



NORTHROP GRUMMAN

Newport News

Portable 3D Measurement Systems in Shipbuilding

International Metrology Interoperability Summit (IMIS)

March 28, 2006

Ron Hicks
Metrology Manager
Northrop Grumman Corporation

DEFINING THE FUTURE

FROM UNDERSEA TO OUTER SPACE TO CYBERSPACE



Presentation Outline

- **Newport News at a Glance**
- **Current Projects**
- **Measurement Equipment**
- **Interoperability Issues**
- **Common Software Platform**
- **Conclusion**

Newport News at a Glance



- **Largest Private US Shipyard**
- **\$2.8 B in Revenues**
- **18,050 Employees**
- **Delivered Over 800 Ships**
 - 28 Aircraft Carriers
 - 53 Nuclear Submarines
- **Strategically Located across from Largest US Navy Base**
- **550 Acres of Manufacturing and Construction Facilities**
 - 2 Miles of Waterfront Property
 - 7 Dry Docks and 1 Floating Dock
 - 2 Outfitting Berths and 4 Outfitting Piers
- **Over 4,000 Engineers, Designers, and Technicians**

Our Products



Virginia Class Submarines

Nimitz Class Aircraft Carriers



Construction



Portable 3D Systems Employed at Newport News

- Laser Trackers
- Total Stations
- Digital Photogrammetry
- Portable CMM's



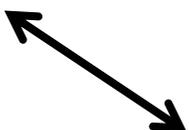
Departmental Statistics

- **180 surveys per month (average)**
- **35 average man-hours per survey (survey, analysis and reporting)**
- **83 supervisory, engineering, technical and support personnel.**
- **Work is generally classified as product compliance, process control, alignment or reverse engineering.**
- **Typical tolerances range from $\pm 0.002''$ - $\pm 0.075''$.**

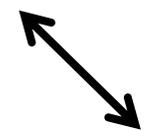
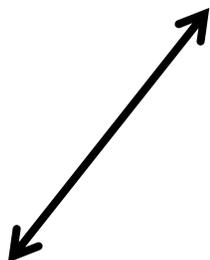
Interoperability Issues (1998)

- **Each measurement system has its own software**
- **Minimal commonality between systems**
- **Metrology technicians mastered only one or two systems.**
- **Limited ability to import CAD data and perform analysis of measured data.**
- **Different measurement systems increased the cost of reporting data. (CAD, Excel, etc.)**

Software Enhancements (1999 – Present)



3D Graphical Software Platform



Benefits of a Common Software Platform

- **One software for all tasks**
- **Graphical interface, direct CAD import**
- **Graphical software is more comprehensive**
- **The ability to script surveys or analysis in advance**
- **Reporting of results substantially improved**
- **Man-hour savings of 15% - 20% over previous software**

Immediate Issues Left to Solve

- **Improve CAD import to measurement software**
- **Stronger GD&T analysis**
- **Improve reporting**
- **Improve communication to NC cutting and machine shop tools.**
- **Integrate to fixed CMM's**

Questions

