



GEOSTATIONARY ATMOSPHERIC NETWORK

GYRONAUTICA - Welcome to the Future
New telecommunication technology

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Internet?

2/3 Earth without Internet

1/2 of humanity offline

United Nations «Global Broadband Progress» Report for 2017

Why?

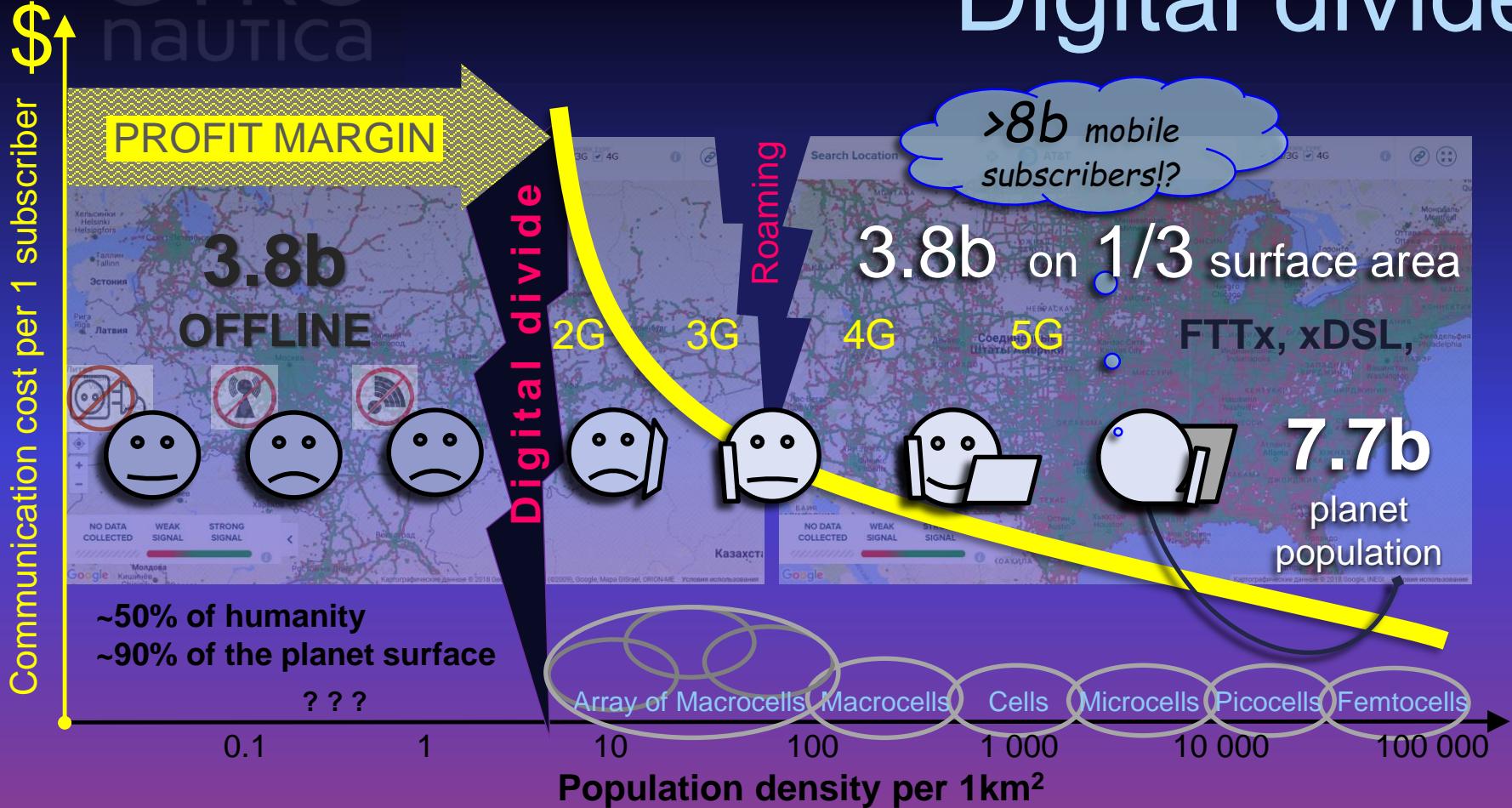
Low density subscribers.

