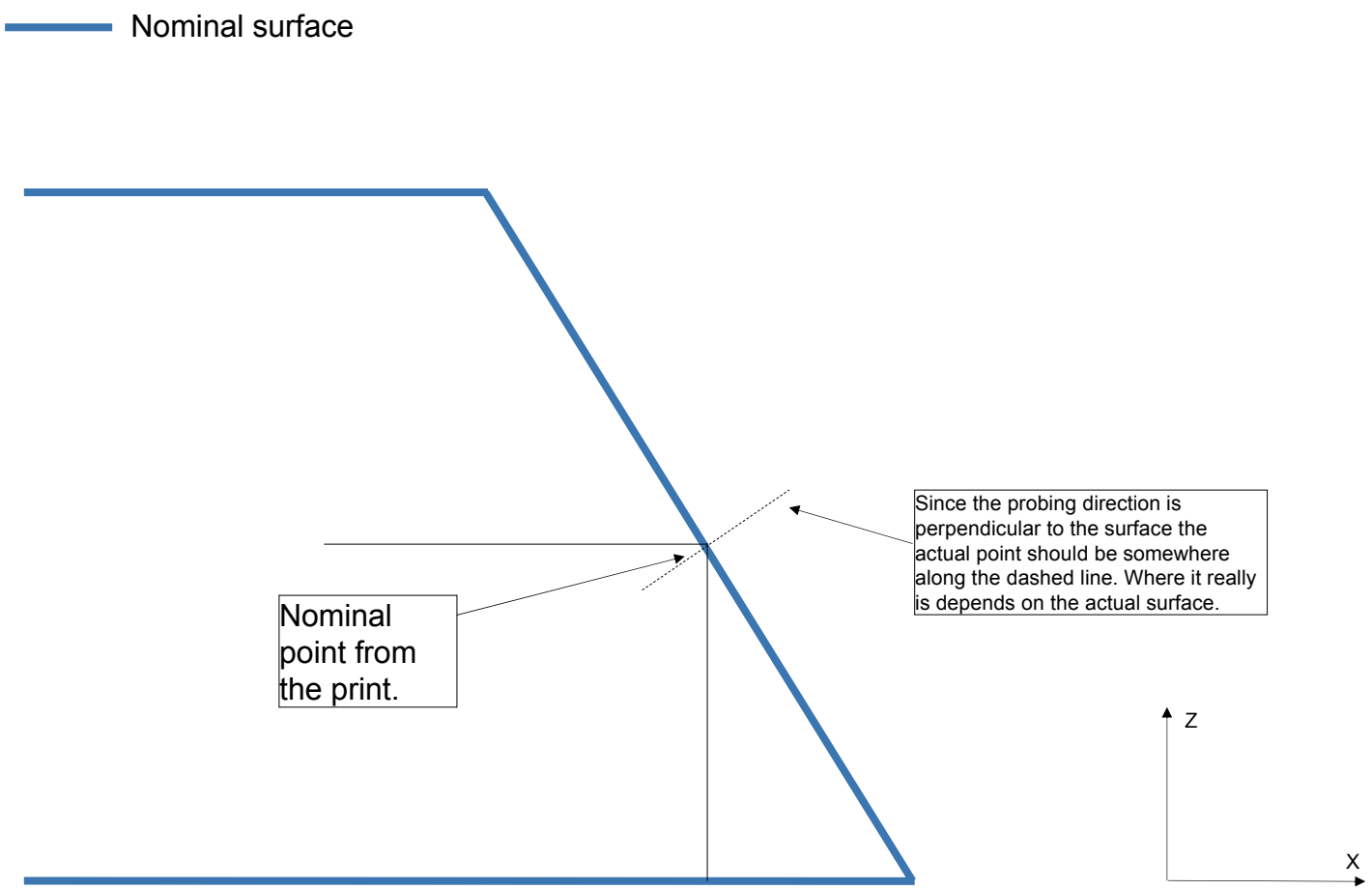
