

GeO IoT World 2016

Creating a hybrid monitoring network of global processes of natural and man-made disasters on the planet Earth, using geo-technologies of the Internet of things (GeoloT).

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Content

1. The need to find new solutions to radically improve the predictive capacity of existing processes for global monitoring systems.
2. The need for multidisciplinary research.
3. The new paradigm of personalized management of disaster.
4. The possibility of using GeO IoT for the monitoring and management of natural disasters with nature.

1.The need to find new solutions...

- **Every year, emergency situations of natural character (such as earthquakes and floods) are sources of excessively large material and human losses in different parts of the Earth. In this case the loss is equally high for both developed and developing countries.**
- **Therefore, the international community and individual countries pay great attention to the development and operation of the global processes of monitoring systems.**

1. The need to find new solutions ...

- **However, the measures taken can not yet improve the predictive capacity of existing systems to the economic value and each time another disaster is a catastrophic surprise for both the administration and for the entire population of the area in which emergency happened. It should be noted that natural disaster is often accompanied by a man-made disaster. Particularly large losses - in large cities.**

1. The need to find new solutions ...

It is necessary to take into account another cause large losses for countries that are exposed to shocks and man-made disasters of natural origin. The fact that the efforts of States in the development of tools for monitoring and prevention of emergency situations arise are often ineffective as citizens who find themselves in the emergency area, and even warnings about emergencies become helpless, immediately forget all the instructions and as a result, are often the victims of these emergencies . This phenomenon, as a rule, the further analysis of disaster qualifies as a "human factor". Moreover, we emphasize again, this phenomenon is equally characteristic of both developed and developing countries. Suffice it to recall the recent tragic events in Japan, the US, China, Russia, South Korea, Guatemala, Pakistan, Taiwan and others.





1. The need to find new solutions

Considering

rapid urbanization (UN predicts about 78% of the world's population (6.3 billion people) will live in cities by 2050) and

the huge costs that are spent in the world on the science of the earth, and on the development of systems (including ICT) monitoring of global processes,

MOE efforts

Humanity can no longer put up with the poor results obtained and urgently requires the search for new solutions.

2. The need for interdisciplinary research

- Background possible solutions:
- The search for methods of detection signals, harbingers of global processes.
- Research the impact of global processes on living and inert objects of nature.
- Development of models of a particular disaster at a particular facility.
- Development of ICT - GeO IoT.

2. The need for interdisciplinary research

Combining the achievements of various scientific disciplines through a common network with the use of infocommunication Geo IoT as a signal-harbingers of disaster indicators to radically improve the predictive potential of global processes of monitoring systems.

3. Technology breakthroughs that would allow the GeO IoT (1):

- **convergence of communication networks, including sensor networks into a single infocommunication medium (ICS). Ubiquitous access to mainstream users to broadband channels single X (in the Russian Federation is the Russian Communications Administration program for the deployment of fiber-optic communication channels throughout the territory of RF-program 2020). Transition to the new system of assigning IP addresses - IPv6, which provides virtually unlimited access IoT into a single IP-based ICS.**

3. Technological breakthroughs that would allow the Geo IoT (2).

1. The development and practical use of large data processing (database).
2. The development and practical use of cloud computing (OS).
3. Transition service providers for broadband TV (LTE standards, etc.).
4. technology development, production and use of wireless sensor networks.
5. Rapid mass intellectualization of subscriber devices.
6. Development GeO systems.

