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# Mass service of individualized control for the population rescue in the event of all kinds of emergency situation

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# The main objective

**The introduction of ambitious and at the same time technologically feasible plans for the development of ICT until 2030 and beyond, which are set for the new Focus Group on Technologies for Network 2030 will require huge investments for its implementation.**

**Therefore, from the very beginning, it is necessary to develop adequate promising mass services.**

**This proposal describes such a service, which we named as "Mass service of individualized control of the rescue of the user in the event of a state of all kinds of emergency situation (ES) anywhere in the place and at any time".**

**Given the vital importance of this service for the population, it can be reliably assumed that this service will be in demand by everyone, including humanoid robots.**

# Current status

**Unfortunately, current status and value of the issue to be considered in our proposal are getting more and more critical and urgent for equally for all countries year by year.**

**Every year, various emergencies cause the unreasonably large material and human losses in different parts of the Earth. At the same time, losses are equally high for both developed and developing countries. It is unlikely that by 2030 the situation will change.**

**As the statistics show, the risks of human losses due to ESs tend to increase annually in all countries of the world: increasing the frequency of natural global emergencies (earthquakes, tsunamis, etc.), anthropogenic load on nature, the tendency of population concentration in megacities, the construction of smart cities, the increasing pace of life and mobility of the population, faster technology change etc.**

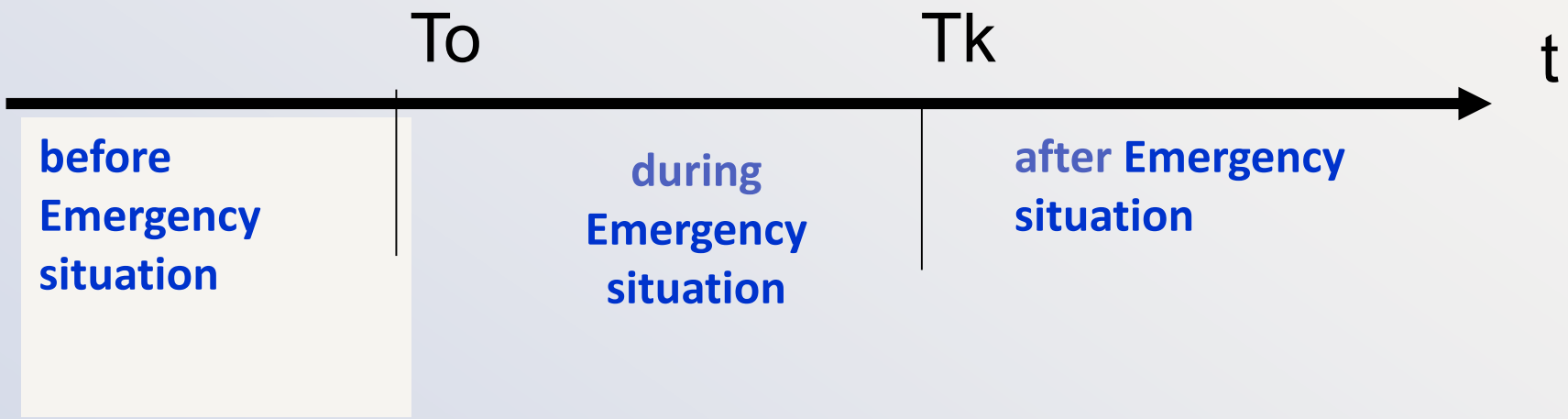
**As a result, the sensory abilities of a person are greatly reduced.**

# Proposed solutions

**The works that were carried out during 2010 -2018 by the authors showed that the sensory abilities of a person can be raised to the required level only using modern ICT.**

**The main idea of increasing the sensory abilities is the expansion of the field of interaction of a person equipped with an intelligent subscriber device with a smart environment, which at the right time informs him with warning signals about the upcoming ES and uses the developed models of possible emergency situations tied to a specific location, a digital map of this locality and the user's coordinates, forms and reports individually for him the route of moving him to a safe place.**

# Proposed solutions




**The fundamental difference between ES, natural and technogenic origin, differs precisely in that when the moment of the beginning of the ES- To differs from its catastrophic phase -Tk.**

