ROADMAP

«Connected Sub-Saharan Africa 2020»

Connecting everyone, everything, everywhere in all countries of Sub-Saharan Africa by construction of 8 nationwide highly secure 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 for connecting 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 connecting tractors, animals, equipment on farms (Internet of Things in agriculture) and ubiquitous digital services for farmers

5. AutoNet & MariNet (Transportation): overlay network for connecting 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 connecting healthcare wearables and ubiquitous mobile medical consultations of citizens in rural areas online

7. EnergyNet (Energy): overlay network for connecting various smartmeters,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 in Sub-Saharan Africa by 2020

List of countries: Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Cape Verde, Central African Republic, Chad, Comoros, Republic of Congo, Cote d'Ivore, Democratic Republic of Congo, Equatorial Guinea, Eritrea, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mozambique, Namibia, Niger, Nigeria, Rwanda, Sao Tome and Principe, Senegal, Seychelles, Sierra Leone, Somalia, South Africa, Swaziland, Togo, Uganda, United Republic of Tanzania, Zambia, Zimbabwe

Services	Global market	CAGR	Global market size by 2020*	Market size in Sub-Saharan Africa by 2020**	Target market share 5% in Sub-Saharan Africa by 2020
Telecom: mobile broadband service in rural areas, service fee from local mobile networks operators for usage of our network	Telecom market (mobile network operators)	1.27 %	$1414 bn	**$ 28.09 bn**	**5 % ($ 1.40 bn)**
Digital Media (TV): service fee from local(foreign) TV broadcasters for usage of our network	TV advertising market	0 %	$ 210.92 bn	**$ 4.19 bn**	**5 % ($ 209.54 m)**
Digital Media (Radio): service fee from local(foreign) digital Radio broadcasters for usage of our network	Radio advertising market	0 %	$ 32 bn	**$ 635.84 m**	**5% ($31.79 m)**
AeroNet: commercial drones services (infrastructure surveying, agriculture, transport, security, media & entertainment, insurance, mining)	Commercial applications of drone technology	10 %	$ 127 bn	**$ 2.52 bn**	**5 % ($ 126.17 m)**
AgriNet: precision farming and connected agriculture services for farmers	Precision farming market	12.2 %	$ 4.55 bn	**$ 90.40 m**	**5 % ($ 4.52 m)**
AutoNet: connected car services (connectivity, navigation, telematics, safety & driving assistance, etc.)	Connected Car market	34.21 %	$ 123.08 bn	**$ 2.44 bn**	**5 % ($ 122.27 m)**
MariNet: maritime mobile broadband and eNavigation services	Maritime communications market	7.7 %	$ 5.62 bn	**$ 111.66 m**	**5 % ($ 5.58 m)**
HealthNet: eHealth services and service fee from local telemedicine companies	Telemedicine market	14.3 %	$ 36.3 bn	**$ 721.28 m**	**5 % ($ 36.06 m)**
EnergyNet: smart grid services and service fee from local energy companies	Smart Grid market	18.2 %	$ 139.59 bn	**$2.77 bn**	**5 % ($ 138.68 m)**
SecurityNet: security & video surveillance services, service fee from security organizations	Video surveillance market	23.51 %	$ 42.06 bn	**$ 835.73 m**	**5 % ($ 41.78 m)**
SecurityNet: cybersecurity services	Cybersecurity market	9.8 %	$ 170.21 bn	**$ 3.38 bn**	**5 % ($ 169.10 m)**

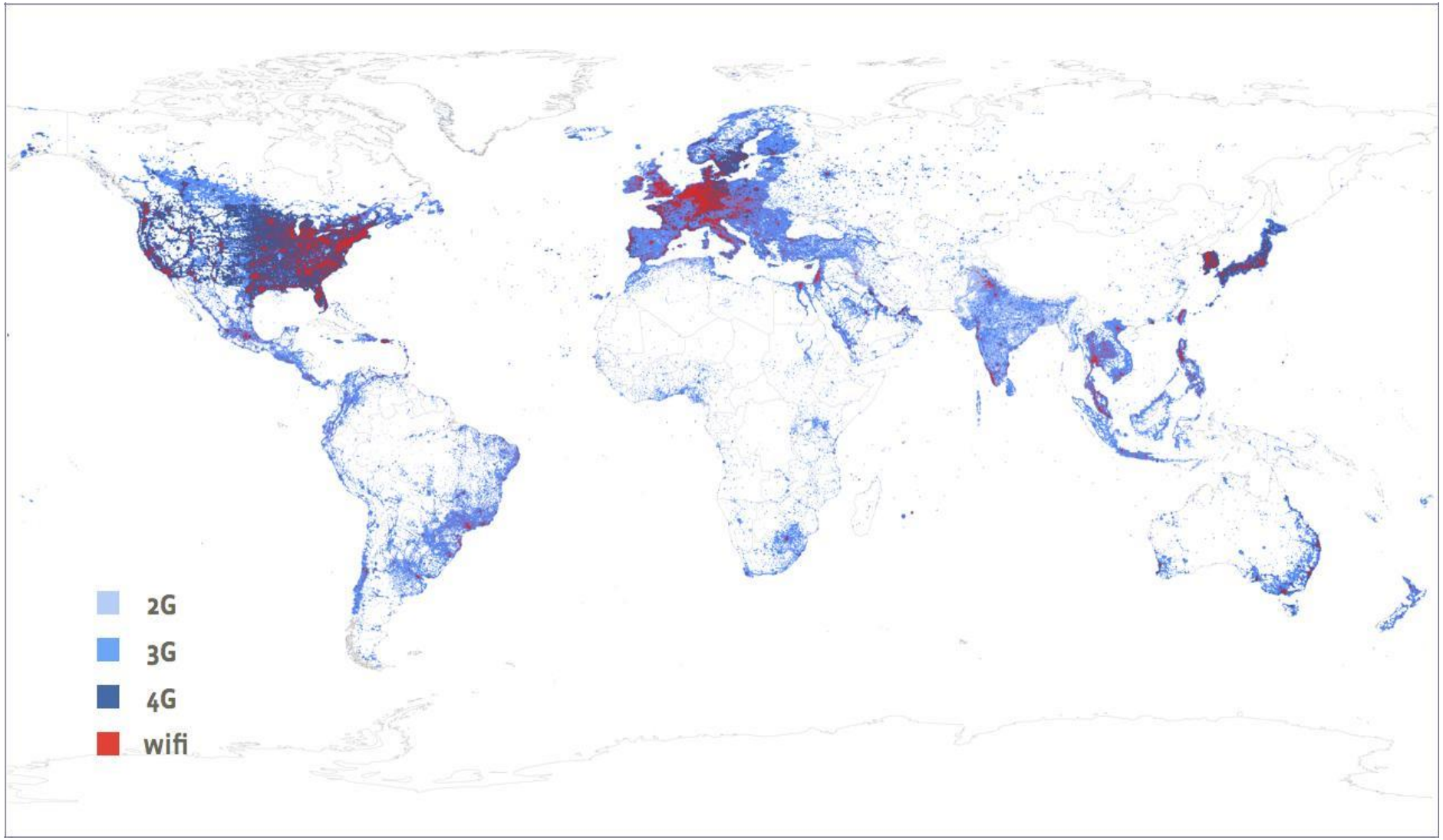
***** - by data of Statista, Markets&Markets, Pwc;

