GYRO nautica

6G

GEOSTATIONARY ATMOSPHERIC NETWORK

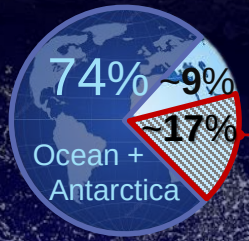
New telecommunication technology

WELCOME TO THE FUTURE

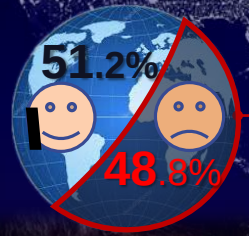
GYRONAUTICA LLC

Measuring the Information Society Report
#ITUdata

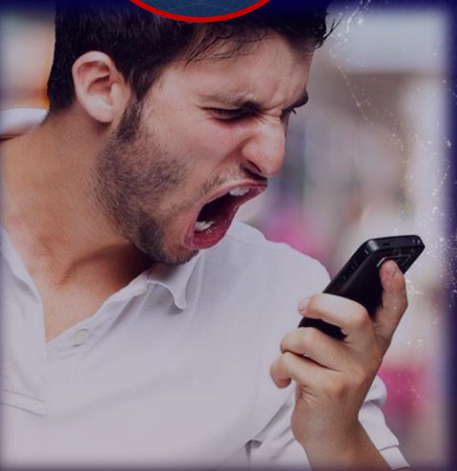
Were is the Internet?



2/3 of the land ‘out of reach’



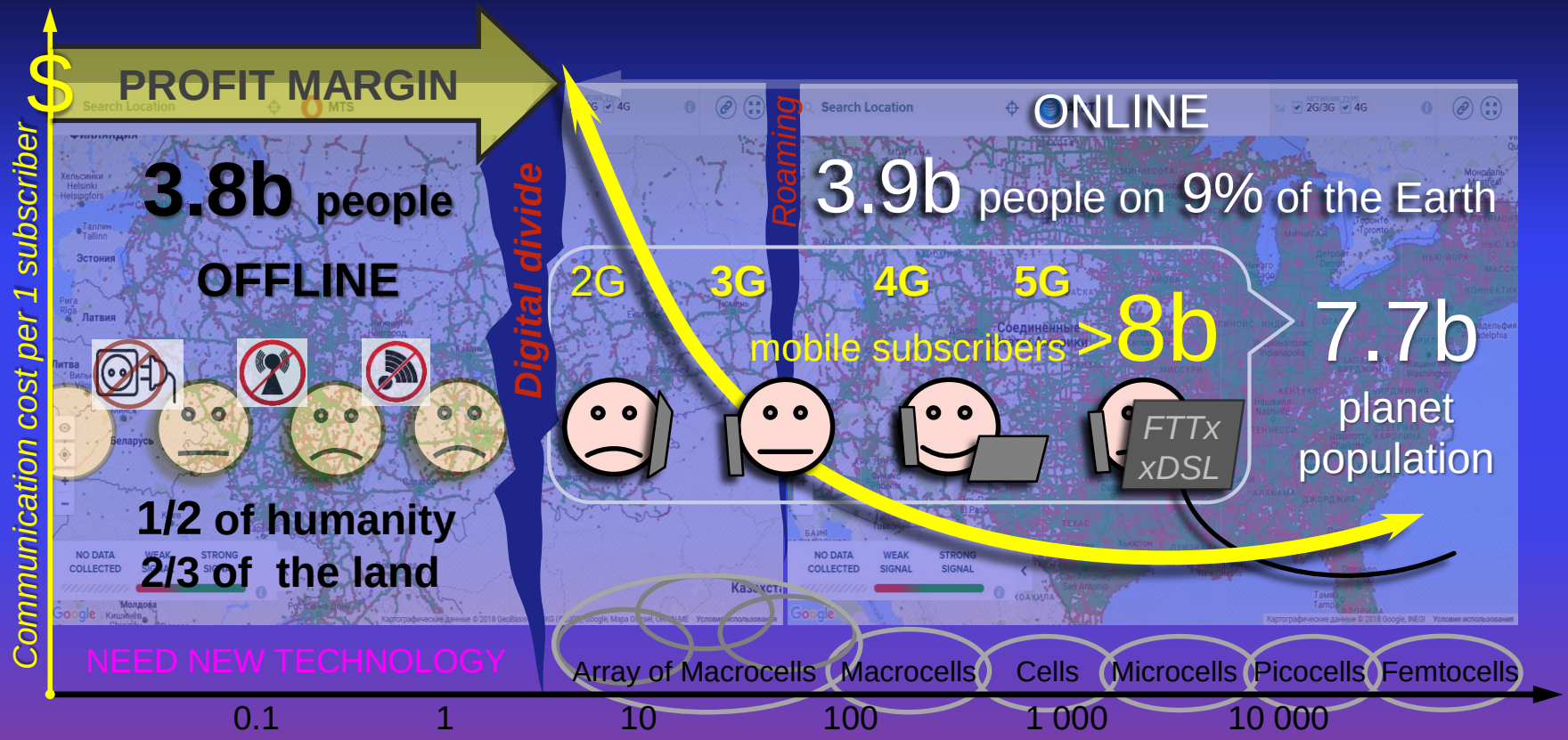
1/2 of Humanity is offline



Why?

- Low density of subscribers.
- Remoteness from the channels.
- There are no sources of energy.

