REQUIREMENTS FOR THE 2-DETECTOR ASSEMBLY

Spartan IR Camera for the SOAR Telescope

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1 Purpose

The 2-Detector Assembly, which is simpler than the 4-Detector Assembly with a pyramidal mirror, is for integration and testing.

Two detectors are offset by 32mm in the direction perpendicular to the plane of the optical box in order to prevent overlap of the detector frames. They are tilted 4.1029° because the lenses are offset from the center of the entire field. The rotation axis is behind the detectors, and the rotation angle between the f/12 and f/21 channels is 9.4494°. (See Figure 1.) The location of the detectors and the rotation axes are defined in the file 2Detector.sldasm. The optical design is in f21D4x111.zmx.

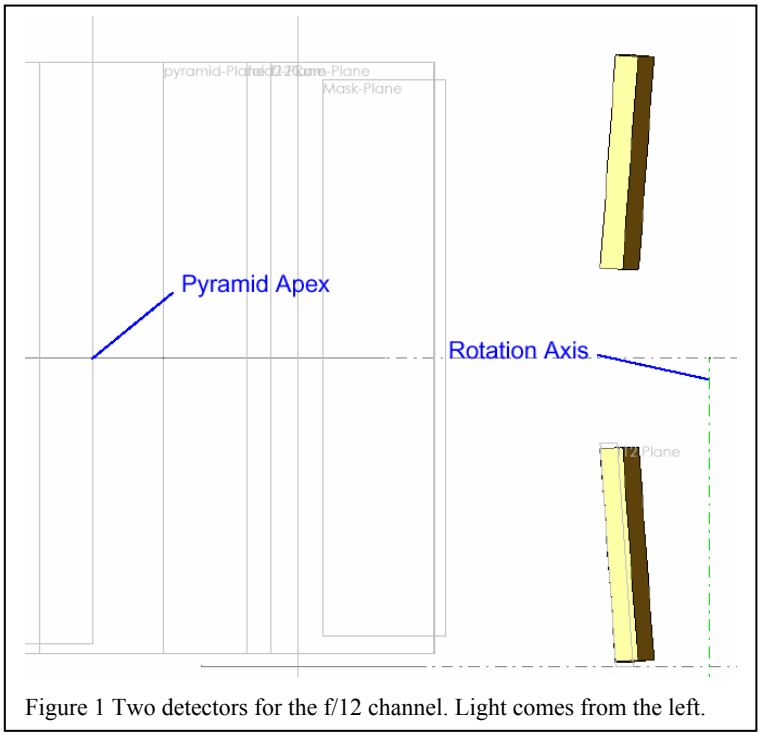

Figure 1 Two detectors for the f/12 channel. Light comes from the left.

2 Tolerance

The tolerance on the focus is 0.07 mm for f/12 and 0.20 mm for f/21 to limit the loss in Strehl to 0.007. The tolerance on the rotation is in Table 2.

3 Gravity

When the direction of gravity, which is in the y-z plane, changes, the focus must not change by more than 0.03mm, and the shift in the perpendicular direction must be less than 0.009mm. This requirement preserves focus and insures that the four detectors maintain boresight to ½ pixel.

Table 1 Tolerance of the positioning of the tilt axis.

Parameter	**Tolerance f/21**		**Tol f/12**
Tilt axis out of detector plane	276 mrad	16 deg	96 mrad
Tilt axis in detector plane	21 mrad	1.2 deg	7 mrad
Tilt angle	2.0 mrad	0.12 deg	0.7 mrad
Translate in plane	0.6 mm		0.2 mm
Translate perp to plane	7.0 mm		2.4 mm

4 Possible Implementation

The assembly can be put on a rotation stage.

The rotation stage moves in steps of 0.35 mrad.

The rotation stage can accept a 45 N-m torque perpendicular to the rotation axis before the detector at 100mm moves 0.03mm.