****** - total nominal GDP of countries of Sub-Saharan Africa is approximately 1.987 % of world's GDP, market size in region is calculated as 1.987 % of Global market size.

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

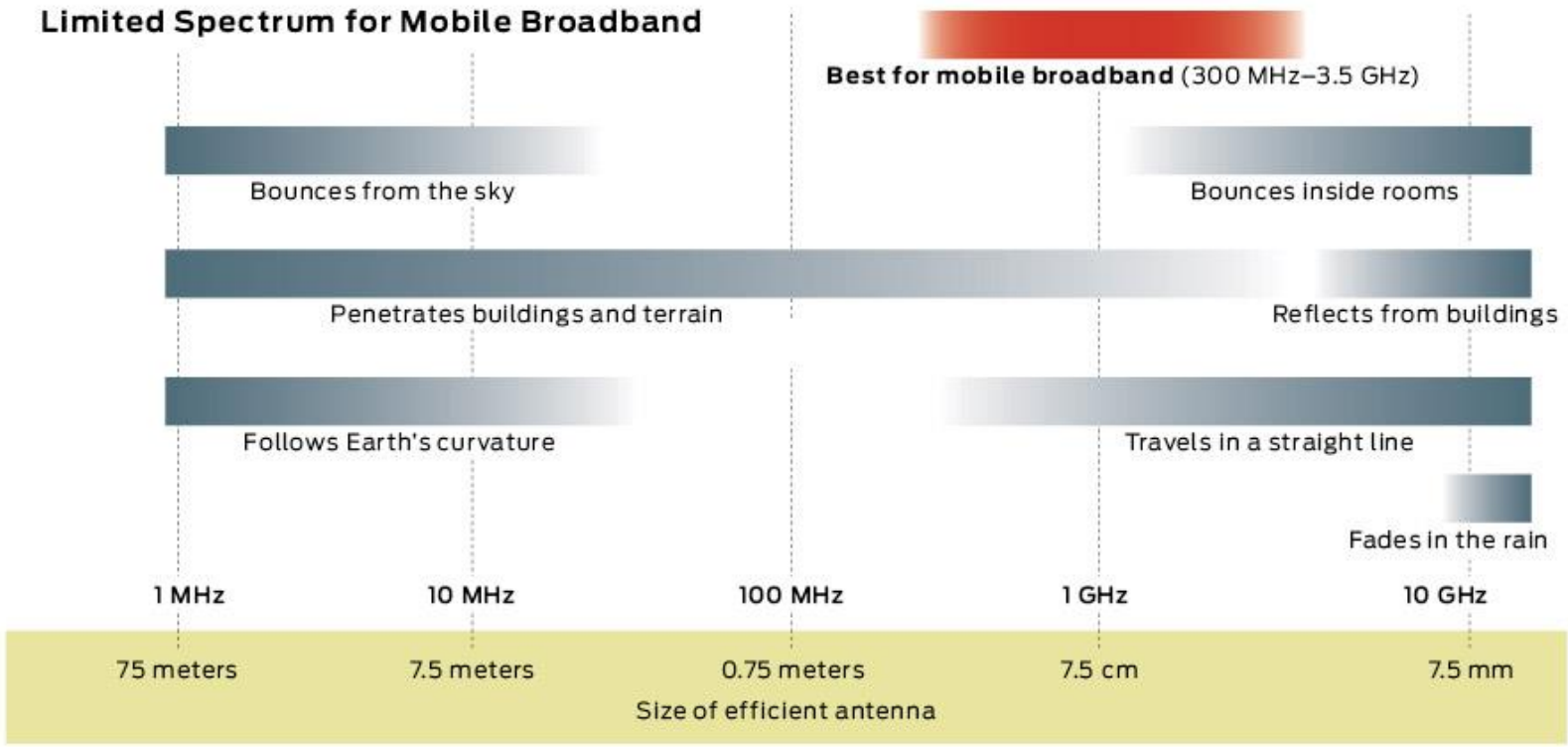
Mobile internet coverage map:



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 limited resource.
- 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.



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 small red circle with 3 km radius on the south of Cape Town.

- Moreover, right now all connections are unstable in bad weather (storm), rough landscape (mountains, big buildings, etc.), metro, etc.

