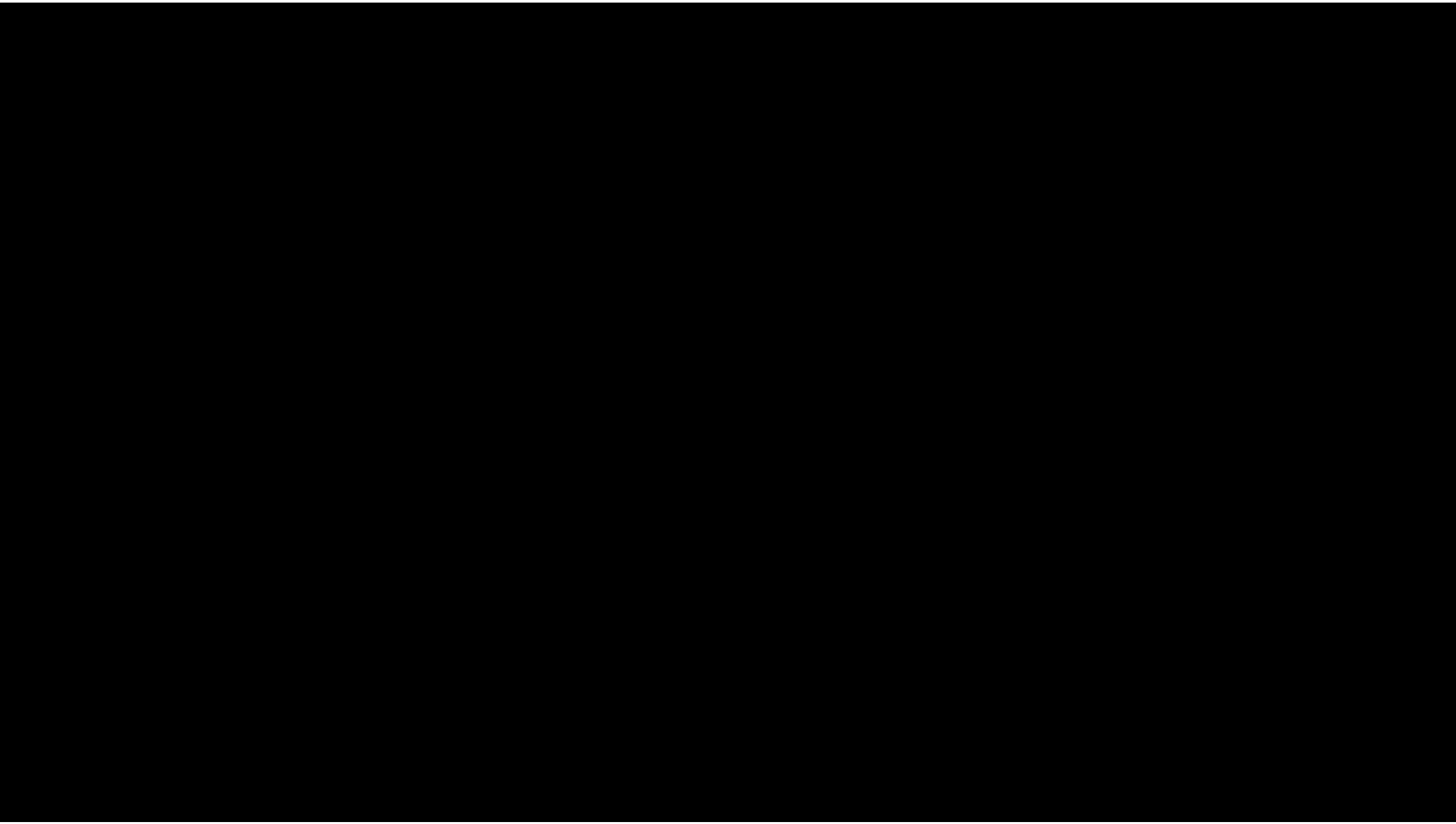

Introducing
Hiberband
The Low Power Global Area Network.
Revolutionising Internet of Things (IoT) connectivity.
hiber

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The Hiber® Story.

Enabling an opportunity…

- Founded in 2016
- 2 IoT satellites in LEO orbit, network live June 2019
- 50 Launch partners including iconic brands in Logistics, O&G, Insurance, and Agriculture, and another satellite Operators
- Selected as Amazon's global "Launch Startup of the Year" with previous winners including Airbnb and Netflix.
- Featured as one of Europe's top 100 hot startups of 2018 in WIRED magazine, and won other awards from PwC and Accenture.
- LPGAN (Low Power Global Area Network) The Hiberband® Network

