Vetrov Anatoly Nikolaevich, author of the unique cognitive modeling technology
www.vetrovan.(spb.)ru
The RF, Saint-Petersburg city

THE FUNDAMENTAL DEVELOPMENTS BRANCH
"COGNITIVE MODELING IN THE EXACT SCIENCES" ("OEMMPU")
OF "THE SRI "SFA CMT" OF "THE RA(N)S" NAMED AFTER V.N. VENIAMINOV"

The developed "The fundamental developments branch "Cognitive modeling in the exact sciences"" ("OEMMPU") treats to the fundamental developments divisions of "The scientific-research institute "System and financial analysis based on cognitive modeling technology" of "The RA(N)S" named after V.N. Veniaminov" ("The SRI "SFA CMT" of "The RA(N)S" named after V.N. Veniaminov" – The SRI) as the first SRI in structure of "The SIO "Academy of cognitive natural sciences"" ("The SIO "ACNS""), an additional component of science and education system of the modern country for creation, distribution and use of the main and derivative scientific results of the cognitive modeling technology (CMT) (www.vetrovan.(spb.)ru) [see the fundamental developments branches and departments of The SRI]: 1) it is executed by the principle of "administrative-economy submission"; 2) works in several main directions, which allow to provide development of the fundamental main and derivative scientific results (my second report on SRW from 2006-2008(9) y. was submitted to "The SPbSETU "LETI"" and The Government of The RF for the translation, carrying out of int. action and receiving of "The Nobel Prize"); 3) includes several various main divisions: I. "The fundamental developments department "The theory of the (theoretical) mechanics and gyroscopes"" ("SM") (*) [***the fundamental developments „in area "Theoretical mechanics" (*)*** – theoretical bases, general problems and methods of theoretical mechanics, theory of general mechanics, theory of mechanics of liquid and gas, theory of mechanics of deformable firm body, theory of complex and special sections of theoretical mechanics, theoretical bases of cognitive modeling technology in theoretical mechanics, theoretical bases of formation of parametrical cognitive models block for the complex system analysis of objects, processes and phenomena of theoretical mechanics, theory of ways of representation of structure of cognitive models and problem environments: formal classical of the 0^{th} generation (logical and production models), nonformal classical of the 0^{th} generation (semantic network, frame network and ontology), formal new of the 0^{th} generation (calculus of theory of sets and corteges on domains and innovative calculus of theory of sets and graphs), nonformal new of the 0^{th} generation (multilevel structural scheme and multilevel encapsulated pyramids combining theory of graphs and theory of sets), flat of the 1^{st} generation (cognitive circle and cognitive disc), volumetric of the 1^{st} generation (cognitive cylinder, cognitive cone and cognitive sphere), flat and volumetric of the 2^{nd} generation (one-, two-, three-, four-, five- and more cognitive circle, cognitive disc, cognitive cylinder, cognitive cone and cognitive sphere), hybrid of the 3^{rd} generation (combinations of the existing cognitive models), theory of adaptive automation means of research of objects, processes and phenomena of theoretical mechanics, theory of technical means of the complex system analysis support of difficult objects, processes and phenomena of theoretical mechanics (automation means of formation and research based on cognitive circle, cognitive disc, cognitive cylinder, cognitive cone, cognitive sphere, one-, two-, tree-, fore-, five- and more cognitive sphere and others), theory of statistical substantiation of practical use of received results, theory of factors influencing to efficiency of functioning of objects, processes and phenomena of theoretical mechanics, theory of organization and plan of carrying out of experiment, theory of research of parameters of parametrical cognitive models block, theory of preliminary processing of a posteriori results of diagnostics, theory of choice of statistical analysis methods of generated data sets, theory of analysis of productivity dynamics of objects, processes and phenomena of theoretical mechanics, theory of dispersion, regression, discriminant, cluster analysis, multidimensional scaling, factor analysis and bibliographical lists;

the fundamental developments in area "Theoretical mechatronics" – theoretical bases, general tasks and methods of theoretical mechatronics, theory of general theoretical mechatronics, theory of mechatronics of liquid, gas and deformable firm body, theory of complex and special sections of theoretical mechatronics, theory of automation means and devices of mechatronics, theory of cognitive modeling technology in theoretical mechatronics (theory of hygroscope building)].

