

INTRODUCTION TO KICKOFF MEETING FOR THE PROJECT “DESCARTES-NUTATION”

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The Descartes Prize 2003 was awarded to the IAU/IUGG Working Group on “Nutation for a nonrigid Earth” chaired by Veronique Dehant. This prize is awarded for a fruitful collaboration in Europe and outside Europe, in order to achieve a goal in the frame of Science and Society. This prize was for their development of a new model of the nutations and precession of the Earth. The model was adopted by the International Astronomical Union (IAU) in 2000 and the International Union of Geodesy and Geophysics (IUGG) in 2003. It provides the link between the terrestrial frame, ‘fixed’ in relation to the Earth’s crust and rotating with the Earth, and the celestial frame, which is immobile in space. The relationship between these frames is complicated by the fact that the rotation and orientation of the Earth is subject to irregularities caused by the gravitational pull of the Sun and Moon, as well as by many other factors that are progressively being identified by geodesists, geophysicists, and astronomers. Because the Earth is an ellipsoid flattened at its poles, the combined forces acting upon it produce changes in both the speed of rotation and the orientation of the Earth symmetry axis. The term ‘precession’ describes the long-term trend of this latter motion, while ‘nutation’ is the name given to periodic variations, which were the prime focus of the present project. We have presented this work to the European Union and defended it in front of the Grand Jury. We have learned at the 2003 ceremony that we have been awarded and this was really a very nice surprise!

The EU has given the following citation: *An award of 300 000 Euros was presented to a project which considerably improves the efficiency of positioning and navigation systems. Led by Prof. Veronique Dehant of the Royal Observatory of Belgium, in association with researchers from France, Poland, Spain, Germany, Austria, the Czech Republic, the Ukraine, Russia (+USA, India, Japan, Canada, and China), this project has produced a highly accurate reference model to predict future variations in the Earth’s axis. The new model will have major concrete applications for European and international satellite systems.*

The project was coordinated by Prof. Veronique Dehant of the Royal Observatory of Belgium in association with researchers from her institution, from the Bureau International des Poids et Mesures in Sèvres, the Institut de Mécanique Céleste et de Calcul des Ephémérides and the Department “Systèmes de référence Temps-Espace” of Observatoire de Paris (France), the Space Research Centre of the Polish Academy of Sciences in Warsaw (Poland), Universidad Complutense of Madrid, the Universities of Alicante and Valladolid (Spain), Technical Universities of Dresden and Munich and GeoForschungsZentrum Potsdam (Germany), the Technical University of Vienna (Austria), Astronomical Institute of the Academy of Sciences of Czech Republic in

Prague (Czech Republic), the Main Astronomical Observatory of the National Academy of Sciences of Ukraine in Kiev (Ukraine) and the Sternberg State Astronomical Institute of Moscow State University (Russia). In addition to these European countries, USA, India, Japan, Canada, and China were also participating in the project.

Since that time, an advisory board was created; it is composed of Veronique Dehant, Aleksander Brzezinski, Nicole Capitaine, Juan Getino, and Harald Schuh. have announced a call for proposals for financing PhD students or post-doctoral fellowships and received a lot of good proposals. The advisory board decided to finance the following subjects (cf. Table). The call for proposals was not limited to European projects and several non-European projects have been accepted for financing.

The Descartes Nutation advisory board has also decided to provide some financial support for participation in these Journées Systèmes de Référence.

The Descartes Nutation advisory board is also willing to organize a summer school in Les Houches in May 2006. This will allow the previous WG members and other scientists to share their knowledge in the frame of research for the next decimal of the nutation model and observation.

Project Name	Institution	Contract Person	Length	Status
Dynamical Flattening Geophysical Fluids Combination	Vienna TU	Laura Fernandez	6 months post-doc	running
Investigation of Excitations of nutation from geophysical fluids	AER, USA	Yonghong Zhou	6 months post-doc	running
Relations between the Earth Orientation Parameters and the variations of the Earth gravity field, through the inertia tensor	Vienna TU	Géraldine Bourda	6 months post-doc	running
Estimation and modelling of the Free Core Nutation parameters (FCN)	Valladolid University	Vladimir Zharov	4 months	running
Part I - Advances in the integration of the equations of the Earth's rotation in the framework of the new parameters adopted by the IAU 2000 Resolutions	Observatoire de Paris	Marta Folgueira	6 months post-doc	running
Part II - Geophysical effects of considering the new solutions for the Earth's rotation in the framework of the new parameters adopted by the IAU 2000 Resolutions	Observatoire Royal de Belgique	Marta Folgueira	3 months post-doc	running
Modeling and prediction of the FCN Study of the atmospheric and nontidal oceanic effects on nutation	RSC Warsaw & USNO	Maciej Kalarus	6 months PhD student	running
Combination of AAM series for a IERS product	Observatoire Royal de Belgique	Laurence Koot	2 months PhD student	finished
Modeling atmospheric and oceanic contribution to nutation	Polish Academy of Sciences in Warsaw	Sergei Bolotin	6 months post-doc	running
Study of the Chandler Wobble and sub daily variability of polar motion and length of day	Polish Academy of Sciences in Warsaw	Maria Kudryashova	4 months PhD student	running
GPS-GALILEO-VLBI for nutations	Vienna TU & Observatoire Royal de Belgique	Kristyna Snajdrova	2 years PhD student	running
Combined effects of electromagnetic and topographic coupling on nutation	GSFC	Laurent Metivier	6 months post-doc	accepted
“Missioner” - Exchange program to study nutation Part 1	Observatoire Royal de Belgique	Cheng-Li Huang		running*
“Missioner” - Exchange program to study nutation Part 2	Shanghai Observatory	Véronique Dehant		running*

* The project was foreseen withing the Descartes Nutation Prize but a bilateral agreement budget between Belgium and China has been obtained in the mean time.