

**Marangoni Experiment In Space series-1**

[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  
 MEIS1: Marangoni Experiment In Space -first series-  
 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) + 2.0[K]	Argon(96%)+Air(4%)

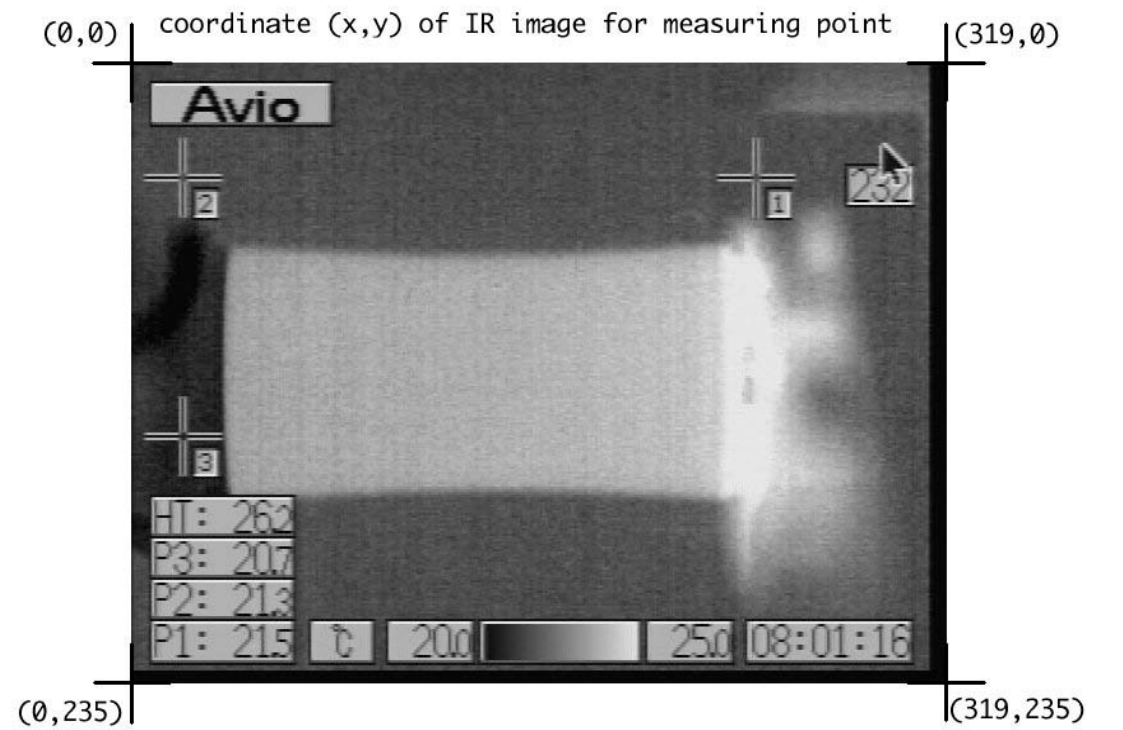
[Experiment sample]

	Material name	Manufacture	Model number, Character	amount	density @25 degree C [kg/m <sup>3</sup> ]	kinematic viscosity @25degree C [m <sup>2</sup> /s]	temperature coefficient of surface tension [N/mK]	Thermal diffusivity [m <sup>2</sup> /s]
Working fluid	silicone oil	Shin-Etsu Chemical Co., Ltd.	KF-96L-5CS	-	912.35	5.00E-06	-6.58E-05	7.46E-08
Dye	N/A							
Tracer particles	Gold-coated acrylic sphere particles	Soken Chemical & Engineering Co., Ltd.	Dia.=180 micrometer	15 particles	1364.27	N/A	N/A	-
			Dia.=30 micrometer	0.3w% for L/R=0.64 liquid bridge	1485.68	N/A	N/A	-

[Experiment Table]

