



COMISIÓN NACIONAL DE ENERGÍA ATÓMICA

# A framework to understand and model the dynamics of safety management in the operation of a nuclear reactor.



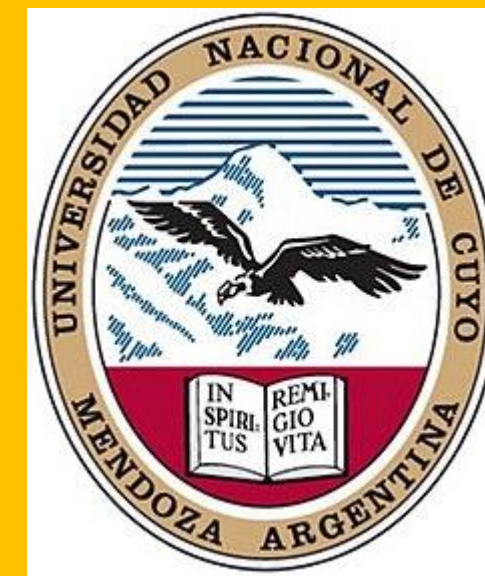
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## INTRODUCTION

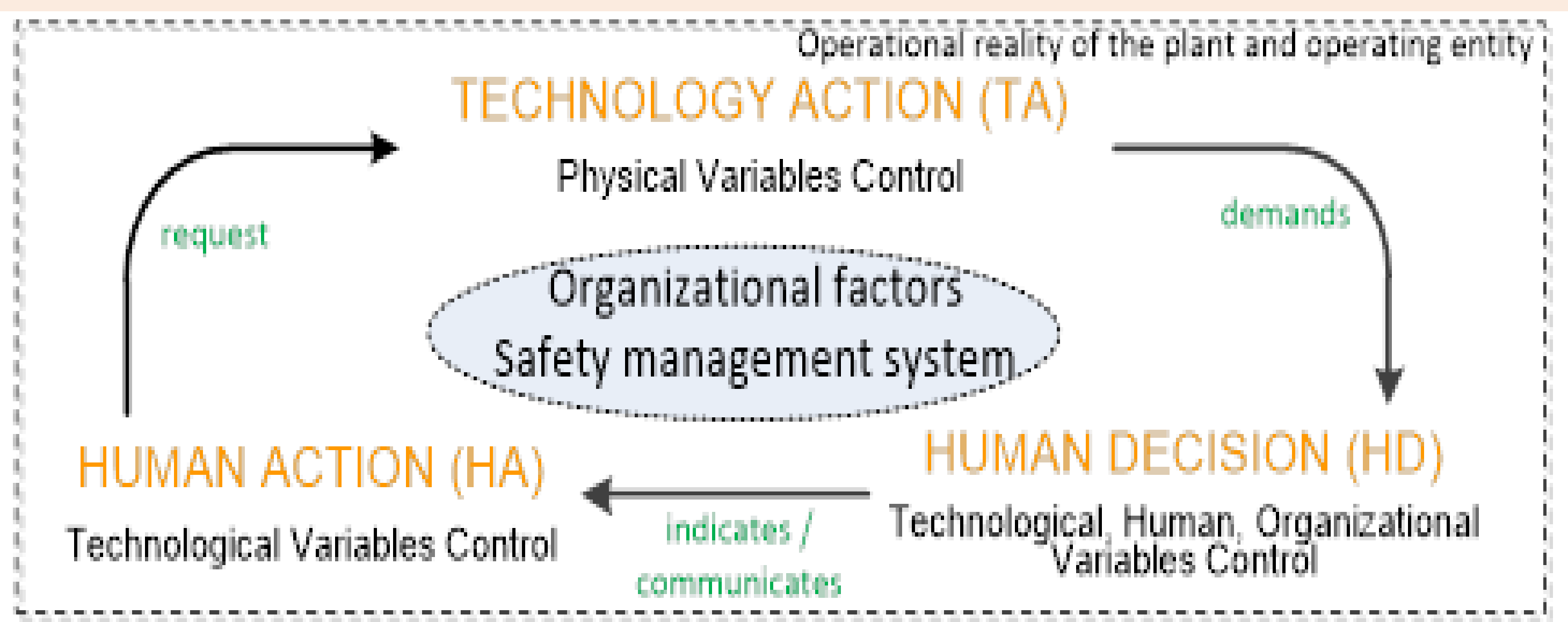
This work aims to present the basis of a framework to understand and then be able to model the management of safety in the operation of a nuclear reactor from a systems perspective. Method: Bibliographic review, use of the inductive and deductive method, and analytical reduction to the root causes of the main nuclear accidents. A safety definition is presented, based on the MTOI framework modifications proposed to it. It is proposed to rename it as MTOE and detail its elements. The problem of safety management is analyzed and described systematically and dynamically. Some appropriate methodologies are presented to be used in the representation of the proposed subsystems. Conclusions: The bases are presented to model with dynamic modelling methodologies the safety management of an organization operating a nuclear reactor.

