

CAM to CAM Data Exchange



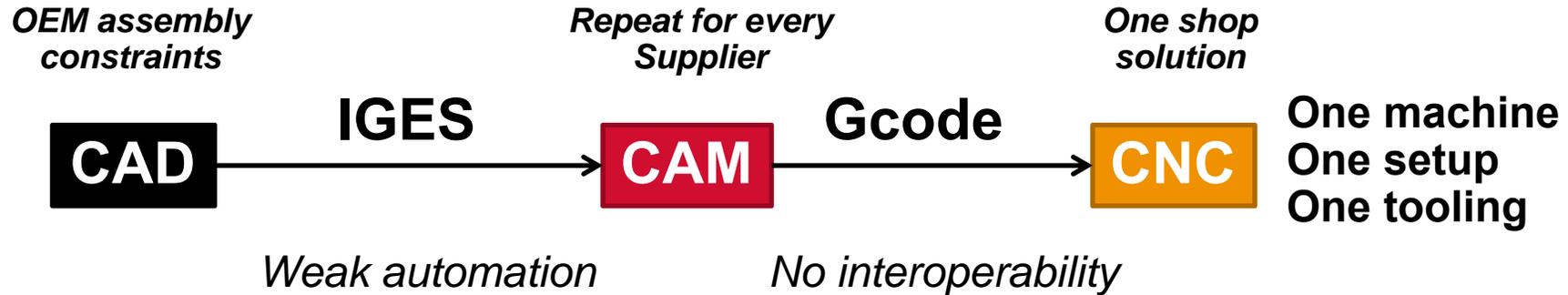
STEP Tools, Inc.
<http://www.steptools.com>

Martin Hardwick
MBE Summit – 2012-12-13



- **How to reduce costs by cooperating?**
 1. If OEM owns the process (by owning the resources) then the solution is more expensive (traditional solution)
 2. If supplier owns the process then the solution is more time consuming (recent aerospace solution)
 3. If OEM and supplier share the process then solution is less expensive and less time consuming (CAM Data Exchange solution)

Unnecessary costs



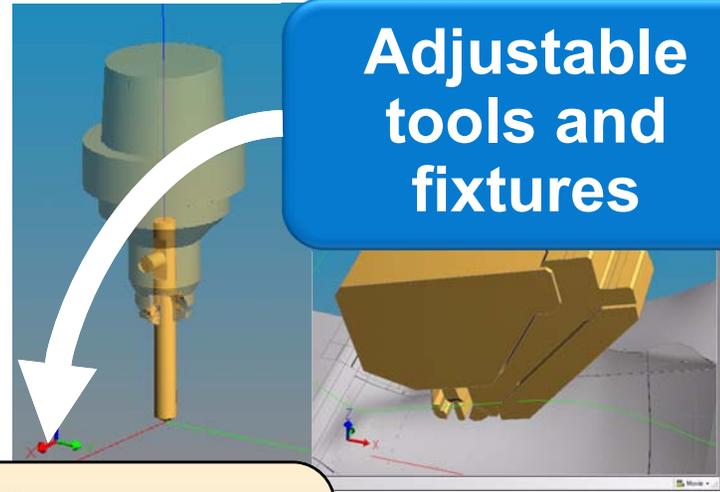
- **Visits to suppliers to explain models**
- **Maintenance of additional machines**
- **Repetitive, error prone data entry**
- **Misunderstandings over drawing symbols**
- **Incomplete simulations**