Exp. No.	Exp. Day(JST)	Team	Exp. Day (GMT)	Disk Dia. [mm]	Target LB Length [corrected] [mm]	initial gap [mm]	"CD posn" at Exp. end [mm]	AR (L/D)	Typical VR (V/V <sub>0</sub> )	Target	measuring point in IR image, coordinate (X1, Y1). see Pic.-1	note
MEIS1-C/O	2008/8/20	ALL	2008/8/19-20	30	-	0.36	0	-	-	checking FPEF facilities	-	check out day for experiment system
MEIS1-1	2008/8/22	ALL	2008/8/21-22	30	9.6	0.36	0	0.32	-	critical ΔT	-	study of air bubble removal
MEIS1-2	2008/8/24	ALL	2008/8/23-24	30	max. 15	0.36	0.1	-	-	bubble removal	(228,119)	study of air bubble removal
MEIS1-3	2008/8/26	ALL	2008/8/25-26	30	9.0	0.46	0	0.30	-	critical ΔT	(228,119)	study of air bubble removal
MEIS1-4	2008/8/27	ALL	2008/8/26-27	30	from 8.6 to 12.5	0.46	0	from 0.29 to 0.42	-	bubble removal -> critical ΔT	-	study of air bubble removal
MEIS1-5	2008/8/31	ueno	2008/8/30-31	30	9.6	0.46	0	0.32	0.96		-	Only HD control operation
MEIS1-6	2008/9/2	ueno	2008/9/1-2	30	13.8	0.46	0	0.46	0.96		-	Only HD control operation
MEIS1-7	2008/9/3	ueno	2008/9/2-3	30	12.0	0.46	0	0.40	0.96		-	Only HD control operation
MEIS1-8	2008/9/4	ueno	2008/9/3-4	30	7.5	0.46	0	0.25	0.96		(230,119)	Only HD control operation
					8.1	0.46	0	0.27	0.96			Only HD control operation -> HD&CD control operation
					6.9	0.46	0	0.23	0.96			Only HD control operation
MEIS1-9	2008/9/5	ueno	2008/9/4-5	30	7.2	0.46	0	0.24			(230,119)	
					7.4	0.46	0	0.245				
MEIS1-10	2008/9/6	ueno	2008/9/5-6	30	12.0	0.46	0	0.40	0.96		-	
MEIS1-11	2008/9/9	nishino	2008/9/8-9	30	7.5	0.46	0	0.25	0.95		-	
MEIS1-12	2008/9/10	nishino	2008/9/9-10	30	8.1	0.46	0	0.27	0.95		-	maximumΔT=48.1[K]
					8.7	0.46	0	0.29	0.95		-	maximumΔT=48.1[K]
MEIS1-13	2008/9/11	nishino	2008/9/10-11	30	8.7	0.46	0	0.29	0.95		-	maximumΔT=48.5[K]
MEIS1-14	2008/9/21	nishino	2008/9/20-21	30	-	0.46	0	-	-	bubble removal	-	bubble removal operation only
MEIS1-15	2008/9/26	kawamura	2008/9/25-26	30	-	0.46	0	0.25	0.85		-	
MEIS1-16	2008/9/27	kawamura	2008/9/26-27	30	60.0	0.46	0.7	2.00		0-position detecting mode -> Gas replacement -> LB formation to 60mm	-	Hydrothermal wave
MEIS1-17	2008/9/28	kawamura	2008/9/27-28	30	60.0	1.06	0	2.00	0.90	bubble removal in 1st half, preliminary test for LB length=60mm in 2nd half	(93,120)	Hydrothermal wave
MEIS1-18	2008/9/29	kawamura	2008/9/28-29	30	60.0	1.06	power keep 19.0	2.00			(93,120)	Hydrothermal wave, LB separation occurred.
MEIS1-19	2008/9/30	kawamura	2008/9/29-30	30	-	1.06	power keep 9.2	-	-	Detached mode -> Re-wetting	(193,120)	LB was re-formed by re-wetting operations. (L=10[mm], VR=0.8)
MEIS1-20	2008/10/4	nishino	2008/10/3-4	30	10.27	10.26	0	about 0.7			(229,120)	
MEIS1-21	2008/10/5	nishino	2008/10/4-5	30	10.27	10.26	0	0.65			(229,120)	Asymmetrical to axial direction
MEIS1-22	2008/10/6	nishino	2008/10/5-6	30	10.26	10.26	power keep 2.0		0.86		(229,120)	Asymmetrical to axial direction, CD side dia.:20.6[mm], HD side dia.:23.6[mm]
MEIS1-23	2008/10/7	nishino	2008/10/6-7	30	15.0	10.26	power keep 3.74	0.50	0.57		(223,120)	Asymmetrical to axial direction, CD side dia.:24.4[mm], HD side dia.:26.9[mm]
MEIS1-24	2008/10/8	nishino	2008/10/7-8	30	15.76	10.26	0	-	-		(207,120)	
MEIS1-25	2008/10/9	nishino	2008/10/8-9	30	6.63	0.5	0.8	-	0.85	0-position detecting mode -> bubble removal -> LB formation to 6.63mm	(207,120)	
MEIS1-26	2008/10/13	ohnishi	2008/10/12-13	30	3.0	1.3	0	0.10	-		(207,120)	
MEIS1-27	2008/10/14	ohnishi	2008/10/13-14	30	4.5	1.3	power keep 0.5	0.15	-		(234,120)	
MEIS1-28	2008/10/15	ohnishi	2008/10/14-15	30	7.5	1.3	0	0.25	-	Midair tubular Liquid	(207,120)	
MEIS1-29	2008/10/16	ohnishi	2008/10/15-16	30	6.0	1.3	0	0.20	-		(220,120)	Mid-air tubular Liquid Bridge, a big bubble and three bubbles
					4.5	1.3	0	0.15	-			
MEIS1-30	2008/10/17	ohnishi	2008/10/16-17	30	4.3	1.3	0	-	-	Detached Mode	(228,120)	The liquid bridge was not formed by shortage of liquid. MEIS-1 closed.

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]