SAND2016-3252PE

Exceptional service in the national interest

Sandia National Laboratories

114th IMOG Measurement Technology Subgroup

Resolving Customer's External Supplier Dispute on Measurements

Presented by: Margie Baca

U.S. DEPARTMENT OF ENERGY | NNSA National Nuclear Security Administration

Sandia National Laboratories is a multi-program laboratory managed and operated by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Corporation, for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000. SAND NO. 2011-XXXXP

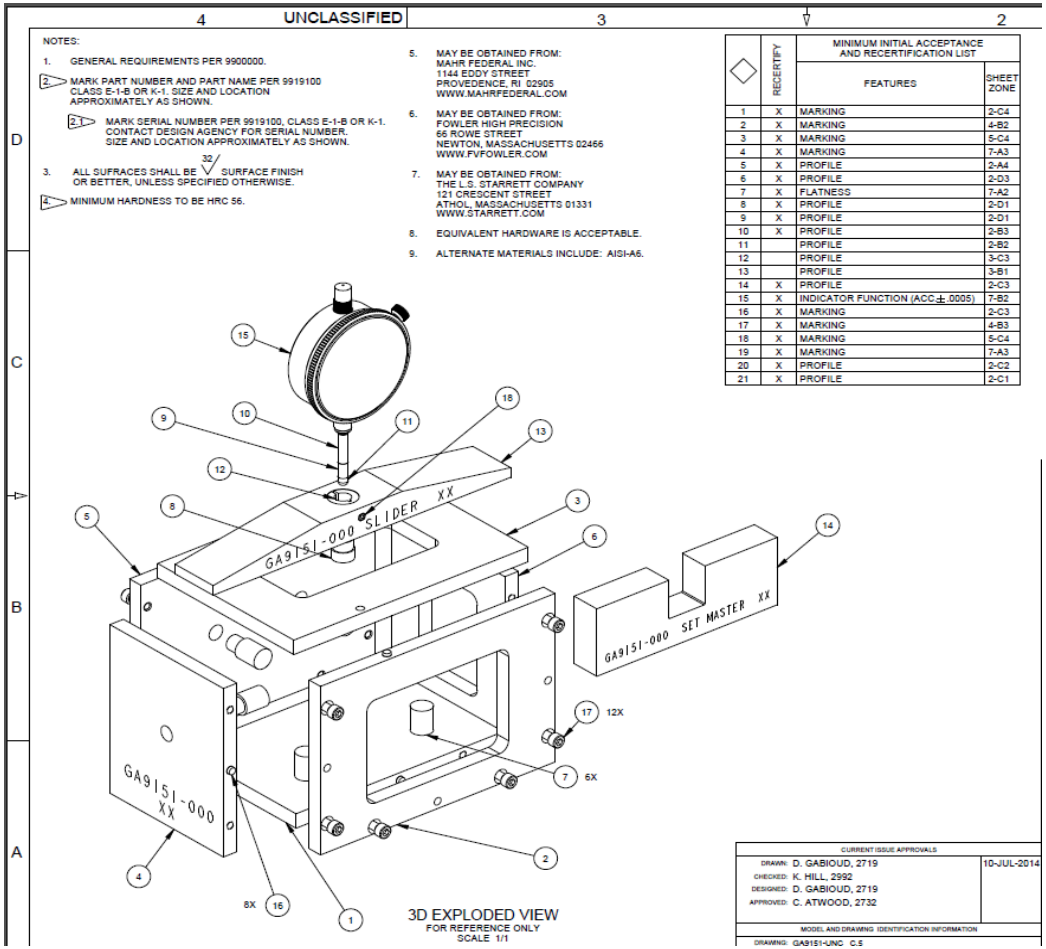
External Supplier Procurement Gage Dispute

