

Marangoni Experiment In Space series-5

[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
 MEISS: Marangoni Experiment In Space series-5
 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]

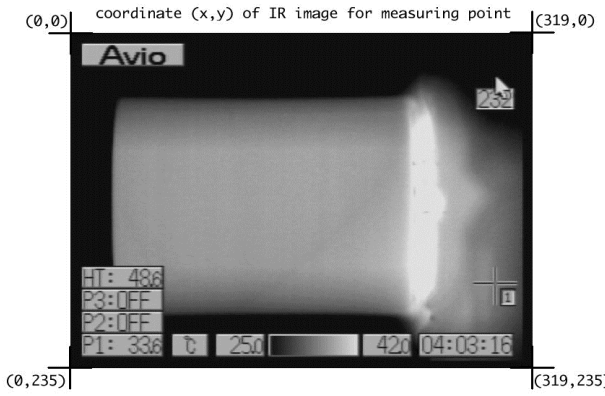
Correction value	surrounding gas
Corrected HD temperature = HD temperature of telemetry (ITO1) + 0.9[K]	Argon(94.3%)+Air(5.7%)

[Experiment sample]

	Material name	Manufacture	Model number, Character	amount	density @25 degre 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-10CS	-	932.29	1.00E-05	-6.12E-05	8.94E-08
Dye	N/A							
Tracer particles	Gold-coated acrylic sphere particles	Soken Chemical & Engineering Co., Ltd.	Dia.=180 micrometer	10000 particles (32.8mg)	1364.27	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 ₀)	Target	measuring point in IR image, coordinate (X1, Y1), see Pic.-1	note-1	note-2
MEISS-C/O	2012/6/26	JAXA	2012/06/25-26	50	25.0	0.2	0	-	-	-	-	check out operations	
MEISS-1	2012/6/26	ohnishi	2012/6/26	50	12.5	0.525	0	0.25	0.94	critical ΔT	(218,122)->(217,124)		
MEISS-2	2012/7/3	ohnishi	2012/7/2-3	50	25.0	0.525	0	0.50	0.95	critical ΔT	(196,124)		
MEISS-3	2012/7/4	nishino	2012/7/3-4	50	50.0	0.525	0	1.00	1.02-1.03	the influence to critical point by rate of temperature increase	(153,124)	21:30-22:31 air bubble removal No VRU Recording	
MEISS-4	2012/7/5	ohnishi	2012/7/4-5	50	22.5, 16.0	0.525	0	0.45, 0.32	0.95	critical ΔT, PAS	(200,124)		
MEISS-5	2012/7/6	ohnishi	2012/7/5-6	50	14.0	0.525	0	0.28	0.95	critical ΔT, PAS	(214,124)		
MEISS-6	2012/7/11	ueno	2012/7/10-11	50	50.0	0.525	0	1.00	1.00	critical ΔT	(153,124)	21:21-21:56 air bubble removal	
MEISS-7	2012/7/12	ueno	2012/7/11-12	50	12.5	0.525	0	0.25	0.95	observation on high Marangoni number	(216,124)		
MEISS-8	2012/7/14	ueno	2012/7/13-14	50	17.5	0.525	0	0.35	0.89	critical ΔT, PAS	(153,124)	21:40-00:14 air bubble removal No VRU Recording	
MEISS-9	2012/7/15	ueno	2012/7/14-15	50	25.0	0.525	0	0.50	0.95	PAS	(222,124)	21:19-0:50 air bubble removal No VRU Recording	
MEISS-10	2012/7/20	ueno	2012/7/19-20	50	10.0-14.0	0.525	0	0.20-0.28	0.85-0.95	PAS	(214,124)	# various rotating oscillation mode without PAS. # At Exp. end, we spilled out a silicone oil from disk edge # No VRU Recording	
MEISS-11	2012/7/21	nishino	2012/7/20-21	50	12.5	0.525	1.0	0.25	-	PAS	(204,124)	the air bubble removal operation only No Exp. data No VRU Recording	Liquid Bridge length (corrected) is 1.525[mm] at the experiment end. After experiment, FPEF has been kept power-on mode to keep the C-D position information.
MEISS-12	2012/7/22	nishino	2012/7/21-22	50	12.5	0.525	1.0	0.25	-	PAS	(216,124)	the air bubble removal operation only No Exp. data No VRU Recording	Liquid Bridge length (corrected) is 1.525[mm] at the experiment end. After experiment, FPEF has been kept power-on mode to keep the C-D position information.
MEISS-13	2012/7/23	nishino	2012/7/22-23	50	12.5, 10.0	0.525	0	0.25, 0.20	0.80	PAS	(217,124)	No VRU Recording	
MEISS-14	2012/7/26	nishino	2012/7/25-26	50	50	0.525	0	1.00	0.98	observation on high Marangoni number	(216,124)	ε=18 21:15-01:32 air bubble removal	
MEISS-15	2012/12/19	nishino	2012/12/18-19	50	45	0.525	0	0.90	0.95	critical ΔT	(216,124)	21:54-22:37 air bubble removal 21:22-21:38 air bubble removal	
