



Digital Twin Identifiers: Naming Schemes

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Functionalities

Requirement

- Digital Twins for very large complex assemblies
- Context dependent details for same component
- Same detail for different components
- Quality management for entire assembly

Solution

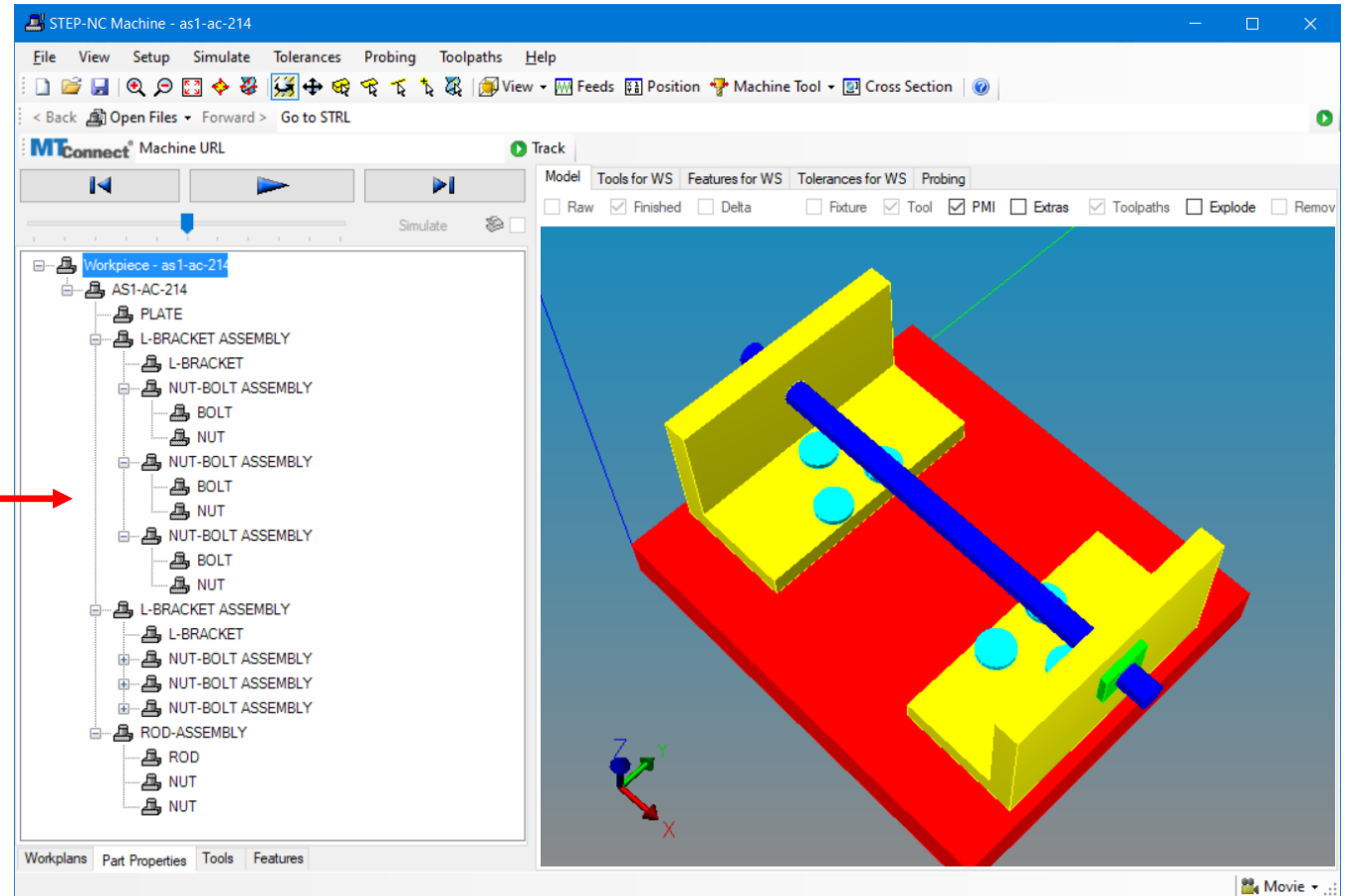
- Hierarchical decomposition (assembly->detail->assembly)
- L-Bracket left detail.stp, L-Bracket right detail.stp
- Multiple types of sunbed models on the cruise ship
- Each component has its own details, results and machining file

Test Case

5 designed items have engineering requirements (plate, L-Bracket, nut, bolt, rod)

