

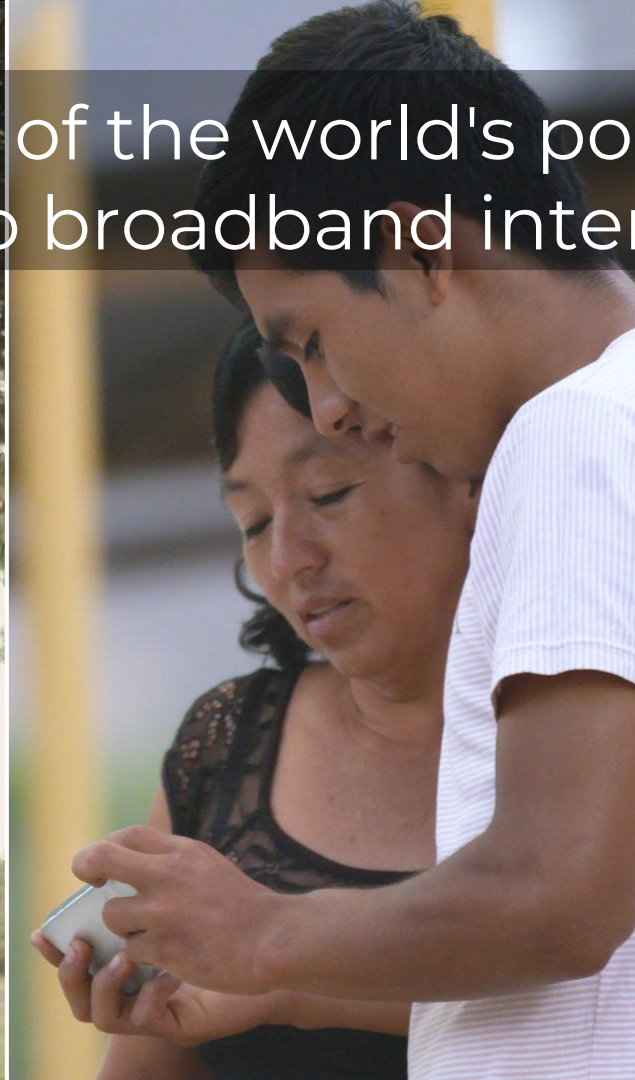
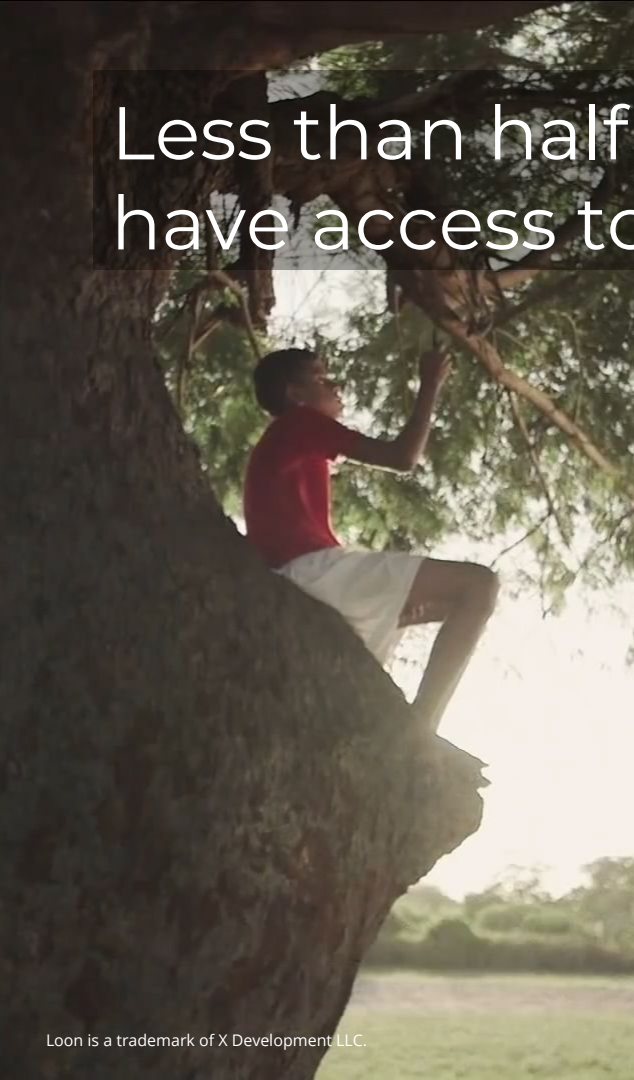