1) Tk >10 min ; 2) Tk= 0

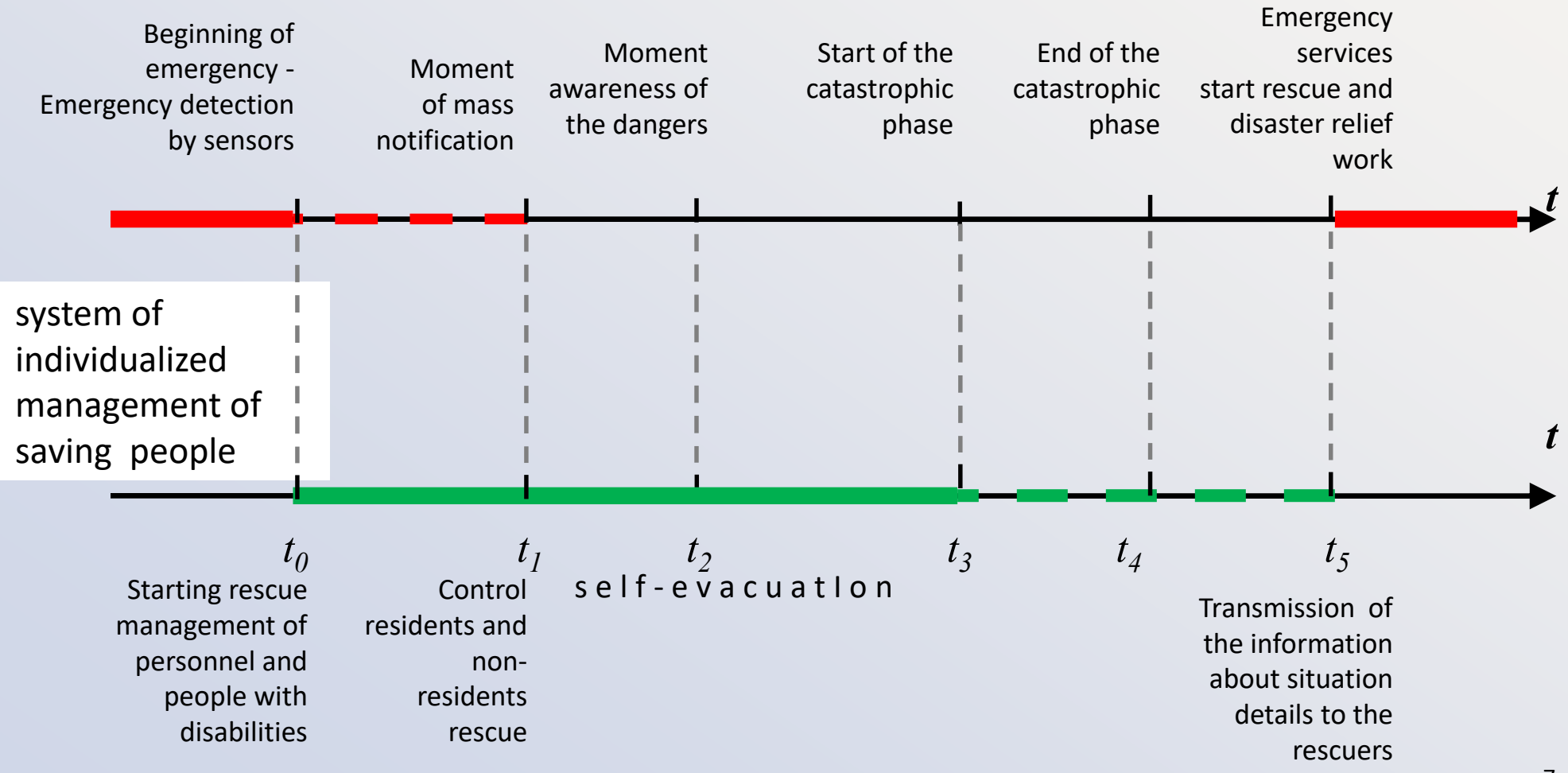
# Proposed solutions

**The difference lies in the fact that in the case when Tk> 10 min, it is possible, with the help of an organized interaction of the subscriber terminal and sensors based on the IoT, to organize an individualized control of the rescue of people from a building in which an ES occurred. Thus, the system will facilitate the self-evacuation from the facility to a safe place to 90% of the people who were in it, including non-residents and people with disabilities, before Tk comes. These solutions are described in the our contrubution: Draft ITU-T Recommendation Y.smart-evacuation "Framework of Smart Evacuation during emergencies in Smart Cities and Communities" (Geneva, 4-15 September 2017) and Draft ITU-T Recommendation Y.disaster_notification "Framework of the disaster notification of the population in Smart Cities and Communities" (Cairo, 6-15 May 2018). The working model of the system was demonstrated at exhibitions in Geneva, Hong Kong, Hanover, Moscow.**

**The next slide shows that the effect is achieved by using the received warning signals received by the subscriber terminal from the IoT environmental sensors and ES models**