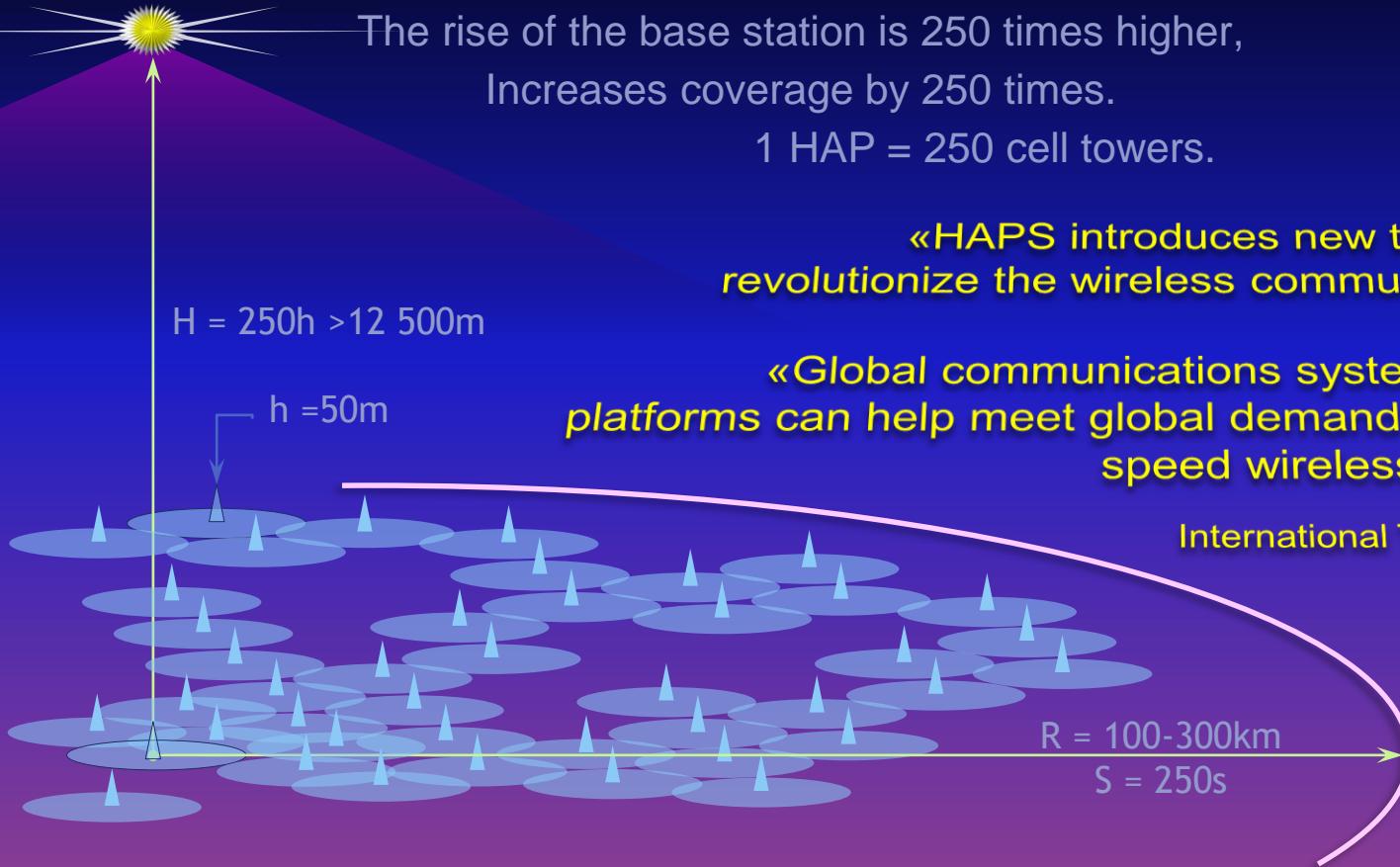
Remoteness from the main channels.

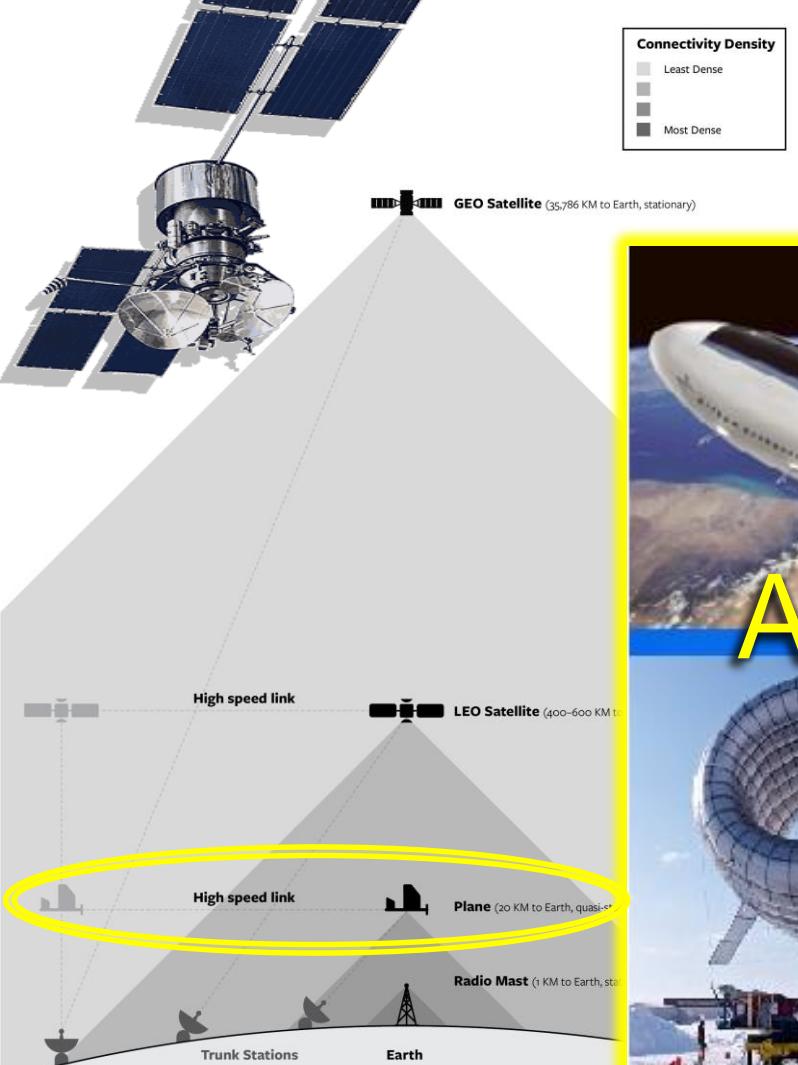
There are no sources of energy.