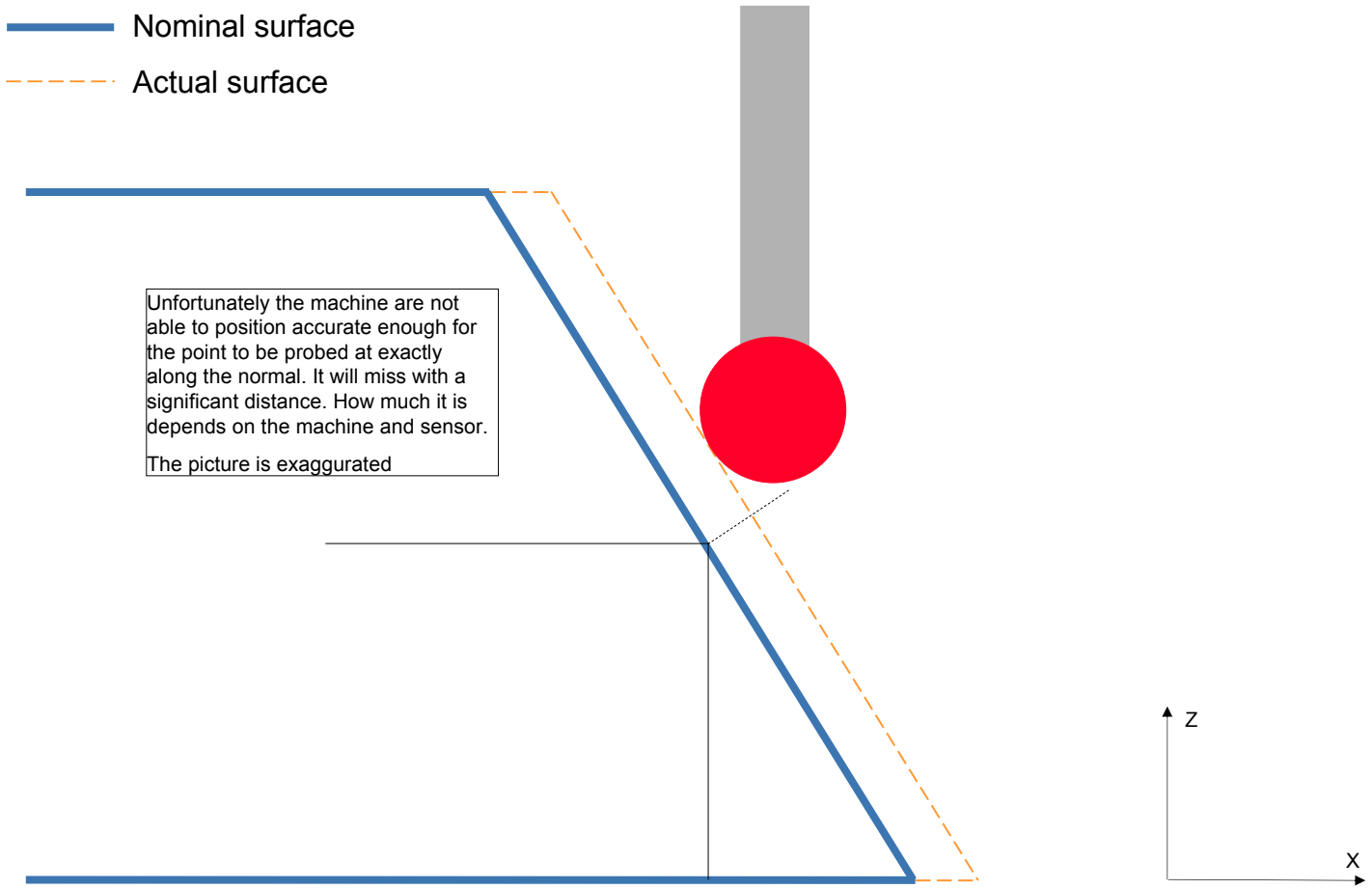
Comparing space point modes.

