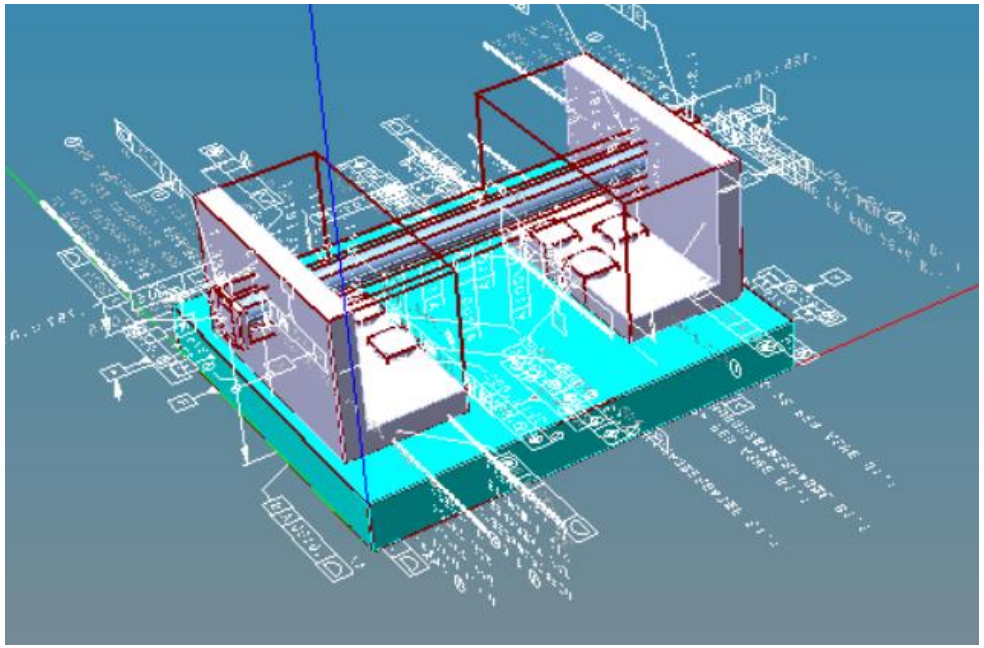
Digital Twin Identifiers and the Digital Thread

