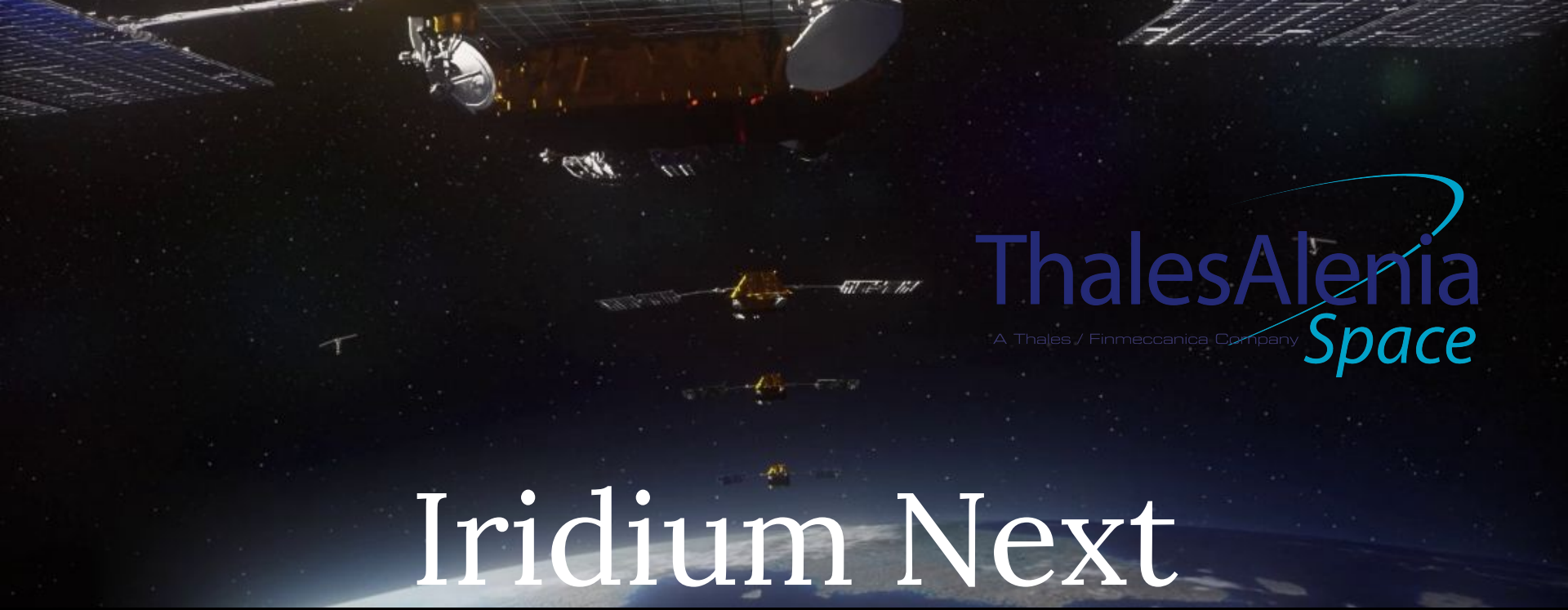


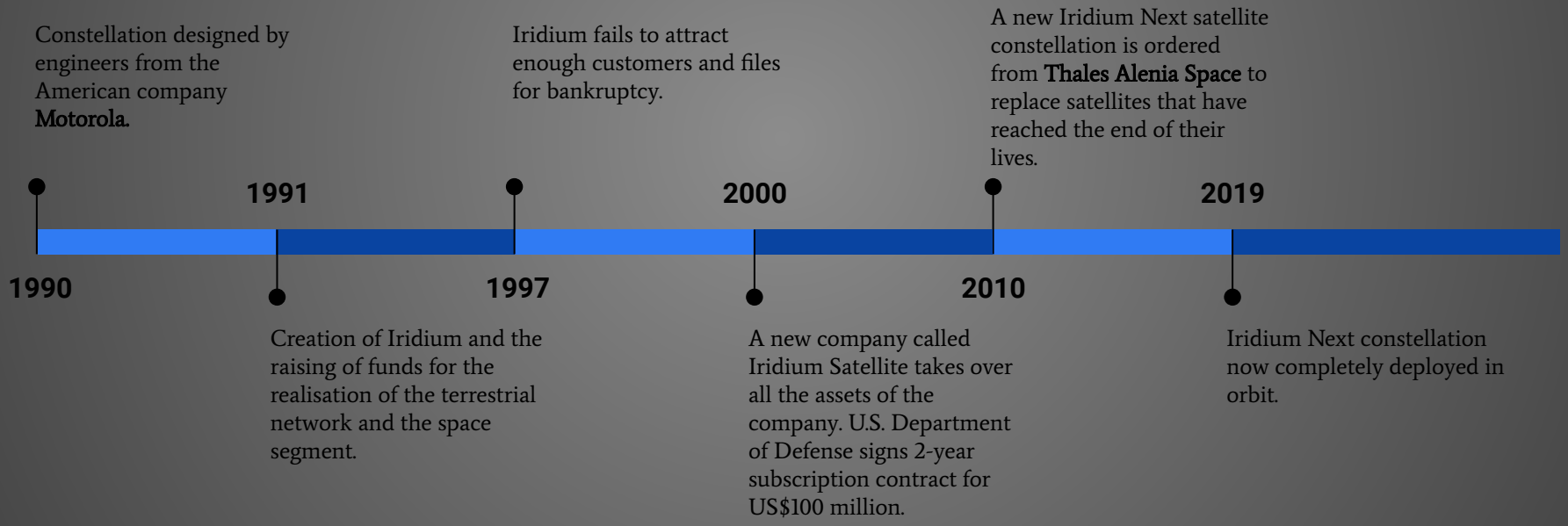
Iridium Next

Loïc Djebar - Evan Tissot - Emmanuel Ferrandi

Janvier 2020

The Iridium Company

Iridium Next is the second generation of the Iridium communications satellite constellation.



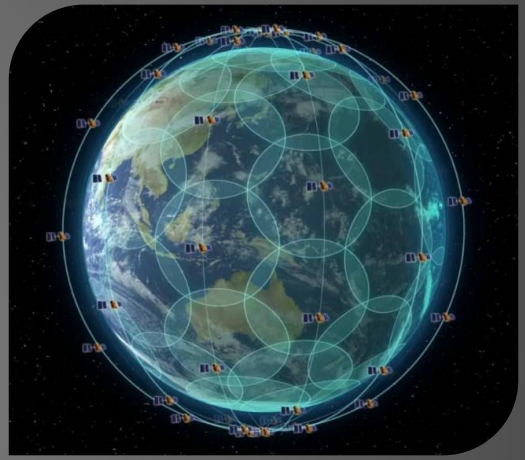
Iridium Communications : Connectivity Provider

Services :

High quality Voice, **Data connectivity** and **Localization** anywhere in the world (including across oceans, airways and polar regions).

24/7 coverage and unaffected by local conditions, such as natural disasters.

A ground infrastructure ensuring the high reliability and capacity of the communications network through multiple layers of redundancy.



Satellite Constellation
(image credit: Iridium Satellite)

Customers :

Governments

Aviation

Maritime

Land Mobile

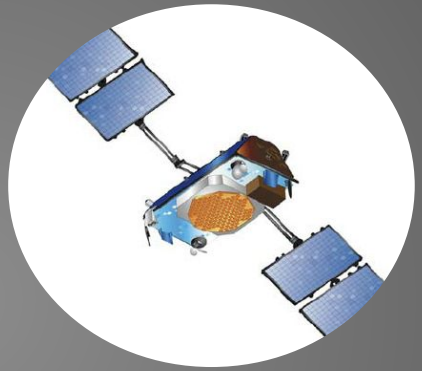
IoT

Iridium's Satellites

First Generation

Weight : 670 kg
Power : Two Solar Panels
Deployed Wingspan : 7.3m
Service life : 8 years

Second Generation : NEXT



Weight : 860 kg
Power : Two Solar Panels
Deployed Wingspan : 9.4m
Service life : 15 years

