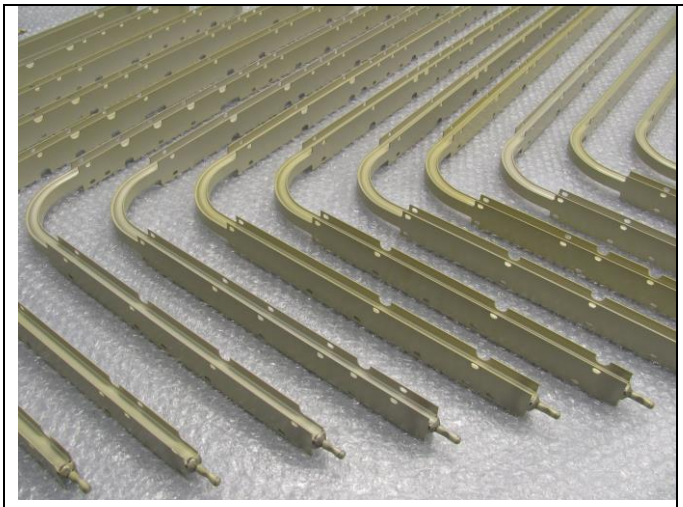
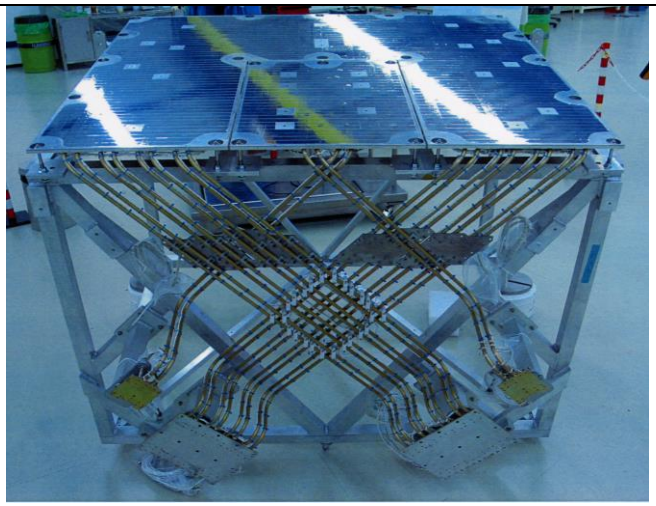
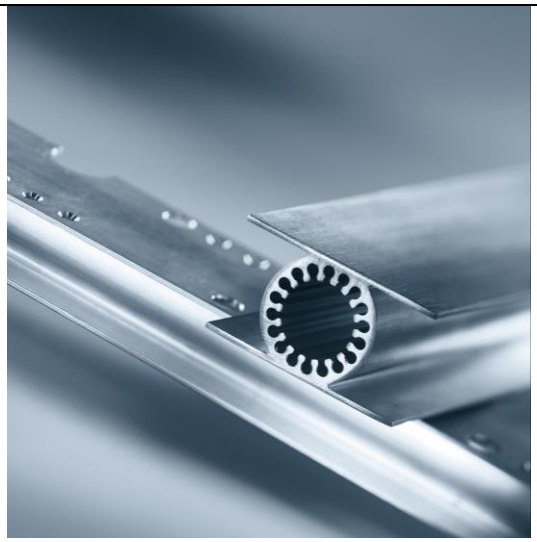
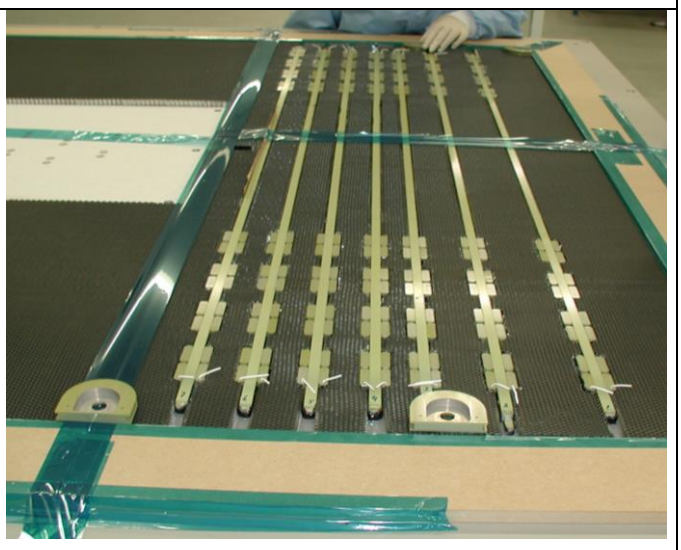
Technical data sheet N° 1A :
EHP AGXXX Heat Pipes