Digital divide

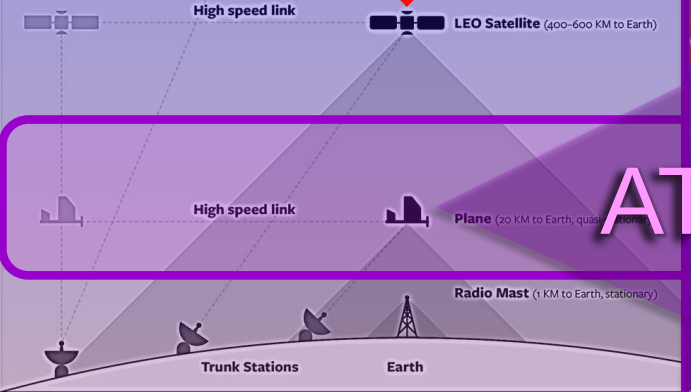


HAPs technology

High Altitude Platforms

Atmospheric satellites

Satellite communications
only work outside buildings
through a bulky terminals
with a directional antennas



Lifted BASE STATION ONLY
within the range of a Cellular Standard <100km
Extends COVERAGE
directly to a cell phone.

ATMOSPHERIC SATELLITES

Green energy for HAPs

SOLAR CELLS

< 1 kW/m² - low Power Density

<< 20% - low efficiency

- 90% - to fight with the WIND

