



## 118<sup>th</sup> IMOG Measurement Technology Subgroup Meeting

ROUND ROBIN UPDATE May 2018

Presented by: Margie Baca

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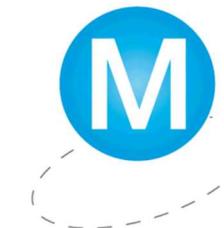
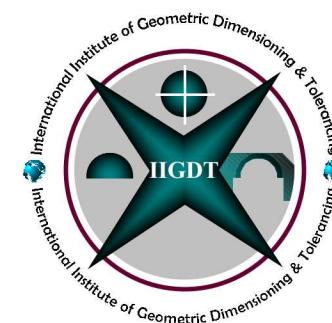
## Round Robin Update

- IMO Round Robin Inspection Gage
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- IMO Round Robin “Specification Requirements”
- IMO Round Robin Supplementary Information
- IMO Round Robin Gage Presently
- Measurement Information Request Reminder
- Report IMO Round Robin Inspection Gage data timeline

# IMOOG- Round Robin Inspection Gage



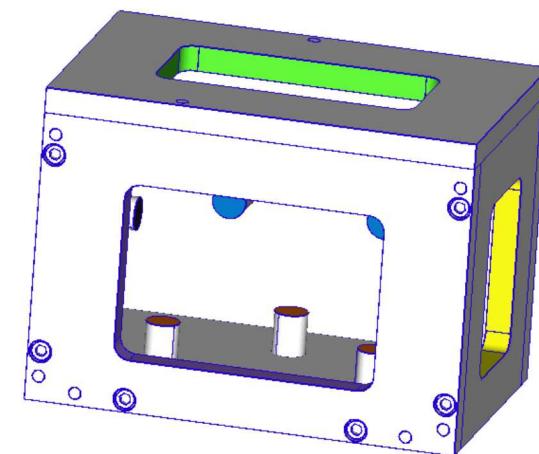
**Sandia  
National  
Laboratories**



**Marten  
Machining**  
inc.  
Multi-Axis Quality

## Developers

- Margie Baca – SNL/NM Mechanical Calibration
- Tony Bryce – SNL/NM Mechanical Calibration
- Monico Lucero – SNL/NM Manufacturing Liaison
- Dr. Greg Hetland – IIGDT
- Ryan Wierzba – Marten Machining
- Al Marten – Marten Machining

