

IMTS and JIMTOF 2018 Grand Challenge Status as of March 1

Dr. Martin Hardwick

Professor of Computer Science, RPI

President STEP Tools, Inc.

Convener ISO TC184/SC4 WG15 Digital Manufacturing

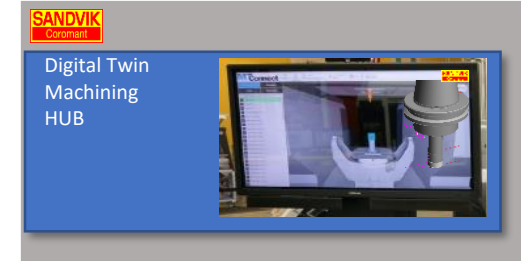
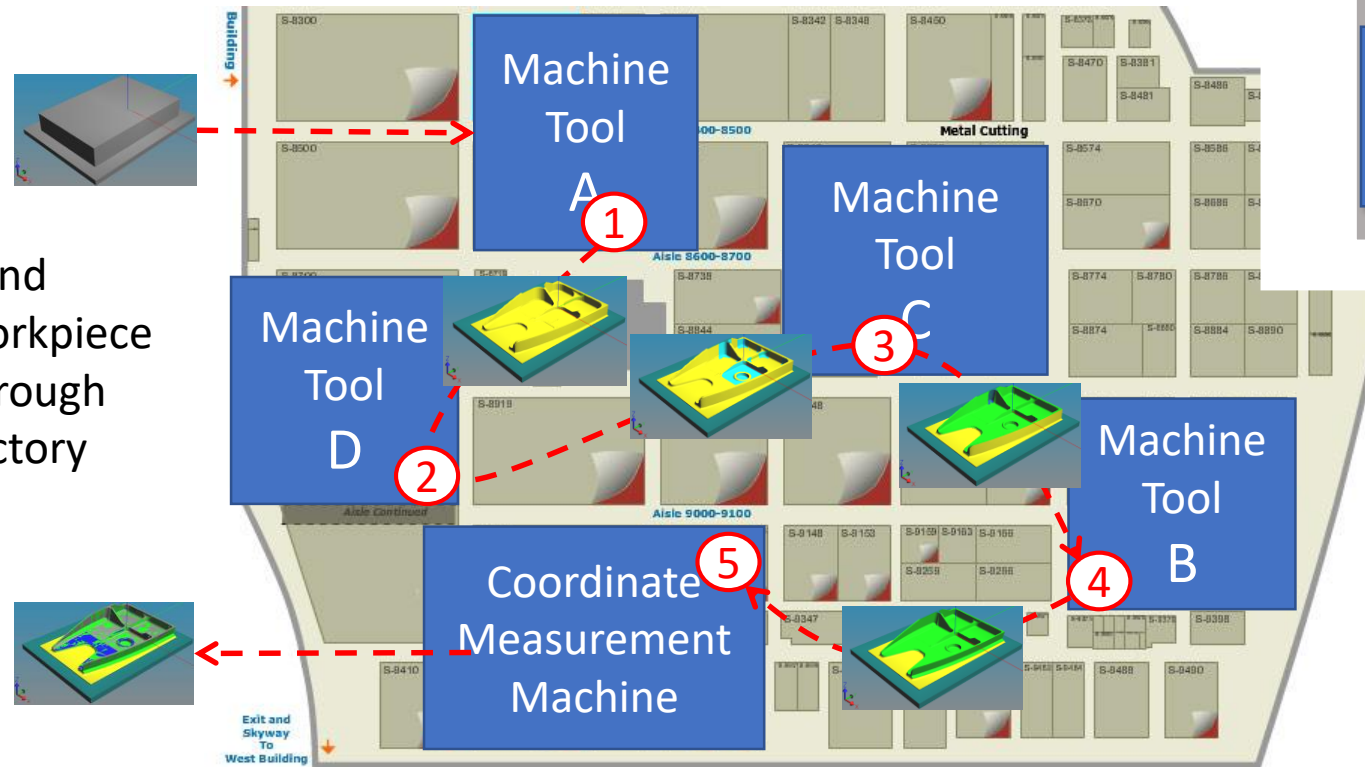
Digital Twin Machining at IMTS 2018