AWS re:Invent — *Launch Startup of the Year 2018*

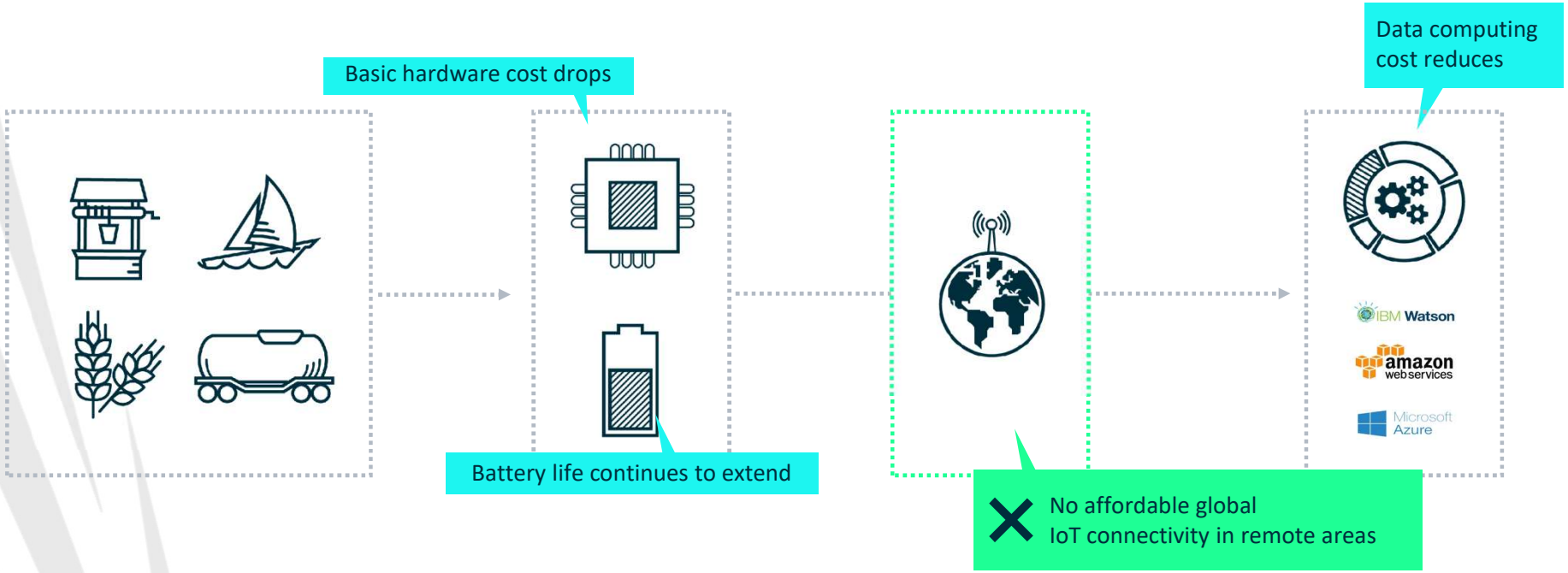
WIRED — *Europe's hottest startup 2018*

accenture — *Innovation award winner 2017*

pwc — *Pioneer Festival Global top 50 2017*

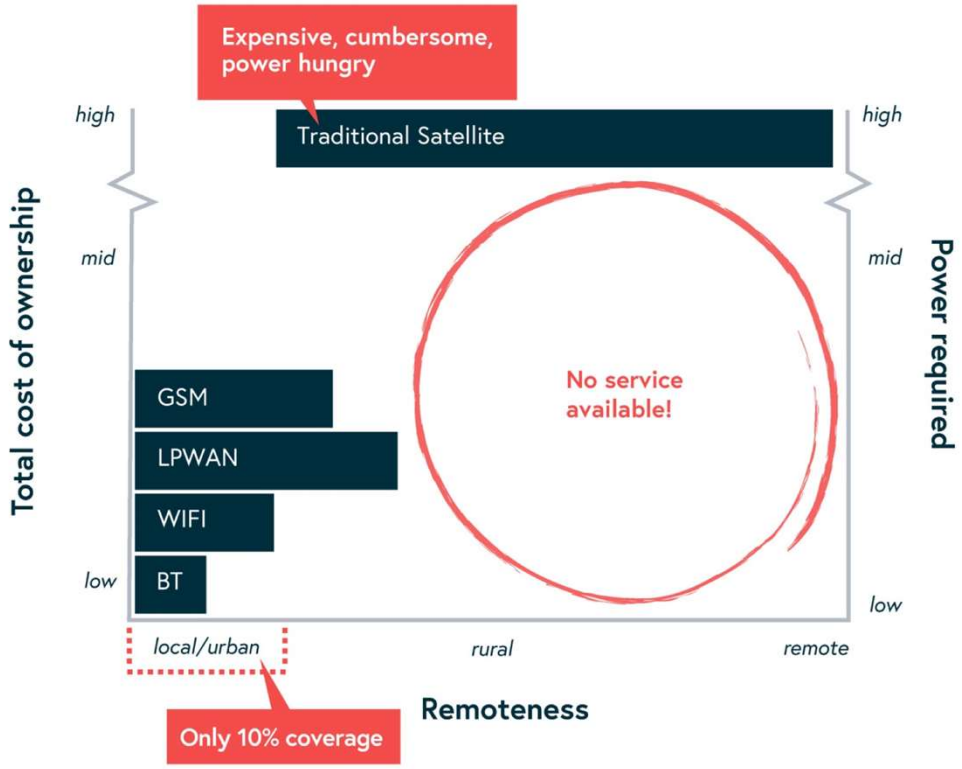
The global IoT connectivity problem.

IoT devices often have no viable means to send data via internet.