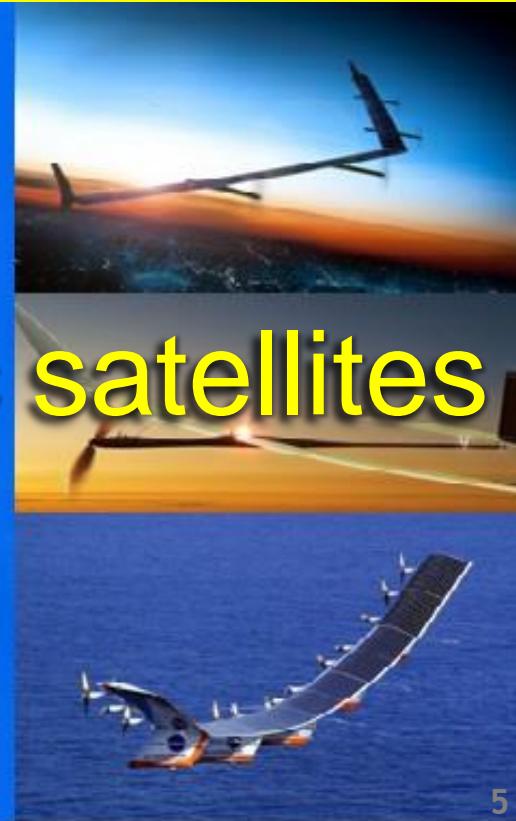
Digital divide







HAPs technology



Atmospheric satellites

Communications energy

SOLAR CELLS

<1 kW / m² - low density
 15%-20% - low efficiency of the cells.
 - 90% to fight with the wind.
 => Heavy batteries
 => Giant sizes
 => High cost.

Comparison of Mean Power Density (kW/m²)



Surface Solar



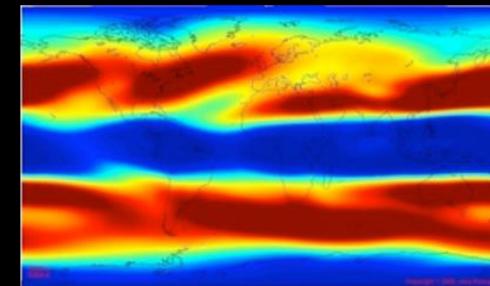
Surface Wind @ 50m

JOBY
ENERGY

ALTITUDE WIND -

global, powerful, reliable.
 Stable energy 5-10 kW / m².

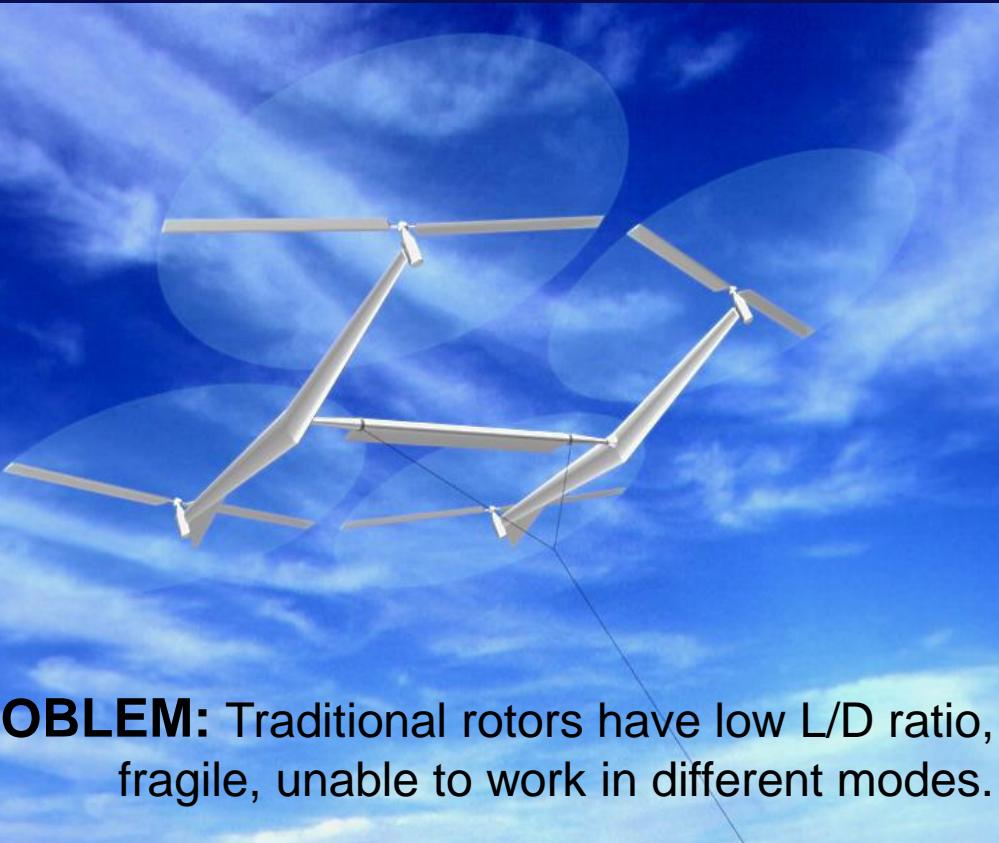
Minimum dimensions, weight
 and platform cost.