- ✓ Plan process

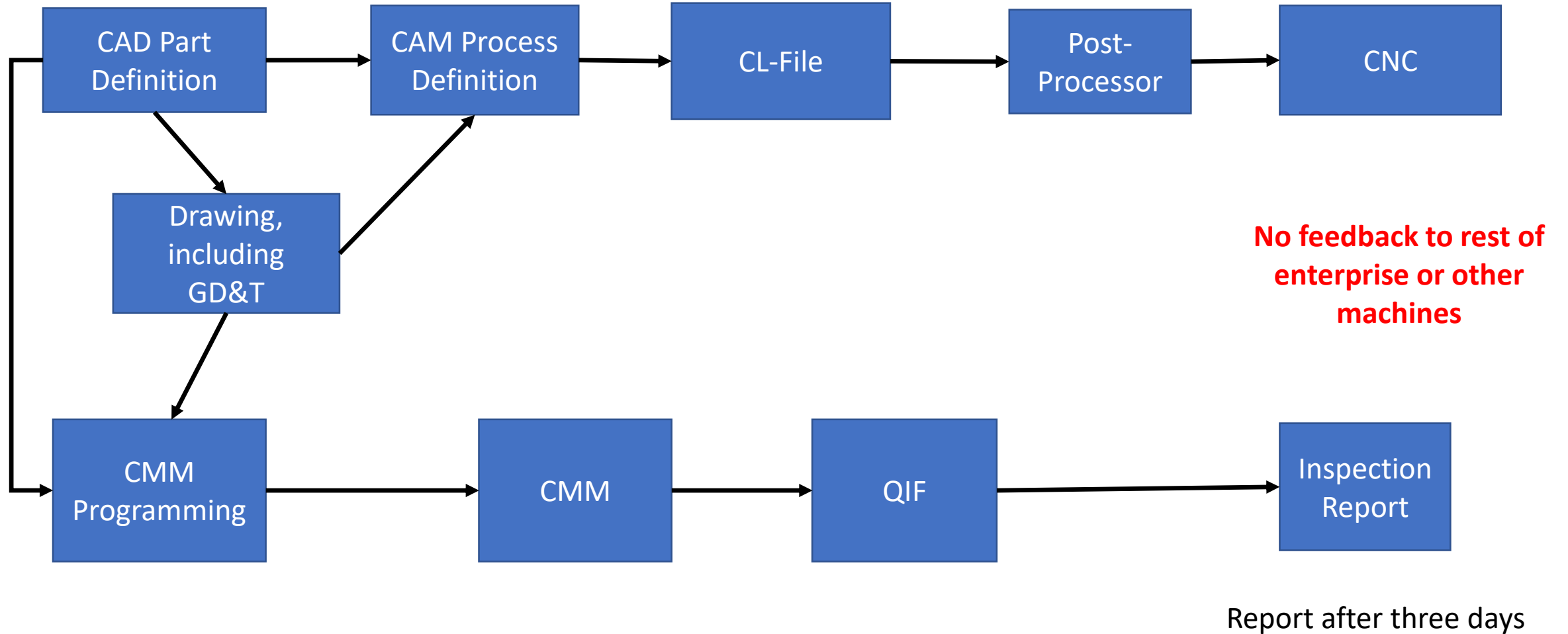
"Factory floor plan" at machine tool show

