

«Dynamics» Experiment
**CHECK OF ADEQUACY OF MATHEMATICAL MODELS
OF THE DYNAMICS OF HIGHLY DEFORMABLE LOW-ELASTIC
LARGE-AREA SURFACES UNDER MICROGRAVITY**

Alpatov A. P., Delyamoure V. P., Khramov D. A., Belonozhko P. P.

*Institute of Technical Mechanics of NAS of Ukraine
15 Leshko-Popel St., Dnipropetrovsk-5, 49600 Ukraine
Tel: (380) +562 +472574, fax: (380) +562 +473414, e-mail: alpatov@pvv.dp.ua*

One of the most important technical trends in solar power engineering is development of large-area solar arrays. Being one of the types of large space structures (LSS), these structures are characterized by an extremely low ratio of thickness to linear surface dimensions. The development of this trend is retarded by a lack of experimental data, which would enable the adequacy of the known and developed mathematical models of LSS dynamics to be checked.

The purpose of the experiment is to obtain experimental data on the parameters of LSS dynamics. From this point of view, the primary objective is to determine the deformations and displacements of the LSS. Study of this problem on the ground is impossible. The reason is that the dynamics of such a model is completely distorted by the Earth's

gravitational field. Therefore, this experiment should be carried out under microgravity. It is assumed to model the large-area solar arrays as a mechanical large-area system with the extremely low ratio of thickness to linear surface dimensions by a thin low-elastic plate with the low bending resistance. The set of parameters will be defined with use of a video filming and remote modes during the exposure of a model in the experimental zone.

The results of the experiment will be used to establish the adequacy of mathematical model of the dynamics of essentially deformable low-elastic large-area surfaces as the basic structural elements of solar arrays. At the same time, the results of the planned experiment may be helpful for numerous researchers in the field of LSS dynamics and, thus, may be of great scientific value.