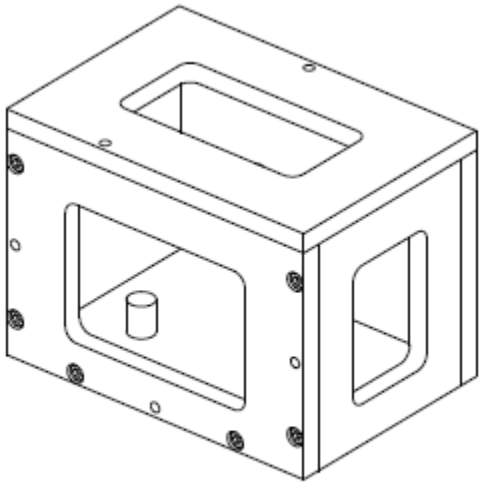
- External supplier approved by Purchased Product Value Stream (PPVS)
  - PPVS mission to provide expertise to achieve operational effectiveness of the supply chain
- 2D drawing was provided to external supplier for fabrication of gage
- Primary Standards Lab Mechanical Cal (Mech Cal) calibration gage calibration process
- Discussion with PPVS technical point of contact (POC)
  - Process of resolving external supplier's dispute of Mech Cal measurements

PPVS External Supplier Approval System

- PPVS has a approval system in place for outside commercial suppliers, within Sandia National Laboratories (SNL) supply chain, to identify, develop, deliver and assure nuclear weapon components, materials and custom tooling
  - PPVS enables and sustains the capability of a commercial suppliers; anticipating and managing risk within the supply chain

Drawing GA9151 Final Acceptance Gage





3D ROTATED VIEW
FOR REFERENCE ONLY

Primary Standards Mechanical Calibration Lab Gage Calibration Process

◇	RECERTIFY	MINIMUM INITIAL ACCEPTANCE AND RECERTIFICATION LIST	
		FEATURES	SHEET ZONE
1	X	MARKING	2-C4
2	X	MARKING	4-B2
3	X	MARKING	5-C4
4	X	MARKING	7-A3
5	X	PROFILE	2-A4
6	X	PROFILE	2-D3
7	X	FLATNESS	7-A2
8	X	PROFILE	2-D1
9	X	PROFILE	2-D1
10	X	PROFILE	2-B3
11		PROFILE	2-B2
12		PROFILE	3-C3
13		PROFILE	3-B1
14	X	PROFILE	2-C3
15	X	INDICATOR FUNCTION (ACC.± .0005)	7-B2
16	X	MARKING	2-C3
17	X	MARKING	4-B3
18	X	MARKING	5-C4
19	X	MARKING	7-A3
20	X	PROFILE	2-C2
21	X	PROFILE	2-C1

- Initial certification
  - At a minimum, ALL diamond feature requirements are verified to initial acceptance list
- Recertification
  - ONLY diamond features with recertify indicated, shown with X, are verified at the next calibration

Discussion with PPVS POC

- PPVS POC - Dan Gabioud
  - Mech Cal staff meets with Dan the third Monday of each month to review check drawings to ensure proper design definition is communicated e.g. Geometric Dimensioning and Tolerancing (GD&T)
  - Mech Cal found one of two gages i.e. GA9151 procured did not meet initial acceptance requirements
    - Profile diamond dimensions exceeded initial certification requirements i.e. tolerances
  - PPVS sent the gage back to supplier
    - Mech Cal has a negotiated turn around timeline (10 working days) on NEW Gages from PPVS
    - Outside supplier was informed of out of tolerance (OOT) condition of gage
    - Outside supplier disputed and or questioned OOT condition when the gage was received back from PPVS

