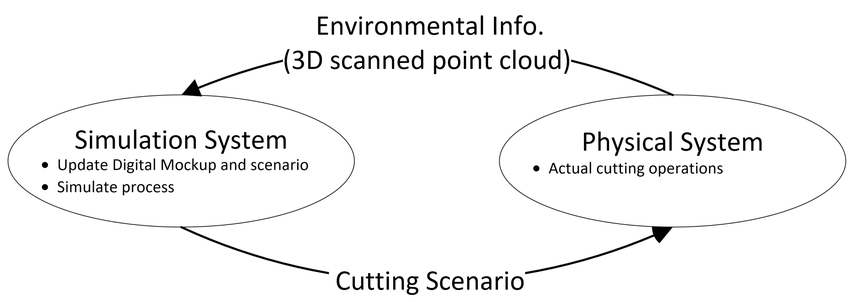
Cutting Simulation Method based on the 3D Scanned Environmental Information for Nuclear facility Dismantlement

Ikjune Kim*[1], Dongjun Hyun[1], Jonghwan Lee[1], Sungmoon Joo[1], Jaehyun Ha[1]

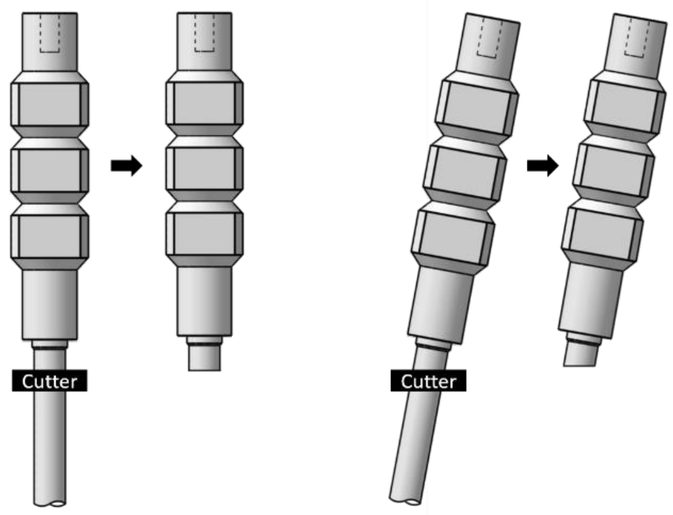
[1] *Korea Atomic Energy Research Institute*
* ikjunekim@kaeri.re.kr

1. Introduction

- Our dismantle system concept:
  - ✓ Performs cutting operations with the scenarios created based on the digital mockup of the nuclear facility
  - ✓ Composed of Simulation system and Physical System
  - ✓ Update the digital mockup and scenario based on the 3D scanned model from actual site because digital mockup could be different from the actual site



- Problems of existing simulation method
  - ✓ Cut result is not accurate
    - Cut result model is created at the initial scenario building procedure based on the digital mockup
    - Initial digital mockup could be different from the actual site

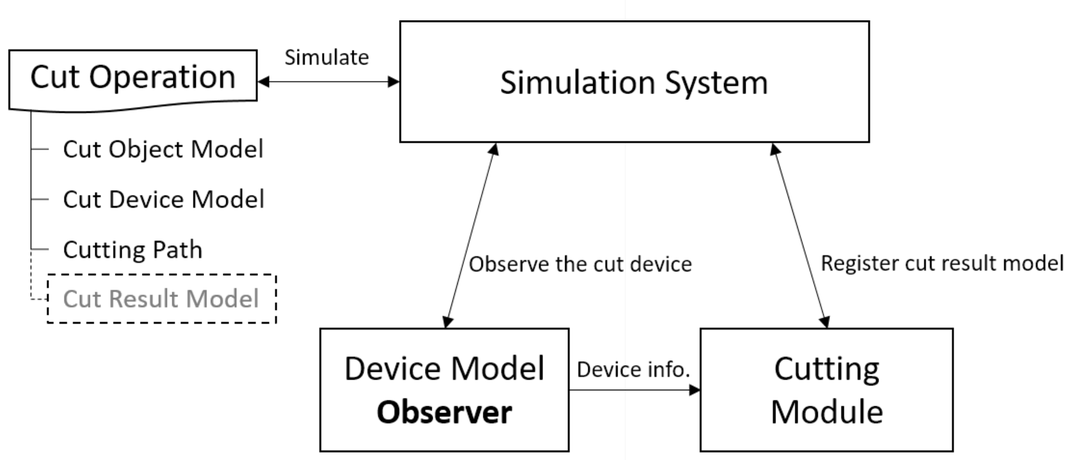


Digital mockup config. Actual site config.

