

# Comparative Analysis of Space Image Orientation

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**ABSTRACT:** Any type of geo-referenced data acquisition based on space images requires the knowledge of the image orientation. The orientation procedure is not the same for the different types of images. Some years ago mainly the close to original scenes have been used which are just corrected by the inner sensor geometry, but today there is a trend to the use of derived products like IKONOS Geo, QuickBird OR Standard or level 1B-data from SPOT or IRS which are projections to a plane with constant height. Together with the images, rational polynomial coefficients are distributed, describing the geometric relations between image and object space based on the direct sensor orientation. With GPS positioning, gyros and star sensors the orientation of IKONOS and QuickBird scenes are known without control points with a standard deviation in the range up to 4m. With control points very often just a shift is required in addition to the terrain relief correction for getting the full geometric quality. The same is possible if the scene orientation will be reconstructed based on the available information like the nominal collection elevation and azimuth. Other solutions are 3D-affine transformation, direct linear transformation or the control point based generation of rational polynomial coefficients. These methods do have some disadvantages in relation to the required number and distribution of control points or even the possible accuracy.

Most high and very high resolution space images have been investigated for the image orientation. If well defined control points are available, sub-pixel accuracy usually is possible.