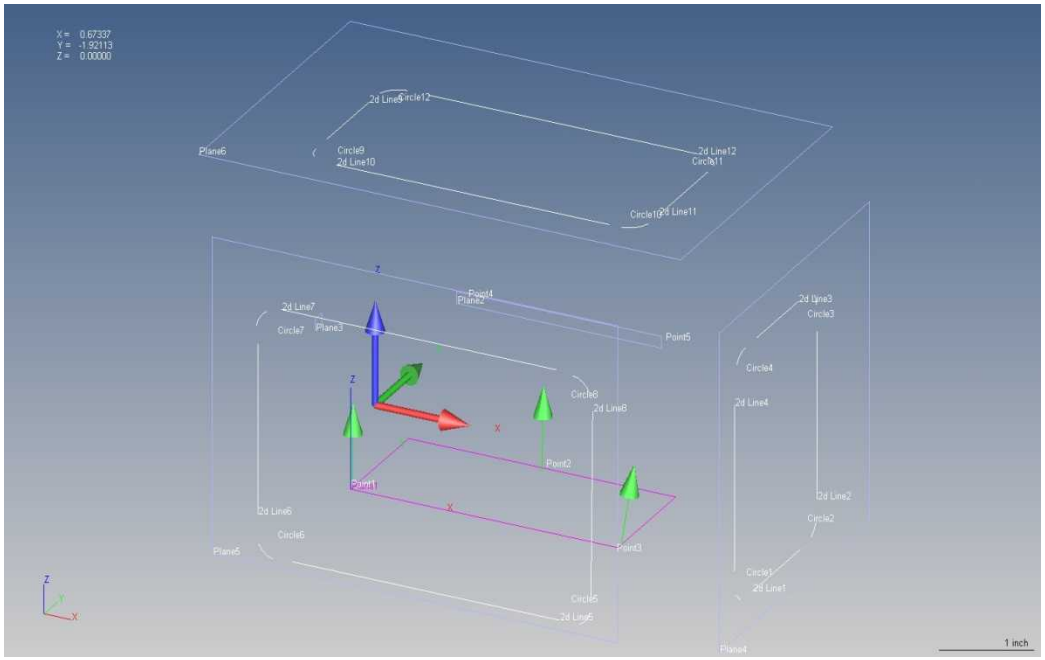
Process to Resolve Dispute with External Supplier

- PPVS agreed to have gage profiles re-verified by SNL Manufacturing Liaison measurement group
  - Mech Cal obtained outside supplier Zeiss Calypso CMM program
  - Gage GA9151 was sent to Manufacturing Liaison
    - To avoid any possible bias or influence measurement personnel were not given any previous gage information and were only directed to measure profile call outs per 2D drawing

Process to Resolve Dispute with External Supplier

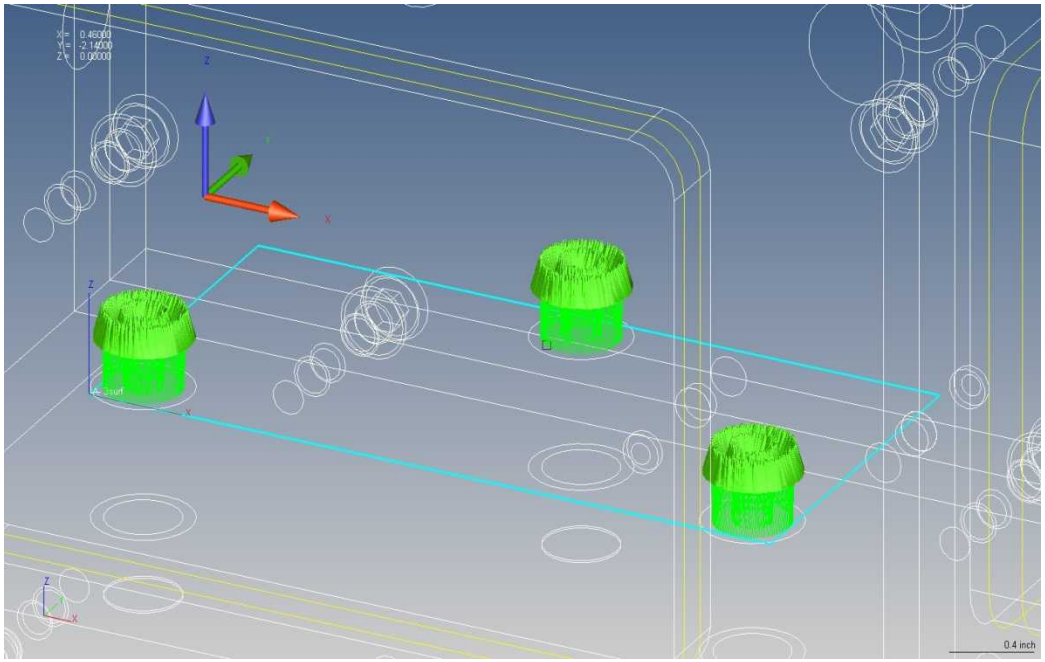
GA9151-000-C
Final Acceptance Gage (MC4915)

- The following slides contain images from the Zeiss Calypso CMM program written by SNL Manufacturing Liaison measurements group & from the Zeiss Calypso CMM program provided by the supplier for the same gage.
- Images show point comparisons (actual number of points taken) for each of the surfaces shown.