Desired solution – Science not Art

Geometry with associative tolerances from assembly

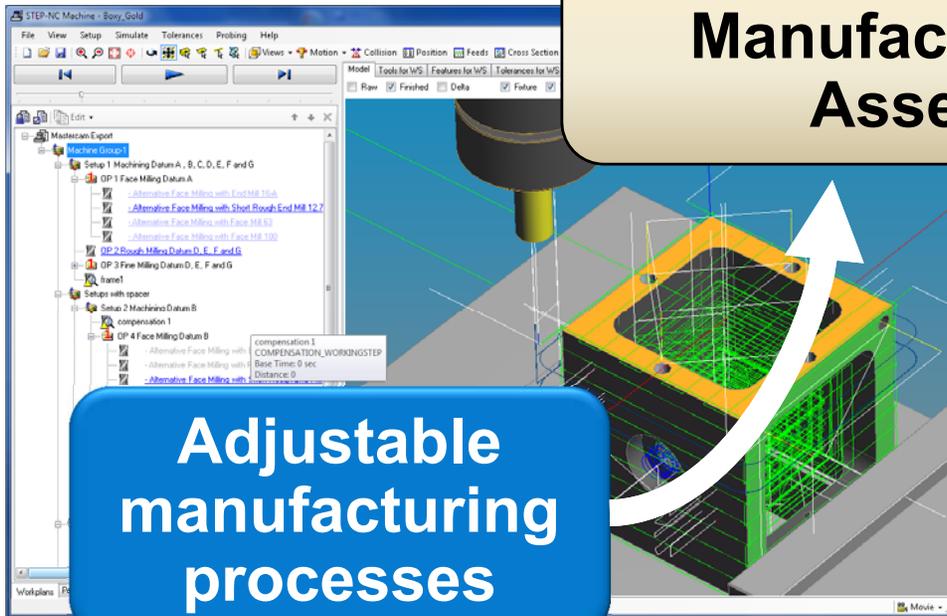


Adjustable tools and fixtures



Model Driven Manufacturing for Assembly

Adjustable manufacturing processes



Manufacturing accuracy solution

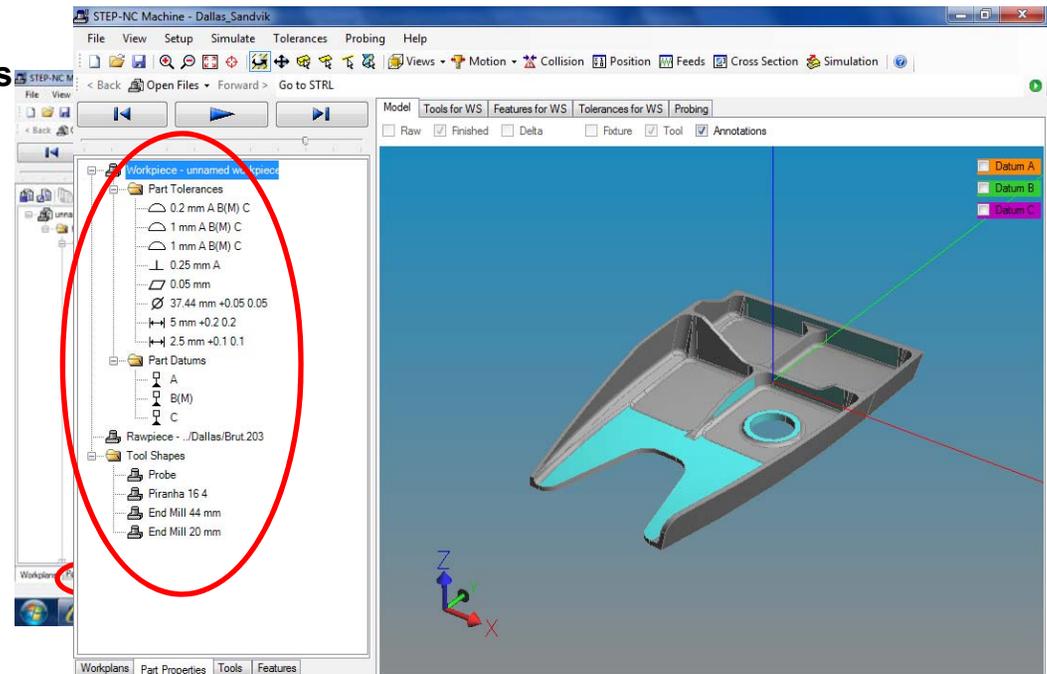


What is ISO 10303-238 STEP-NC?



- **New information to make machining faster and more accurate**

- Supply chain interoperability
- On machine feed-speed/tool-wear optimization
- On machine simulation and collision detection
- Closed loop machining and measurement
- Feature based
- Platform independent
- Full fidelity simulation
- Plug and play with CAD and CAM systems



- **STEP-NC describes “what” not “how”**
 - Make this geometry from this stock
 - By removing these features
 - In this order
 - With these tolerances
 - And tools that meets these requirements
- **The old standard described “how”**
 - Move tool to this location
 - Move tool to this location
 - And so on for millions of commands

How do we know - 10 years of testing

Phase	Demonstration Dates	Capabilities Shown	Application
1	November 2000 February 2002 January 2003 June 2003	Tool path generation from manufacturing features	Cost estimate automation
2	February 2005	CAM to CNC data exchange without post processors	Interoperability
3	May 2005 June 2006 July 2007	Integration of machining and measurement	On machine acceptance
4	December 2007 March 2008 October 2008	Cutting tool modeling Cutting cross section modeling	Resource and performance optimization
5	May 2009 September 2009 June 2010 October 2011 June 2012	Tool wear modeling Machine tool modeling Closed loop compensation Accuracy prediction	Just in time tooling

Projected Benefits*

- **35% reduction in preparation costs for routine machining**
- **50% reduction in costs for engineering changes**
- **50% reduction in inspection costs**
- **90% reduction in drawings**

