CLAIMS:

1. Method for removing a foreign particle from a surface of a fragile object, the method comprising the steps of:

gripping a particle removal tool with a tool gripper;

determining with a force sensing device a cleaning position of the particle removal tool relative to the surface whereat a threshold force is exerted on the surface, the threshold force being a force that is exerted by the particle removal tool on the surface that would pick up the foreign particle but would not damage the fragile object;

determining a position of a tip of the particle removal tool with an optical device prior to conveying the particle removal tool over a location of the foreign particle;

conveying the particle removal tool with the tool gripper over the location of the foreign particle and moving the particle removal tool towards the surface to the cleaning position whereat the threshold force is exerted on the surface; and

lifting the foreign particle away from the surface with the particle removal tool.

2. Method as claimed in claim 1, further comprising the step of ascertaining the location of the foreign particle on the surface by inspecting the surface using an automated optical inspection device.

3. Method as claimed in claim 1, wherein the particle removal tool is gripped and taken by the tool gripper from a cleaning tool station containing a supply of multiple particle removal tools.

4. Method as claimed in claim 1, wherein the force sensing device is a force/pressure transducer which is located at a force calibration station.

5. Method as claimed in claim 4, wherein the force/pressure transducer is separate from the tool gripper and particle removal tool, and the force/pressure transducer comprises a force sensor or a strain gauge.

6. Method as claimed in claim 4, wherein the force calibration station is positioned next to the optical device.

7. Method as claimed in claim 4, further comprising the step of gradually decreasing a distance between the tool gripper and the force/pressure transducer, and determining the cleaning position whereat a force corresponding to the threshold force is detected by the force/pressure transducer.

8. Method as claimed in claim 1, wherein the force sensing device is a force/pressure transducer coupled to the tool gripper, the force/pressure transducer monitoring a force being exerted by the particle removal tool on the surface at each position of the particle removal tool relative to the surface.

9. Method as claimed in claim 8, further comprising the step of monitoring a position of the particle removal tool relative to the surface with a displacement sensor when the particle removal tool is being moved by the tool gripper.

10. Method as claimed in claim 8, wherein the tool gripper pushes the particle removal tool against the surface until the threshold force is reached, whereupon the particle removal tool is lifted away from the surface together with the foreign particle.

11. Method as claimed in claim 8, wherein the force/pressure transducer comprises a force sensor or a strain gauge.

12. Method as claimed in claim 1, wherein the particle removal tool comprises a gel stick which has a gel-like substance attached to one end of the gel stick for attracting foreign particles.

13. Method as claimed in claim 1, wherein the object is a CMOS sensor that is arranged and conveyed on a carrier.

14. An apparatus for removing a foreign particle from a surface of a fragile object, the apparatus comprising:

a tool gripper which is operative to grip a particle removal tool, to convey the particle removal tool over a location of the foreign particle and to move the particle removal tool towards the surface to a cleaning position of the particle removal tool relative to the surface whereat a threshold force is exerted on the surface, and to lift the particle removal tool carrying the foreign particle away from the surface;

a force sensing device for determining the cleaning position; and

an optical device operative to determine a position of a tip of the particle removal tool prior to the particle removal tool being conveyed over the location of the foreign particle;

wherein the threshold force is a force that is exerted by the particle removal tool on the surface that would pick up the foreign particle but would not damage the fragile object.