

RAWG meeting 06.06.2023

Participants:

A. Asko, T. Baumann, M. di Mita, L. Felsberger, E. Fortescue, B. Mikulec, L. Millet, C. Hernalsteens, G. Perinic, J. Uythoven, F. Waldhauser, C. Wiesner, D. Wollmann

The slides are available on Indico: <https://indico.cern.ch/event/1290448/>

Advancing Data Understanding Using Live Assurance Cases using KPIs and SPIs – An LHC Machine Protection System Case Study – Speaker: L. Millet

L. Millet gave an introduction on how to use key performance indicators (KPIs) and how they can be both derived from system assurance cases and used to ensure that systems remain safe.

J. Uythoven added as context that an assurance case was developed for the LHC Machine Protection System (MPS) together with colleagues from Critical Systems Labs. Now the idea is to extend the assurance case by KPIs that can be used to enlarge the existing monitoring of the LHC MPS.

Comments and Questions after the talk:

J. Uythoven commented that the post-mortem (PM) system is complex, but simpler things can be extracted from it. E.g. the dump cause of a fill and whether it was related to a malfunction of the MPS can be an indicator of the MPS integrity.

D. Wollmann pointed out that AFT may be a better alternative to get data as the root cause of a dump is sometimes better classified. B. Mikulec replied that one may have to go deeper in the details of the faulty components than is possible in AFT. L. Felsberger added that high level KPIs on the dump cause could already be identified from AFT but to get indicators as suggested in slide 8 the logging database may be the way to go. D. Wollmann replied that the logging data is generally not accessible in a “digested” form and that the multitude of different failure modes makes it difficult to interpret the data properly.

J. Uythoven pointed out that for key MPS systems special PM modules are available where the data is available in a more accessible form.

He also pointed out that the indicators probably do not have to be “live” but can be periodically updated.

L. Millet commented that she observed that a lot of so-called lagging KPIs are already done in the PM system that reports problems after they happened. The added value would be to go towards leading indicators that indicate symptoms before problems appear.

C. Hernalsteens asked whether instead of identifying new indicators it made sense to check if the existing indicators in the PM match well with the critical information identified in the assurance case. This may give insight where either the PM or the assurance case need improvement if discrepancies are found. As concrete example he gave the intensity ramp-up checklists that are done.

D. Wollmann added the automatic beam loss analysis that is currently being implemented as possible source of KPIs.

C. Wiesner complemented that the examples mentioned were already considered. The idea with them would be to move from binary indicators towards more continuous ones.