ROADMAP
Connected Central Asia & Caucasus 2020

Technological development of rural and maritime areas and their integration into Digital Economy using 8 steps and 8 nationwide networks (with local manufacturing of equipment for networks):

1. RuralNet (Telecom): terrestrial mobile network with ubiquitous affordable mobile broadband access and digital mobile TV & Radio broadcasting with coverage on 100% rural areas, operating in HF & VHF spectrum (standard IEEE 802.22)

2. NavigationNet (GNSS): terrestrial autonomous network with ubiquitous 1 centimeter level precision navigation with corrected signals of GPS, GALILEO, GLONASS, BEIDOU, providing 100% stable navigation services for transportation, agriculture, geodesy, etc.

3. AeroNet (Unmanned Aviation): an infrastructure in the sky - overlay network of connected commercial Unmanned Aircraft Systems (UAS) providing nationwide services: telecommunications, digital 3D mapping of infrastructures (roads, buildings, etc.) and agricultural fields, video surveillance and monitoring, prompt delivery of e-commerce goods to rural areas, rescue operations.

4. AgriNet (Agriculture): overlay network for connected farms (Internet of Things in agriculture) and ubiquitous digital services for farmers

5. AutoNet & MariNet (Transportation): overlay network for connected cars, ships, Intelligent Transportation Systems, self-driving-cars & trucks, Unmanned Surface Vehicles (USV) and ubiquitous digital mobile services for drivers, sailors, passengers, transportation companies.

6. HealthNet (Medicine): overlay network for connected healthcare wearables and ubiquitous mobile medical consultations of citizens online

7. EnergyNet (Energy): overlay network for connected renewable energy sources, Smart Grids and electrification of rural areas.

8. SecurityNet: overlay network for first responders and their devices, nationwide digital security services (instant warning of population in emergency situations, remote video monitoring of any areas from any distance, rescue operations, cybersecurity services for businesses)

Target markets

Market Group	Global Market	Global Market Size by 2020	CAGR (Compound Annual Growth Rate)	Target market share in countries of Central Asia & Caucasus by 2020
Telecom	Telecom market	$1414 bn	1.27 %	5 %
GNSS	Global Navigation Satellite Systems market (GNSS)	$483 bn	9 %	5 %
Aviation	Commercial Avionics Systems market	$23.7 bn	6.6 %	5 %
	Commercial Applications of Drones market	$127 bn		5 %
Agriculture	Precision Farming market	$4.55 bn	12.2 %	5 %
	Agricultural equipment market	$281.61 bn	8.7 %	0.5 %
Transportation	Connected Car market	$123.08 bn	34.21 %	5 %
	Intelligent Transportation Systems	$33.89 bn	11.57%	5 %
	Self-Driving Cars market	$42 bn (by2025)	___	0.5 %
Maritime transportation	Maritime mobile communications market	$5.62 bn	10.2 %	5 %
	Maritime e-Navigation market	$1.2 bn	6.9 %	5 %
	Maritime security market	$22.26 bn	7.7 %	5 %
	Unmanned Surface Vehicles market	$0.85 bn	18 %	5 %
Medicine	Telemedicine market	$36.3 bn	14.3 %	5 %
	Healthcare wearable's(eHealth) market	$12.9 bn	20.15 %	5 %
Energy	Smart Grid market	$139.59 bn	18.20 %	5 %
Security	Cybersecurity market	$170.21 bn	9.8 %	5 %
	Video surveillance systems market	$42.06 bn	23.51 %	5 %

Digital Divide

Only 10 % of Earth's land area are covered with mobile internet. More than 4 billion of people, living in rural areas, do not have an access to the internet and ICT
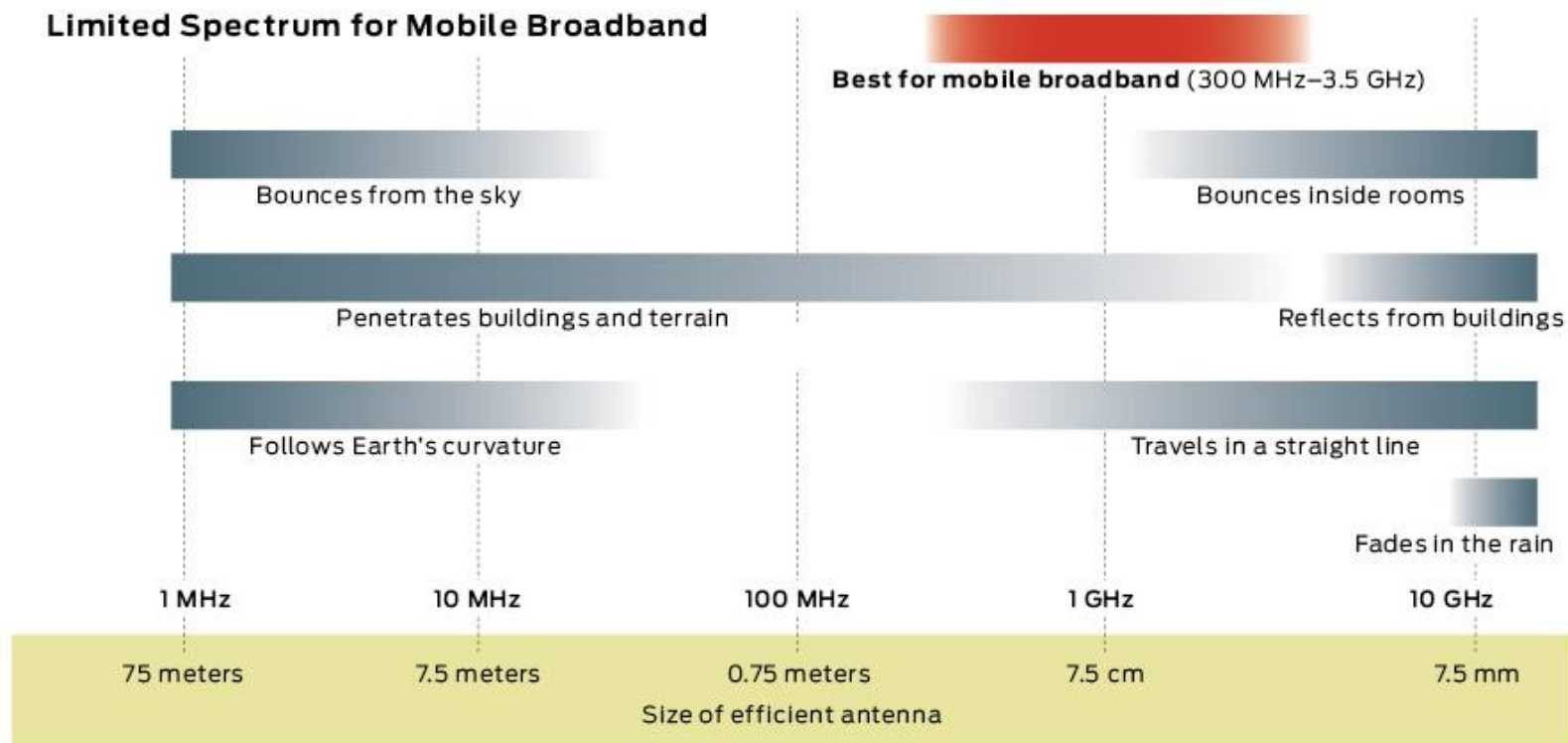
Mobile internet coverage map:

Legend:
- 2G
- 3G
- 4G
- wifi
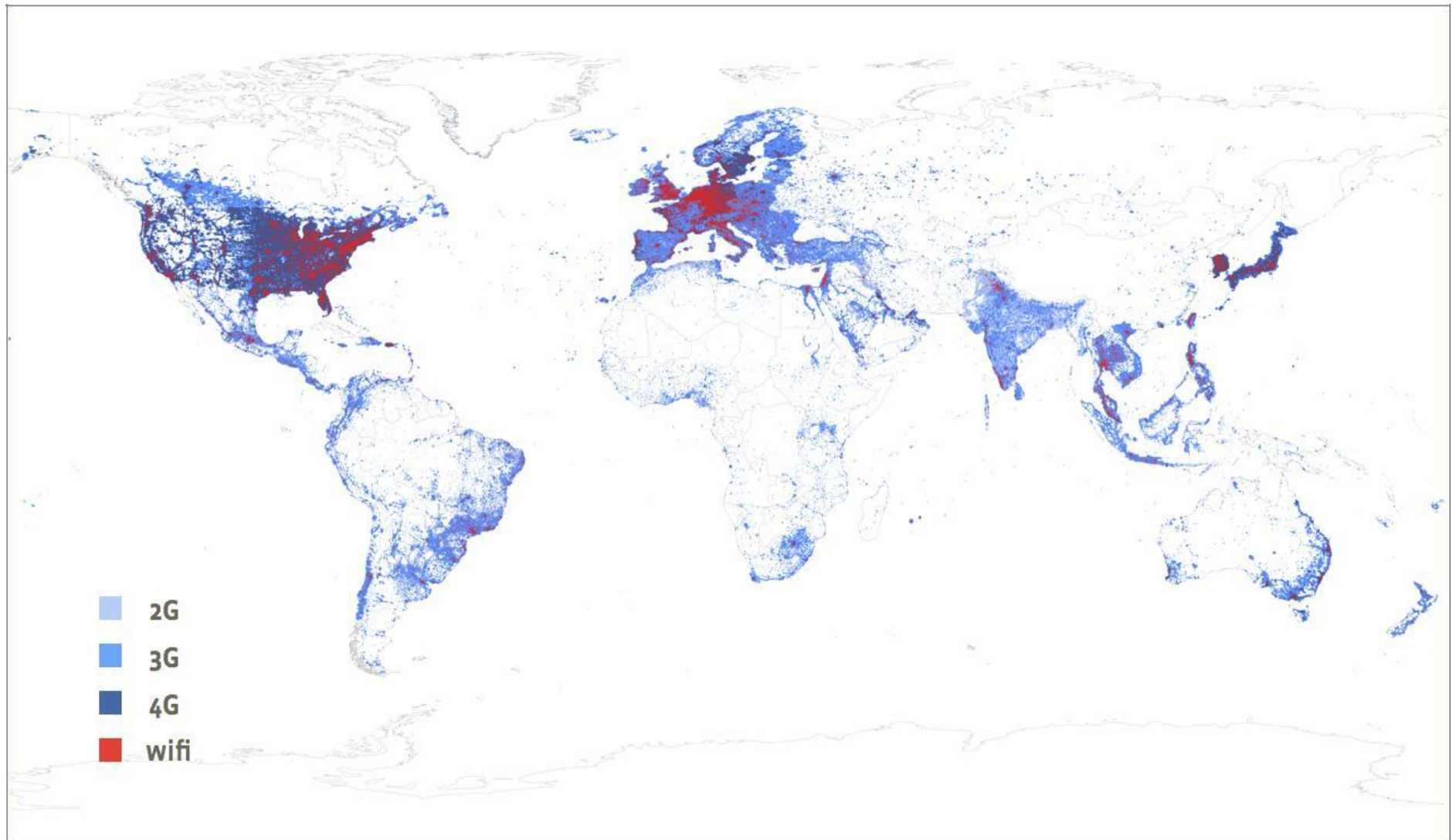
Limited spectrum & small coverage with traditional technologies