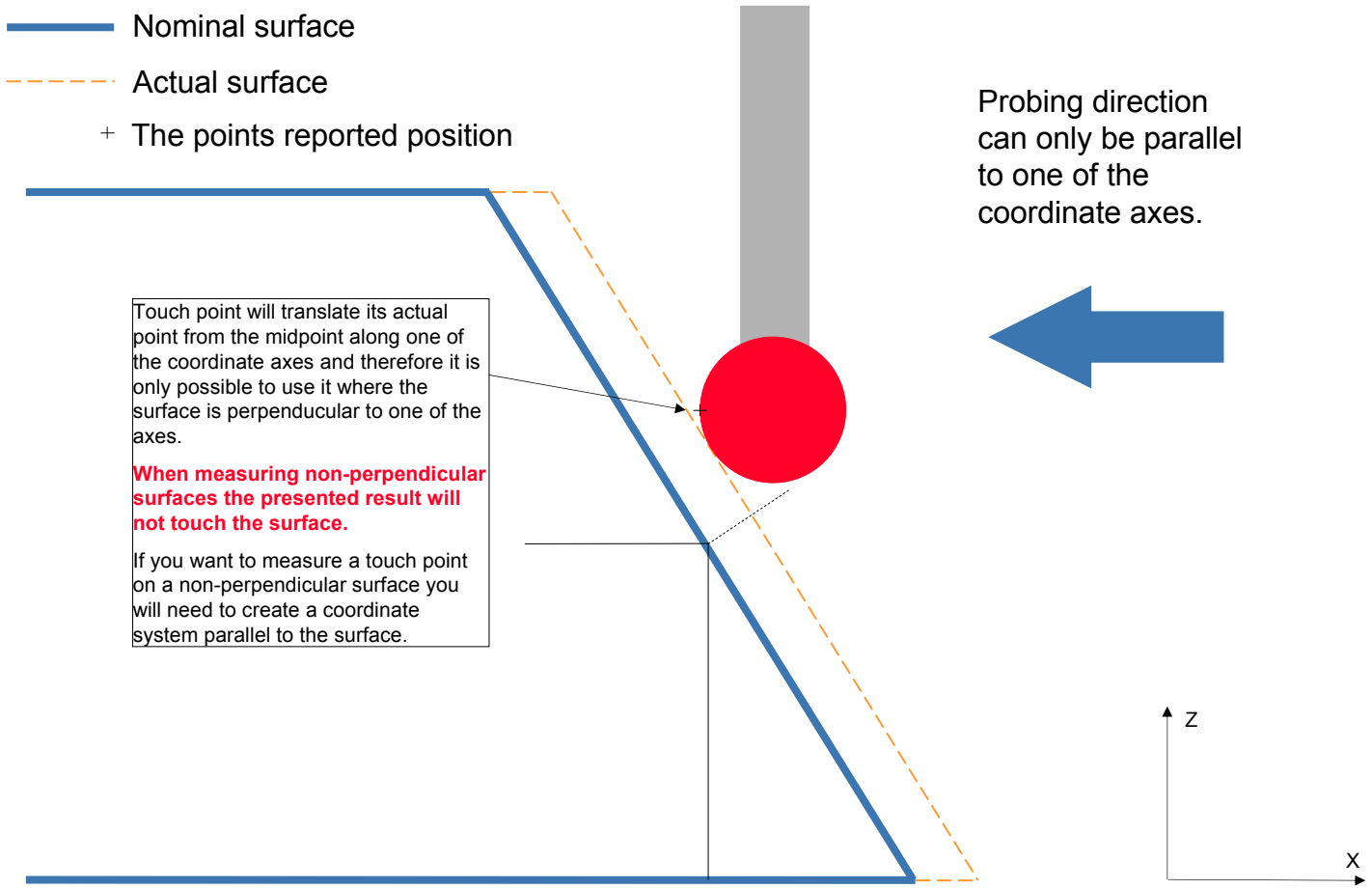
Henrik Lindahl, Carl Zeiss AB

Carl Zeiss.
Passion to Win.