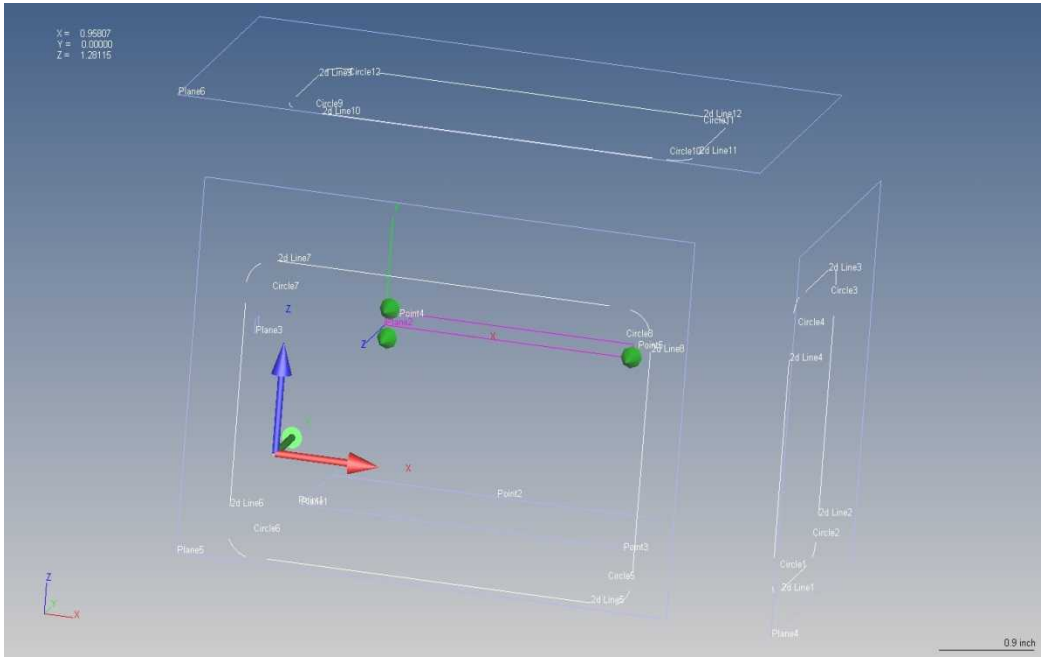
Plane1 => Datum A
[3 points]

Supplier CMM Program



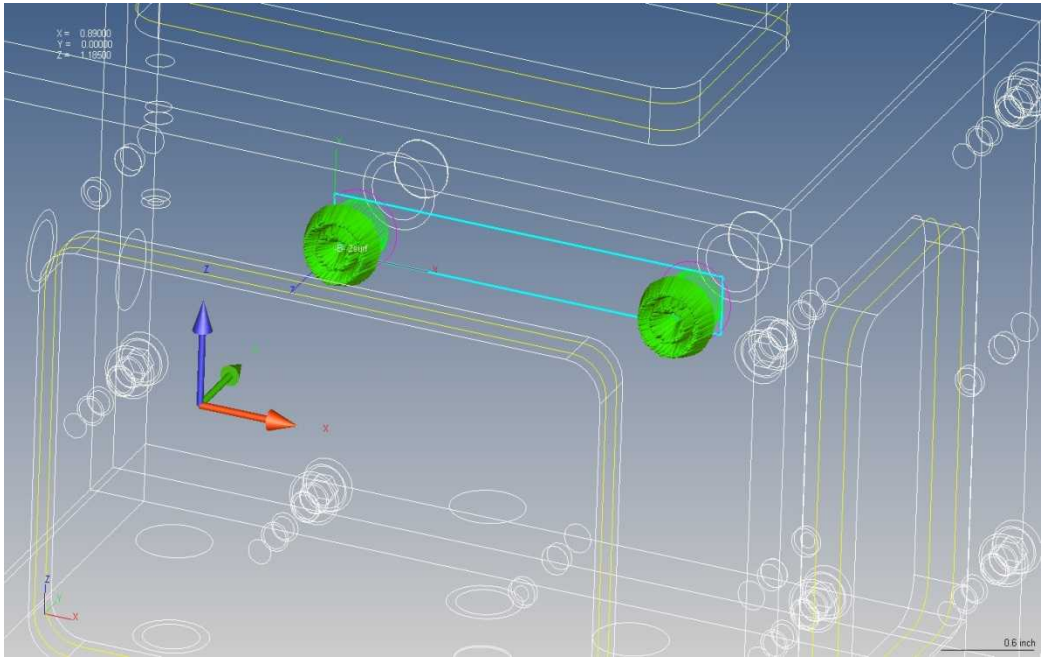
Datum A (3 surfaces)
[approx. 670 points total]

