

# Global Next Generation Satellite Communication System



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# Principal provisions

*Technological revolution in the field of satellite communication systems and high-speed Internet*

According to statistics already conducted by ICO, no more than 12% of Web sites visitors study White Paper. For this reason, within a few minutes of reading, we will provide important information that we want to convey to our potential customer!

International Sky Group Company (ISG) presents Satellite Communication System (SCS) with high-speed broadband access to Internet, which is more superior to analogues. The system is developed based on low-orbit, mobile, small-size satellite constellation.

*Brand new created ISG SCS is the answer to the current challenges of today. It has no alternative – it opposes the existing.*

This is the only system, combined with high speed of data transmission, functionality, reliability, security and economy. Unprecedented intersatellite and interorbital communication is able to provide broadband access to Internet, high-speed multimedia communication with subscribers located anywhere in the world. This system is not comparable to any other SCS in the world.

An own, fundamentally new "product" – which is not a copy of another technology.

## What will be different after execution of the project?

In case of global organization of communications, ISG SCS will meet all the needs and will open new opportunities in the field of education, medicine, science, industry, business for an unlimited number of users in ground segment.



On board of a modern airliner, you will be able to communicate through voice or video communication with your colleagues or friends flying in another aircraft. You can send and receive messages, including video, watch movies and TV shows online. These opportunities will become regular to everyone!

 When using satellite communication devices, there is an unbreakable rule which states that it is necessary to see the sky! With ISG technology, you will be able to use satellite communication services even indoor!

 Outside the city, district, region or country: do not think about roaming problems, multimedia communications availability, Internet and e-mail! These services will also be available to you.

## Existing capacity:

- Ready to use technological and physical solution;
- A platform for SV (Space vehicle) was developed, prototypes were built;
- More than 100 ground tests (experiments) were conducted, the results of which are stored on hard data mediums, and documented by authoritative, profile organizations of the country;
- Elements of technical platform of space vehicle are implemented and successfully used in working communication systems for various purposes;
- Ready-made "product" for implementation.

## Main functional capabilities:

 Telephony;

 Digital TV;

 Payment systems;

 SV is equipped with a navigation signal processing system GPS/GLONASS, as well as its own navigation system, with a resolution power of up to 50 cm;

 Meteolocation;

 Emergency Tracking function (Emergency situations)

## Technological advantages:

- ☑ 100 % coverage of the Earth's information surface;
- ☑ "Long-liver satellite", with the function of reusable re-programming during operation, with the weight up to 400 kg;
- ☑ (ASL) - Active shelf life is not less than 15 years;
- ☑ Active shelf life of the engine, with control system on APPWPTL (ablation plasma propulsion with pulsed transmission line), is 18 years;
- ☑ ORC (Onboard Radio Complex) will operate in S, Ku, Ka frequency bands, communicating with ground and sub-satellite transmitters;
- ☑ The time ORC will connect subscriber to SV is not more than 76 microseconds and will hold the signal, with Doppler frequency shift of 4000 Hz / s;
- ☑ Throughput capacity of a single SV is 12.152 Gbps;
- ☑ High-speed multimedia communication, providing data transfer rate of up to 12 Mbps per one subscriber, with a potential development reserve;
- ☑ Direct contact of subscriber terminal with SV – the system does not provide ground repeaters or switches;
- ☑ An absolutely new protocol for receiving and transmitting information was developed and tested, not providing a synchronizing signal accompanying the data stream. This factor provides highly stable and very accurate reception and transmission of the information;
- ☑ Asynchronous communication. For initial and periodic adjustment, a long-term preamble is not required. Reception is feasible even at a signal of an unknown form;



- ☑ Stable voice and multimedia communication for air subscribers, without expensive access points, as well as for users traveling at speeds of up to 12,000 km / h;
- ☑ Due to a synchronized signal absence used in other wireless communication systems and information transfer, it significantly reduces the radio frequency background, which will positively affect the reduction of RF load on people and the environment!
- ☑ The whole world without roaming;
- ☑ Satellite communication for the price of a mobile one;
- ☑ Stable communication for subscribers is universal. SCS configuration can be dynamically reconstructed to compensate local overloads to subscriber traffic;
- ☑ SCS will continue to function even if a part of SV fails.

## Introduction

Among the knowledge-based industries, a special place is occupied by the industry for production and processing of information. If the XIX century was called the century of steam and steel, and the XX- the century of machines, then XXI with good reason can be called the century of formation of a global information society, the technological basis of which will be a global information infrastructure.

Many countries build their future based on development of information and communication technologies. To date, the global trends of telecommunications industry as a whole, affecting the development of satellite communications are:



**Increasing demand** for space communications services in the world, despite the economic crisis that began in 2008;



**Growth of subscriber** base in Eastern Europe countries, CIS, Asia and South America, increase in demand for TV services and content services;



A sharp **traffic increase** in data connection networks caused by the Internet technologies development.