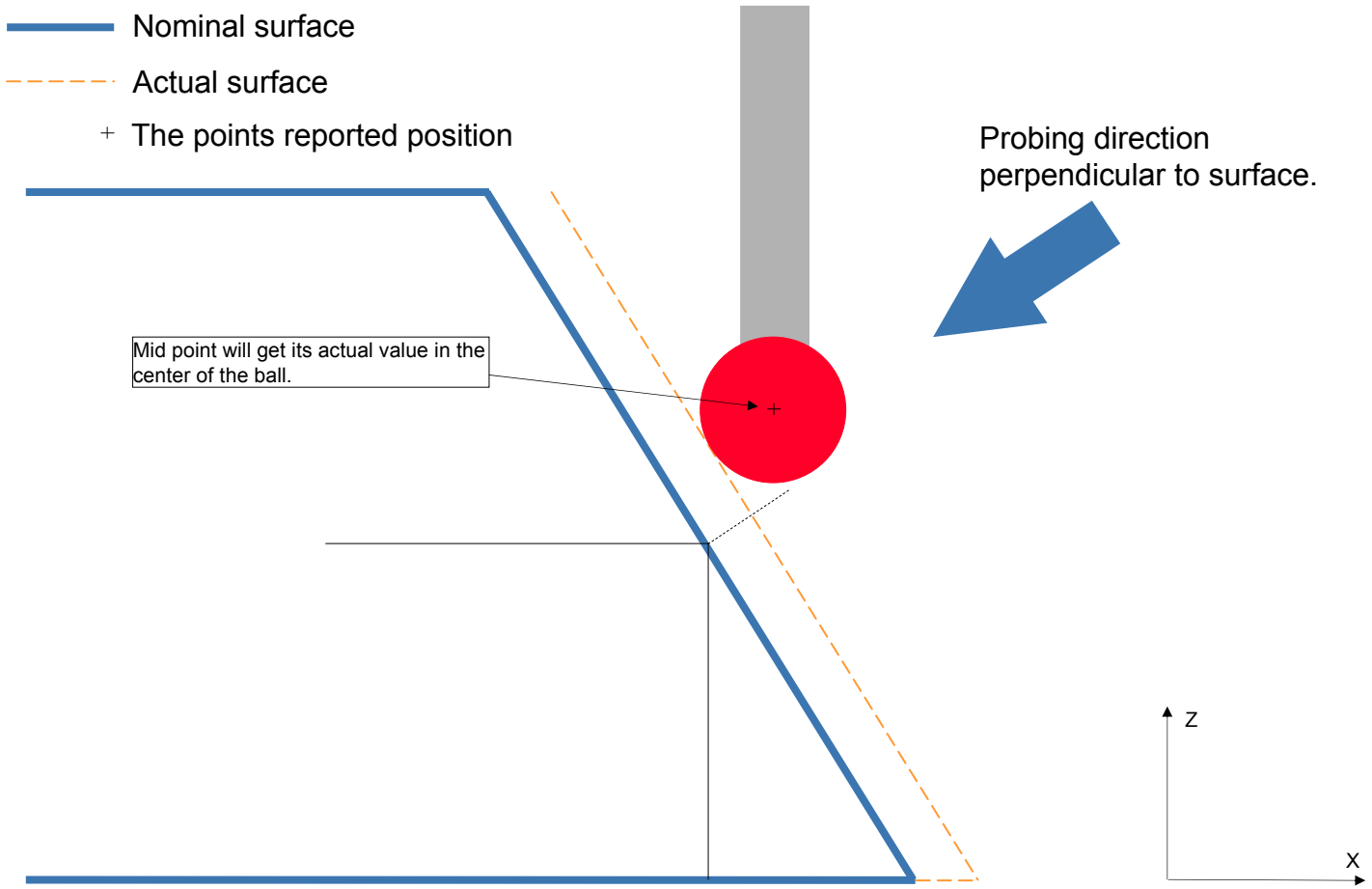

Nominal surface
Since the probing direction is perpendicular to the surface the actual point should be somewhere along the dashed line. Where it really is depends on the actual surface.
Nominal point from the print.
Z
X


Nominal surface
Actual surface
Unfortunately the machine are not able to position accurate enough for the point to be probed at exactly along the normal. It will miss with a significant distance. How much it is depends on the machine and sensor.
The picture is exaggurated
Z
X