There is no cost effective global connectivity

Less than 10% of the globe covered by IoT ready connectivity



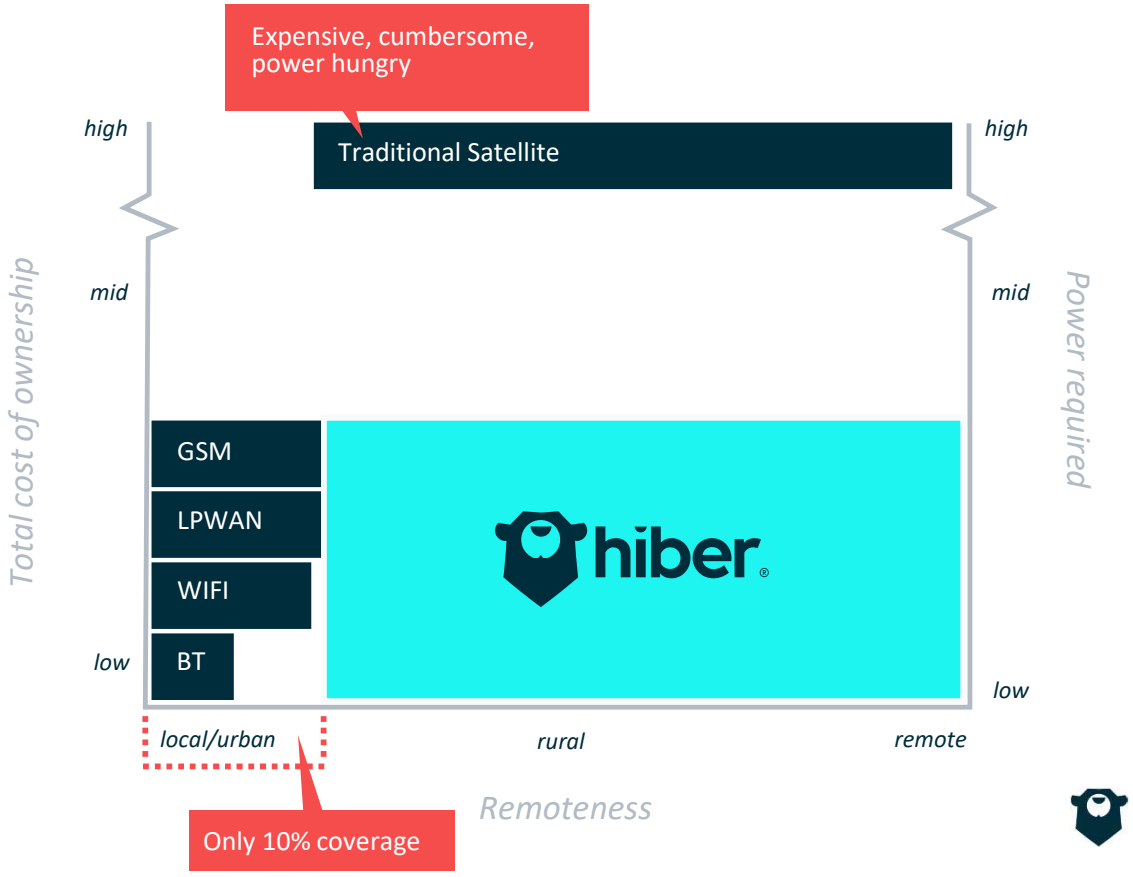
- Monitoring fleets of small fishing boats
- Monitoring the location and status of hazardous goods in unpowered transport units
- Monitoring soil moisture to improve production efficiency and crop quality
- Monitoring gas tanks to plan, schedule and develop delivery schedules in advance

Examples of IoT applications and services currently **not** economically viable

Solution: Hiberband®

Hiber covers the remaining 90% as well

1. Global coverage
2. One global standard
3. Up to 20x cheaper than existing global solutions
4. Ease of use
   - *Direct to satellite*
   - *Power efficient*
   - *Easy to integrate*



How Hiber compares to other connectivity solutions

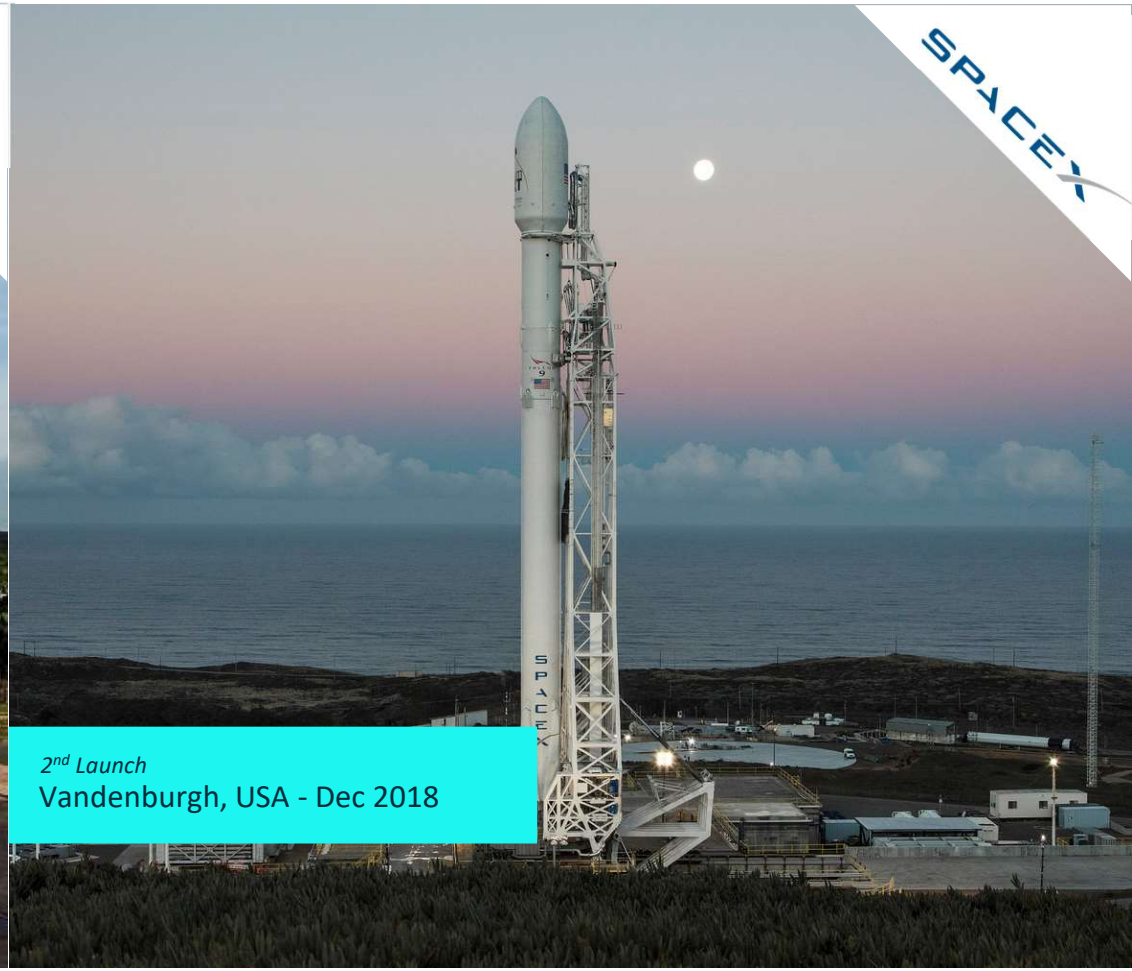
	LPGAN	Satellite	LPWAN	Cellular	Wifi, Bluetooth
Terrestrial / satellite	Satellite	Satellite	Terrestrial	Terrestrial	Terrestrial
Coverage	100%	85% - 100%	<3%	10%	<3%
Cost	€	€€€	€	€	€
Data rate	+	++	+	+++	+++