PROJECT LOON


Loon
for all

Nick Kohli
March 2018

Less than half of the world's population
have access to broadband internet



Our solution: Project Loon

Network as a Service

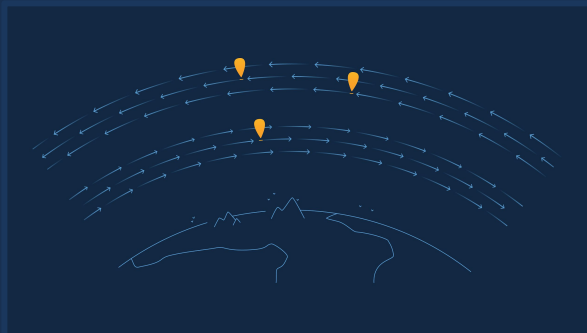
Taking to the skies with **LTE network made up of stratospheric balloons** designed to bring Internet connectivity to rural and remote areas worldwide.

Project Loon: How it Works



~ 200 km —
SATELLITES

NAVIGATE PRECISELY



by catching currents at
different altitudes

CLUSTER IN TEAMS



to provide prolonged
periods of coverage

CONNECT DIRECTLY



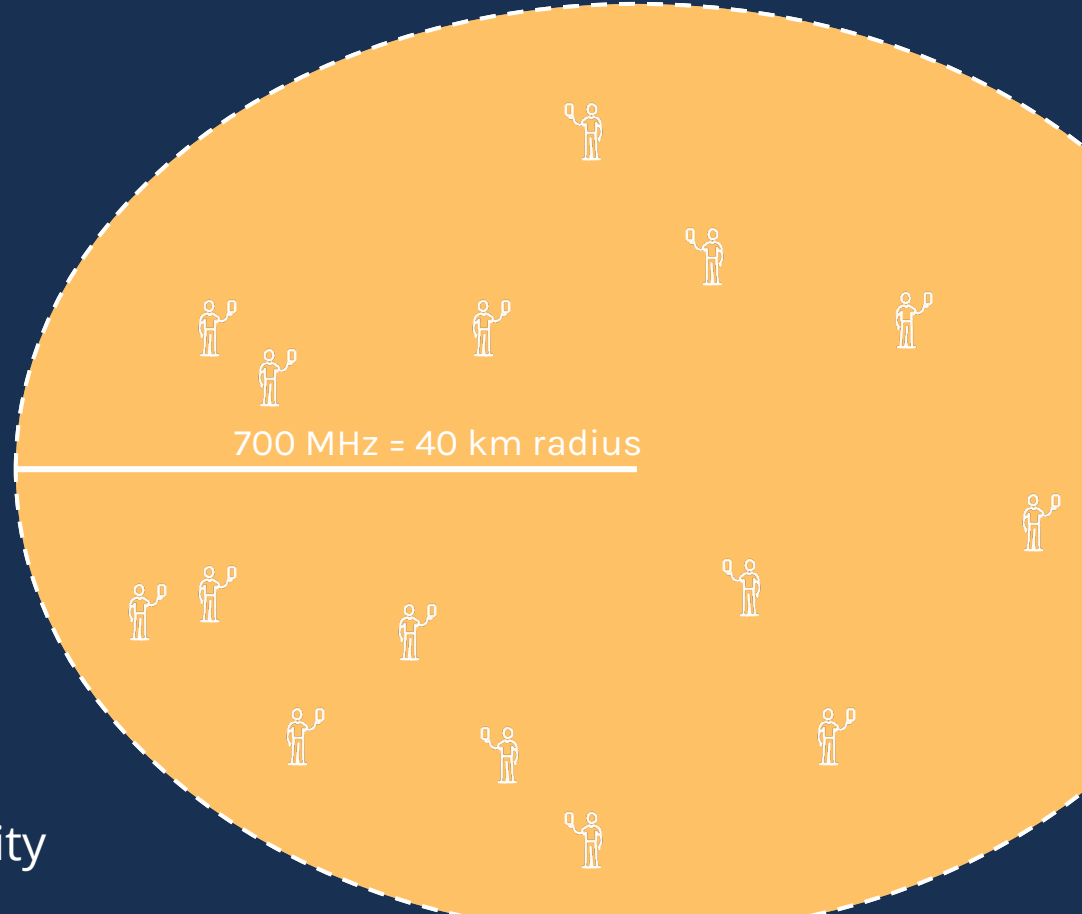
via LTE to the
users' mobile

Designed to connect **rural** users



Smaller coverage area of cell-towers works for **urban areas** with high population density...