With new technologies – hundreds of times cheaper & more effective

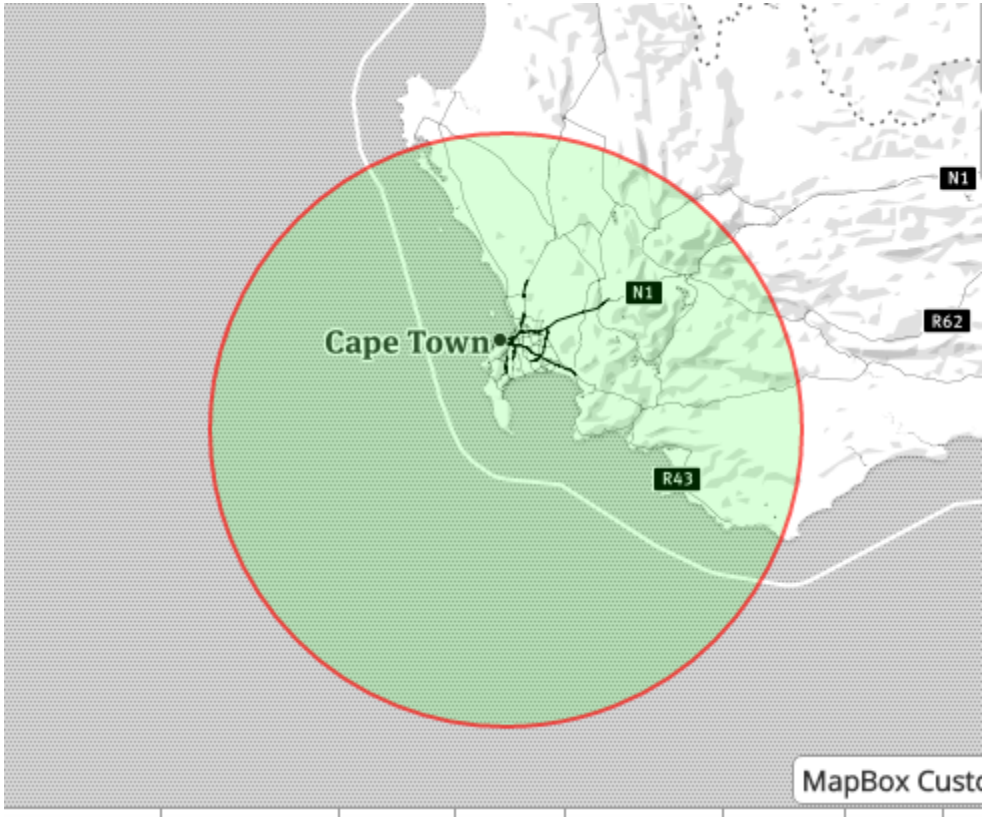
Next generation antenna technologies (patent US 8823599) allow creating mobile mesh-networks operating on HF & VHF frequencies with long range communications up to 150 km

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



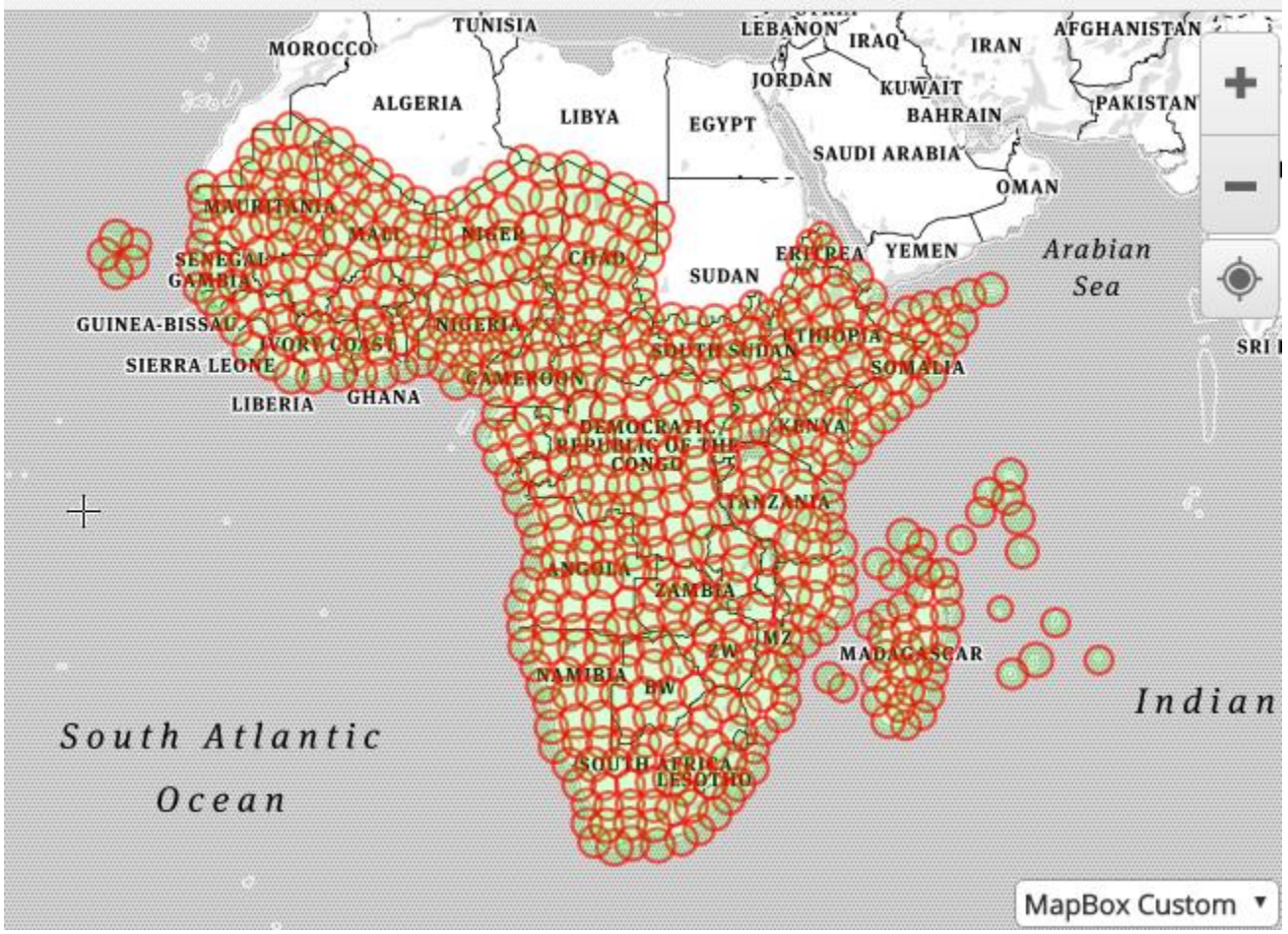
Integration of rural & maritime areas into Digital Economy

Any device – any service - anywhere

• In fact, even less than 500 HF & VHF transceivers with next generation antenna systems can cover the whole area of Sub-Saharan Africa

• The project proposes local assembling and installation on initial stage 44467 transceivers with next generation antenna systems in all countries of Sub-Saharan Africa until 2020.

