The pointing of the JTSIM-DARA radiometer was measured four times during its construction in the optic laboratory of PMOD/WRC. The final offset of the pointing before shipping relative to the optical axis, defined by a removable alignment cube, is $1.07^\circ/0.67^\circ$ ($\beta/\gamma$-axis) for the four-quadrant sensor and $0.095^\circ/-0.017^\circ$ for the radiometer cavity A.

**JTSIM-DARA**

Continuous and precise TSI measurements are indispensable to evaluate the influence of short and long-term solar radiative emission variations on the Earth’s climate. PMOD/WRC has constructed the JTSIM-DARA (DARA for the Joint Total Solar Irradiance Monitor) absolute radiometer for the Chinese FY-3E mission. JTSIM-DARA is one of PMOD/WRC’s contributions to the almost seamless series of spaceborne TSI measurements since 1978. It will be mounted on the FY-3E satellite, which is the 5th flight unit of the Fengyun-3 (FY-3) series. Key aspects of the FY-3 satellite series include collecting atmospheric data for intermediate and long-term weather forecasting and global climate research.

**MEASUREMENTS**

Measurements of the pointing of the three JTSIM-DARA cavities relative to each other were performed on the WSG sun tracker. The pointing relative to a cube alignment mirror was measured at the angular response facility in the optic laboratory of the WRC. This setup (Fig. 3) consists of a 1 kW Xe-Lamp.
emitting a collimated light beam towards the test device which is mounted on a goniometer about 3 m away from the light source [2]. The variability of the light intensity of a 50 mm³ cube around the optical axis was characterized prior to the measurements. The homogeneity within this entire cube is 3% and inside a 10 mm³ below 0.5 % (Fig. 4).

Figure 5 shows the alignment relative to the optical axis using a laser. First JTSIM-DARA was orientated using the removable alignment cube. Thereafter one selected cavity and the four-quadrant sensor (4Q) was moved into the centre. The measurements where performed by rotation around the β-axis of JTSIM-DARA and after a 90° rotation of the device around the γ-axis. The experiment was repeated four times: Before the end assembly (1), before (2) and after (3) the vibration tests and before shipping (4).

RESULTS

Figure 6 and 7 shows results of the pointing measurements of the 4Q and the cavity A. Table 1 the results of the 4 measurements as numbered above.

Table 1. Summary of the offsets for the 4 pointing tests as defined in the text.

<table>
<thead>
<tr>
<th>Test</th>
<th>β-4Q</th>
<th>β-Cavity A</th>
<th>γ-4Q</th>
<th>γ-Cavity A</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.91°</td>
<td>-0.45°</td>
<td>0.76°</td>
<td>0.16°</td>
</tr>
<tr>
<td>2</td>
<td>0.98°</td>
<td>0.025°</td>
<td>0.62°</td>
<td>-0.026°</td>
</tr>
<tr>
<td>3</td>
<td>0.71°</td>
<td>0.25°</td>
<td>0.67°</td>
<td>-0.00°</td>
</tr>
<tr>
<td>4</td>
<td>1.07°</td>
<td>0.095°</td>
<td>0.67°</td>
<td>-0.017°</td>
</tr>
</tbody>
</table>

OUTLOOK

The setup used for the pointing measurements is limited to about 20 Nm load on the goniometer. A new mechanic was constructed to enable loads up to 200 Nm.

REFERENCES