

Marangoni Experiment In Space series-2

[acronym]
 AR: Aspect Ratio (=Length/Dia.=L/D)
 C/O: check out
 CD: Cooling Disk
 Dia.: Diameter
 ΔT: Temperature difference between Cooling disk and Heating disk
 Exp.: Experiment
 GMT: Greenwich Mean Time
 H: Liquid Bridge Length [mm]
 HD: Heating Disk
 IR: Infrared (Infrared image)
 JST: Japan Standard Time (=GMT+9h)
 L/D: Length/Diameter (ratio of liquid bridge length to liquid bridge diameter)

[acronym]
 L/R: Length/Radius (ratio of liquid bridge length to liquid bridge radius)
 LB: Liquid Bridge
 MEIS2: Marangoni Experiment In Space series-2
 N/A: Not Applicable
 VR: Volume Ratio (=actual Liquid Bridge volume/straight Liquid Bridge volume)

[glossary]
 Corrected LB Length[mm]="CD posn" on telemetry data+"initial gap"
 initial gap: correction value of distance between disks
 cor: the folder name, the folder containing Data that recorded on the time zone
 which a communication line (Air to Ground) cannot establish
 real: the folder name, the folder containing "real time data".

[Information]

| | |
|--|------------------------|
| Correction value | surrounding gas |
| Corrected HD temperature = HD temperature of telemetry (ITO1) + 2.4[K] | Argon(96.5%)+Air(3.5%) |

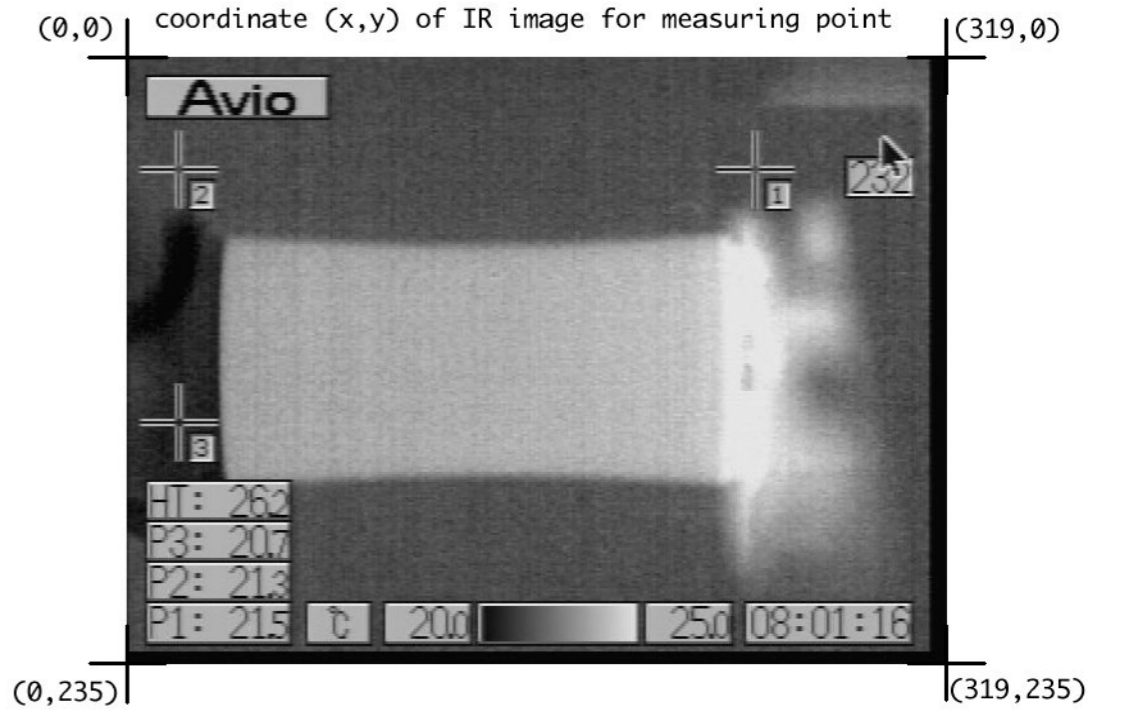
[Experiment sample]

| | Material name | Manufacture | Model number, Character | amount | density @25 degree C [kg/m ³] | kinematic viscosity @25degree C [m ² /s] | temperature coefficient of surface tension [N/mK] | Thermal diffusivity [m ² /s] |
|------------------|--------------------------------------|--|--|------------------------|---|---|---|---|
| Working fluid | silicone oil | Shin-Etsu Chemical Co., Ltd. | KF-96L-5CS | - | 912.35 | 5.00E-06 | -6.26E-05 | 7.46E-08 |
| Dye | TNSB | KAWAJI lab, university of Toronto | 1,3,3-Trimethyl-6'-nitrospiro [indoline-2,2'-chromene] | 0.05w% of silicone oil | - | - | - | - |
| Tracer particles | Gold-coated acrylic sphere particles | Soken Chemical & Engineering Co., Ltd. | Dia.=180 micrometer | 500 particles | 1364.27 | N/A | N/A | - |