Hiber.Global/findsats

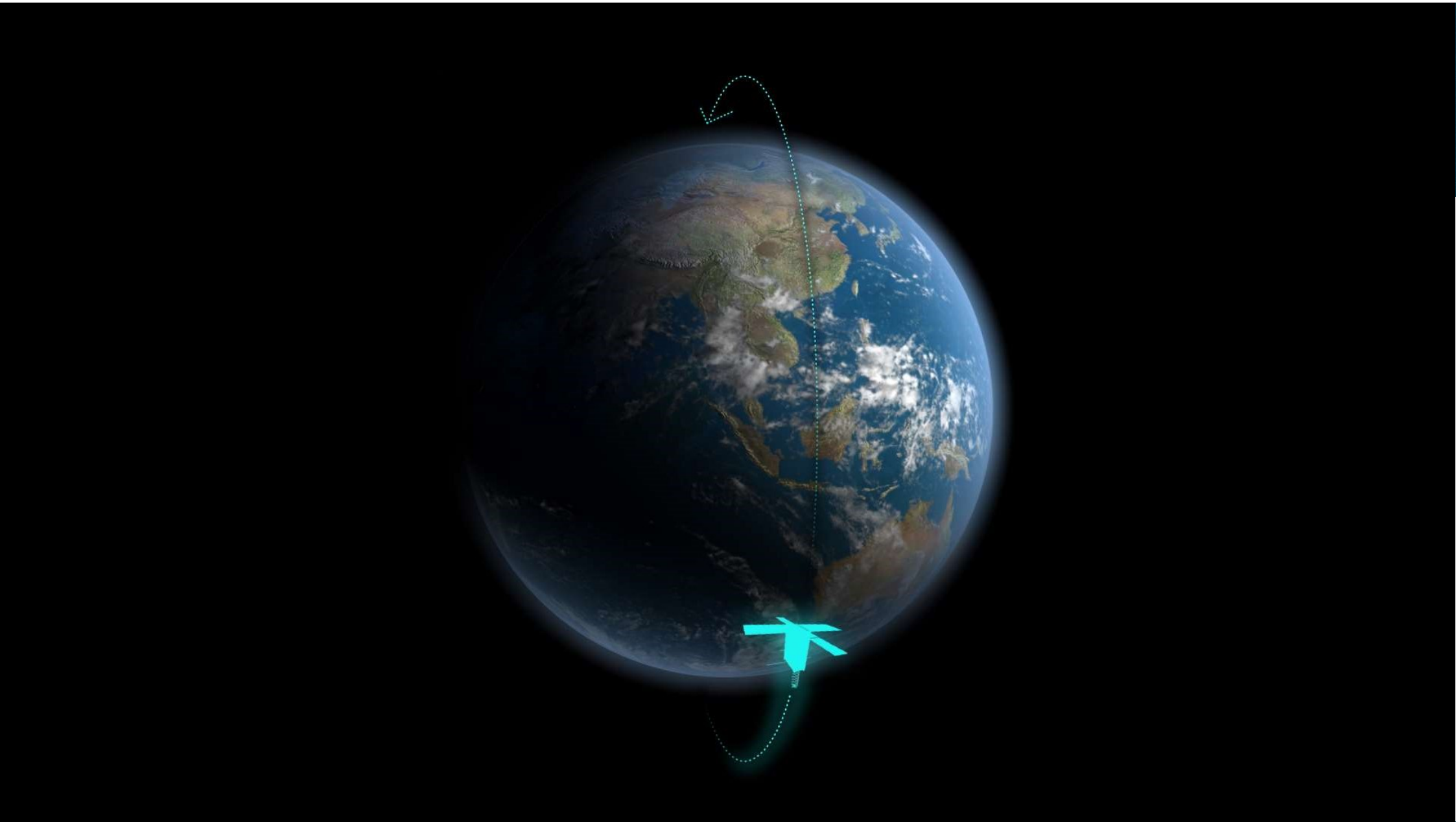
We have launched two satellites

Signed launch contracts with dedicated launchers & ride shares for 2020

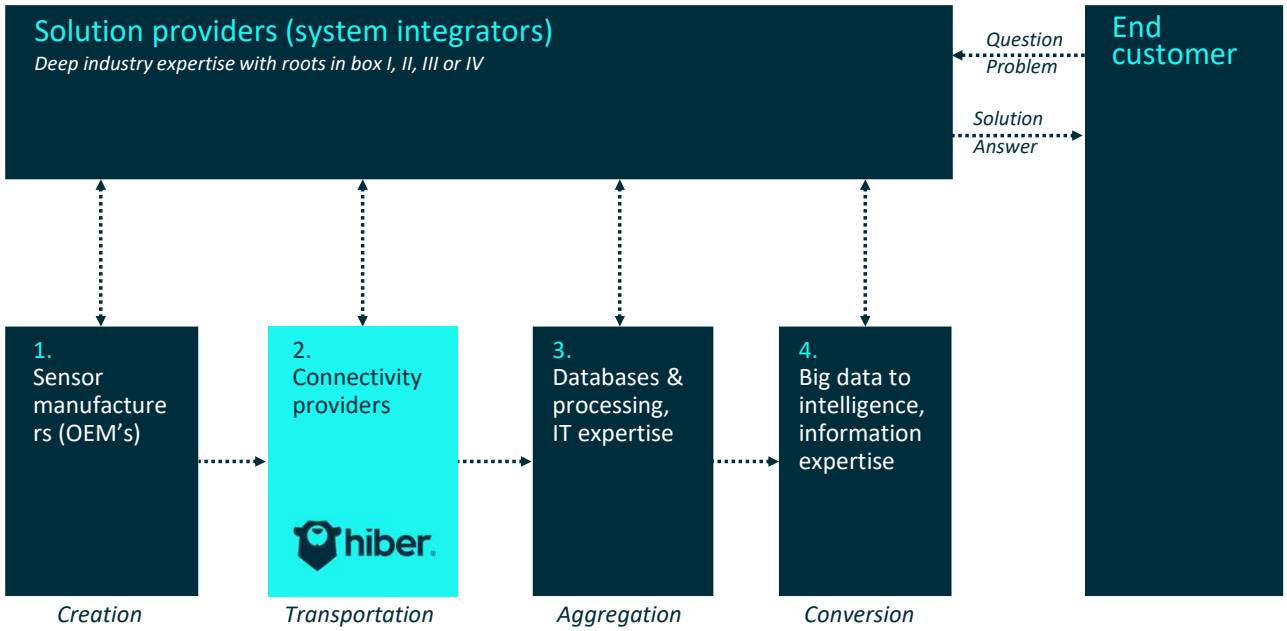
1st Launch
Sriharikota, India - Nov 2018



2nd Launch
Vandenburgh, USA - Dec 2018



Hiber’s role in the IoT-valuechain: Connectivity.



Core technology developed and fully tested

In the past years, we developed our modem, satellites and mission control for seamless transport of IoT data

MODEM

Ultra low power transmissions

Various patents pending

SATELLITE

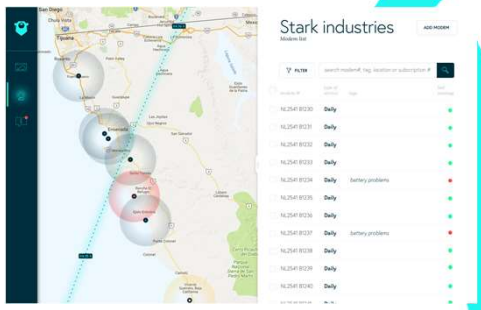
2x 6U satellites launched

Next generation satellites
half the size and cost

MISSION CONTROL

Latest online tools

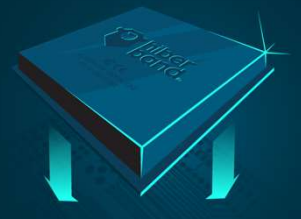
Integrated with
cloud providers



Supporting hardware connectivity solutions

Three solutions to match every deployment type

