**Problem 2-2:** A coordinate measuring machine has sampled the surface of a shaft feature at a particular cross section and has generated the planar pattern of points shown below. The shaft size limits are 14-15 mm. Two gages are shown – the GO gage circle having a diameter of 15 mm and a NOTGO gage having a diameter of 14 mm. Grab the GO gage with a mouse and move it to see if the entire pattern of points can be fit inside the 15 mm circle. Do the same for the NOTGO gage and see if the entire pattern of points can be fit outside the 14 mm circle.

15 mm GO

14 mm NOTGO

Note: By holding the ALT key you can move the circles smoothly.

While the points represent one cross-section, if the cross-section test fails either for the GO or NOTGO gage, then the feature does not meet the size tolerance. However, if the cross-section passes the gage test, it is not a guarantee that all cross-sections pass the test. In practice, the inspector has to make a judgement based on one or more cross-section tests. Most processes (especially machining processes) create uniform sizes along the length of the feature so if the feature size is acceptable at one cross-section, it is usually safe to accept the feature. This is not different than what an inspector does with a caliper measurement. The inspector usually measures the size at one or two cross-sections and makes a judgement whether the feature is acceptable or not.