



# Presentation on STEP-NC to the Aerospace States Association

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&

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# Why Standards

- Define connectivity and facilitate communication
- Enable new levels of functionality
- Create new markets and opportunities

## Transformation Stories

Internet Protocols  
HTML  
IBM PC  
MS Word  
Postscript  
RS274D  
**STEP**  
**STEP-NC**

## Other Stories

MAP  
SGML  
Ada or PL/1  
Microchannel  
Wordperfect  
HPGL  
BCL  
IGES

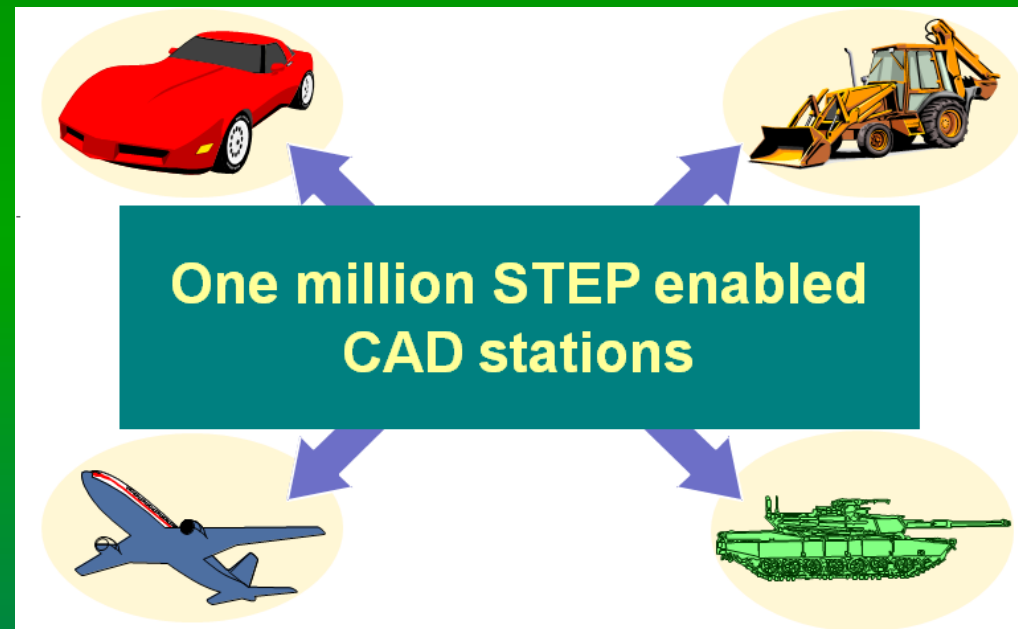
# STEP – Standard for CAD data

“Standard for the Exchange of Product model data”

## ■ Advantages

- Supplier can use \$15K system instead of \$50K
- 3D models replace paper
- Fewer errors, faster to market

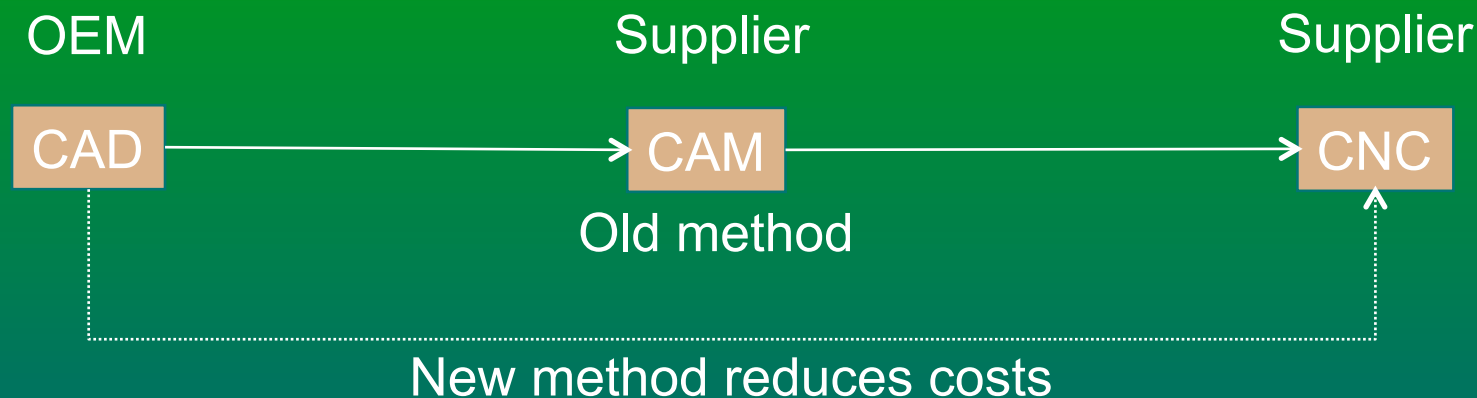
NIST estimate for total savings is > \$1.2 B



Started in 1991, released in 1997, universal in 2003

# What is STEP-NC and Why

- But the supply chain still has to spend a lot of time making manufacturing plans after it gets the CAD data
- STEP-NC is a new standard language for sharing OEM manufacturing plans with the supply chain



