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Digital Technologies Supporting Lifecycle Nuclear Knowledge Management of NPPs

International Workshop on Application of Advanced Plant Information Systems for Nuclear Decommissioning and Life-cycle Management

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Ashok Ganesan
Nuclear Knowledge Management Section,
Department of Nuclear Energy, IAEA

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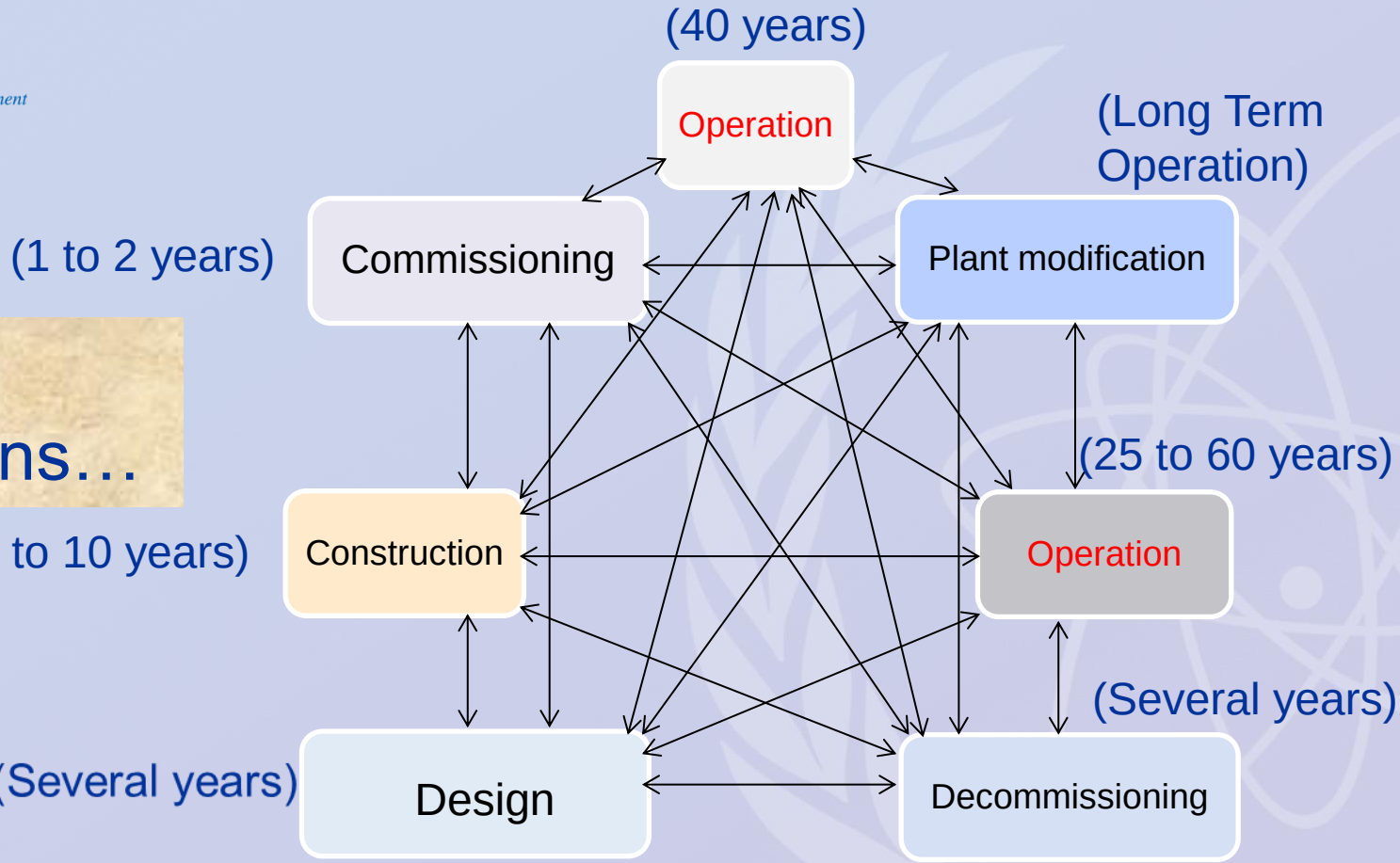
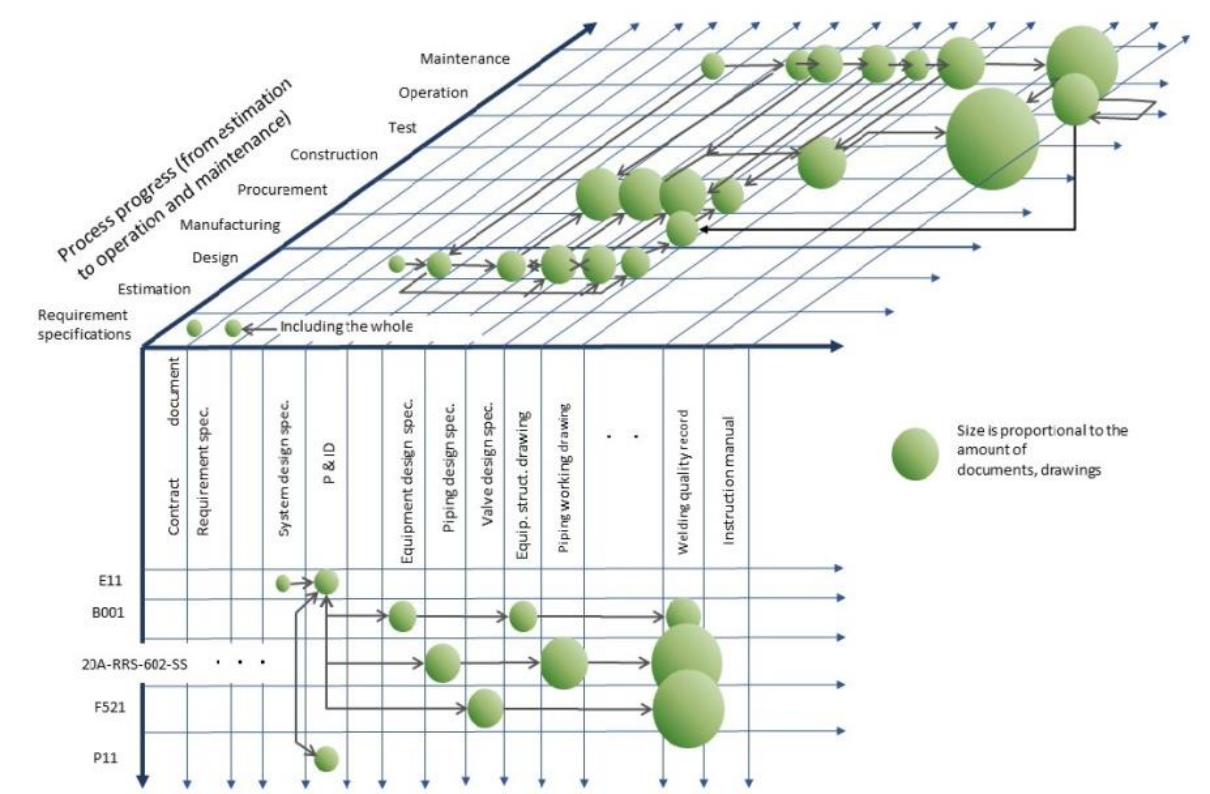
Objectives

