Zipline in Rwanda

February 2017

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Company overview

Zipline is a Silicon Valley-based logistics company that designs, manufactures, and operates drones to deliver lifesaving medical products on demand.

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With Zipline, countries affordably provide fast and reliable access to healthcare for all their citizens, regardless of challenging terrain or gaps in road infrastructure.

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Our Mission

1	Improve health	• Provide full access to essential medical products • Zipline strengthens health systems and saves lives
2	Reduce waste	• Centralize inventory to reduce waste • Zipline makes the most of scarce resources
3	Transform logistics	• Fast, simple, on-demand delivery for the planet • Zipline provides transparency and real-time data

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Challenges in logistics

Winding, and unpaved roads through rough terrain lead to long transport times.

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Transportation is even more challenging during rainy season.

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Limited resources and challenging transport result in frequent stock-outs.

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Product expiry and gaps in storage or handling lead to significant waste.

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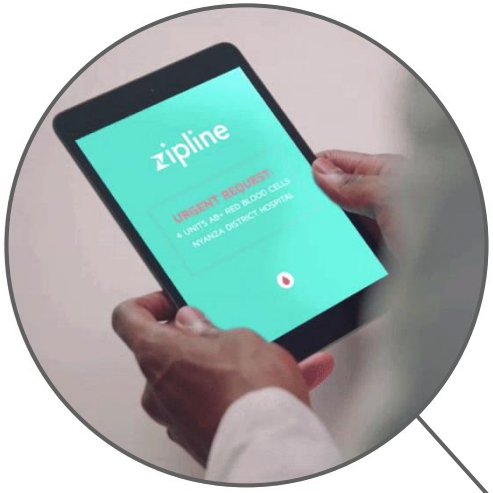
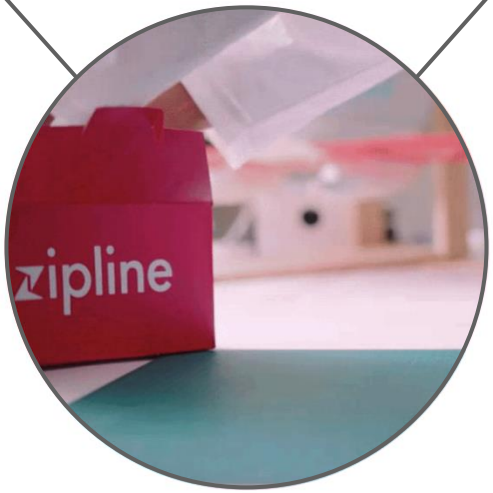
How can we improve last-mile logistics

On-demand delivery enables more agile supply

1 Place an order for products via mobile



2 Hub prepares package and dispatches a Zip



3 Zip flies to health facility in 15-45 min

4 Zip notifies recipient and drops off package

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Zipline's services have broad applications

Medical product deliveries

- Blood products
- Emergency medicines
- Vaccines

Other commercial deliveries

- Agricultural & veterinary products
- Lab reagents
- Other urgently needed products

Zipline can deliver hundreds of small packages every day

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Zipline achieves near-national scale from one site

20,000+ km^2

The area covered by a single distribution center, serving populations of

7.0 million[1]

1 Estimated population in catchment area is based on Rwanda's population density, excluding large population centers such as Kigali.

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Drone safety & security

Zipline uses multiple layers of risk mitigations

Zip aircraft design	• Zips have no single point of failure, and use similar safety measures to manned aviation
No-fly zones	• RCAA defines no-fly zones around sensitive areas, such as airports, within which Zips will not fly
Operating limits	• Zips have operating limitations for time of day, altitude, weather, etc.
Route design	• Routes design avoids areas that likely have manned air traffic and that are densely populated
ATC coordination	• Zipline will coordinate active flights with ATC and can intervene in real-time if necessary

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Redundancy throughout Zip’s design ensures safety

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Primary failure modes of traditional drones

Engine failure	• Internal combustion engines used on most drones are inherently complex and failure-prone mechanical systems • Engine failure is therefore the most common failure mode
Communications	• Radio and satellite communications between aircraft and ground stations can also be unreliable • Lost links were a factor in over 25% of accidents involving the United States' military drones
Operator error	• Most drones rely heavily on human ground personnel and remote pilots for safe operation • This introduces significant risk of human error in both pre-flight ground operations as well as flight operations

