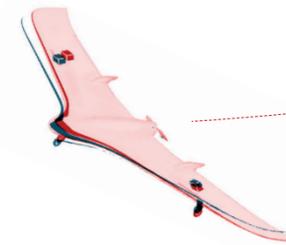


## CONNECTED THINKING

#DRONEPORTS #AFRICA #AI



# UNDER AFRICAN SKIES

**Jonathan Ledgard** leads a team of roboticists, architects and logisticians seeking to build the world's first droneport in Africa. By 2030, he predicts, there will be one in every town in the tropical world

**The Possible: Why drones? You've said that cheap flying robots will be one of the most important innovations for Africa this century. What possibilities do they offer that others don't?**

**JL:** You have to think of it as a sort of supplemental transportation system. It's not going to beat the motorbike, the bicycle is amazing, the pickup truck is incredible. And railways beat everything else. Cargo drones are just going to add an extra layer of connectivity, particularly in poorer countries where there's not enough money to build tunnels or bridges. There are roads, but they're very circuitous, overcrowded and slow, and in the rainy season, they often wash away. I would imagine cargo drones can add 4-6% to transportation capacity, for high-value, time-dependent items. They will be valuable for healthcare, for spare parts

and, eventually, for e-commerce.

It doesn't have so much utility in richer countries, but in the tropical parts of the planet, I anticipate that most towns should have a droneport before 2030. We've tried to define the typology of the building: it's cheap, very low carbon, and in particular it's a civic building, like an early railway station. It has a lot of shared value for the community — almost like a sort of marketplace or forum.

We think this technology is going to happen, so how, from an engineering and architecture point of view, could it happen in a way that is more likely to favour poorer people? That's the whole guts of our project. We started to think about how we could shape the industry, and what happens on the ground. Where would these drones land, how would they be stored? How would they be repaired? How would they interface with

healthcare, with the logistics system? We felt that the aerospace side needed to be defined, and that we could have a go at defining that space in an innovative way.

**TP: You've made the point that it's inevitable we're going to make more use of the sky, but not that flying robots and landing sites will be engineered for poorer communities. How can designers ensure their ideas benefit those who need them most?**

**JL:** It's really three simple things. One is, obviously, price. On a community or town basis, you have to hit a pretty aggressive price point. Then you really have to think about the durability of design. A cargo drone would have to be a combination of a VW Beetle and a Star Wars fighter. The end result is something futuristic, but very modular, tough, utilitarian. The third

thing is the ecosystem. Who is going to repair these things? Who will operate them? How do you train them? If you think about a motorbike in the African or Indonesian context, then there are plenty of mechanics who can fix anything.

When you talk about a droneport, there are questions that you wouldn't necessarily think about elsewhere. In Africa, unless you lock everything down all the time, your droneport is going to get stripped out in the first week.

**TP: You've said that robotics and AI are really going to mess up developed economies but will have a much more positive effect on poorer countries. In what areas will they have the greatest transformational impact on Africa?**

**JL:** Robots in all fields of agricultural productivity can have an enormous

impact. Large parts of Africa are very arid; it's a real problem watering the soil. It's pretty easy to imagine that within the next two or three years we'll have very cheap, super-advanced drip-feed irrigation. You take a piece of hosepipe, add one robotic widget, connected with AI, which might cost you 20 bucks. Suddenly you have drip-feed irrigation that may add 20-30% to your output over the year, while saving water.

I think that robotics will also play a very significant role in warehousing and in logistics. It seems counterintuitive for areas with very high rates of unemployment to seek out automation. For its own sake, where it rips out the guts of local employment, automation is not to be welcomed. But you have to remember that these countries have very limited amounts of industry. So adding in some automation that provides a lot more efficiency can be really positive.

**TP: One of the big trends of the next 10-20 years will be Africa joining the global world as south and east Asia did 20 or 30 years before. But how might its path be different, given the very different technology that's potentially available today?**

**JL:** In South Korea, they looked at what Western industries were doing in

shipbuilding or in construction and said, we're just going to do it cheaper. They had access to regional markets, and had an educated workforce. In Africa, there are much more intense demographic and environmental pressures. I think the African path of development is going to be completely different, and it's a great opportunity to think again about very basic questions. For example, should we allow new megacities to be shaped by the motor car or should we try to get rid of most cars, or make them sharing vehicles, and entirely rethink the infrastructure?

**TP: 20th-century cities were built around the car. How might 21st-century urban areas built around the drone differ?**

**JL:** I would never ever go as far as to say that any city will be built around the drone. I would think that a city has to be built around the bicycle or the motorbike, the bus, the whole range of transport. But the drone illustrates a future direction of the interface between a small piece of very advanced technology and a lot of low technology. *I think the ideal future city will be both much denser and much much greener;* with a lot of tarmac stripped out, and large amounts of shared infrastructure, which is quite low-

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tech but can be incredibly smart.

We know there is not going to be much money in the system, but that AI and other technologies, particularly renewable energy systems, will come online. So you want to aim for a sharing economy that is mostly lower-tech but occasionally super high-tech. The crucial point is to cut out a lot of middle technologies — your motor car, your air conditioner.

At the moment, we've got a disastrous situation where cities are growing incredibly fast. And so we're going to end up with ten or 15 megacities in Africa where the entire infrastructure has been imported from industrial China and some middlemen have made a large profit on it, but it's not suited for purpose at all.

**TP: You'd like to see droneports along the shores of Lakes Victoria and Tanganyika by 2020. How likely do you think this is to happen?**

**JL:** They will definitely be on Lake Victoria by 2025, and all the waterways

will follow. There are many things that still have to be proved about this technology, and the most obvious thing is whether humans actually want a robot flying over their heads. Even if things make cognitive sense, it doesn't mean that people are comfortable with them. The biggest potential drag on this technology is that the craft are not beautiful enough, not quiet enough. Maybe they crash a couple of times. Maybe someone actively campaigns against them.

But it's definitely worth pushing it as hard as possible, because the history of aviation shows that you start with a military solution and end up with a mass, civil application. I don't think many people get into an EasyJet plane today and think, "Oh my God, this could be a bomb". They're just flying to Berlin. I think that's probably the future for cargo drones. ☒

**Jonathan Ledgard** is founder of the Afrotech initiative at the École Polytechnique Fédérale de Lausanne, and of the Red Line cargo drone