# Proposed solutions

## PHASES OF EMERGENCY SITUATIONS

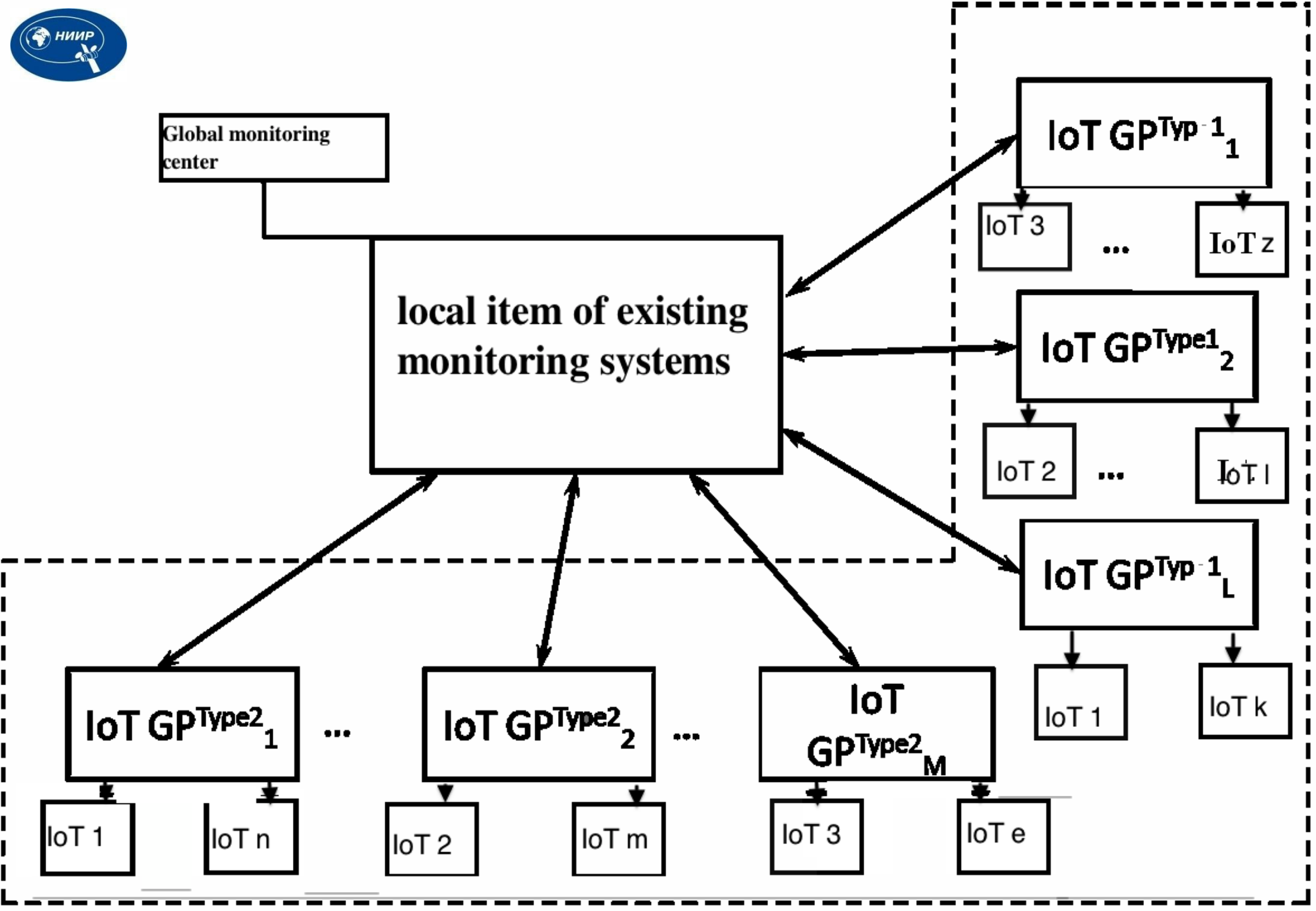


# Proposed solutions

**For, ES, in which Tk = 0 (for example, an earthquake or explosion), the solutions described above are not suitable. Here it is necessary to have warning signals at least 10 minutes before of this ES. In this case, it is possible to organize the individualized control of the self-evacuation to a safe place as described in the previous section. The solution of this problem was again found with the help of smart devices connected to the network. It turns out that such sensors have increased sensitivity to warning signals of such ES can be a live (including human) and inert objects of nature, transformed into IoT.**

**These solutions are described in the Recommendation Y.IoT-GP-Reqts "Requirements of an Internet of Things enabled network for support of applications for global processes of the earth" - output of Q2/20 e-meeting, 7-9 March 2018.**

**The next slide shows a block diagram of a typical site of the proposed hybrid monitoring system, where signals received from natural IoT objects are processed in conjunction with signals from existing sensors on traditional monitoring networks. Such joint processing of the readings of sensors of different physical nature makes it possible to detect even very weak warning signals, for example earthquakes.**


Global monitoring center
local item of existing monitoring systems
IoT GP Typ 1 1
IoT 3
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IoT z
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IoT GP Type2 2
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IoT GP Type2 M
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IoT e