Loon's vastly greater coverage area enables Telco partners to cost-effectively bring service to areas with lower population density



Operating at Scale

Automated capabilities

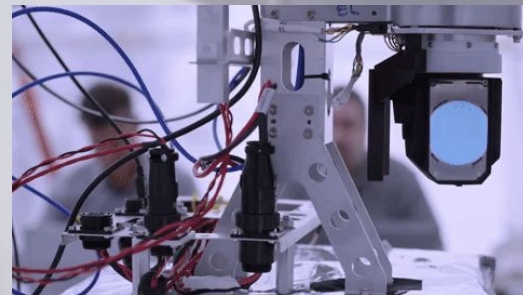


2012 Proof of Concept

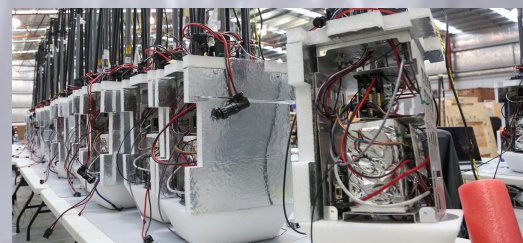


2017 Launching Rapidly

Product Evolution



2015 Rapid Prototyping



2017 Manufacturing at Scale

2016-05-15 00:35 UTC

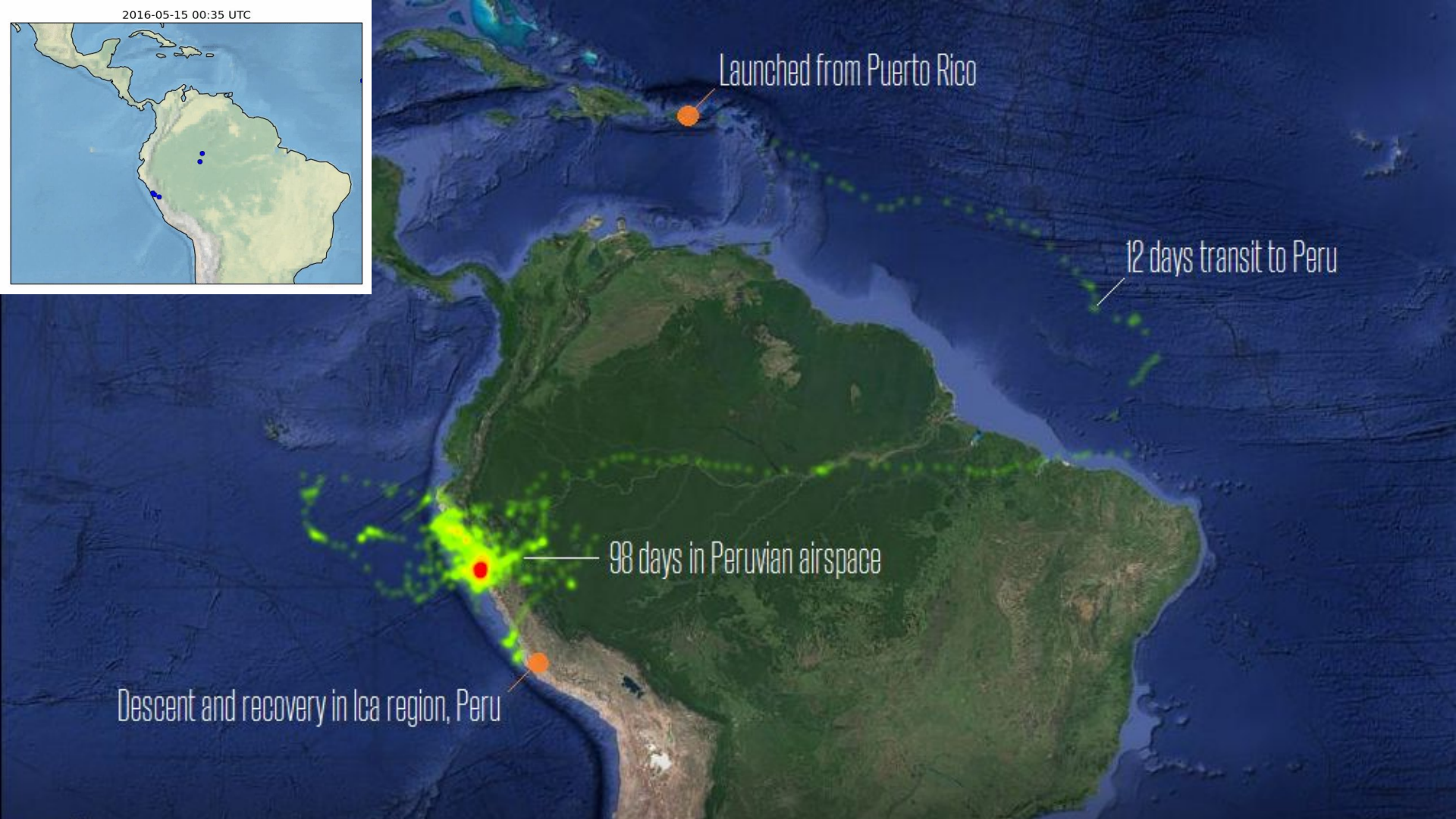


Launched from Puerto Rico

12 days transit to Peru

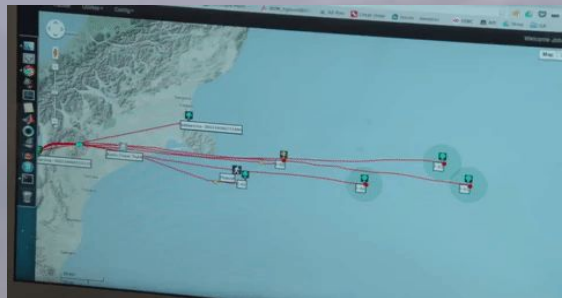
98 days in Peruvian airspace

Descent and recovery in Ica region, Peru

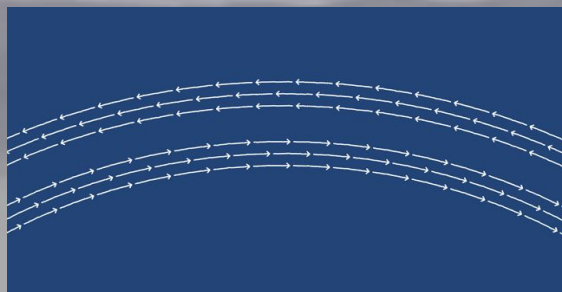


Balloon Recovery: Launch, Recover, Iterate

Tracking & Navigation



Control and Monitoring