Despite considerable progress in different fields of telecommunications, many challenges remain for global penetration of voice and Internet technologies. For example, mobile communication is not everywhere, and in many places where it is present, it is complex and expensive. Roaming is expensive and not completely reliable for a large number of customers at the same time; Shut downs and interruptions in service are common today. Many places outside the urban spaces are labeled as the 'dead zone', and even within the cities, there are places not covered by mobile signal.

In addition to technical problems, the main barrier that prevents wide use of modern communication services is economic.

According to world statistics, only 40% of the world's population is online. The reason for this is the lack of access to technology, in the places where they live, and the lack of sufficient income to afford to use mobile services.

For example, in developing countries, the cost of broadband services is equal to the monthly salary, whereas in developed countries is only 1.5% of the typical monthly salary.

"Online world" appearance without uncovered territories will become revolutionary for the world development and economy. A research by the World Bank estimated that a 10% increase in broadband penetration would generate GDP growth by 1.21% in developed countries and 1.38% in developing ones.

Just imagine a world without roaming, "dead zones", antenna towers, and no distinction between urban markets and rural and isolated geographic areas. This would mean that the excluded 60% of the population would have a considerably cheaper access to mobile communications and broadband internet, thus joining the part of global economy.

*According to projection data of Cisco:*

*«The volume of IP traffic in 2015-2020 will grow by an average of 22% per year, and the average data transfer rate and Internet access will double. The share of traffic generated by smartphones will exceed the share of personal computers by 2020».*

## Challenges of our age

The main challenge in sphere of communication is continuous improvement of the quality of services for existing and new users. ISG technology will solve these, and many other challenges facing the satellite communications industry.

For project implementation, ISG will conduct a Token Generation Event (TGE), aka Initial Coin Offering (ICO). As it will be explained further in this whitepaper, ISG provides a unique opportunity for everyone to become a part of the world technological revolution and to receive investment income.

The rest of this whitepaper will be structured as follows:

-  ***At first***, the current situation of the satellite communications market will be disclosed, as well as, problems and development trends are being considered.
-  ***Then***, there will be a description of the ISG project value proposition, cost of the project, business model and technological basis.
-  ***Afterwards***, the Token Generation Event (TGE) process will be described in detail.

In conclusion, an international team of professionals with extensive experience in telecommunications, information technology and business will be presented.

# Global market of satellite communication services

## Growth trends of multimedia communications market

The last decade has been a time of challenges for many industries. However, mobile and satellite communications markets showed growth.

The price per share of Iridium Communications Inc., Orbcomm Inc., Inmarsat Inc., ViaSat Inc. and Globalstar Inc., increased 67.3% on average from 2012 to 2014, with the later showing a dramatic market cap growth of 950%.

A 2017 report by the Broadband Commission, a joint initiative of the International Telecommunications Union (ITU) and UNESCO (“The State of Broadband report”) determined the growing trend of number of people with access to mobile communications and broadband Internet connection.

Growth in the number of mobile subscribers worldwide was 56% (from 3.2bn in 2010 to 5bn in 2018), while the increase in the number of Internet users reached 80% (from 1.99bn in 2010 to 3.58bn in 2018).

The EU investments in ICT infrastructure (Information and Communication Technologies) until 2020, should make a record of 1.5 - 2.0 trillion Euro.

In recent years, interest in the Internet of things (IoT) has steadily increased. Today, the seemingly endless potential of this market is increasingly acquiring the features of reality.

According to a new IDC study, a transformation is taking place in the world market, as a result of which the costs for IoT solutions will grow to 7.1 trillion dollars in 2020.

By 2020, IoT-clouds will add to the world economy 14.2 trillion dollars. The cumulative average annual growth of the industrial Internet of things market in the world is expected to be 7.3%.

According to MarketsandMarkets, the leading directions of the markets will be: smart cities (26%), industrial IoT (24%), healthcare (20%), smart houses (14%), cars (7%), smart utilities (4%) and wearable devices (3%).

According to Cisco report:

**«Mega Internet will generate \$ 19 trillion.**

*Geographical boundaries will be dissolved, and people from different corners of the earth will be able to work on projects online in the same productive way as in reality.*

*By 2025, "Internet of everything" will include 100 billion connected devices, this will lead to the creation of a trillion-sensor economy, with which the information revolution will transcend the boundaries of our imagination».*

## Connecting people to “broadband economy”

As it can be seen at the diagram, while in Europe, CIS and America, most people have access to the Internet, the situation in the rest of the world is reversed, with only one fifth of the African population having access to a “broadband economy”.