# Some results of the work performed

**This decision, like the previous one, is widely approved at such authoritative expert sites as ITU, APEC TEL, ESCAP. On October 01, 2018, the Workshop "Earthquakes and Waterfloods Monitoring System with the application of the Internet of Things (IoT)" is held on our initiative.**

**Here are some of our reports at international conferences.**

**Sarian V., Nazarenko A., Lyubushin A., «Creating a hybrid monitoring , network of global processes of natural and men-made disaster of planet Earth using geotehologes of the IoT. GeO IoTWorld, Brussels. Belgium, 25 may 2016**

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BIOGEL БИОГЕЛ

V.V. Kovalsky .
RAVEL's SONATA IN A
VIRTUOSO PERFORMANCE
OF DAVID OISTRAKH.
Gouache. 1964

**WORLD CONGRESS**
**of GEOCHEMISTRY**
***«Current Trends and Innovations in Geochemistry»***
**November 16-17, 2017**
**Atlanta, USA**

[1]Vadim Ermakov, [2]Viliam Sarian

**GEOCHEMICAL ECOLOGY AND ITS SIGNIFICANCE IN PRESENT BIOSPHERIC RESEARCH**

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# What we plan?

**However, two conditions are necessary to solve the issues of large-scale implementation of this service, and they appear to be implemented. The first uses the potential of IoT to create prerequisites for a superconnected world.**

**The next slides shows our vision of this process.**

# The potential of IoT to formation of a hyper-connected world

**Objects interacting in the modern global convergent infocommunication environment (ICE) :**

**Before IoT**

-Man-machine systems (MMS),
-Machine systems (MS),
-Machine learning systems (MLS),
-Artificial intelligent system (AIS),
- Humanoid robots (HR)

**After IoT**

-Man-machine systems (MMS),
-Machine systems (MS),
-Machine learning systems (MLS),
-Artificial intelligent system (AIS),
- Humanoid robots (HR),
-- IoT inert and living systems (IoTS)

**Near future**

- IoTS only
(Since the MMS, MS,MLS, AIS, HR are transformed into IoTS)

**All living and inert objects in real world "acquire" a voice and can interact with each other in the ICE using IoTS technology**