INTEGRATED MODEM & ANTENNA



DIRECT-TO-SATELLITE SOLUTION

Large deployments anywhere

+ 1-way, up to 4 messages/day
+ Hardware cost €35
+ Testing in Q4 ‘19

AVAILABLE IN Q1 ‘20

HIBERHUB

DIRECT-TO-SATELLITE SOLUTION

Prototype and connect

+ 1-way, up to 4 messages/day
+ Hardware cost €100
+ Testing in Q1 ’20

AVAILABLE IN Q2 ‘20

VIA

GATEWAY SOLUTION

Connect any LoRa or BlueTooth deployment

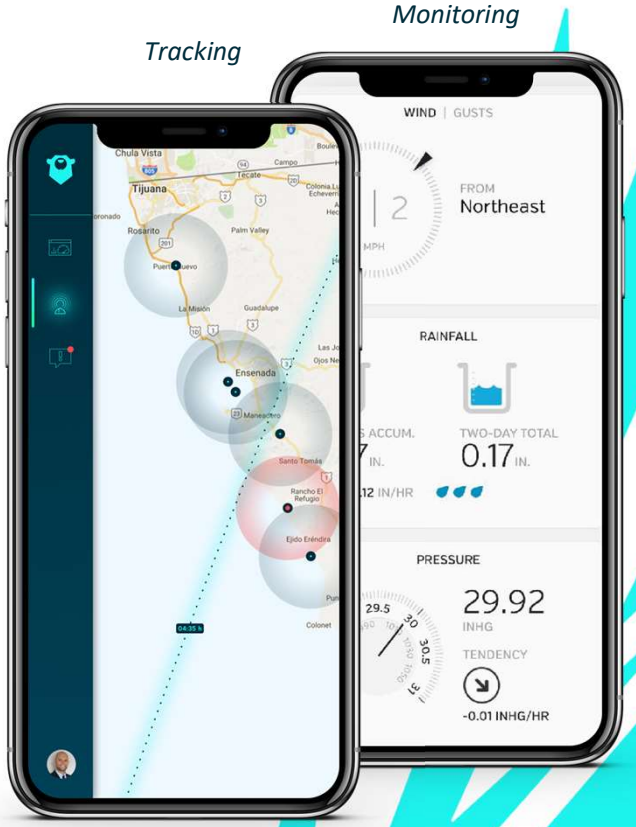
+ 1-way, up to 4 messages/day
+ 2-way, unlimited messages, real-time
+ Hardware cost range €1,500 - €3,500

NOW AVAILABLE

Service levels & pricing

Secure tracking & monitoring data 20x cheaper than regular satellite networks

FREQUENCY	PRICE
1 message per day	€0,50 per month
4 messages per day	€1 per month
24 messages per day	€3 per month



Use cases

Powered by Hiberband

Opening up a world of new opportunities.