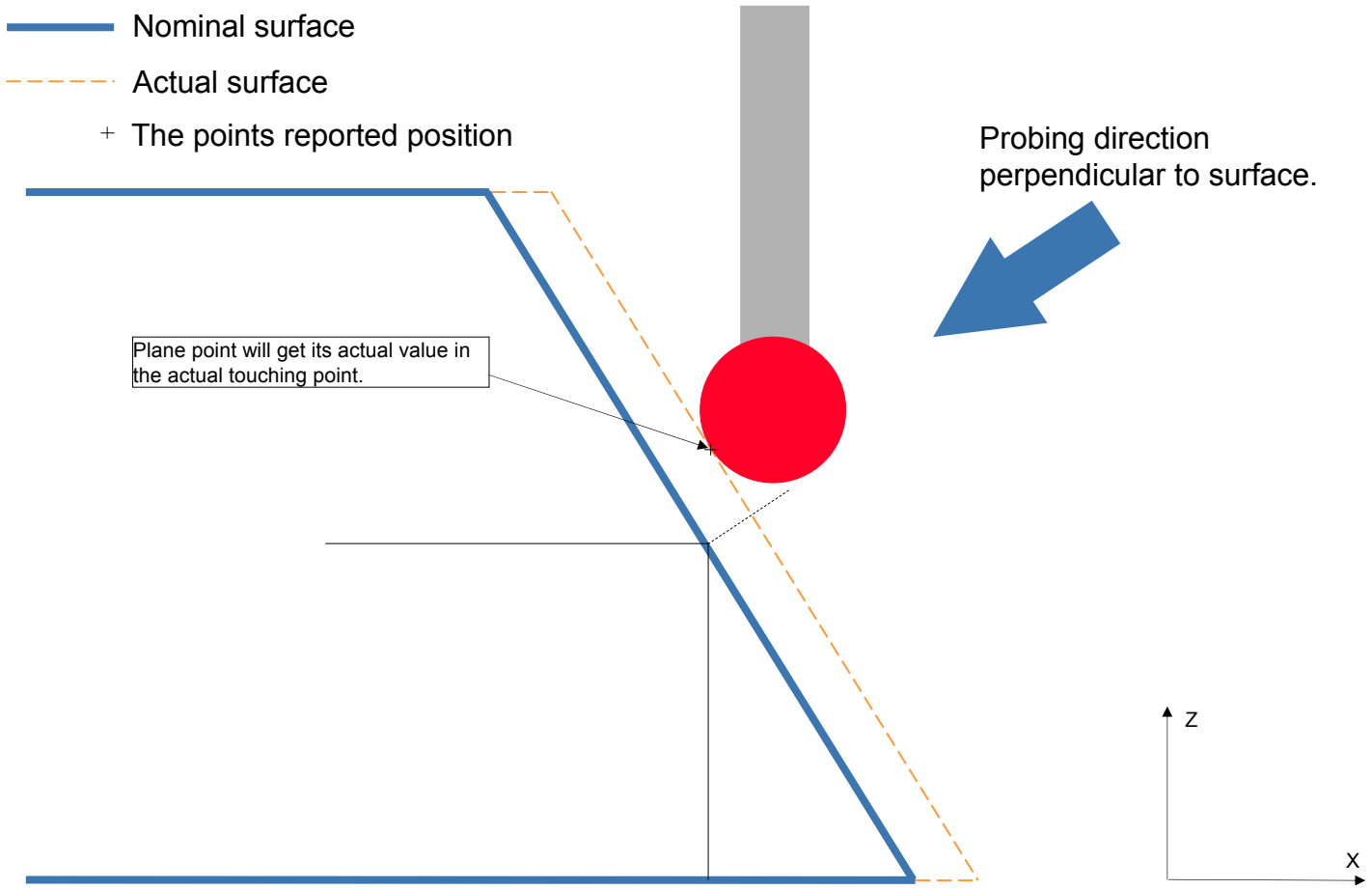
Touch point


Nominal surface
Actual surface
The points reported position
Probing direction can only be parallel to one of the coordinate axes.
Touch point will translate its actual point from the midpoint along one of the coordinate axes and therefore it is only possible to use it where the surface is perpenducular to one of the axes.
When measuring non-perpendicular surfaces the presented result will not touch the surface.
If you want to measure a touch point on a non-perpendicular surface you will need to create a coordinate system parallel to the surface.
Z
X

