

the equipment will be separated from the URM and will move separately until entering the atmosphere.

The tasks defined in this experiment undoubtedly have a scientific novelty. Their solution is of great importance for development of promising space

tethered systems, orbital space stations, creation of the «space vehicle — tether — sub-satellite (micro-satellite)» system, development of space electrical engineering and power engineering, as well as of orientation and stabilization systems.

**«Concentrator» Experiment**

**PROCESSES OF SOLAR ENERGY CONVERSION INTO ELECTRIC ENERGY  
IN THE ADVANCED MULTIPLAYER PHOTO CELLS  
IN A COMPLEX WITH SOLAR RADIATION CONCENTRATORS**

**Alpatov A. P., Fokov O. A.**

*Institute of Technical Mechanics of NAS of Ukraine  
15 Leshko-Popel St., 49600 Dnipropetrovsk, Ukraine  
Tel:(380) + 562 + 472574, fax:(380) + 562 + 473413, e-mail: alpatov@pvv.dp.ua*

**Statsenko I. M.**

*ISR «Energetika» of the Dnipropetrovsk State University  
13 Naukova St., 49050 Dnipropetrovsk, Ukraine  
tel:(380)+562+433145*

**Rassamakin B. M., Shmireva A. H.**

*National Technical University of Ukraine «Kyiv Polytechnic Institute»  
6 Politekhnichna St., 04056 Kiev, Ukraine  
tel/fax: (380) +44 +241 86 66, e-mail: lab\_hp@teftnuu.kiev.ua*

**Belov D. G., Medvednikov S. V., Tarasov G. I.,  
Perekopskiy I. I., Khoroshilov V. S.**

*Yangel State Design Office «Pivdenne»  
3 Kryvorizska St., Dnipropetrovsk 49600 Ukraine  
tel: (380) +562 +92 51 13, fax: (380) +562 +77 0 01 25*

The use of advanced solid-body photo-voltaic (PV) converters and PV converters with solar energy concentrators allows reducing the solar arrays cost, increasing their resistance to performance degradation under the impact of the space environment factors, and improving their efficiency. Development of efficient PV converters is hindered by insufficient knowledge of physical phenomena of solar energy conversion under the space environment conditions. Application of concentrators is limited by the need to maintain the required thermal mode of PV converters exposed to concentrated radiation. This implies the urgency of studying new physical phenomena in solid-body PV converters and of solving the problem of heat removal.

The purpose of the experiment is to study the physical phenomena that occur in the solar array structures under the complex influence of space factors and to determine the maximum permissible degree of solar radiation concentration for PV converters of different structure and with different methods of heat removal.

The results of the experiment will allow verification of the calculated data and design solutions aimed at decreasing the degradation, as well as selection of coatings and materials both for PV converters and concentration systems, and for heat removal systems. Novel technologies will be developed to improve the solar arrays both for space and ground applications.