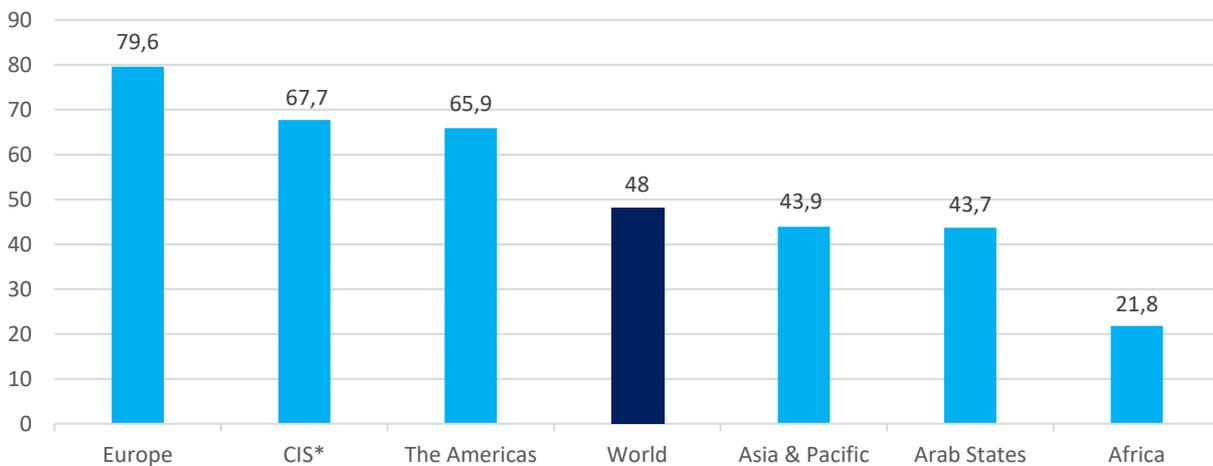


Figure 1. Internet penetration in 2017  
Source: The State of Broadband report, p. 12

The positive side is the remaining potential for growth in the mobile market, Internet access and the “broadband economy” - especially in a progressive world.

One way to increase global penetration of services is the use of submarine fiber-optic communication lines (FOCL), one example of which is an underwater fiber-optic cable laid in the Atlantic Ocean with a total length of more than 4100 miles by Microsoft and Facebook in 2017. Underwater fiber optic cables, however, cannot solve the internet accessibility problem in many geographic areas. The only feasible solution for a truly connected world is telecommunication satellites.

# Value of ISG Proposal

## Economic efficiency of low-Earth orbit satellites

The ability of corporations providing communications to respond quickly to changing market conditions, high speed of investments turnover, high level of profitability, make provision of information and communication services as one of the most important income sources in the world. Taking into account the published plans of a number of well-known companies entering the market of satellite communication services, and investing tens of billions dollars in projects to bring out hundreds and thousands of small satellites:

*"By 2020, it can be expected that this year will be a year of massive launches of huge constellations of small communication satellites".*

The segment of “small communication satellites” with a mass of less than 500 kg is distinguished by a significantly lower development and launch cost than traditional ones, and they allow creating sufficient space constellation in a short period of time.

Low-Earth orbit satellites have number of advantages in use. The main advantage, however, is the possibility of 100% coverage of the earth's surface, without "dead zones". Low-Earth orbit satellites are the best solution for people living in inaccessible areas, or those for whom these services are a luxury, because of their high cost.

In addition, as mentioned earlier, the emergence of new mobile telecommunication technologies, such as 5G, is costly to deploy successfully.

Growth is limited only by the technical capabilities of satellite constellations. According to experts, the emergence of satellite communication systems, allowing increasing the data transmission rate

to 5-10 Mbps, will significantly change the structure of financial flows towards satellite communications to \$ 2.0 trillion.

Planned time for obtaining the above technical parameters is 2025.

Leading orbit satellite companies with SV are Iridium Communications Inc. with 66 satellites, Globalstar Inc. with 48 satellites and Orbcomm Inc. with 32 satellites. None of these satellite companies have 100% coverage of the information surface of the earth.

During 1 year, from May 8, 2017 to May 8, 2018, Iridium had an 11% growth in stock price (10.55 to 11.70 USD), Global-star had a steep 68% decline (1.96 to 0.61 USD), and Orbcomm experienced several peaks and drops but finished with a slight decline of 3.6% (9.74 to 9.69 USD).



Figure 2. Share in stock value of the leading satellite companies LEO for the last year. Source: Google Finance

The proposed SCS ISG of a new generation is nothing else than a new interactive environment that can integrate with the existing one, but also function independently!

The new system will be created based on low-Earth orbit satellite constellations, with high-speed information transfer to its consumers.

A system of 98 satellites in low-Earth orbit will provide 100% coverage of the information surface of the ground, significantly reducing costs and significantly increasing the availability of the services offered.