• Transceivers will be installed at least each 40 km in rural areas and each 3km in metropolitan areas, so that affordable mobile services will be available absolutely everywhere



Nationwide mobile mesh-networks in Sub-Saharan Africa: on the ground, on the water surface and in the air

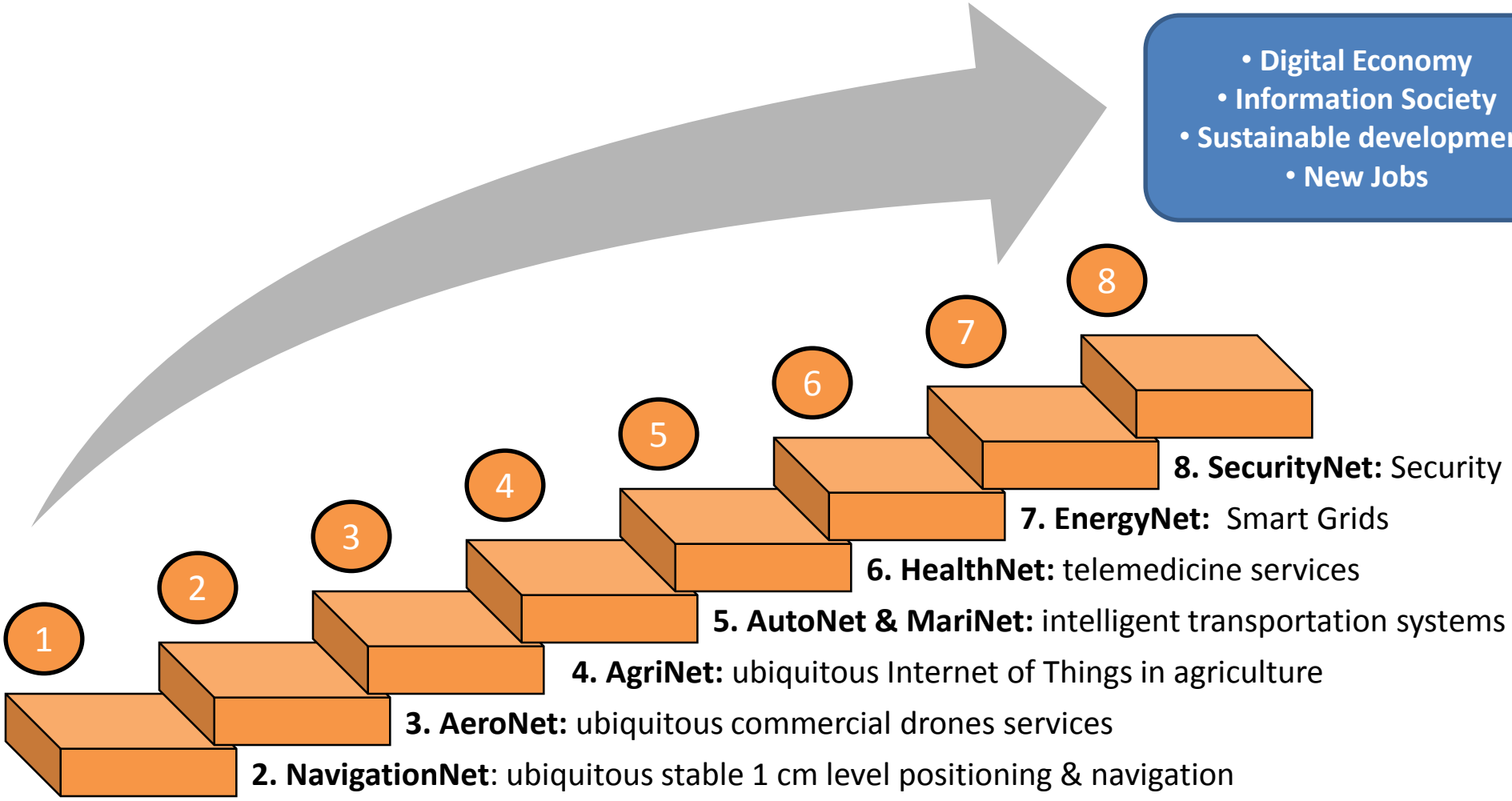
1. Ubiquitous mobile infrastructure on the ground:
On the initial stage approximately **32994** transceivers located on towers, roofs, trucks, buses, trains, etc.

2. Ubiquitous mobile infrastructure on the water surface:
On the initial stage approximately **7363** transceivers located on ships, Unmanned Surface Vehicles, islands, buoys.

3. Ubiquitous mobile infrastructure in the sky:
On the initial stage approximately **4110** commercial Unmanned Aircraft Systems (“flying base stations”)

All infrastructures will be interconnected in one single mesh-network

8 steps – 8 industries – 8 nationwide networks



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), MIMO (Multiple Input-Multiple Output)
- 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			
	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

- 3 % of telecom market
- 3% of TV advertising market
- 3 % of Radio advertising market

Total cost

$ 1251.17 M

Action Lines	Responsible	Start	End	Cost
1. Creation of a joint venture	—	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)	1st Q. 2017	4th 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	1st Q. 2017	4th Q. 2017	**$ 18 221 931,22**
4. Hiring and training of local engineers	Genesys Technologies (US)	1st Q 2017	4th Q. 2017	**$ 300 000**
5. Construction of pilot networks, 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 terrestrial infrastructure (on initial stage 32994 transceivers total, $ 30 000 each), including additional infrastructure for digital mobile TV and Radio broadcasting	Joint venture	3rd Q. 2017	4th Q. 2019	**$ 989 820 000**
7. Construction of maritime infrastructure (on initial stage 7363 transceivers total, $ 30 000 each)	Joint venture	3rd Q. 2017	4th Q. 2019	**$ 220 890 000**

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:** encryption on both software and 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