Wind @ 10,000m

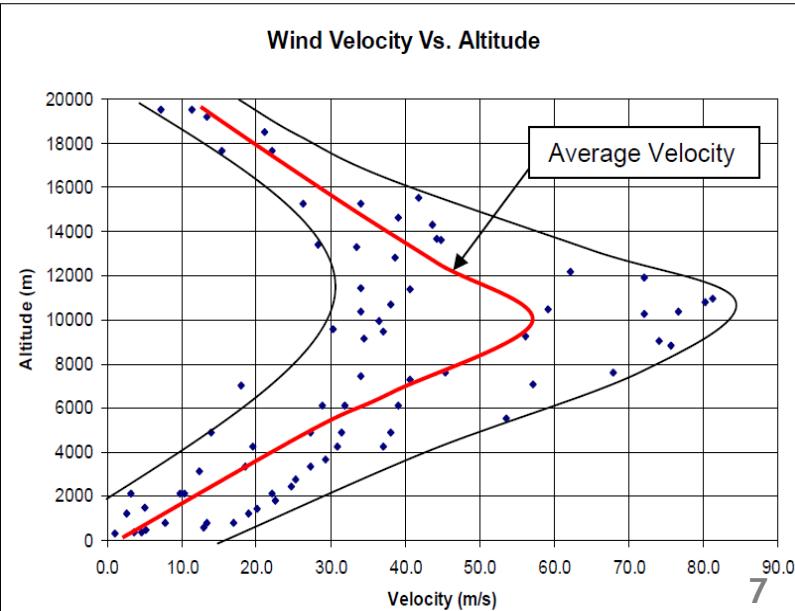


High-altitude wind power



PROBLEM: Traditional rotors have low L/D ratio, fragile, unable to work in different modes.

*High Wind -
powerful reliable source.
The only one in the Arctic!
How to get it?*



