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USING A HUMAN-CENTRIC DESIGN PROCESS FOR THE IMPLEMENTATION OF ADVANCED COMPUTER-BASED TOOLS IN SPACE PROGRAMS

Abstract

One of the challenges for long-duration crewed missions to deep space is the use of advanced computer tools. We first need a thorough understanding of how to successfully incorporate these in current processes that support the design and actual built of projects here on Earth that will be sent to space. This study will use as an example the implementation of advanced computer-based tools to the traditional pen and paper redline process. A redline process is used in aerospace companies, commercial and government, to reflect any changes made to a document. In the test phase, these redlines are generally made to test procedures and drawings. The effectiveness of proposed computer-based tools and their interaction with the user will be explored. It is necessary to understand the challenges and scientific processes that come with the integration of both the user and complex systems such as computer-based tools as new release methods for redlined procedures. Typically these type of tools use a universal design that allows accessibility by everyone, but making these tools too general may lose the user-oriented idea. A major challenge is to create safe systems that are easy for the user to understand and operate; this means a system that incorporates a human-centric design process. Methods that can quickly be processed through human's perceptual system and expand our working memory and information storage will be explored, such as the influence of different organizational factors in employees' behavior, actions, and job performance. Personnel and products safety as well as the effectiveness of our performance may depend on several of those organizational factors, yet many they are not taken into account. For example, when organizational changes are made to departments or procedures without clearly having communicated to the teams can result in significant mishaps. We will see how the cognitive processing of decision making for human-machine interaction through the practices used in aviation psychology and crew resource management can help minimize human errors in the aerospace realm. The correct integration of advanced computer-based tools with the abilities and limitations of humans will be helpful for earlier detection and better management of errors during the design and built of space programs here on Earth. Once that process is well understood and established we will be able to apply it in future human missions into deep space.