# Example of STEP-NC Program

Project

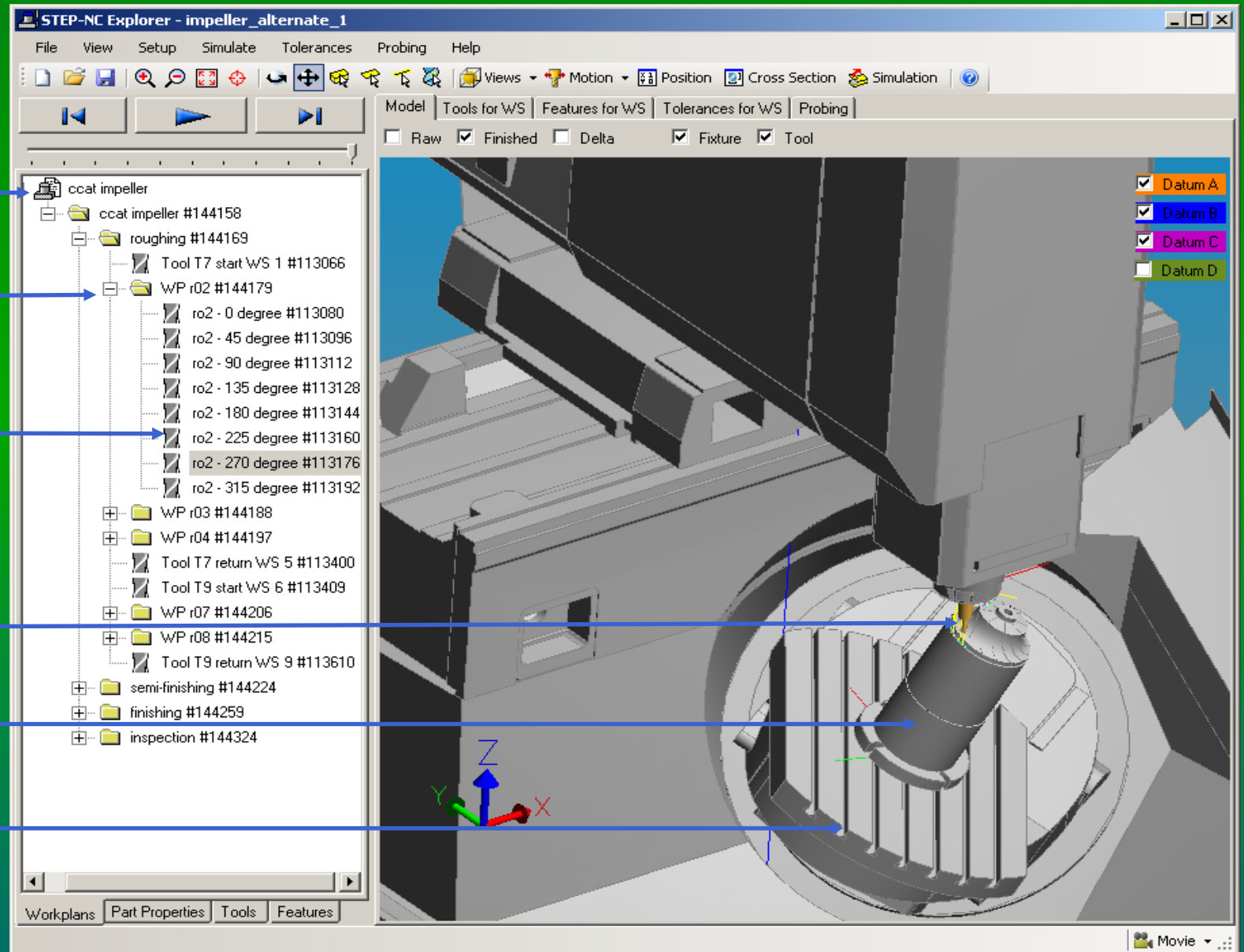
Work plan

Working step

Toolpaths

Workpiece

Machine



# Current state of STEP-NC Standard

- Brief history
  - Started in Germany and Japan in 1999
  - 19 industry demonstrations in USA since 2000
  - ISO 10303-238 completed in April 2007
  - ISO STEP-Manufacturing team continues to develop and test the standard.
- Current status
  - Complete the second edition of the standard
    - Enhancements for more accuracy and reduced tool wear
  - Enable networked machining
    - Link programs for distributed planning and simulation

# Who is currently participating



Sandvik Sweden, March 2008

## ■ Industry

- Boeing, Airbus, Lockheed
- Pratt & Whitney, Honeywell
- Sandvik, Scania, Rolls Royce