# What we plan?

In the emerging global unified convergent information and communication environment (ICE), an already vast and geometrically increasing number of objects are currently interacting in real time. Human-machine systems (MMS), machine systems (MS), Internet of things systems (IoTS), machine learning systems (MLS), artificial intelligence systems (AIS) and humanoid robots (GRS ). But soon all these objects will converge into IoTS. Denote this convergence as - IoTSMMS, IoTMS, IoTMLS, IoTAIS and IoTGRS. Thanks to IoT technology, all objects that are inert and living (including humans) environment objects can join these objects. And it is very important that at the same time natural objects “acquire” a global voice, providing truly unseen possibilities for ICE in the near future. This means that, in principle, all inert and living (including humans) objects of nature, belonging to the same species or at different stages of development, can fundamentally (that is, be technically accessible) enter the global information interaction. Hardware and software tools for communication of objects of nature today are created, and they are scaled, i.e. They can connect to the Internet any natural object converted into an ICE (IoTS) (Fig. 1), regardless of its size and place in the hierarchical natural series.

# Proposed solutions

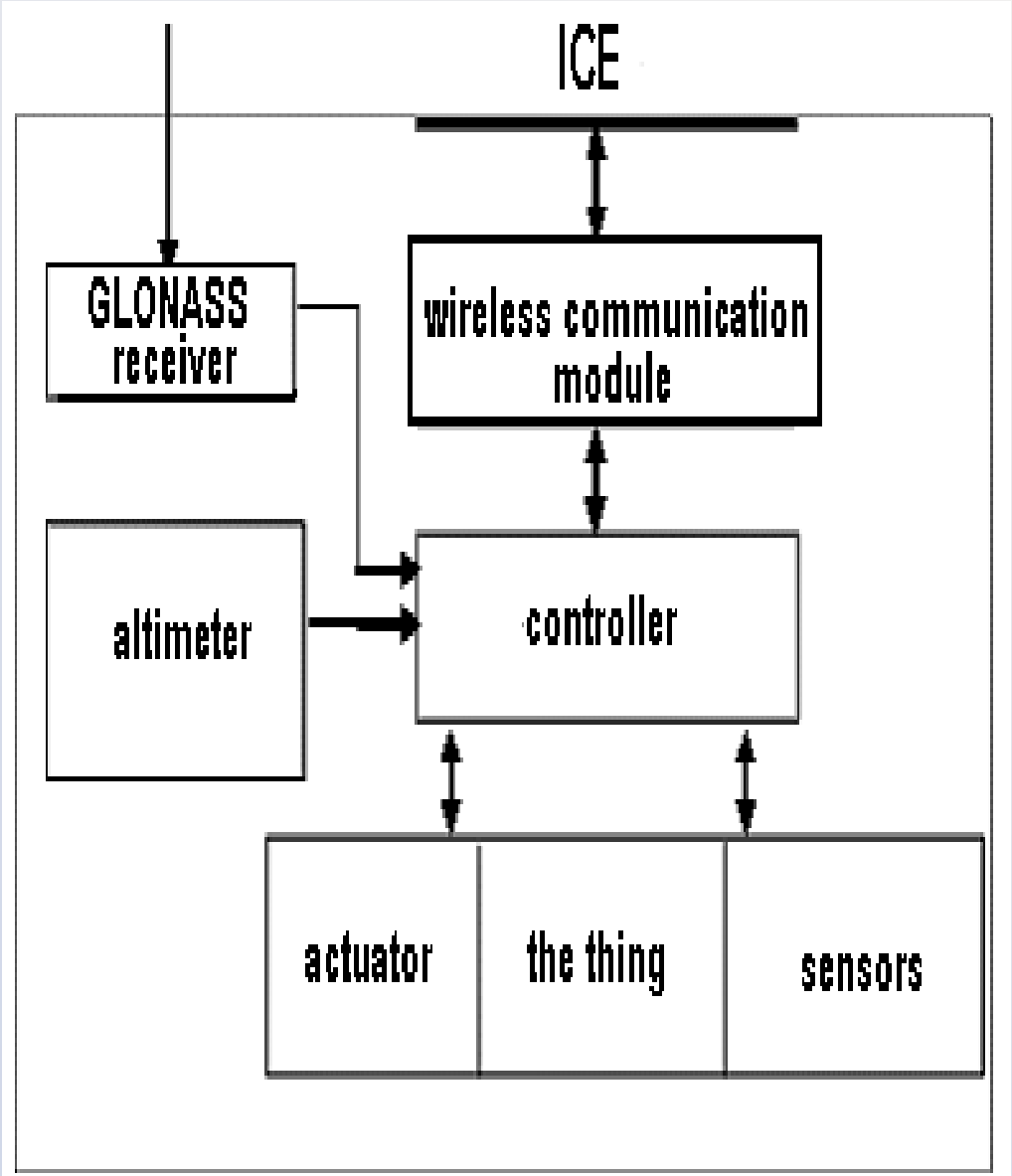



Fig 1

# Proposed solutions

- In addition, as can be seen from Fig. 1 is a block diagram of a typical IoTS, it can not only send signals from its sensors to the ICE, but also receive incoming signals from the outside, including control signals. This means that the new ICE gives natural objects, their communities the same opportunity to interact as a community of people. This convergence means that from this stage all the objects interacting in the ICE will not only be consumers of data on the natural and social environments that produced IoTS, but will also become sources of data about themselves.
- In fact, this transition means a new qualitative leap in building a new model of the world - a hyper-connected world

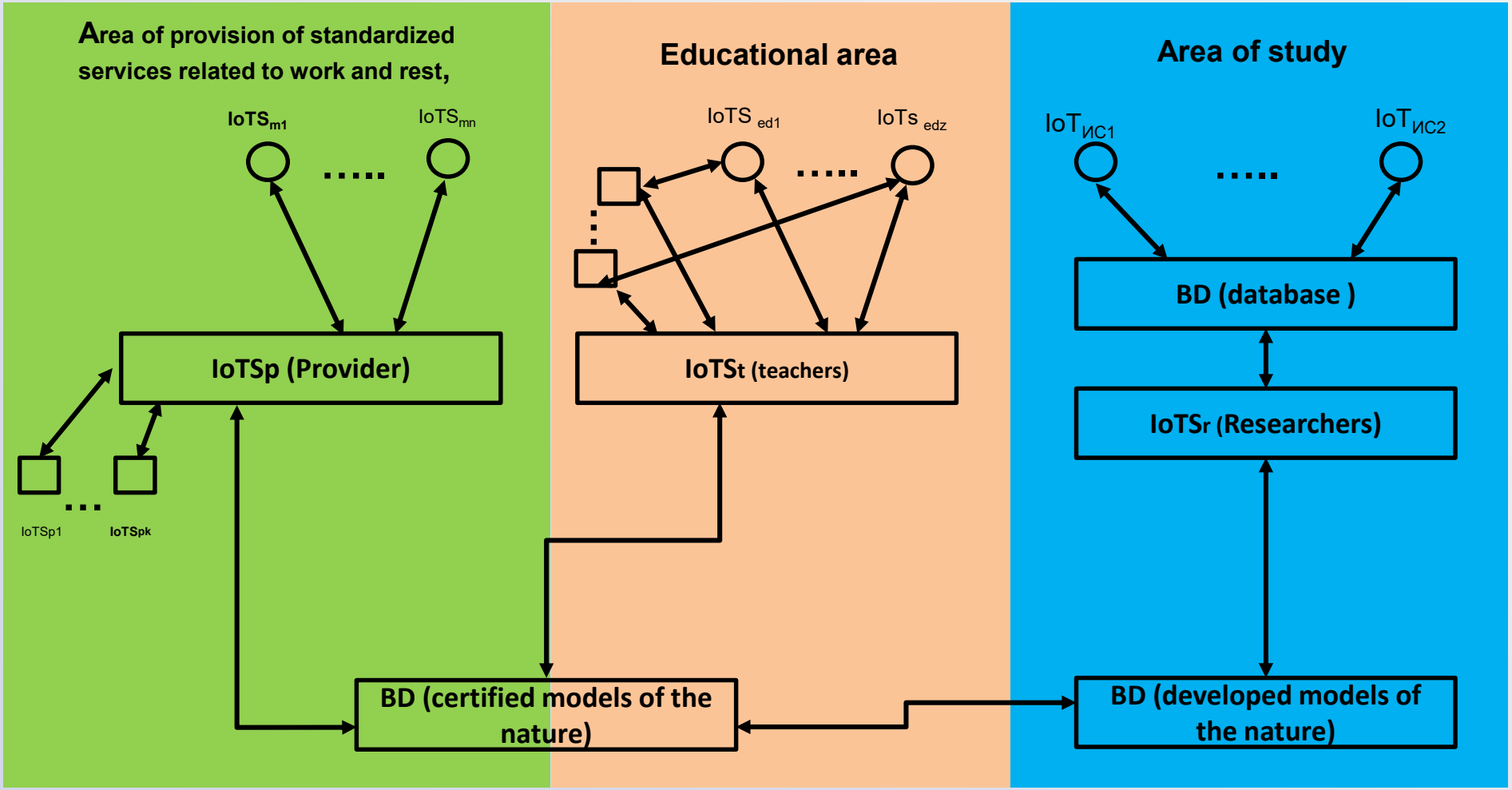
  that will affect all spheres of human activity.