ISG network will offer significant advantages over current satellite communication systems. Data transmission will occur at speeds up to 12 Mbps for one subscriber, vs 2 Mbps, of the maximum forecast of the leading companies of the world, in 2021.

## ***There are no analogues in the world!***

Reception and information transfer will occur using phase-code-manipulated signals, without any signs of dividing the information in the data array.

The time required to connect subscriber device to space vehicle is not more than 76 microseconds, instead of current time up to 10 seconds.

If the communication is lost, recovery will be almost immediate.

Further improvement of technical parameters will significantly change the communication system that we are familiar with, switching the vector towards the space systems of information transfer, which will allow realizing the most ambitious projects in this area.

Several arguments in favor of achieving the objectives set by ISG team:



### **Scientific base**

The project is based on science - mathematics and physics. Studies and experiments have allowed achieving the results outstripped its time.

Some of the brightest profile scientists are the pioneers of the development of this revolutionary technology.



### **Timeliness and relevance**

The satellite constellation that ISG network shall put into orbit, comes at a time where there is still huge potential for market growth, and the new technologies being introduced by mobile operators, like 5G, require strong infrastructure support from satellites.



### **Globality**

100% coverage of information surface of the Earth!



### **Economic expediency and efficiency**

The proposed global ISG SCS will significantly improve the quality and parameters of the existing info communication environment.

As the world becomes more globalized, data analytics is increasingly used, and consumers are more demanding, communication is essential for business success.

The proposed SCS is an undeniable value for users.

The costs for the creation of a global brand new ISG SCS are not comparable with the world market of communications: Internet services, Internet of things - estimated by analysts as a rapidly developing, specific market today amounts to several trillion US dollars.

## Equipment and services

Besides the 98 LEO SCS, ISG will offer ordinary subscriber terminals, not exceeding the size of modern smartphones.

SCS will provide several services to corporate customers: navigation systems for marine, road, rail and aviation industries, as well as high-speed multimedia communication for individuals without roaming, for the price of a regular mobile plan.

## ISG system as a growth factor of "broadband economy"

ISG SCS will provide a significant increase in capacity on a global scale and will create additional value for the global economy.

In particular, this will provide access to multimedia communication services and will increase throughput capacity of the proposed types of communication for hard-to-reach regions of the world where no alternative is available.

## Increased security

*ISG technology will ensure blockchain functions, while preserving the confidentiality of information!*

Over the past few years, data protection has become one of the main and discussed issues. Public scandals, such as listening of policy makers by intelligence agencies, or an unauthorized use of personal information, have forced millions of people to understand how vulnerable they are ahead of threat of invasion to their private life.

Our ISG SCS will be different. It meets the highest security standards. The used technology of wireless data transmission cannot be influenced by the third party! The personal code provided by the company is an additional level of protection. The system will protect all user data and connections without exception.

## Electromagnetic compatibility (EMC) of SCS

The performed works on modeling and calculations show the possibility of SCS operation in various real operating conditions. While modeling and calculations, factors and a number of parameters are taken into account:

- ☑ application of power adjustment;
- ☑ multiple nature of the interference;
- ☑ selectivity of antennas;
- ☑ maximum excess of protection criterion (signal-to-noise ratio).

## Ecological component of the project

Due to the absence of a synchronized signal, the exposure of radio-frequency background to people and the environment is significantly lower than from other wireless communication systems and information transmission!

# Project plan & business model

## Project plan

ISG plans to present three extended projects. The adopted ISG approach is thoughtful and cautious, given the size, importance and expected effect when the project is launched. The proposed SCS has every reason to become the most advanced in LEO, surpassing all existing technologies, in many ways.

The implementation of the project will take several years.

### Q2 2019

The implementation of the space experiment: the production of satellites, launch and adaptation in real space conditions. This phase will take from 18 to 24 months.

### Q2 2021

Systematic deployment of the system, within the next 2-3 years, will occur as part of the creation of joint ventures with developed countries. The coverage of the information space of their territories will be the beginning of a gradual launch of the ISG satellite system into commercial exploitation.

### Q2 2023/2024

Large-scale commercial operation launching procedures of the ISG satellites system, start of the services provision and sales.



## 1 stage

Preparation and implementation of space experiment (SE), for adaptation of 4 SV in given orbits, including: production of SV, launch, and direct adaptation in real space conditions. This phase will take from 18 to 24 months.

*Please note:*

All stages of ground tests are conducted successfully, according to Technology readiness levels (TRL), which is generally accepted in space industry methodology and show a high degree of technology availability.

## 2 stage

In strategic development plan, it is the provision of "final product" to large states, and the creation of joint ventures with them. Covering the information space of large territories will be the beginning of a phased withdrawal of ISG SCS to operation. The attracted funds, within the framework of the JV creation, will also be directed to a consistent large-scale deployment of the system within the next 2-3 years. Step-by-step information on the implementation of the strategic development plan will be provided at our website.