3. A new paradigm of individualized management disaster

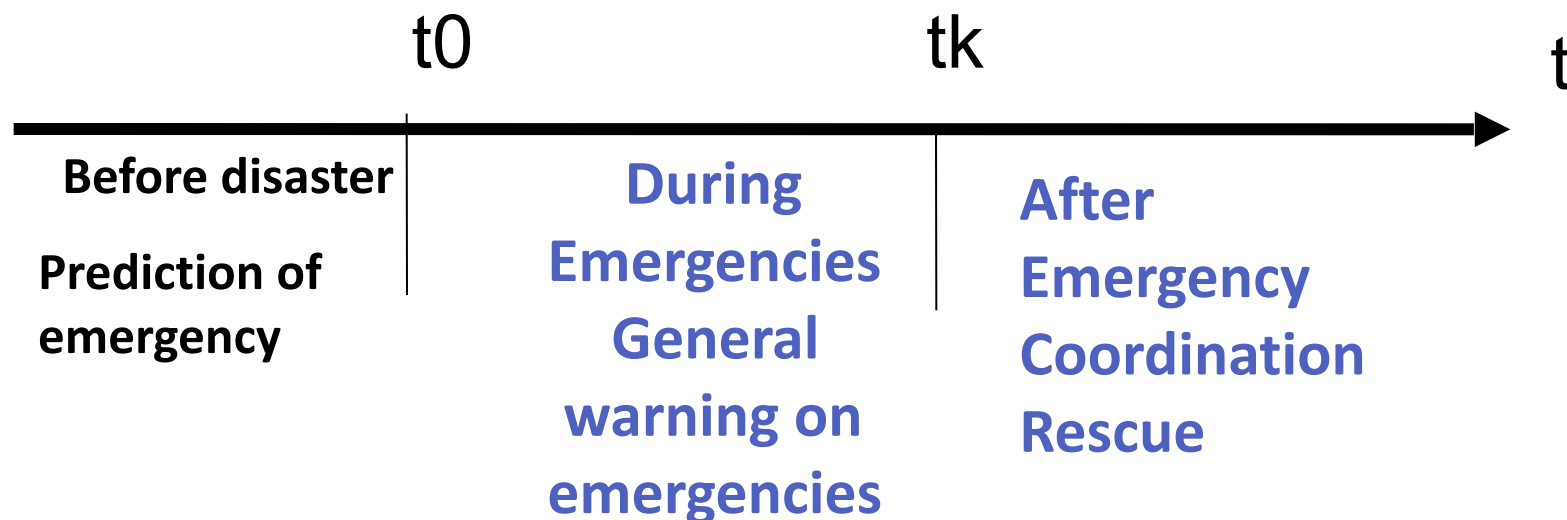
It is necessary to allocate three temporary stage, around which all the existing systems are built:

Monitoring and prediction of the disaster - the time before the disaster.

The catastrophe - the catastrophe.

Consequence - the time after the accident.

3. A new paradigm of individualized management disaster



Existing security systems operating before and after the disaster, almost no controlled rescue of people during the course of emergency, while the greatest loss of population are taking place during the course of an emergency.

3. A new paradigm of individualized management disaster

- It is impossible to prevent every CHC- concept of a non-zero risk.**
- People do not remember or do not know how to be saved at a specific type of emergency.**
- Without external assistance (management) people in emergency situations often make bad decisions.**
- the salvation of every human being should be managed, taking into account its individual characteristics.**