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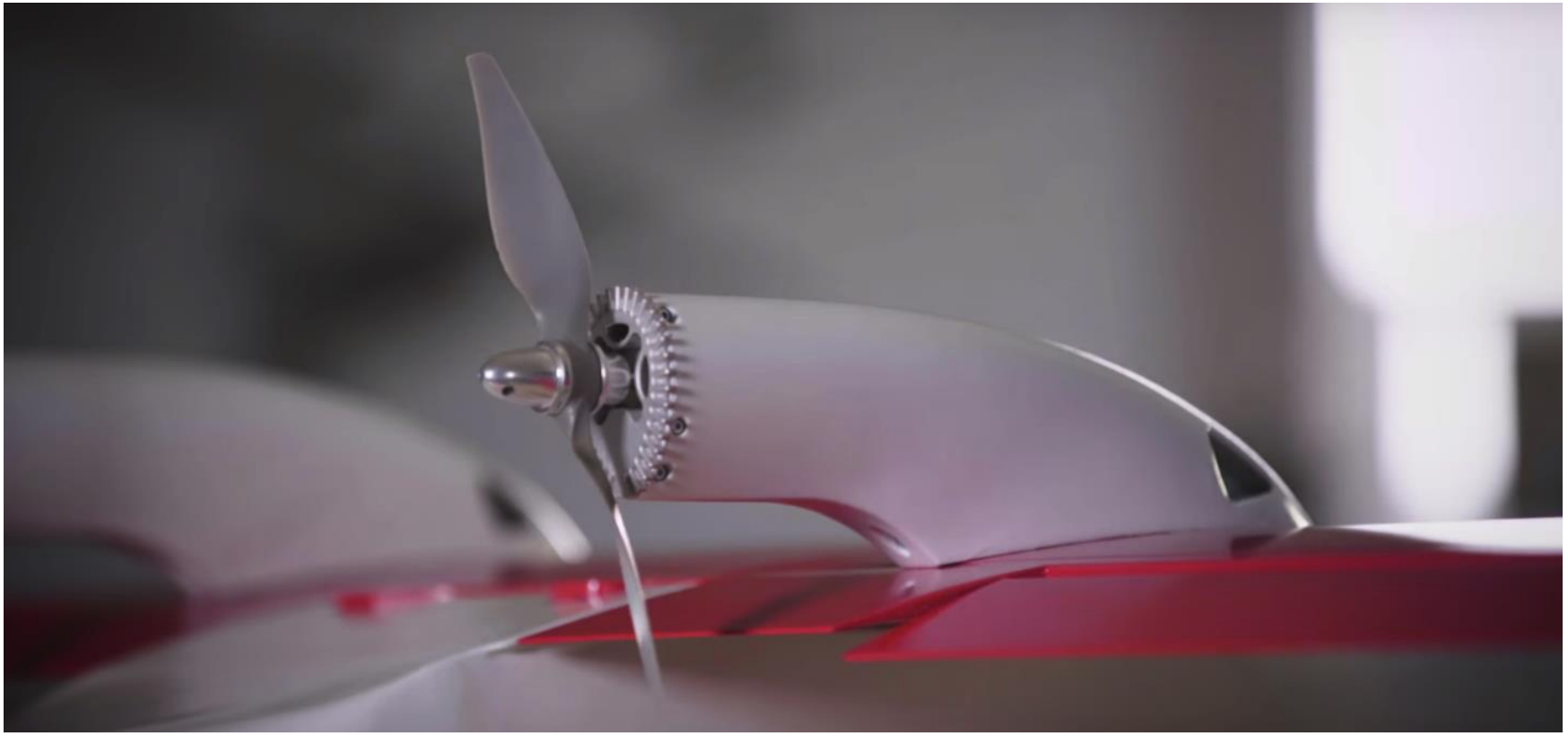
Zips have redundant, high-reliability propulsion



- A Zip’s electric motor can reliably operate for 10,000+ hours

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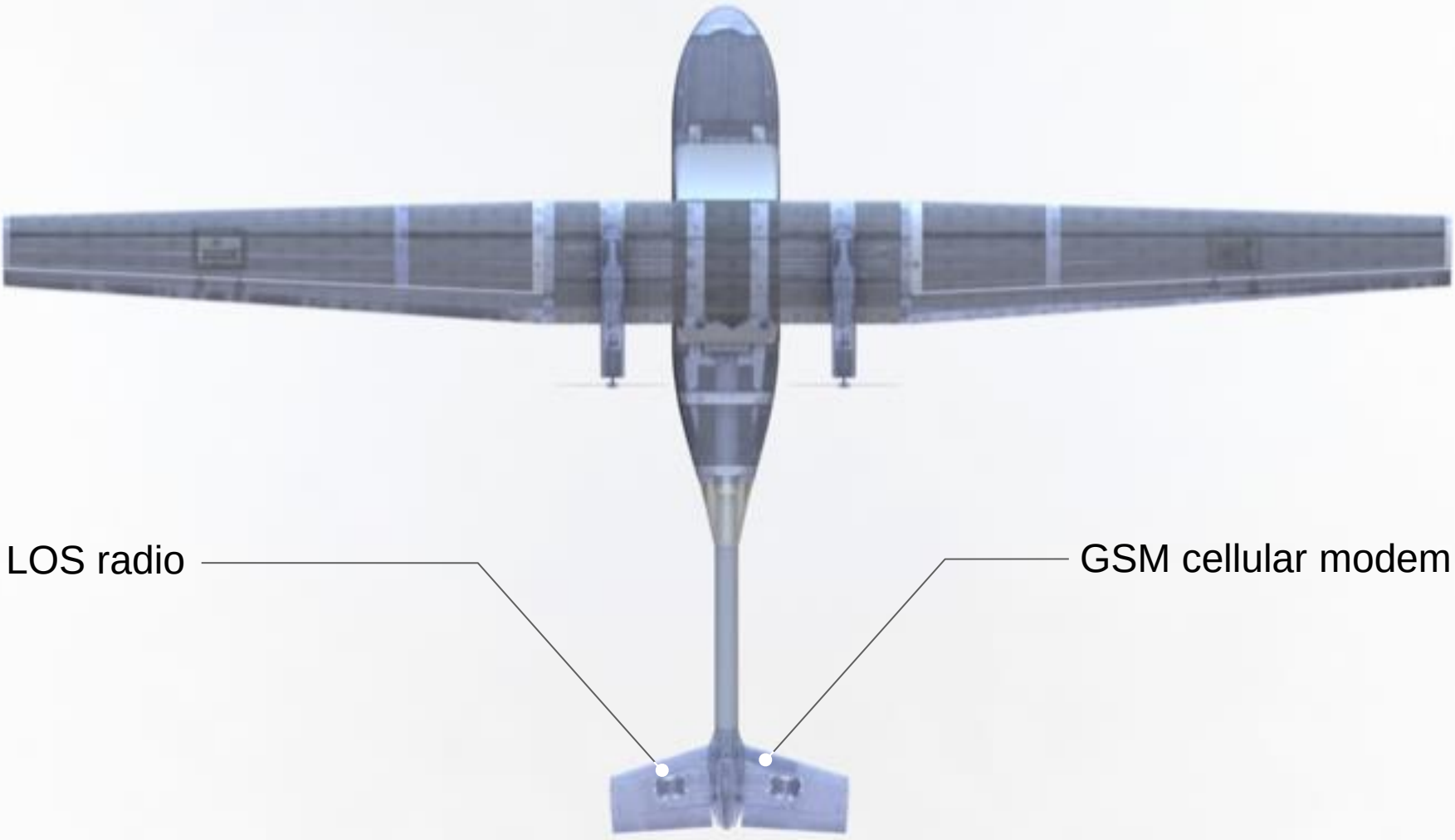
Zip communications are redundant and secure



