

PROBLEM STATEMENT

- Robotic solutions are becoming commonplace for the military maintainers. Actual robot performance results remain suspect as compared to original robot OEM published specifications.
 - ✓ robots possess high aptitude for repeatability, but low aptitude for accuracy.
 - ✓ Robot's position, orientation, distance, and path accuracies are its major performance factors.
 - ✓ Low accuracy limits the use of robots beyond common tasks like spot welding, painting, deburring, and material handling.

BENEFITS

- Establishing a baseline for understanding the performance of the robot allows the maintainer to quantifiably measure the robots performance.
- With improvement in the accuracy of the robotic process (DH Model) this now allows the maintainer to utilize robots in a more broad scale use with higher precision and accuracy:
 - ✓ Precision welding
 - ✓ Precision drilling/milling/riveting
 - ✓ Assist in Additive Manufacturing (AM) for precision grinding or deburring of AM parts being repaired
 - ✓ Non Destructive Inspection of 3D parts being reproduced through reverse engineering utilizing high precision non-contact scanning.

TECHNOLOGY SOLUTION

- **Robot Performance Measurement** - In accordance to the ISO Standard 9283, API has developed a comprehensive suite of software to evaluate a robots actual performance against the robots original OEM published specifications.
- **Volumetric Error Compensation** This software creates a corrected reverse kinematic model of the robot, and can be used to compensate robot's error either directly through the controller (OEM permitted), or through off-line path programming software. Accuracy improvements from 10 – 14X.
- **Process Path Enhancement** – This software is an off-line process path planning tool that programs the robot specifically to the application utilizing the corrected values from the Volumetric Compensation to improve the accuracy.