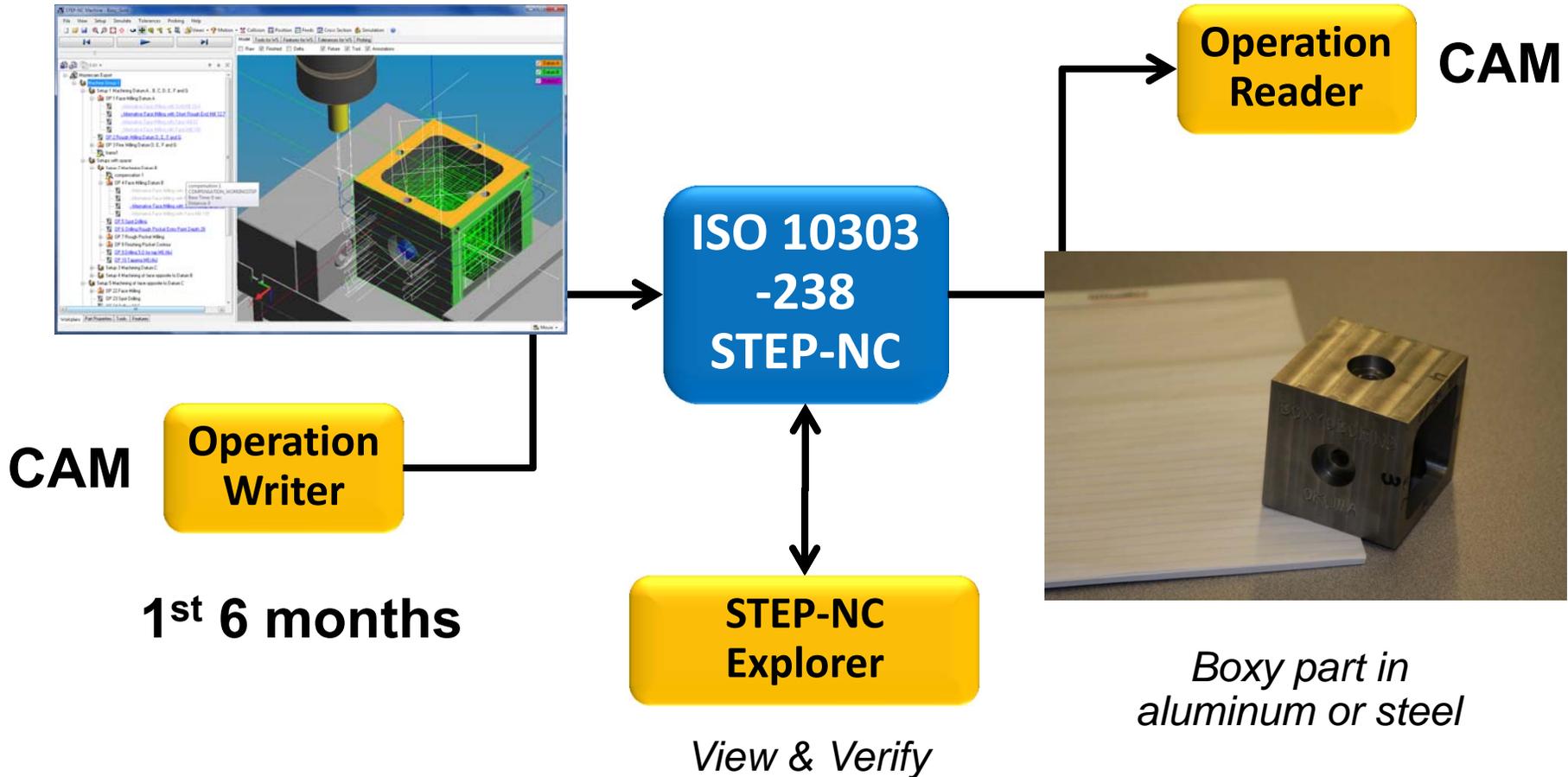
- **20% increase in value of CAM solutions**
 - New shop floor applications (e.g. adaptive fixturing)
 - Increased usage of advanced functionality (e.g. feed/speed automation)
 - Access to a much larger database
 - Support for a long term archive data format

***by Organization for Machine Automation and Control (OMAC)**

Path to Deployment – Starting Jan 2013

Boxy STEP-NC file
(www.steptools.com)

2nd 6 months



CAM to CAM data exchange for a 3 axis part

- **STEP-NC defines a technical data package for manufacturing**
 - Portability and Interoperability for manufacturing
 - Enable many new automation applications
 - Faster communication, fewer errors, more accurate simulations
 - Decade of testing, ready for deployment
- **Industry projects large process savings and significant increased value for CAM systems**
- **Join us!**
 - Make a Boxy
 - Translate to STEP-NC
 - Participate in testing forum