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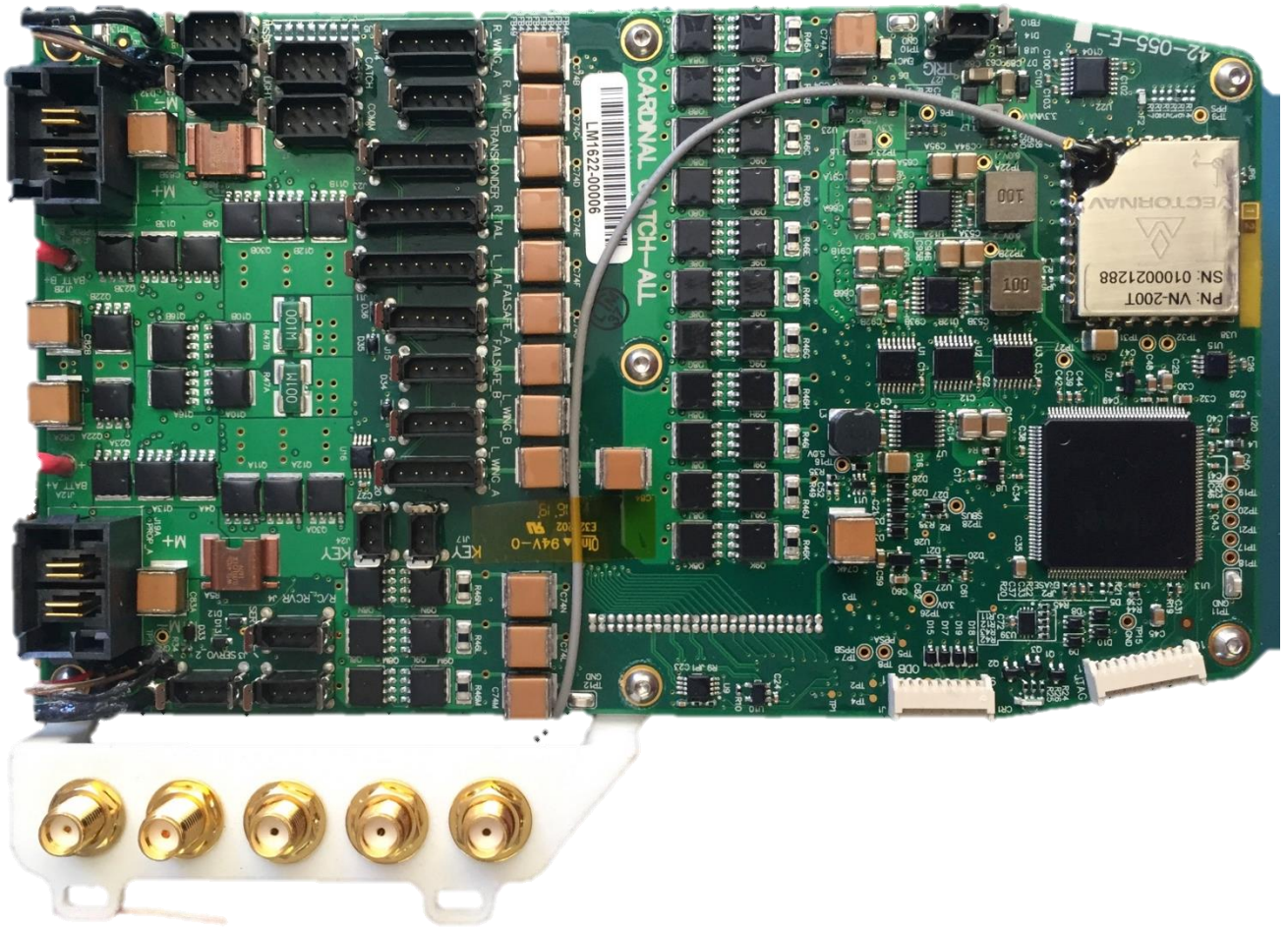
Zip avionics allow a high degree of autonomy



