Brief concept of the geodynamical processes monitoring method and means of usage of the discovered effects

On the basis of principles of lord Cavandish's torsion balance it has been developed multichannel system for monitoring of geodynamical processes. System is being operated in realtime 24-hour mode during more than 25 years. On the basis of the data registered by the system it has been established the following:

1. Before the earthquake with M>5 in the readings of the system it is observed signal causing angular deviation of the torsion balance beam from the equilibrium state during time intervals of several hours, days and even months and years. This regularity corresponds to the 95-100% confidence level, being in compliance with the actual events on the planet during 25 years.

2. Every beam deviation from the equilibrium state is associated with the strictly definite frequency range of the gravitational waves (relations of the potentials forming every mass) registered by the system's instruments.

3. On the basis of the mentioned above data it has been reformulated the concept of the geodynamical processes physics. Nature of gravitation, kinetic energy, magnetism, space polarization, electric charge appearance has been understood. Also it has been established that the primary frequencies relation of potentials, forming any structure in the mass of the planet including before the earthquakes with M7-7.5, corresponds to the ultra-low-frequency (ULF) range as leading and to the microwave frequency range as driven, appearing at the concluding phase. This fact allowed to draw a conclusion that primary signal disturbing equilibrium in the structures of the planet corresponds to the range related to the planet geomagnetism.

4. In compliance with this conclusion, our system has been redesigned and construction elements corresponding to the Lobachevski geometry and function were embedded into the receiving elements. This gives huge opportunities for information transmission and reception as the multivariant matrix (hologram) on the basis of modern achievements of nonlinear physics, thermodynamics of open interconnected systems and nonlinear topology.

5. Thus, creating in the wave of ULF frequency range the matrix at the nanometers scale and embedding the required information into it, it became possible to transmit this information (also for the purpose of the formation of the specific kind of energy without the cost of natural resources) over any distance according to the specifically designed mathematical program and then immerse it to the desired coordinates. This has been validated by the experiments. Among them there are developments of wideband gradiometers system and working prototype of motor which doesn't need external power supply.

<u>I. Wideband gradiometer instrumentation system</u> (further named as WBG) is designed for real-time monitoring of ultra low frequency range (ULF, $f<10^{-1}$ Hz) disturbances of quasi-equilibrium state of the terrestrial gravity field. Instrumentation system principle of operation is based on the usage of asymmetrical torsion system analogous to the Cavendish balance having weights-antennas of complex geometrical shape.

Every WBG device has several torsion systems, each of which is associated with specific measurement channel. Measured quantity of every channel is the angular position of the beam with weights-antennas.

Currently WBG-2, WBG-3 and WBG-4 systems are being operated.

Lab in which WBG systems are installed

WBG system structure:

1) personal computer (PC) running Microsoft Windows operating system;

2) system case-screen in which torsion systems and rotation angle sensors are mounted;

3) electronic data acquisition system performing preprocessing and sampling of sensors signals and transmission of the resulting digital codes to the PC;

4) special software performing archiving, displaying and processing of the data.

WBG system instrumentation characteristics:

1) measured value range: 40°;

2) resolution is 0,02 for WBG-4 and greater than 0,001° for WBG-3;

3) highest sampling frequency (regulated) is 1Hz;

Other characteristics: 1) indoor operation; 2) power supply: 220V, 50Hz; 3) energy consumption of the WBG system excluding PC is not greater than 10W.

<u>II. Unipolar motor prototype</u> is based on the usage of the device realizing potential difference which can be made infinitely high when necessary at the expense of external field magnetism.