Measurements CMM Program



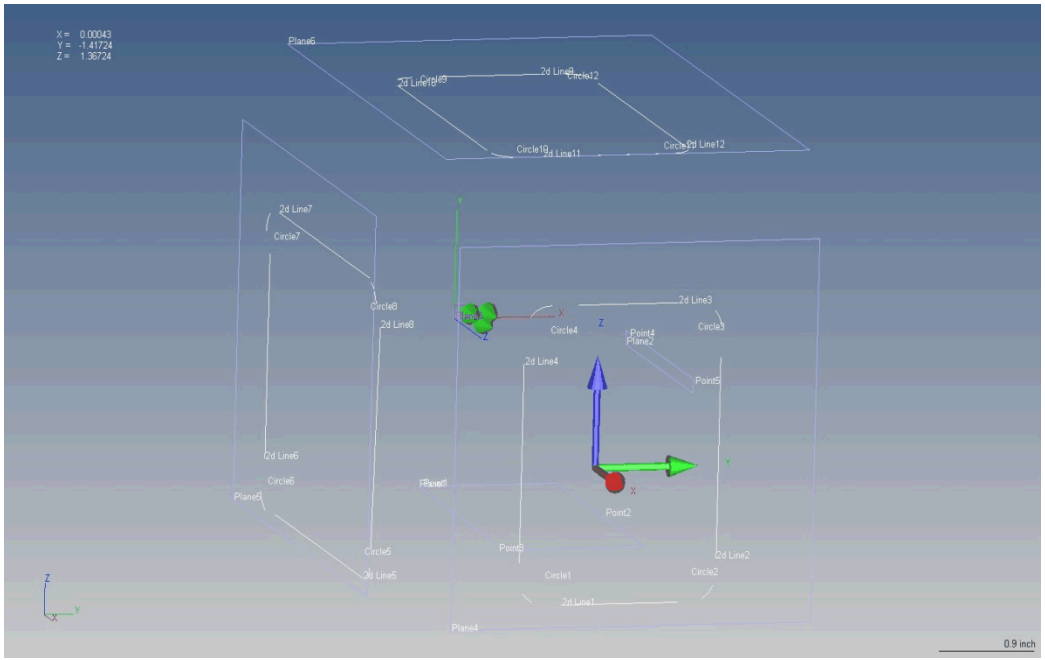
Plane2 => Datum B
[3 points]

Supplier CMM Program



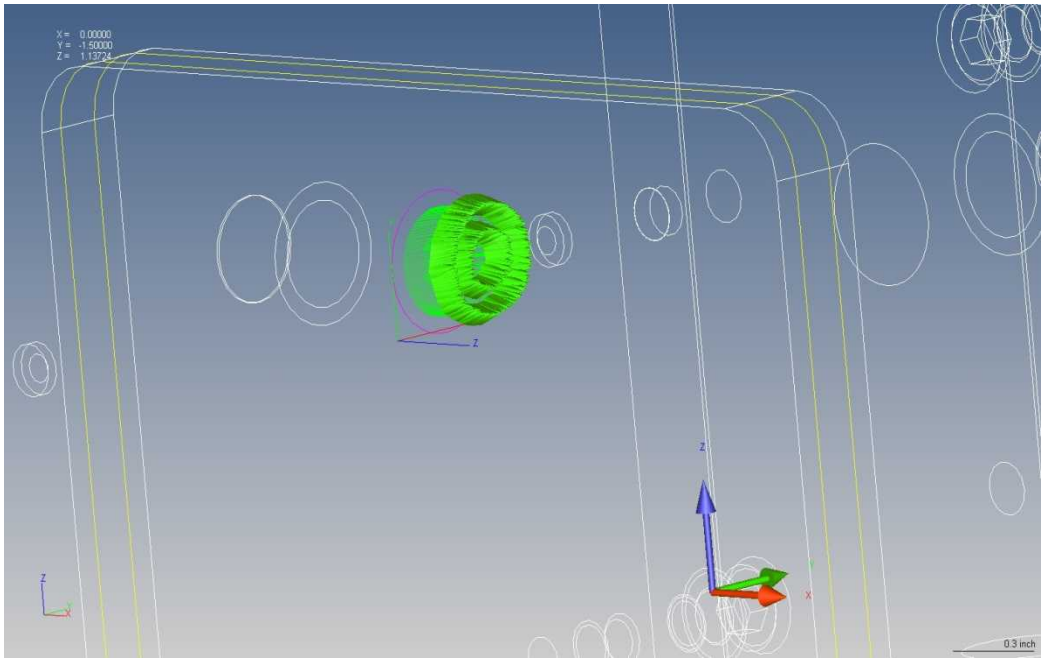
Datum B (2 surfaces)
[approx. 450 points total]