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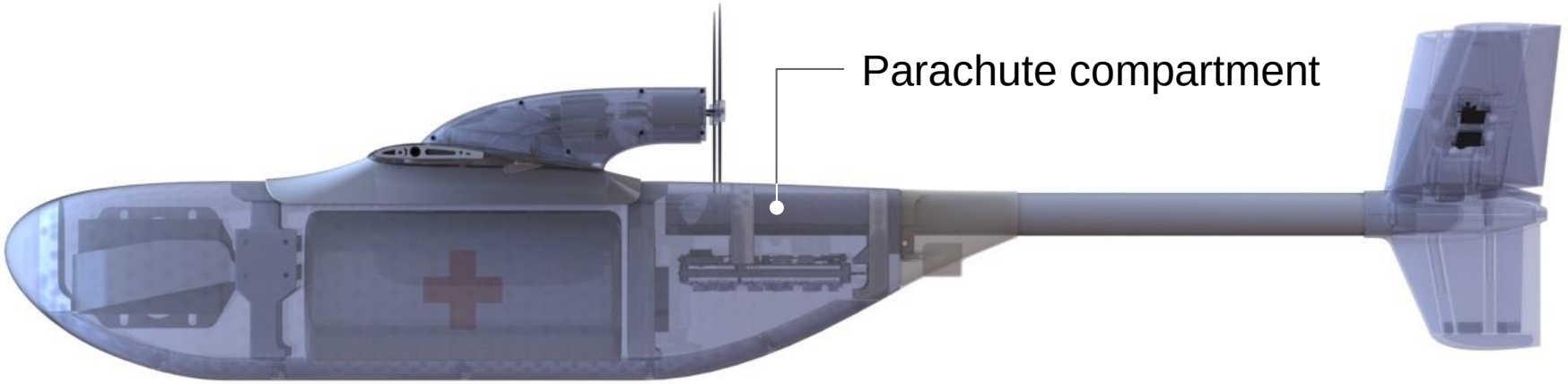
A Zip can land by parachute if necessary



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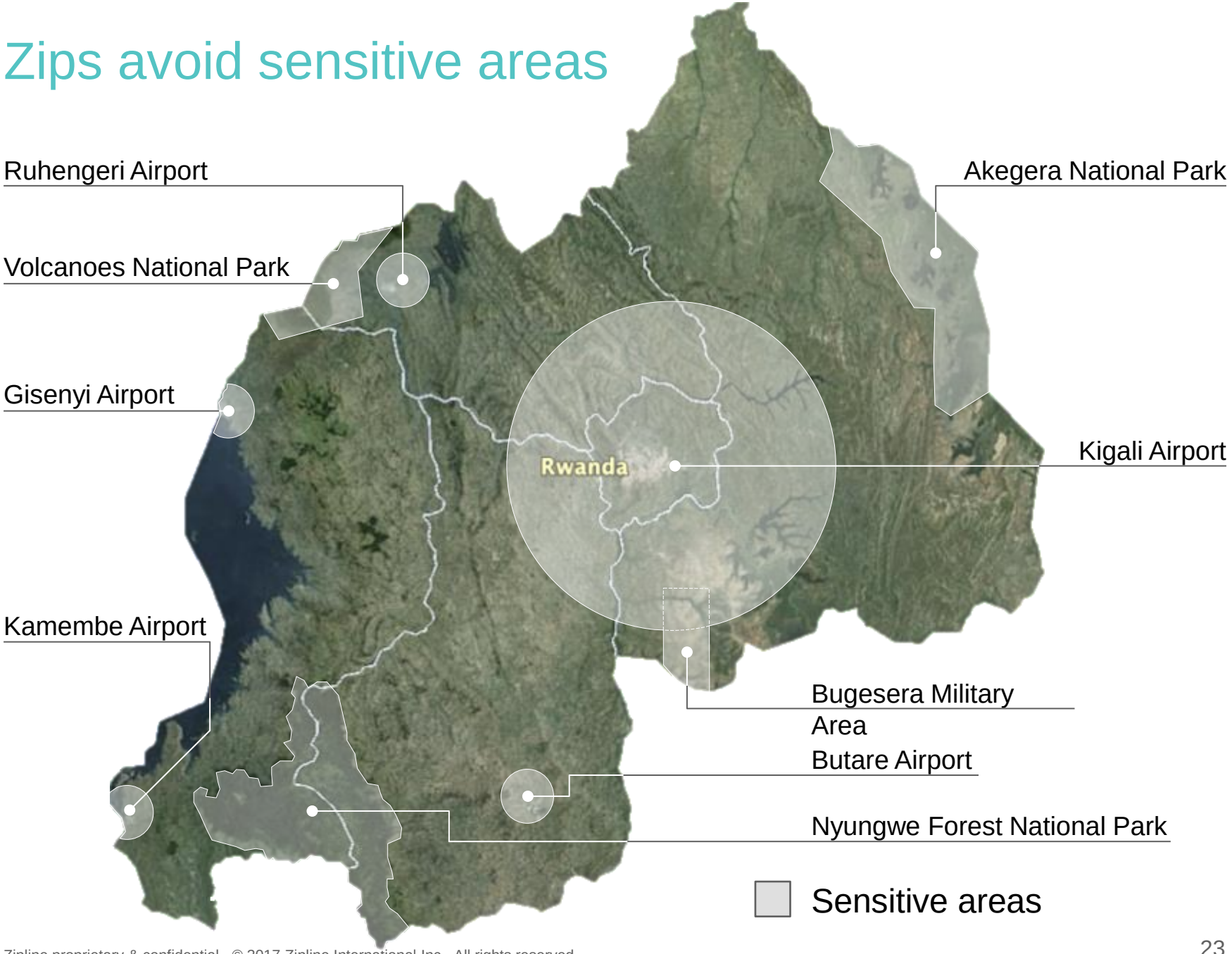
Zips avoid sensitive areas