- ✓ Send workpiece through factory

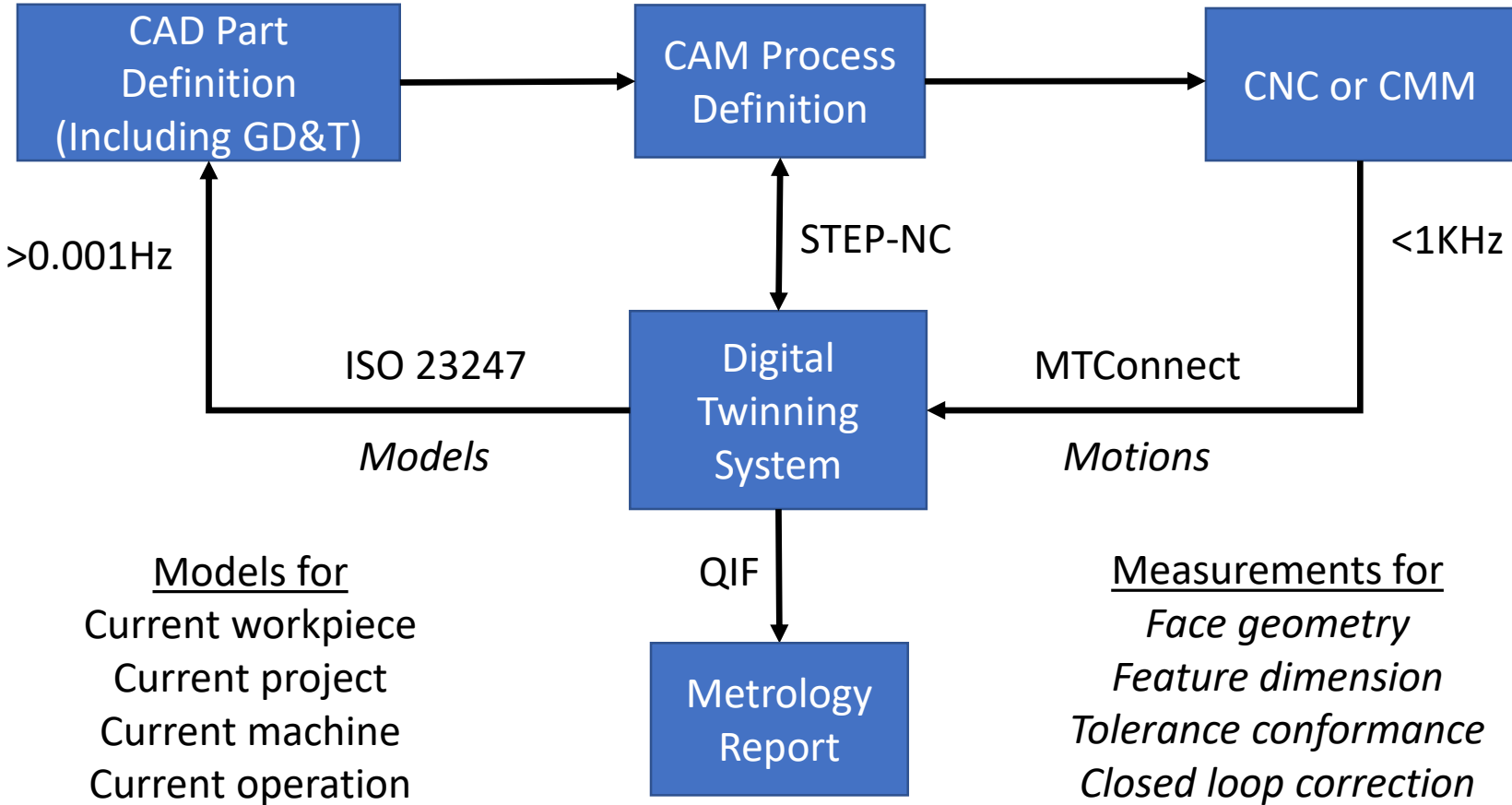
- ✓ Receive finished part



Traditional CNC and CMM Data Flow



Digital Thread Data Flow



Data sharing with other machines and systems

Active Participants

- Participants / Supporters/ Invitees (* = not confirmed)