Predictability through navigation

Recover & Learn



Recovery: remote w/o obstructions



Continuous Learning

Where we are today

Longevity



100+ days
balloon lifetimes achieved

Balloon duration record of
190+ days

Navigation



27+ Million km travelled since
2013 project launch

30+ million km simulated
everyday to improve navigation

Connection



Delivering connectivity to
100's of thousands of users

Across an area of
over 50,000 km²



Project Loon: Connecting Users after a disaster

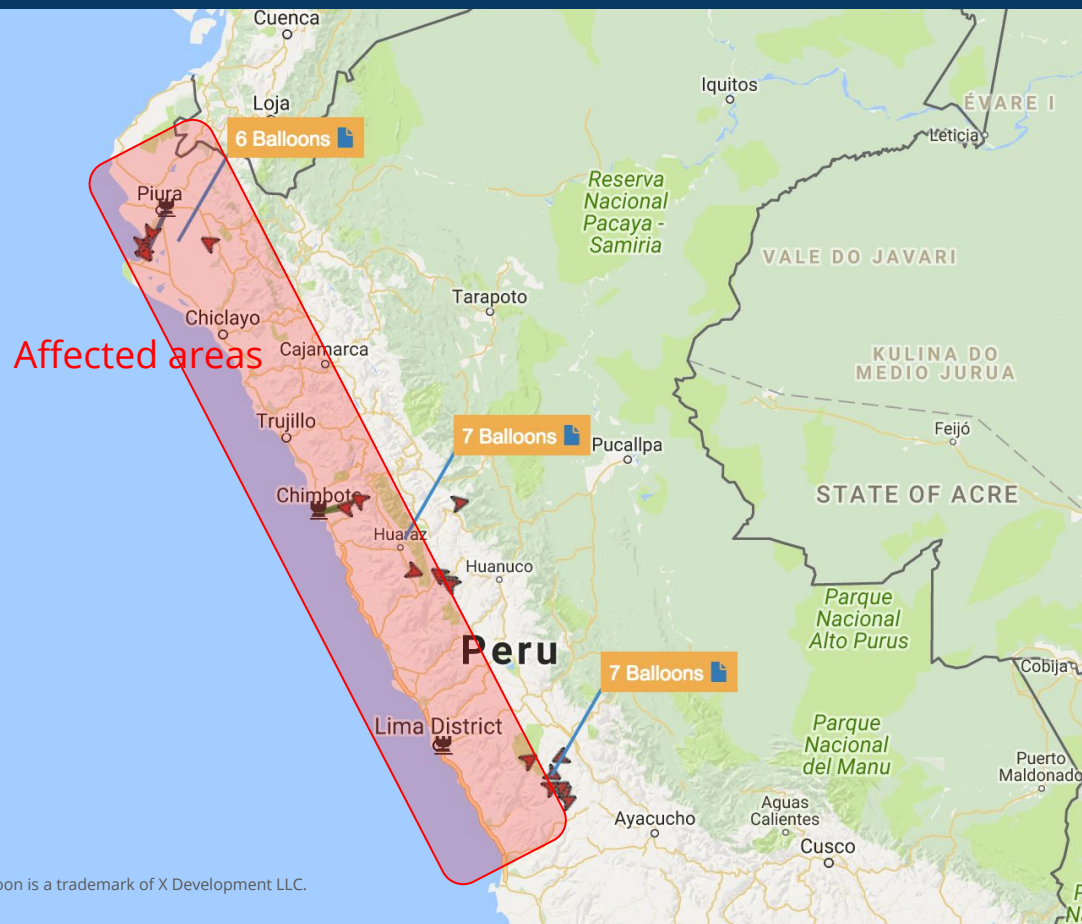
Delivering connectivity to 100's of thousands of people across both Peru and Puerto Rico in partnership with Telefonica, AT&T and T-Mobile



In March 2017, Peru suffered the worst flooding seen in many decades