- 3% of GNSS receivers market

Total cost

$18.29 M

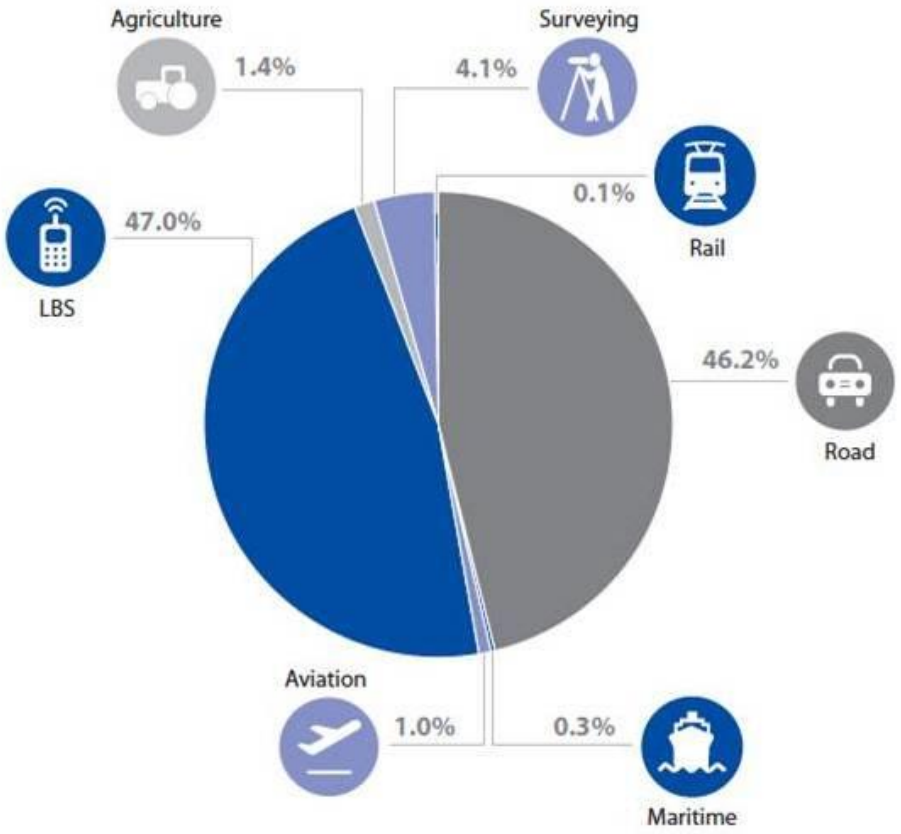
Action Lines	Responsible	Start	End	Cost
1. • Replacement of antenna systems of GNSS receivers on market (GPS, GLONASS, BEIDOU, GALILEO, LOCATA), transition of LOCATANET to VHF frequencies(174-266 MHz): • Detailed technical documentation for local assembling, certification	Genesys Technologies(US)	1st Q. 2017	4th 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)

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



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

Market results by 2020

- 3 % of commercial avionics market
- 3 % of commercial application of drone technology market

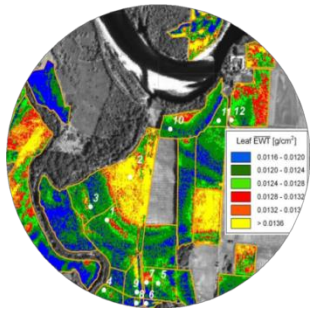
Total cost

$ 430.22 M

Action Lines	Responsible	Start	End	Cost
1. Replacement of antenna systems of VHF avionics on the market, technical documentation for local assembling, certification	Genesys Technologies(US)	1st Q 2017	4th Q 2017	**$ 18 221 931.21**
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)
3. AeroNet – nationwide networks of connected commercial drones :on the initial stage 4110 commercial Unmanned Aircraft Systems with next gen avionics, approximately $100 000 each Combing networks on the ground, on the water surface and in the air in one single smart mesh-network	Joint venture	3rd Q . 2017	4th Q 2018	**$ 411 000 000**

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

- 3 % of Precision Farming market
- 0.5 % of Agricultural machinery market

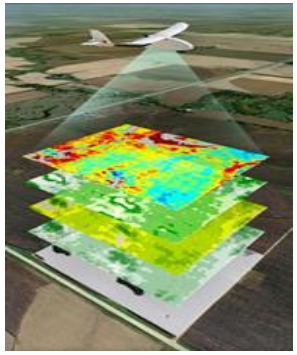
Total cost

$ 25.7 M

Action lines	Responsible	Start	End	Cost
2. Creation of «Connected Farm» applications with interfaces on local languages	Trimble(US), Genesys Technologies(US)	1st Q 2017	4th Q 2017	**$ 1000 000**
3. Creation of highly secure overlay network of Internet of Things in Agriculture in pilot region	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), Joint Venture	1st Q 2018	4th Q . 2020	**$ 20 900 000**

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

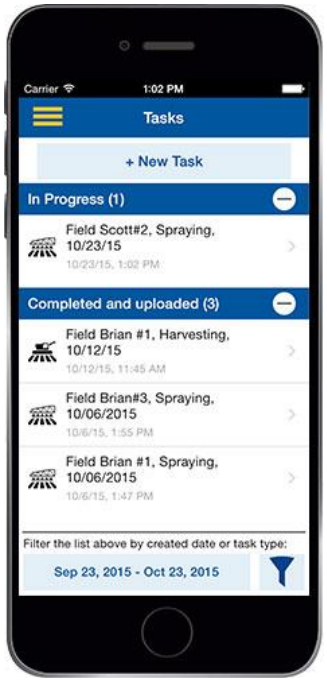
Storing agridata in the cloud + access to historical data

Online financial tools for farmers, insurance, etc.

Integration of autonomous machinery into agriculture and Remote precision farming

Step 4: AgriNet

Products and services created

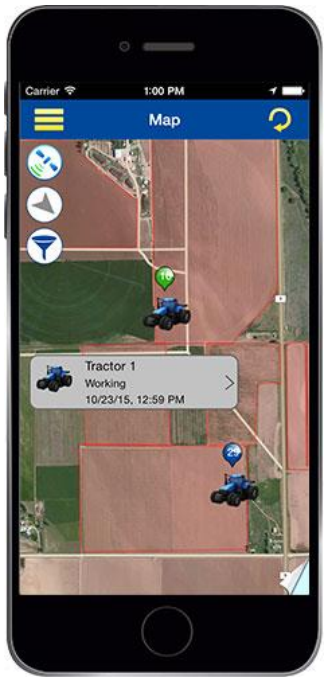


Connected Farm Field App

This app helps farmers to understand which field areas are profitable and why.

