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RAM METHODOLOGY AND ACTIVITIES FOR IFMIF ENGINEERING DESIGN

IFMIF (International Fusion Materials Irradiation Facility) will be an accelerator-based neutron source to test fusion candidate materials. It consists on a set of two parallel deuteron accelerators (40 MeV, 125 mA, CW) bringing the beam to a liquid lithium target. The interaction between the deuterons and the lithium generates a flux of neutrons whose spectrum is rather well suited with fusion needs. This flux irradiates the samples hosted in the test facilities.

The Engineering Validation and Engineering Design Activities of IFMIF are aimed to deliver the complete engineering design file of this major facility. This engineering design will be validated by the design, the construction and the operation of three prototypes representative of the main challenging systems of IFMIF, including the low energy part of the accelerator (up to 9 MeV), tested at full current (125mA) in continuous wave at Rokkasho, Japan.

Achieving a high level of availability and reliability is a key point for IFMIF mission. A goal of 70% of availability (including schedule maintenance time) has been established. In order to fulfill the availability requirements, RAM has to be considered during the engineering design phase. This paper summarizes the proposed process aimed at including RAM methodology in the design of IFMIF, as well as the activities performed in this framework.

Technical guidelines have been developed for the designers' consideration during the engineering design phase. As a first step for the iterative process of RAM analysis of IFMIF design, an independent fault tree model based on a new reliability database has been developed with Risk Spectrum®. The result is a first assessment of the availability and first allocation of RAM requirements. On the other hand, data capture methodology has been proposed for IFMIF prototypes in order to improve IFMIF database.

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