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Insuring Quality and Safety in a Cost Constrained Environment: Which Trade-Off? (1)

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THE ENSURING OF THE CONTROL SYSTEM EFFICIENCY OF TECHNOLOGICAL SYSTEMS OF A ROCKET-SPACE COMPLEX ON PRE-LAUNCH STAGE OF ITS OPERATION DR. VADIM KADZHAEV, KAVA.TSENKI@MAIL.RU

Abstract

What does it mean – to ensure the control system efficiency of technological systems? 1. It is necessary to ensure sustainable operation of the control system and acceptable level of reliability. These systems possess a number of special characteristics. The most important is ergodic property, which means that by one realization it is possible to define all properties of random process. For stochastic function X (t) the average value of its one realization is approximately equal to an average value of supervisions set. It is true also for X2(t), X(t) • X(t +), etc. It means that we can't define a posterior reliability of a control system, like as we did for technological systems, by using the tree of refusals and Bayes' formula. And how can we solve this problem? – Only by way of system reservation. 2. The control system must give out the commands for executing operation according to the hierarchy of control commands. At first we need to do the preparatory operations and after that – concluding operations. For example: before beginning to fill the tanks of space object by cryogenic fuel, its cooling must be carried out. The role of an operating system for elimination the personnel's errors are also important. If a system has a lag, the operator has to make transit to manual control. In both cases, it is important to have the results of the original commands performance. 3. The monitoring subsystem should show the function and (or) the curve of the key parameter of the process. When we to fill the tanks, it can be the flow rate or the flow velocity. In addition, the first and second derivatives have to display the gradient of the function (curve) and the jump of curvature. The change of the gradient indicates the unpredictable drift of the parameter. The jump of the curvature indicates the changing nature of the process and the failure's possible. In all cases the operator has to respond. Certainly, the process of interaction between the control and technological systems requires more detailed consideration, and we will try to do it in the manuscript.