Heavy batteries + Giant sizes

= HIGH COST

HIGH-ALTITUDE WIND

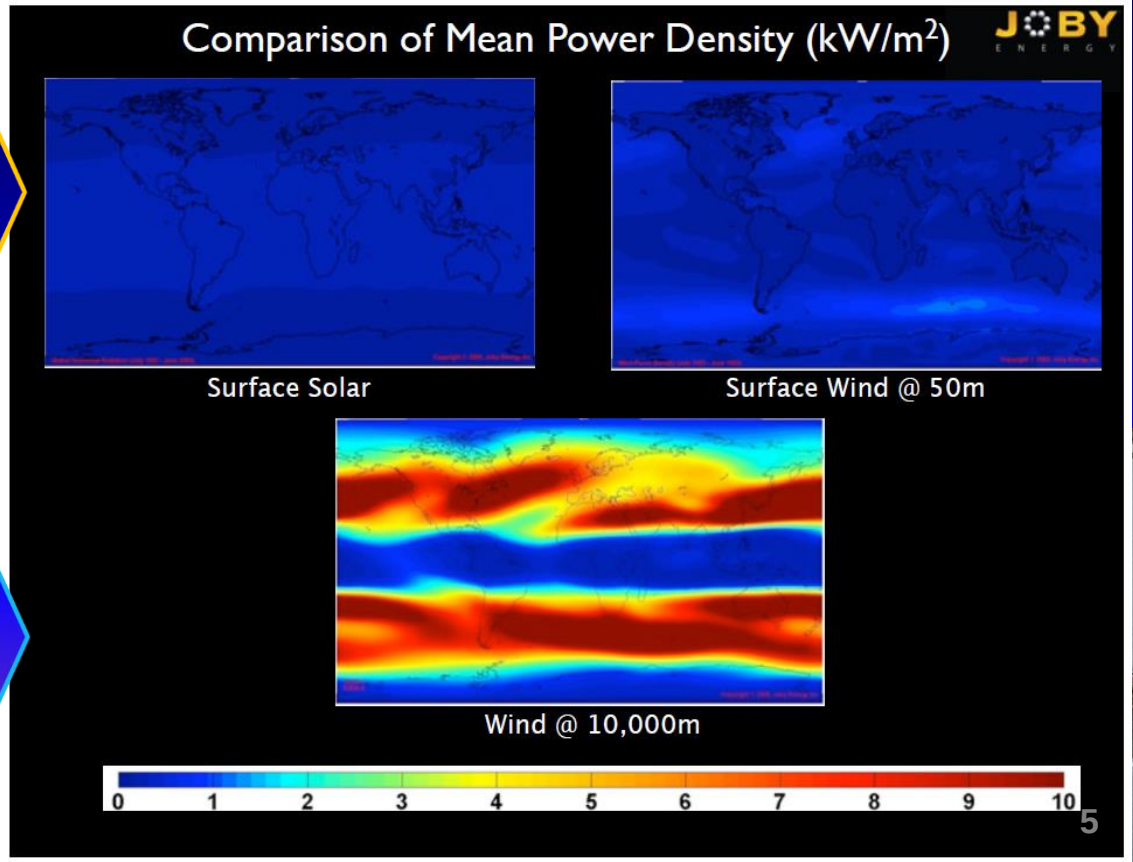
global, powerful, reliable

High Power Density 5-10 kW/m²

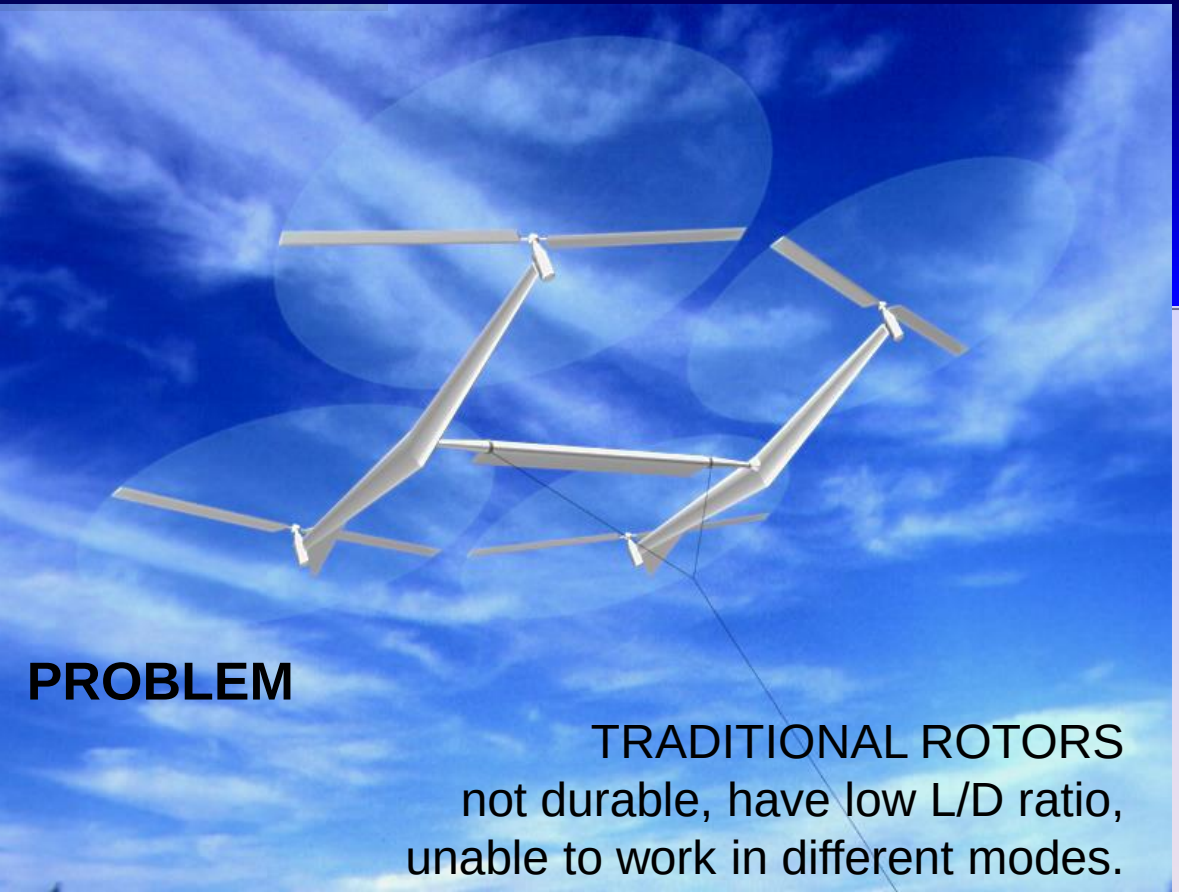
High efficiency up to 59%.

Do not fight, but use!

Minimum dimensions, weight and COST of the platform.



High-altitude wind power

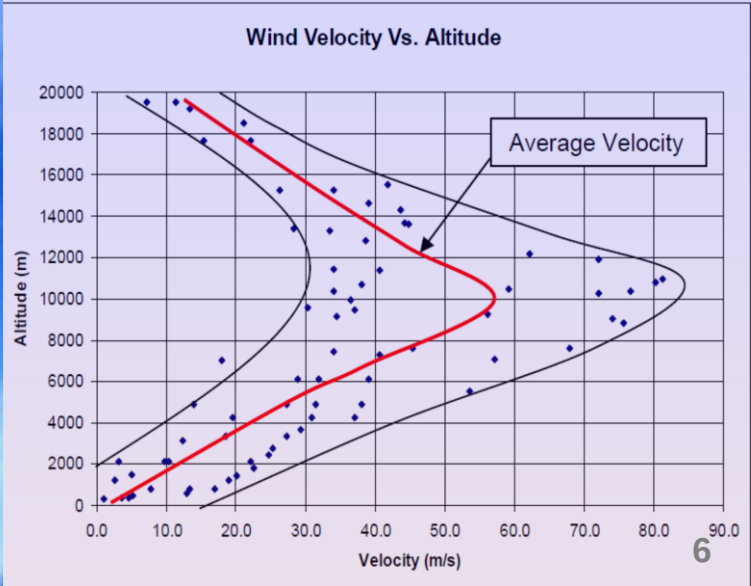


PROBLEM

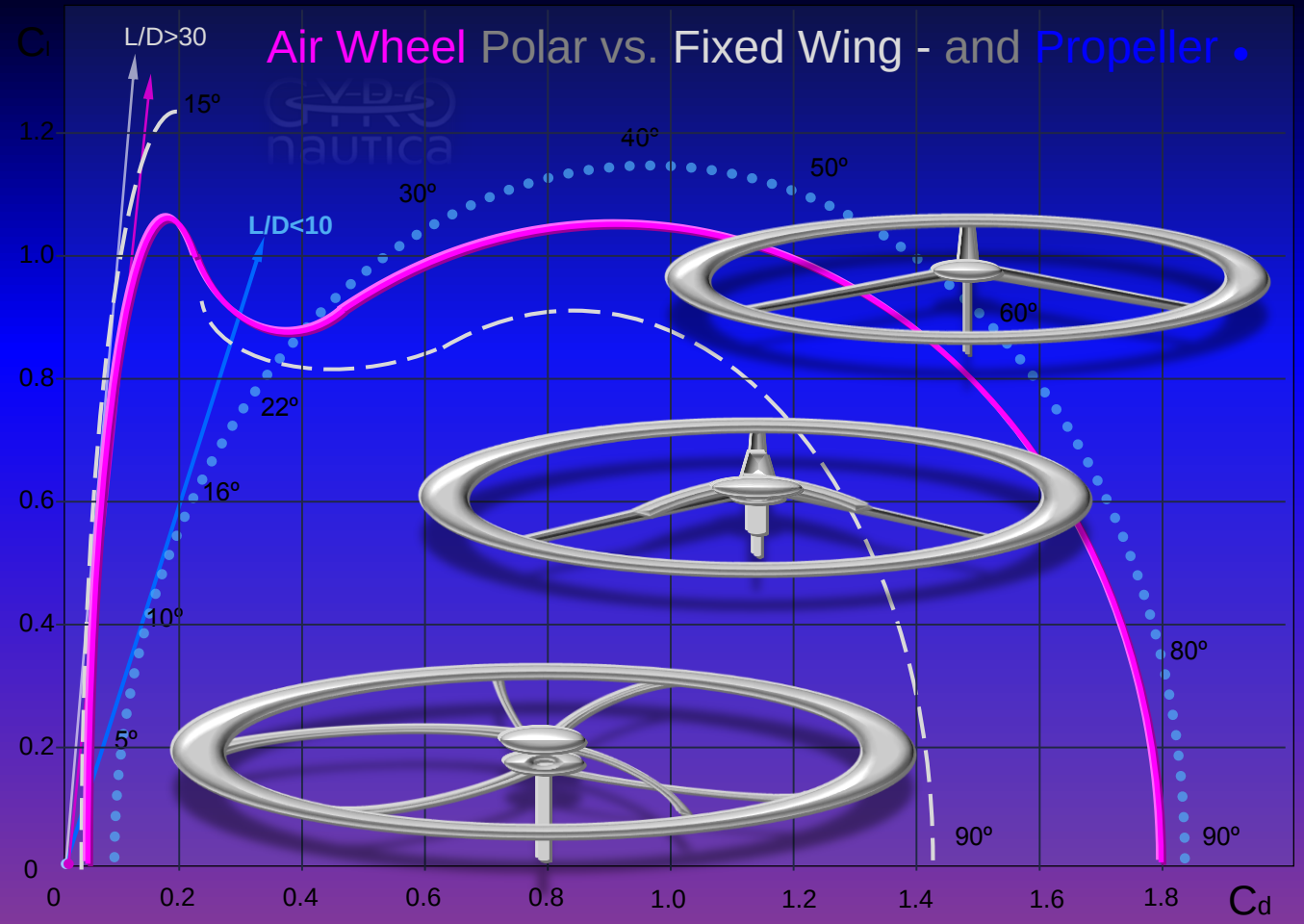
TRADITIONAL ROTORS
not durable, have low L/D ratio,
unable to work in different modes.