*Please note:*

ISG technology group is in a continuous process of research works. The results of the work carried out give us the right to believe that the parameters stated by us may not be limiting. The results of ongoing work will be reflected on our website with frequency.

## 3 stage

The launch of ISG SCS in large-scale commercial operation is the beginning of services provision and its sale.

## Go-to-market strategy



For the introduction of ISG network satellite services to the global communications market, a B2B strategy will be followed.



The project provides a satellite constellation, composed of 98 low orbit satellites (SV). There will be 7 solar-synchronous near-polar orbits, with 14 satellites in each orbit.

 The coverage and maintenance area of one SV represents a circle with a diameter of 5,901 km.

 The control of satellites constellation will be exercised through control centers in stationary and mobile execution.

***The developed visualization system will allow:***

- To manage, monitor and analyze the condition of all components of SV and the constellation as a whole;
- To monitor and respond to various situations when the SV is operating in real time.

Subscribers of network will be capable of using both individual means of communication, and means for collective access.

Subscriber terminals can simultaneously connect with the ground stations of mobile network operators.

Service centers and ISG support centers will provide services both through authorized partners and through the company's own branches.

# Monetization

***Monetization of ISG SCS would be realized through three main revenue sources:***

- Revenues from services provided to other telecom operators;
- Legal entities and individuals;
- State organizations and commercial structures.

The flexible development strategy of ISG includes B2B business model, and is also designed for the growing evolutionary changes in the industry.

## Use of tokens in future

As has been already explained earlier, ISG system enables millions of people to become a part of "broadband economy".

In future, ISG will conduct a Token Generation Event (TGE) of crypto-currency, which will be used in ISG system, to pay for the services provided, and also as a means of payment for various goods and services.

It is planned that this cryptocurrency will be based on ERC-20 or other similar standard, and would be available at the stage of launching the SCS in commercial operation.

# Technological parameters of one SV

Throughput capacity - 12.152 Gbps, with a development reserve;

- ☑ S-band (for working with subscribers) 5.446 Gbps;
- ☑ Ka-band (inter-satellite communication) of 456 Mbps;
- ☑ Ku-band (for receiving and transmitting information to gateways) 6.706 Gbps.

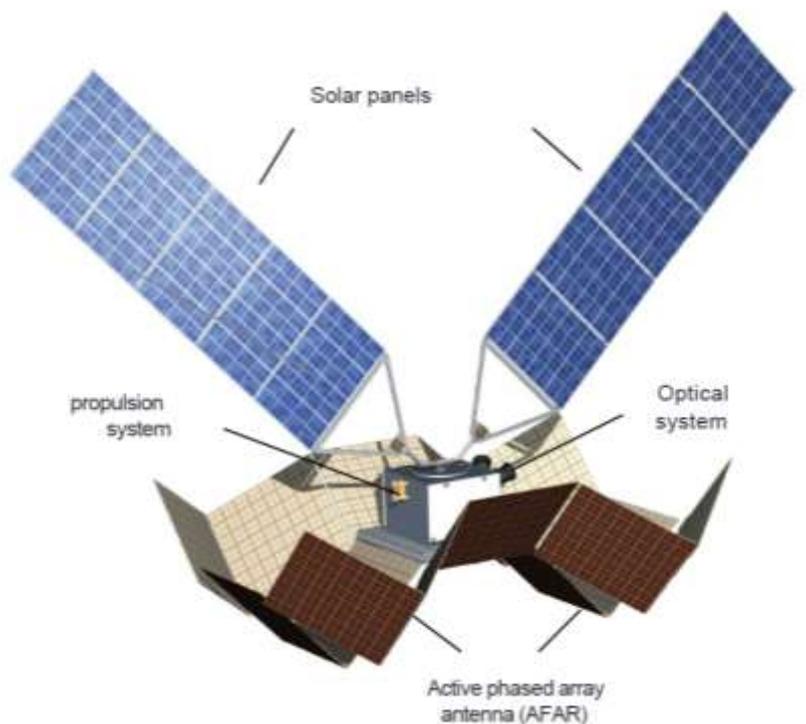


Figure 4. Illustration of SV satellite model.

## Comparison chart

Comparative analysis with competitors:

	Coverage	Markets	Data transfer rate	Forecast 2021
<b>ISG</b>	Global, including poles	Mobile networks, aero and marine transport, government, M2M, IoT, etc.	12 Mbps	76 Mbps
<b>Inmarsat</b>	50%	Mobile networks, aero and marine transport, government, M2M, IoT, etc.	> 700 Kbps	> 2 Mbps.
<b>Iridium</b>	50%	Mobile networks, marine transport, government, M2M, IoT, etc.	256 Kbps	1.4 Mbps
<b>Thuraya</b>	Regional (EMEA, ASIA)	Marine transport, government.	492 Kbps	No data
<b>Orbcomm</b>	Global	M2M	4.8 Kbps	9.6 Kbps
<b>Globalstar</b>	Multiregional (NA, SA, EMEA, ASIA)	HH, M2M	64 Kbps	256 Kbps

## Testing of technology

The work was carried out in three stages:

### 1 stage

The first stage included tests of the radio part of SCS RTD (receiving and transmitting device) intended for operation in on-board radio complex with reception and transmission of phase-code-manipulated signals, with automatic compensation of Doppler frequencies and with symbolic synchronization in S frequency range.



