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Extended Analysis of a Fluid Configuration Experiment on the Space Shuttle ERIC BARNETT, MARCUS DEJMEK, Canadian Space Agency — Glass cylinders, partially filled with water, were exposed to the near free-fall environment. In at least two of the cylinders, the liquid-vapour interface adopted a two-interface configuration, as previously predicted. An initial analysis was conducted on 20 images for one cylinder, resulting in contact angles of $6.7\pm2.7^\circ$ at the upper three-phase line and $26.5\pm6.2^\circ$ at the lower. Herein, the analysis has been extended to include all 12538 images recorded for each of two cylinders, in addition to correcting for optical distortion. An automated procedure to calculate the contact angles was developed, resulting in values of $2.7\pm2.8^\circ$ and $16.5\pm5.3^\circ$ for the same cylinder previously analyzed. The effective gravity (g_e) based on this analysis was inferred to be 3.3 ± 2.1 x 10^{-4} g/g_0, which differs from that previously reported. However, the standard deviation of g_e is of the same order of magnitude as the RMS accelerations recorded. The difference in pressures between the two liquid phases was calculated to be 0.21 ± 0.14 Pa. A Fourier analysis was conducted and no significant frequencies could be distinguished.

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