

IMTS and JIMTOF 2018 Grand Challenge

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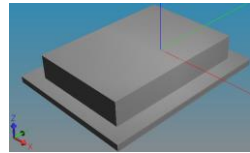
President STEP Tools, Inc.

Convener ISO WG15 Digital Manufacturing

Digital Twin machining demonstrations 2018

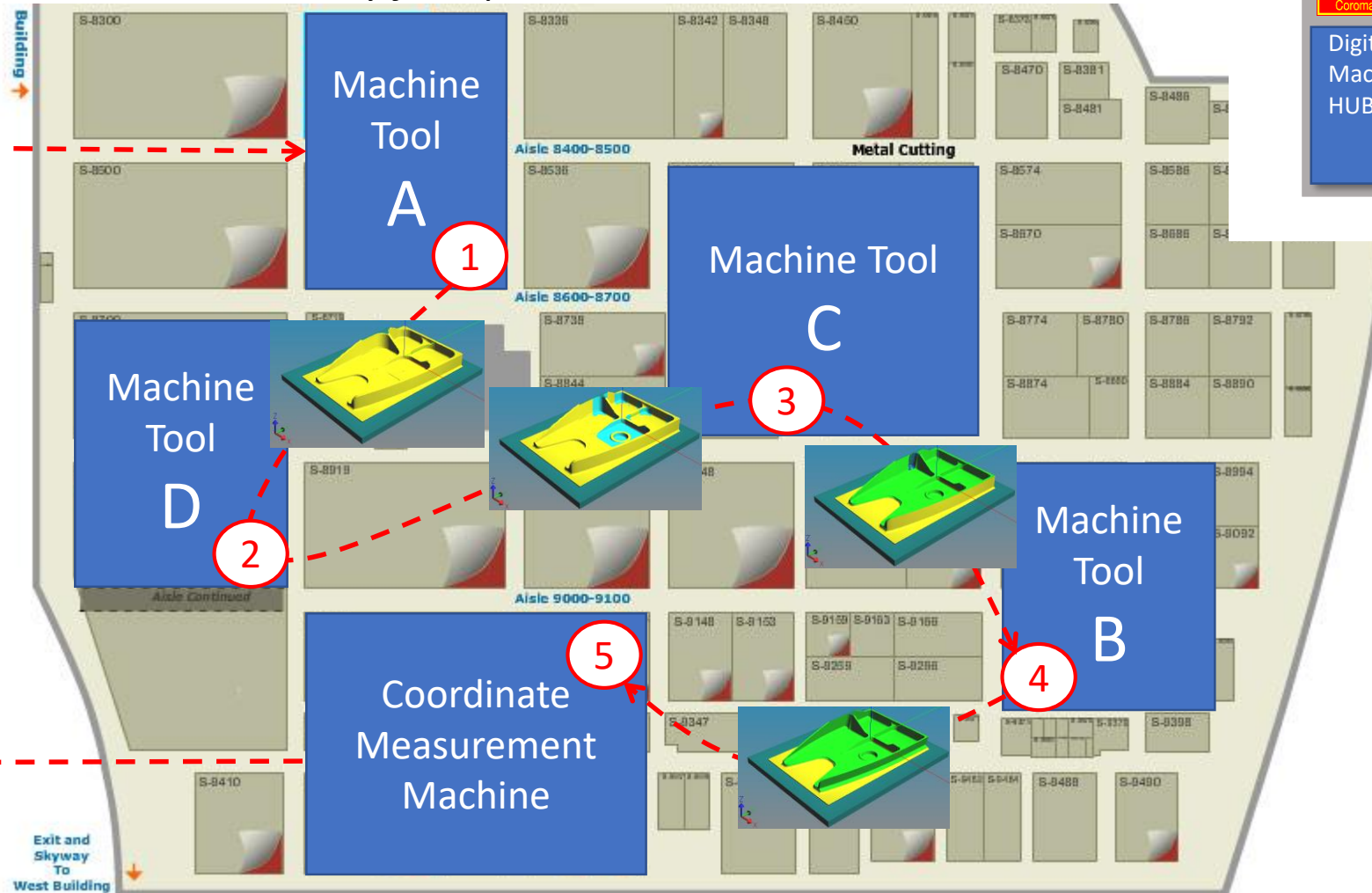
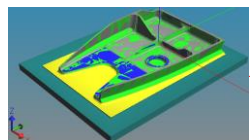
"Factory floor plan" at machine tool show

- ✓ Plan process



- ✓ Send workpiece through factory

- ✓ Receive finished part



Base Goals

1. Digital Twin machining in multiple booths
 - Read STEP-NC process for fishhead
 - Transmit machining status to large screen TV's using MTConnect
2. Demonstrate “Digital Twin manufacturing framework”
 - Stop the machining
 - Transfer to another booth
3. Digital Twin measurement to validate results meet AP242 tolerances
 - In process measurement at the CNC
 - Final measurement on a CMM
 - Feedback to the digital twin using QIF