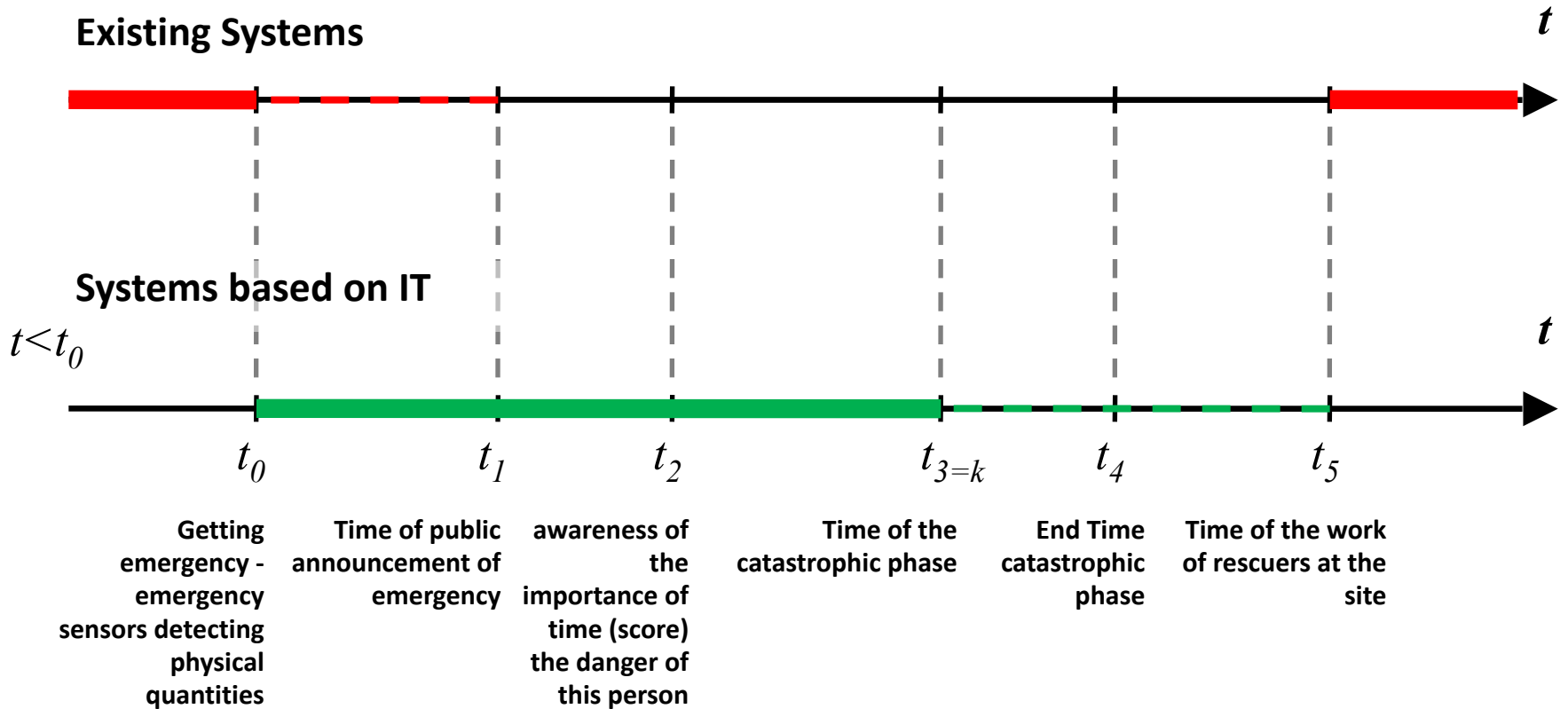
3. A new paradigm of individualized management disaster

user Groups	Individual characteristics
Guests building	Gender, age, health category
Residents of the building	Job responsibilities
Persons with disabilities	Special needs (hearing limitations, vision and ability to move)

3. A new paradigm of individualized management disaster

- In the first stage (before the development of the catastrophic phase) need emergency center involvement in the management of personal salvation of each individual on the site should be minimized**
- Due to the fact that in case of an emergency center resources may not be available, you need as much as