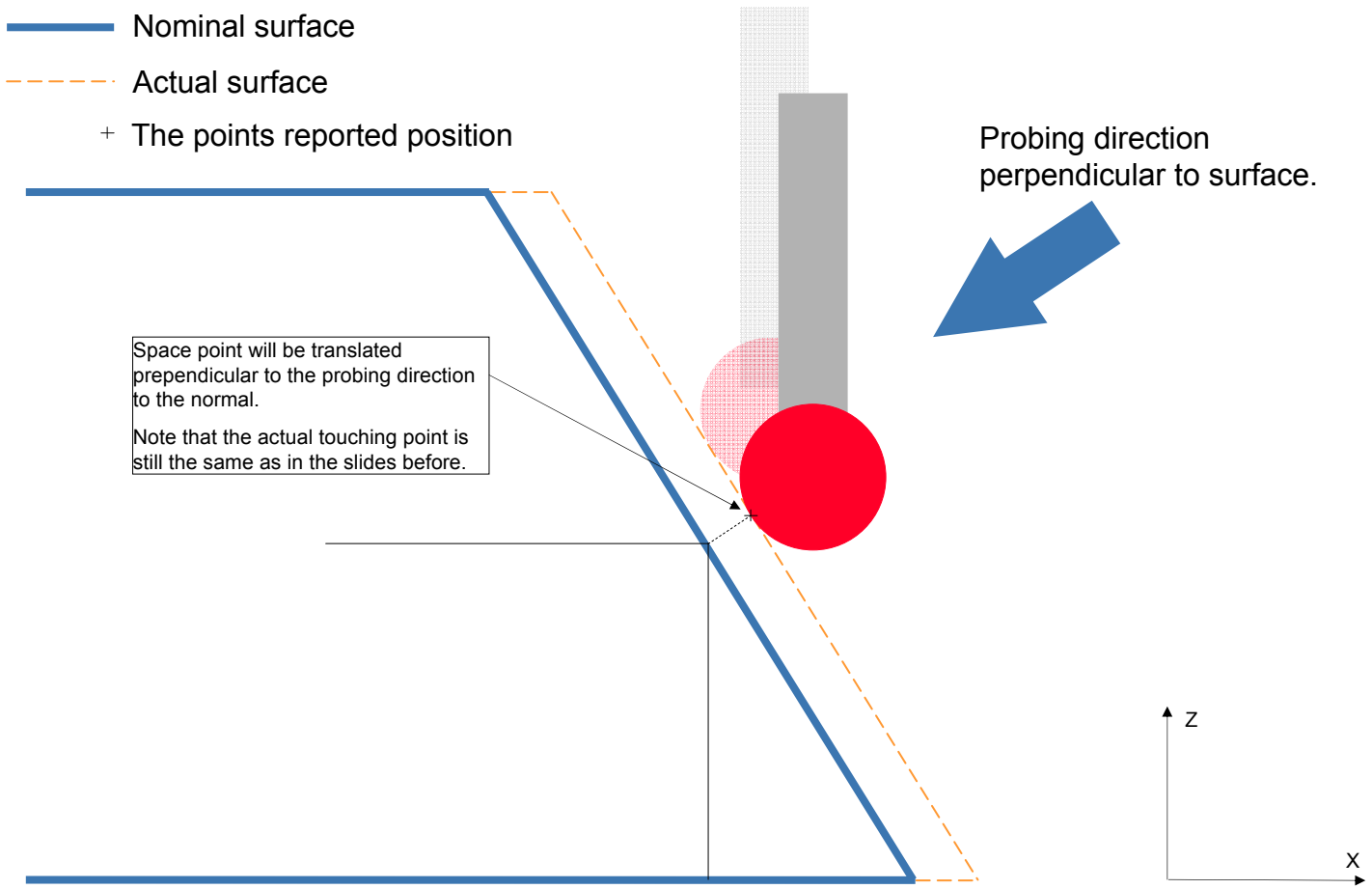
Mid point


Nominal surface
Actual surface
The points reported position
Probing direction
perpendicular to surface.
Mid point will get its actual value in the
center of the ball.
Z
X