28 nodes in assembly tree

18 machined items (8 nuts, 6 bolt, 2 brackets, 1 plate, 1 rod)





Digital Twin Identification

- Identification for physical entities is easy
 - The plate and rod
- Identification for virtual entities is still not agreed
 - The 8 nuts, 6 bolt and 2 brackets
- Today we can assign a UUID to the physical entities
- Today we cannot assign a UUID to the virtual entities



New naming

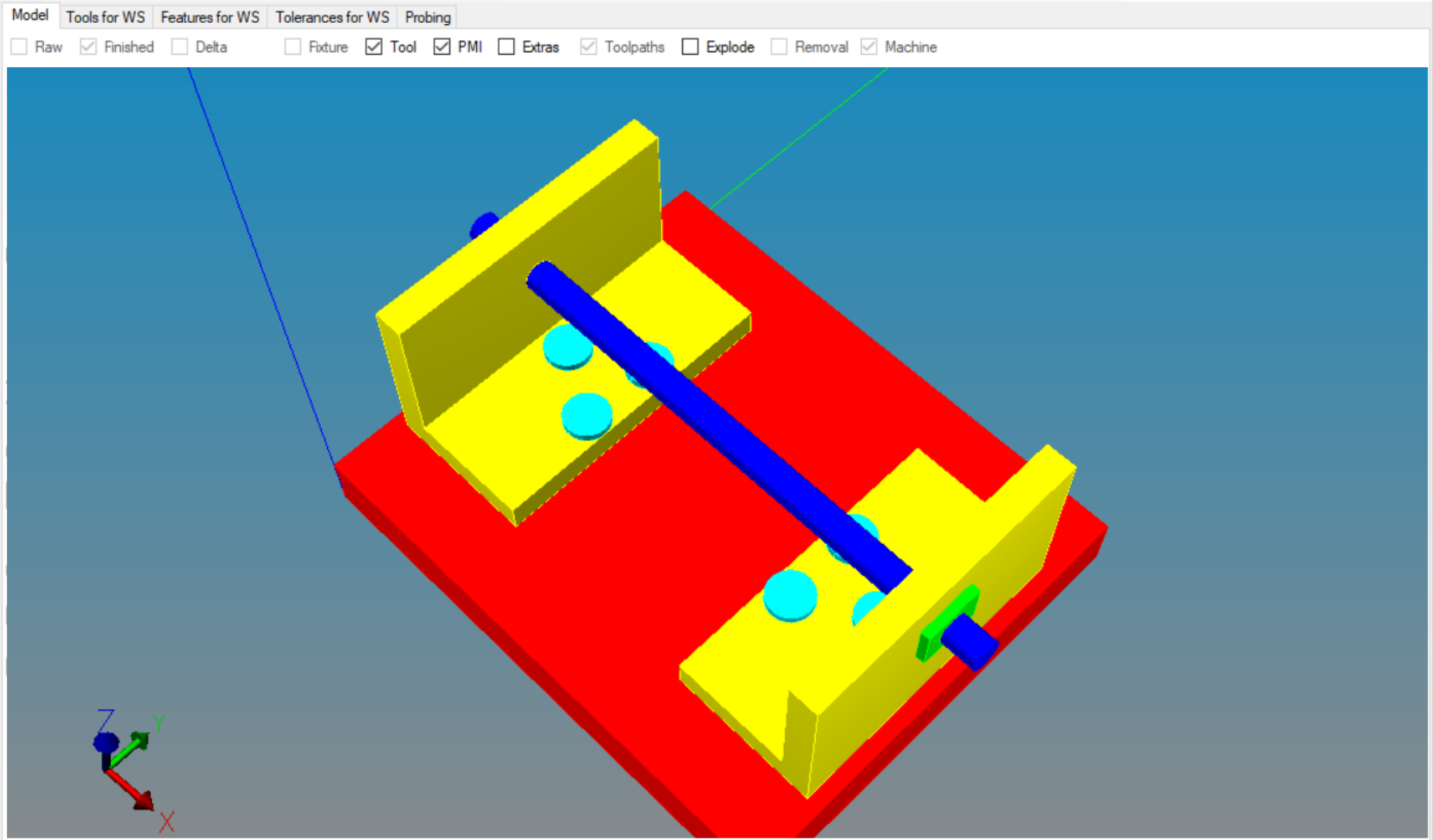
- Add naming schemes to enable identification of the virtual entities
 - A1, A2, A3 etc. for assemblies
 - E1, E2, E3 for executables
- Advantages
 - Can give each a UUID $\langle \text{UUID} \rangle = A1$
 - Can give each a URL $\langle \text{UUID} \rangle = AI \{ \text{detail: } \langle \text{L-BRACKET right.stp} \rangle \}$
- Problem
 - How to make the naming scheme clear and unambiguous
 - And preferably not too complicated!
- Note
 - Every CAD system is resolving the naming but in its own way