Due to the size of efficient antenna only UHF spectrum (frequencies 300 - 3000 MHz) are available for mobile broadband. The higher the frequency - the shorter a wavelength and smaller radius of coverage

• Spectrum refers to electromagnetic spectrum – the resource that allows us to send wireless signals. Almost every electronic device we use today, from smartphones to FM radio to TV remotes, uses spectrum frequencies to transmit wireless signals and information. Without spectrum, wireless communication would be impossible.

• Spectrum is a scarce resource you use every day, including when you use a mobile phone or Wi-Fi, listen to the radio, or click a remote control. As demand for spectrum increases, the supply becomes scarce.

• Due to the limitations of antenna technologies, which have not changed significantly during decades, only small portion of spectrum (UHF spectrum) is best suitable for mobile broadband because of the size of efficient antenna.

Limited Spectrum for Mobile Broadband

Best for mobile broadband (300 MHz–3.5 GHz)

Bounces from the sky

Bounces inside rooms

Penetrates buildings and terrain

Reflects from buildings

Follows Earth's curvature

Travels in a straight line

Fades in the rain

1 MHz	10 MHz	100 MHz	1 GHz	10 GHz
75 meters	7.5 meters	0.75 meters	7.5 cm	7.5 mm

Size of efficient antenna

OPPORTUNITY WINDOW: The best frequencies for mobile broadband are high enough that the antenna can be made conveniently compact, yet not so high that signals will fail to penetrate buildings. This leaves a relatively narrow range of frequencies available for use [red band].

With traditional technologies it is unprofitable to cover rural areas

All mobile networks on the market operate in UHF frequencies having a very small radius of coverage. It is unprofitable to build networks in rural areas with low population density.

- All mobile networks on the market (3G, 4G, LTE, Wi-Fi) operate in UHF spectrum (frequencies above 300 MHz).

- Usually the radius of coverage of UHF base stations is about **3 - 10 kilometers**.

- As an example, a circle with 3 km radius on the south of Atirau.

- Moreover, connection are unstable in bad weather (storm), rough landscape (mountains, big buildings, etc.), metro, etc.
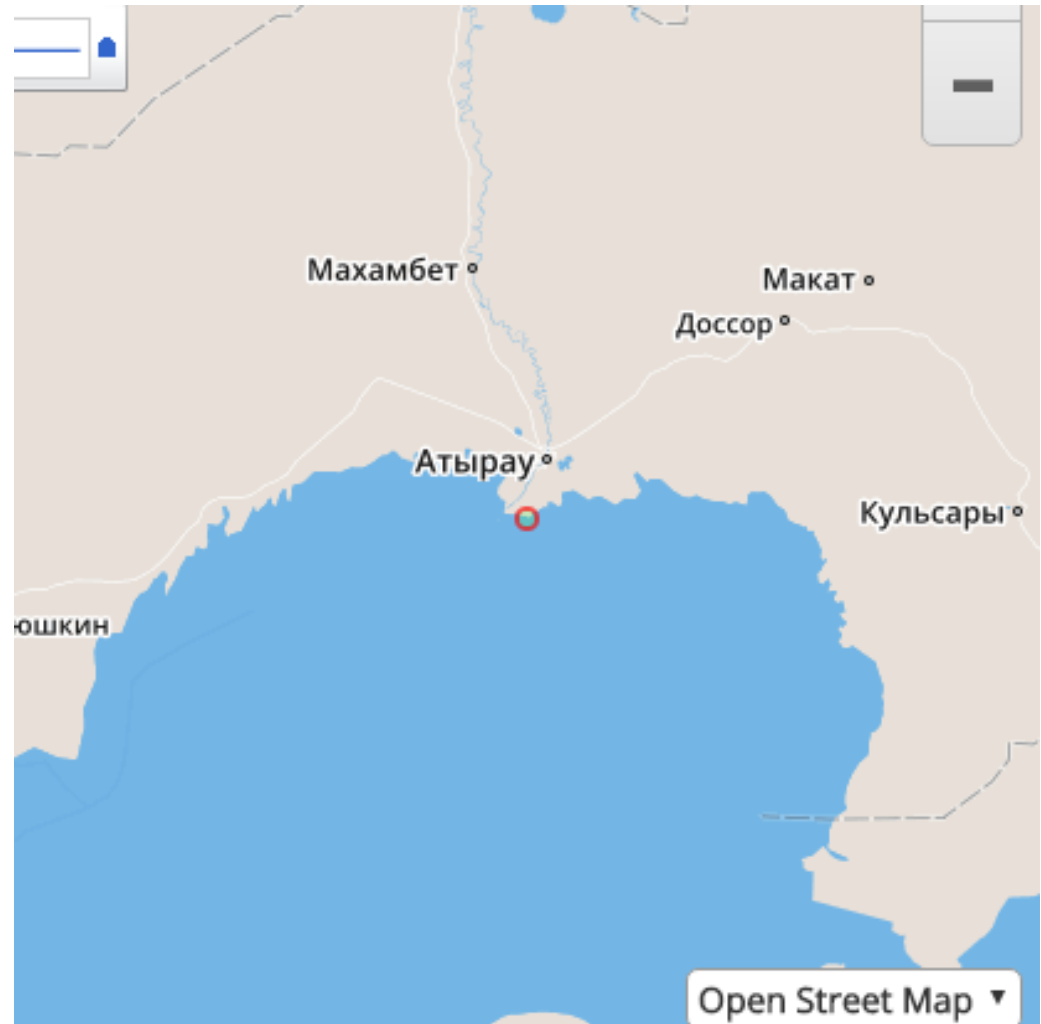
With new technologies – hundreds of times cheaper & more effective

Next generation antenna technologies (patent US 8823599) allow creating mobile mesh-networks on HF & VHF frequencies with long range up to 150 km communications

• Next generation antenna systems, which are 10 times smaller than classical ones on the market, allow adding HF & VHF spectrum for mobile broadband (3 - 300 MHz) in order to bring long range communications up to **150 kilometers** from base station

• Area of coverage is up to 70 650 square kilometers

• Speed up to 31 Mbps

• With next generation antenna systems connections are 100% stable in any weather (even in storm) and any rough landscape (even in high mountains, canyons, etc), also their energy consumption is to 40% lower and it decreases operational expenses on network maintenance

Integration of rural & maritime areas into Digital Economy

The availability of all digital mobile services in absolutely in any geographic location

• In fact, even 200 HF & VHF transceivers can cover the whole area of Central Asia and Caucasus