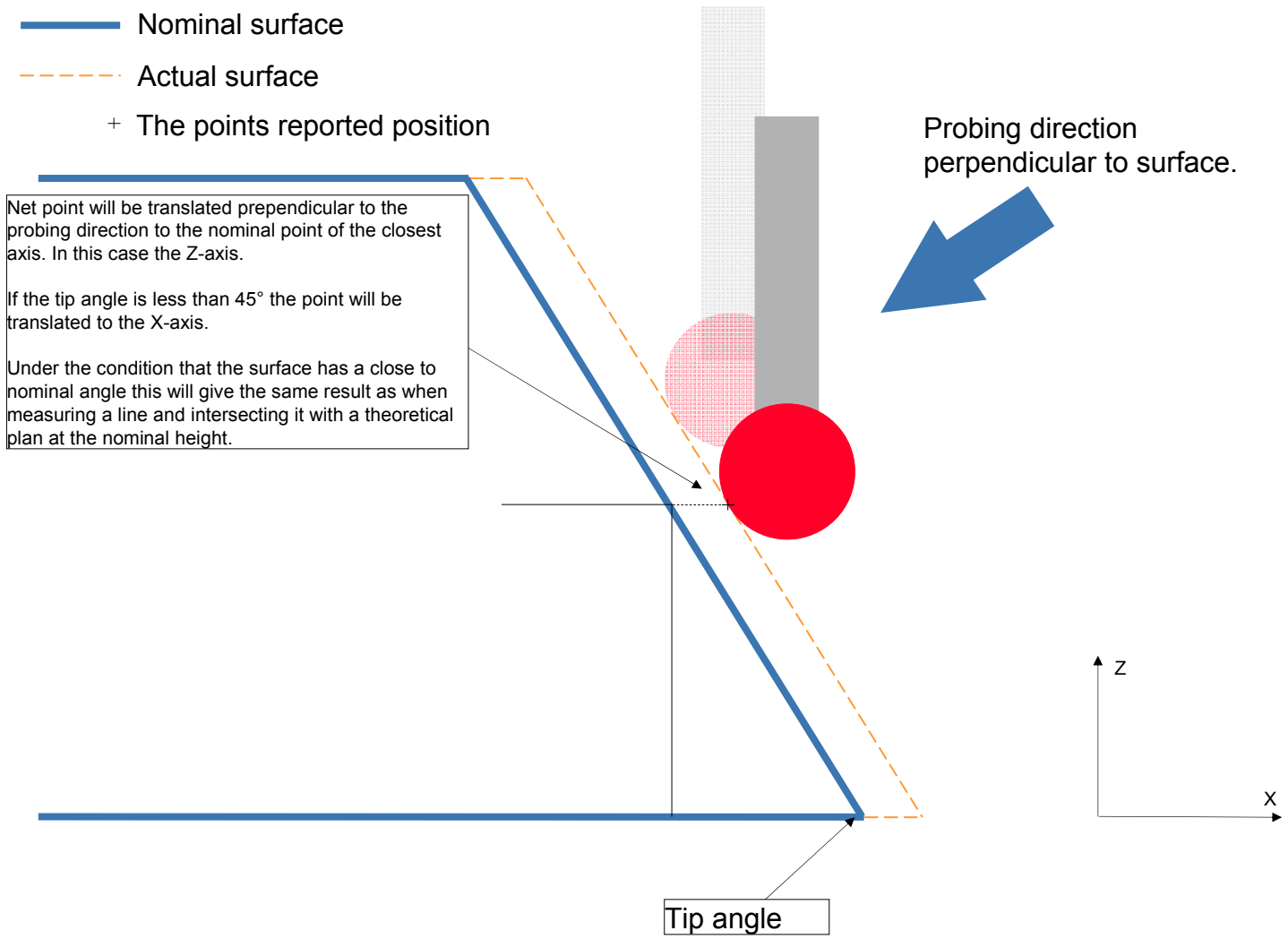
Plane point


Nominal surface
Actual surface
The points reported position
Probing direction
perpendicular to surface.
Plane point will get its actual value in
the actual touching point.
Z
X