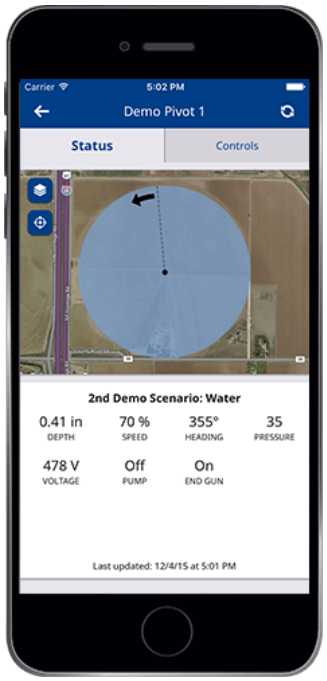
Connected Farm Scout App

- 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

- 3 % of connected car market
- 3 % of Intelligent transportation systems market
- 0.5 % of self-driving cars market
- 3 % of maritime communications market
- 3 % of maritime e-navigation market
- 3% of maritime security market
- 3% of Unmanned Surface Vehicles market

Total cost

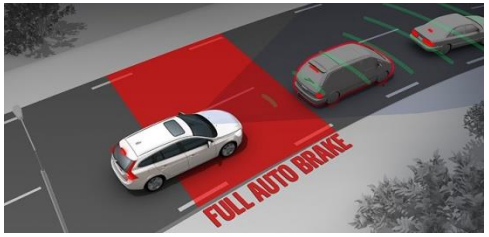
$ 25.9 M

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. in pilot region	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

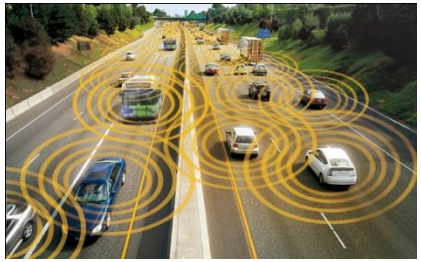


Safety & drive assistance

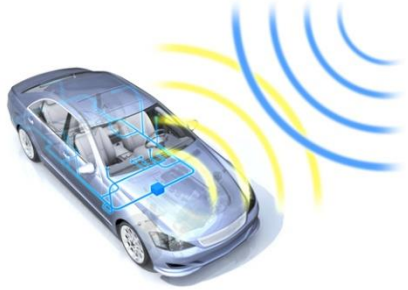
Stable navigation services

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

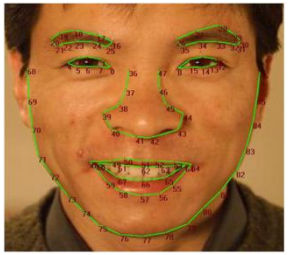
Stable mobile internet, communications & navigation even in storm weather

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 of 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

- 3 % of telemedicine market
- 3 % of healthcare wearables market

Total cost

$ 23.4 M

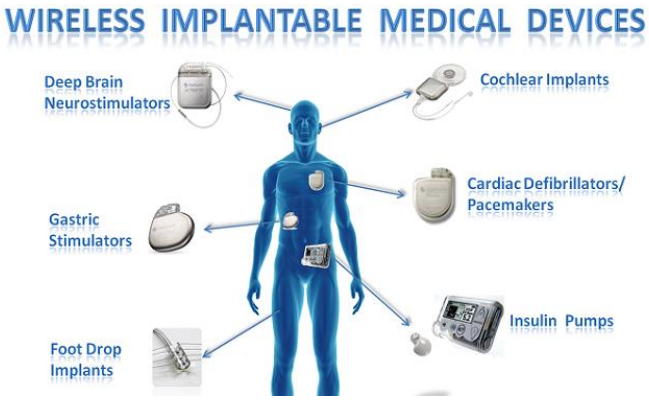
Action Lines	Responsible	Start	End	Cost
1 Replacement of antenna systems of healthcare wearables, transition to VHF bands, technical documentation for local assembling	Genesys Technologies	3rd Q. 2017	4th Q. 2018	**$ 20 900 000**
2. Creation of highly secure overlay network for telemedicine and healthcare wearables in pilot region	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	—

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 with renewable energy resources		
	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 with renewable energy resources		

Step 7. EnergyNet

Action Lines

Market results by 2020

- 3 % of Smart Grid market

Total cost

$ 23.4 M

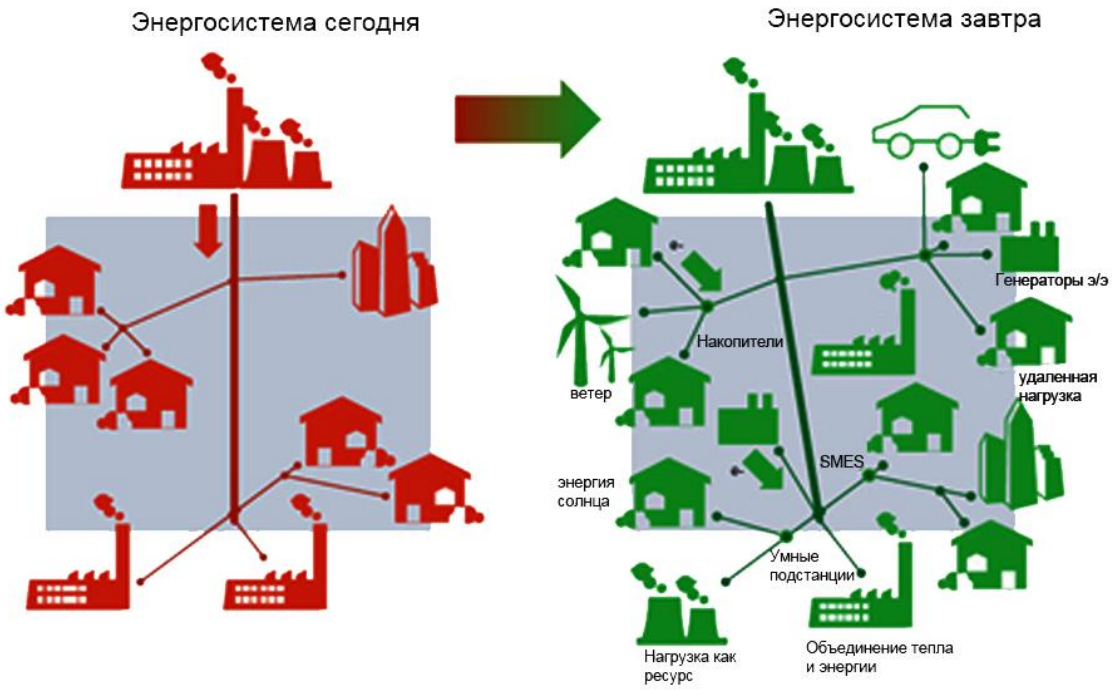
Action Lines	Responsible	Start	End	Cost
1 Replacement of antenna systems of smart grid modules on the market, transition to VHF frequencies, technical documentation for local assembling	Genesys Technologies	3rd Q. 2017	4th Q. 2018	**$ 20 900 000**
2. Creation of highly secure overlay network for SmartGrid in pilot region	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	—