• The project proposes replacement of antenna systems of transceivers on the market, organization of local assembling of transceivers and construction of networks in all countries of Economic Belt of Silk Roads (Central Asia and Caucasus). Totally 15121 transceivers are planned to locate in order to create Digital Single Market between Asia and Europe with ubiquitous mobile infrastructures on the ground, on the water surface and in the air.
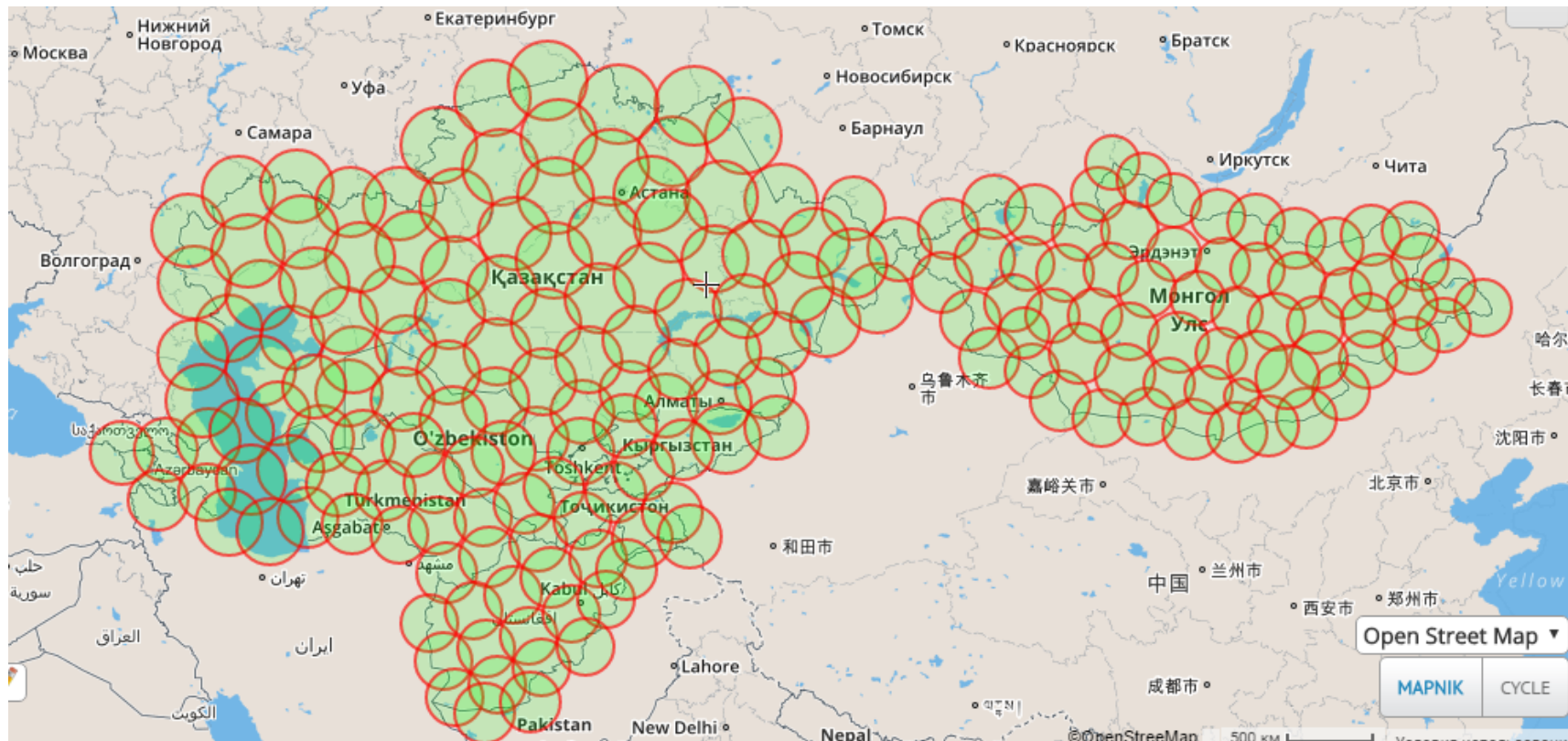
Nationwide mobile mesh-networks of Central Asia & Caucasus: on the ground, on the water surface and in the air

1. Ubiquitous mobile infrastructure on the ground:
On the initial stage approximately 11478 transceivers located on towers, roofs, trucks, buses, trains, etc.

2. Ubiquitous mobile infrastructure on the water surface:
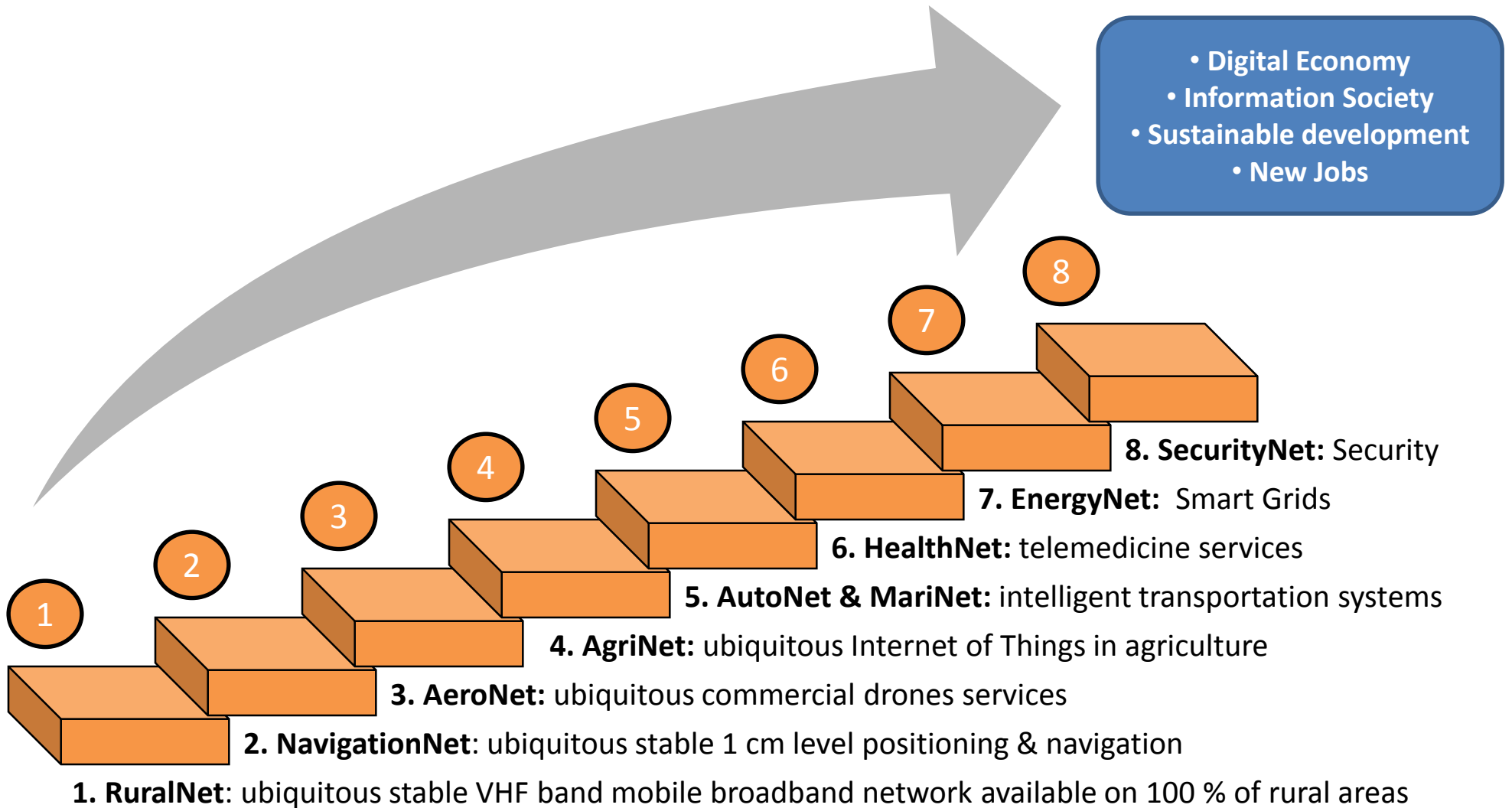On the initial stage approximately 2213 transceivers located on ships, Unmanned Surface Vehicles, islands, buoys.
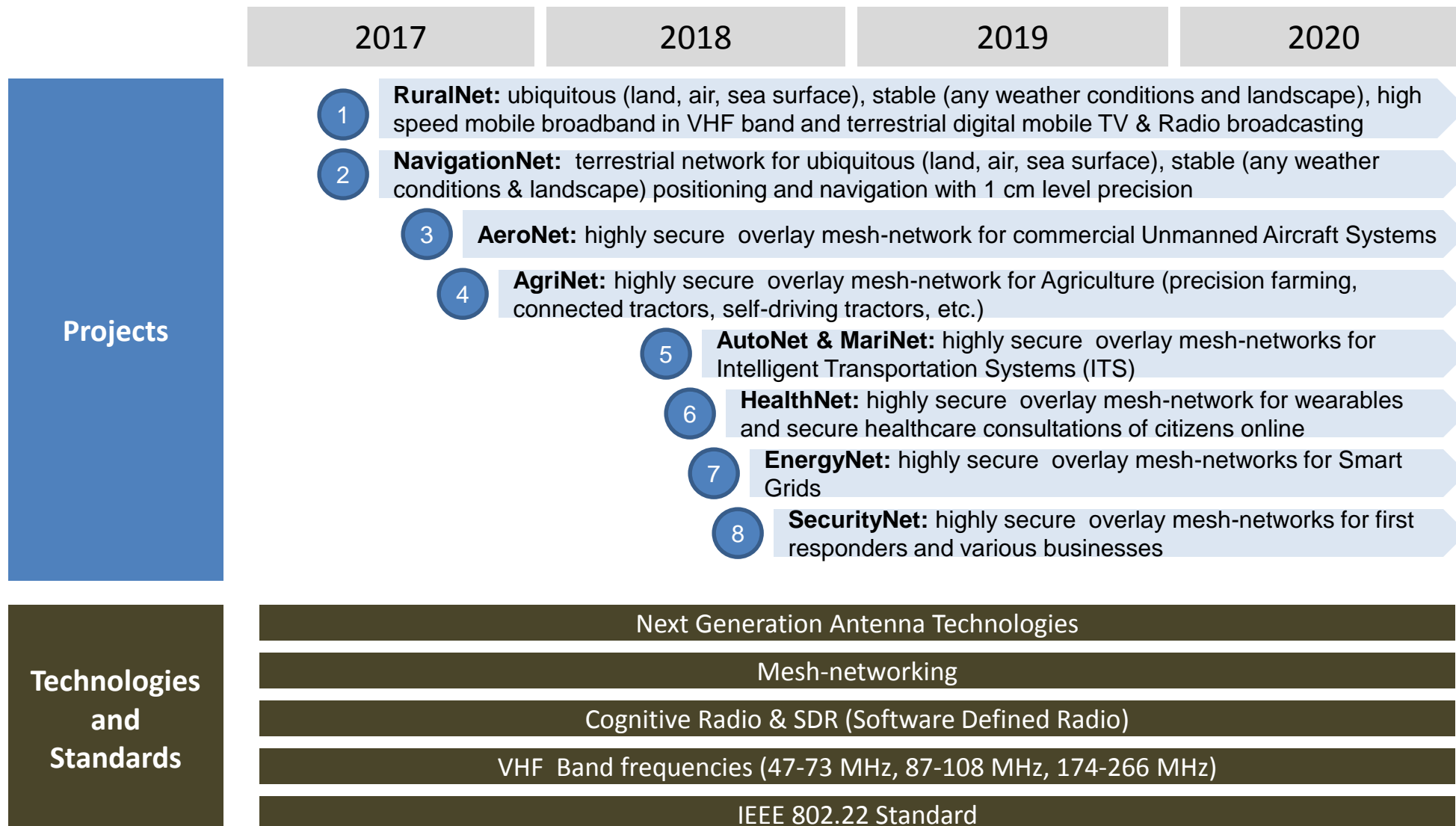