possible to carry out action to save locally, taking into account the specificity of places and people**

3. A new paradigm of individualized management disaster



Phases of emerging situation

3. A new paradigm of individualized management disaster

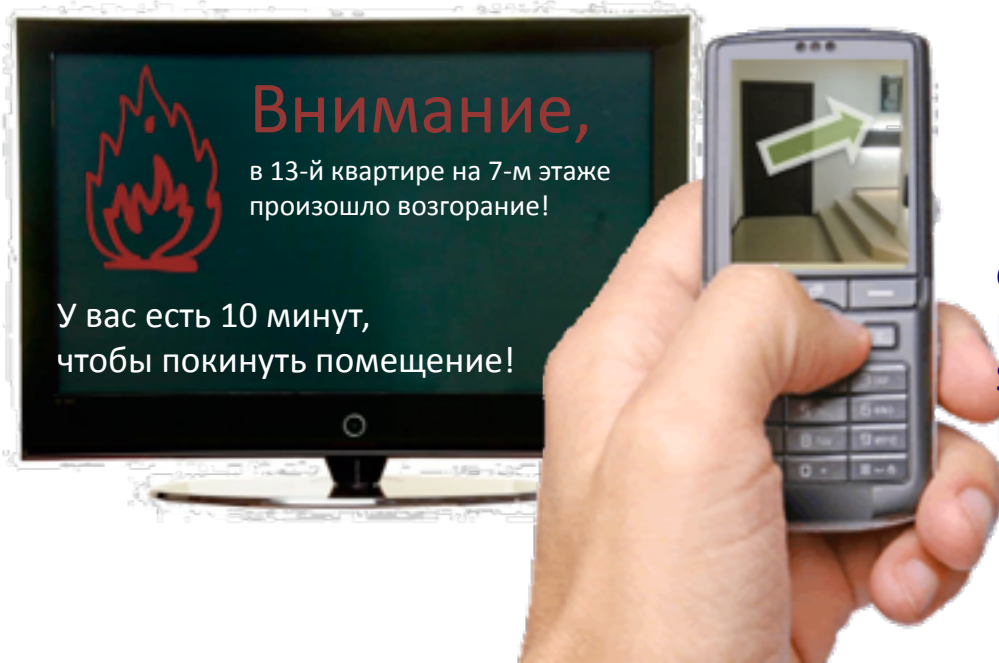
Implementation of a new paradigm of personalized control the behavior of people who find themselves at the facility in the emergency area, it was possible when using:GeO IoT as sensors object environment, - Intelligent subscriber units to communicate with sensors GeO IoT, located in this facility,-Development Of models of specific emergency situations at the facility, created divisions MOE.

