

Lobachevsky Year at Kazan University: Center of Science, Education, Intellectual-Cognitive Tourism "Kazan – GeoNa – 2020+" and "Kazan-Moon-2020+" projects

A. Gusev and N. Trudkova
Kazan Federal University, Russia (alexander.gusev@mail.ru. / Fax: +7-843-23375125)

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Abstract

Center "GeoNa" will enable scientists and teachers of the Russian universities to join to advanced achievements of a science, information technologies; to establish scientific communications with foreign colleagues in sphere of the high technology, educational projects and Intellectual-Cognitive Tourism. The Project "Kazan - Moon - 2020+" is directed on the decision of fundamental problems of celestial mechanics, selenodesy and geophysics of the Moon(s) connected to carrying out of complex theoretical researches and computer modelling.

1. Introduction

Historically thousand-year Kazan city and the two-hundred-year Kazan federal university (Russia) carry out a role of the scientific-organizational and cultural-educational center of Volga region. The Kazan Federal University is one of the oldest and largest institutes of higher learning in the Russia. It was founded on November 5, 1804. The history of Kazan University abounds in the names of outstanding scientists, staunch revolutionaries, eminent public figures, educators, painters actors. One of the greatest names in the history of Kazan University is Prof. Nikolai Ivanovich Lobachevsky - the founder of non-Euclidean geometry (1826). This year, the Kazan Federal University (2010) celebrates 225 years since the birth of the greatest geometer of mankind, the rector and builder of the Kazan Imperial University, Prof. N. I. Lobachevsky (1892).

2. International Center "GeoNa"

For the further successful development of educational and scientific - educational activity of the Russian Federation, the Republic Tatarstan, Kazan city is offered the federal project - the International

Center of the Education, Science, Internet of Technologies and Intellectual-Cognitive Tourism "GeoNa" (Geometry of Nature - "GeoNa" is developed - wisdom, enthusiasm, pride, grandeur), which includes a modern complex of conference halls (up to 4 thousand places), the Center the Internet of Technologies, 4D Planetarium - development of the Moon, Physics Land, an active Museum of Natural Sciences, Oceanarium, Training a complex «Spheres of Knowledge», botanical and landscape oases. In center "GeoNa" will be hosted conferences, congresses, fundamental scientific researches of the Moon(s) and planets, scientific-educational actions: presentation of the international scientific programs on lunar and planetary research; modern lunar databases, exhibition Hi-tech of the equipment, the extensive cultural-education, touristic and cognitive programs. **Ring of Knowledge:** personifies infinity of a way of Knowledge at the limited opportunities of the Human and the Civilization. The Ring connects all objects of a scientific - cognitive complex, showing the uniform approach and a method of researches of the World around of us. Expositions of the Ring will reflect all essential aspects and stages of development of a human Civilization. **4D Planetarium:** 4D video-acoustic representation of the expanding universe, the dynamic world of colliding Galaxies and accretion black holes, system of bewitching planets around of the Sun and exoplanets about other stars of our Galaxy, exploration of the Moon and asteroid hazard, distribution of a reasonable Life to the universe and scientific searches of extraterrestrial intelligence, research and development of near Space, creation of settlements on the next planets. **Physics Land:** Cognitively - training complex for children, schoolboys, students, adult, based on modern achievements of science and technology and their three-dimensional visual and sensual perception. The complex will contain more than 100 simulators and 200 demonstration automated platforms: Flight on

the Moon and Mars, Formula - I, Falling in Black hole, Birth of the Universe, Rings of Newton, Machine of time. The complex can simultaneously accept up to 500 children with parents and school teachers.

3. “Kazan-Moon-2020+” project

The Moon in the Russian project “Kazan-GeoNa-2020+”: The Project “The Moon - 2020+” is directed on the decision of fundamental problems of celestial mechanics, selenodesy and geophysics of the Moon connected to carrying out of complex theoretical researches and computer modeling: 1. **Spin - orbital longtime evolution and physical librations of the multi-layer Moon:** a) construction of the analytical theory of rotation of the two / three-layer Moon and reception on its basis of physical libration tables for their application at processing precision supervisions; construction of a Lunar Navigation Almanac. b) The analysis of spin - orbital evolution of the early Moon, an estimation of internal energy dissipation, modeling of the long-term mechanism of maintenance free librations of the Moon. 2. **Geodynamics of a lunar three-layer core:** the analysis of differentiation of a lunar core, detailed elaboration of plume-tectonics of a mantle and a core of the early Moon, evolution of a boundary layer a core - mantle, reconstruction of gravitational and viscous - mechanical interaction of a lunar core and a mantle, resonant dissipation of internal energy, calculation free and forced nutations a lunar core, free fluctuations of system a core - mantle. 3. **Selenodesy of lunar farside:** the decision of a reverse problem of lunar gravimetry, construction of geodynamic tidal dissipative model of the lunar crust, mantle and core, Moho boundary, reconstruction initial mascons on the Moon, creation precision topographical and gravitational models of the Moon on modern supervision.

4. References

Gusev A., “Kazan-Moon-2020+”, Booklet, 2017, Kazan federal university press, p.1-4