Digital Twin machining



“Mind the Gap” 14-02-02

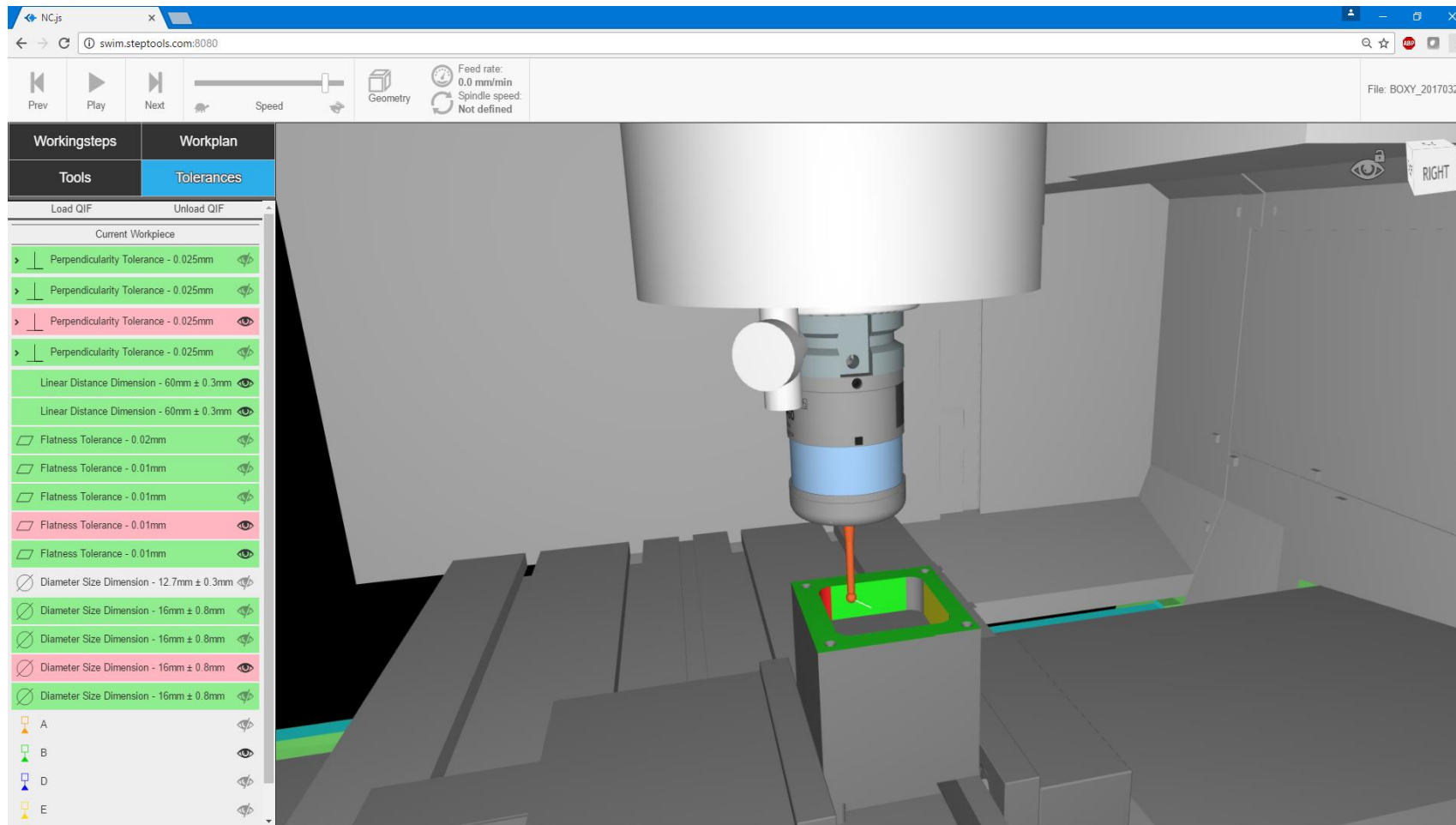


<http://fishhead.steptools.com:8080/>

- Real time twinning from MTConnect
 - 1Hz trace the plan data
 - 250Hz model the run data
- Phone and large screen TV display
 - STEP in Node.js
 - View in Three.js
 - UI in React.js

