Supplementary Material for

Depth from Optical Turbulence, CVPR 2012

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All turbulence videos are on the website http://www.cs.cmu.edu/~yuandong/, under the project Depth from Optical Turbulence.
Table 1: Columns 1-4 show the ground truth measurement (in cm) for the four checker-board experiments. Columns 5-6 show comparison between the measured (5th column) variance ratio and that predicted by the model (6th column). In all but one case, the measurements are very accurate.

<table>
<thead>
<tr>
<th>No.</th>
<th>( L_c )</th>
<th>( L_t )</th>
<th>( L_{near} )</th>
<th>( L_{far} )</th>
<th>Measured</th>
<th>Predicted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exp1</td>
<td>54</td>
<td>171</td>
<td>163</td>
<td>225</td>
<td>1.77</td>
<td>1.79</td>
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<td>173</td>
<td>183</td>
<td>382</td>
<td>3.60</td>
<td>3.52</td>
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<tr>
<td>Exp3</td>
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<td>173</td>
<td>247</td>
<td>382</td>
<td>1.67</td>
<td>1.94</td>
</tr>
<tr>
<td>Exp4</td>
<td>74</td>
<td>173</td>
<td>247</td>
<td>320</td>
<td>1.56</td>
<td>1.55</td>
</tr>
</tbody>
</table>

Figure 1: Experiments with two planar checker-boards placed at different distances from the camera. Rows correspond to different experiment settings (Table 1). The first column shows a sample distorted frame, the second and third columns show two views of the variance distribution of the corners of the checker-boards. In all cases, variances changes due to depth discontinuity and height is obvious. We detect the discontinuity and fit smooth surfaces to the variances. The ratio of variances of the two depth planes are then computed and quantitatively compared to the ground truth (Table 1).
Figure 2: Convergence of average variance over time for different experiment setting. (Left) Morning capture, 110meters to target, 30mm aperture with 0.5ms exposure time. (Right) Morning capture, 160meters to target, 30mm aperture with 0.75ms exposure time.

Figure 3: Scene Rectification. (a) Sample frame from a video. The image is sharp but noisy. (b) Mean image of the video. The image is noise-free but blurry. (c) Rectification using [1].
Figure 4: Scene Rectification. (a) Sample frame from a video. The image is sharp but noisy. (b) Mean image of the video. The image is noise-free but blurry. (c) Rectification using [1].

References