High-altitude Wind -
powerful reliable source.

The only one in the Arctic.
How to get it?



Solution



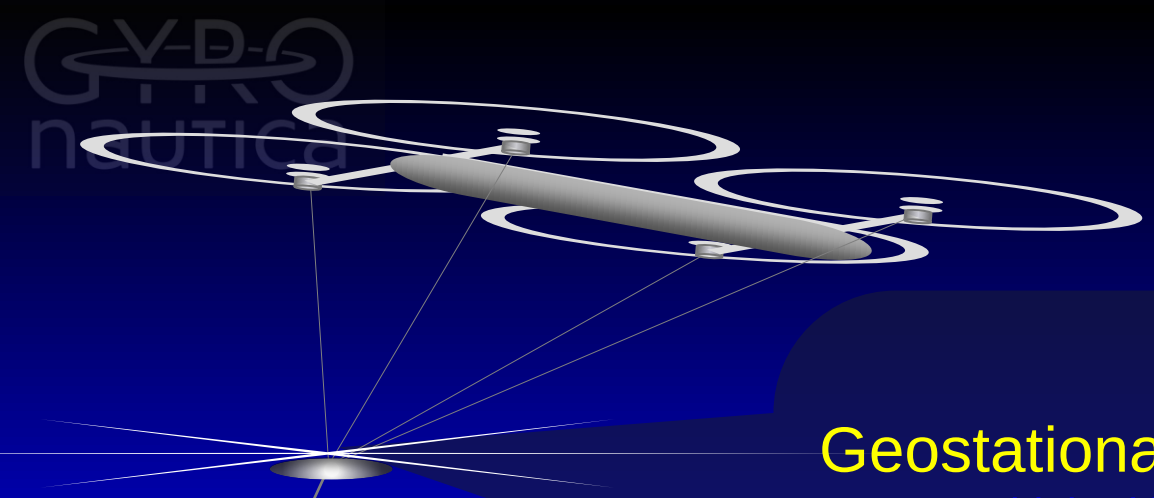
A key element
of the technology is
the Air Wheel rotor.

Work in 3 modes:

- ✓ helicopter,
- ✓ autorotations,
- ✓ wind turbines.

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

Solution



GAS

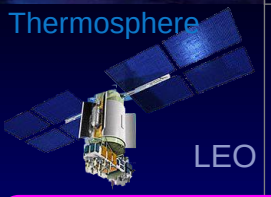
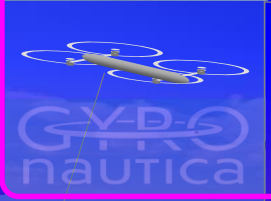
Geostationary Atmospheric Satellite

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

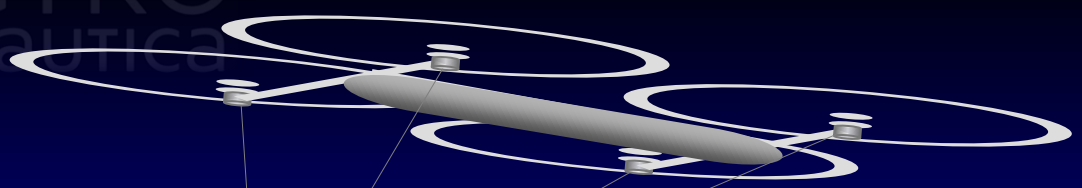
- ✓ Absolute Green energy autonomy.
- ✓ Maximum reliability and power for transmitter.
- ✓ Minimum mass and dimensions.
- ✓ Minimum cost of the platform and its flight year.
- ✓ Minimal ground infrastructure (pile with a winch).
- ✓ Reliable fiber optic channel to Base Station.
- ✓ Work area from the 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.