MEISS-16	2012/12/20	nishino	2012/12/19-20	50	56	0.525	1.5	1.12	0.95	critical ΔT	(216,124)	Liquid Bridge length (corrected) is 2.025[mm] at the experiment end. After experiment, FPEF has been kept power-on mode to keep the C-D position information.	
MEISS-17	2012/12/21	nishino / yano	2012/12/20-21	50	62.5	0.525	0	1.25	0.96	critical ΔT	(216,124)		
MEISS-18	2013/1/10	ohnishi	2013/1/9-10	50	50	0.525	2.0	1.00	0.95	critical ΔT	(196,124)	Exp. with air bubble	Liquid Bridge length (corrected) is 2.525[mm] at the experiment end. After experiment, FPEF has been kept power-on mode to keep the C-D position information.
MEISS-19	2013/1/11	ohnishi	2013/1/10-11	50	50.0, 20.0	0.525	0.475	1.0, 0.4	0.94, 0.89	observation on high Marangoni number and critical ΔT	(196,124)	L=50 for High Marangoni (ε=3, 5), L=20 for critical ΔT	After Experiment, the CD Posn Data was initialized on 0.475[mm]
MEISS-20	2013/1/21	ueno	2013/1/20-21	50	50	1.00	0	1.00	0.94-0.95	observation on high Marangoni number	(153,124)	ε>9	
MEISS-21	2013/1/26	ueno	2013/1/25-26	50	50	1.00	0	1.00	0.95	observation on high Marangoni number	(153,124)	ε=7, 13	
MEISS-22	2013/1/27	ueno	2013/1/26-27	50	50	1.00	0	1.00	0.95	observation on high Marangoni number	(153,124)	ε=7	
MEISS-23	2013/1/28	ueno	2013/1/27-28	50	62.5	1.00	0	1.25	0.95	observation on high Marangoni number	(132,124)	ε=11	
MEISS-24	2013/2/4	ohnishi	2013/2/3-4	50	25	1.00	0.5	0.50	0.95	observation on high Marangoni number	(196,124)	ε=1, 5, 8 21:10-01:40 air bubble removal	Liquid Bridge length (corrected) is 1.525[mm] at the experiment end. After experiment, FPEF has been kept power-on mode to keep the C-D position information.
MEISS-25	2013/2/5	ohnishi	2013/2/4-5	50	62.5	1.00	0	1.25	0.95	transition process to Chaos	(196,124)	ε=9	
MEISS-26	2013/2/9	nishino	2013/2/8-9	50	20	1.00	0	0.40	0.80-0.95	influence to critical point by volume ratio	(204,124)		
MEISS-27	2013/2/10	nishino	2013/2/9-10	50	20	1.00	12.0	0.40	0.70-0.95	influence to critical point by volume ratio	(204,124)		keeping Liquid Bridge to next Experiment.
MEISS-28 daytime	2013/2/10-11	nishino	2013/2/10	50	11.5	1.00	10.5	0.23	0.945	PAS	(204,124)	operation in ISS daytime (The experiment in the crew activity time)	keeping Liquid Bridge to next Experiment.
MEISS-28	2013/2/11	nishino	2013/2/10-11	50	9.5-11.5	1.00	0	0.19-0.23	0.76-0.945	PAS	(204,124)		
MEISS-29	2013/2/12	ueno	2013/2/11-12	50	62.5, 25.0	1.00	0	1.25, 0.50	0.95	observation on high Marangoni number	(132,124)	ε=11, 8	
MEISS-30 daytime	2013/2/20-21	ohnishi -> yano -> nishino	2013/2/20-21	50	10	1.00	4.0	0.20	0.79	PAS	(132,124)	operation in ISS daytime (The experiment in the crew activity time) No VRU Recording	keeping Liquid Bridge to next Experiment.
MEISS-30	2013/2/21	nishino	2013/2/21	50	50	1.00	0	1.00	0.95	pre-research for temperature measurement inside Liquid Bridge	(132,124)	ISS attitude control No VRU Recording	
MEISS-31	2013/2/22	nishino	2013/2/21-22	50	50	1.00	0	1.00	0.95	observation on high Marangoni number	(196,124)	ε=13	
MEISS-32	2013/2/25	nishino	2013/2/24-25	50	50	1.00	0	1.00	0.95	temperature measurement near the gas-liquid interface and inside Liquid Bridge	(153,124)	ε=3	At the Exp. end(06:12), it operated the zero-position detecting mode.



Pic.-1 Coordinate of IR image
 The Liquid Bridge size on above image: Dia.=50[mm], L=62.5[mm]