



November 3, 2014

To: Mr. Igor Karavaev  
Executive Director of Nuclear Technology Cluster  
Skolkovo Foundation  
4 Lugovaya str.,  
Skolkovo Innovation Centre,  
143026 Moscow, Russia

Dear Mr. Karavaev

The purpose of this letter is to share with you my expert opinion on originality and potential of the prototype of the robotic set-up developed by the start-up company "Computational robotics" for educating graduate students in control engineering and robotics subjects.

By its design, the set-up is aimed to illustrate different aspects of theories important for modelling and identification of dynamical systems and to emphasize for students applicability and limitations of various motion planning and feedback design algorithms for classical motion control task if a mechanical system is subject to constraints. Indeed, perpetual rotations of a freely moving disk on an frame driven by a DC-motor, if found, should be consistent at least with two constraints: the first one is inherited due to lack of sufficient number of actuators in the system, and the second one is due to a contact model between the disk and the frame. The disk will depart from the frame if along a motion the normal force between two bodies in contact has a wrong sign. Taking into account the constraints, the motions provided with the set-up by the company make the equipment and the work behind original and rather unique on the market of the available lab equipment. Another important feature of the set-up is its safety. The robot has no metal parts to intersect or collide to harm a student.

The components of the robot are rather standard and commonly used in industry and research labs through the globe. It includes a DC motor, a high-speed vision sensor, portable electronics and computing devices of the shelf. However, the experiments this robot is showing are very challenging and require deep theoretical knowledge and engineering skills. So that students and researchers educated to comprehend the development will certainly gain from it and come enthusiastically into the subject to learn new concepts and organize new fascinating experimental studies on standard equipment.

I believe that the robot is appropriate for labs in our Scientific Research and Superior Education Center CICESE and I am interested to follow its development into the product. Hope our department will have a chance to purchase it in short time.

Sincerely yours

Professor Yury Orlov

Electronics and Telecommunication Department