- Rationale of lifecycle approach
- Digital technologies
- IAEA assistance to Member States
- Considerations and insights

Lifecycle considerations…



Interaction of Information/Knowledge



Courtesy : Hitachi, Japan

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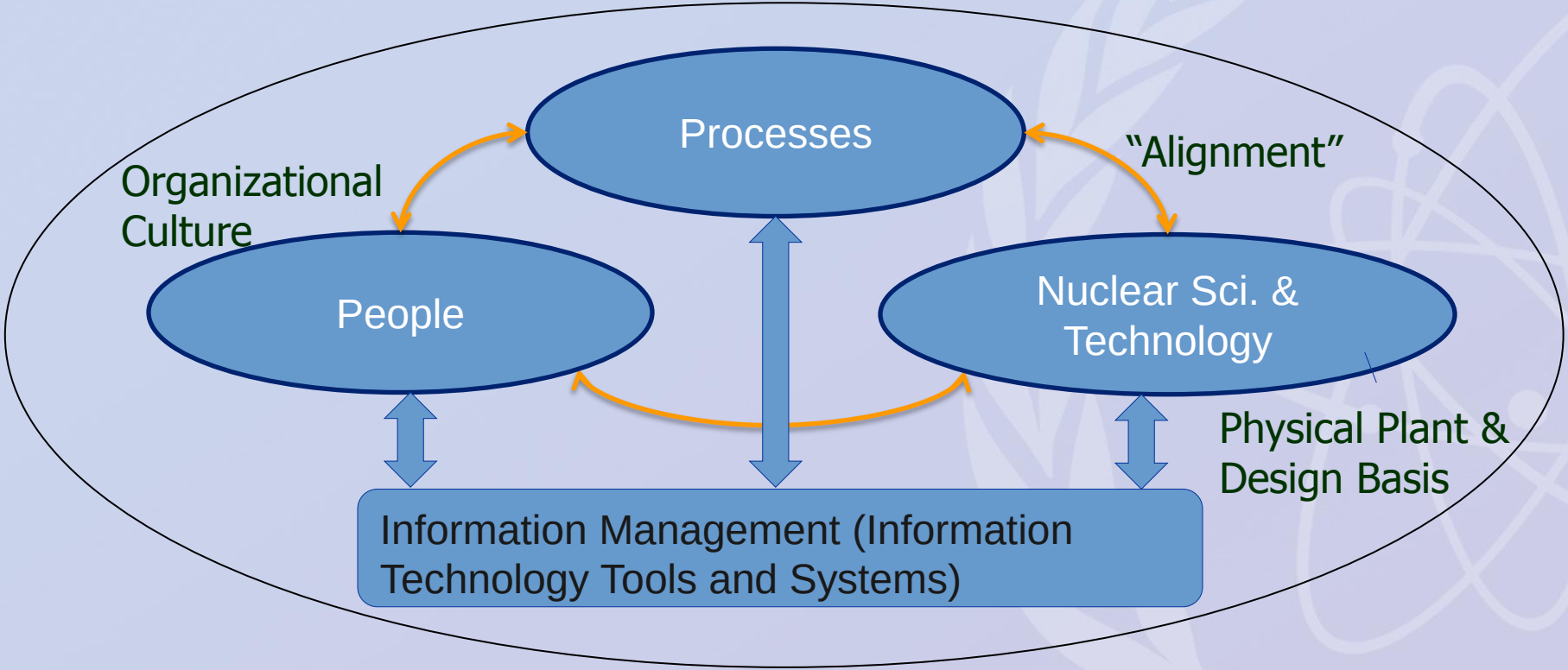
Digital technologies for lifecycle management of nuclear knowledge in NPPs