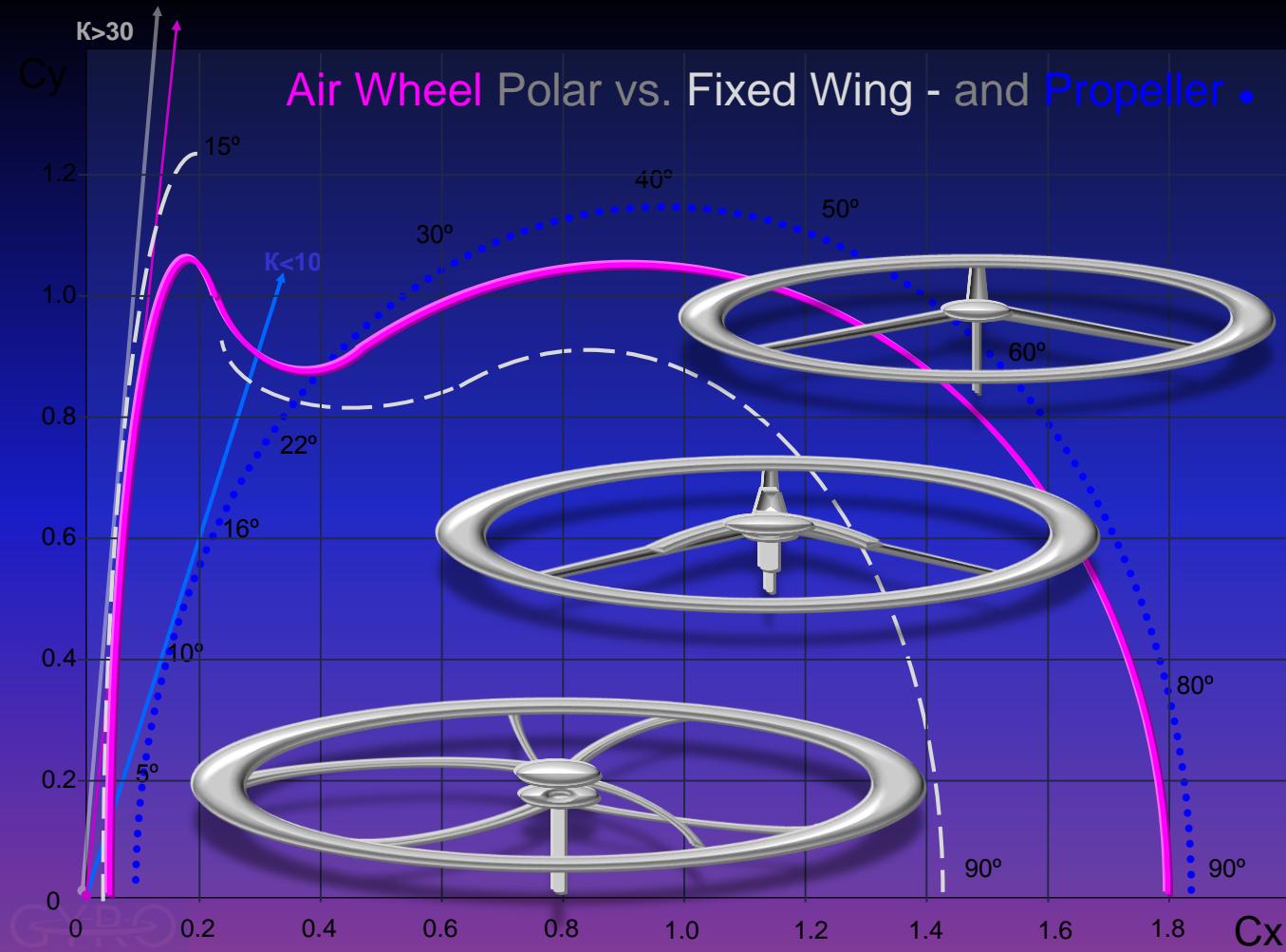
Solution

A key element
of the technology is
the Air Wheel rotor.

Work in 3 modes:

- helicopter,
- autorotations,
- wind turbines

Maximum:
strength, resource,
L/D ratio, efficiency,
elevation angle, ...



Solution

GAS

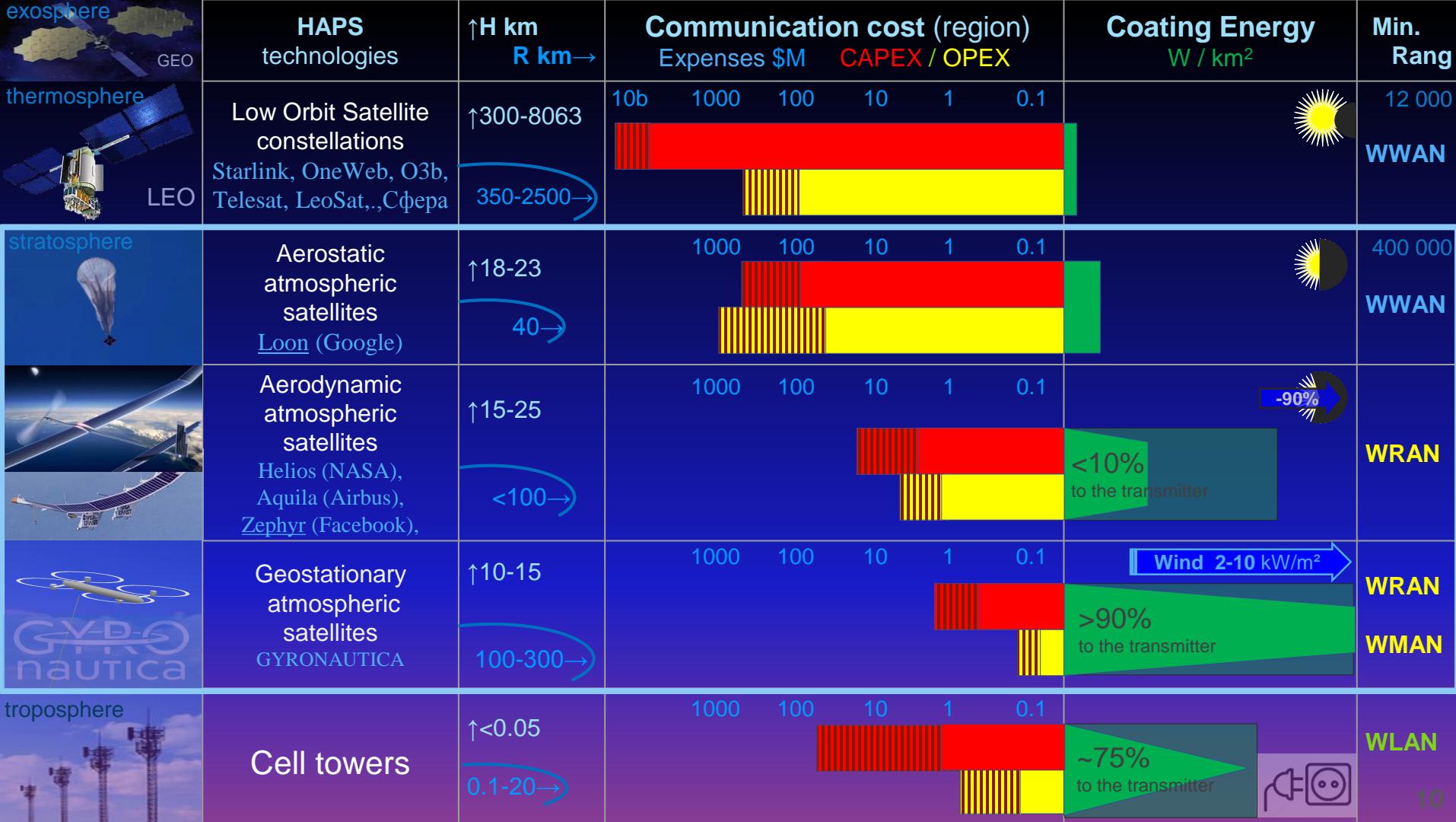
Geostationary Atmospheric Satellite

- high-altitude aerodynamic tethered platform
on bearing Air wheel rotors.