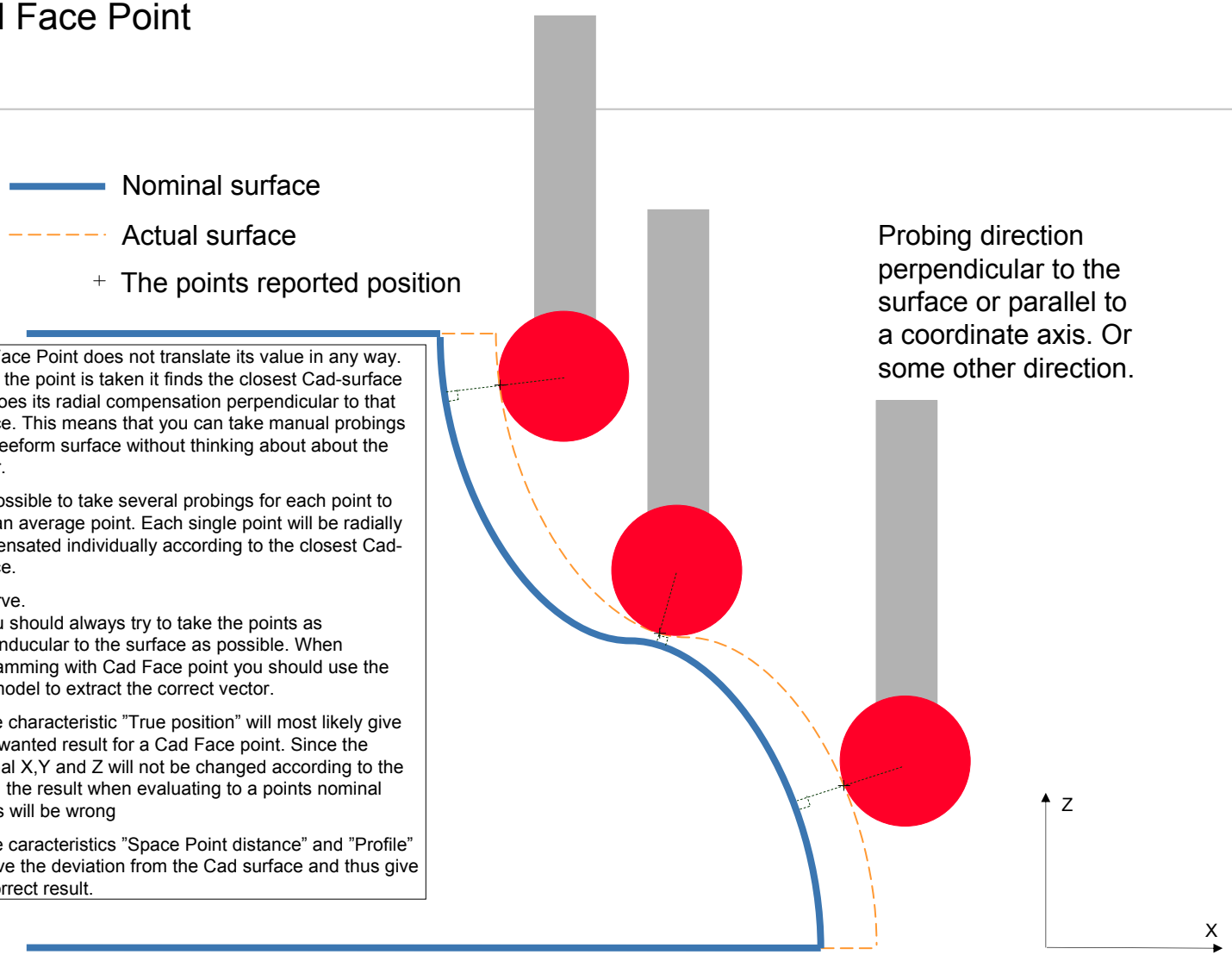
Space point


Nominal surface
Actual surface
The points reported position
Probing direction
perpendicular to surface.
Space point will be translated prependicular to the probing direction to the normal.
Note that the actual touching point is still the same as in the slides before.
Z
X

Net point


Nominal surface
Actual surface
The points reported position
Probing direction
perpendicular to surface.
Net point will be translated prependicular to the probing direction to the nominal point of the closest axis. In this case the Z-axis.
If the tip angle is less than 45° the point will be translated to the X-axis.
Under the condition that the surface has a close to nominal angle this will give the same result as when measuring a line and intersecting it with a theoretical plan at the nominal height.
Z
X
Tip angle

Cad Face Point



Cad Face Point does not translate its value in any way. When the point is taken it finds the closest Cad-surface and does its radial compensation perpendicular to that surface. This means that you can take manual probings of a freeform surface without thinking about about the vector.

It is possible to take several probings for each point to form an average point. Each single point will be radially compensated individually according to the closest Cad-surface.

Observe.
1. You should always try to take the points as perpenducular to the surface as possible. When programming with Cad Face point you should use the Cad model to extract the correct vector.

2. The characteristic ”True position” will most likely give an unwanted result for a Cad Face point. Since the nominal X,Y and Z will not be changed according to the model the result when evaluating to a points nominal values will be wrong

3. The caracteristics ”Space Point distance” and ”Profile” will give the deviation from the Cad surface and thus give the correct result.