Evaluating Control Points for Rational Polynomial Orthorectification

The status of each control point (active, inactive, selected) is indicated by the list row color, which is a pastel version of the symbol color in the View window. Choices on the Georeference window's Option menu let you set these colors, show or hide the Elevation column, separate or aggregate the X-Y residuals, and sort the control point list.

Overall Root Mean Square (RMS) positional errors for the control points are shown in the lower pane of both georeference windows. These values are updated when the status of any point changes.
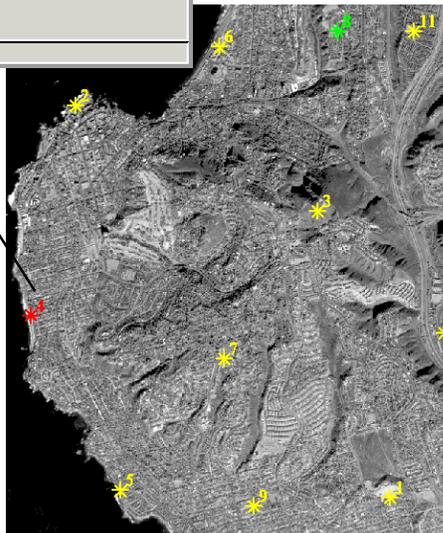
The Control Points Projected to Orthorectified Image window shows coordinates and residuals for the orthorectified image that would be produced using the current RPC model. Z residuals in both windows show the difference between the entered elevation value for the point and the elevation for the corresponding geographic location in the digital elevation model (DEM) you selected when choosing the RPC model.

Re-georeferencing an IKONOS or QuickBird image using accurate, well-distributed 3D control points prior to performing Rational Polynomial (RPC) orthorectification can improve the accuracy of the result. (See the color plate entitled *Rational Polynomial Orthorectification of IKONOS/QuickBird Images*). To properly evaluate the quality of your control points for this purpose, select the Rational Polynomial model from the Model menu in the Georeference window. (You are then prompted to select the RPC coefficients file for the image and to select a digital elevation model [DEM] covering the image area.) Your control points are used to adjust the rational polynomial model, improving its accuracy in comparison to the nominal georeferencing supplied with the image. Residual errors shown for each control point are computed by first projecting all control point locations through the RPC model to remove terrain displacements. The residuals therefore reflect the fit of each point to the adjusted RPC orthorectification model.

Overall Root Mean Square (RMS) error statistics are also provided for the collection of control points. Separate RMS error values are provided for the set of currently active points and the set of inactive points (if any). If you identify control points that you believe are less accurate than the rest, you can make them inactive and immediately see the overall error statistics for both groups of points. Once you are confident in your identification of the less accurate points, you can then delete them.

If you have a sufficient number of accurate control points, you can reserve some of them as test points by making them inactive at the beginning of your georeference session and letting only the remaining points provide the georeference control. The individual residuals for these test points and their overall RMS