# Fitting Tie-In Points into a PointCloud

kubit PointSense Plant v16.5 and AutoCAD Plant 3D 2016

A laser scan of existing assets is fast becoming the norm as the starting point for many brownfield projects.

If we're looking to establish tie-in points for new plant or equipment then kubit PointSense Plant is a tool that can significantly speed up the post-processing of laser scan images, providing conversion to an intelligent AutoCAD Plant 3D model.
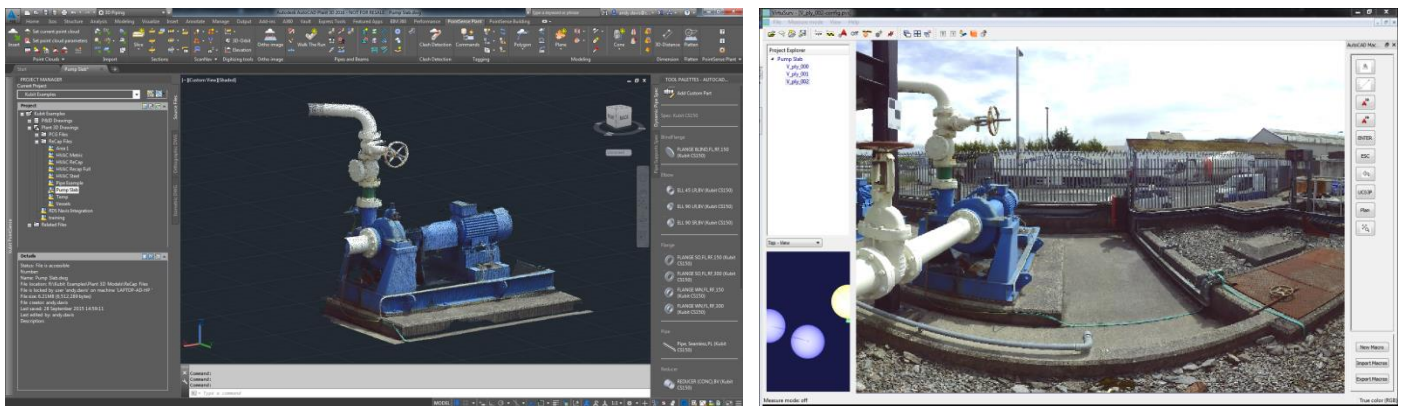

The image above left shows a section of a pointcloud that has been loaded into a drawing in AutoCAD Plant 3D with the kubit PointSense Plant plugin installed. Using the sectioning tools in PointSense Plant, we have clipped out a section of the pointcloud that contains a pump set that is of interest.

The image above right shows the same pump set in the original laser scan from which the pointcloud was created viewed in VirtuSurv. VirtuSurv is a companion product to PointSense Plant that provides a planar view of laser scan files and the ability to send 3D co-ordinates and commands directly to AutoCAD. This provides us with greater visual acuity to enhance the pointcloud that we have in AutoCAD.

In the example above, we will determine tie-in points for the intake and discharge flanges of the pump.
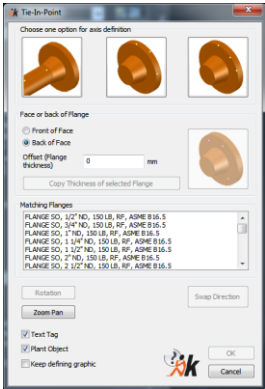
Fit Tie-In Point

One of the buttons on the PointSense Plant tool ribbon is called *Fit Tie-In-Point*.
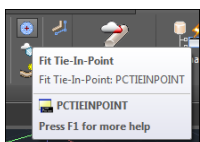

When we click this button, we are presented with the *Tie-In-Point* window through which we are able determine the centre point and orientation of a flange simply by clicking points on the surface of the flange within the pointcloud. In fact, it is possible

to fully locate the tie-in point of a flange by clicking as few as 3 points in the pointcloud.