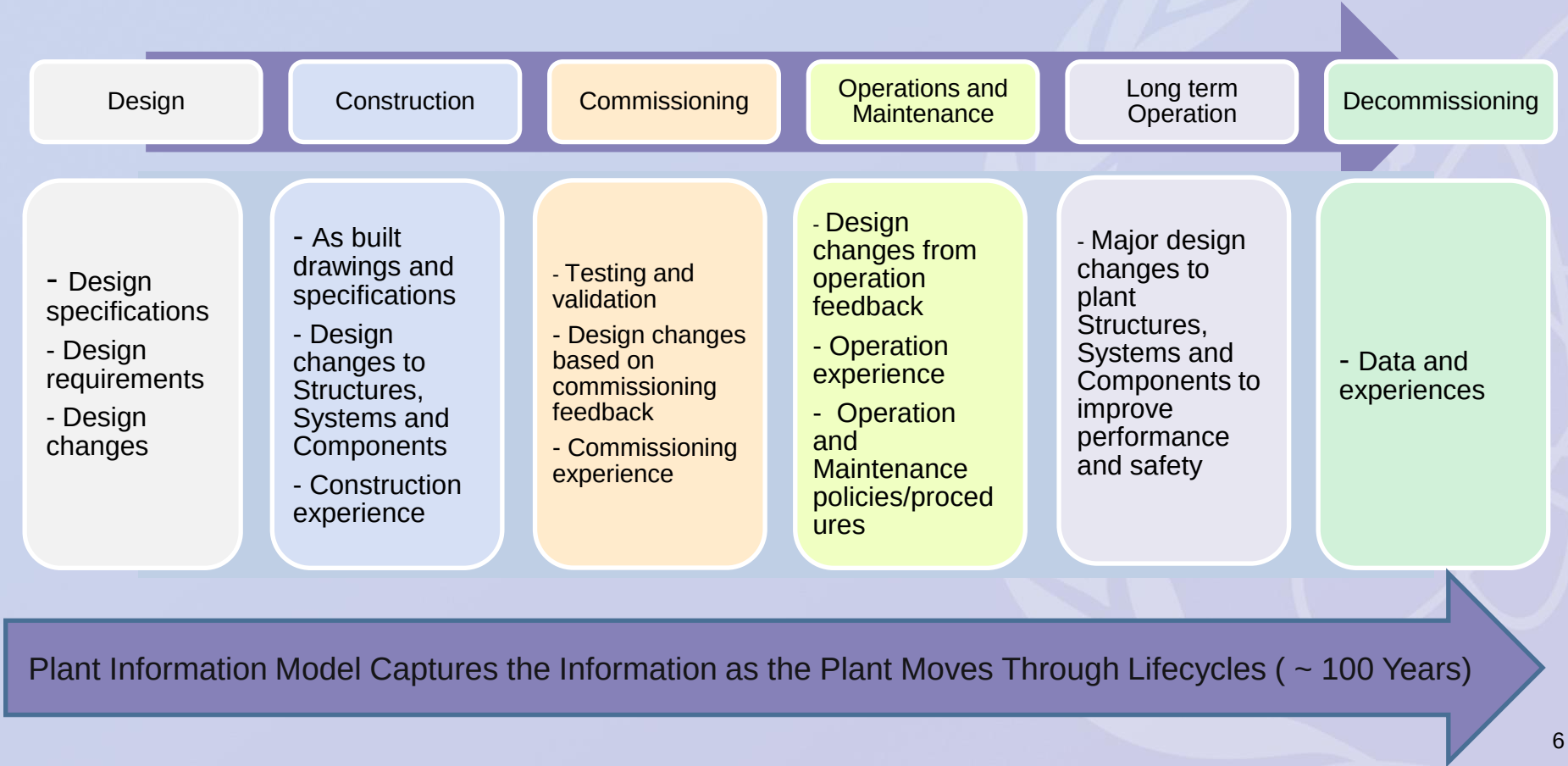
NPP Organization's Primary Knowledge Assets