← Tether, leash with fiber optic
UltraHighMolecularPolyEthylene
UHMPE (Dyneema®, Spectra®)
specific strength = 378km,
<15% of the platform weight

	HAPS Technologies	↑H km R km→	Communication cost (region) Expenses $M CAPEX / OPEX	Coating Energy W / km²	Min. Rang
Exosphere  GEO					
Thermosphere  LEO	Low Orbit Satellites constellations Starlink, OneWeb, O3b, Telesat, LeoSat,Сфера	↑300-8063 350-2500→	10b 1000 100 10 1 0.1		12 000 WWAN
Stratosphere 	Aerostatic atmospheric satellites Loon (Google)	↑18-23 40→	1000 100 10 1 0.1		400 000 WWAN
	Aerodynamic atmospheric satellites Helios (NASA), Aquila (Airbus), Zephyr (Facebook),	↑15-25 <100→	1000 100 10 1 0.1	-90% <10% to the transmitter	WRAN
	Geostationary atmospheric satellites Gironautica	↑10-15 100-300→	1000 100 10 1 0.1	Wind 2-10 kW/m² >90% to the transmitter	WRAN WMAN
Troposphere 	Cell towers	↑<0.05 0.1-20→	1000 100 10 1 0.1	~75% to the transmitter	WLAN

Competition




РОССИЙСКАЯ ФЕДЕРАЦИЯ

ПАТЕНТ

НА ИЗОБРЕТЕНИЕ

№ 2538737

РОТОР "ВОЗДУШНОЕ КОЛЕСО", ГИРОСТАБИЛИЗИРОВАННЫЙ ЛЕТАТЕЛЬНЫЙ АППАРАТ И ВЕТРОЭНЕРГЕТИЧЕСКАЯ УСТАНОВКА, ИСПОЛЬЗУЮЩИЕ РОТОР "ВОЗДУШНОЕ КОЛЕСО", НАЗЕМНОЕ/ПАЛУБНОЕ УСТРОЙСТВО ИХ ЗАПУСКА.

Патентообладатель(ли): *Кузнаев Сергей Юрьевич (RU)*

Автор(ы): *Кузнаев Сергей Юрьевич (RU)*

Заявка № 2013100919

Приоритет изобретения **11 февраля 2013 г.**

Зарегистрировано в Государственном реестре изобретений Российской Федерации **21 ноября 2014 г.**

Срок действия патента истекает **11 февраля 2033 г.**

Руководитель Федеральной службы по интеллектуальной собственности А.Л. Кирин

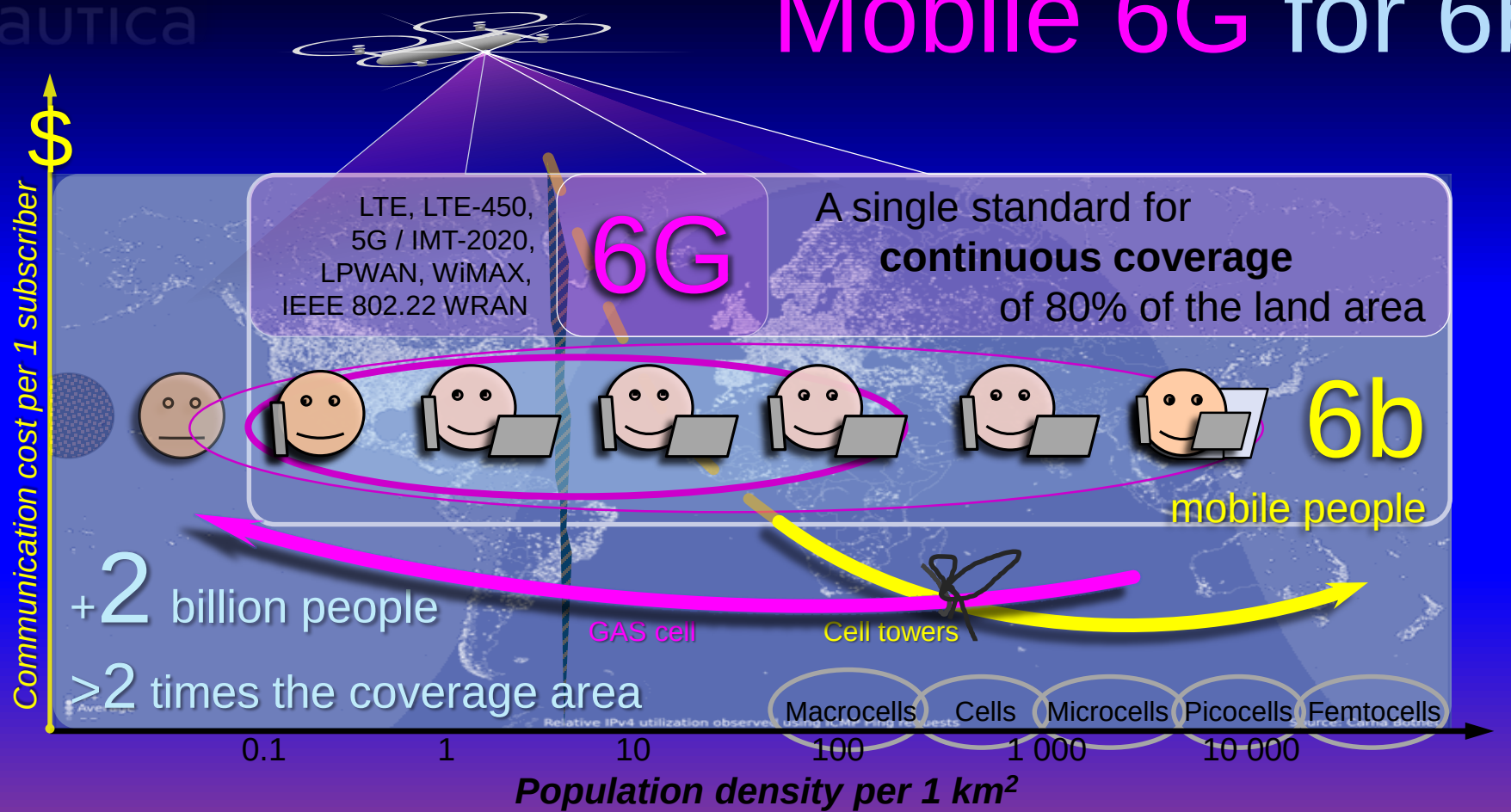
The technology of

Geostationary Atmospheric Satellites

is protected by patent and applications until 2034.