- Workpiece - as1-ac-214_fm
 - AS1-AC-214
 - PLATE
 - L-BRACKET ASSEMBLY
 - L-BRACKET**
 - NUT-BOLT ASSEMBLY
 - #660 @4
 - L-Bracket detail right.stp
 - NUT-BOLT ASSEMBLY
 - L-BRACKET ASSEMBLY
 - L-BRACKET
 - NUT-BOLT ASSEMBLY
 - NUT-BOLT ASSEMBLY
 - NUT-BOLT ASSEMBLY
 - ROD-ASSEMBLY

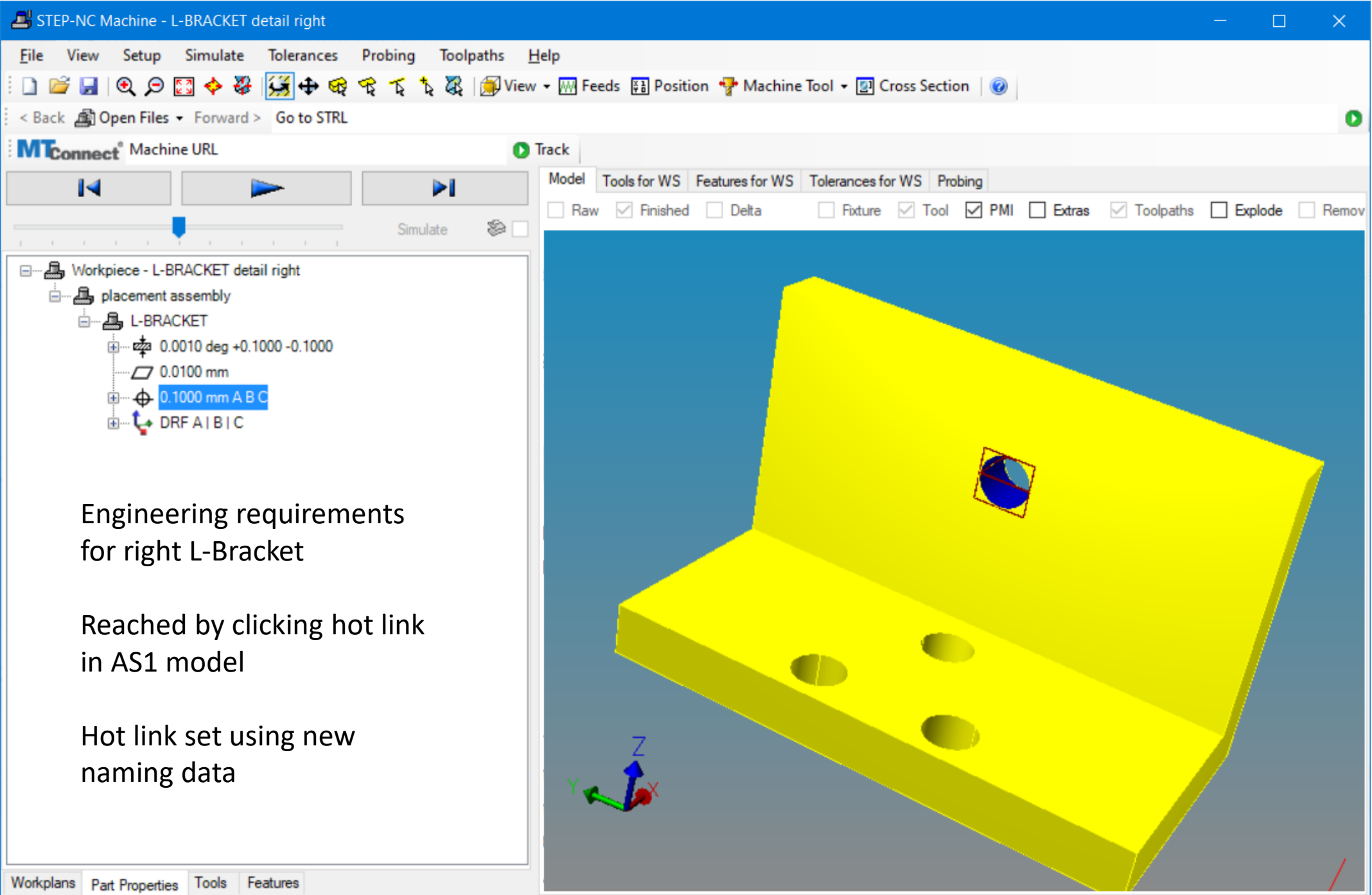