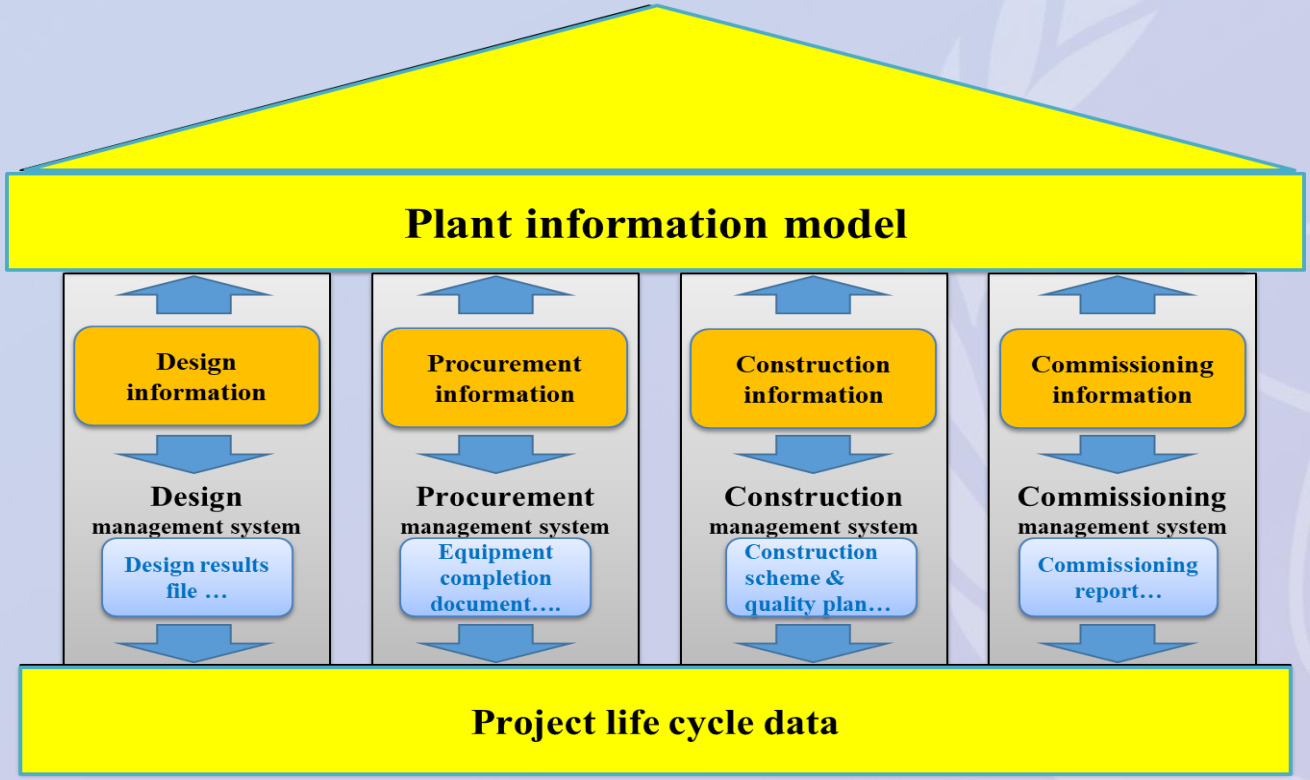
Plant Information Model (PIM)

A Knowledge-centric Plant Information Model is a semantically organized set of interlinked facility information, relationships, rules and knowledge frameworks that collectively
form digital representations of the plant throughout its life cycle