On the practically executed stand, the possibility of receiving and transmitting information at speeds up to 12 Mbps is experimentally confirmed. At this speed, a single error per bit is  $*10^{-9}$ . The signal-to-noise ratio is 18.02 dB.

## 2 stage

- ☑ Complex tests of 2 (two) APAA curtains of S band with a size of 1200 × 1200 mm;
- ☑ Tests of mobile terminal (telephone) of S band in the laboratory.

APAA tests were carried out in an anechoic shielded chamber. During APAA tests, it was successfully performed:

- ☑ Phasing of APAA elements - adjustment of in-phase radiation of the transmit-receive modules (TRM). Correction of TRM stage was carried out using the system of phase shifters and APAA software of our own design;
- ☑ Receiving and transmitting information data arrays of different duration (color photographs, video message with the accompanying audio stream).

## 3 stage

Tests of mobile terminal (the phone of the usual geometric dimensions), which confirmed the possibility of receiving and transmitting information data arrays of different lengths (color photographs, video message with the accompanying audio stream), as well as through APAA.

Own operating system (OS) of real-time was developed, which is compatible with OS Android, for integration with modern applications.

# Token Generating Event (TGE)

## ISG use tokens

According to CoinSchedule data, the volume of funds raised under the ICO has been more than \$9 billion since the beginning of 2018, whereas for the whole of 2017, it was less than \$4 billion.

Among the factors that have made this method of finance very popular, there is an enormous success of Ethereum as a blockchain platform supporting smart contracts, and the increasing capitalization of Bitcoin, despite a sharp drop in its value at the beginning of the year.

"Use Tokens" are digital assets intended to be exchanged for goods and services provided by Emitter Company. This has become one of the innovative ways to attract financing for new companies

around the world. Users of services offered by the company in Token Generation Event (TGE) can pre-purchase tokens on terms that are more favorable. As explained in more detail in section "Use tokens", the goal of ISG token is: to make payment for services more convenient for customers, without restrictions connected with the use of fiat currencies, and to receive a discount.

## Token issuance

ISG token is released on Ethereum platform, using the ERC-20 standard, which is supported by most crypto-purses.

The face value of each ISG token is to be defined in relation to US dollars (USD), at a parity rate of 1 ISG token per 1 USD.

During Pre-sale stage "Friends & Strategic buyers", token sale shall be exclusively directed at people, companies and organizations chosen by ISG team. Pre-Sale period will last 3 months, and it will be open to accredited investors.

Finally, TGE crowdsale will last 3 additional months and shall be open to all customers, for a minimum amount equivalent of \$100.

TGE hard-cap will be \$150 millions, and the soft-cap will be \$30 millions. If minimum number of soft-cap tokens is not sold during at the end of all TGE stages, the funds shall be returned to customers.

## Discounts and special conditions

Throughout TGE pre-sale and during the first two weeks, ISG tokens will be offered at a discount rate, in the way shown in the following table:

<b>First month</b>	50%	<b>Pre-Sale</b>
<b>Second month</b>	35%	
<b>Third month</b>	20%	
<b>First and second weeks</b>	10%	<b>Crowdsale</b>
<b>Third and fourth weeks</b>	5%	
<b>Rest of crowdsale</b>	Face value	

Table 3. Discounts table

This way, the early accredited customers shall benefit from discounted prices of ISG token.

Additionally, customers that acquire a minimum of \$5 million will be offered the opportunity to be present at a demonstration of experiment in laboratory conditions close to space ones. The timetable for the demonstration of the experiment will be formed during TGE stages, and will be announced later.

For customers admitted to demonstration experiment, an e-mail will be sent, in order to inform about the approved schedule.

## Token rights

The main function of ISG tokens will be payment for satellite services offered by ISG.

The truth is that to date millions of people around the world do not have access to basic banking services, such as: deposit and credit payment cards, bank accounts and transfers, etc. This, in turn, affects the availability of telecommunications services. In the past few years, the spread of financial services has been growing along with the penetration rates of Internet.

With creation of ISG SCS, where the issued ISG token will be used as payment for communication services, not only quality communication will appear in every corner of the world, but there will be also access to a reliable and secure payment system based on blockchain technology. ISG tokens are provided as a means of payment for individual and corporate customers.