Measurements CMM Program



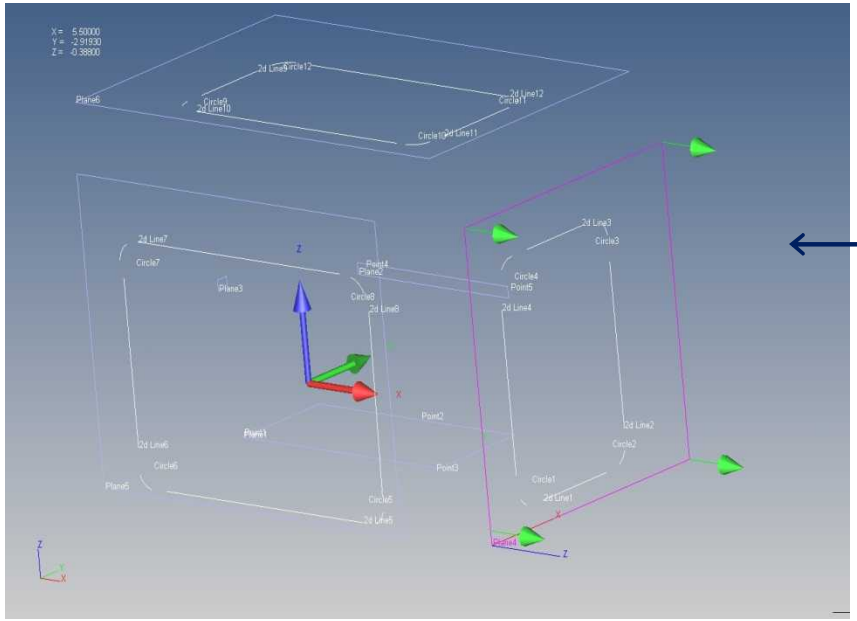
Plane3 => Datum C
[3 points]

Supplier CMM Program



Datum C
[approx. 220 points total]

Measurements CMM Program



8 Profile of Right side surface to Datum C

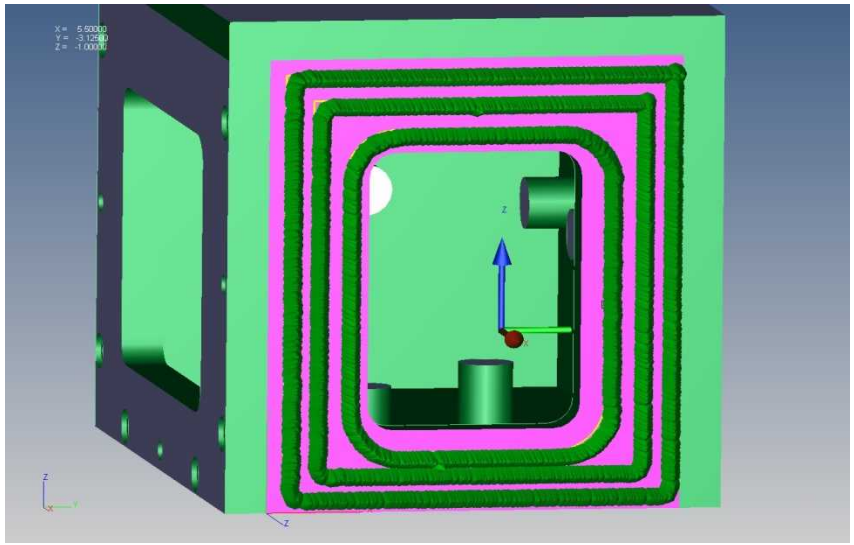
Plane4 => Right side surface
[4 points]