3. A new paradigm of individualized management disaster

- Organization of independent personal evacuationpanic PreventionHelp in the organization of rescue operationsSaving up to 90% of the people before the onset of a catastrophic disaster phase

Development Research Institute of Radio

Система защищена 10 патентами



Gold medal at the 13th Moscow International Salon "Archimedes 2010" Inventions



Gold medal and a special prize for the best invention of the year at the 38th International Exhibition of Inventions in Geneva in 2010

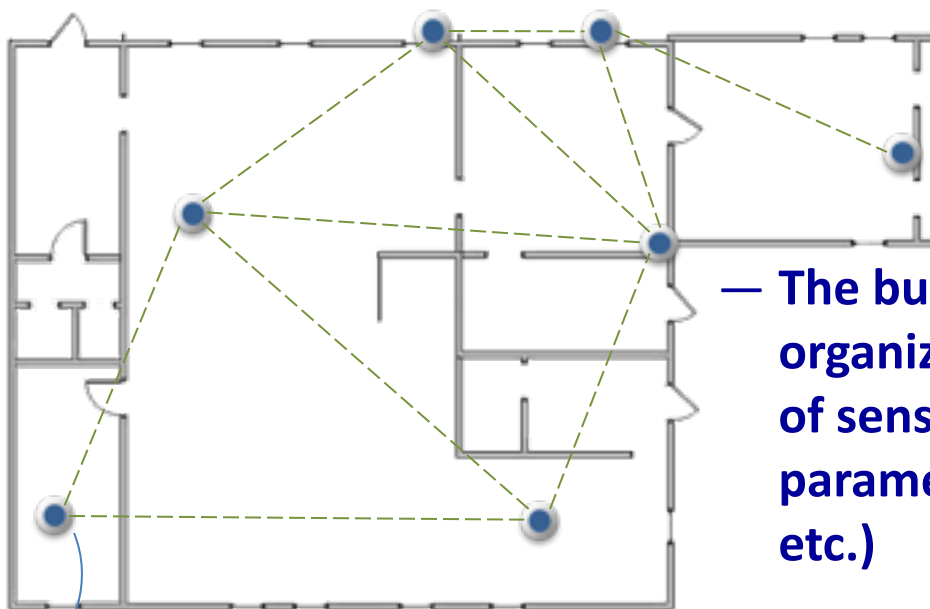
Предлагаемое решение

Сеть датчиков

Мобильное приложение

Стационарное приложение

Диспетчерский комплекс

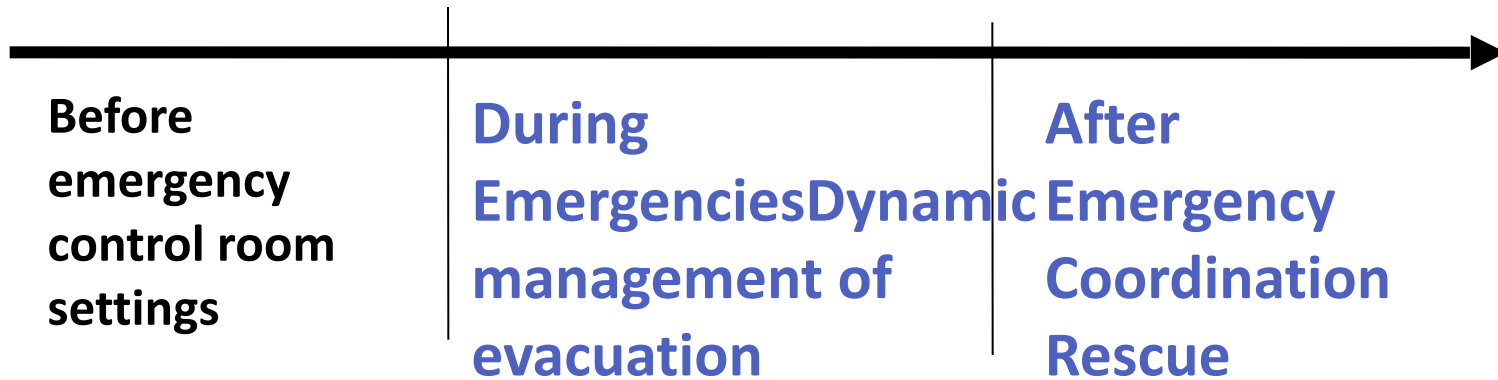


— The building (object) is set self-organizing (touch) the IoT network of sensors to monitor physical parameters (temperature, smoke, etc.)



— IoT can be integrated with existing sensors

3. A new paradigm of individualized management disaster



In contrast to existing security systems running before and / or after a disaster, the proposed system provides dynamic personalized management of evacuation of people directly during emergencies.

4.Possibility to use of IoT for monitoring and control in disasters of natural origin.

But the system of individualized management of saving people when disaster occurs, powerless, if the time interval between the beginning of emergency and the start of its catastrophic phase approaches zero. And this value is typical for such devastating disasters such as earthquakes, which bring the greatest human and material losses.

4.Possibility to use of IoT for monitoring and control in disasters of natural origin.

Professor Lyubushin A.A.- Head of the Laboratory of the Institute of Physics of the Earth RAS. O. Schmidt in his work suggested that the detection of these signals, the precursors can be reliably carried out (and thus increase the predictive capacity), if we compare the real-time synchronization of sensor readings by different physical nature, located close to the sensors of existing monitoring systems, sensors with readings of these systems. We assumed that for this purpose the best suited IoT.