After ICO holding, it is planned to list ISG tokens on cryptocurrency exchanges. Issued ISG tokens are not intended to be used as an investment instrument and do not give their owners the right to vote, receive dividends and / or share ownership.

This document is not a prospectus for the issue of securities, investment or any other proposal related to attracting investments in the jurisdiction of ISG registration.

## Token distribution & funds allocation

Token distribution & funds allocation shall be as described in figures 4 and 5.



Figure 4. Token allocation



Figure 5. Cost

## ISG blockchain

In addition to ISG token issuing, during ICO period, it is planned to create its own ISG blockchain to ensure transactions within ISG network. Within ISG blockchain network, it is planned to create two types of tokens: ISGVALIDATOR (ISGV) and ISGSERVICE (ISGS). The owners of ISGV tokens become validators of ISG blockchain network and will receive remuneration in ISGS tokens. ISGS tokens will be used to pay for ISG communication services and for any other transactions, similar to existing bitcoin blockchain systems, etc. Released ISG tokens will be converted to ISGV tokens at a rate of 1:1. The need to create its own ISG blockchain is related to the expected high load on ISG network and the requirements for speed of payments.

ISGV tokens will be listed on cryptocurrency exchanges. ISGS tokens are planned to become available for purchasing through special on-line services provided by ISG.

ISG blockchain will focus on use of IoT networks and implementation of Machine-to-Machine (M2M) transactions. For confirmation of transactions, a mixed consensus algorithm (confirmation) will be used by Proof-of-Stake and Proof-of-Authority. Transaction validators (owners of ISGV tokens) within the Proof-of-Authority mechanism will receive a 2% fee in ISGS tokens from all transactions for communication services generated with ISG wallets and 0.01% of the amount of transactions made for other wallets. The distribution of the reward between the validators will be in accordance with the logic of the Proof-of-Stake algorithm and will be provided one time every 3 months.

The cost of ISG services will be fixed in a fiat currency and converted into ISGS tokens. ISGS token will be implemented through online services at a price of \$1. When paying for ISG services, ISGS tokens will have a discount of 20% of the current selling price in the fiat currencies.

## ISG Token ERC20 Ethereum:

Token name	ISG
Date of issue	Q3 2018
Distribution method	Pre-sale, ICO, further listing at cryptocurrency exchanges
General emission	350 000 000
Hard-cap	\$150 000 000
Soft-cap	\$30 000 000
Assignment	Exchange of ISG ERC20 to ISGV tokens at the rate of 1:1
Jurisdiction	Netherlands
Minimal purchase during ICO	\$ 100
Forbidden countries	USA, China, Canada

## ISGV token ISG blockchain:

Token name	ISGV
Date of issue	No more than 18 months from successful completion of ICO
Distribution method	Exchange of ISG ERC20 to ISGV tokens at the rate of 1:1
General emission	350 000 000 (similar to ISG ERC20)
Assignment	Payment for ISG communication services, validating transactions in ISG blockchain and receiving a 2% reward from all payment transactions for ISG communication services and 0.01% from the other transactions.
Jurisdiction	Netherlands

## ISGS token ISG blockchain:

Token name	ISGS
<b>Date of issue</b>	No more than 18 months from successful completion of ICO
<b>Distribution method</b>	Online services
<b>General emission</b>	2 000 000 000 – primary emission. As far as geography of ISG SCS is expanded, ISG Board of Directors will determine additional emission.
<b>Assignment</b>	Payment for ISG communication services with 20% discount towards fiat currencies
<b>Jurisdiction</b>	Netherlands

## Team

ISG team, responsible for project implementation at all its stages, includes the highest authorities in scientific, business and telecommunication communities.



**Sirotkin Oleg Sergeevich**  
Advisor

Chairman of the Board, President of the National Technology Chamber.

Academic, Doctor of Technical Sciences, Professor. Member of the Academy of Security, Defense, Law and Order. Member of the International Engineering Academy of the Russian Federation, and the Scientific Council on the Mechanics of Structures from Composite Materials Sciences. Chairman of the Scientific Council of Rosaviakosmos "Machines, technologies and production of the future," the dissertation council of NIAT, a member of the thesis council of the Moscow State Institute of International Relations. Creator of integrated structures of composite materials, aluminum, aluminum-lithium alloys, which were used when creating TU-204, IL-96-300, IL-76, Su-27 planes, Ka-50, Mi-28 helicopters. Author of more than 140 scientific works, including 11 monographs, 8 patents. He was awarded a medal "For labor merit".



**Bubela Vladimir Alekseyevich**  
Advisor

Vice President of the National Technology Chamber. PhD in Technical Sciences. General Director TECHCOM - Electronic LTD.



**Boykachev Vladislav Naumovich**  
First Deputy Chief Technical Officer

PhD in Technical Sciences. Moscow Aviation Institute, Faculty of Aircraft control systems.

