

How To Perform First Article Inspections in Under 10 Minutes

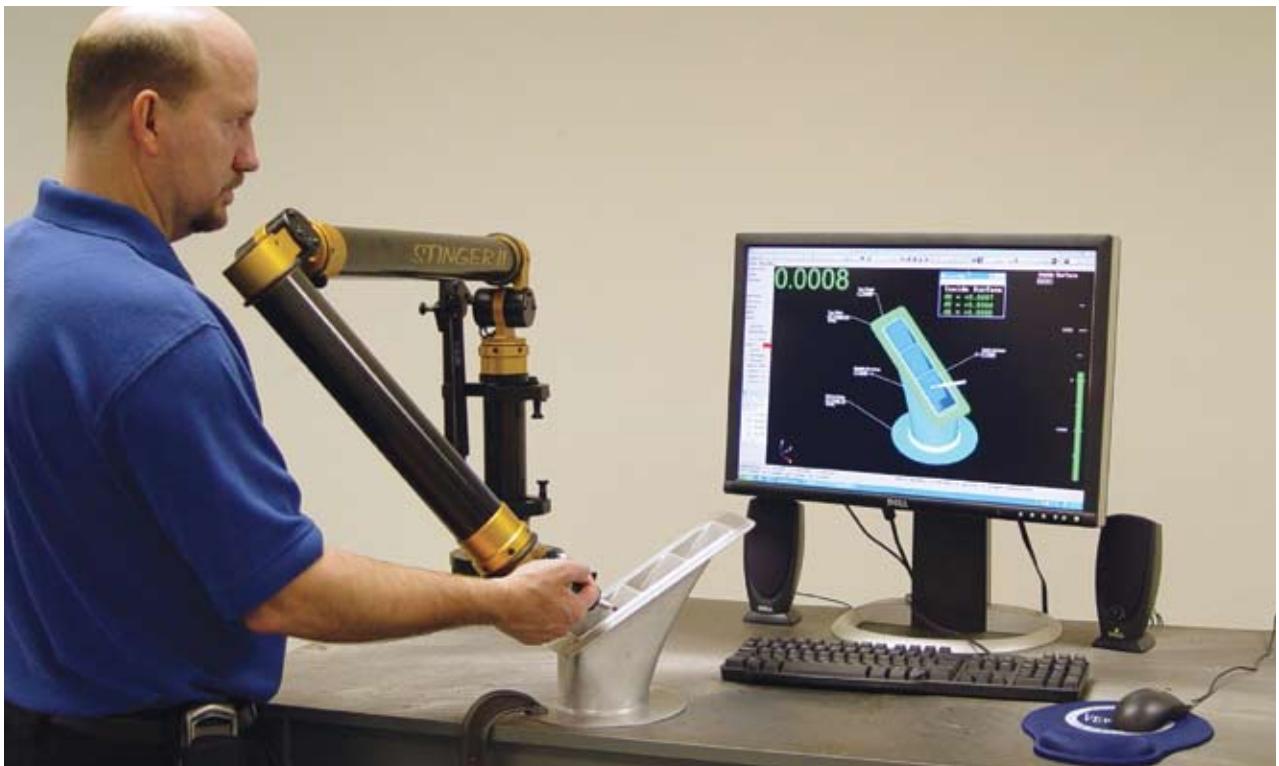
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Computer-aided design (CAD) and computer-aided manufacturing (CAM) have been around for a long time. But the goal of transforming to full model-based definition (MBD) has been elusive. One of the key disciplines where it has not been incorporated is in Quality Control. While organizations have partially employed model-based methods for CMM (coordinate measuring machine) inspection, most QA departments have continued to rely on drawings, manual techniques, and other non-digital means to complete the process. But now, moving the enterprise towards a fully model-based process not only yields technical and process control benefits, but it can also greatly reduce the time and cost of inspection and buy-off of manufactured goods. Most companies would jump at the chance to reduce their first article inspection (FAI) time to a

few minutes instead of hours or possibly days. Today, model-based inspection with a modern metrology platform is the solution.

FAST FIRST ARTICLE INSPECTION IS PERFORMED IN 4 QUICK AND EASY STEPS:

1. **Load CAD model** – Import CAD model into metrology software – about 1 minute.
2. **Align** – using metrology software, quickly create automated alignment by picking targets on CAD features (datums), then run the routine by probing each target on the part as directed by the metrology software's CAD display – about 2 minutes.
3. **Inspect** – probe part taking data on each feature to be reported, with modern metrology software this process is simple and fast since the user is provided live feedback throughout the process, no need to pause to interpret anything – time to complete about 5 minutes.





4. **Report** – modern metrology software automatically formats data for reporting and uses CAD model for nominal data as well as GD&T – approximate time 1 minute.

JOB COMPLETE!

With a properly prepared CAD model an operator should be able to both set up and complete the alignment routine in less than 60 seconds. Metrology software should be self-sufficient, and come with built-in capability to prepare the CAD model without any help from Engineering. Model based inspection for fast first articles can be speeded even more with the addition of further automation. With advanced software applications, one can import the CAD model, pick features on the model via mouse clicks aided by clever visual indicators, and fully automate the inspection process. There should be no need for advanced training or special programming languages. This provides the ability to create a routine that does not require high levels of operator skill and is easily performed in just a few minutes. The bonuses do not stop there. The automated routines insure a totally controlled process, one that is repeatable and is well-suited for SPC reporting.

Fast first article inspection begins with a CAD model. These days one almost always exists since everything is designed in CAD and is very often manufactured via CAM technology such as CNC machining or some other computer controlled or robotic process. Any modern model-based inspection software systems should have a robust, powerful CAD engine that provides an easy

means of importing the CAD model accurately and fully intact. Since most prime contractors deal with several vendors and since most sub-tiers supply to many customers, the software must be able to work effectively with CAD models originating from all popular CAD platforms.

There is a common misconception that model-based inspection adds complexity and cost compared with traditional methods thought to be simpler and less expensive. In fact the contrary is true. While there is some capital investment required for a modern digital inspection device and CAD-enabled metrology software, so to are the multitude of hand tools, drawings, mylars, check fixtures, and other enabling equipment needed with older manual methods.

Newer techniques with lower cost, more flexible hardware such as portable CMM arms used in conjunction with modern model-based inspection software offer considerable productivity improvements and cost savings for manufacturers of all types of products.



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