Already today, global interaction has become a significant influence on all aspects of society, of all areas of our life.

# Proposed solutions

It is assumed that extensive use of additional data produced by IoT allows to reduce uncertainty in decision making and to rationalize in real time not only the activity of MMS in the context of increasing anthropogenous environment, but also to reduce consumption of limited resources and improve the quality of life of a mass user by providing him personalized services.

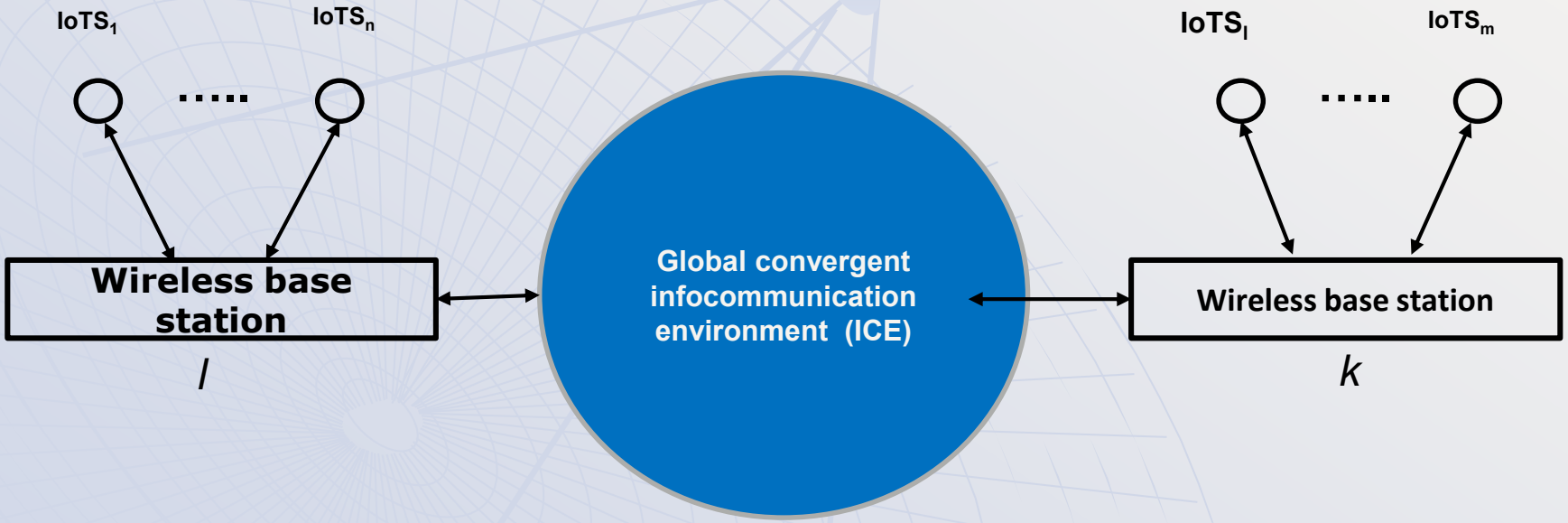
# Three areas of life a hyper-connected world