3. Ubiquitous mobile infrastructure in the sky:
On the initial stage approximately 1430 commercial Unmanned Aircraft Systems ("flying base stations")

8 steps – 8 industries – 8 nationwide networks

- Digital Economy
- Information Society
- Sustainable development
- New Jobs

8. **SecurityNet**: Security

7. **EnergyNet**: Smart Grids

6. **HealthNet**: telemedicine services

5. **AutoNet & MariNet**: intelligent transportation systems

4. **AgriNet**: ubiquitous Internet of Things in agriculture

3. **AeroNet**: ubiquitous commercial drones services

2. **NavigationNet**: ubiquitous stable 1 cm level positioning & navigation

1. **RuralNet**: ubiquitous stable VHF band mobile broadband network available on 100 % of rural areas

Key networks, technologies and standards

	2017	2018	2019	2020

Projects

1. **RuralNet:** ubiquitous (land, air, sea surface), stable (any weather conditions and landscape), high speed mobile broadband in VHF band and terrestrial digital mobile TV & Radio broadcasting

2. **NavigationNet:** terrestrial network for ubiquitous (land, air, sea surface), stable (any weather conditions & landscape) positioning and navigation with 1 cm level precision

3. **AeroNet:** highly secure overlay mesh-network for commercial Unmanned Aircraft Systems

4. **AgriNet:** highly secure overlay mesh-network for Agriculture (precision farming, connected tractors, self-driving tractors, etc.)

5. **AutoNet & MariNet:** highly secure overlay mesh-networks for Intelligent Transportation Systems (ITS)

6. **HealthNet:** highly secure overlay mesh-network for wearables and secure healthcare consultations of citizens online

7. **EnergyNet:** highly secure overlay mesh-networks for Smart Grids

8. **SecurityNet:** highly secure overlay mesh-networks for first responders and various businesses

Technologies and Standards

Next Generation Antenna Technologies

Mesh-networking

Cognitive Radio & SDR (Software Defined Radio)

VHF Band frequencies (47-73 MHz, 87-108 MHz, 174-266 MHz)

IEEE 802.22 Standard

Step 1. RuralNet (Telecom)

Objective: ubiquitous (land, air, sea surface), stable (any weather conditions and landscape), high speed mobile broadband and digital media services (mobile digital TV & Radio broadcasting) in VHF band

	3rd Q 2017	2018	2019	2020

Key results

MobileNet: terrestrial VHF band mobile ICT-infrastructure (standard IEEE 802.22) with 100% coverage and extension of services of local (foreign) mobile network operators (MNOs) to all rural , mountain and sea areas

VHF Band Spectrum optimization: additional terrestrial infrastructure for digital mobile TV& Radio broadcasting, **complete elimination of multi-million dollar expenses on old analog TV & Radio broadcasting**, the transition of analog TV and Radio into digital mobile format, making VHF bands free of analog signals (**the fulfillment of international obligations:** all analog TV signals in all countries had to be switched off already on 17th of June 2015)

100 % stable communications in all weather and landscape conditions: storm, large buildings, metro, etc. because of new antenna technologies and VHF bands used

100% affordable (starting with $0.50 monthly data plans) mobile broadband services for rural areas with speed 23 Mbps

Long range (up to 150 km) Device-to-Device, Vehicle-to-Vehicle, Vehicle-to-Device communications : all devices and objects in network work like virtual base stations and can transmit data on long distance

«Any service- Any device –Anywhere» principle: all kind of digital services available on any devices in any geographical place

New jobs created

Electronics assemblers: assembling of transceivers for networks, construction of networks in various countries of Mediterranean and Eastern Europe

Operators of telecom systems: networks maintenance

Cybersecurity specialists: prevention of cyber attacks on the networks

Partners & form of cooperation

Local (foreign) Mobile Networks Operators: extension of their services into all rural and maritime areas, improving their services (stable connections in all conditions, cybersecurity, etc.), increasing telecom market size

Local (foreign) TV & Radio broadcasters: service fee for digital mobile TV & Radio broadcasting, extension of their services to all rural and maritime areas, increasing TV and Radio Advertising market size

Step 1. RuralNet

Action Lines

Market results by 2020

- 5 % of telecom market
- 5% of TV advertising market
- 5 % of Radio advertising market

Total cost

$ 451.19 M

Action Lines	Responsible	Start	End	Cost
1. Creation of a joint ventures (50/50), obtaining VHF band frequency licenses and rights to use TV towers, transfer of technologies for local usage	—	3rd Q. 2016	4th Q 2016	—
2. • Replacement of classical antenna systems of 802.22 transceivers on the market to next generation antenna systems • Detailed technical documentation of transceivers for local assembling • Certification	Genesys Technologies (US)	3rd Q. 2016	3rd Q. 2017	**$ 20 940 388,88**
3. Replacement of classical antenna systems of VHF TV & Radio broadcasting transceivers on the market to next generation antenna systems, detailed technical documentation, certification	Genesys Technologies (US	3rd Q. 2016	3rd Q. 2017	**$ 18 221 931,22**
4. Hiring and training of local engineers	Genesys Technologies (US)	1st Q 2017	3rd Q. 2017	**$ 300 000**
5. Construction of pilot networks in pilot region, demonstration for foreign partners in countries of Central Asia, signing export contracts	Joint venture	3rd Q. 2017	4th Q. 2017	**$ 1 000 000** (including demonstration of networks NavigationNet, AeroNet & AgriNet)
6. Construction of mobile ICT-infrastructure on the ground (all land area of Central Asia and Caucasus): 11478 transceivers total, $ 30 000 each	Joint venture	3rd Q. 2017	4th Q. 2018	**$ 344 340 000.00**
7. Construction of mobile ICT-infrastructure on the water surface (all area of Caspian Sea and Black Sea): 2213 transceivers total, $ 30 000 each	Joint venture	3rd Q. 2017	4th Q. 2018	**$66 390 000.00**

Step 1: RuralNet

Products & services created

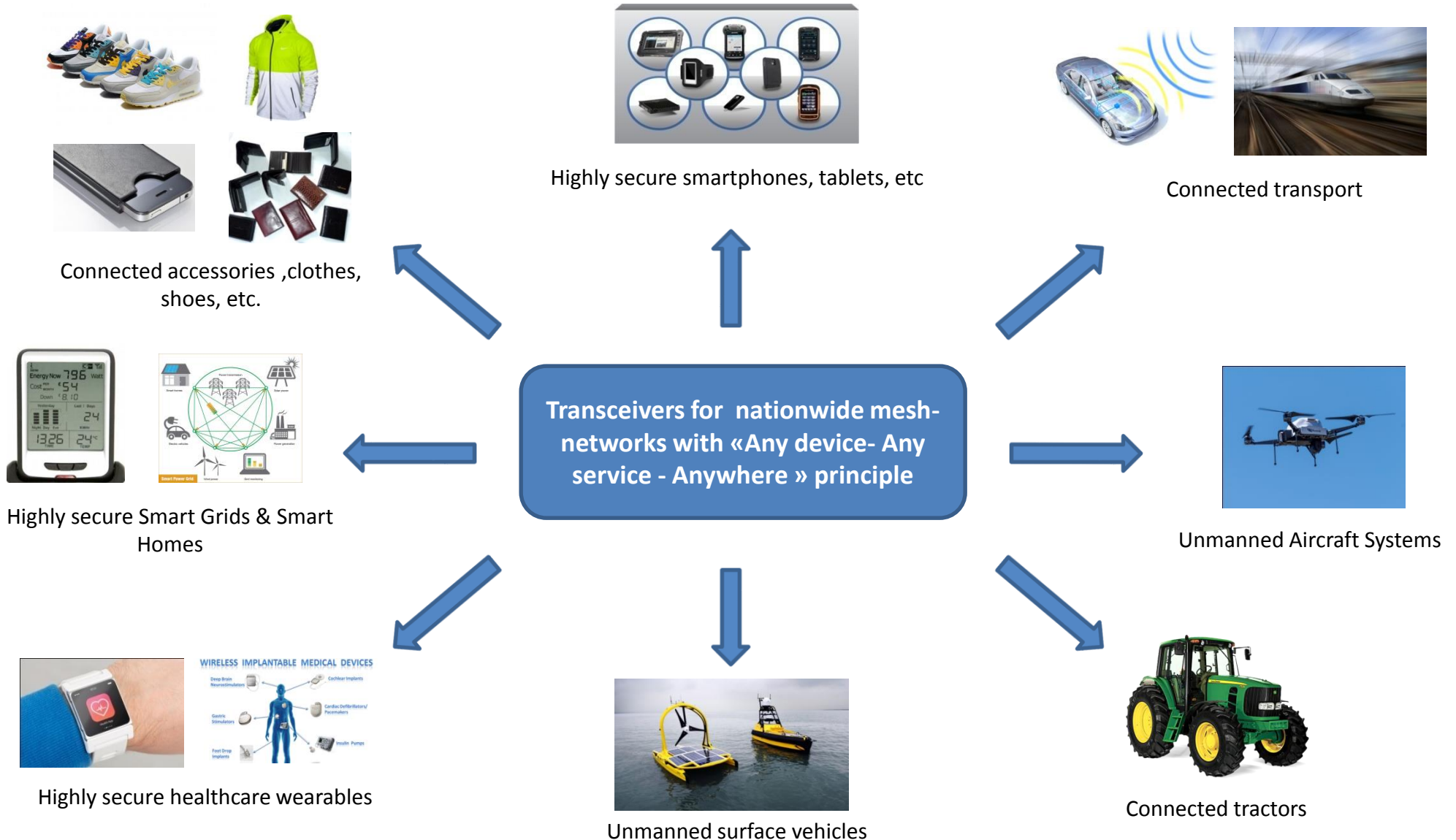**Ubiquitous highly secure mobile ICT-infrastructures with nationwide coverage (100% land & sea areas)**