Agriculture

- Beehive monitoring
- Soil monitoring
- Water level/quality monitoring
- Cattle tracking

Energy

- Pipeline monitoring
- Gas and fuel tank monitoring
- Offshore site monitoring
- Well monitoring

Transport & Logistics

- Asset tracking
- Rail car monitoring
- Maritime tracking and monitoring
- Pallet tracking

Environmental

- System health/data loggers
- Well monitoring

Fisheries

- Fishery buoys/drifters

Other

- Miscellaneous

IoT to monitor farming equipment.

No matter where the equipment is, it can be found and managed.

KEYWORDS

economic

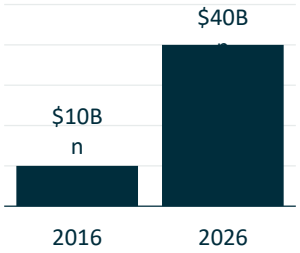
agriculture

COMPANY

AGCO

CHALLENGE

Inefficiently used, lost or broken farming equipment solved with IoT.

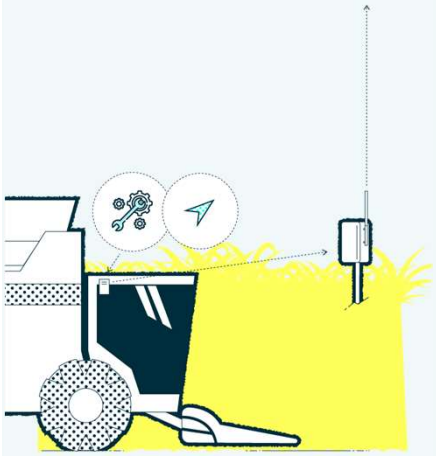


Global smart farming market

Farming equipment can be maintained much more efficient with IoT. Remotely tracking and monitoring tractors, combine harvesters, and other equipment is often unfeasible due to lack of connectivity.

SOLUTION

Keeping track of equipment from a distance.



Data is processed and made available to farmer, dealer and manufacturer.

IMPACT

Improving efficiency for complete value chain.

- The farmer can use the fleet more efficiently, leading to better profits.
- Dealers can create new business models for just-in-time maintenance.
- Manufacturers can improve their product based on real-world data.

IoT improves the commodity quality chain.

Delivering real-time commodity insights across the Globe.

KEYWORDS

economic

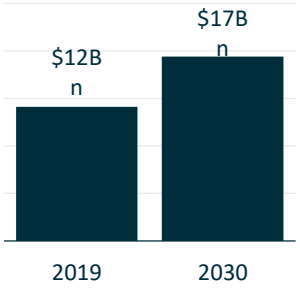
agriculture

COMPANY

Centaur

CHALLENGE

Global post harvest grain loss.

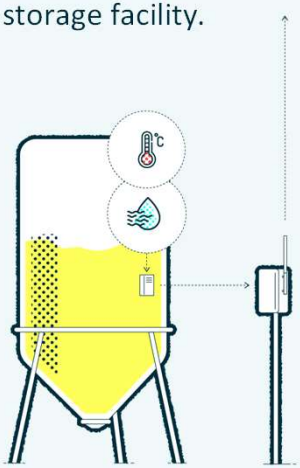


Yearly loss in US dollars.

Remote monitoring of grain storage is in most cases unfeasible due to lack of connectivity.

SOLUTION

Hourly monitoring of storage facility.



Data is being processed to information and made available to the farm manager.

IMPACT

Higher profitability and better service.

- Due to flexible storage periods and selling commodities at peak market prices.
- Reduce losses from spoilage, theft or degradation of quality.
- Storage information allows traders, insurance companies and banks to improve risk models and financial services. availability.

Connected cows put farmers' minds at ease.

Improving farm operations and animal welfare by tracking cattle via satellites.

KEYWORDS

economic

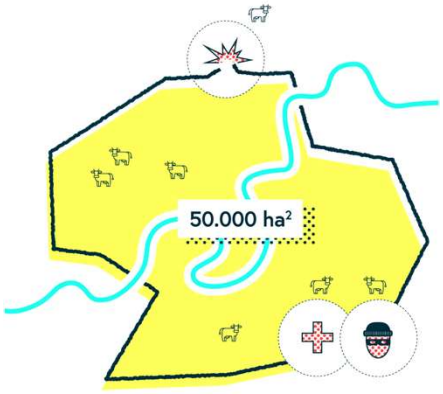
livestock

COMPANY

Mahindra

CHALLENGE

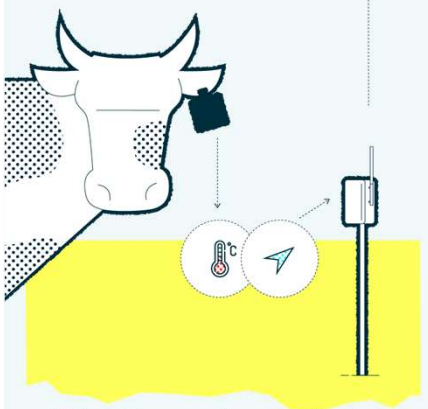
Slow response to livestock emergencies leads to unnecessary loss.



Lack of connectivity on large farms forces farmer to check on animals by car or helicopter. In case of emergencies it's often too late.

SOLUTION

Connected ear tag equipped with sensors.



GPS and temperature monitoring via smartphones allows farmer to respond faster on steeling, fence breaks and illness.

IMPACT

Enabling farmer to monitor herd from phone.

- Saving up to 60% on mustering activities (man hours and helicopter usage).
- Reduced cattle mortality rates.
- Reduced cattle loss by fence jumps and theft.
- Beef traceability means future proof farming business.

The future of palm oil production.

In response to market demands, transforming to a more sustainable industry.