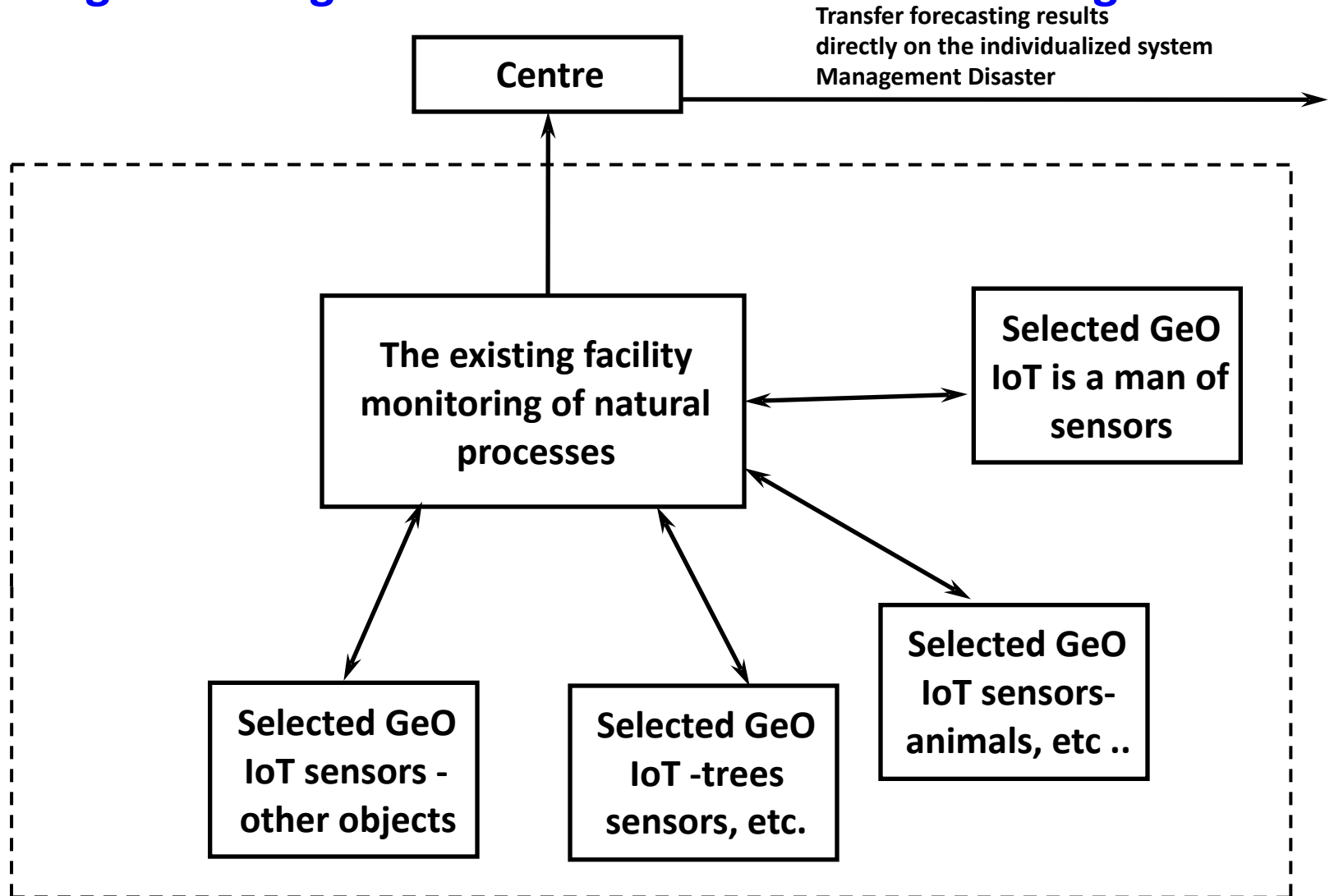
4.Possibility to use of IoT for monitoring and control in disasters of natural origin.

The basic idea of the use of sensors of other physical nature (IoT) for synchronization is that the signals -predvestniki accidents are a common modulating signal for sensors of different physical nature.

4.Possibility to use GeO IoT for the monitoring and management of natural disasters with nature.

The sensors GeO IoT (as defined) may be used any living (including humans) and objects stagnant nature.In the basic sciences have accumulated a lot of the results of studies of the influence of global processes on living and inert objects that can be used to search for GeO IoT, the most sensitive to certain types of signal-precursors.

4. Possibility to use GeO IoT for the monitoring and control of natural disasters with the character in the way of integration of geosciences and the Internet of things.



4. Finding suitable GeO IoT as sensor signals, harbingers of global natural disasters

Given the fact that among the objects of nature there is an enormous amount of objects that exhibit increased sensitivity to certain changes in the environment settings, there is a high probability of finding among them suitable natural sensors. The choice of such sensors can be carried out only with the help of scientists who study the impact of changes in the parameters of the external environment on the parameters of natural objects. Since the early stages of a global disaster of natural or man-made origin may occur at the same time quite a lot signalov- precursors emergencies of varying intensity, it is therefore proposed to use the joint GeO IoT sensor (ie panel, consisting of different types of natural sensors GeO IoT, some of which under real circumstances may have more sensitive data signals -predvestnikam than the other) to complement the sensors, the existing monitoring systems for the global processes of natural and technogenic origin.

4. Possibility to use GeO IoT for the monitoring and management of natural disasters with nature

It is supposed to create two experimental plots of the network: Kamchatka and in Armenia. Institute of Applied Physics, National Academy of Sciences of Armenia has applied for the job in Skolkovo. It is expected that this work will carry young staff IPPF, Vernadsky Institute, NIIR, IPE RAS, IEE RAS

Thank you for attention

Speaker Sarian Viliam, Professor, Honored Worker of Communications of Russia. State Prize of Russia winner, has 2 prizes of the Russian Government in science and technology, professor at the Moscow Institute of Physics and Technology (State University) and the Moscow Technical University of Communications and Informatics.