## METHOD

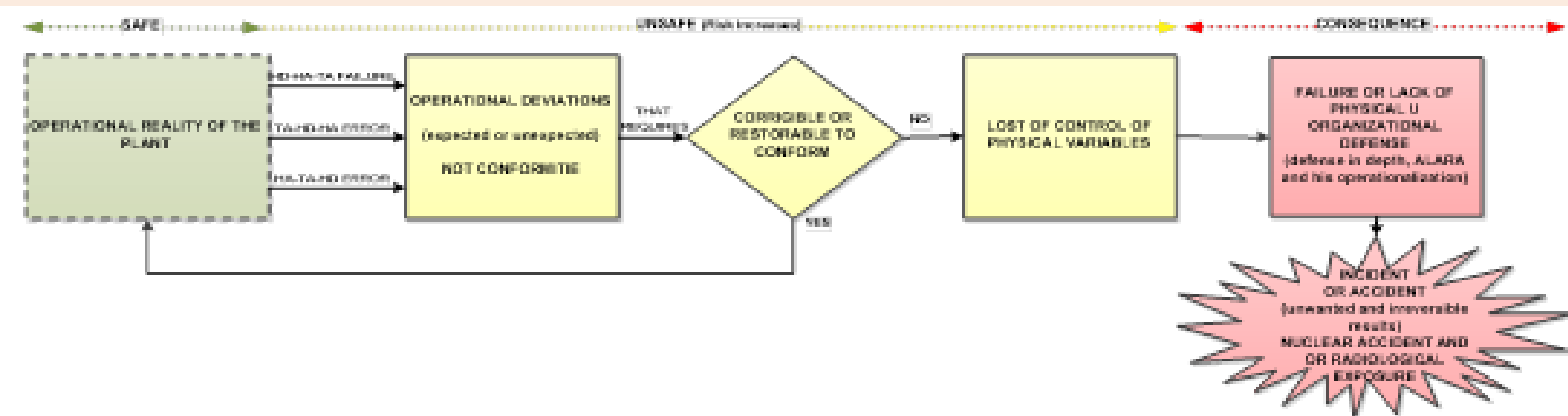
- Apply the deductive-inductive method [2].
- Apply analytical reduction to the main root causes of the principal nuclear accidents [3].
- Analysis of bibliography and study of the gaps identified in state of the art [4].

## RESULTS

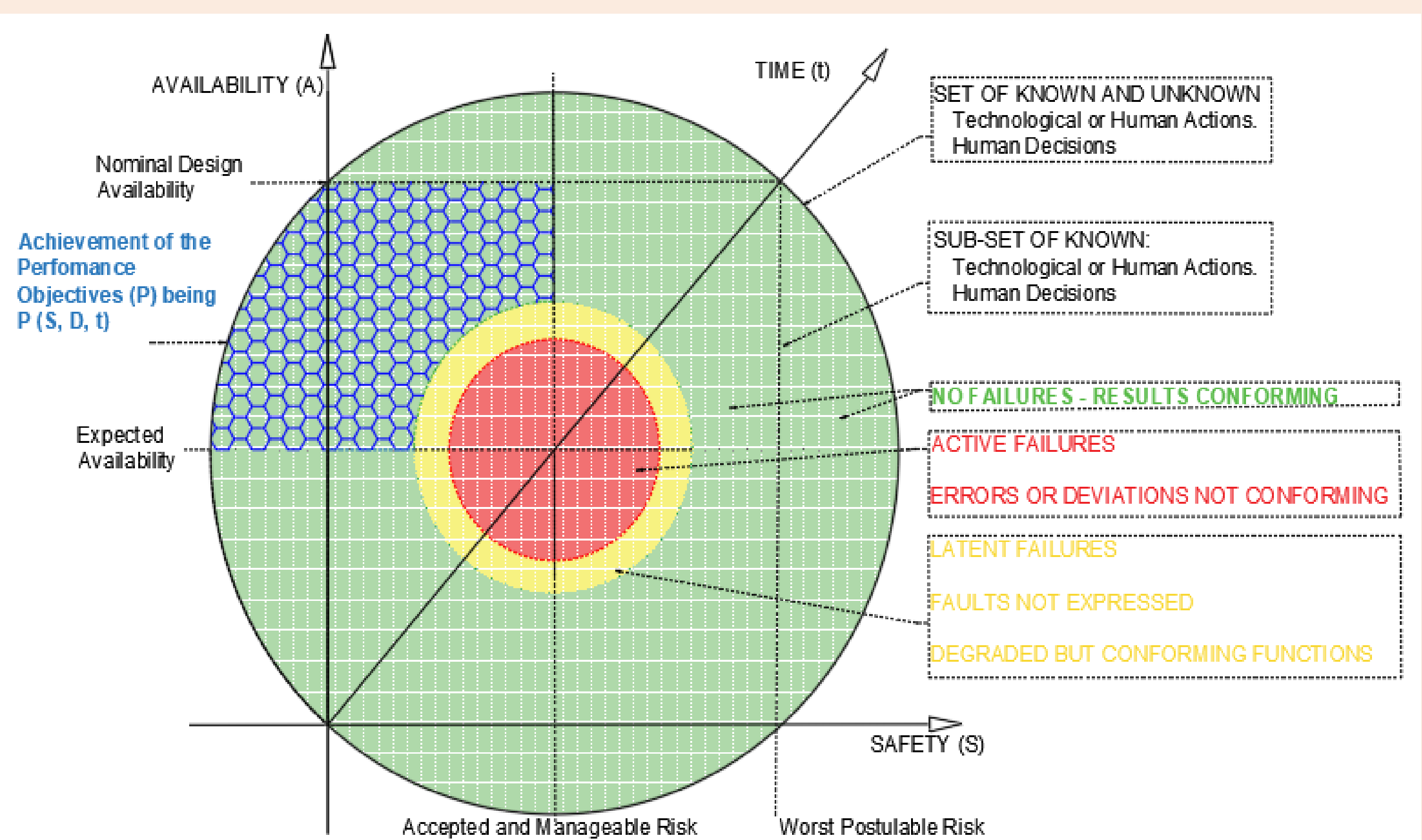
Fundamental causal loop unit of accidents/incidents.