Supplier CMM Program

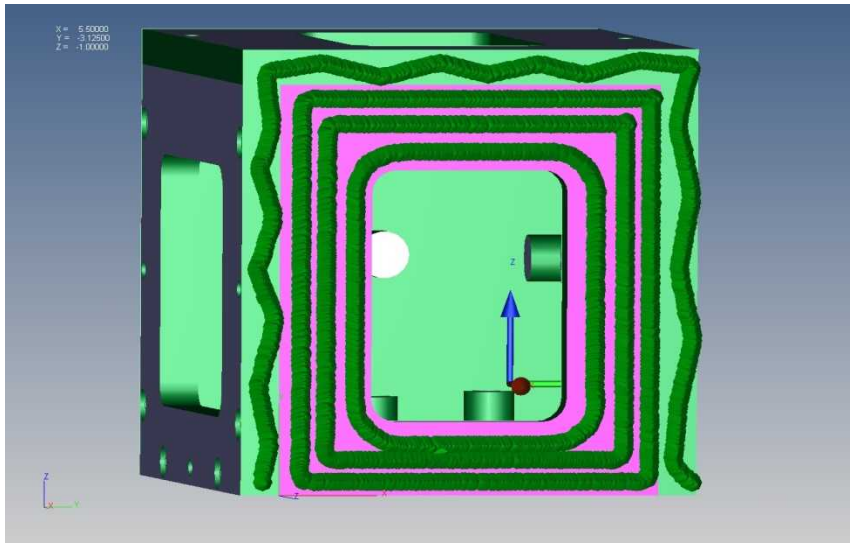
Pic.1 = Right side surface without edges
[approx. 1520 points total]

Pic.2 = Right side surface including edges (4 surfaces total)
[approx. 2050 points total]