Plant Information Model (PIM) for the Plant Lifecycle



Plant information model for decision making

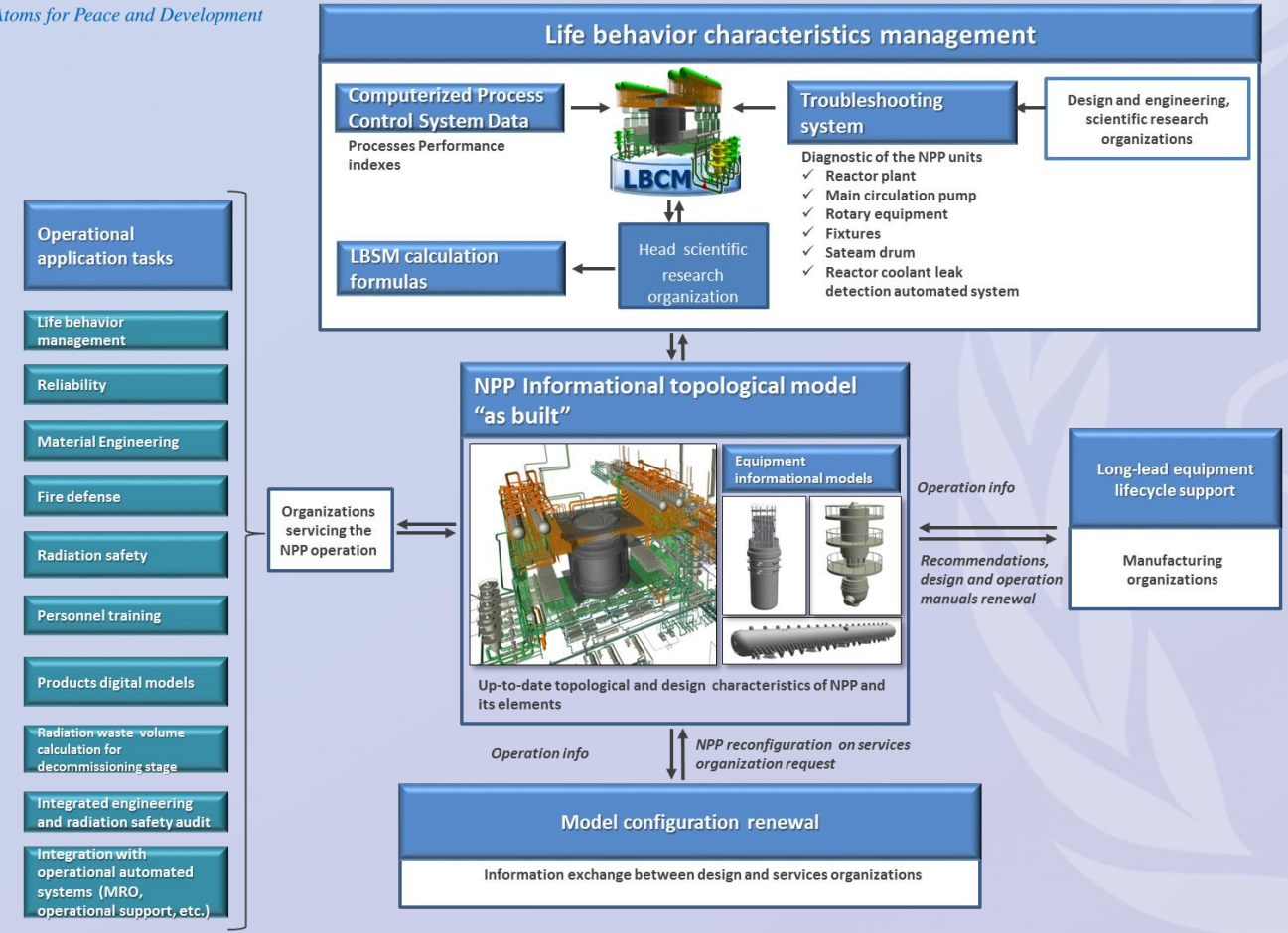


Plant Information Model (PIM) for the Plant Lifecycle- Example of an equipment- Reactor Coolant Pump

Design	Basic design information
Construction	Knowledge of Installation, Assembly and Disassembly
Commissioning	Pump-Motor Characteristics, Commissioning test performance
Operation	Changes to operation and maintenance procedures
Long Term Operation	Major changes like change of motor or seals or bearings etc…
Decommissioning	Decommissioning data from pump impeller, casing, piping etc..

Experience feedback from Designer, Manufacturer, User groups etc…

Case Study of Plant Information Model (PIM)



Knowledge Management Assist Visit (KMAV)

1. Policy and Strategy for KM
2. Human Resource (HR) Processes for KM
3. Training and Competence Development for KM
4. Methods, Procedures & Documentation Processes for Improving KM
5. Technical Solutions for KM
6. Approaches to the Capture, Retention and Transfer of Knowledge
7. Organizational Culture to Support KM
8. Internal/External Collaboration for KM