If we start with the flange on the intake of the pump, we have a view of the back of the flange and the straight length of pipe running into it, clearly visible in the pointcloud. So, we choose the Back of Face option in the *Tie-In-Point* window and then click on the method by which we we will define the direction of the axis of the flange – we will do this by clicking two points on the pipe in the pointcloud.
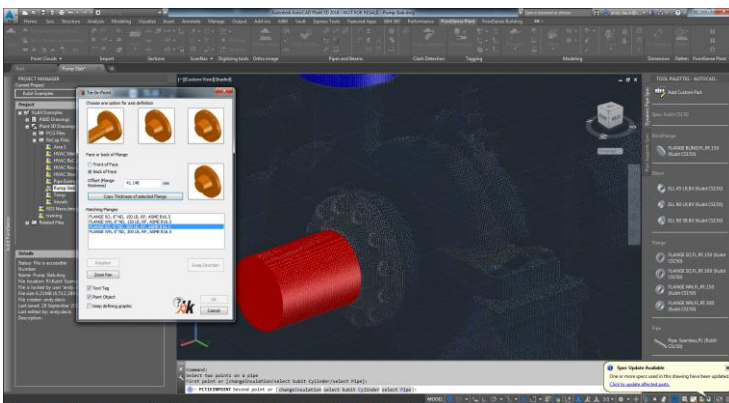

The diameter and direction of the pipe are identified for us automatically and we are presented with a list of flanges that could be attached to the pipe. We know the size and rating of the flange, so we choose this from the list and click the button to *Copy Thickness of selected Flange* as we need to offset the face of the flange from where we position it. To position the flange, we now click one point on the back of it and the tie-in point for the flange is fully defined.
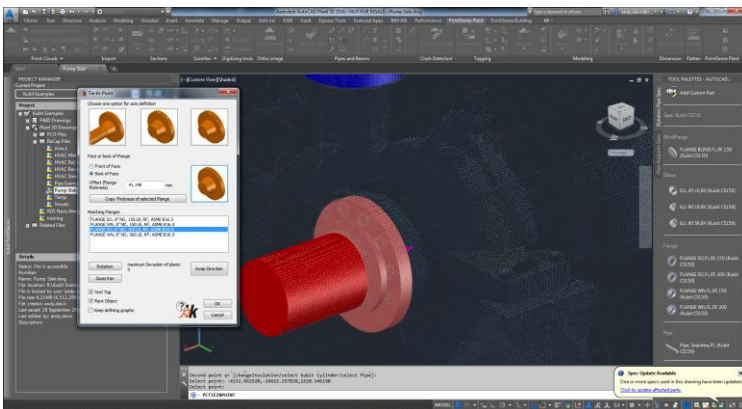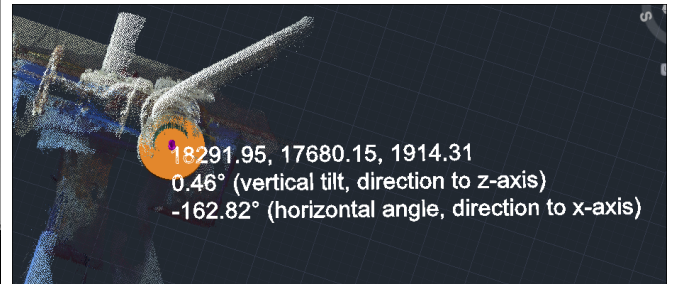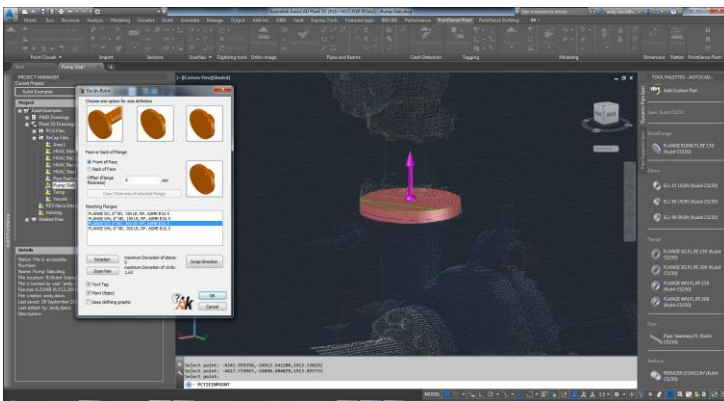
When we choose *Plant Object* as an output option the kubit representation of the flange is drawn for us. If we choose *Text Tag* then the co-ordinates and orientation of the flange are written to the drawing when we click the OK button to finish.
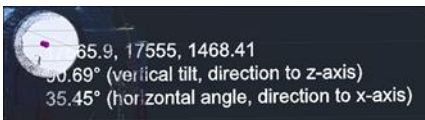
Our view of the discharge flange is not as clear as the intake. This time we'll choose the middle option to determine the axis of the discharge nozzle and click points around the edge of the flange plate.
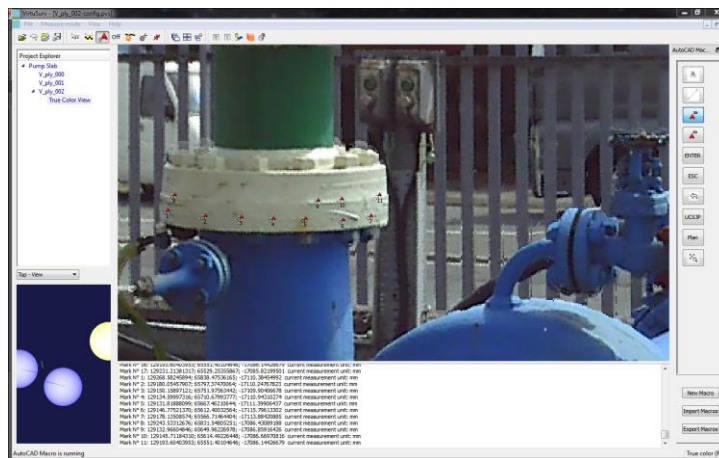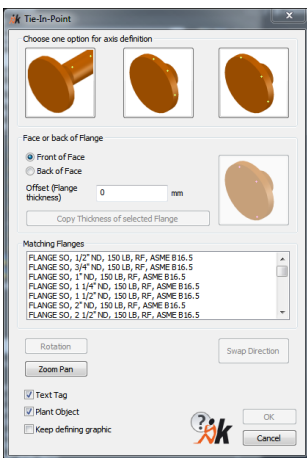