Iridium 9505

Satellite Phone

Tablet Thorium X

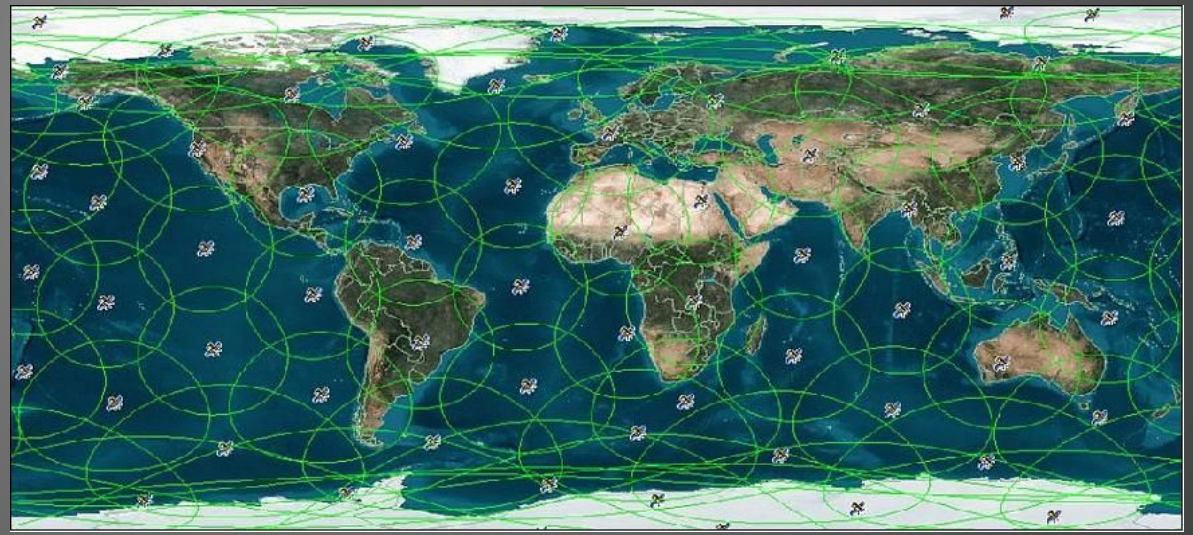
Video/Emails/Phone

Evolution : **expanded capacity - higher data rates - more cost-effective (maintenance & standard operations)**

Communications Satellite Constellation

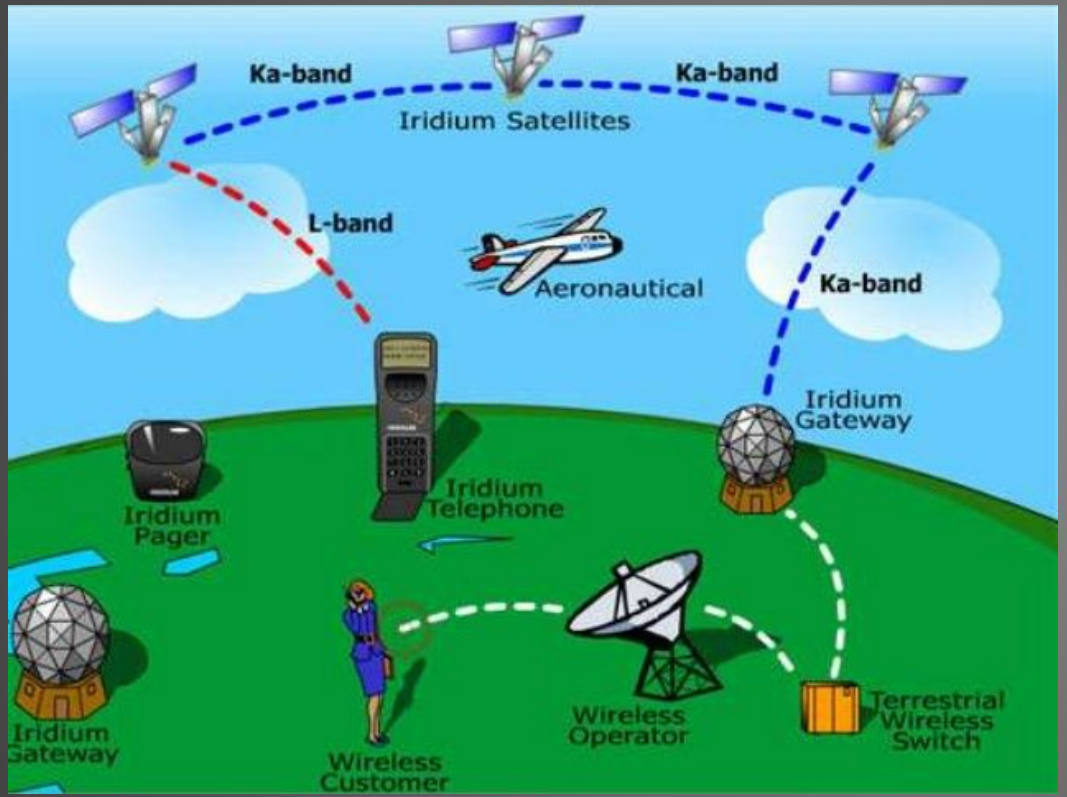
Orbital coverage of the Iridium NEXT constellation of 66 spacecraft (image credit: Iridium Satellite)