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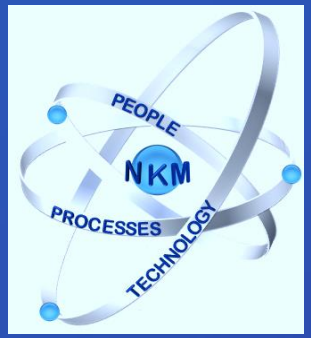
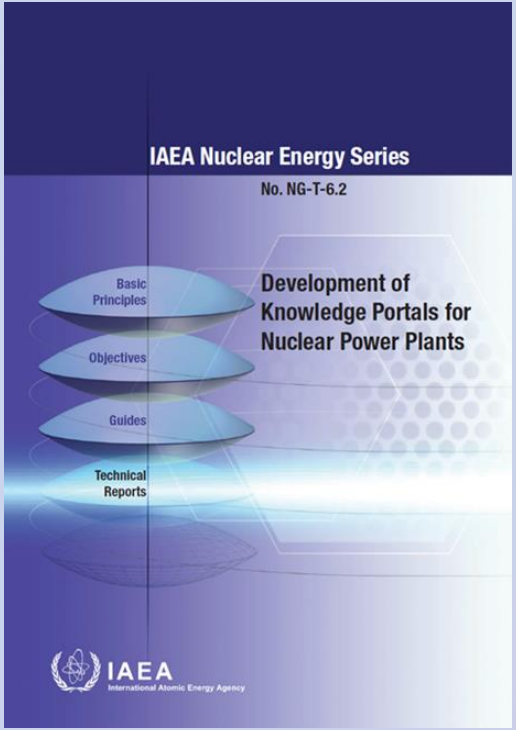
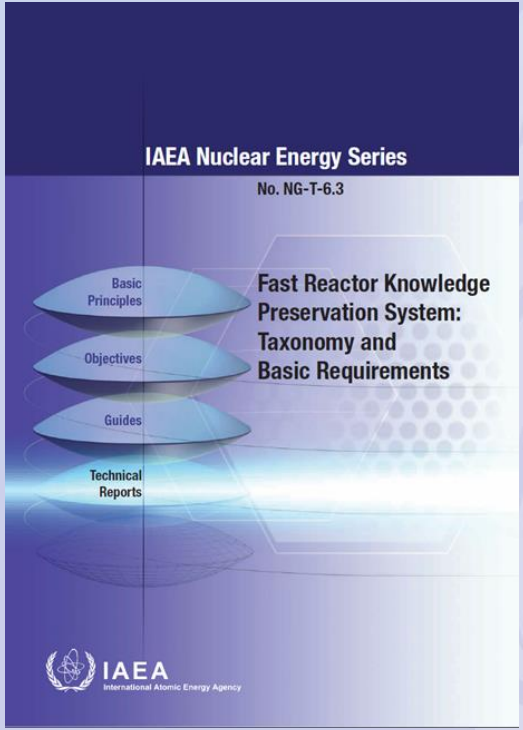


IAEA assistance to Member States

IAEA Publications





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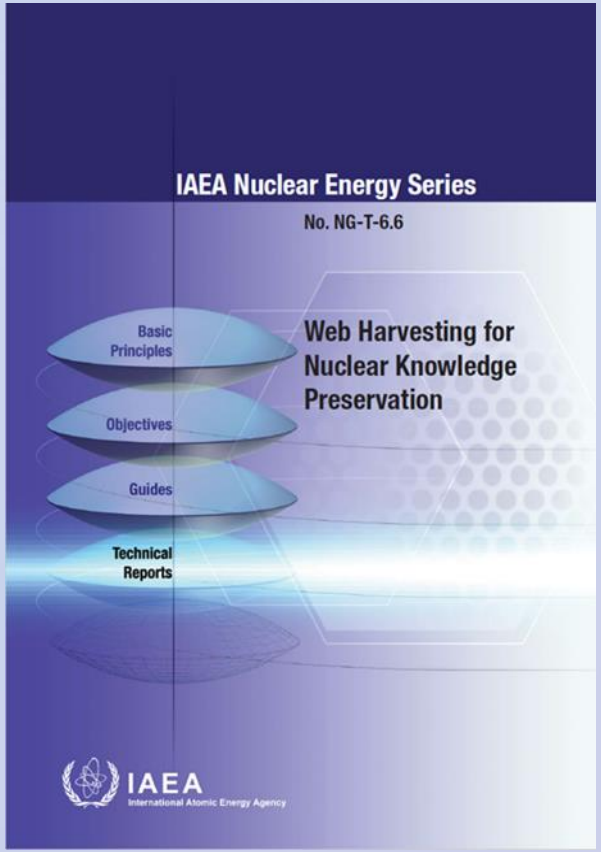