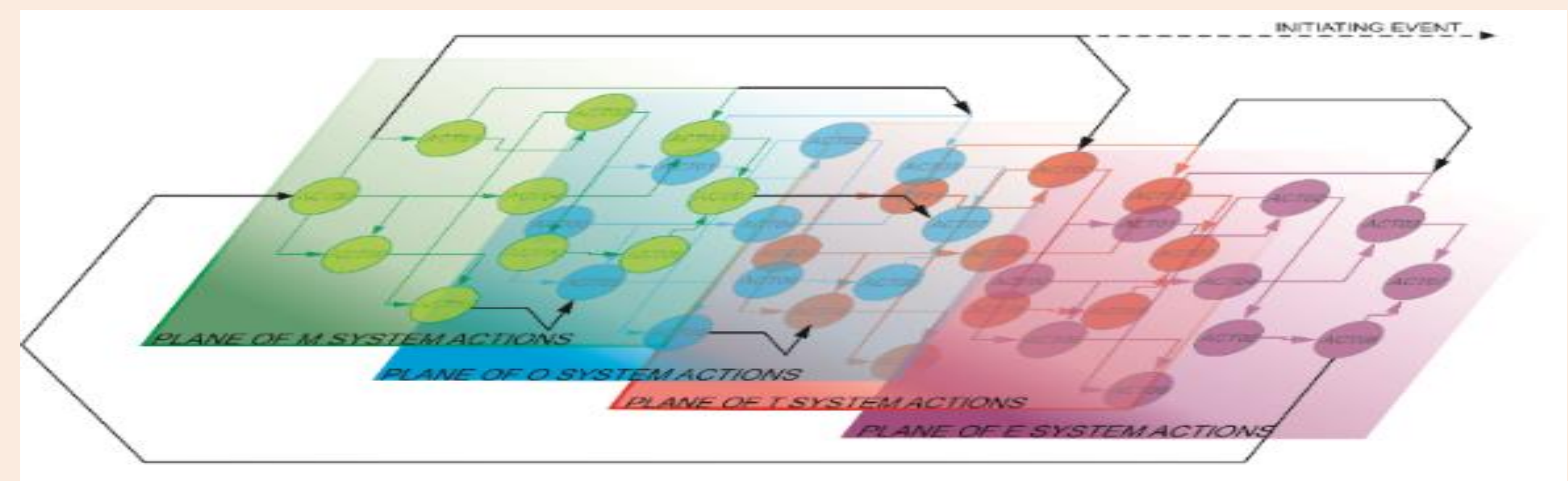
## Simplified accidental/incidental sequence.



Integrated domains of safety and availability. Safety as a dynamic problem.



Man, Technology, Organization, Environment Framework proposal.



## CONCLUSIONS

A framework basis for developing a systemic and dynamic model of the SM of nuclear reactors' operating organizations is developed based on a bibliographical review. A proposal to understand the causal relations of the elements of this system was presented. The MTOE framework was introduced, and the tools to represent its subsystems have initial considerations.

## REFERENCES

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- [3] G. Acuña, M. Giménez, M. Sánchez, Evolution of safety management before the Fukushima Daiichi accident. A bibliographical revision in the context of major modern industrial accidents., (2020).
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