

NEW OPPORTUNITIES OF SLR SERVICE OF MAIN METROLOGICAL CENTER  
OF STATE SERVICE OF TIME, FREQUENCY AND EOP EVALUATION

Ignatenko Igor, Emelyanov Valery\*, Tsyba Efim, Pasyuk Sergey  
([igig@vniiftri.ru](mailto:igig@vniiftri.ru))

141570 Mendeleev, Moscow region, Russia, VNIIFTRI. <http://vniiftri.ru/eng>  
\* 664056, The Russian Federation, Irkutsk, Borodina st., 57. <http://www.en.vniiftri-irk.ru/>



1. Introduction

Federal State Unitary Enterprise (FSUE) "National Research Institute for Physical-Technical and Radio Engineering Measurements" (VNIIFTRI) is subordinated to Federal Agency on technical regulation and metrology of Russia. It has the status of the State scientific metrological center and is one of the main centers of the State standards of Russia. The VNIIFTRI plays role of the Main Metrological Center (MMC) of State Service of Time, Frequency and Earth's Orientation Parameters (EOP) evaluation (SSTF).

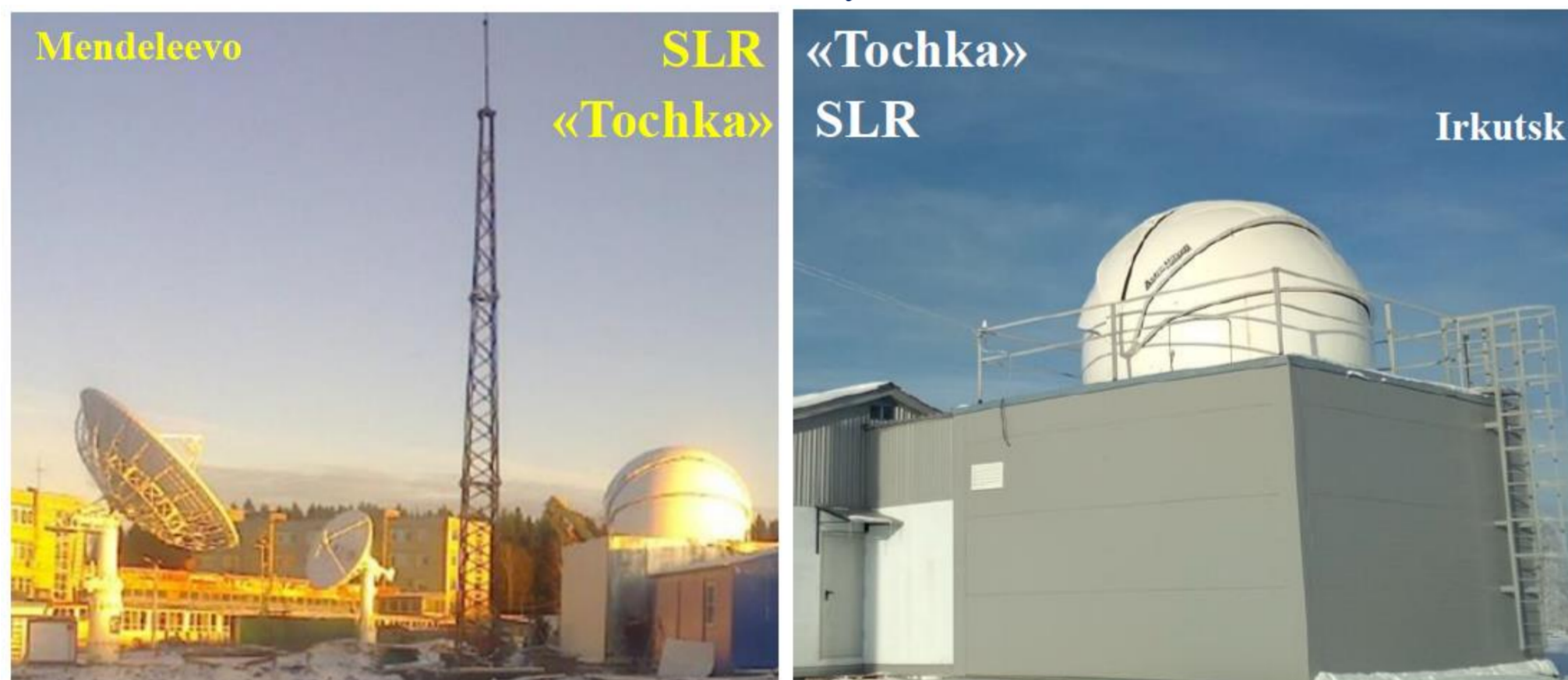


The East-Siberian branch of FSUE «VNIIFTRI» is an autonomous structural subdivision of FSUE «VNIIFTRI» and acts in accordance with The Rules of FSUE «VNIIFTRI», The Branch Regulations and Russian legal system.