II. "The fundamental developments department "The theory of the mechanical-engineering, instrument making and metrology"" ("SPMPU") [***the fundamental developments in area "Theoretical mechanical-engineering"*** – theory of mechanical-engineering science and details of machines, theory of machine-building materials, technology of mechanical-engineering, theory of foundry manufacture, theory of forge-stamp manufacture, theory of assembly manufacture, theory of cutting of materials, theory of electrical-physical-chemistry processing, theory of thermal and strengthening processing, theory of furnish of surfaces and drawings of coverings, theory of manufacture of products from powder materials, theory of manufacture of nonmetallic products, theory of machine-tool construction, theory of robotics, theory of tool manufacture, theory of mining mechanical-engineering, theory of metallurgical mechanical-engineering, theory of reactor construction, theory of turbine construction, theory of special power plants, theory of chemical and oil mechanical-engineering, theory of locomotive construction and carriage building, theory of engine construction, theory of motor car building, theory of ship building, theory of aircraft building, theory of space technics and rocket building, theory of hoisting-transport mechanical-engineering, theory of building and road mechanical-engineering, theory of communal mechanical-engineering, theory of tractor and agricultural mechanical-engineering, theory of mechanical-engineering for light industry, theory of polygraphic mechanical-engineering, theory of mechanical-engineering for food-processing industry, theory of mechanical-engineering for trade and public catering, theory of household machines and devices, theory of manufacture of weapon, theoretical bases of other branches of mechanical-engineering, theory of cognitive modeling technology in theoretical mechanical-engineering;

the fundamental developments in area "Theoretical instrument making" – theoretical bases of instrument making, theory of general technology of production and equipment in instrument making, theory of designing and constructing of devices, theory of devices for measurement of electrical and magnetical sizes, theory of devices for measurement of mechanical sizes, theory of devices for measurement of time and frequency, theory of devices for measurement of composition (structure) and physical-chemical properties of substances and materials, theory of devices for thermal-technical and thermal-physical measurements, theory of devices for measurement of acoustical sizes and characteristics, theory of devices for measurement of optical and lighting-technical sizes and characteristics, theory of devices for measurement of ionization radiations, theory of devices of not destroying control of products and materials, theoretical bases of general structural elements, units of measuring devices and systems, devices of interface and office equipment means (periphery), theory of cognitive modeling technology in theoretical instrument making;
the fundamental developments in area "Theoretical metrology" – theory of scientific bases and technical means of theoretical metrology and metrological support, theory of state, national and international systems and services of metrology, theory of measurement of separate sizes and characteristics, theory of standard samples of composition (structure) and properties of substances and materials, theory of cognitive modeling technology in theoretical metrology (theory of measurement)].

III. "The fundamental developments department "The theory of the power engineering and electrical engineering"" ("SE") [***the fundamental developments in area "Theoretical power engineering"*** – theory of power resources, theory of power (energy) balance, theory of electrical power engineering (industry), theory of thermal-power engineering (industry), theory of thermal-technical engineering, theory of atomic power engineering (industry), theory of hydro-power engineering (industry), theory of helium-power engineering (industry), theory of wind-power engineering (industry), theory of direct transformation of energy, theory of cognitive modeling technology in theoretical power engineering;
the fundamental developments in area "Theoretical electrical engineering" – theory of electrical engineering, theory of electrical-technical materials, theory of electrical machines, theory of electrical devices, theory of transformers and electrical reactors, theory of power electrical condensers, theory of power converting technics, theory of electrical drive, theory of electrical-thermy, theory of electrical-welding equipment, theory of wire and cable, theory of electrical isolators, theory of light engineering, theory of electrical-technical equipment of special purpose, theory of cognitive modeling technology in theoretical electrical engineering].

The fundamental developments branches and departments of The SRI allow to develop the main and derivative scientific results of CMT.