

Cloud services for the seamless digital thread

Model based manufacturing

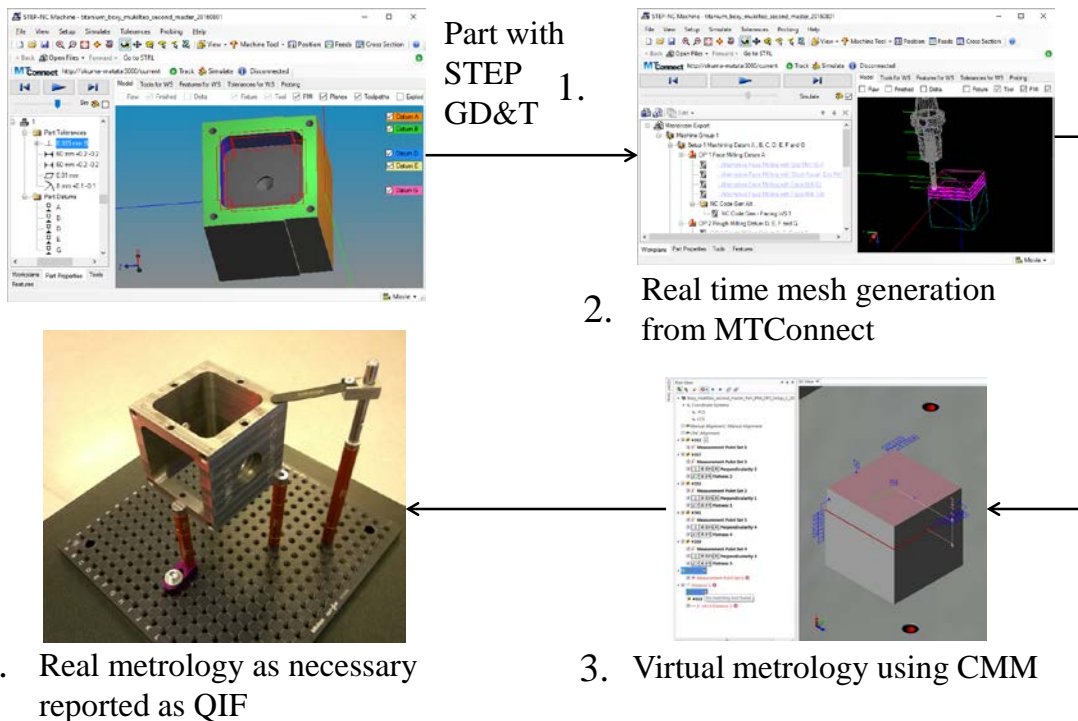
Model based metrology

A demonstration of cloud services for the Seamless Digital Thread is offered to the SC4 members starting at 10:30AM to Noon at the Future of Flight museum in Mukilteo, Washington on October 5th, 2016. These cloud services were developed under the sponsorship of the DMDII* to reduce manufacturing costs by 15% or better and can be applied to all types of manufacturing activities.

The new services use design requirements in the form of semantic GD&T to optimize and validate all stages of manufacturing. An NC generation service is used to make solutions for different machines and materials. A metrology service is used to validate planned and realized solutions. A tooling optimization service is used to minimize tool wear.

The services can be used with traditional machine tools and robots. They will be demonstrated on **live**, remote CNC machining taking place at Boeing, Renton. Benefits include:

- Prevention of errors using just in time simulation
- Reduction in tool wear by keeping constant chip thickness
- Remote operation from tablets and smart phones
- Enhanced accuracy using integrated measurement
- Flexible **robotics** with automatically adjustable processes



*Digital Manufacturing Design Innovation Institute in Chicago

“The Smart Machining Advisor”

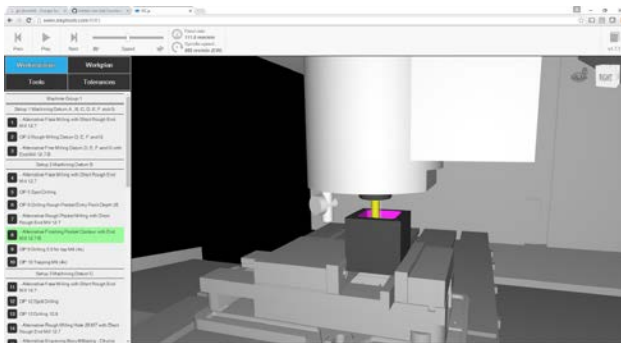
October 5th, Future of Flight Museum, Mukilteo, WA

Aft Room – 10:30AM to 11:25AM

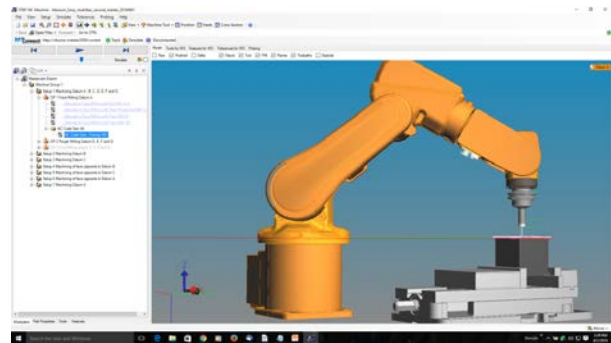
1. Demonstration of the Smart Machining Advisor (10 minutes)
 - a. Open up the web site – Sid and Martin discuss what is happening
 - b. Show it giving tool advice for live machining in Renton
 - c. Show it giving tolerance advice for planned machining in Mukilteo
2. Explain the technology (5 minutes)
 - a. Show the MTConnect stream
 - b. Show the STEP data
 - c. Show the QIF data
3. Show some applications (10 minutes)
 - a. Verification of setup
 - b. Detection of wrong tooling
 - c. Detection of bad process data
4. Explain the services (15 minutes)
 - a. PSU demonstrates / discusses the NC Generation Service
 - b. Mitutoyo demonstrates / discusses the Measurement Service
 - c. Sandvik demonstrates / discusses the Tooling Optimization Service
5. Summary and Q&A (15 minutes)
 - a. Prevention of errors using just in time simulation
 - b. Reduction in tool wear by keeping constant chip thickness
 - c. Remote operation from tablets and smart phones
 - d. Enhanced accuracy using integrated measurement
 - e. Flexible robotics with automatically adjustable processes

Automated metrology using semantic GD&T
October 5th, Future of Flight Museum, Mukilteo, WA
Basement Room – 11:30AM to Noon

1. Demonstration of the CMM (10 minutes)
 - a. Open up the CMM – Larry and Asa discuss what is happening
 - b. Show it planning the metrology
 - c. Show it measuring the previously machined part
2. Explain the technology (10 minutes)
 - a. Show the STEP data
 - b. Show the QIF data
 - c. Show how the QIF results are related to the STEP tolerances using UUID's
3. Summary and Q&A (10 minutes)
 - a. Ease of use
 - b. Traceability
 - c. Paperless manufacturing



Traditional Machining



Robot Machining