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



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

- 3% of cybersecurity market
- 3% of video surveillance systems market

Total cost

$ 23.4 M

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 in pilot region	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	—

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 in one of the countries of region and exported to neighbor countries

1. VHF Transceivers: (base station transceivers)

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

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

- For creation of ubiquitous networks 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 various devices, smartmeters, surveillance systems, wearables, etc.
- Direct cost: stating from $ 32
- Export price: stating from $ 35

All transceivers consist of 2 main parts

=

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

+

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

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

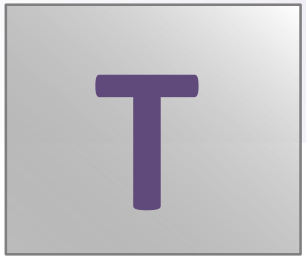
Opportunities

- **Spectrum sharing**

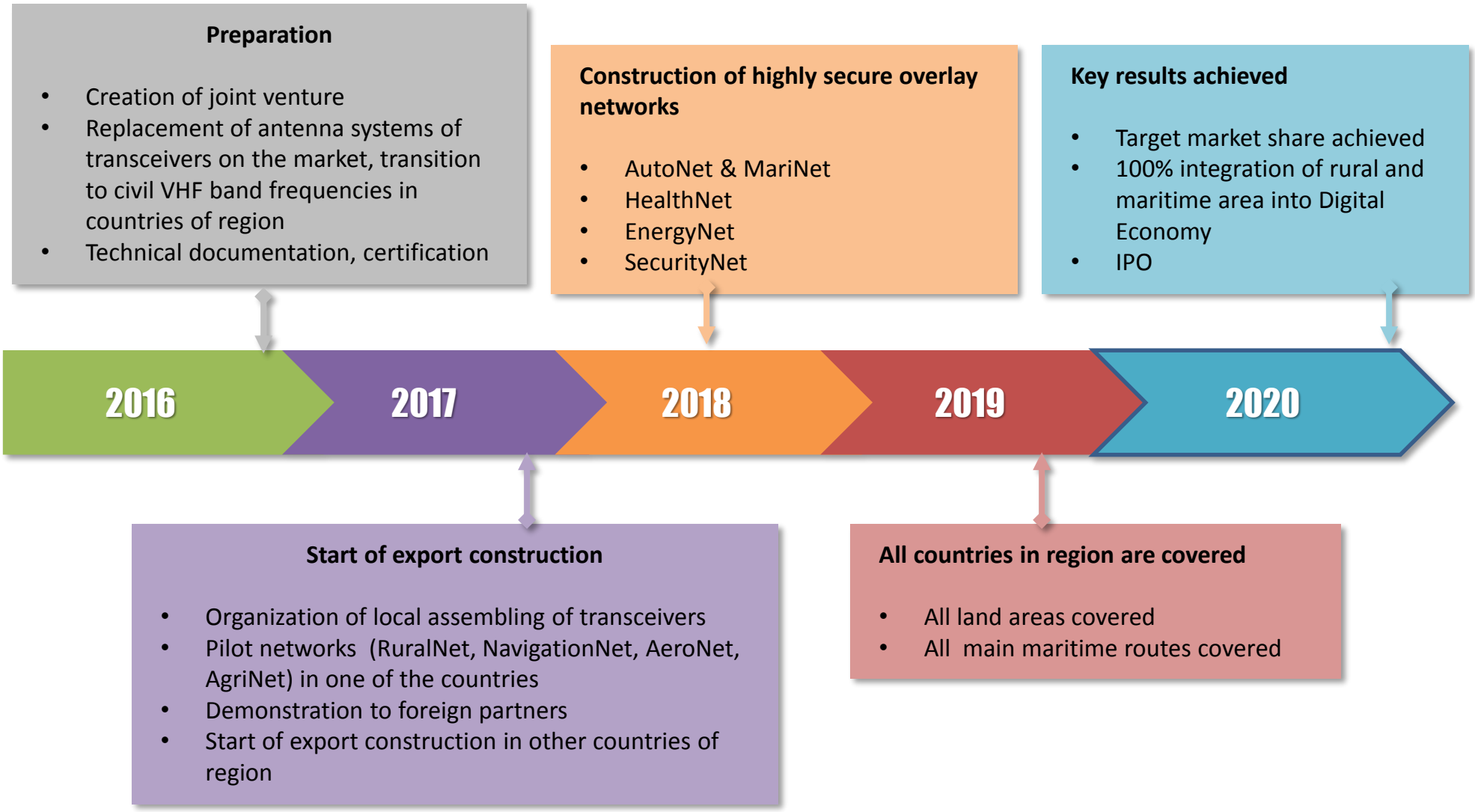
- **Cooperation with Global Connect Initiatives:**
  - Project Loon,
  - Google & Facebook Solar drones,
  - OneWeb & SpaceX LEO microsatellites

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



Milestones


Preparation
• Creation of joint venture
• Replacement of antenna systems of transceivers on the market, transition to civil VHF band frequencies in countries of region
• Technical documentation, certification
Construction of highly secure overlay networks
• AutoNet & MariNet
• HealthNet
• EnergyNet
• SecurityNet
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 construction
• Organization of local assembling of transceivers
• Pilot networks (RuralNet, NavigationNet, AeroNet, AgriNet) in one of the countries
• Demonstration to 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

Project costs (organization of local assembling of transceivers)