Key advantages:

- **At least 227 times cheaper** in comparison with existing technologies on the commercial market because of VHF bands and new antenna technologies

- **Mesh-network:** all objects in the network are interconnected on a **distance up to 150 km** between each other and can work like virtual base stations to transmit other objects' data on absolutely any distance

- **100% stable communications:** antenna systems are wide band tunable regardless of position

- **Increased cybersecurity:** additional encryption on hardware (antenna systems) level

Step 1: RuralNet

Products & services created

Connected accessories ,clothes, shoes, etc.

Highly secure smartphones, tablets, etc

Connected transport

Highly secure Smart Grids & Smart Homes

Transceivers for nationwide mesh-networks with «Any device- Any service - Anywhere » principle

Unmanned Aircraft Systems

Highly secure healthcare wearables

Unmanned surface vehicles

Connected tractors

Step 2. NavigationNet (GNSS)

Objective: ubiquitous (land, air, sea surface), stable (any weather conditions & landscape) positioning and navigation with 1 cm level precision and immunity to spoofing

	3rd Q 2017	2018	2019	2020

Key results

100% coverage: terrestrial network LOCATANET operating in VHF band with next generation of antenna systems technologies

100 % stable positioning and navigation in any conditions: storm, large building, metro, etc.

Correction of GPS, GLONASS, BEIDOU, GALILEO signals

Immunity to spoofing: it will be almost impossible to spoof commercial drones, self-driving cars, autonomous tractors, etc.

Next Generation GNSS receivers with extremely high signal selectivity, combining GPS, GLONASS, BEIDOU, GALILEO + LOCATA

New Jobs created

Electronics assemblers: assembling of transceivers for networks, construction of networks in various countries

Operators of navigation systems: network maintenance

Cybersecurity specialists: prevention of cyber attacks on the networks

Partners & form of cooperation

LOCATA (Australia): improvement of their solution using new antenna technologies, transition to VHF band frequencies, combining communications data and navigation data in one smart network (standard IEEE 802.22)

Step 2. NavigationNet

Action Lines

Market results by 2020

- 5% of GNSS receivers market

Action Lines	Responsible	Start	End	Cost
1.				
• Replacement of antenna systems of GNSS receivers on market (GPS, GLONASS, BEIDOU, GALILEO, LOCATA), transition of LOCATANET to VHF frequencies(174-266 MHz): • Detailed technical documentation for local assembling, certification	Genesys Technologies(US)	3rd Q. 2016	3rd Q. 2017	**$ 18 221 931,21**
2. Construction of pilot networks , demonstration for foreign partners	Joint Venture	3rd Q 2017	4th Q 2017	**$ 1 000 000** (this action line goes together with step 1: RuralNet)

Total cost

$18.29 M

Step 2: NavigationNet

Products and services created

- **GNSS receivers with next generation antenna systems**, combining GPS, GLONASS, BEIDOU, GALILEO и LOCATA for agriculture, surveying, rail , road and maritime transport, aviation and various devices

- **Service fee for ubiquitous 1 cm level positioning and navigation**, stable in all weather conditions and landscape

Agriculture 1.4%

Surveying 4.1%

Rail 0.1%

LBS 47.0%

Road 46.2%

Aviation 1.0%

Maritime 0.3%
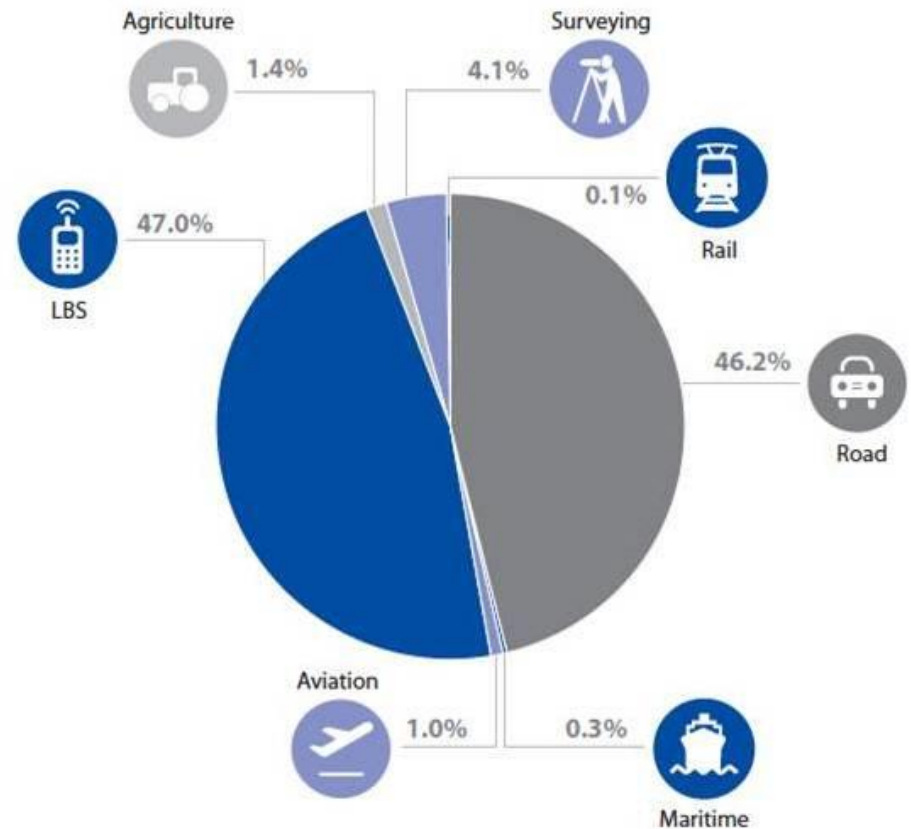
Step 3. AeroNet (Network for Commercial Drones)

Objective: Safe integration of commercial Unmanned Aircraft Systems (UAS) in airspace and nationwide commercial drones services (agriculture, delivery, rescue operations, etc.)

	4th Q 2017	2018	2019	2020

Key results

AeroNet: highly secure overlay mesh-network for commercial UAS

100% coverage: stable terrestrial control non-line of sight and data collection in real time on the whole countries territory

100 % stable data-communications between objects moving in airspace (Intelligent Air Transportation System)

Immunity to spoofing: it will be almost impossible to spoof commercial drones

Next Generation Avionics with new antenna technologies, with extremely high signal selectivity, with lower weight, and no loss of aerodynamic properties (antennas can be made of any shape, and can covered like a thin foil layer

New Jobs created

Electronics assemblers: assembling of avionics

Operators of UAS: controlling the group of unmanned aircraft systems and data collection

Operators of Intelligent Aerial Transportation Systems: control and regulation of commercial air traffic

Cybersecurity specialists: prevention of cyber attacks on the systems

Partners & form of cooperation

Commercial drones manufacturers, delivery companies : supply of avionics for drones

Step 3. AeroNet
Action Lines

	Action Lines	Responsible	Start	End	Cost
Marker results by 2020	**1.** Replacement of antenna systems of VHF avionics on the market, technical documentation for local assembling, certification	Genesys Technologies(US)	3rd Q 2016	3rd Q 2017	**$ 18 221 931,21**
• 5 % of commercial avionics market	**2.** Construction of pilot network, demonstration for foreign partners, signing of export contracts	Joint venture	3rd Q . 2017	4th Q 2017	**$ 1 000 000** (together with RuralNet and NavigationNet)
• 5 % of commercial drones market	**3. AeroNet – nationwide networks of connected commercial drones :**on the initial stage 1430 commercial Unmanned Aircraft Systems , approximately $100 000 each Combing networks on the ground, on the water surface and in the air in one single smart mesh-network	Joint venture	3-й кв. 2017	4-й кв. 2018	**$ 143 000 000**

Total cost

$ 162.22 M

Step 3: AeroNet

Products and services created
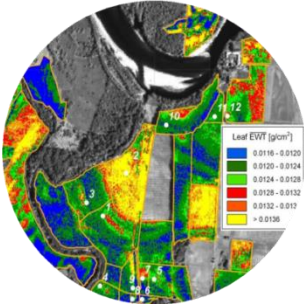
Remote sensing

Detailed Cadastral plans
of any territories

Monitoring of various
infrastructures

GIS services for agriculture

Integration of UAS into rescue
operations

Consumer goods delivery

Step 4. AgriNet (Network for Agriculture)

Objective: making rural areas and agriculture attractive for young people, foreign investors using Internet of Things in agriculture and commercial drones

4th Q 2017	2018	2019	2020

Key results

AgriNet: highly secure overlay mesh-networks for Internet of Things in agriculture

100% transparency of agribusiness (all processes and results) for farmers, investors, banks, insurance companies

100 % attractiveness of agriculture for young people (including people with disabilities) because of ability to remotely operate autonomous agriculture machinery, drones, etc.