UUID meeting 9/21/2022

Martin Hardwick

Convenor WG15



AS1 Prototype

Prototypes and Instances

Fastener Prototype UUID's

Fastener Instance UUID's

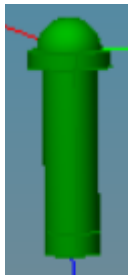
Hole Instance UUID's

Hole Prototype UUID's

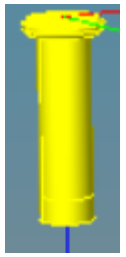
ACME Prototype

Bolts R Us Prototype

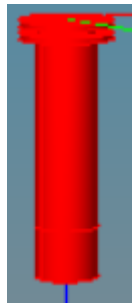
SGR Prototype



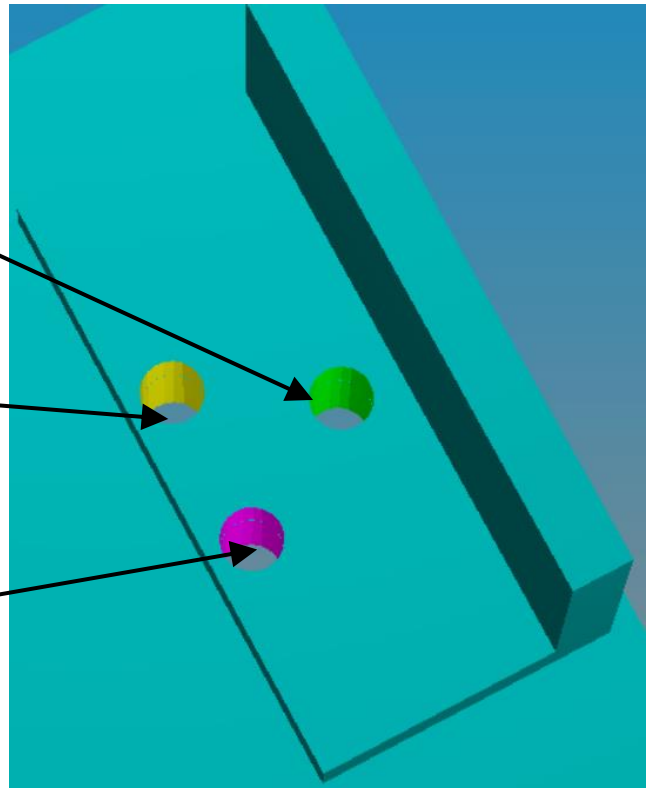
ACME instance



Bolts R Us instance



SGR instance

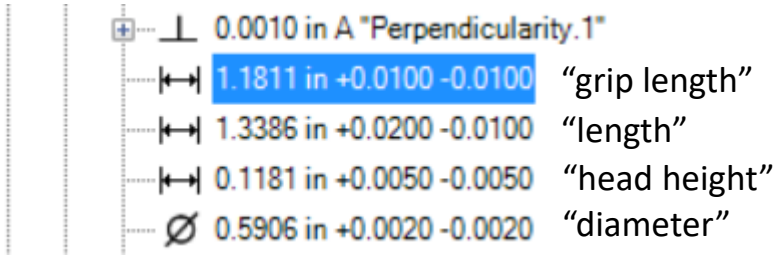


AS1 Instance

AS1 Prototype

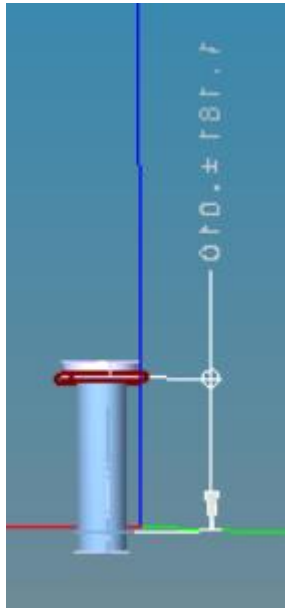
Prototype Properties

- UUID registration enables flexible naming
  - E.g “Grip length” means `e00a534e-4a44-4fd1-a530-e4f0abc34037`
  - CAD puts the names into data files
  - Manufacturing adjusts assembly operations



“grip length”
“length”
“head height”
“diameter”

CAD Checking



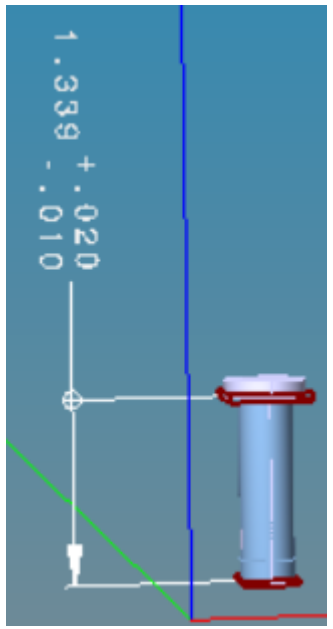
Drill hole at location = “fastener.1”
depth=“grip length”
diameter=“diameter”

CAM Planning

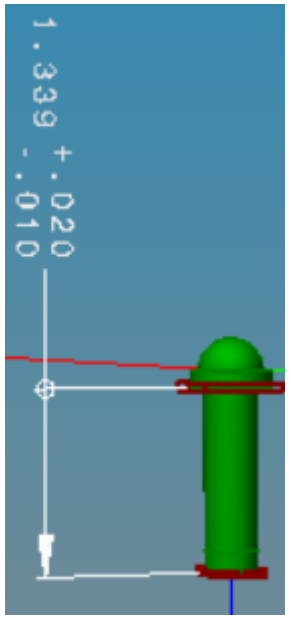
CAD Checking

- Good – manufacturing dimensions identical to engineering
- Bad – manufacturing dimensions different but instance maybe OK
- Ugly – manufacturing dimensions mean instance can never be OK

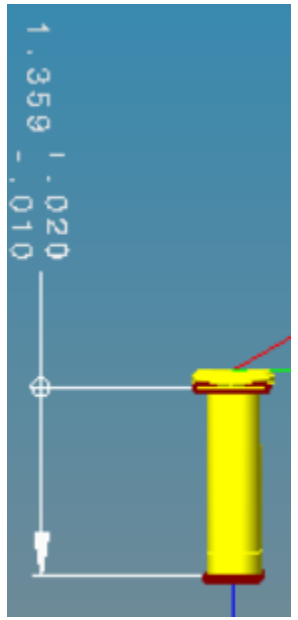
Prototype



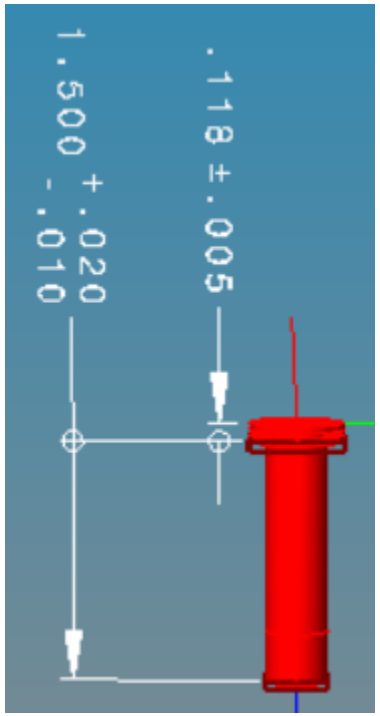
Good



Bad



Ugly



Manufacturing

- The length UUID determines
  - Feature size for machining operations
  - Placements for assembly operations
  - Expected locations for inspection operations
- An instance of a fastener that
  - Meets the design requirements (bad is not ugly)
  - Was inspected for actual dimensions (bad is good)
  - Expands to actual feature size (bad is better)

Principles

- Each “item” of “interest” shall have a UUID
- UUID’s are the stiches that connect the digital thread

- Some UUID’s define the value of an instance
- Some UUID’s define the value of a prototype

- A stitch connects the UUID of an instance to the UUID of a prototype
- Good stitching will reduce product weight and production costs