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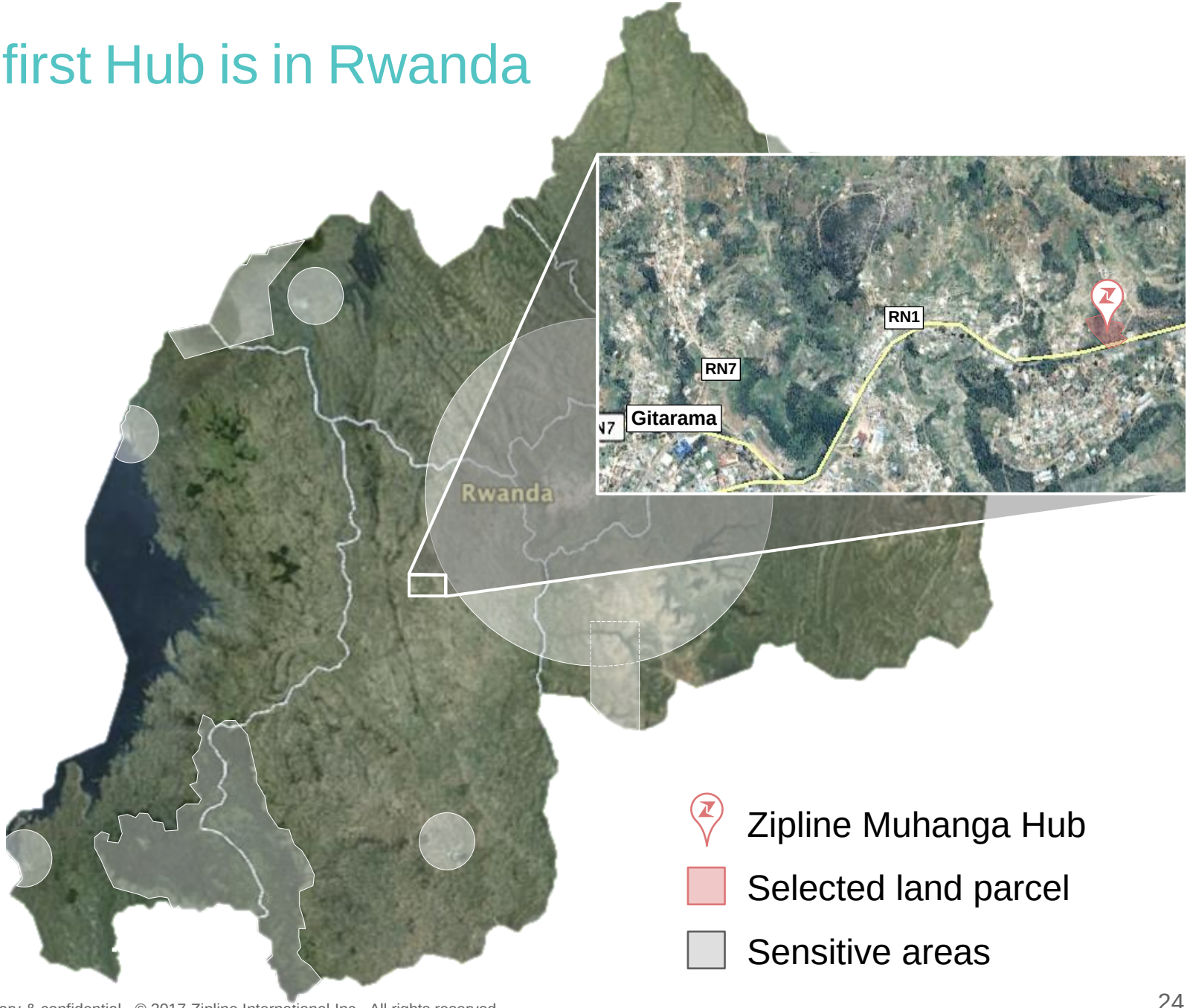
The first Hub is in Rwanda