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

Mobile 6G for 6b

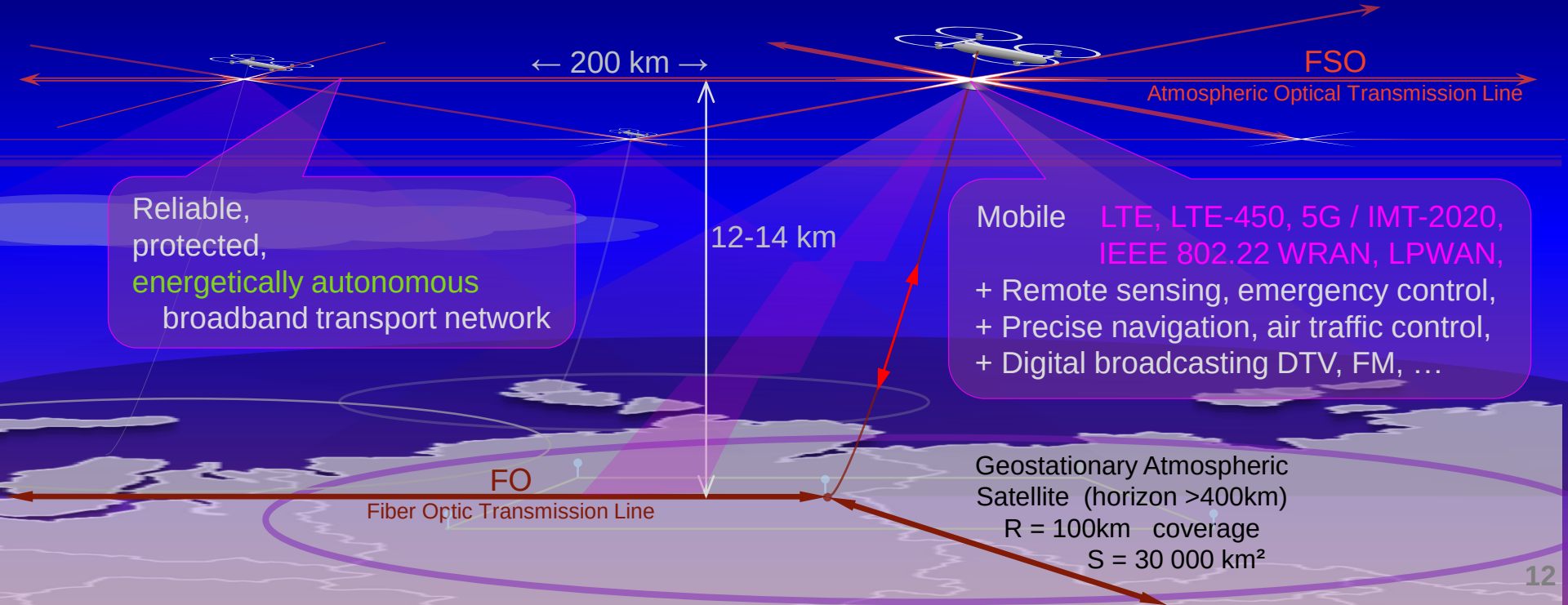


LightNet

Light network

Geostationary Atmospheric Satellite with Free Space Optics (FSO)

ATMOSPHERIC OPTICAL TRANSPORT NETWORK



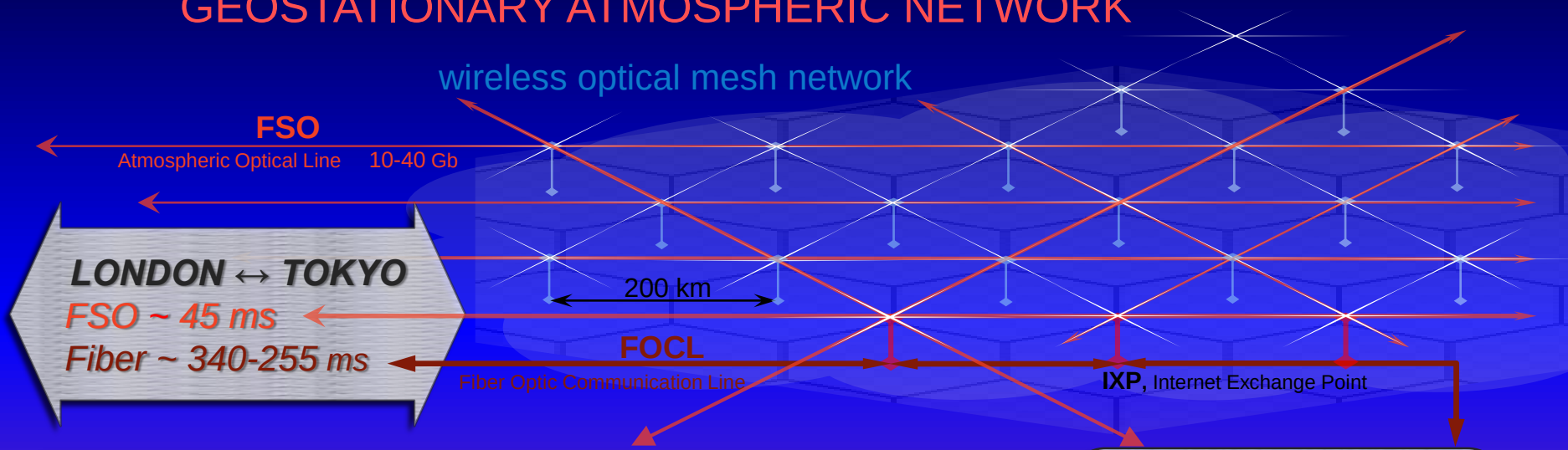
LightNet

GYRO nautica

Internet Next

GAN on Free Space Optics (FSO)

GEOSTATIONARY ATMOSPHERIC NETWORK



- The speed of light in FSO is 50% higher than in fiber.
- There are no nonlinear signal distortions.
- The stratosphere is more transparent and cheaper than optical fiber.

