Unmanned Aerial Vehicles (UAVs).

#2 However, layering use cases can provide efficiencies and cost savings by allocating fixed costs across a greater number of flights and maximizing utilization in terms of capacity and time.

#3 The Ukerewe case study suggests a capital cost of a UAV that would bring this mode at price parity with current road- and boat-based transport and this is consistent with available solutions in the market.

#4 Cost-effectiveness of UAVs cannot be analyzed without looking at the public health benefits, which appear to be substantial.
## Challenges to large scale implementations

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<th>Technology</th>
<th>Connectivity</th>
<th>Systems</th>
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<tr>
<td>Country level regulations are slower than the want and need to integrate drone logistics into health systems</td>
<td>Most of the Tech is not designed in and for the African market, creating logistics challenges</td>
<td>Connectivity with remote locations is not stable (to fly drones and for people receiving drones to communicate)</td>
<td>Limited understanding of what it takes to integrate drones into the <em>entire ecosystem</em></td>
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<td>Very resource intensive for drone providers to refine technology in the African context with short term pilots</td>
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<td>Unclear what the future business model is for drones due to the limited data on long term costs at scale</td>
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<td>Limited commitment and investment from the private sector for tech R&amp;D</td>
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#ADF2020
African Drone Forum Recap from Regulatory Track
March 2020
Key Topics Covered

Harrison Wolf - World Economic Forum welcomed everyone to the session and provides an overview of the agenda, the goals of the workshop, recap of previous experiences, and introduction to the ADF Document package for input.

Stephen Creamer, Leslie Cary & JC Shine - ICAO presented and discussed new guidance from ICAO on UAS/RPAS as well as the role ICAO plays in enabling UAS innovation.

Joerg Dietrich - DLR/JARUS demonstrated how new policies (SORA) developed by international group JARUS can be used in conjunction regulatory advancement.

Brian Kamamia - ADDA introduced AVUSI Top certification 2, the program in collaboration with UNICEF and Virginia Tech, and explained the first cohort of certifications.

Tiamiyu Radji - WeRobotics, Senegal Flying Labs highlighted the WeRobotics network, the advancement of local economic development and capacity building, and promoted drone use for government and private industry business using local operators.

Andrew Mutabaruka - RCAA explained the Rwandan government approach to regulation and oversight and how they were able to enable both high-end, high efficiency throughput and grassroots innovation from students and SMEs

Francine Zimmerman - FOCA discussed the role of regulators as a force for approving rather than limiting innovation.
Drone Regulation for the Digital Age
Moving from Pilot to Scale

PBR & Model Regulation
- Working with the Rwandan government to co-curate RCAR Part 27.
- Collecting data on performance in support of publication highlight the success of 1st national scale PBR.
- Launching the next phase of this project to focus on implementation for drone projects in low - medium risk operations (non-certificated).

ICAO Task Force & ADOT Implementation
- ICAO invited WEF to attend the first Task Force on Humanitarian and Development use of Drones (TF-UHAD).
- ADOT was recognized as reference material for the task force to inform implementation as best practice from industry.
- Medicine from the Skies project leveraging PBR and ADOT

African Drone Forum & Model Drone Regulation
- Co-Host of ADF in collaboration with World Bank, WFP, and UNICEF
- Develop guidance that assist governments and private stakeholders advance drone operations

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Tools & Best Practices

- Specific Operations Risk Assessment
- Model UAS Regulations
- UAS for Humanitarian Aid and Emergency Response Guidance (U-AID)
- UTM Primer for Governments
- Model Request for Proposal
- Harmonization through Certification
Next Steps!
Contribute, Review, Publish, Support

Contribute to case studies and guidance documents.
Be listed as a contributor and have direct input.

<table>
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<tr>
<th>What Can You Do Now?</th>
<th>What Can We Do?</th>
<th>What’s Next on the List?</th>
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<tr>
<td>Become part of the Forum Expert Network for Drones and Aviation in Africa</td>
<td>Highlight and Amplify the work you're doing at the World Economic Forum Summit on Africa</td>
<td>We want to work with you to create an ongoing community to support African technology successes globally</td>
</tr>
<tr>
<td>Provide Review and Comments by May 2020</td>
<td>Publish these Case Studies and Materials in Summer 2020</td>
<td>What we need is commitment to Provide Case Studies, Solutions, and Calls to Action</td>
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<td>Encourage your DG or Minister of Transport to join us in Ethiopia at the World Economic Forum Summit on Africa</td>
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Observations and Challenges

- Individual regulators are excited and inspired to move forward to enable drone operations.
- Security concerns and a misunderstanding of what regulations do and do not do are preventing promulgation.
- UTM is seen as a necessary enabler for awareness, even when UTM may not be a key enabler.
- Harmonization is key, but only if we model the regulatory environment to enable, rather than restrict, meaningful operations.
Outcomes & Next Steps

1. Community formation of over 60 regulators from 24 countries
   Driving a robust African Drone Leadership Community

2. Concrete obligations for harmonization across East Africa and West African environments led by ICAO, AFCAC, and World Economic Forum

3. 5 Case Studies in development with 2 key tools in peer review
   To be published in series over the next 6 months

4. Request from regulators for direct regulatory assistance and the development of a model drone regulation guide
Panel Discussion

Gabo Allstock - UPDWG
Panelists

Antoine Beyeler - Co-Founder, senseFly
Olivier Defawe - Director, Health Systems, VillageReach
David Guerin - ADF Safety and Airspace Integration Advisor, World Bank
Catalina Ochoa - Sr. Transport and Digital Development Specialist, World Bank
Barbara Pareglio - Technical Director Drone Interest Group GSMA-IoT Programme
Roza Vasileva - Sr. Urban Data and Innovations Consultant, World Bank
Harrison Wolf - Aerospace and Drones Lead, World Economic Forum
Connecting the tracks

Regulations are evolving, but hindering full scale operations at this stage.

Need to bridge the gap between stakeholders when it comes to safety and security concerns

Full scale operations need multiple integrated systems and strong connectivity which comes at a high burden

Tension between unclear business models yet the need to move into long term operations
Thank you!

Photo Credit: African Drone Forum