Reducing expenses on fuel, fertilizers, pests up to 30%; increasing crop yield, profit up to 20%

Transceivers for connected tractors: stable telematics, data-communications, 1 cm level positioning and navigation, ability of remote control on any distance.

New Jobs created

Electronics assemblers: assembling of transceivers for connected tractors and other agricultural machinery

Operators of commercial drones, connected tractors: remote control of group of drones, tractors; data collection, 3D mapping of agricultural fields

IT-farmers: analysis of agricultural data

Agriconsultants: online consultation of local farmers

Cybersecurity specialists: prevention of cyber attacks on networks

Partners & form of cooperation

Agricultural machinery manufacturers: supply of highly secure transceivers for agricultural machinery for stable telematics, control, navigation, etc.

Trimble (US): improvement of their «Connected Farm» system (as it's the best on commercial market so far) and adoption to the networks in different countries

Step 4. AgriNet
Action Lines

Market results by 2020

- 5 % of Precision Farming market
- 0.5 % of Agricultural machinery market

Action lines	Responsible	Start	End	Cost
2. Creation of «Connected Farm» applications with interfaces on local languages	Trimble(US), Genesys Technologies(US)	3rd Q 2016	4th Q 2017	**$ 1000 000**
3. Creation of highly secure overlay network of Internet of Things in Agriculture	Joint venture	3rd Q 2017	4th Q 2017	**$ 2 500 000**
4. Creation of detailed 3D maps of all land areas of pilot region	Joint venture	1st Q 2018	4th Q 2018	**$ 1 000 000**
5. Hiring and training of local specialists: commercial drones operators, IT-farmers, etc	Joint venture	3rd Q 2017	4th Q 2020	**$ 300 000**
6. Organization of local assembling of self-driving tractors	Genesys Technologies(US), Kinze Manufacturing(US)	1st Q 2018	4th Q . 2020	**$ 20 900 000**

Total cost

$ 25.7 M

Step 4: AgriNet

Products and services created
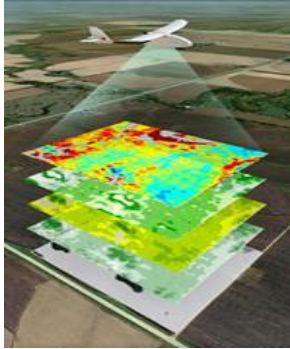
3D mapping and analysis of agricultural fields

Detailed meteo data & rainwave contour maps

Autopilot and parallel steering

Special tablets for farmers

Unmanned systems for irrigation and pest management

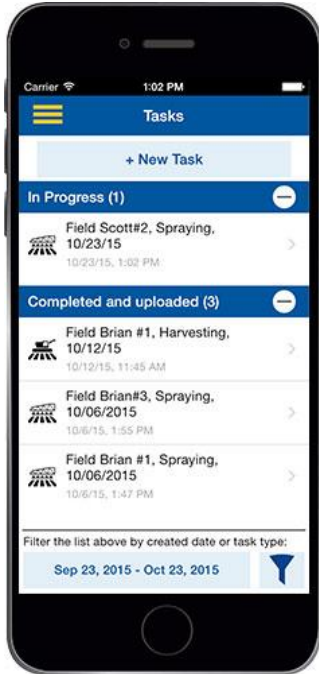Storing agridata in the cloud + access to historical data

Online financial tools for farmers, insurance, etc.

Integration of autonomous machinery into agriculture and Remote precision farming

Step 4: AgriNet

Products and services created

Connected Farm Field App

This app helps farmers to understand which field areas are profitable and why.
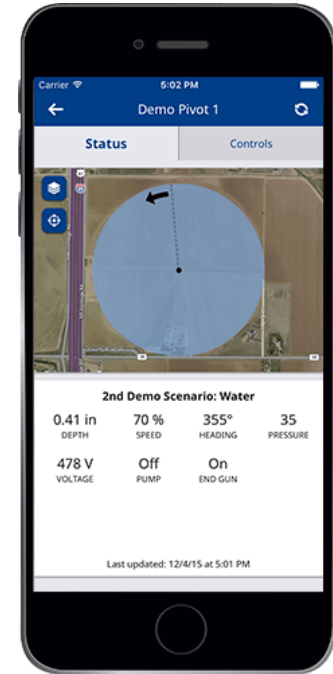
Connected Farm Scout App

- detailed field maps
- crop health imagery
- nitrogen rates
- analysis of problems

Connected Farm Fleet App

- control of farm fleet
- control of work
- historical positions and data

Connected Farm Irrigate App

- Monitor and control irrigation systems in real-time from any location with a smartphone or tablet.
- The Irrigate app helps farmers ensure the right amount of fluid is applied in the right place.

Step 5. AutoNet & MariNet (Networks for Transportation)

Objective: smart transportation and logistics, precision navigation and safe integration of self-driving cars, unmanned surface systems into road and maritime traffic

	2nd Q 2018	2019	2020

Key results

AutoNet & MariNet: highly secure overlay mesh-networks for road, rail & maritime transport (Intelligent Transportation Systems)

100% stable data- communications and navigation on land, on water in any weather conditions and any landscape

100 % remote control and smart logistics in any geographical place

Reducing transportation accidents, 100 % control on accidents, **100 % control** on maritime security (illegal fishing, illegal migration routes, piracy)

Transceivers for road, rail & maritime transport: stable and highly secure data-communications and telematics, 1 cm level positioning and navigation, possibility of remote terrestrial control of unmanned surface systems on any distance

New Jobs created

Electronics assemblers: assembling of transceivers

Operators of Intelligent Transportation Systems: controlling and regulating of traffic on land and sea

Operators of Unmanned Surface Vehicles: operating the group of Unmanned Surface vehicles and Unmanned Aircraft Systems for effective maritime control, maritime security and data collection in real time

Cybersecurity specialists: prevention of cyber attacks on networks

Partners & form of cooperation

System integrators, Manufacturers of self-driving cars, Unmanned Surface Vehicles: supply of transceivers

Step 5. AutoNet & MariNet
Action Lines

Market results by 2020

- 5 % of connected car market

- 5 % of Intelligent transportation systems market

- 0.5 % of self-driving cars market

- 5 % of maritime communications market

- 5 % of maritime e-navigation market

- 5% of maritime security market

- 5% of Unmanned Surface Vehicles market

Total cost

$ 25.9 M

Action Lines	Responsible	Start	End	Cost
1.1 Replacement of antenna systems of Intelligent Transportation systems on the market, technical documentation, certification **1.2** Organization of local assembling of highly secure modules for cars, trucks, unmanned surface vehicles, etc	Genesys Technologies(US)	3rd Q. 2017	4th Q. 2018	**$ 20 900 000**
2. Creation of highly secure overlay networks for stable data-communications between cars, unmanned surface vehicles, etc.	Joint venture	2nd Q 2018	4th Q 2018	**$ 5 000 000**
3. Safe integration of self-driving cars into local road traffic	Joint venture	3rd Q. 2017	4th Q. 2020	—
4. Hiring and training of local specialists: operators of intelligent transportation systems, maritime security systems, unmanned surface vehicles, etc	Joint venture	3rd Q 2017	4th Q . 2020	—

Step 5: AutoNet & MariNet

Products and services created

Infotainment: stable mobile internet and digital media services

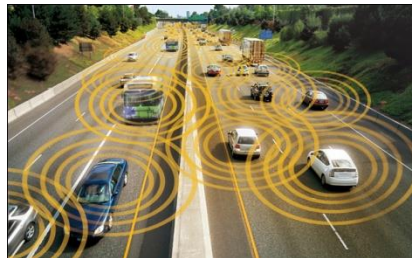

Safety & drive assistance

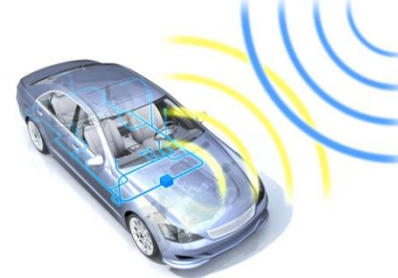
Stable navigation services

location based advertising

eCall systems

Stable and highly secure data communications between moving objects

Stable telematics & remote diagnostics

Insurance «pay as you drive» (how you drive)

Step 5: AutoNet & MariNet

Products and services created

Stable mobile internet, communications & navigation even in storm weather

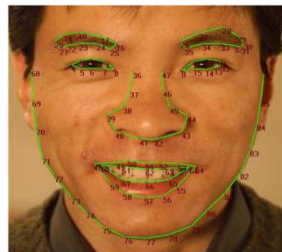Commercial services using Unmanned Surface Vehicles

Mesh-networks of unmanned ground, surface and maritime systems operating as one system

Stable remote control of unmanned systems from any distance and real time data collection

Effective control on maritime security: illegal fishing, migration routes, piracy and maritime terrorism

Ability to identify, track criminals remotely on any distance , create a digital «Face ID», storing in secure database for historical data

100% stable cargo tracking in any areas and smart logistics

Cybersecurity: highly secure communications on land, in air and on water surface

Step 6. HealthNet (Network for Telemedicine)

