**Steps to Create and Validate a 3DCS Model**

1. **Modifying the assembly (Preparing):**

* Clearly identify the number, location, nominal and assembly specifications of the Build Objectives or measurements to be analyzed.
* Identify the number of assemblies, components, fixtures, or gages required in the tolerance path to analyze all the desired Objectives.
* Load the appropriate release level assemblies or components into the appropriate NX, 3DEXPERIENCE, CATIA V5 or Multi-CAD solution.
* Create the product assembly tree in accordance to the manufacturing assembly process.
* Create assembly fixtures or gages where required.

1. **Applying the Assembly Process (Moves):**

* Identify the functional features on each component and their relationships to the other components, assembly fixtures or gages.
* Create the appropriate 3DCS move for each component and sub-assembly in accordance to the actual manufacturing process. (Hole-Pin Floats, Manual Adjustments, Deformations or Conditional Assembly logic may require additional moves to be created)
* Visually verify the component and assembly process behavior through the animation function.

1. **Defining Tolerances:**

* Define part tolerances based on GD&T, actual part capability (CMM Data) or generic tolerances at functional surfaces and measurement locations.
* Visually verify tolerance on the components features or points.

1. **Build Objectives (Measures)**

* Create individual measurements at each toleranced feature or point. Run Simulation to assure toleranced points are within the specified range.
* Create measurements between the target and object points/features for each move. Run Simulation to assure that the object and target features are properly aligned or within the allowable hole to pin float.
* Create the final Build Objectives at the specified locations.
* Visually verify all measurements nominal and Vector Directions

1. **Results**

* Perform Monte Carlo Statistical Analyses. Run Simulation.
* Review the nominal, mean and 6 sigma of each measurement. Utilize other statistical outputs if non-normal distributions are identified.
* Perform HLM Sensitivity Analysis and evaluate tolerance contributions for each measurement. Identify if each contributor is in the datum flow or tolerance loop.
* Perform GeoFactor Analysis to identify geometric factors that may have produced any unexpected Simulation or Sensitivity results.

1. **Report the Results**

* Create a Report that indicates the assumptions utilized in the 3DCS model.
* Create MTM notes and descriptions to describe each for understanding the model and the report.