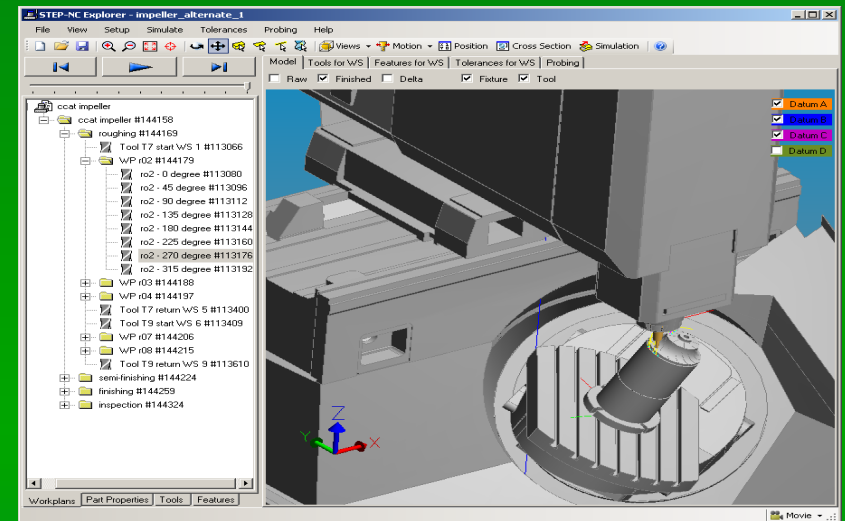
Boeing Renton, May 2009

## ■ Vendors

- STEP Tools, Fanuc, Siemens
- Mastercam, GibbsCAM, UGS, Catia
- Mitutoyo, NIST, KTH, CCAT

# Advantages for Aero Supply Chain

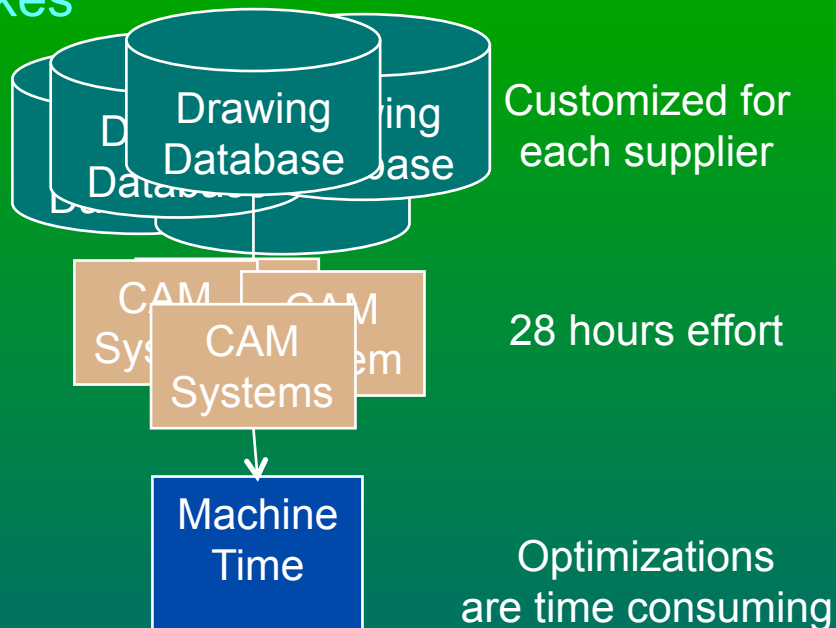
- Suppliers get digital production plan instead of drawing
  - Reduces data preparation time from average 28 hours to average 4 hours
- Machining is better
  - Optimization of feeds
  - Less tool wear
  - More accurate
  - Improved vendor qualification



# Advantages Comparison

## Current Situation

- Customer sends 2D drawing
- Supplier interprets drawing to create CAM
- Supplier determines feeds and speeds
- Supplier and customer review for mistakes



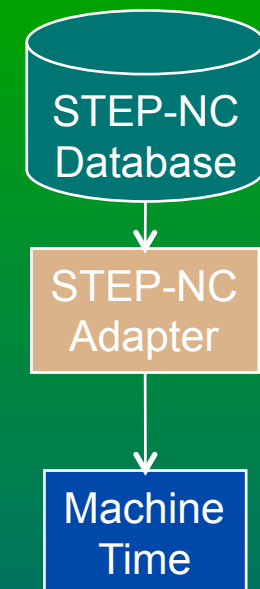
## STEP-NC

- Customer sends STEP-NC data
- Supplier selects machine tool, cutting tools and fixtures from options in the data
- Software calculates best speeds and feeds and verifies process

Built once for all suppliers

4 hours effort

15% faster



# Current alternatives to STEP-NC

- Continue using current method (G-codes)
  - This standard is now 50 years old
  - Every machine needs different codes
  - Makes manufacturing very labor intensive and time consuming
- Put the OEM CAD system onto the controller
  - Suppliers have to buy more controllers
  - Suppliers have to buy \$50+K CAD systems again
  - Makes SSM captive to single vendor; reduces opportunity for innovation

# How ASA can help?

- Reduce costs for individual manufacturers and the aerospace supply chain
  - Strengthen domestic and global competitiveness
- Expand SSM capabilities and opportunities
  - Reduce software entry costs
  - Give access to new markets
- Speed STEP-NC standard adoption
  - Give voice to the small guys
- Build on current STEP-NC demonstrations
  - Identify critical opportunities for demonstrations