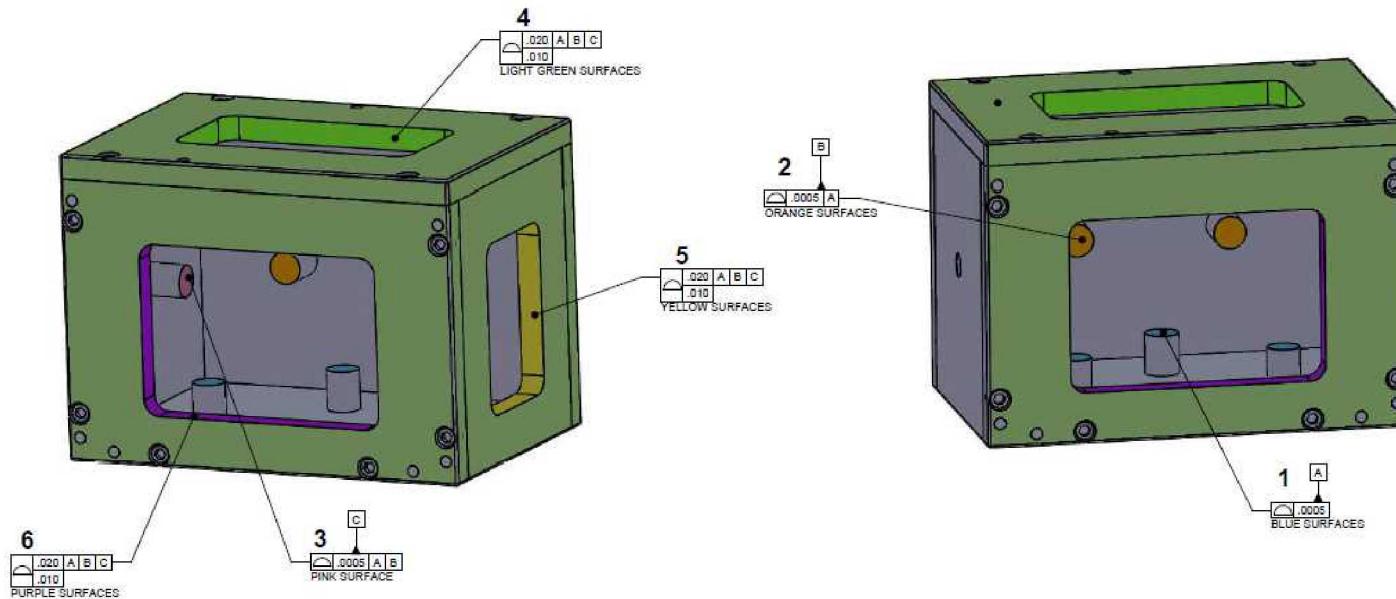


# Motivation For Round Robin

- To utilize a gage in a round-robin effort to evaluate measurement methods from various labs and determine potential biases between results and implications to each lab's ability to optimally consider applicable error consideration when developing their uncertainty analysis.
- The magnitude of these measurement biases will determine each lab's ability to have a high-degree of confidence in measuring parts for conformance to specification requirements with a known magnitude of measurement uncertainty.
- Failure to ensure confidence in these results could have a technical & business impact to IMOG participants as it will result in potentially rejecting parts that truly conform to specification requirements, or at a higher risk, accepting parts that truly do not conform to specification requirements.

# IMOG Round Robin “Specification Requirements”

\*Note that previously sent email regarding specifications did not represent the discrepancy found later on that should excluded datum A on the composite profiles



**DO NOT DISASSEMBLE GAGE**

UNLESS OTHERWISE SPECIFIED:  
 1. ALL DIMENSIONS ARE BASIC, CONTROLLED BY THE CAD MODEL,  
 AND CONTROLLED SIMULTANEOUSLY.  
 2. BREAK EDGES (.002-.010)  
 3. SURFACE ROUGHNESS IS NOT TO EXCEED 63Ra OR 2% OF FORM REQUIREMENT



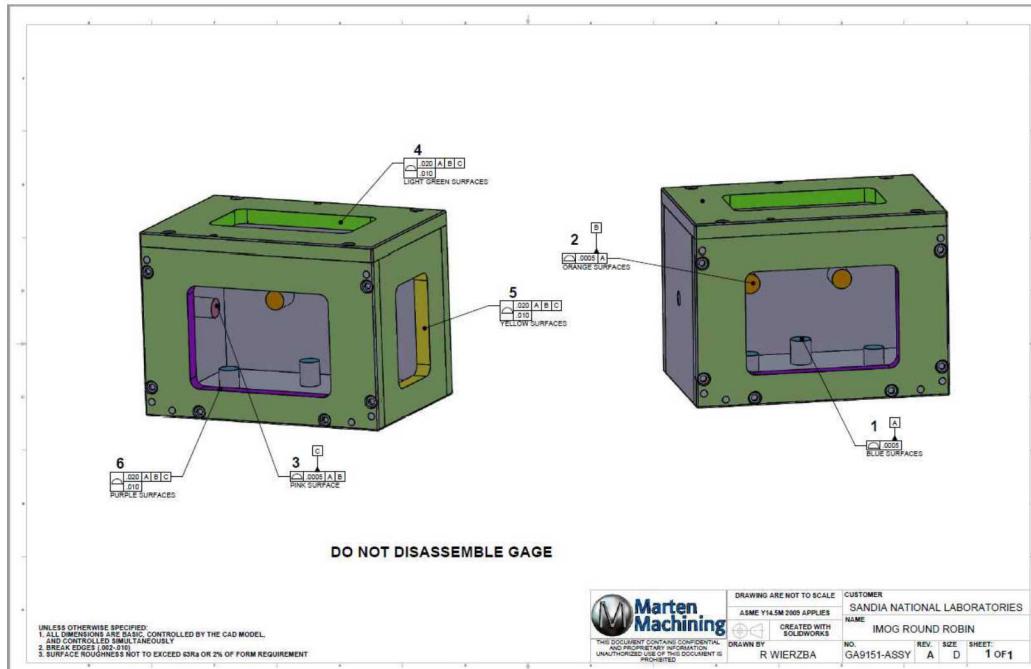
|                          |                              |
|--------------------------|------------------------------|
| DRAWING ARE NOT TO SCALE | CUSTOMER                     |
| ASME Y14.5M 2009 APPLIES | SANDIA NATIONAL LABORATORIES |
| CREATED WITH SOLIDWORKS  | NAME                         |
|                          | IMOG ROUND ROBIN             |
| DRAWN BY                 | NO.                          |
| R WIERZBA                | GA9151-ASSY                  |
| REV.                     | A                            |
| SIZE                     | D                            |
| SHEET                    | 1 OF 1                       |