**All IoTS shown in fig. 2 may include MLS and AIS**

# The area of possible direct global interaction of natural objects

## The use of IoTS in global Trophic chain



# Three areas of life a hyper-connected world

- In the 1st and 2nd areas task, and obtaining the necessary services for the interaction of objects with each other and the environment are based on measured readings of IoTS objects that track the user environment, and are based on the existing model. help each user with the corresponding cells of the institutional matrix to solve the problem of functioning in this area more quickly and more rationally, that is, to perform one of their typical standard tasks (or one of the periodically reproducible processes that provide homeostasis of an object in this taxon)

# Three areas of life a hyper-connected world

- The third area of the formative super-connected world differs from the first two in that in this area it is based on monitoring the surrounding natural and social environments with the help of IoTS, scientific research and knowledge are being developed, that is, models are created that can be used operatively to achieve greater rationality in functioning in the first two areas. The adaptive capabilities of IoTMMS and IoTGRS expand, which will increase their predictive capabilities, which will lead to a radical reduction in the risk of emergency situations (ES) of natural and man-made origin and to a radical reduction in the risk of human and material losses in the event of an emergency. Thus, all geochemical studies will organically built into the first and second areas and will contribute to improving the quality of life.

# Solutions

Today's problems of experimental biogeochemistry, which can be solved using IoT:

- The need for continuous spatial monitoring of the state of living and inert objects of nature under external natural and anthropogenic influences,
- The study of the interaction of living organisms with the environment, the processes of self-organization and regulation of biological systems, which is the subject of ecology,
- Necessity of definition of parameters of adaptive possibilities of objects at external natural and anthropogenous influences.

# Solutions

On the other hand, such an integration, which allows biogeochemists, taking into account the actually accessible feedback (the possibility of remote access to the indications of facilities operating in the first and second areas), quickly take into account the degree of impact of the introduction of new technologies of various environmental factors on health, productivity and other indicators of sustainable development. Such an opportunity, connected with the possibility of real-time monitoring of the objects under study, will make it possible to reach new heights in the study of the natural environment. For example, a researcher - a subscriber of the third sphere  can -fix and study the adaptation processes that occur inside a natural object under adverse environmental effects, when the reproduction of one or several typical processes that ensure the homeostasis of this object and the readiness of its transition to degradation. In this case, it can be assumed that if the semantics of this process is studied, it is possible by external influence (it can come from the researcher or other similar smart object located in the same or territorially distant taxon, restore disturbed typical processes and stop irreversible degradation of the object and taxon as a whole.

# Proposed solutions

**The works that were carried out during 2010 -2018 by the authors in RF showed that the sensory abilities of a person can be raised to the required level only using modern ICT, in particular IoT.**

**The main idea of increasing the sensory abilities is the expansion of the field of interaction of a person equipped with an intelligent subscriber device with a smart environment, which at the right time informs him with warning signals about the upcoming ES and uses the developed models of possible emergency situations tied to a specific location, a digital map of this locality and the user's coordinates, forms and reports individually for him the route of moving him to a safe place (a change in the generally accepted paradigm - not only a warning about ES, but a management of rescue). Thus we greatly increase the adaptive capabilities of a person potential , bring them closer to the environmental technological**

# What we plan?

- Of course, such a mass service as a whole can not be created without realizing the plans that the initiators of the FG plan to implement. These developments and research will make a qualitative leap in implementing plans for creating the necessary services for the entire population, which we call "anywhere in the world and at any time“
- That's why we hasten to join the FG Net 2030 enthusiast group.
- We look forward to in-depth cooperation with many other scientists and specialists from different.

# Thank you for your attention!
# With Best Regards,

*Reporter Prof. Dr.* **Viliam Sarian**
*Academician of NAS RA,*
*The State Prize Laureate,*
*Honored Worker of Communications of Russia*

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