- ✓ Absolute Green Energy Autonomy.
- ✓ Maximum reliability and power for transmitter.
- ✓ Minimum mass and dimensions.
- ✓ Minimum cost of the platform
and its flight year.
- ✓ Reliable fiber optic channel to Base Station.
- ✓ Work area from the tropics to high latitudes.

Altitude up to 14 km ,
Horizon up to 400 km ,
Coverage area
from 30 000 km²,
up to 300 000 km².

Ultra High Molecular Polyethylene
UHMPE (Dyneema®, Spectra®)
specific strength = 378km!



Competition



The technology of
Geostationary Atmospheric Satellites
is protected by patent and applications until 2033.

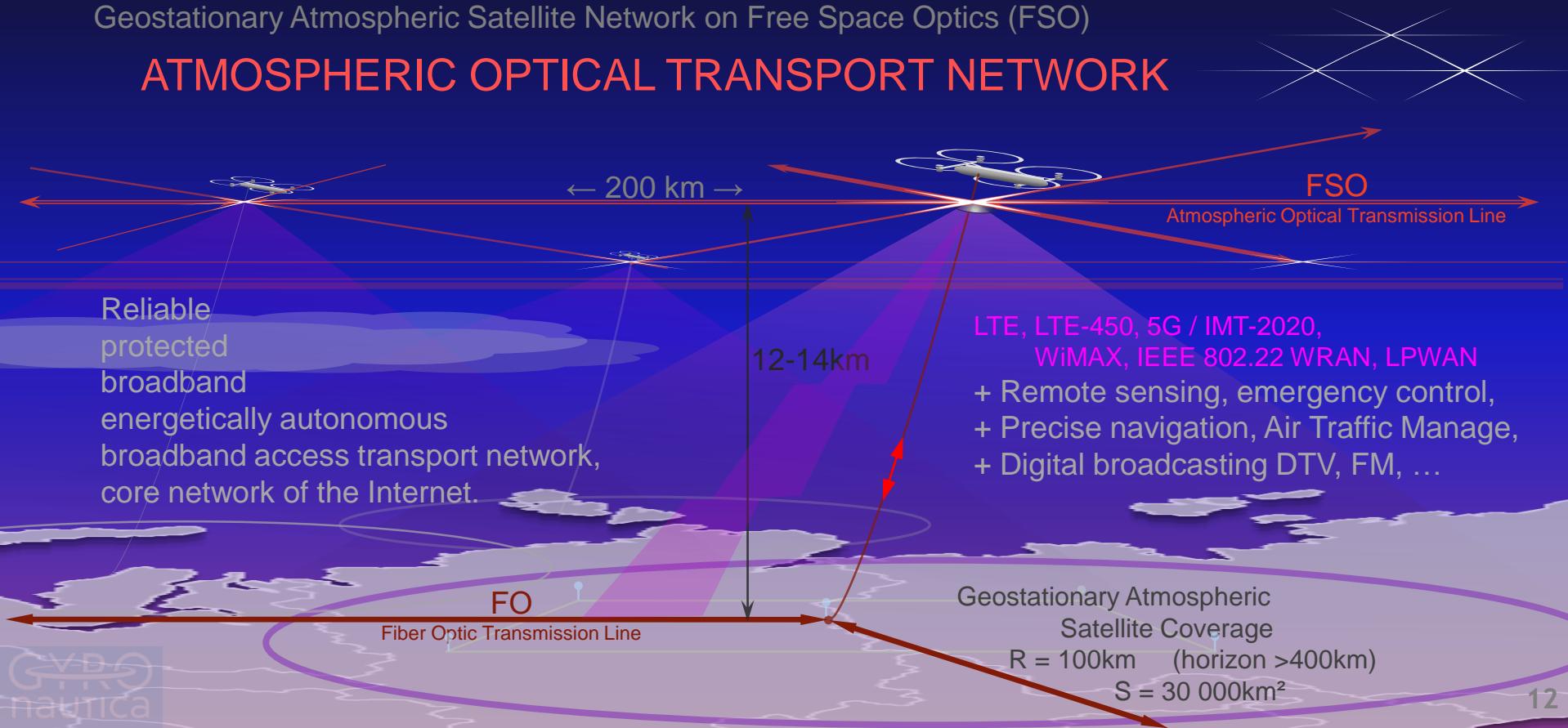
- The maximum signal power in the direct line of sight of the Base Station.
- Compatibility and addition of cellular technologies.
- Organic combination with cable optic lines.
- The cost of coverage is lower than competitors by orders of magnitude.
- Internet backbone stratospheric Free Space Optic.
- A comprehensive solution to communication, navigation, remote sensing, digital broadcasting DTV, ...