# IMO Round Robin Supplementary Information

| dimension | description                    | on cmm as measured | unit of measure | effective probe diameter & material | ball center or surface points | scan points or single points | machine model and software  | cmm specification | metrologist/facility   | exported points |
|-----------|--------------------------------|--------------------|-----------------|-------------------------------------|-------------------------------|------------------------------|-----------------------------|-------------------|------------------------|-----------------|
| 1         | Profile Datum A                | .0001              | INCH            | 5mm / Silicone Nitrite              | Surface                       | Scan                         | Zeiss Contura G2<br>Calypso | 1.9 +L/300μm      | Jesse Sanchez / SNL-NM | Metric &Inch    |
| 2         | Profile Datum B                | .0000              | INCH            | 5mm / Silicon Nitrite               | Surface                       | Scan                         |                             |                   |                        |                 |
| 3         | Profile Datum C                | .0005              | INCH            | 5mm / Silicon Nitrite               | Surface                       | Scan                         |                             |                   |                        |                 |
| 4         | Composite Profile Top Window   | -.0034             | INCH            | 3mm / Ruby                          | Surface                       | Scan                         |                             |                   |                        |                 |
|           |                                | .0050              | INCH            | 3mm / Ruby                          | Surface                       | Scan                         |                             |                   |                        |                 |
|           |                                | .0096              | INCH            | 3mm / Ruby                          | Surface                       | Scan                         |                             |                   |                        |                 |
| 5         | Composite Profile Right Window | -.0083             | INCH            | 3mm / Ruby                          | Surface                       | Scan                         |                             |                   |                        |                 |
|           |                                | .0083              | INCH            | 3mm / Ruby                          | Surface                       | Scan                         |                             |                   |                        |                 |
|           |                                | .0209              | INCH            | 3mm / Ruby                          | Surface                       | Scan                         |                             |                   |                        |                 |
| 6         | Composite Profile Front Window | -.0086             | INCH            | 3mm / Ruby                          | Surface                       | Scan                         |                             |                   |                        |                 |
|           |                                | .0083              | INCH            | 3mm / Ruby                          | Surface                       | Scan                         |                             |                   |                        |                 |
|           |                                | .0169              | INCH            | 3mm / Ruby                          | Surface                       | Scan                         |                             |                   |                        |                 |

Please send all the point files for all the datums along with all the window features and include the units of the exported points. Please also include the stylus size diameter and if the exported points are surface or ball center data.

## Supplementary Information Requested



# Round Robin Gage Presently

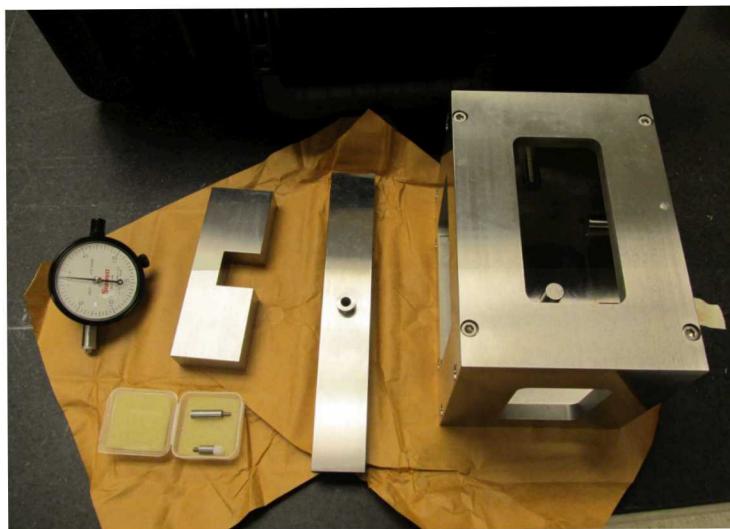
- Three participants that have measured the Round Robin Gage so far:
  - Mechanical Calibration (SNL/NM)
  - Manufacturing Liaison (SNL/NM)
  - Mission Support and Test Services (NSTech)
- Sandia Livermore California is next in line to receive the Round Robin Gage
  - SNL/CA next participant John Friddle
- Just a reminder that there is no DOE funding for shipping the Round Robin Gage to and from each IMOG participant. It is understood that shipping cost will be on the IMOG participant.

# Measurement Information Requested Reminder



- Report methodology per participant site's normal process
- Contact information for delivery of Round Robin gage
- Would like to receive from each participant if possible the following information-
  - X, Y, Z, i, j, k measured points (i.e. surface point data)
    - Measured surface points of all datums along with profile measurements
    - Follow participant's site process to provide information (e.g. E-mail, CD file transfer)
  - Units of measure of the data
  - Effective probe tip diameter
  - Software (e.g. name and version) being used on CMM actual profile measurement value result
  - Certified CMM specification or accuracy

# Round Robin Gage



# IMOG- Round Robin Inspection Gage

## Reporting Timeline

- Round Robin data reporting timeline
  - Anticipate having enough data to report on during the fall IMOG meeting this year
    - Would like to have the majority of the IMOG Round Robing Gage participants measure the gage before reporting any data.

# Questions?