https://youtu.be/n_syXtpyxgM

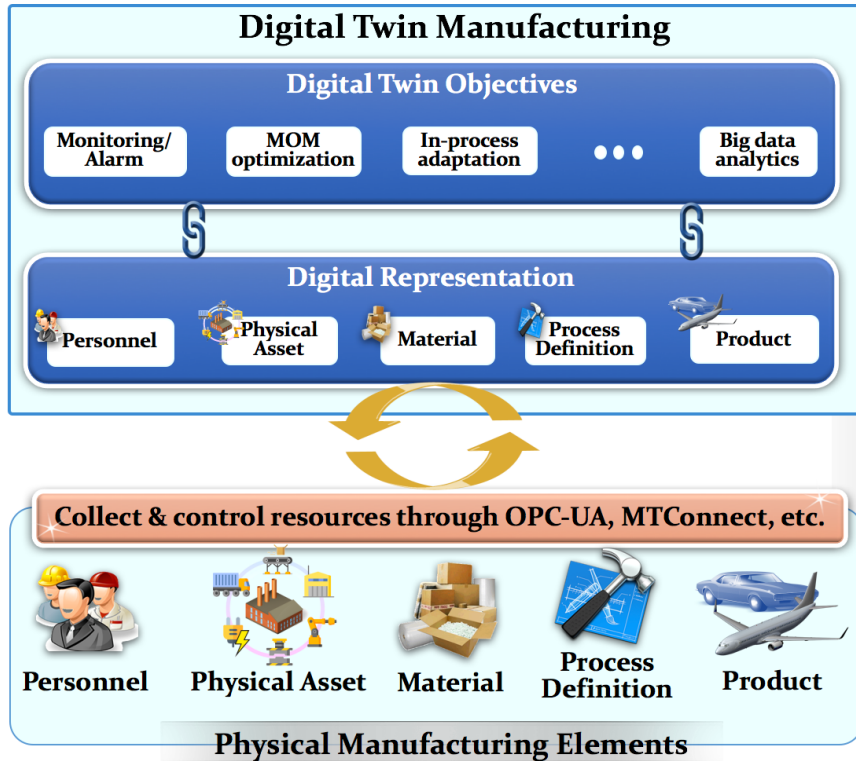
QIF results on STEP twin using MTConnect



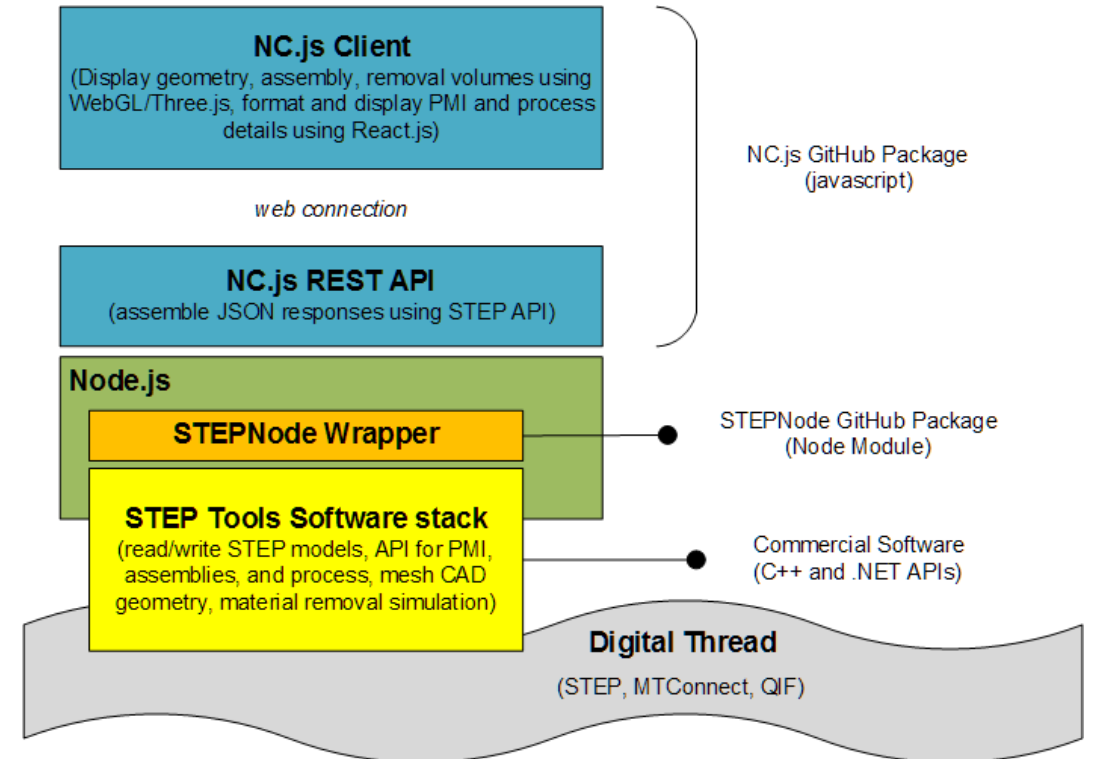
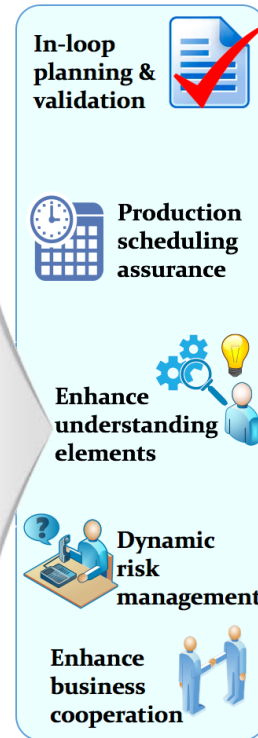
- Green good
- Red bad
- Yellow good and bad

Tablet,
Phone or
Large Screen TV

Digital Twin manufacturing framework



ISO NWI 23247



<https://steptools.github.io/NC.js/>