- 66 operational satellites
- 6 orbital planes of 11 satellites each
- a low orbit of 780 km
- an orbital period of 100.5 minutes.



Global Coverage (image credit: Iridium/NASA)

Satellite Communication



L-Band (1-2 Ghz)

48 transmit/receive beams for communication with user terminals per satellite

Frequency	1616-1626.5 MHz
Modulation	DEQPSK
Carrier bandwidth	32 kHz

Data rates

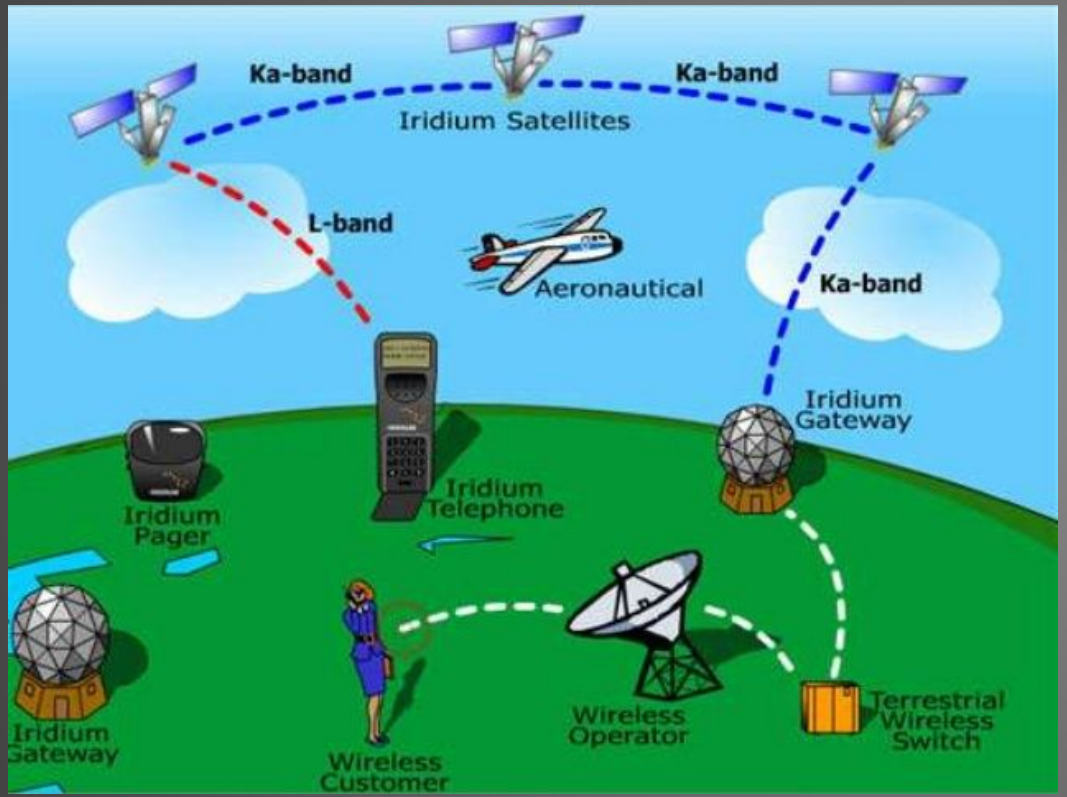
Voice: 2.4 kbp/s

L-Band high speed: Up to 512kbps up/ 1.5Mbps down

Time division duplex (TDD)

Time slots for uplink & downlink

Satellite Communication



KA - Band (20-30 GHz)

