

Image coordinate correction function in *Australis*

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The image coordinate correction function in *Australis* is the commonly used 10-parameter model employed in digital close-range photogrammetry. The calibration parameters can be grouped as follows:

- Camera interior orientation: c, xp, yp
- Radial distortion parameters: $k1, k2, k3$
- Decentering distortion parameters: $p1, p2$
- Affinity, non-orthogonality parameters: $b1, b2$

The corrected image coordinates (x_{corr}, y_{corr}) can be calculated from the measured coordinates (x_{meas}, y_{meas}) by using the formulas

$$x = x_{meas} - xp$$

$$y = y_{meas} - yp$$

x and y are now with respect to the principal point.

$$r^2 = x^2 + y^2$$

$$dr = k1 \cdot r^3 + k2 \cdot r^5 + k3 \cdot r^7$$

$$x_{corr} = x_{meas} - xp + x \cdot dr / r + p1 \cdot (r^2 + 2x^2) + 2 \cdot p2 \cdot x \cdot y + b1 \cdot x + b2 \cdot y$$

$$y_{corr} = y_{meas} - yp + y \cdot dr / r + p2 \cdot (r^2 + 2y^2) + 2 \cdot p1 \cdot x \cdot y$$

It is noteworthy that $b1$ & $b2$ are invariably set to zero.

The additional parameters (calibration values) extracted from *Australis* should be applied as per these correction equations, without change of sign. Thus, calibration terms in *Australis* can be thought of as corrections and not calibration 'errors'.

For information regarding the adopted origin of the xy image coordinate system, see Appendix B of the *Australis* Manual.