- Proposed solution
  - ✓ Create the cut result in the process simulation time steps
    - Define the dynamic simulation framework
    - Define the cut operation data structures

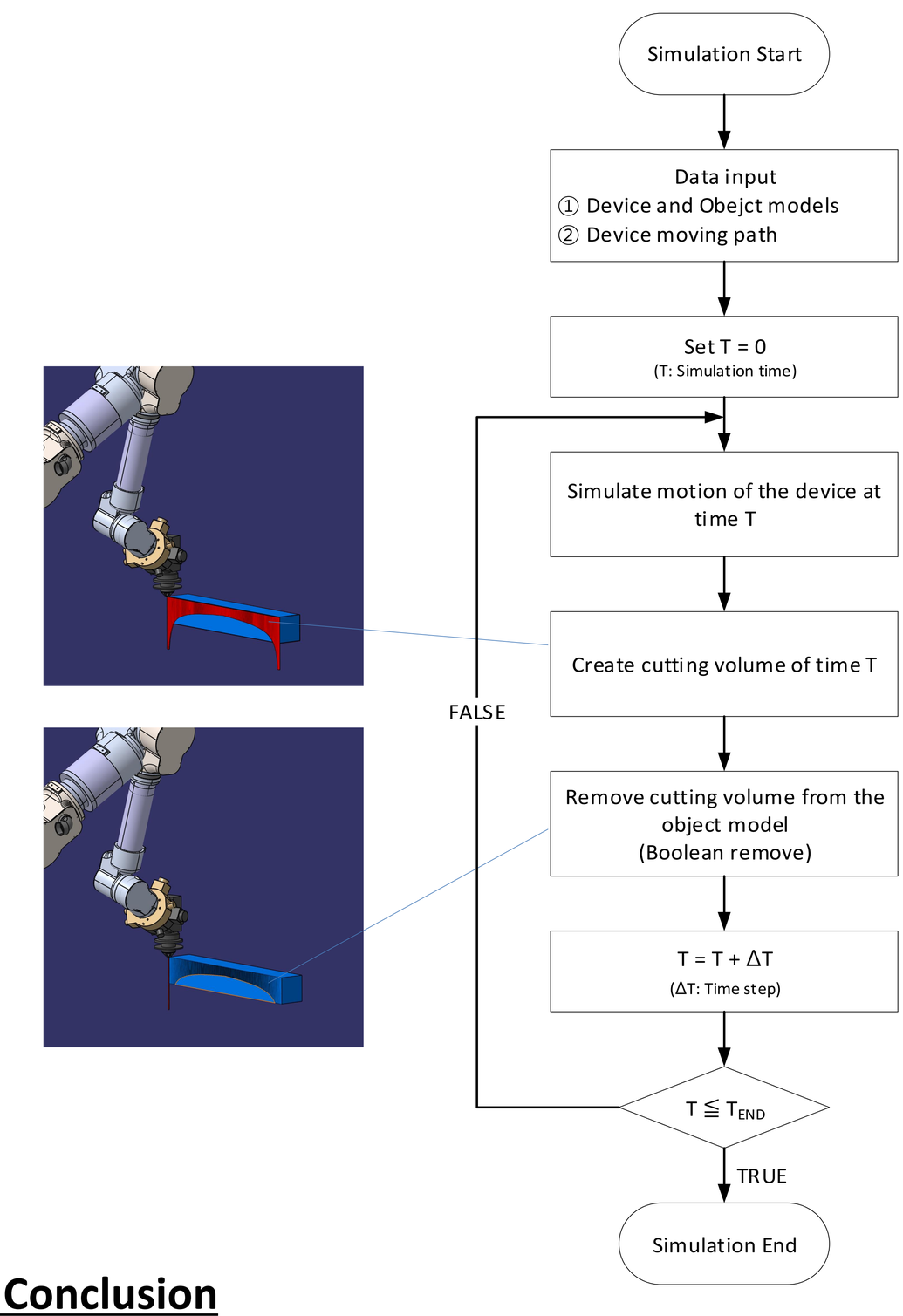
3. Simulation Framework design

- Cut Operation Design
  - ✓ Each Cut operation has the information as the figure
  - ✓ Cut result model is attached after finishing a simulation



4. Simulation Flow Diagram

- Creating the result in the simulation loop
  - ✓ Device model observer is activated when simulation started
  - ✓ The observer observes device model motion and speed and position
  - ✓ Based on the observed info. Creates the cutting volume by which cut the object model
  - ✓ Using the cutting volume object model is cut and registered to the cut operation for scenario evaluations



4. Conclusion

- Works Done
  - ✓ Proposed the dynamic cutting process simulation method
  - ✓ Define the new data structure to enable the dynamic cutting process simulation
- This method helps reducing the process modeling time when modeling the cutting process of the nuclear facility decommission
- And enables simulation system to evaluate the scenario more efficiently and accurately