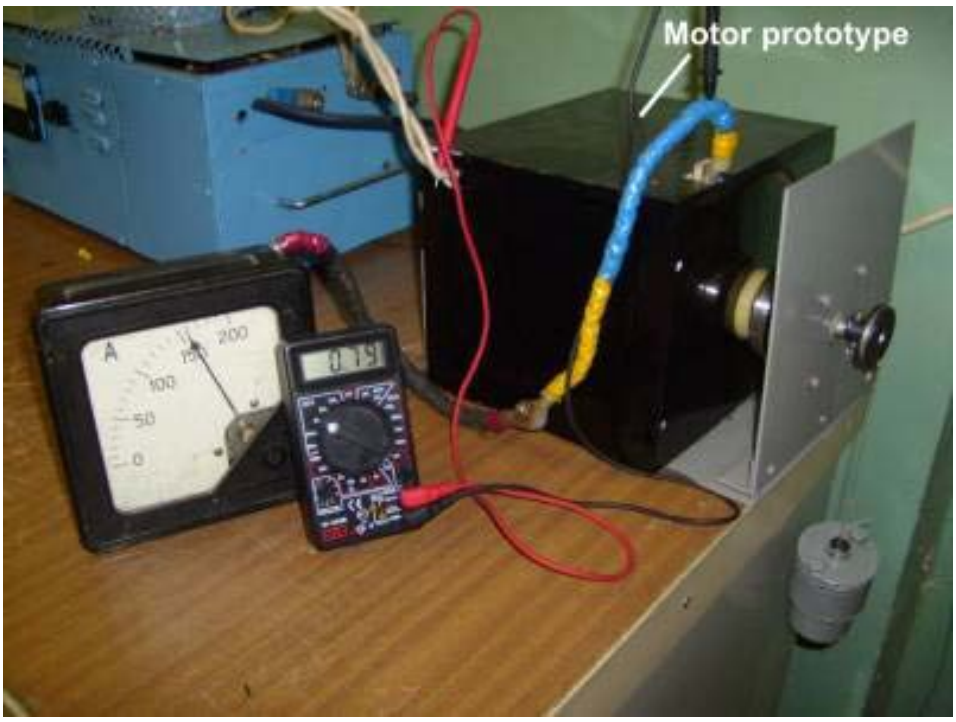

Photo of the laboratory setup including developed motor prototype

In the motor prototype superconductivity principles are not used. However, we have found the solution which allows us to achieve motor characteristics at least an order of magnitude greater than the most advanced competitive solutions even using superconductivity principles. In the proposed demonstration prototype, the simplest, cheapest and widespread materials are used including magnets with ordinary characteristics. But even in such case it is demonstrated rotation direction reversing capability by changing polarity of supply voltage being as low as 1.3V with no-load speed reaching 5000 rpm and current consumption of 19A.

Motor doesn't need cooling! One of the major features of the motor is anomalously low resistance and inductive reactance of the rotor. In the demonstrated motor prototype rotor resistance (R) is **0.00239 Ω**, consequently, at a particular moment, at a current of 19 A (5000 rpm, no-load) the active component of voltage (U) and power (W) of rotor are **0.045 V** and **0.86 W** (860 mW), respectively:

$$U=R\cdot I=0.00239\cdot 19=0.045\ (V)$$
$$W=U\cdot I=0.045\cdot 19=0.86\ (W)$$

If the motor shaft is locked, then rotor current is 400 A (at a current of 350A rotor is heated up to the 25°C) and tractive effort of 1kg is developed on the pulley, having diameter of 65mm, mounted on the motor shaft. Voltage and power are **0.96 V** и **384 W** respectively:

$$U=0.0239\cdot 400=0.96\ (V)$$
$$W=0.96\cdot 400=384\ (W)$$

If the locking is removed, the motor keeping mentioned above tractive effort unchanging (since the smallness of inductive reactance) will quickly reach critical rotation speed limited only by the strength of used materials. It is of great interest for gyroscope industry.

Torque on the motor shaft is determined by the coercive properties of the corresponding material of the motor. Utilizing modern magnetic materials, for example, based on compositions of Nd-Fe-B, tractive effort can be increased by an order in comparison with the prototype while exciting magnet dimensions being 5 times smaller. Prototype has overall dimensions of 200 x 160 x 140 mm.

It is possible to develop motors with outer case dimensions as low as several mm.

Because motor doesn't have a commutator, there is no current ripple in the rotor. Thus motor has stable torque what is sufficiently important for data reading from different type recording mediums, servo-drives and positioning systems. On the same reason interference associated with commutator motors is absent. Motor can be widely used in household appliances (kitchen machines, drills and other electrical instruments and etc).

Motor is very manufacturable and because it doesn't contains windings, costs of manufacture promise to be very low due to the usage of "know-how" and a large coercise force of relatively inexpensive exciting magnets. But if large speeds are needed (100000-150000 rpm and greater), there will be needed corresponding constructional materials, bearings and etc. Motor prototype demonstrates unlimited speed ceiling while voltage supplied to rotor is **0.32V**.

It's worth to note that motor prototype is intentionally built of unbalanced components and balancing was not performed. This implies ease of fabrication and assembling even with low-precision manufacturing technology.

When designing traction drive for transport it is desirable to use reduction gear, for example, of the aviation turbine. This will increase the torque according to the reduction. Also let's note the reduction of operational costs associated with servicing on one or two rechargeable battery with high electrical capacity instead of rechargeable battery composed of multitude of battery jars (an average count of 20-40 pieces per vehicle) with smaller capacity even non-considering low reliability of battery jars themselves. It is expected increasing of car mileage per transporting energy intensity at least of 3 times even through absence of Joule heat wasted in the windings of traditional motors.

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