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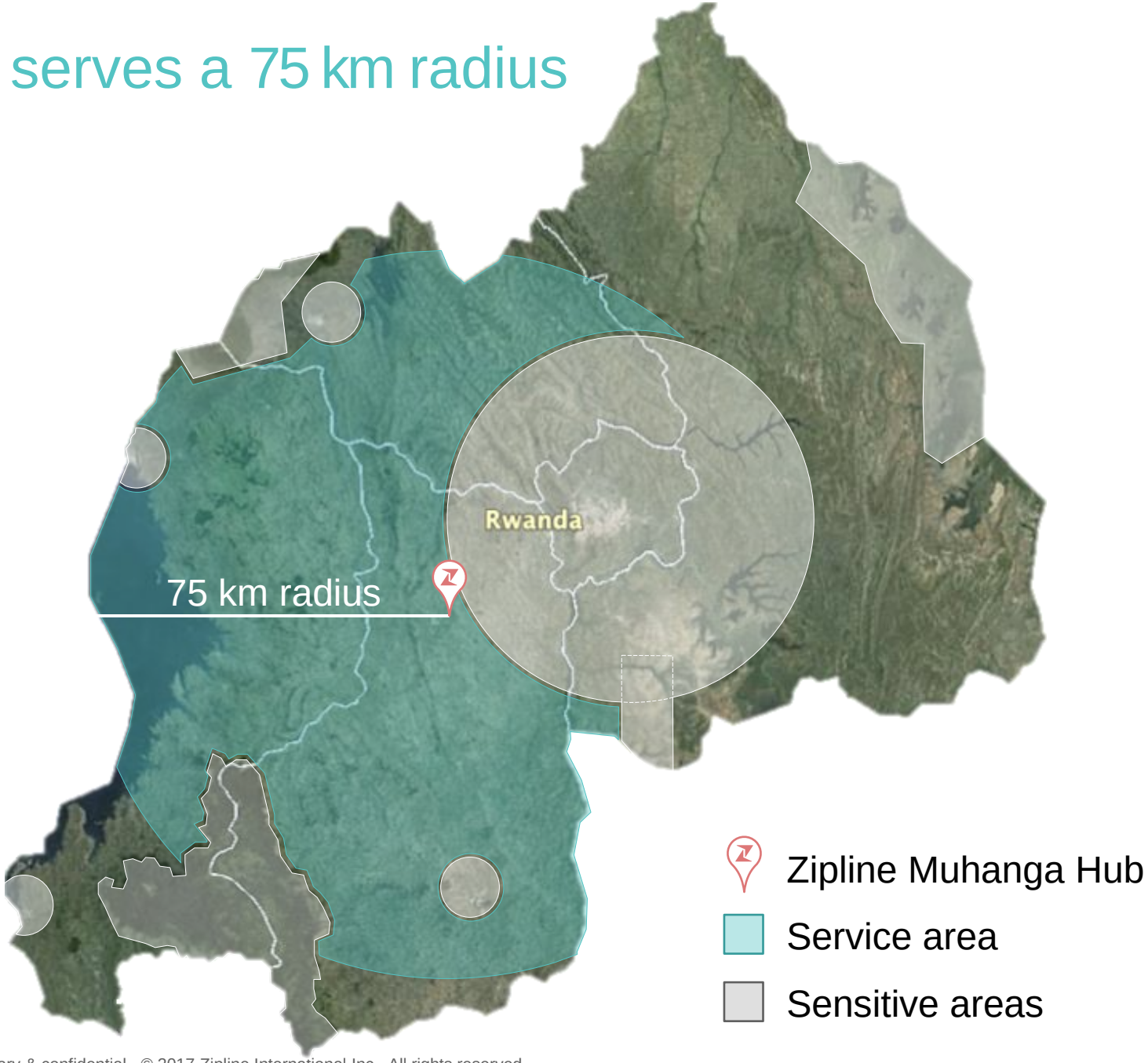
Hub serves a 75 km radius