The Challenge...



Since late-2016, Project Loon had been delivering internet to trial users in Peru.

We could help:

- Balloons were already in the area
- Some ground stations were already installed
- Interconnect with mobile operator was already in place

However:

- Our backhaul was knocked-out
- We needed cooperation and approval from operator
- Needed more ground stations to cover wider area

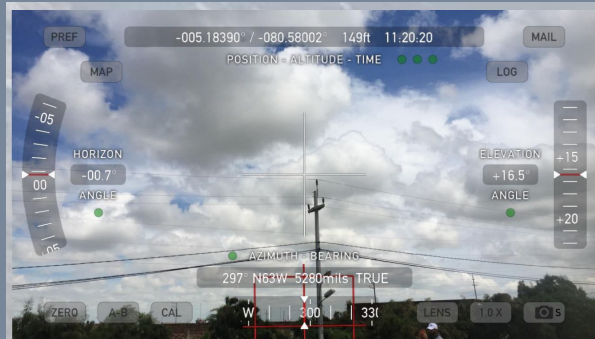
Bringing Connectivity Back to Peru

Assessing the Situation



Air Survey:

- Highest Impact Areas
- Potential to serve most users w/o service



Ground Station Survey:

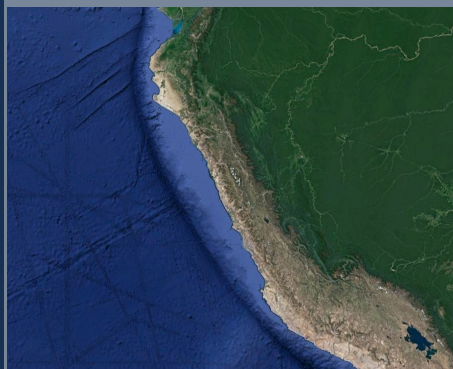
- Safe & secure above flood water
- Power / fiber back available or LOS to O3B
- LOS to balloons