1st

2nd

1st is A4
2nd is A15



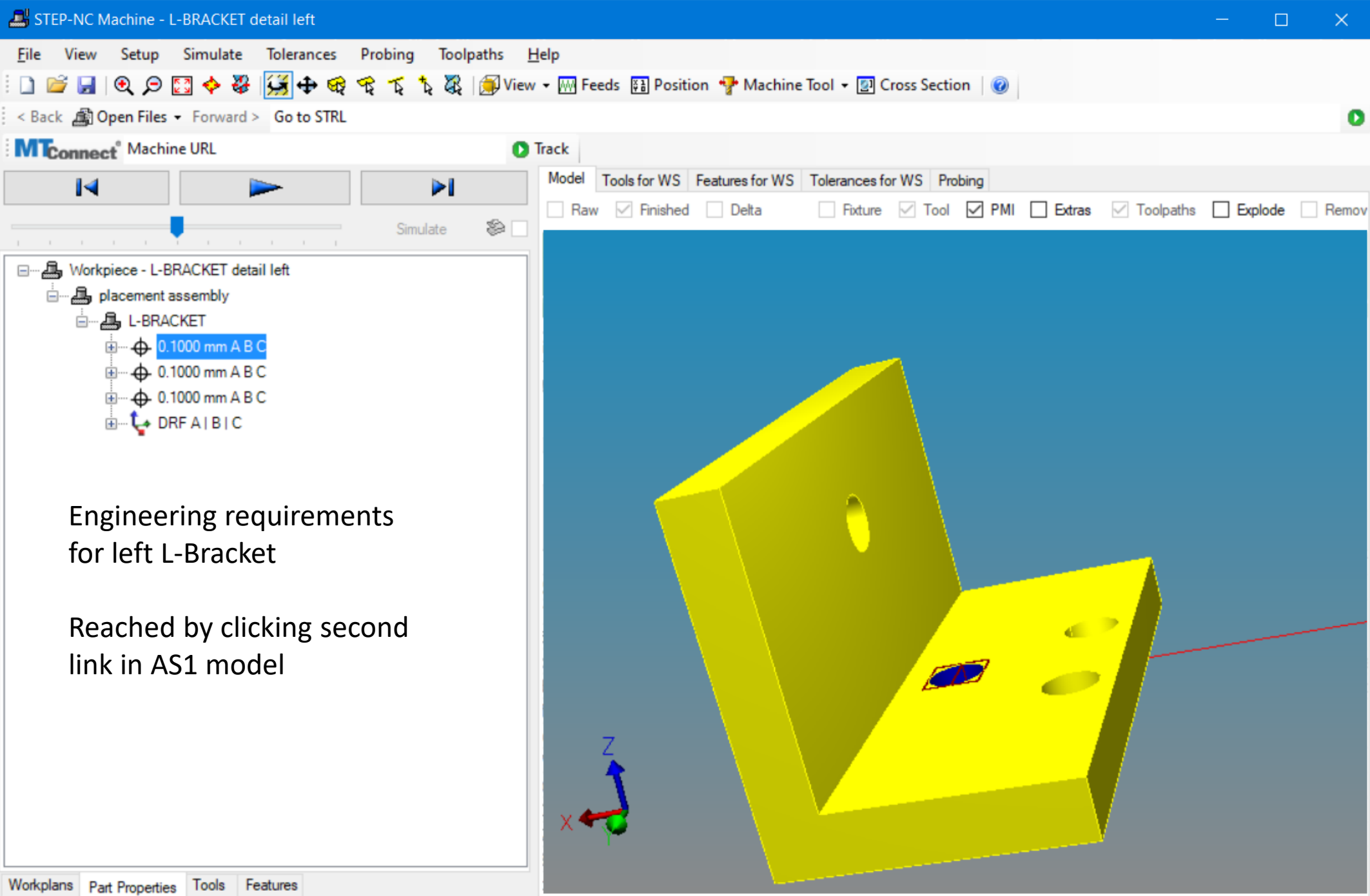
Left click



Engineering requirements
for right L-Bracket

Reached by clicking hot link
in AS1 model

Hot link set using new
naming data



Engineering requirements
for left L-Bracket

Reached by clicking second
link in AS1 model