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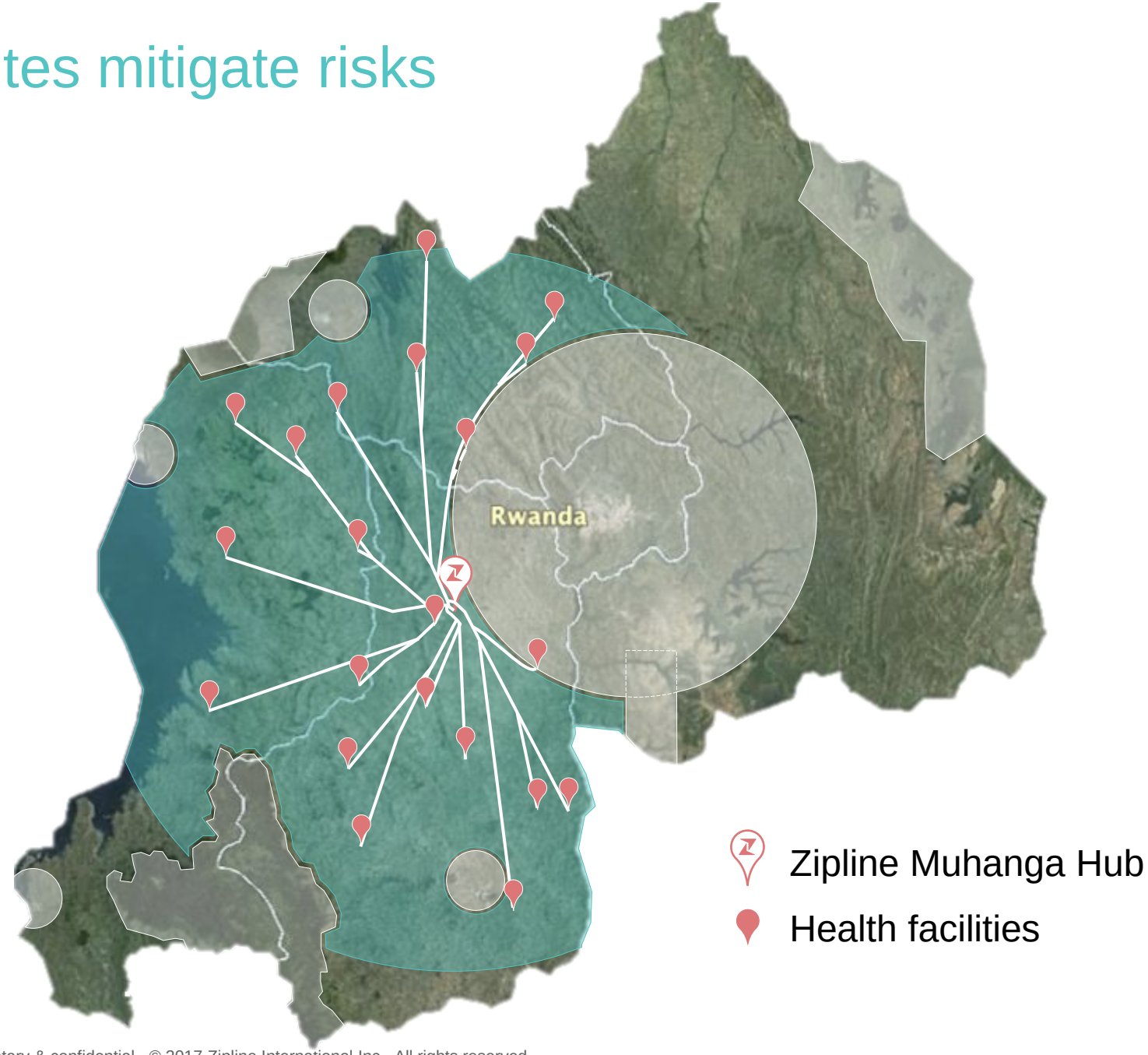
Routes mitigate risks



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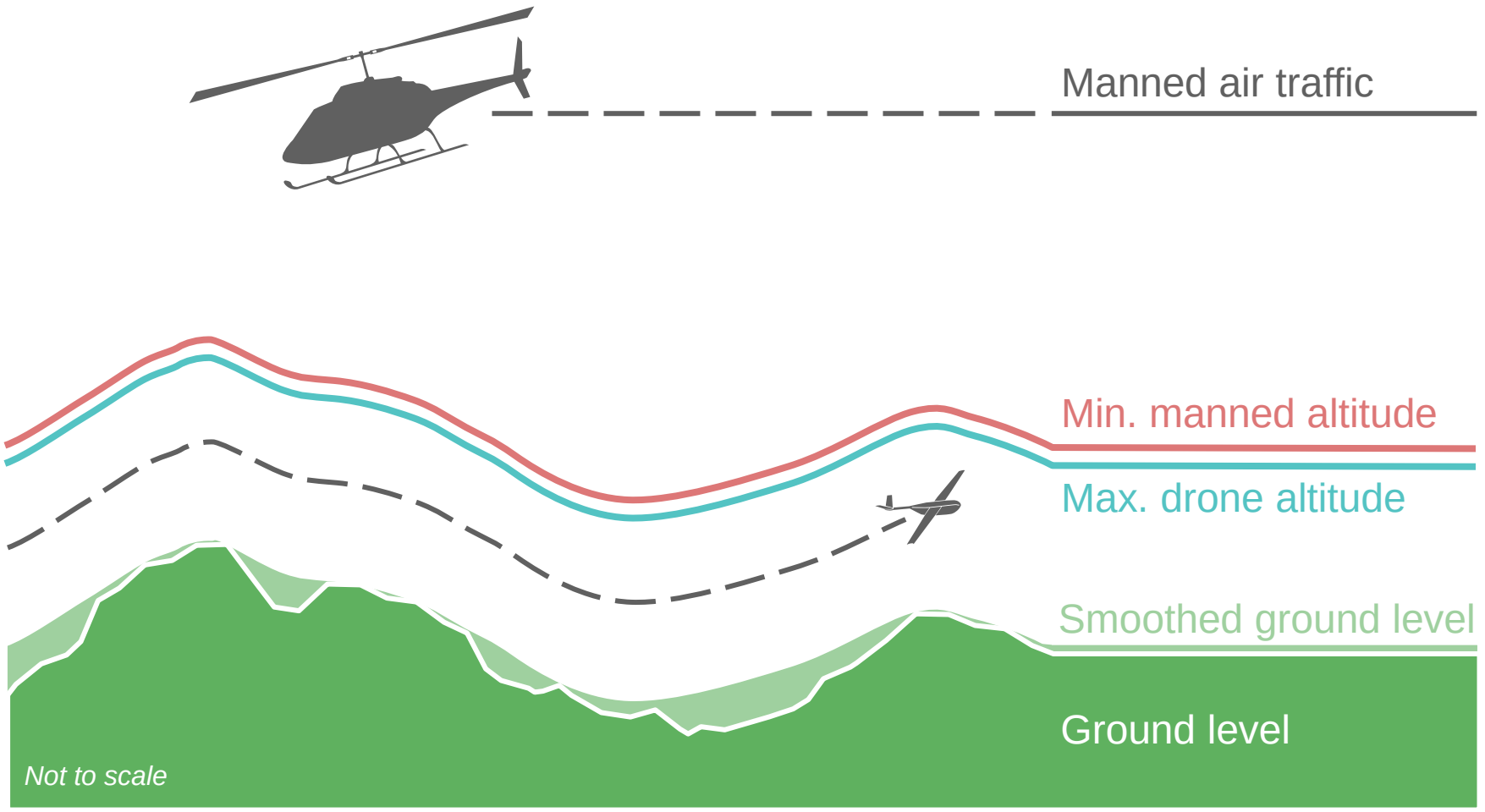
Airspace is vertically segregated