We will use VirtuSurv to help us here as this provides much greater visible acuity. We click several points around the edge of the flange and then further points to locate the flange face. We will represent the nozzle with a flange to aid visualisation, and write the co-ordinates and orientation of the nozzle to the drawing.

18291.95, 17680.15, 1914.31
0.46° (vertical tilt, direction to z-axis)
-162.82° (horizontal angle, direction to x-axis)

We have now determined the tie-in points for our pump

Complete the model.

If we wish we could continue to model the existing intake and discharge lines using the PointSense Plant *Walk the Run* feature
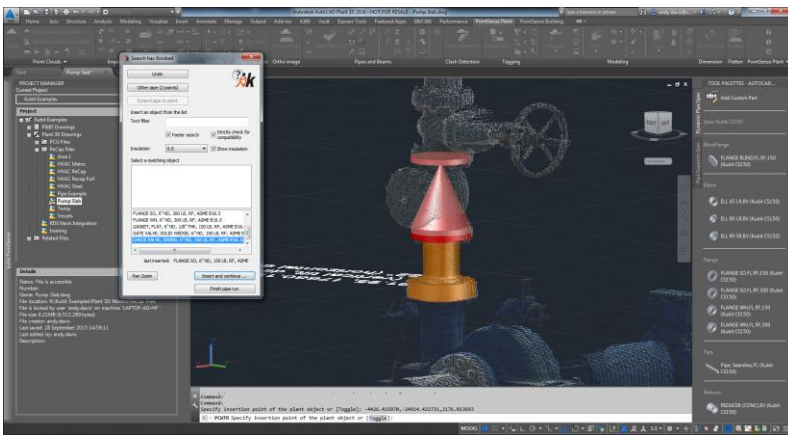
and from the kubit model export an as-built Plant 3D model of the existing lines.