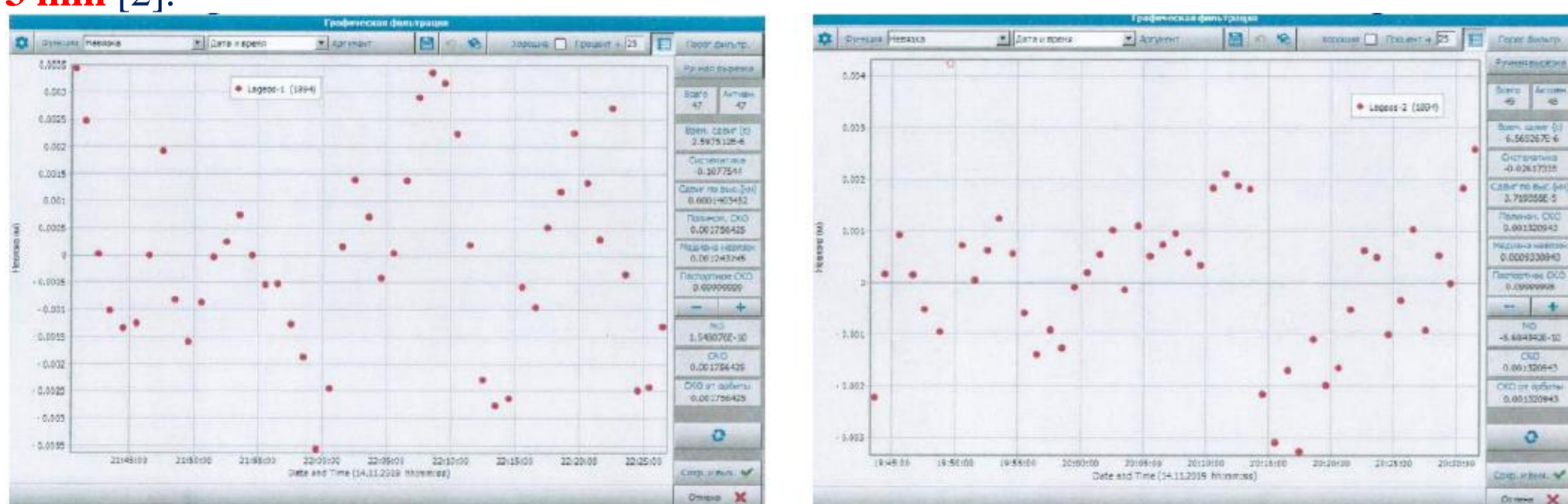
Satellite Laser Ranging (SLR) measurements FSUE VNIIFTRI is held since the 70-ies.

2. New equipment

Now, the two SLR instruments of the new generation [1] of the type "Tochka" are started work in Mendeleev (VNIIFTRI) and Irkutsk city (East-Siberian Branch of VNIIFTRI).



The Lageos 1 and 2 evaluations in IAC TSNIIMASH shows RMS which not exceeding of **3 mm** [2].



The processing in VNIIFTRI shows close results.