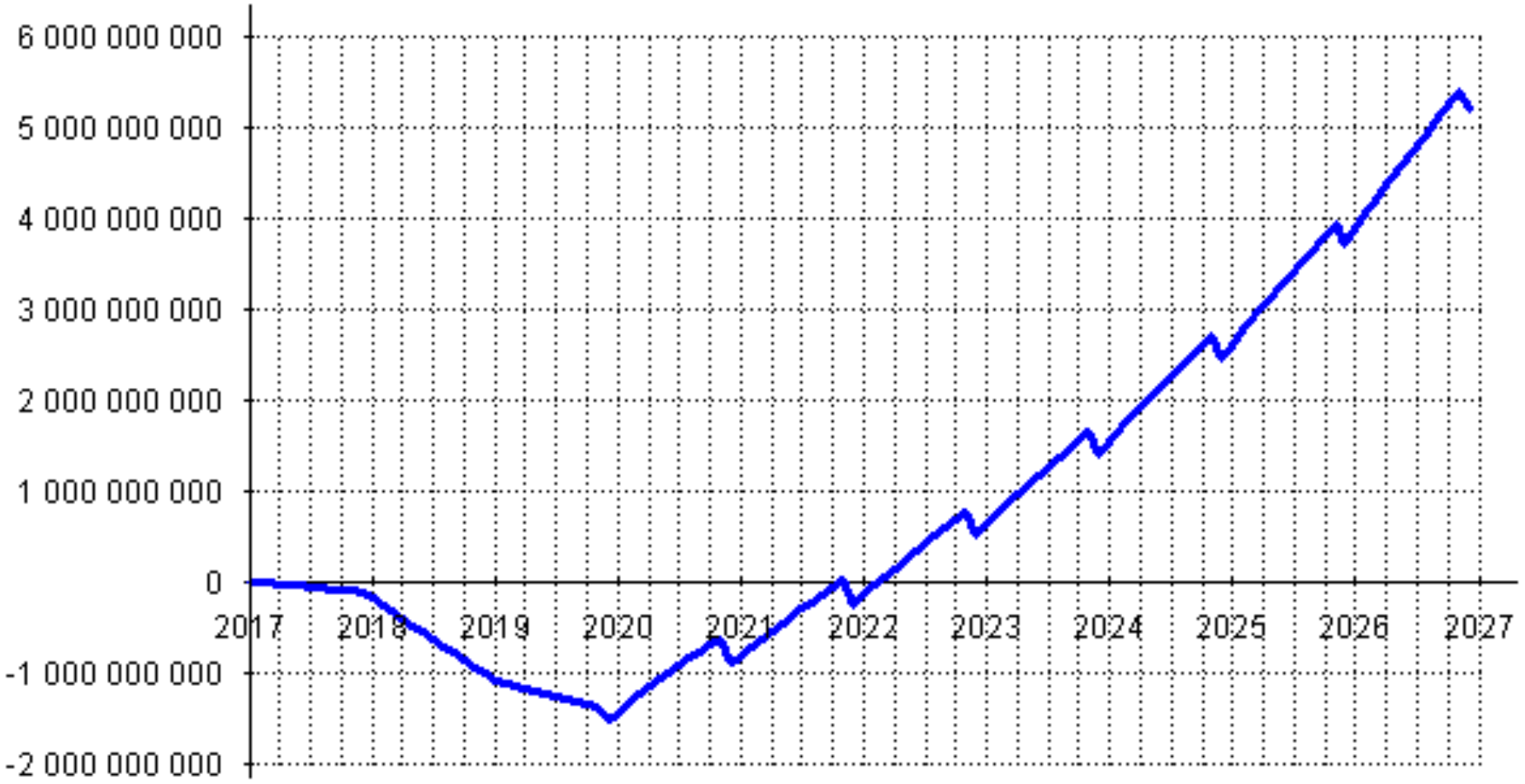
Project stages	Duration	Start date	Finish date	Cost
Step 1. RuralNet - VHF mobile internet transceivers (IEEE 802.22 standard): replacement of antenna systems of 802.22 transceivers on the market, transition to civil VHF frequency bands in countries of region, detailed technical documentation for local assembling, certification.	365	01.01.2017	31.12.2017	$ 20 940 388.88
Step 1. RuralNet - VHF digital TV & Radio transceivers: replacement of antenna systems of 802.22 transceivers on the market, transition to civil VHF frequency bands in countries of region, detailed technical documentation for local assembling, certification.	365	01.01.2017	31.12.2017	$ 18 221 931.22
Step 2. NavigationNet - GNSS (Navigation): replacement of antenna systems of GPS, GLONASS, BEIDOU, GALIELO, BEIDOU, LOCATA receivers on the market, transition to civil VHF frequency bands in countries of region, detailed technical documentation for local assembling, certification.	365	01.01.2017	31.12.2017	$ 18 221 931.21
Step 3. AeroNet - VHF Avionics: replacement of antenna systems of VHF avionics on the market, transition to civil VHF frequency bands in countries of region, detailed technical documentation for local assembling, certification.	365	01.01.2017	31.12.2017	$ 18 221 931.22
Step 4. AgriNet: creation of «Connected Farm» applications with interfaces on local languages.	365	01.01.2017	31.12.2017	$ 1 000 000.00
Training of local engineers.	180	01.07.2017	27.12.2017	$ 300 000.00
Construction of pilot networks in one of the countries (RuralNet, NavigationNet, AeroNet, AgriNet), demonstration to foreign partners.	90	01.10.2017	29.12.2017	$ 1 000 000.00
Total				**$ 76 906 182.52**

Project costs (construction of networks in all Sub-Saharan Africa countries)

List of countries: Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Cape Verde, Central African Republic, Chad, Comoros, Republic of Congo, Cote d'Ivore, Democratic Republic of Congo, Equatorial Guinea, Eritrea, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mozambique, Namibia, Niger, Nigeria, Rwanda, Sao Tome and Principe, Senegal, Seychelles, Sierra Leone, Somalia, South Africa, Swaziland, Togo, Uganda, United Republic of Tanzania, Zambia, Zimbabwe

Project stages	Duration	Start date	Finish date	Cost
Feasibility stage	365	01.01.2017	31.12.2017	$ 90 000 000
Terrestrial infrastructure (on initial stage 32994 transceivers total, $ 30 000 each)	730	01.01.2018	31.12.2019	$ 989 820 000
Maritime infrastructure (on initial stage 7363 transceivers total, $ 30 000 each)	730	01.01.2018	31.12.2019	$ 220 890 000
Aerial infrastructure (on initial stage 4110 commercial unmanned aircraft systems total, approximately $ 100 000 each)	730	01.01.2018	31.12.2019	$ 411 000 000
TOTAL				**$ 1 711 710 000**

Project payback period



Key results

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

New markets and nationwide services

New jobs and specialties, including young people with disabilities

Increase of GDP

United Nations

Sustainable Development

About us

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

Over the years we are working with and actively consulting:

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