Objective: Remote healthcare consultations of rural citizens, remote monitoring through highly secure wearables

2nd Q 2018	2019	2020

Key results

HealthNet: highly secure overlay mesh-network for Telemedicine and wearables

Highly secure communications and 100% stable working of wearables in any conditions and geographical place

Ability to connect medical history to eID for immediate help in critical situations

Highly secure modules for healthcare wearables and other medical equipment

New Jobs created

Electronics assemblers: assembling highly secure modules for healthcare wearables

IT-doctors: analysis of data coming from wearables

Online doctors: remote consultations of citizens

Consultants on healthy aging: preparation of individual programs for seniors

Cybersecurity specialists: prevention of cyber attacks on networks

Partners & form of cooperation

Healthcare wearables manufacturers: supply of highly secure modules and transceivers

**Telemedicine companies:** service fee for using networks

Step 6. HealthNet

Action Lines

Market results by 2020

- 5 % of telemedicine market

- 5% of healthcare wearables market

Action Lines	Responsible	Start	End	Cost
1 Replacement of antenna systems of healthcare wearables, transition to VHF bands, technical documentation for local assembling	Genesys Technologies	3rd Q. 2017	4th Q. 2018	**$ 20 900 000**
2. Creation of highly secure overlay network for telemedicine and healthcare wearables	Joint venture	2nd Q. 2018	4th Q. 2018	**$ 2 500 000**
3. Hiring and training of local specialists	Joint venture	3rd Q. 2017	4th Q. 2020	__

Total cost

$ 23.4 M

Step 6: HealthNet

Products and services created

Highly secure and stable remote consultations
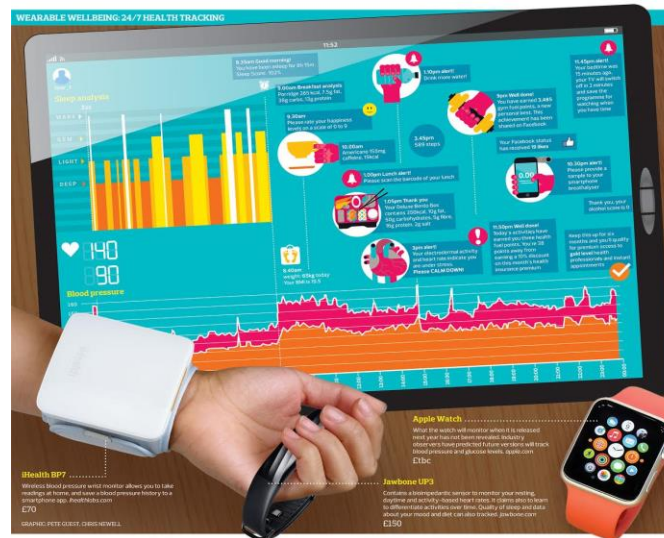
Highly secure and stable remote monitoring in any geographical place

Highly secure wearables with encryption on both software and hardware level

Step 7. EnergyNet (Network for Smart Grids)

Objective: highly secure Smart Grids, remote control of energy networks in rural areas

3rd Q 2018	2019	2020

Key results

EnergyNet: highly secure overlay mesh-networks for Smart Grid

100% smart control and transition to smartmeters

Electrification of rural areas удаленных сельских территорий с помощью возобновляемых источников энергии

Local manufacturing of highly secure modules for Smart Grids

Создаваемые новые рабочие места и профессии

Electronics assemblers: assembling highly secure modules for healthcare wearables

Smart Grid operators: maintenance of networks

Cybersecurity specialists: prevention of cyber attacks on networks

Partners & form of cooperation

Smart Grid equipment manufacturers: supply of highly secure modules, construction of smart grids in various countries

Energy companies: service fee for using highly secure networks

Sun Edison (US): electrification of rural areas

Step 7. EnergyNet
Action Lines

Market results by 2020

- 5 % of Smart Grid market

Action Lines	Responsible	Start	End	Cost
1 Replacement of antenna systems of smart grid modules on the market, transition to VHF frequencies, technical documentation for local assembling	Genesys Technologies	3rd Q. 2017	4th Q. 2018	**$ 20 900 000**
2. Creation of highly secure overlay network for SmartGrid	Joint venture	2nd Q. 2018	4th Q. 2018	**$ 2 500 000**
3. Hiring and training of local specialists	Joint venture	3rd Q. 2017	4th Q. 2020	__

Total cost

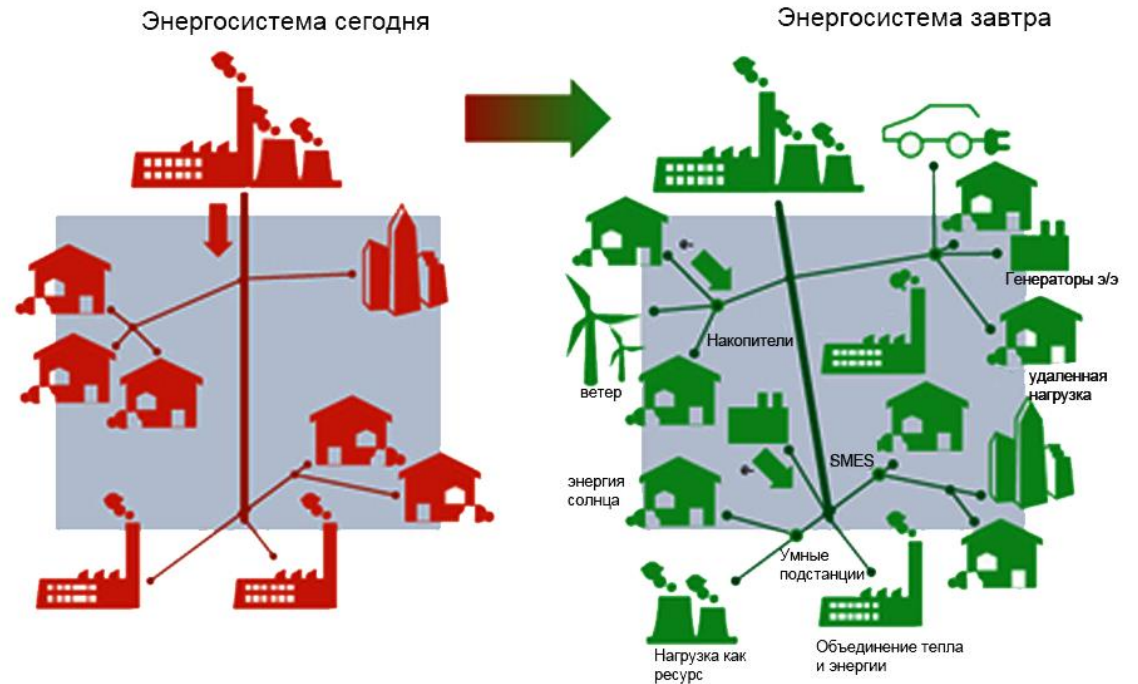## $ 23.4 M

Step 7: EnergyNet

Products and services created

Full digital control through highly secure smartmeters and prevention of theft of electricity, gas, water, etc.

Electrification of rural areas

Энергосистема сегодня

Энергосистема завтра

Генераторы э/э

удаленная нагрузка

Накопители

ветер

энергия солнца

SMES

Умные подстанции

Нагрузка как ресурс

Объединение тепла и энергии

Transition to distributed networks and smart energy systems

Step 8. SecurityNet (Networks for First Responders & Businesses)

Objective: Creation of nationwide interoperable mesh-networks for first responders (ambulance, police, fire services) for stable operations during emergency situations

3rd Q 2018	2019	2020

Key results

FirstNet: creation of highly secure overlay network for first responders

100% stable communications and video surveillance in real time during emergency situations

100% effective instrument for controlling any remote areas in real time , identification of criminals, creation of Face ID's, storing in local database

Instant warning of population during emergency situations

Highly secure modules and transceivers for video surveillance systems with ability to monitor any remote areas, maritime areas, mountain areas in real time on any distance , with facial recognition technologies

Highly secure networks for local businesses.

New Jobs created

Electronics assemblers: assembling highly secure modules for video surveillance systems, smartphones, tablets for first responders and businesses

Security systems operators: maintenance of security systems

Cyber Investigators: investigation of cybercrime

Partners & form of cooperation

Manufacturers of video surveillance systems, secure smartphones, tablets, other devices: supply of highly secure modules

Step 8. SecurityNet
Action Lines

Market results by 2020

- 5% of cybersecurity market

- 5% of video surveillance systems market

Action Lines	Responsible	Start	End	Cost
1 Organization of local assembling of highly secure VHF modules for video surveillance systems, special devices, etc.	Genesys Technologies	3rd Q. 2017	4th Q. 2018	**$ 20 900 000**
2. Creation of highly secure overlay network for first responders	Joint venture	2nd Q. 2018	4th Q. 2018	**$ 2 500 000**
3. Hiring and training of local specialists	Joint venture	3rd Q. 2017	4th Q. 2020	___

Total cost

$ 23.4 M

Step 8: SecurityNet

Products and services created

Highly secure modules and devices for first responders

Special "internet clothes" operating on HF & VHF frequencies for first responders for 100 % stable communications in any conditions, any distance.