Interconnection

- Each satellite is connected to 4 others satellites (front back left right)
- Routing purposes
- Data rate of 12.5 Mbps, half duplex

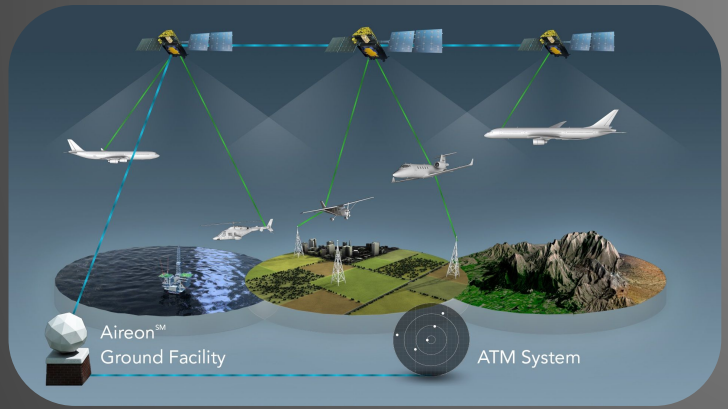
Connection to a gateway

- Route to terrestrial network

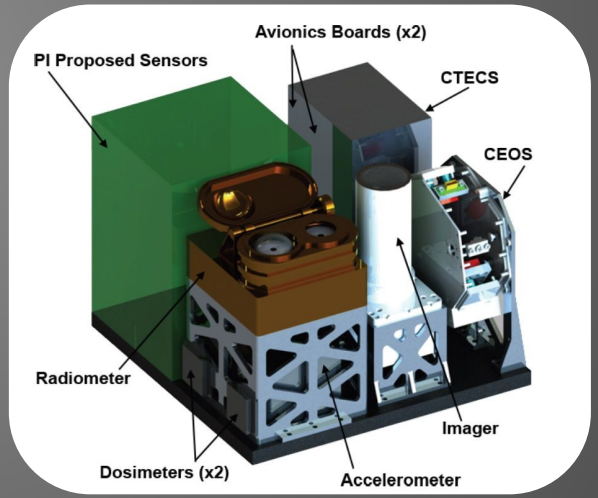
Payloads

Each satellite can accommodate a hosted payload
(altimeters, radiometers, multispectral analyser, fire detection systems...)
50kg - 30cm x 40cm x70 cm

Data from the hosted payloads is made available to operators in near-real time



Aircraft tracking
using ADS-B signals

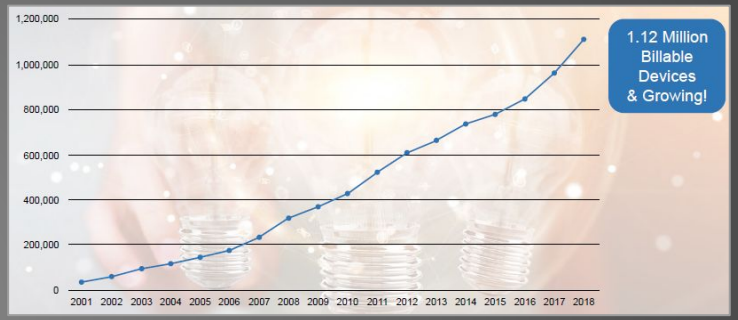


GeoScan Sensor

To Conclude

Advantages:

- Connection all over the world 24/7
- Multi services (weather forecast, aircraft tracking, IoT...)
- 9% CAGR (Compound Annual Growth Rate in 8 years)



Investor day 2019 for Iridium

Disadvantage:

- Low throughput (~ 187 ko/s)

Team opinion:

- This system provide a full coverage on the world allowing specific person (researchers, army...) to call emergency or for specific usage. It is dedicated for some usage and very useful for them but for people like us, it is too expensive.

Sources

1. Iridium NEXT - Satellite Missions
2. Iridium-NEXT – Spacecraft & Satellites
3. IRIDIUM NEXT ENGINEERING STATEMENT Table of Contents
4. Manual for icao aeronautical mobile satellite (route) service part 2-IRIDIUM
5. Global Mobile Satellite Communications Applications: For maritime, land and aeronautical applications Volume 2, Page 132

Images

Iridium-NEXT – Spacecraft & Satellites
Iridium NEXT - Satellite Missions - eoPortal Directory