Connecting Users



Serve Users East of Lima, Chimbote / Huarmey & Piura:

- Deploy Ground Stations on rooftops or flatbed trucks.
- Fiber backhaul via Level 3 or via satellite from O3B



Ground Stations & backhaul connectivity in place:

- Balloons moved to service areas with four ground stations in place.
- Connectivity for +100k users over less than 4 months with local partner Telefonica



Bringing connectivity back to Puerto Rico

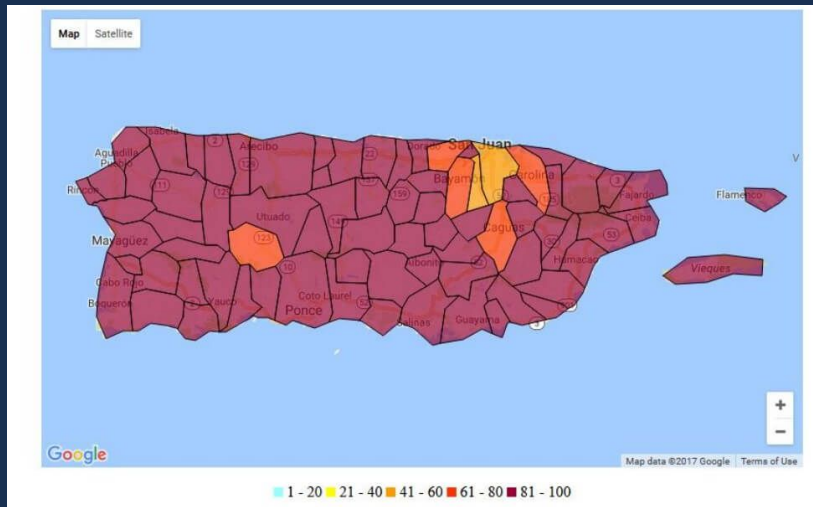
Puerto Rico: Post-Hurricane-Maria

A Category 5 storm - 175 mph Winds



Millions without power, safe drinking water, or connection to their loved ones.