PRICE

3x200км FSO < $1M

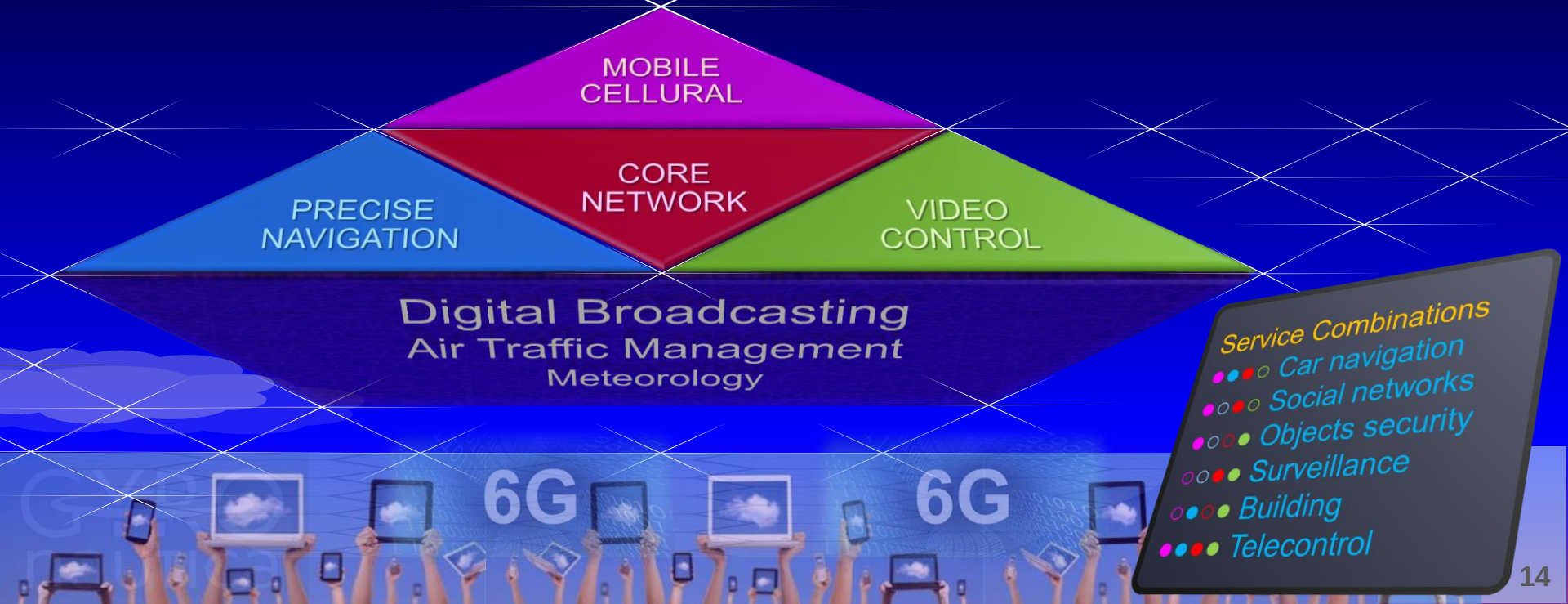
200км FOCL ~ $10M

LightNet

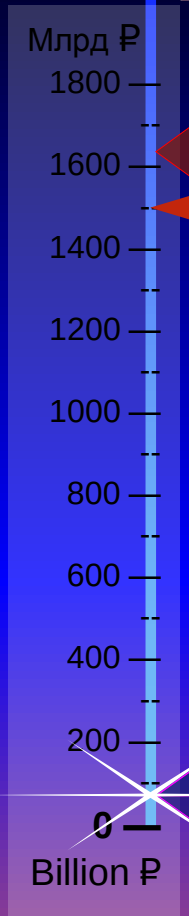
Synergy of Services

GAN on Free Space Optics (FSO)

SERVICES OF THE GEOSTATIONARY ATMOSPHERIC NETWORK



Russian market



National Project DIGITAL ECONOMY Σ budget 1635 ВР ($25 b)
- Federal Program Information Infrastructure 772₄ВР ($12 b)
- FP Elimination of the digital divide in Russia 168 ВР ($2.6b)

*Roskosmos: «**Sphere**» 640 LEOsat - 10M subscribers (9.6-64Kbps)* **1500ВР (>$23b)**

600 GAS (100+500) will cover Russia (17M km² + 61 t.km border):
- ✓ Mobile broadband (LTE, 5G/IMT-2020, IEEE802.22 WRAN, LPWAN)
- ✓ Atmospheric Optical Network - 360 000 km trunk optical lines.
- ✓ Control of territories, ways, forests, state borders, emergency zone
- ✓ National Navigation System (centimeters accuracy).
- ✓ Digital Broadcasting FM, DTV, HDTV, UHDTV.
- ✓ Air navigation (ADS-B), air traffic control, meteorology, ...