- Organizations

- ISO TC184/SC4/WG15
- OMAC
- NIST
- AMT/MTConnect
- DMSC/QIF

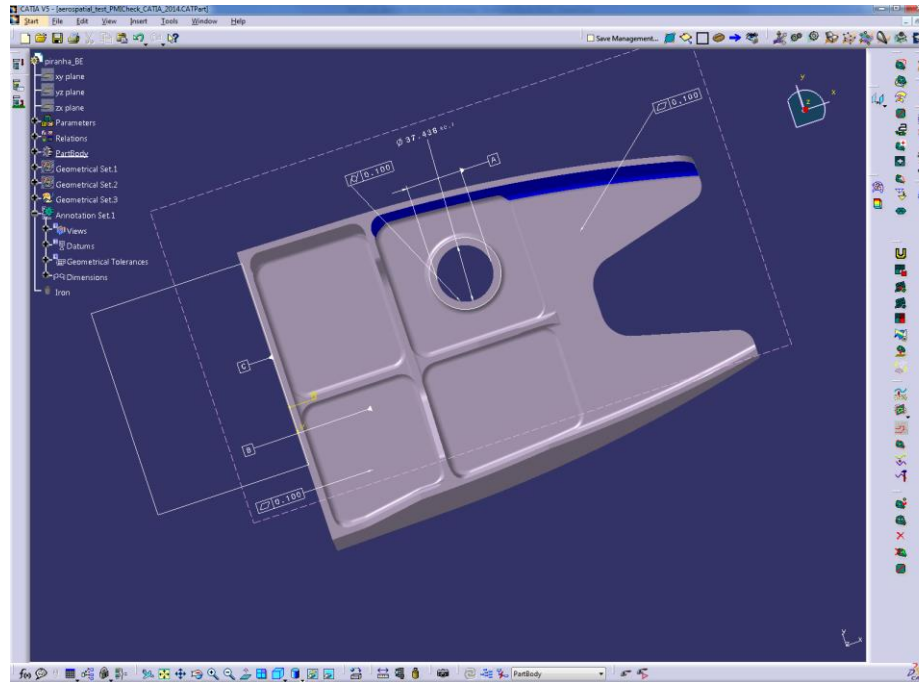
- Technology Providers

- STEP-Tools, Inc.
- Dassault *
- Autodesk *

- Cutters/ HOLDERS

- Sandvik Cormorant

CATIA



- Machine Tool Suppliers

- DMG Mori
- Hyundai
- Makino
- Okuma *

- Metrology

- Mitutoyo *
- Renishaw

- End Users

- Boeing
- Airbus

Participate by adding value to MTConnect, QIF or STEP
Want results from a machining test by May 10th

Advantages to be demonstrated

- Transparency across enterprises (required)
 - CAD users can see the tolerances being met
 - CAM users can see the process being executed
 - Work can be shared between machines
- Automated real-time verification (optional)
 - Verify inclusion of geometry
 - Verify dimensions of features
 - Verify conformance to design requirements (tolerances)
- Adaptive closed loop optimization (encouraged)
 - Automated adjustments based on measured results
 - Third party process optimization based on visibility of process
 - Many new optimizations using the richer data in STEP-NC

Reasons to implement STEP-NC

- CAM Vendor
 - CAM gets easier to use and debug
 - CAM becomes useful with more machines
- Cutter vendor
 - Higher functionality becomes easier to demonstrate
 - Third part optimizations for higher functionality delivered more easily
- Machine shop
 - CAM programs can be shared with other shops
 - Intellectual property that can be sold or kept secret
- Large OEM
 - Design anywhere, Build anywhere with improved quality and measurability
 - Interoperability, long term archiving, data sharing, try before you buy
- Machine Tool Builder
 - Installation at new customer sites becomes easier
 - Upgrades no longer blocked by requirement for changes to post

Action Items

- TBD during the call