KEYWORDS

economic

agriculture

COMPANY

CHALLENGE

Palm oil industry struggles with fertiliser waste and yield challenges.

Causes are incorrect timing of fertiliser application, either when it's too dry or just before it starts to rain, and climate fluctuations which cause water stress and flooding.

SOLUTION

Hiberband enabled LoRa sensors make plantations smart.

Sensors frequently measure micro-climatic rainfall, temperature, soil moisture, water levels. Sensors in trees measure stress and water usage.

IMPACT

Better yields and a better future.

- Reduced risk of yield loss from water shortages or flooding, early warning systems, yield prediction, and pest & disease prevention. All driven by data.
- Significant cost reduction in fertiliser usage since fertilisation is only performed at optimal times.
- Comply with market demand towards product traceability and sustainable practices

Closing Sugar Cane yield gaps in Brazil.

The largest sugar cane producing country in the world has the highest opportunities for optimization.

KEYWORDS

economic

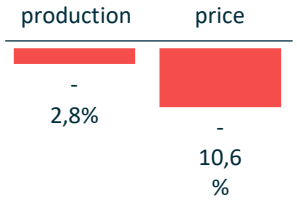
agriculture

COMPANY

CHALLENGE

Sugarcane productivity and pricing are under pressure in recent years.

Farmers try to compensate declining numbers by optimizing production. Options are limited due to lack of connectivity on the large farms.



Brazil sugarcane industry in 2018

Water shortages are number one growth blocker. Efficiency challenges caused by downtime of equipment.

SOLUTION

Data driven farm management.

Data comes from sensors which measure rainfall, soil moisture, and asset status. All measurements are transmitted via satellite to a digital farm management solution.

IMPACT

Efficiency and sustainability go hand in hand.

- Optimized irrigation improves yield through reduces both water shortages and usage.
- Remote asset management decreases downtime and reduced fuel usage of assets.
- Real-time production data enables top management to perform accurate yield prediction.

The combat against biomass storage fires.

Improving safety and regulatory compliance through sensors connected to satellites.

KEYWORDS

compliance

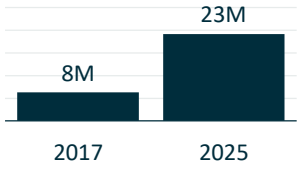
energy

COMPANY

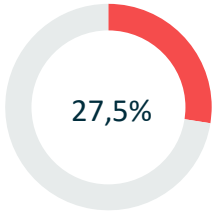
AXA

CHALLENGE

Boom in biomass energy in Japan after Fukushima.



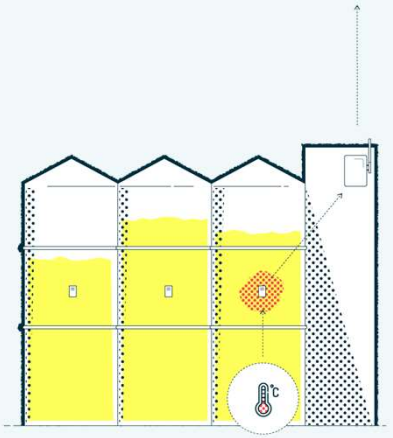
Japanese biomass demand in tonnes.



Percentage of storage fires due to internal heating.

SOLUTION

Automated monitoring of storage facility.



In response to government regulations which enforce fire prevention by monitoring temperature of biomass.

IMPACT

More than just compliance.

- Automated monitoring is a cost effective way to comply with regulation, compared to man powered monitoring.
- In addition to complying to government regulations, the storage facility improved safety for employees, eliminating fires.

Preventing spoilage of valuable cargo.

Preventing loss of cargo and improving transparency by placing sensors in carrier holds.

KEYWORDS

economic

Insurance

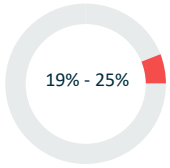
COMPANY

AXA

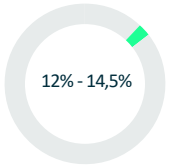
CHALLENGE

High spoilage of bulk cargo due to moist levels.

Cereals like rice spoil during transport if not kept dry. After spoilage, it's difficult for the insurer to assign the responsibility for spoilage to the right entity.



moisture level rice on harvest



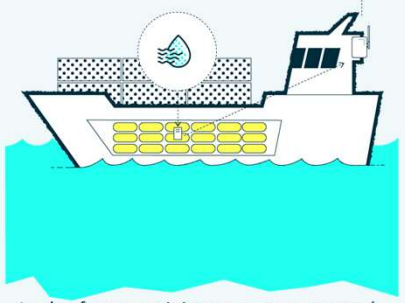
allowed level during transport

Result: insurers are hesitant to insure bulk cargo. Insurances have premium prices.

SOLUTION

Sensors inside cargo holds of bulk carriers.

Insurers and cargo owners ask ship crews to monitor cargo during trips. This is unreliable and untransparent.



Lack of connectivity on sea prevented automated monitoring. Hiberband enables sensors to be placed between the cargo and data sent through.

IMPACT

Less spoilage, cheaper insurances.

- The insurer reduces the risk of receiving large claims and is willing to provide insurance.
- The cargo owner can obtain insurance for shipments and knows the status of the goods during shipment.
- Less food is wasted during transport. Allowing more efficient use of natural resources.

How to effectively manage water resources.

Accurate and reliable data is key for water management.

KEYWORDS

economic

environment

COMPANY

THE WORLD BANK

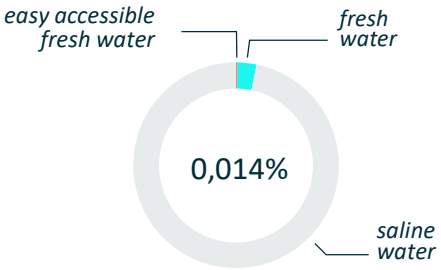
Coca-Cola FEMSA

52impact

CHALLENGE

Water scarcity global problem for citizens and industries.