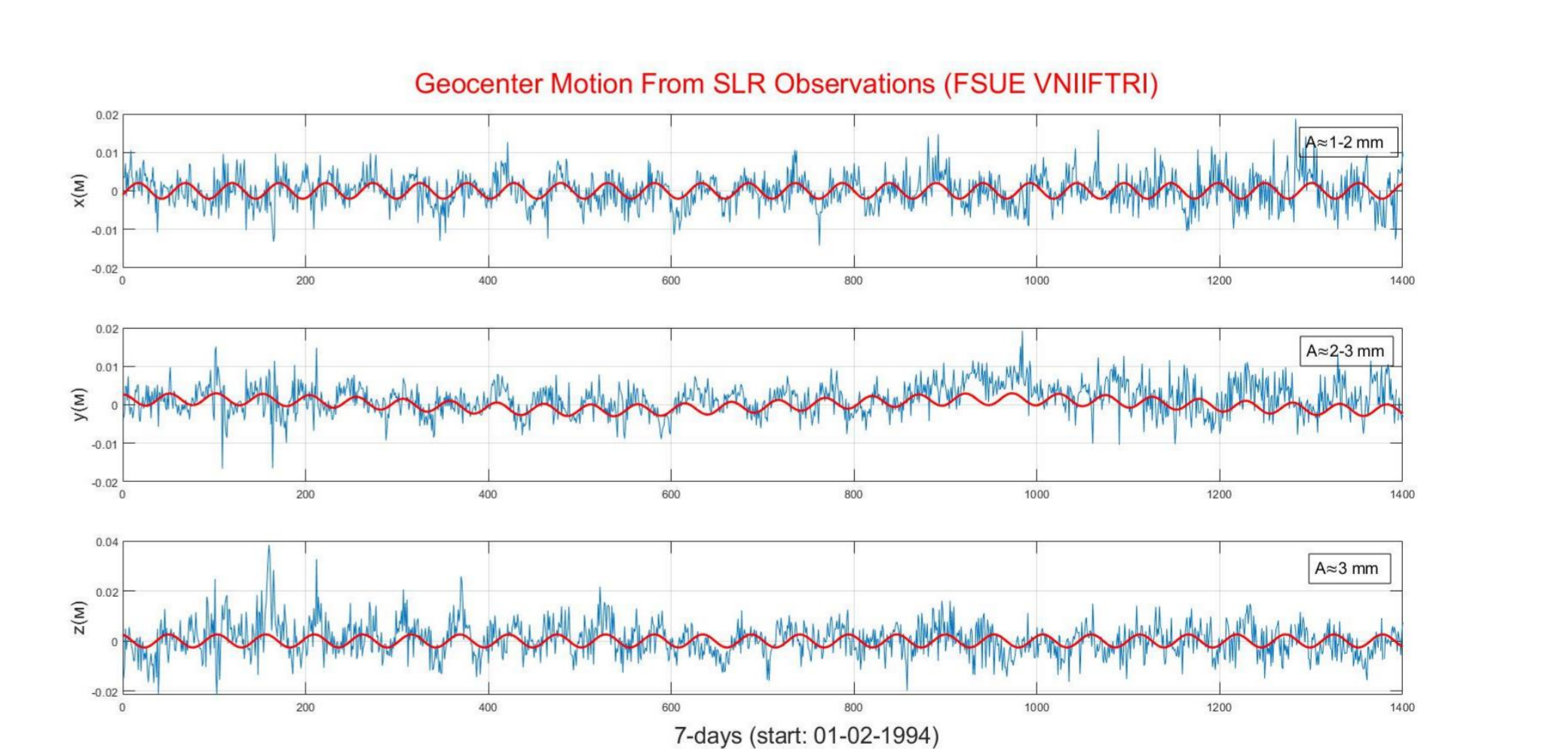
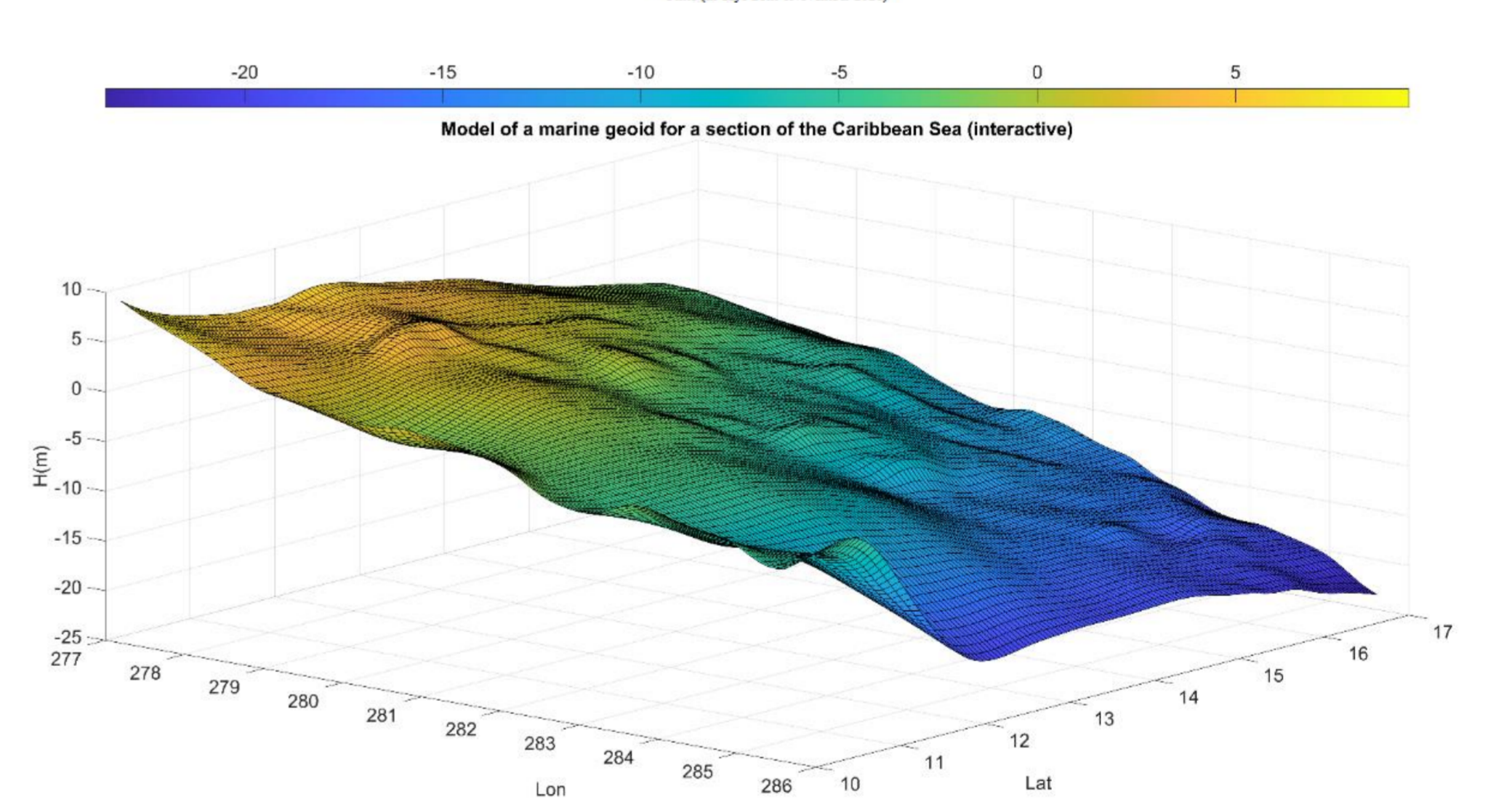
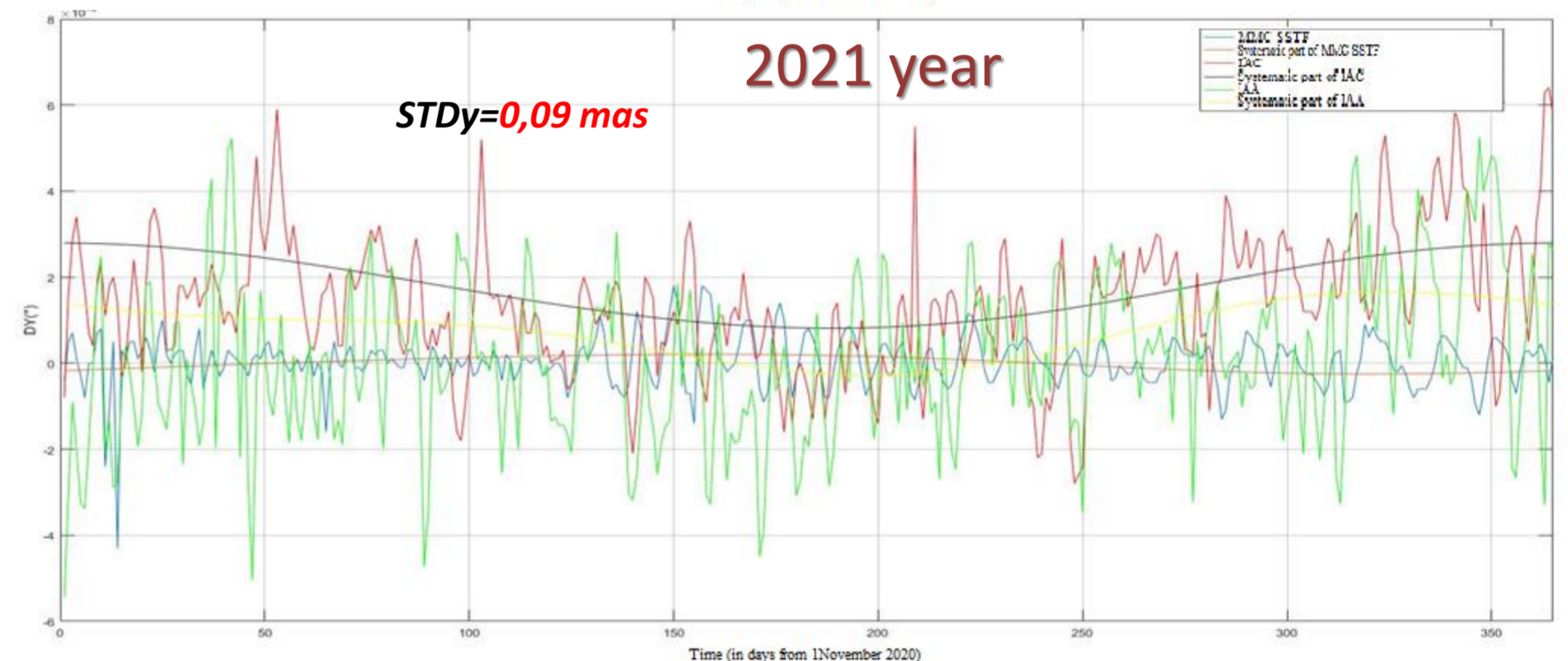
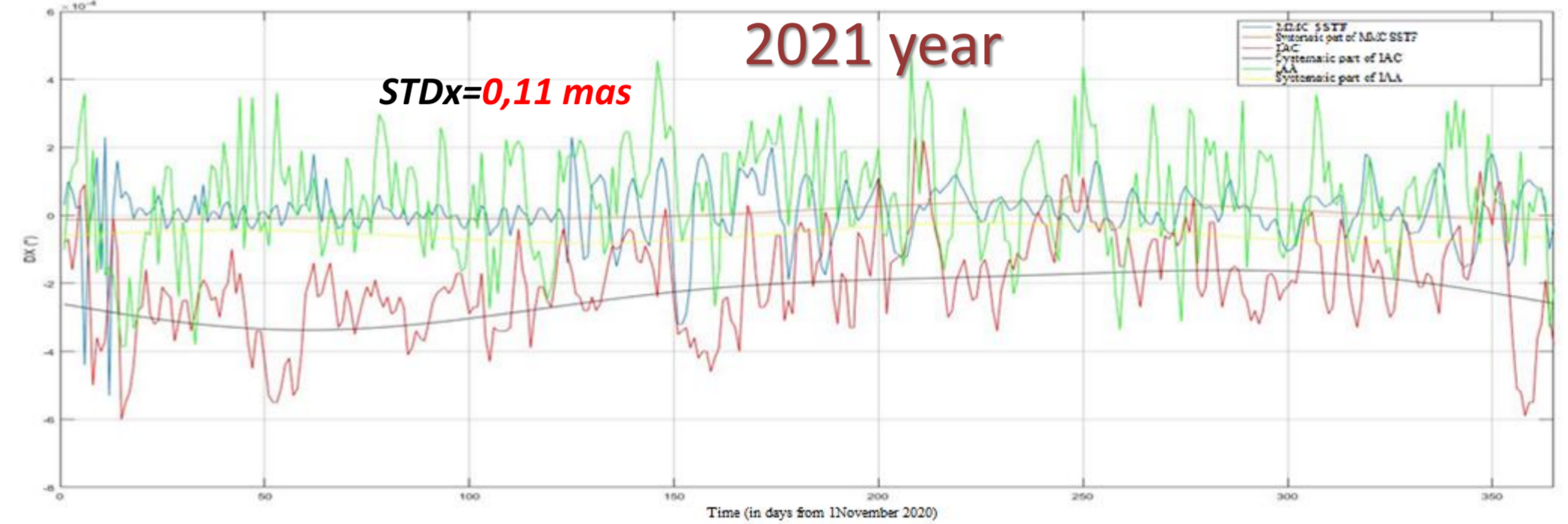
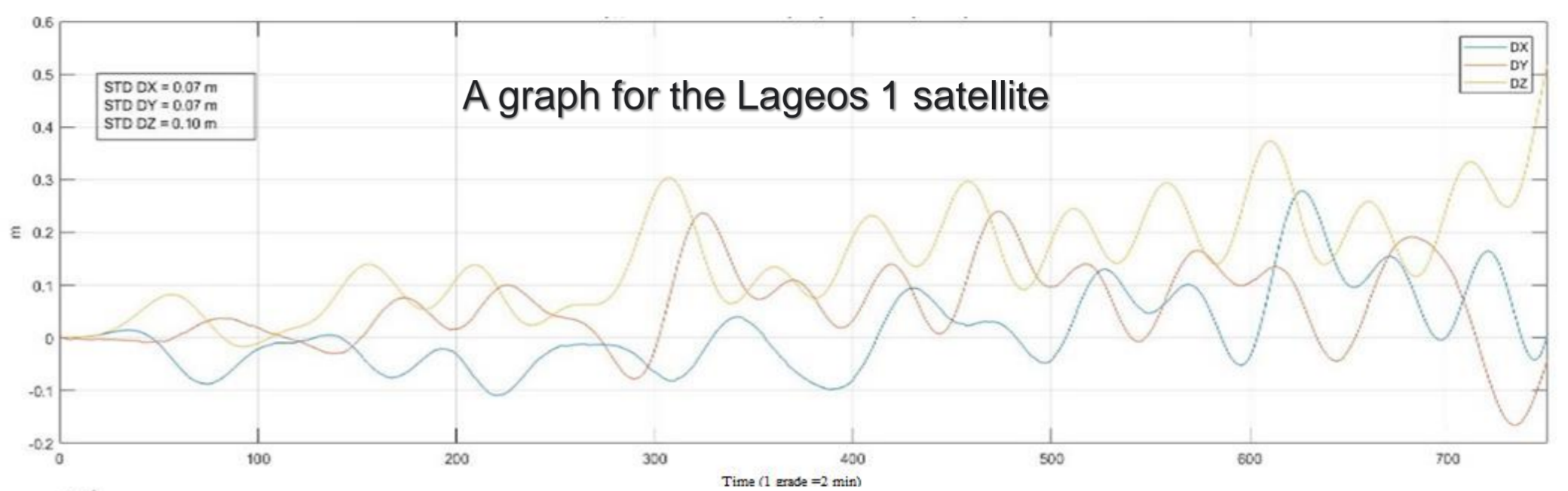
Laser locator is periodically calibrated due to the method of comparison with **state special standard of length**[3].

Station "Tochka" is also used for **time transfer** tasks. It obtains the time signal which physically realizes the national scale of time UTC(SU). Error of laser radiation moment reference impulse to the scale of the signal have not exceed 50 ps accordingly to technical requirements. But value **17 ps** was obtained in experiments.

3. New Software

The SLR software developing and SLR processing group of VNIIFTRI activities:

- creation of software tools for the operational calculation of satellite **orbits** (as an example, a graph for the Lageos 1 satellite is presented);
- regular evaluation of the coordinates of the terrestrial pole (X,Y) and the increment of the length of the day based on the processing of measurement data by SLR for **Earth's orientation parameters** service purposes [4];
- accurately determining the orbits of **oceanographic** satellites (calibrating satellite orbits);
- creation a **Marine geoid model**;
- **geocenter motion** evaluation.



4. Conclusions

The SLR-system of new generation has the instrumental error not exceeding units of millimeters at single measurement.

It was created together with Company «Research-and-Production Corporation «Precision Systems and Instruments». This system is specifically aimed at the transfer time and it will be made several copies.

Results of SLR group of VNIIFTRI have a good convenience with the best international results.

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