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Research at rocket-space complex and orbiter with liquid propellant engines on HPT

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It is a review of criteria for the establishment of active orbital spacecraft, taking into account the analysis of aspects of the application of the propulsion system running on hydrogen peroxide and the possibility of its return to the Earth surface. As a result of research, the concept of creating a modern type of spacecraft maneuvering in orbit, returning unmanned orbiter in the embodiment of the Satellite Remote Sensing (SRS) was proposed. In the report, the results of optimizing the design of the Launch Vehicle (LV) are reflected. This article examines the preceding schematic design elements of space rocket complex. In particular, the elements of LV, Orbiter, and their propulsion systems. Initial calculations of the aerodynamic parameters of Orbiter on the descent and maneuvering in low orbit were carried out. The report shows an embodiment of space rocket engine liquid propellant components that were selected.

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Virtual preparation and commissioning of production systems including PLC-logic

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Vehicle manufacturing companies are today forced to handle and respond to a rapidly growing variety of vehicles, due to the environmental restriction on energy consumption and CO2 emissions. An additional requirement is also that these new innovative and environmental friendly products are produced in already existing factories. A clear trend today is also that production volume has to be changed with short notice to meet market changes. Today's manufacturing systems, therefore, have to be both energy and time-efficient, safe, as well as flexible to manage this complexity. The challenge is to reduce the production preparation time by bringing together mechanical and electrical engineers into a common virtual environment achieving a more efficient cooperation, enabling automatic generation of verified control programs. Another challenge is reducing energy consumption by embedding detailed robot energy optimization into early scheduling. A third challenge is to increase production efficiency, increase human and machine safety and decrease the number of discarded parts by performing virtual commissioning of entire manufacturing stations, including complete robot programs, control logic and safety equipment like HMIs. A required step, in order to handle the above described problems is to extend early process design and mechanical simulation with control logics to ensure an intended behavior. It has been shown that possible savings could be achieved if PLC programming and optimization is included in earlier production preparation phases together with new functionality based on formal methods.

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