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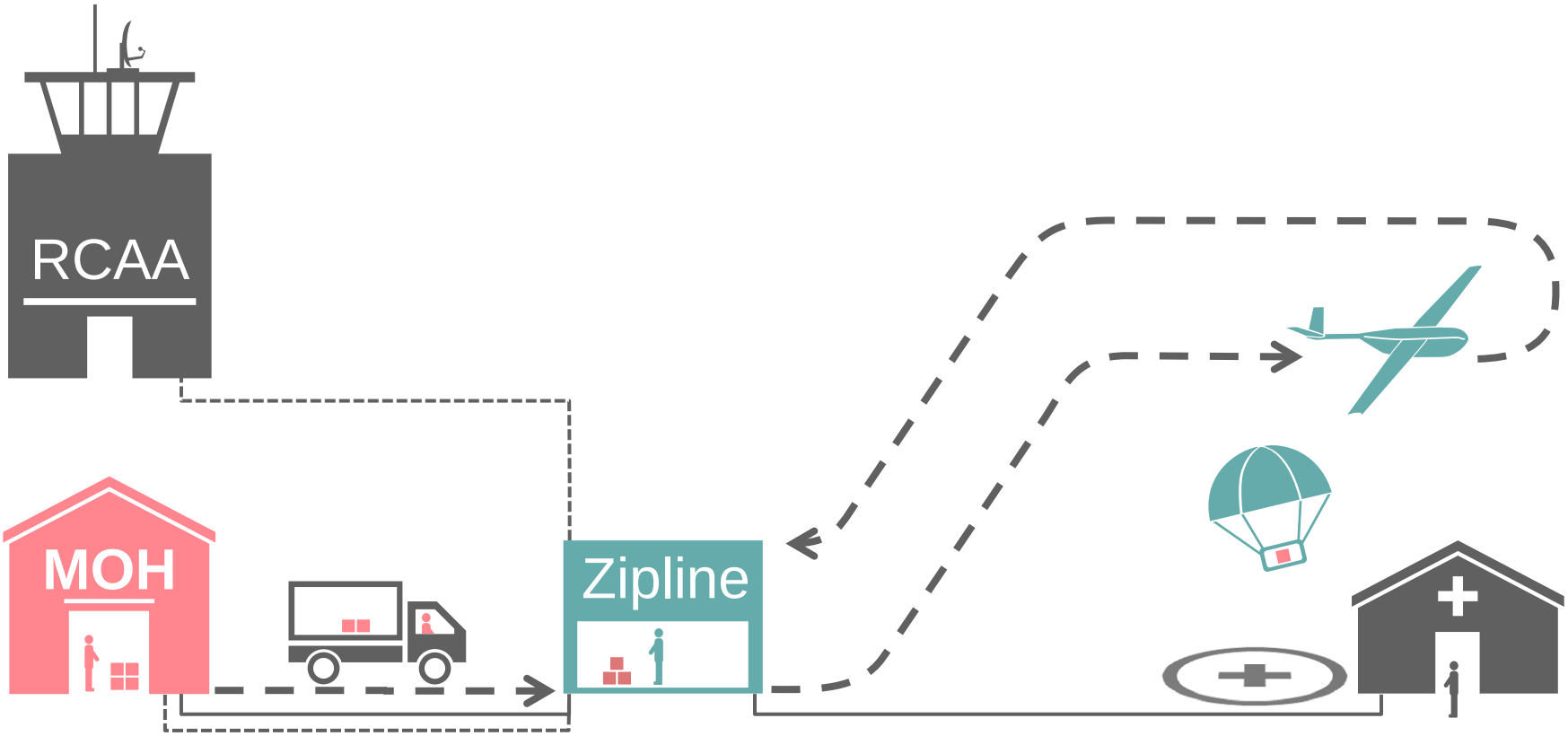
Zipline coordinates operations with ATC



Fulfillment Order request Communication & data

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