Developed the ideology and technology of building a satellite communication system ISG and spacecraft. Supervises the team of specialists who create the ISG CAS. Author of more than 170 scientific works, including inventions and patents of speeches at Russian and foreign conferences and symposia.



**Kubarev Yuriy Vasiliyevich**  
Advisor

Epoch person. One of the most significant figures in the field of aerospace research.

Honored Worker of Science of the Russian Federation, a member of the International Association of Authors of Scientific Discoveries, Honorary Professor of Shanghai Aerospace Academy, Doctor of Physical and Mathematical Sciences, Professor. Author and co-author of about 300 scientific works and inventions.



**Rysin Andrey Vladimirovich**  
Head of Radiotechnics Department

PhD in Technical Sciences. Moscow Institute of Electronics and Automation.

Highly qualified specialist in the field of development of specialized algorithms for high-speed information processing. The method of reception, which he created, for satellite communication, has no analogues in the world.

Author of a significant number of scientific papers, publications and books.



**Bogdanov Yuriy Aleksandrovich**  
Chief Industrial Engineer

PhD in Technical Sciences. In 1965 he graduated from the Moscow Aviation Technology Institute (MATI), specializing in: "Aviation devices and automats"; since 1976 - candidate of technical sciences, "Inventor of the USSR".

Many practical works have no analogues in the world. Supervises a team of specialists who create the design and technology of manufacturing units, systems and spacecraft for the ISG CAS.

The development of Radioelectronic Block was awarded with a second-degree diploma and a silver medal of the 48th World Exhibition of Inventions, Research and New Technologies "BRUSSELS-Eureka-99".



**Ostrovskiy Yakov Borisovich**  
Sector Head

PhD in Technical Sciences. Since 2004, he has participated in the development of a number of ONBOARD COMPUTER and interfaces for a number of spacecrafts. Within the framework of creating a space communication system, in the process of implementing a model of such a system, a message packet switch was developed that provides processing of information packets arriving from receiving antennas and transmitting them to transmit antennas.



**Chernikov Oleg Ivanovich**  
Chief Structural Engineer

PhD in Technical Sciences. Kazan Aviation Institute (1977), "Instruments and Systems of Aircraft".

He has a huge practical experience in the development of on-board radio-electronic equipment for spacecraft, including Yamal-100, Yamal-200, ISS, Meteor-M, space experiment ALIS-M, The interplanetary station "Phobos-Grunt", "Luna-Glob", "Luna-Resurs", "GLONASS-K", "GLONASS-K2". More than a hundred types of instruments and various equipment have been created.

He was awarded the medal "For Services to the Fatherland" 2 degrees for work on the International Space Station (ISS).



**Arkussskaya Sofya Veniaminovna**  
Head of Software Department,  
Deputy Chief Structural Engineer

PhD in Technical Sciences. Graduated Moscow Aviation Institute named after Sergo Ordzhonikidze in 1971, specializing in "Electronic computers".

Specialist of the highest qualification, in the field of software development. Has a rich, many years of practical experience in creating system software, special and applied. At the moment, it manages a division of specialists implementing real-time system software for the ISG CAS.

The winner of the prize is A.S. Popov, was awarded an honorary badge "An Even Radio Operator".



Dubrovskiy Vladimir  
Vyacheslavovich  
Chief Engineer

PhD in Technical Sciences. Graduated from the Ryazan Radio Engineering Institute with a degree in Electronic Computers. A significant number of implemented developments successfully perform their functions in a number of systems and complexes for various purposes. Leading developer of the ISG SCS creation in the part of the specialized processing of communication message packets.



Dmitrov Valeriy Ivanovich  
Head of Department

PhD in Technical Sciences. Head of Department of the National Institute of Aviation Technology JSC.



Scott Larson  
Advisor

Years of experience in technology start-up / entrepreneurship sector, as well as in corporate finance.  
Co-founder and CEO of UrtheCast, a tech company hired by the Russian Space Agency, to install two cameras outside the ISS.  
Currently, co-founder & CEO of Helios Wire, an IoT start-up.



Bedziouk Serguei Vasiliyevich  
Advisor

Leading engineer at Innovation technologies management at National Institute of Aviation Technology JSC. PhD in Space Human Engineering. More than 40 years of experience in technical and business development of the International Aerospace Projects. Member of the Russian Academy of Cosmonautics. Developed and conducted robotics training for the ISS crews. Designed programs and methods for pre-flight and on-board cosmonaut training.



Kilimov Timur Asylbekovich  
Chief Executive Officer

University of Essex, in finance and banking.  
Russian State University for the Humanities with a degree in finance and credit.  
Has a huge experience in managing and implementing projects in various sectors of the economy.  
Board member and co-founder of a number of successful business projects in the B2C segment.



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