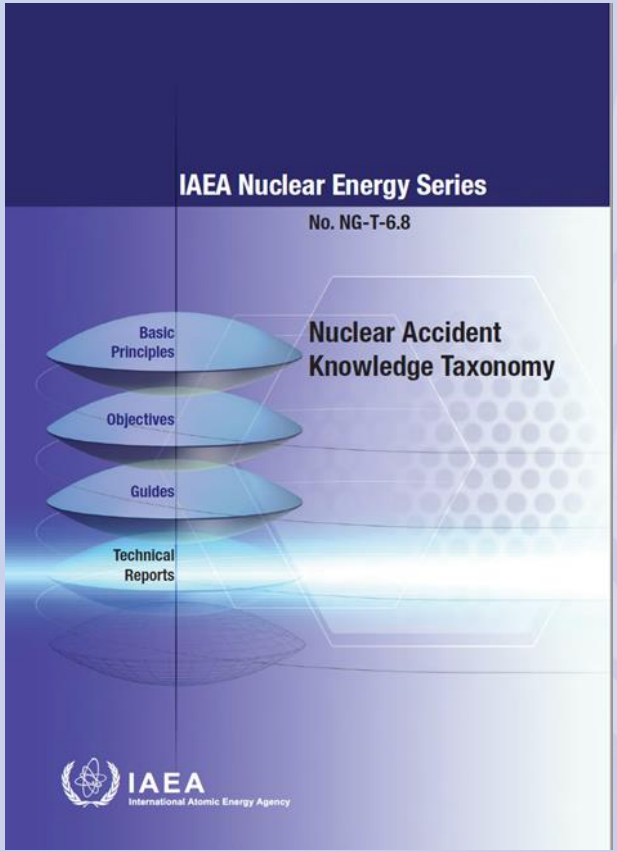

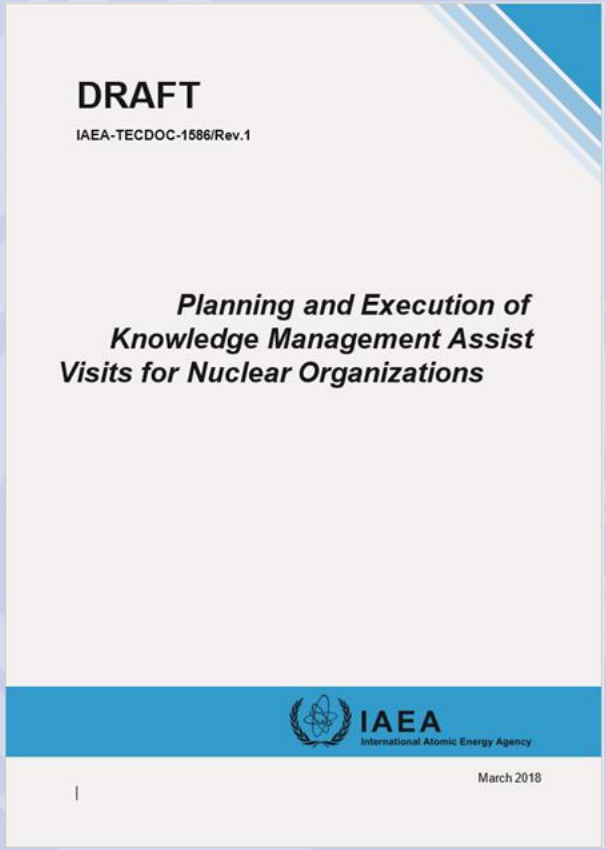

Work in Progress

- Semantic Technologies and their Application to Nuclear Knowledge Management
- Approaches & Guidelines of Taxonomy Development & Management in the Nuclear Sector
- Application of Plant Information Models to Support and Manage Design - Knowledge throughout the NPP Life Cycle
- Managing Nuclear Design Knowledge over the Life Cycle-Stakeholder perspectives, challenges and approaches;
- Approaches to Lifecycle Management of Technical and Design - Requirements Specifications for Nuclear Facilities
- Current Practices in the Management of design, manufacturing, construction and commissioning information and knowledge during New Build Projects;

Conclusions

- Lifecycle perspective for Knowledge Management is an important requirement for safe, economical and reliable performance of NPPs
- Safety and business objectives should be drivers for this initiative
- IT enabled digital technologies like Plant Information Models (PIM) play a key role in this process

Technical meeting :Technical Meeting to Share Experience on Knowledge Management Assist Visits (KMAVs) for Nuclear Organizations,19-22 Mar 2019, Vienna

Technical meeting : IT Digital Applications to Support Nuclear Knowledge Management Programmes, 25- 28 June 2019, Beijing, China

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Mr Ashok Ganesan,
Nuclear Knowledge Management Section
International Atomic Energy Agency
Vienna
Austria
Email: A.Ganesan@iaea.org

Thank you!