Connectivity: Post-Hurricane-Maria



Red = connectivity knocked out



Humacao, Puerto Rico

*FCC, Hurricane Maria Communications Status Report, % cell sites down by county

Puerto Rico: Emergency Response

On The Ground



Launch Site



Ground Network

Loon HQ



Industry &
Partners



Balloons

Mission Oriented



Hitch Hiking

Humanitarian Flight - Delivering 17 boxes of water filters in San Juan



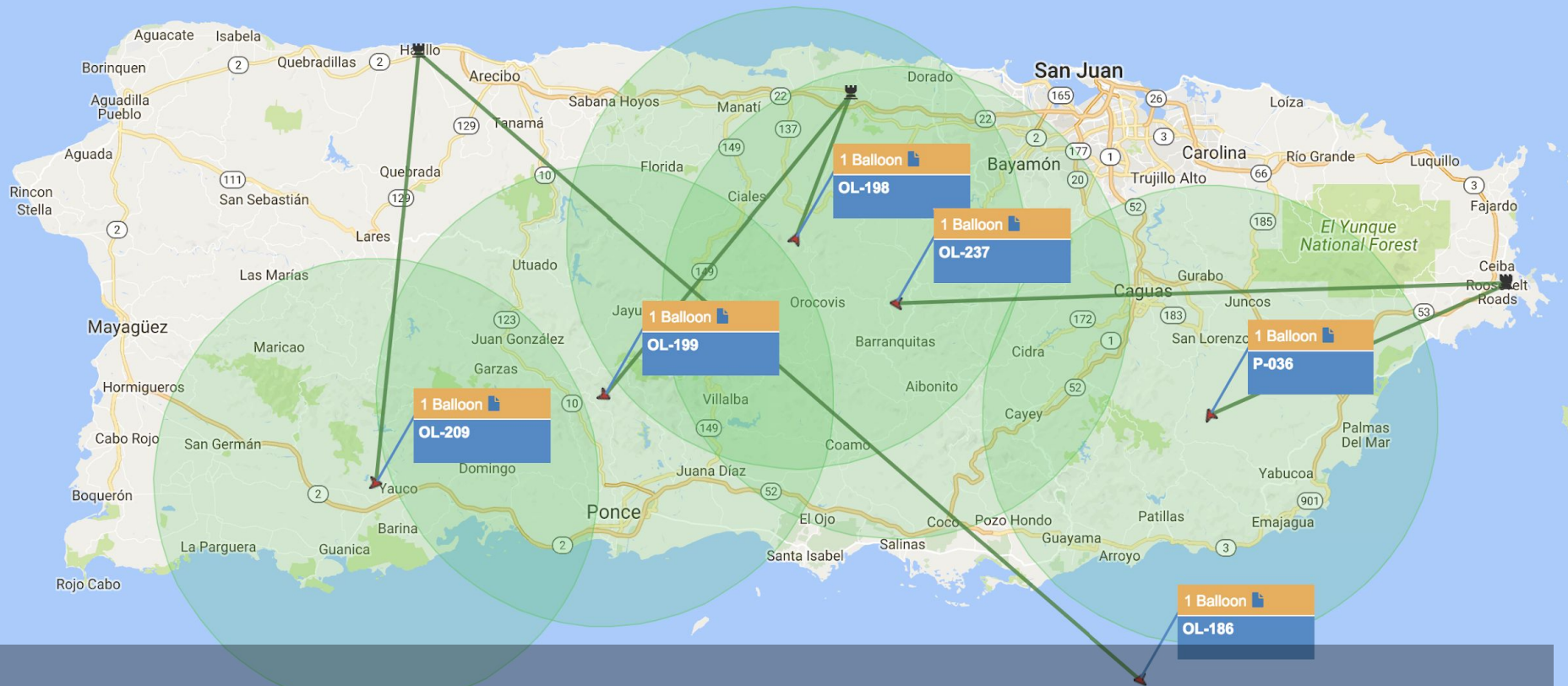
Military Collaboration

26th Marine Expeditionary Unit Base Station - shared equipment (forklift)

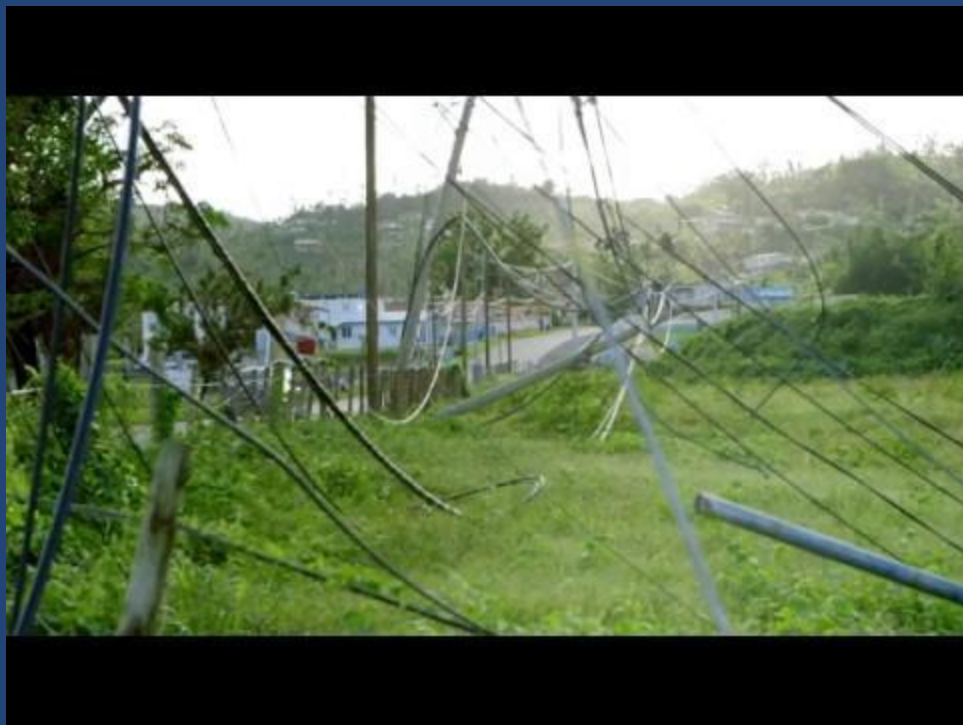


Trade & Barter

Installing rotor mount Chinook Helicopters for diesel & generators



200,000+ LOON USERS IN PUERTO RICO





Questions?

www.x.company/loon