**"Gyroskopiya i Navigatsiya" №2, 2004**

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| In the report represented there are discussed the constructive principles and the technical characteristics of the phase radio-navigation system (RNS) "Krabik-BM", developed in 2000-2002 years by the associations KSTU with FGUP NPP "Radiosvyaz". The RNS is intended for high-precision automatic definition, indication and registering the position coordinates and motion elements of above-water objects, it works in the range of frequencies of 320-332 MHz and ensures the determination of coordinates error 0.5-3 m. In 2002, the prototype of RNS "Krabik-BM" passed official tests according to results of which there was accepted a solution about its series production by FGUP NPP "Radiosvyaz" of Krasnoyarsk. |  |

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| Theories and Methods for navigation control of mobile robots in unknown environments including main contents and recent developments relative to navigation have been surveyed and analyzed. The main contents deal with the Architecture, Environment Modeling, Localization Methods, Path Planning, Motion Control, Fault Diagnosis and Recovery and so on. Some learning and self-adaptive theories and approaches relative to the mobile robot navigation have been investigated, especially the kernel-based reinforcement learning, evolution-based learning and multiple-instance learning have been attracted much attention in recent years. Several existing problems have been presented, some issues of the future research have also been proposed in this paper. |  |

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| In the recent past GPS receivers for space applications have been used in different areas. Orbit determination for different kinds of missions from LEO (Low Earth Orbit) to GEO (Geostationary Orbit) [6] have been explored and used. For LEO satellites the usage of GPS receivers is becoming a standard. Navigation satellite systems are not only used for real-time absolute orbit determination, but also for relative navigation between multiple vehicles, attitude determination, precise orbit determination and a growing number of other areas of interest. The so-called MosaicAODS [5] is a space-borne Attitude & Orbit Determination System developed at Astrium GmbH. It is based on the MosaicGNSS receiver [3], extended by a star sensor and an optional INS. In order to validate the functionality of the MosaicAODS and to ensure its proper functionality in space a modular real-time test environment has been developed, where single AODS modules as well as the full system can easily be tested. Additional to these tests, the system provides the capability to test precise and relative navigation using GPS signals for rendezvous maneuver, formation flying or spacecraft co-positioning. This paper outlines the AODS test environment and the GPS precise and relative navigation test environment. |  |

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