[Experiment Table]

| Exp. No. | Exp. Day(JST) | Team | Exp. Day (GMT) | Disk Dia. | Target LB Length (corrected) [mm] | initial gap [mm] | "CD posn" at Exp. end [mm] | AR (L/D) | Typical VR (V/V ₀) | Target | measuring point in IR image, coordinate (X1, Y1), see Pic.-1 | note |
|------------|---------------|---------|----------------|-----------|-----------------------------------|------------------|----------------------------|----------|--------------------------------|---|--|---|
| MEIS2-C/O1 | 2009/7/9 | JAXA | 2009/7/8-9 | 30 | - | 0.26 | 0 | - | - | - | - | check out day-1 for experiment system. initial gap is from 0.26mm to 0.27mm. |
| MEIS2-C/O2 | 2009/7/30 | JAXA | 2009/7/29-30 | 30 | - | 0.27 | 0.73 | - | - | - | - | check out day-2 for experiment system. initial gap is set to 0.27mm in the first experiment of MEIS-2 series. |
| MEIS2-1 | 2009/7/31 | ALL | 2009/7/30-31 | 30 | 7.5 | 1.00 | 0 | 0.25 | 0.95 | flow under the High Marangoni number | (207,120) | air bubble removal |
| MEIS2-2 | 2009/8/1 | ALL | 2009/7/31-8/1 | 30 | 15.0 | 1.00 | 0 | 0.50 | 0.89 | - | (230,120) | Liquid Bridge swing |
| MEIS2-3 | 200/8/4 | nishino | 200/8/3-4 | 30 | 5.4 | 1.00 | 0 | 0.18 | 0.94-0.95 | critical ΔT | (232,119) | air bubble removal |
| MEIS2-4 | 2009/8/5 | nishino | 2009/8/4-5 | 30 | 4.5 | 1.00 | 0 | 0.15 | 0.94-0.95 | critical ΔT | (232,119) | VR=0.88 -> VR=0.95, calibration data for 3D-PTV |
| | | | | | 6 | | | 0.20 | 0.94-0.95 | critical ΔT | | |
| MEIS2-5 | 2009/8/6 | nishino | 2009/8/5-6 | 30 | 15 | 1.00 | 0 | 0.50 | 0.85 | critical ΔT | (232,119) | |
| | | | | | 30 | | | 1.00 | 0.95 | critical ΔT | | |
| MEIS2-6 | 2009/8/7 | nishino | 2009/8/6-7 | 30 | 15.0 | 1.00 | 0 | 0.50 | 0.85 | critical ΔT | (232,119) | |
| | | | | | 45.0 | | | 1.50 | 0.95 | critical ΔT | | |
| MEIS2-7 | 2009/8/9 | nishino | 2009/8/8-9 | 30 | 15.0 | 1.00 | 0 | 0.50 | 0.80 | critical ΔT | (232,119) | |
| | | | | | 45.0 | | | 1.50 | 0.95 | critical ΔT | | |
| MEIS2-8 | 2009/8/11 | nishino | 2009/8/10-11 | 30 | 60.0 | 1.00 | 0 | 2.00 | 0.94-0.95 | critical ΔT | (232,119) | |
| MEIS2-9 | 2009/8/12 | nishino | 2009/8/11-12 | 30 | 45.0 | 1.00 | 0 | 1.50 | 0.94-0.95 | critical ΔT, flow under the High Marangoni number | (232,119) | |
| MEIS2-10 | 2009/8/13 | nishino | 2009/8/12-13 | 30 | 22.5 | 1.00 | 0 | 0.75 | 0.94-0.95 | critical ΔT, flow under the High Marangoni number | (232,119) | |
| MEIS2-11 | 2009/8/14 | nishino | 2009/8/13-14 | 30 | 60.0 | 1.00 | 0 | 2.00 | 0.95 | critical ΔT, flow under the High Marangoni number | (174,119) | |
| MEIS2-12 | 2009/8/18 | ohnishi | 2009/8/17-18 | 30 | 52.5 | 1.00 | 0 | 1.75 | 0.94-0.95 | critical ΔT | (182,119) | air bubble removal |
| MEIS2-13 | 2009/8/19 | sakurai | 2009/8/18-19 | | 37.5 | 1.00 | 0 | 1.25 | 0.94-0.95 | critical ΔT | (198,119) | |
| MEIS2-14 | 2009/8/20 | ohnishi | 2009/8/19-20 | | 9.9 | 1.00 | 0 | 0.33 | 0.94-0.95 | critical ΔT | (218,119) | Liquid Bridge swing |
| MEIS2-15 | 2009/8/24 | ueno | 2009/8/23-24 | 30 | 18.9 | 1.00 | 0 | 0.63 | 0.95 | critical ΔT, flow under the High Marangoni number | (218,119) | |
| | | | | | 20.7 | | | 1.00 | 0.69 | 0.95 | critical ΔT | (223,119) |
| MEIS2-16 | 2009/8/25 | ueno | 2009/8/24-25 | 30 | 26.1 | 1.00 | 0-position detecting mode | 0.87 | 0.95 | critical ΔT | (223,119) | Experiment end -> 0-position detecting mode |

related telemetry ID: J#P0600J04310, J#P0600J04320
 resolution of original IR image inside IR camera: 320x236 (16bit)



Pic.-1 Coordinate of IR image

The Liquid Bridge size on above image: Dia.=30[mm], L=60[mm]