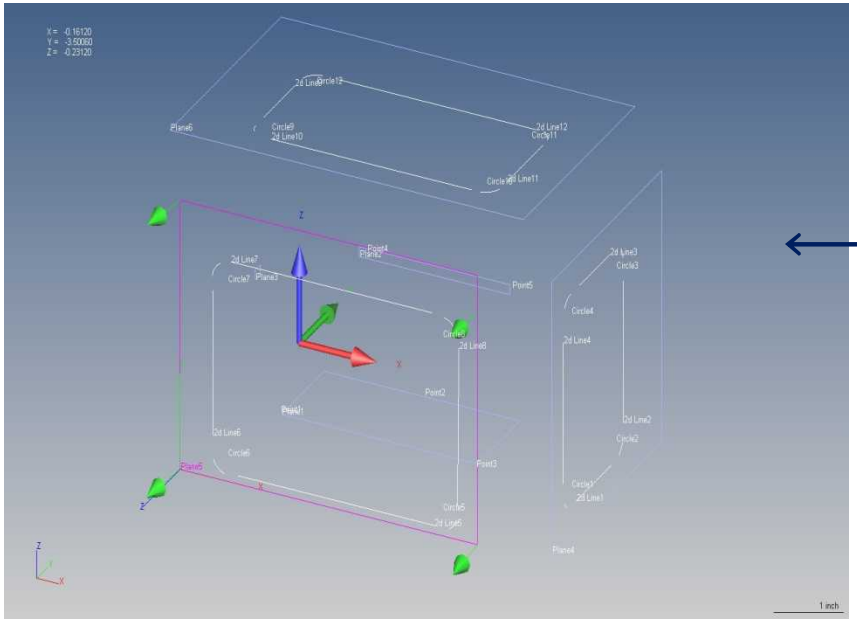
Measurements CMM Program



Pic. 1



Pic. 2



9 Profile of Front side surface to Datum B

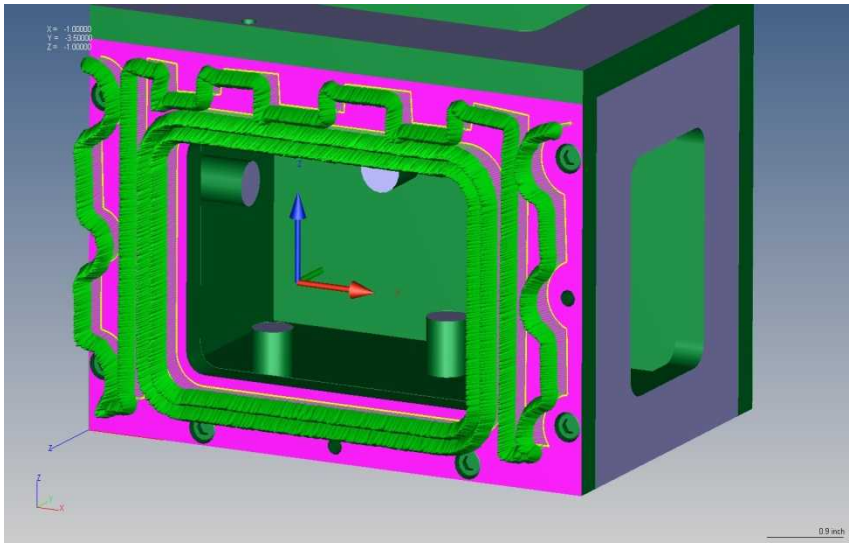
Plane5 => Front side surface
[4 points]

Supplier CMM Program

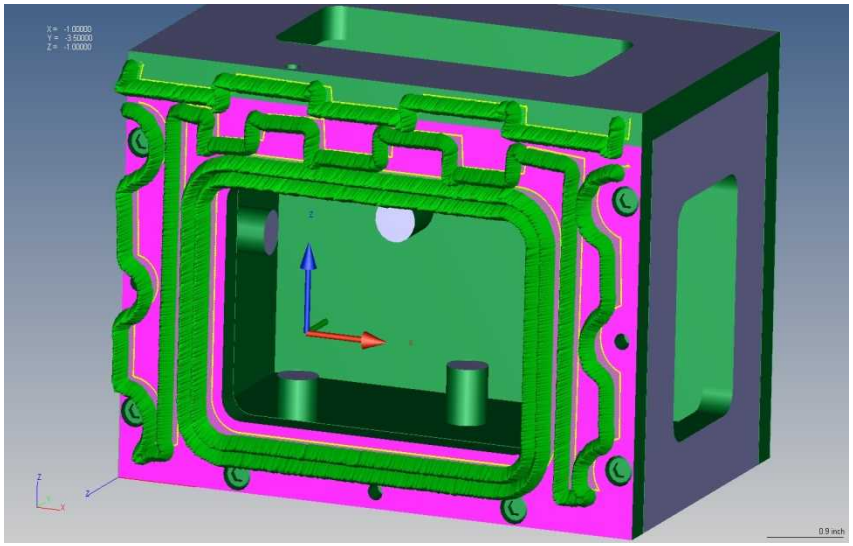
Pic.1 = Front side surface without top edge
[approx. 2050 points total]

Pic.2 = Front side surface including top edge (Top Plate)
[approx. 2340 points total]

Measurements CMM Program



Pic. 1



Pic. 2

Outcome of Re-Inspection

- Provided and reviewed data with PPVS POC
  - Original Mech Cal and re-verified Manufacturing Liaison results were within 0.0006 inches on the non conformance profile measurements
  - The measurement method differences (e.g. point density) between SNL and the external supplier were explained in great detail
    - This resulted in a conference call with the external supplier and the gage GA9151 being returned to the external supplier

Conclusions

- Suppliers CMM probing strategy used limited or in some cases minimum number of probing's to establish datums and measure profile
  - Perhaps due to time issues related to single point probing
    - Scanning not available
  - Perhaps need for high point density not seen
    - How many points to take is always a challenge as ASME Y14.5 uses term “all points” which is not a realistic goal
  - Perhaps CMM software cannot properly evaluate the profile requirements

Sandia National Laboratories

Questions?