GAN solution State co-investment **~5%** of the budget NP
R&D & CAPEX for 4 years ~ 80 ВР (M$1250)
50M subscribers x 134 ₽/mon = 80 ВР / year SOM

World market

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

\+

2 billion cellular subscribers (~50%):

- will reduce cost of mobile tariffs;
- will increase the stability and 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 > US$30 billion / year

Satellite Market Assessment Starlink 2025 Elon Musk

GYRONAUTICA LLC

Project team

CEO, CTO

Sergey Kuzikov

co-founder of the company, IP author, patents owner, aerodynamic calculation, aircraft design,

CFO, Business Development

Daniel Kuzikov

co-founder of the company, design and product experience management in international startups,

Advisor, co-investor

Vladimir Vishnevskiy

Doctor of Technical Sciences, Professor, Academician of the International Academy of Communications and the New York Academy of Sciences, Full Member IEEE Communication Society, ...

- ✓ The project team employs qualified young engineers.
- ✓ Stable team from the foundation of the company in 2015.

Project Current Status

- ✓ The current patent for the group of inventions RU2538737 opens up the possibility of selling the 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 tested on the prototypes.
- ✓ Development of production technologies and components.
- ✓ LOMO started designing FSO modules for the GAN project.

To raise MVP in 2020 requires 3.5M₽ / ~50000€ / ~55000$ / ~400000¥

To continue the GAN 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?

Contacts

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PROJECT

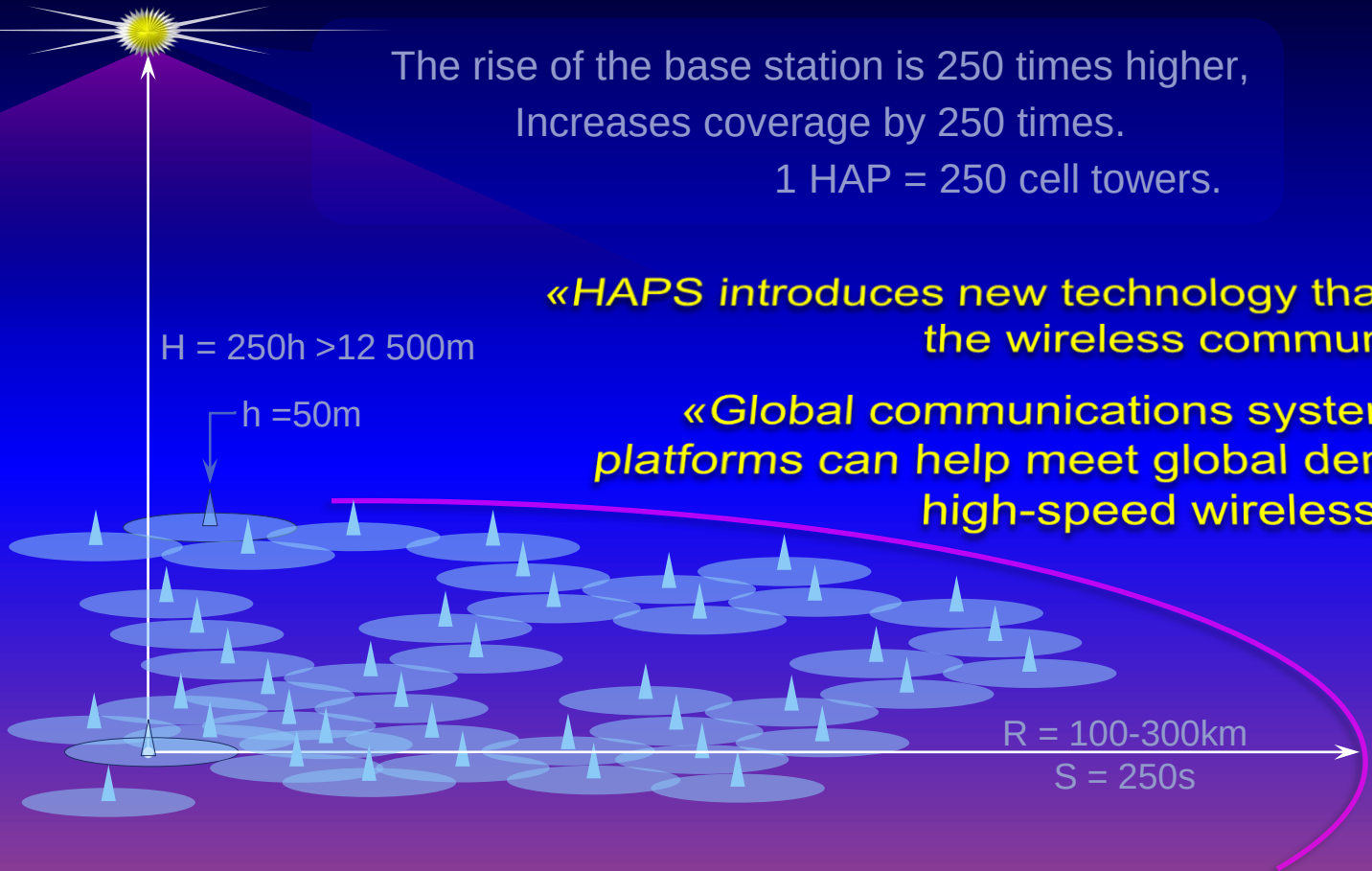
GEOSTATIONARY ATMOSPHERIC NETWORK

WELCOME TO THE FUTURE

The only solution is HAPs

The rise of the base station is 250 times higher,
Increases coverage by 250 times.
1 HAP = 250 cell towers.

High Altitude Platforms
Atmospheric satellites



«*HAPS introduces new technology that can revolutionize the wireless communications industry.*»

«*Global communications system, on stratospheric platforms can help meet global demand for affordable high-speed wireless communications.*»

International Telecommunication Union ITU