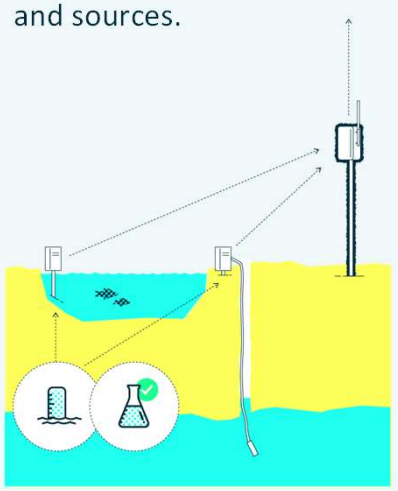
Resulting in declining amounts of water drinking, sanitation, irrigation, among others.



Available data sets about water quality and quantity in rivers, ground and aquifers are outdated and often not reliable.

SOLUTION

Measuring water quality and quantity of rivers and sources.



Data is integrated with other data sources into water risk indicators, processed and made available in a water management platform.

IMPACT

Improve life and business of local communities.

- Access to reliable data creates a clear overview of actual water risks and allows government and industries to practice proper water management.
- Water pollution, droughts and floods will be reduced and has positive impact on humans, agriculture and industry.

Tiny satellites watching over declining honey bee population.

Dramatic honey bee mortality rates affect human food production on immense scale.

KEYWORDS

economic

livestock

COMPANY

hostabee

CHALLENGE

Honey bee population faces historical decline.

Normal mortality rate.

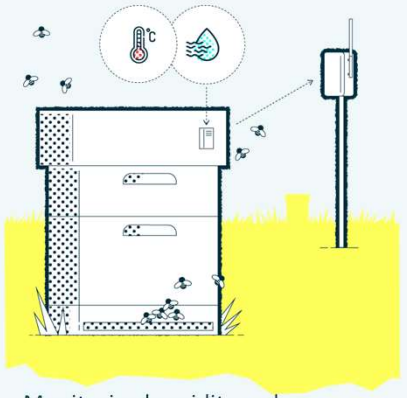
Current mortality rate.

Caused by e.g. pesticides, climate change and monoculture. Resulting even in beehive theft and heists.

Share of global food crop production pollinated by honey bees. Equivalent to $170Bn annually.

SOLUTION

Bee hive monitoring helps reducing mortality.



Monitoring humidity and temperature allows to remotely check the health of the hive and the presence of the queen bee.

IMPACT

Professionals can help amateur beekeepers.

- Reduction in hive visits and bee mortality when hives are on location for pollination.
- Ability to monitor hive health during winter, when opening a bee hive is not possible.
- Enabling professional bee keeper to help amateurs remotely.
- Enabling bee keepers, pollination services ánd crop farmer to keep track of bee hive. So they stay safe, healthy and productive.

hiber®

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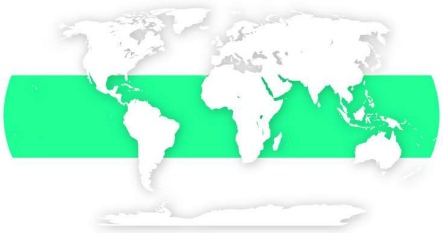
Quick network roll-out

US & Europe will be at hourly revisits in 2020



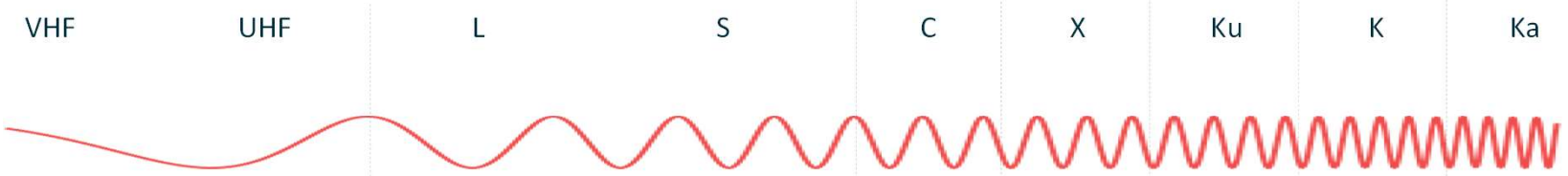
Year	*Sats Launched*	*Frequency EOY*	*Interval EOY*	*Frequency EOY*	*Interval EOY*
2018	2	4 / day	12h	5 / day	12h
2020	4	6 / day	9h	12 / day	6h
2021	10*	19 / day	3h	31 / day	1h 15m
		Equator / Australia / South Am /Afr.		*40° / U.S. / Europe / China*	

** Includes dedicated launches instead of rideshares*

Hiber in a prime postion!!

Access to frequencies key barrier to entrance

UHF & L-Band provide optimal mix of antenna size and power consumption,
L & S Band very complex from regulatory perspective & dominated by existing satellite players



	VHF	UHF	L	S	C	X	Ku	K	Ka
Sensitivity	+++	+++	+/-	-	-	-	-	-	-
Companies		**Hiber** 2 sats in 2018. UHF. **Myriota** Demo sat in 2018 Priority date after Hiber. **Argos** 1st sat in 2019. Priority date after Hiber. **Swarm** 7 demo sats. Priority date after Hiber.	**Astrocast** Demo sat in 2018 Need large constellation. Expensive lease of spectrum.	**Helios wire** 2 sats failed. Lots of spectrum, but have coordination challenges. Technology in very early stage. **Fleet** 2 demo sats in 2018. Challenges with respect to frequencies. Commercial in 2H19 Gateway solution			**Kepler** 1 sat in orbit. Antenna's are designed for 20MB/s. Not suitable for low power IoT		