Special drones and devices for police

Drones for firefighting, delivery of medicaments, rescue operations

Highly secure overlay networks and devices for businesses

4 groups of export products

4 groups of products will be assembled locally and exported to other countries of the region

1. VHF Transceivers: (base station transceivers)

- Stationary (for TV towers, roofs, etc)
- Mobile (trucks, ships, etc.)
- Direct cost: $ 10 000
- Export price: $ 30 000

2. Avionics Transceivers: («flying» base stations)

- For creation of ubiquitous networks on the ground and in the air
- Direct cost:: $ 30 000
- Export price: $ 50 000

3. GNSS-receivers :
1 cm level precision GNSS receivers

- GPS + GLONASS + BEIDOU + GALILEO +LOCATA
- Direct cost: $ 80 – 5000
- Export price: $ 100 - 15 000

4. Transceiver Lite: transceivers for markets of Internet of Things

- Transceivers for tractors, energy systems, wearables, etc.
- Direct cost: stating from $ 32
- Export price: stating from $ 35

All transceivers consist of 2 main parts

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1. Modules of next gen antenna systems: will be manufactured locally

+

2. Various digital modules (Intel, Qualcomm, etc): will be imported

List of countries and cost of networks

Country	Population, miilion	Area, square kilometers	GDP (nominal), $ biilions	Share of World's GDP (nominal), %	Terrestrial infrastructure, number of transceivers ($ 30 000 each)	Aerial infrastructure, number of commercial drones ($ 100 000 each)	Maritime infrastructure, number of transceivers, ($ 30 000 each)	Terrestrial infrastructure cost	Aerial infrastructure cost	Maritime infrastructure cost
Kazakhstan	17.73	2724902	116.151	0.157	4339	542	1446	$ 130 170 000	$ 54 200 000	$ 43 380 000
Mongolia	3	1564116	11.652	0.015	2490	311	0	$ 74 700 000	$ 31 100 000	$ 0
Uzbekistan	31	447400	61.649	0.079	712	89	0	$ 21 360 000	$ 8 900 000	$ 0
Afghanistan	31.1	652864	17.275	0.022	1039	129	0	$ 31 170 000	$ 12 900 000	$ 0
Tajikistan	8.4	142000	6.245	0.008	226	28	0	$ 6 780 000	$ 2 800 000	$ 0
Kyrgyzstan	5.9	198500	6.03	0.008	316	39	0	$ 9480 000	$ 3 900 000	$ 0
Turkmenistan	5.2	491200	35.398	0.045	782	97	260	$ 23 460 000	$ 9 700 000	$ 7 800 000
Azerbaycan	9.6	86600	35.141	0.045	137	17	45	$ 4 110 000	$ 1 700 000	$ 1 350 000
Pakistan	199	803940	269.97	0.34	1280	160	426	$ 38 400 000	$ 16 000 000	$ 12 780 000
Armenia	3.01	29743	10.774	0.015	47	5	0	$ 1 410 000	$ 500 000	$ 0
Georgia	3.72	69700	13.942	0.019	110	13	36	$ 3 300 000	$ 1 300 000	$ 1 080 000
TOTAL	**317.66**	**7 210 965**	**584.227**	**0.753**	**11478**	**1430**	**2213**	**$ 344 340 000**	**$ 143 000 000**	**$ 66 390 000**

Note: these are initial infrastructures, on further stages network will grow and build itself as a mesh network, as more and more transceivers and devices will be added through B2Bsales (selling transceivers to transportation, agriculture, energy companies, etc.). All transceivers will be interconnected in one single ubiquitous mesh- network (all cars, trucks, trains, buses, drones, ships, buoys, unmanned surface vehicles, smartmeters, various devices such as smartphones, tablets, wearables, etc).

SWOT analysis

Strengths

• **Cost of coverage:** at least 227 times cheaper in comparison with existing equipment on the market because of long-range communications on VHF frequencies : 47-73 MHz, 87-108 MHz, 174-266 MHz.

• **nobody on the market has antenna technologies to utilize VHF spectrum** and it's being unutilized in all the countries.

• **solving essential problems in wireless industry and drastically improving communications with next gen antenna systems:** making communications 100% stable in any conditions, increasing cybersecurity, decreasing operational expenses (energy consumption), making ubiquitous mobile broadband

Weaknesses

• **In many countries VHF frequencies are still used by analog TV:** many countries still haven't fulfilled international obligations and didn't finish transition to digital TV (deadline was on 17th of June 2015), that's why project proposes creation of additional infrastructure for digital mobile TV and radio broadcasting on VHF frequencies in order to help local governments with transition and to make VHF spectrum free of analog signals

Opportunities

• **Spectrum sharing**

• **Cooperation with Global Connect Initiatives:**
 - Project Loon,
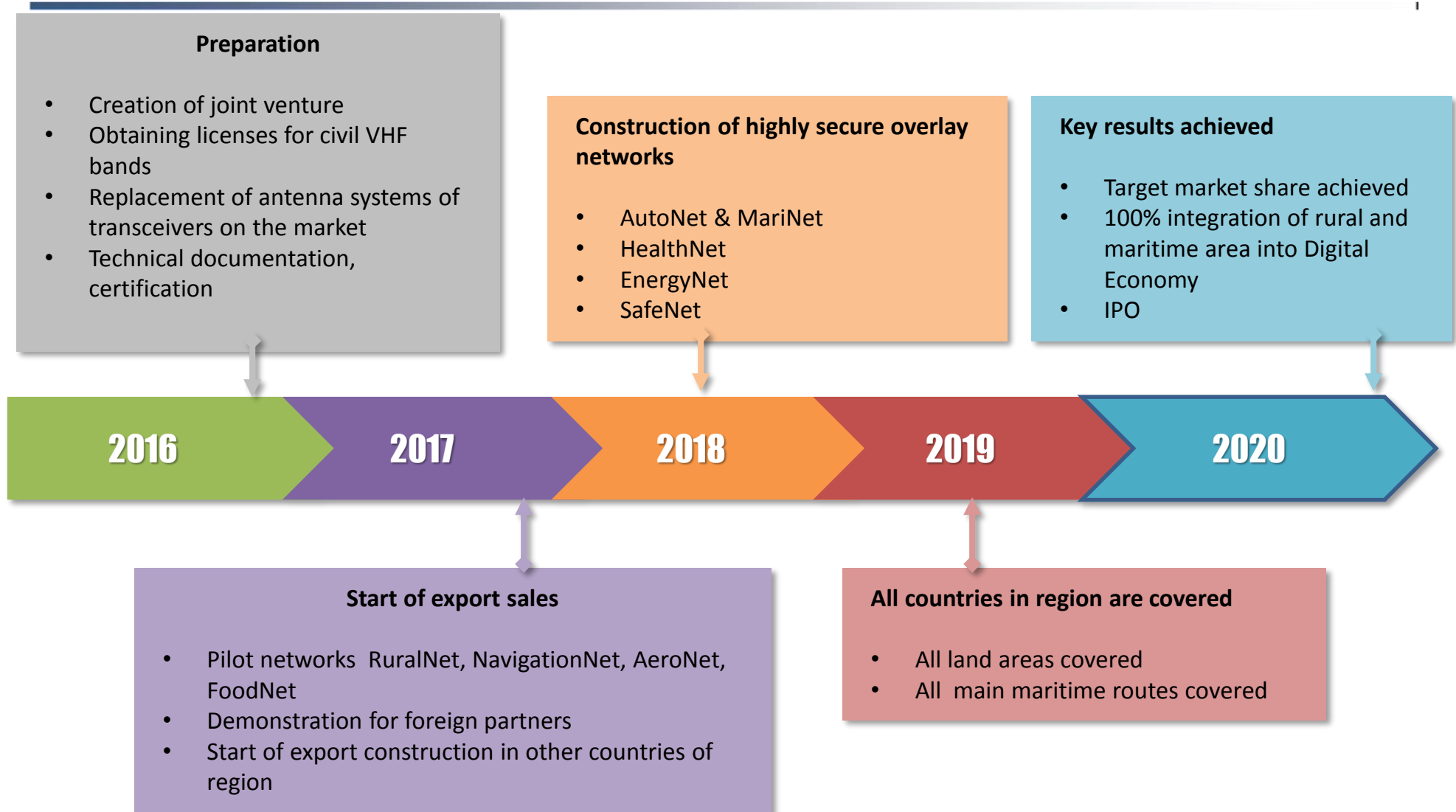- Google & Facebook Solar drones,
- OneWeb & SpaceX LEO microsatellites

Threats

• **Reverse engineering:** all schemes will be covered with special nanocapsules and when opponents will X-ray (or like that), the heat would be increased and all schemes will be destroyed

S   **W**   **O**   **T**

Milestones

Preparation

- Creation of joint venture
- Obtaining licenses for civil VHF bands
- Replacement of antenna systems of transceivers on the market
- Technical documentation, certification

Construction of highly secure overlay networks

- AutoNet & MariNet
- HealthNet
- EnergyNet
- SafeNet

Key results achieved

- Target market share achieved
- 100% integration of rural and maritime area into Digital Economy
- IPO

2016 **2017** **2018** **2019** **2020**

Start of export sales

- Pilot networks RuralNet, NavigationNet, AeroNet, FoodNet
- Demonstration for foreign partners
- Start of export construction in other countries of region

All countries in region are covered

- All land areas covered
- All main maritime routes covered

Key results

Digital economy, information society and sustainable development of rural and maritime areas

New markets and nationwide services

New jobs and specialties, especially for young people with disabilities

Increase of GDP

Sustainable Development

About technical partner – Genesys Technologies (USA)

Genesys Technologies LTD is a team of top specialists in the field of wireless communications, cybersecurity and unmanned systems.

During many we are actively consulting:

- **FCC:** Federal Communications Committee
- **FAA:** Federal Aviation Administration
- **DARPA**: Defense Advanced Research Projects Agency
- **DOD:** Department of Defense
- **US Congress**
- **UN project office on governance**