LightNet

Light network

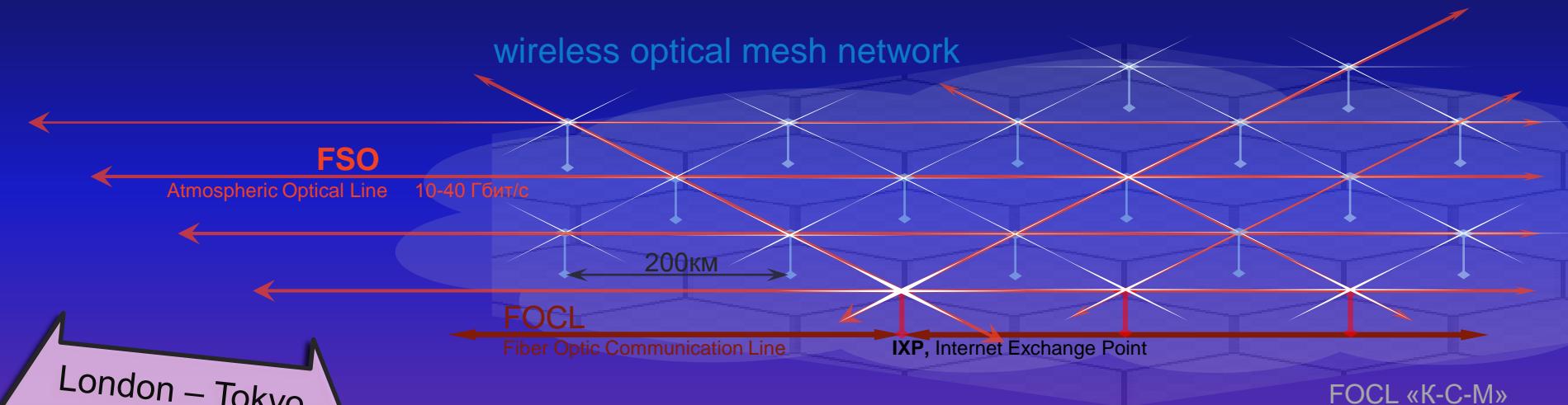
Geostationary Atmospheric Satellite Network on Free Space Optics (FSO)

ATMOSPHERIC OPTICAL TRANSPORT NETWORK



Geostationary Atmospheric Satellite Network on Free Space Optics (FSO)

ATMOSPHERIC OPTICAL BROADBAND NETWORK



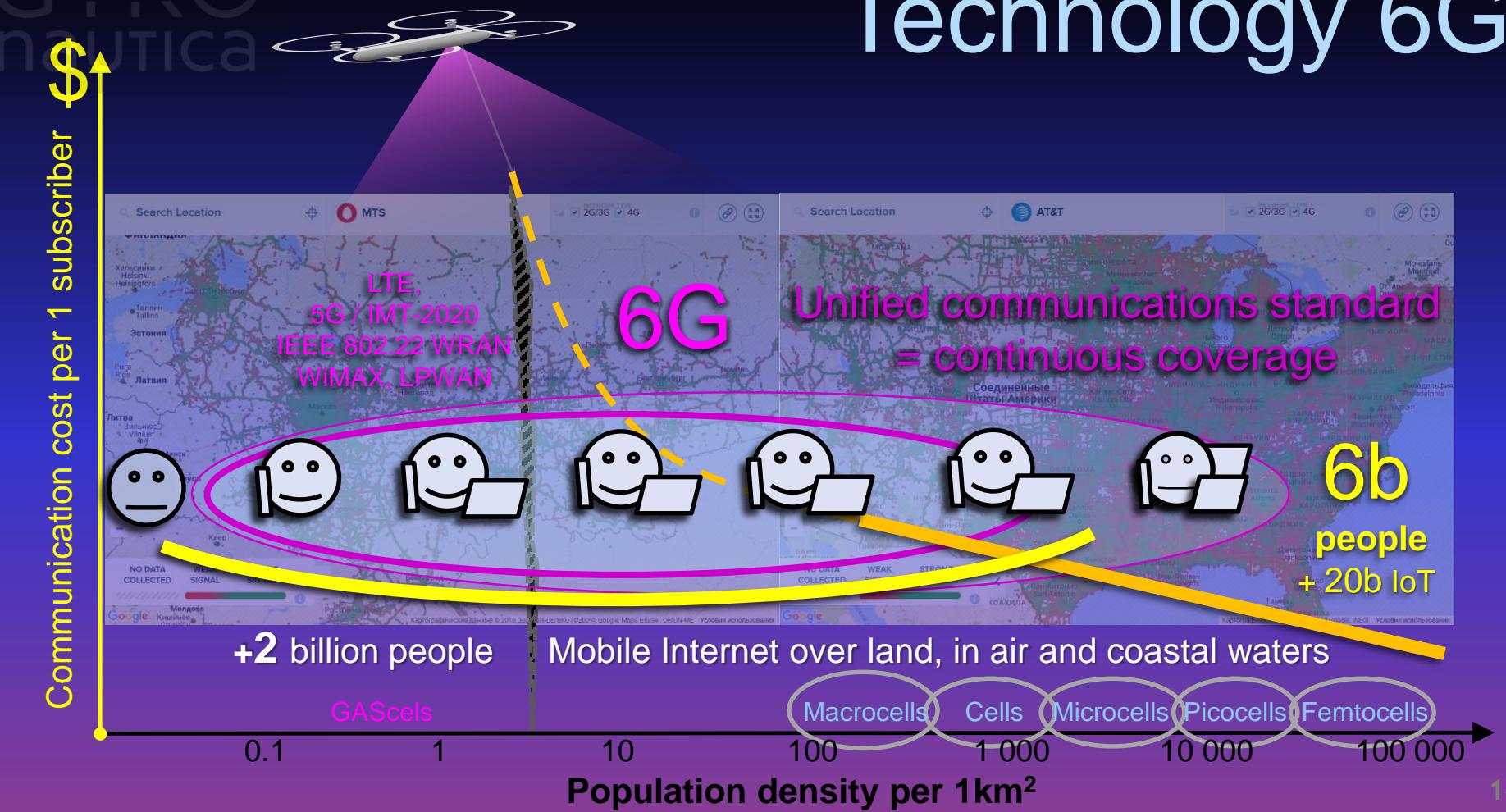
- The stratosphere is more transparent and cheaper than fiber.
- There are no nonlinear signal distortions.
- The signal speed in FSO is **50% higher** than FOCL.
- Each GAS adds ~ 3 FSO channel at ~ 200km.

