Centre for the Fourth Industrial Revolution Network

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FORUM

Accelerating the Adoption of Drone Technology through Regulatory Change

PROJECT CASE STUDY
OCTOBER 2020

Project overview

Remotely piloted, highly automated, aircraft provide support and resiliency to meet the intense challenges facing society only if the regulatory foundations exist to allow it. As part of the World Economic Forum's Platform for Shaping the Future of Mobility, the Aerospace and Drones (formerly Drones and Tomorrow's Airspace) team piloted a project in Rwanda to better understand the country's drone ecosystem, identify challenges to unlocking the skies, and enable a more robust and long-term vision for accelerating positive uses of drones.

The project, beginning in 2017, originated in partnership with the Rwandan government to assist in co-developing a framework for oversight of unmanned aircraft systems (UAS), or drones. Through stakeholder engagement on the ground and direct collaboration with the Rwandan Civil Aviation Authority (RCAA), Rwandan Office of the President and Ministry of Youth and ICT, a first-of-its-kind agile, performance-based approach to UAS oversight was developed and implemented within three months. Twelve months later, Rwanda was highlighted at the Lake Victoria Challenge in Tanzania as a leader in the field of unmanned aviation, and some 18 months following the initial framework development, the Advanced Drone Operations Toolkit was published, highlighting Rwanda and the tools necessary for establishing open and agile drone oversight.

Project phases

Assess

The assessment phase consisted of an initial trip to Rwanda by the Forum's then Drones and Tomorrow's Airspace team accompanied by Alline Kabbatende, a Forum Fellow from Rwanda, who was instrumental in helping set up meetings with government leaders and technical experts.

A number of core challenges presented themselves that the project sought to address:

– An inability for local operators and businesses to use drones for commercial gains

– An inability for students to build, fly, or crash drones

– Identification of international operators as "public-use aircraft" to avoid oversight and impact from international aviation standards and recommended practices

– An inability to scale operations across the country or internationally

After getting buy-in from the RCAA, the team was able to then move to the scoping and opportunity mapping phase, with guidance from Timothy Reuter, Head of Aerospace and Drones, and Harrison Wolf, Project Lead, Aerospace and Drones.

Stakeholders for the scoping, development and implementation phase included the RCAA, Ministry of Infrastructure of Rwanda, Ministry of Youth and ICT of Rwanda, Office of the President of Rwanda, Rwanda Utilities Regulatory Authority, Private Sector Federation (Rwanda ICT Chamber), Charris UAS, Zipline and International Civil Aviation Organization (ICAO).

Other stakeholders included the Rwanda Ministry of Local Governance, Ministry of Justice, Ministry of Health and Ministry of Agriculture, as well as the Rwanda Bureau of Standards, Rwanda Insurers Association, Smart Africa Secretariat, Fablab Rwanda and Carnegie Melon Africa.

Design and develop

The top policy issue facing the development of the drone ecosystem was a regulatory barrier that prohibited drone use, though operations had been ongoing through exemptions.

The goal of the project was to create a new type of drone regulation that could serve as a model for the global community. By transitioning from highly prescriptive and restrictive drone regulations to a model of risk-based analysis, the new policy allowed more freedom for innovation and a more accurate assessment of risk. The risk-based analysis was developed in Switzerland and tested, but not fully promulgated, by the European Union.

Over a three-month period, Harrison Wolf and Timothy Reuter met with the RCAA to discuss regulatory changes as well as hosted community stakeholders, drafted regulatory changes, conducted peer reviews and met directly with the ICAO. Alline Kabbatende was engaged throughout the entire process and developed the expertise on drone regulations necessary to support the work. While not directly assisting in the framework development, she provided guidance and review that enabled a policy that was more reflective of the cultural norms of Rwanda than otherwise could have been developed.

Deploy and iterate (three months)

Two distinct piloting phases defined this work. The first was a strawman run-through to determine if the regulation itself would meet the requirements set out in the initial phases to enable domestic opportunity and continue to enable ongoing operations. The second testing phase took place through community involvement for review, analysis and input that was then incorporated as a virtual in-person stress test with the RCAA. Once the regulation was completed, it was promulgated by the country's national legislature in time for an announcement at the 2018 World Economic Forum Annual Meeting in Davos-Klosters, Switzerland.

The Rwandan regulation could be seen as a test of performance-based regulations (PBR) to determine if it would accelerate approvals of drone operations, enable further scaling of domestic operations by international companies, and promote regional interest in more progressive and agile drone oversight. This phase took place between months three and six. Stakeholders for this phase included the World Bank Group, ICAO, RCAA, Swiss Federal Office of Civil Aviation, Tanzanian Civil Aviation Authority, United Nations Children's Fund (UNCIEF), United Nations World Food Programme, Village Reach, WeRobotics, Airmap and Zipline

Monitoring and evaluation

The project had a number of monitoring and evaluation frameworks. Among the most important was to determine if this framework expanded drone operations, enabled scaling of Zipline operations within and beyond the country's borders, and to measure whether new operations were explored by government ministries. About 18 months into the project, the team published the Advanced Drone Operations Toolkit, which amplified the work of Rwanda and began the process of scaling the regulations across East Africa in a new partnership with the World Bank.

Key learnings

There were two primary learnings from the project:

- The Forum's government fellow was a crucial part of the project and special attention should be made to ensuring that the fellow is empowered to work with the most vital government stakeholders for piloting, implementation and follow-up phases.

- It is important to identify medium- and long-term KPIs to which data agreements are in place from the beginning, which will enable thorough and meaningful review later on.

Next steps and scale

The World Economic Forum's Aerospace and Drones team continues to convene African regulators from over 25 countries, seeking to foster regional harmonization around more progressive drone operations. Regional groups responsible for aviation safety are driving key messages, and the ICAO continues to engage the Forum on regulatory development because of its unique leadership position in the field.

The Advanced Drone Operations Toolkit is used as reference for ICAO, UNICEF and World Bank efforts. Sierra Leone, Kenya and Tanzania have already adopted – or are set to adopt – key elements of the Rwandan framework as captured in the toolkit, and ICAO has been advocating for a more performance-based regulation.

Next steps include a regulatory review of the entire continent resourced by the World Bank with the goal of creating a Drone Opportunity Indexing that combines both regulatory readiness and supply chain opportunities into one indicator.