Space robotics is a fascinating field developed for the purposes of space exploration and space missions. For a long time, our technology was not advanced enough to allow us to explore space. In addition, expeditions in space often take more than a human's life span. This is why we need to use autonomous robots of various sorts and types. Robots allow us to extend our abilities, to plan such long missions and to safely and efficiently explore space. Automated spacecraft may be the answer to problems of deep space travel and exploration. Some current issues, such as space debris removal from Earth orbits and on-orbit servicing of satellites, may be solved by autonomous robots equipped with a manipulator. This project, realised by The Space Research Centre of the Polish Academy of Sciences (CBK PAN) and Wrocław University of Technology, aims to develop planning and control algorythms for such spacecraft and test their application on the planar test-bed with air bearings in CBK PAN, upgraded within this project, allowing us to better understand the nonholonomic constraints and as a consequence the movement of these spacecraft.