FOCL «К-С-М»
1800км = 5 млрд₽

200км FOCL ~ 555М₽
3x200км FSO < 50 М₽

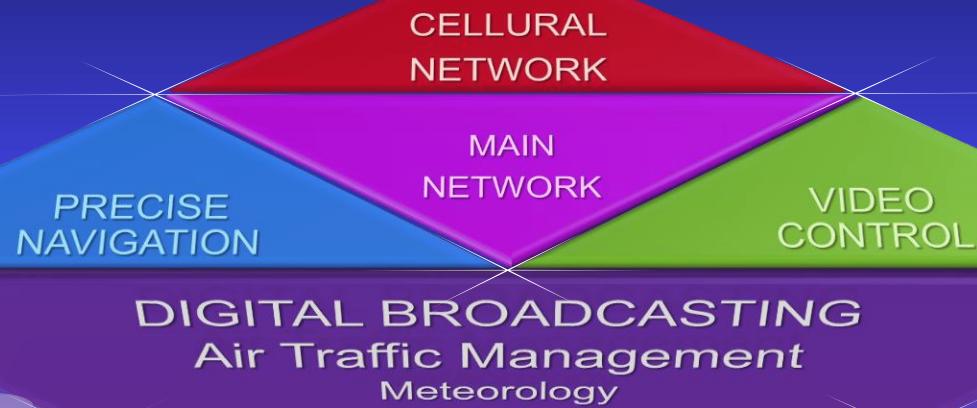
Technology 6G

Communication cost per 1 subscriber \$



Geostationary Atmospheric Satellite Network on Free Space Optics (FSO)

SERVICES OF THE GEOSTATIONARY ATMOSPHERIC NETWORK



- Service Combinations*
- Car navigation
 - Social networks
 - Objects security
 - Surveillance
 - Building
 - Telecontrol





Russian market

National Project DIGITAL ECONOMY Σ budget 1 635 mlrd ₽ (\$25 b)
- Federal Program Information Infrastructure - 7724 mlrd ₽ (\$12 b)
- FP Elimination of the digital divide in Russia (<2024) - 168 mlrd ₽ (\$2.6b)

600 GAS(100+500) will cover Russia (17 million km² + 61t.km state border):

- ✓ Mobile broadband (LTE, 5G / IMT-2020, IEEE802.22 WRAN, LPWAN, ...).
- ✓ Atmospheric Optical Network - 360 000 km trunk optical lines.
- ✓ Control of territories, highways, forests, ports, state borders, emergency zone
- ✓ National Accurate Navigation System.
- ✓ Digital Broadcasting FM, DTV, HDTV, UHDTV, ...
- ✓ Air navigation (ADS-B), airtraffic management, meteorology, ...



State co-investment ~5% of the budget NP

R&D & CAPEX Project for 4 years - 80 mlrd ₽ (M\$1250)

SOM : 50 million subscribers * tariff 134 ₽/mon = 80 mlrd ₽ / year

World market

+ **2 billion** new subscribers will receive mobile communications and Internet access.

2 billion cellular subscribers (~50%):

- will reduce mobile tariffs;
- forget about roaming;
- will increase the stability and communication speed;
- will expand the Internet access area on land, in the air, in coastal waters.

10 billion devices and sensors IoT (LPWAN).

Geostationary Atmospheric Satellites (GAS) able to expand and cover the mobile market

SOM > \$30 billion / year

Satellite Market Assessment Starlink 2025 Ilon Mask

Gyronautica LLC

Team



CEO, CTO
Kuzikov Sergey
co-founder of the company,
author and owner of patents,
aerodynamic calculation,
aircraft design



CFO, Business Development
Kuzikov Daniel
co-founder of the company,
design and product experience
management in international
startups



Advisor
Vishnevskiy Vladimir
Doctor of Technical Sciences,
Professor, Academician of the
International Academy of
Communications and the New York
Academy of Sciences, Full Member
IEEE Communication Societi, ...

The team has qualified young engineers.

Project Current Status



- ✓ The current patent for the group of inventions RU2538737 opens up the possibility of selling technology licenses.
- ✓ The final stages of patenting in USA, Europe, China, Canada.
- ✓ The R&D cycle of the Air Wheel rotors is completed.
- ✓ Aerodynamically stable schemes worked out on the prototypes.
- ✓ Development of production technologies and components.
- ✓ LOMO started designing FSO modules for the project.

To continue the GAS project, we need to make a responsible choice:

- Whose base stations will rise above the surface and cover the planet with 6G.
- Whose global atmospheric optical network will be the backbone of the Internet.



Project

GEOSTATIONARY ATMOSPHERIC NETWORK

Welcome to the Future

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