Aluminum extruded heat pipes

AGXXX = Aluminum Grooved Heat Pipe with diameter XXX in tenths of millimeters

Items	EHP performances	Comments
Type	CCHP	Constant conductance HP
Material	Aluminium 6063 (T5 or T6)	
External coating	Bare Aluminum or Alodine 1200 or BR127	
Working fluid	NH3	High purity NH3 type N50 or better
Capillary structure	Extruded re-entrant grooves	
Off-the-shelf HP dimensions	Size 6, 10, 11, 11.12, 12.8, 13.2, 15, 19, 20, 25mm	Other sizes from 3 to 30mm upon request
HP length	≤ 4 m	Up to 6m upon request
Bending radius	5 x OD for all models > 3.5 x OD for some models	11.1 & 13.2LW heat pipes cannot be bent
Maximal power load	See figure 1	Homogeneous heat spreading on evaporator, typical length = 1.5m
Maximum evaporator heat flux	7 W/cm²	Typical at saddle level
Maximum condenser heat flux	5 W/cm²	Typical at saddle level
Evaporator conductance	> 5.000 W/m²K > 120 W/mK	Typical 0G performances at T>-20°C
Condenser conductance	> 3.500 W/m²K > 85 W/mK	Typical 0G performances at T>-20°C
Mass (without NH3, before machining)	Size 6mm : 200 g/m Size 11mm (round) : 274 g/m Size 11mm (squared) : 307 g/m Size 11.12mm : 147 g/m Size 12.8mm : 450 g/m Size 13.2mm : 300 g/m Size 13.2LWmm : 264 g/m Size 13.2LWmm : 205 g/m Size 15 mm : 367 g/m Size 19 mm : 540 g/m Size 20 mm : 566 g/m Size 25 mm : 575 g/m	With 2 saddle 30 x 1mm with 2 saddles 30 x 1mm with 2 saddles 30 x 1mm without saddle (squared) With 1 saddle 40 x 3mm with 2 saddles 30 x 1mm with 2 saddles 30 x 1mm with 2 saddles 18 x 1mm with 2 saddles 30 x 1mm with 2 saddles 38 x 1.5mm with 2 saddles 35 x 1.5mm without saddles (round)
Operating T° range	-60°C / + 80°C	
Non op T° range	-65°C / + 90°C	This range can be extended to lower temperature on demand, but it has to be studied due to ammonia freezing below –77°C. Most of heat pipes models are proofed at +125°C to demonstrate resistance to the embedding (curing) process
Proof pressure	> 65 bar for 13.2LW > 110 bar (> 2 x MNOP) > 125bar for 11LW	

Burst pressure	> 78 bar for 13.2LW > 150bar for 11LW > 166 bar (> 4 x MNOP)	
Mechanical environment	- sinus 5-25Hz : +/-10mm - sinus 25-100Hz : 25G - random 20-2000Hz : 30.7Grms - constant acceleration : 35G - 20.000 pressure cycles between 1 and 42 bars	Typical
Thermal cycling	1000 cycles between –50°C (1min) and +80°C (1min) 5 cycles between –70°C (2 hours) and +120°C (2hours)	Typical
Ageing tests	Ageing tests for more than 10 years on 3 HP	
Long term storage	No degradation after 19 years of on-ground storage performed	
He leak rate	< 3.10^{-7} atm.cm^3/s	Typical
Life time	15 years	Typical
Qualification level	0G in orbit qualification & ESA-PSS-49	External and embedded applications

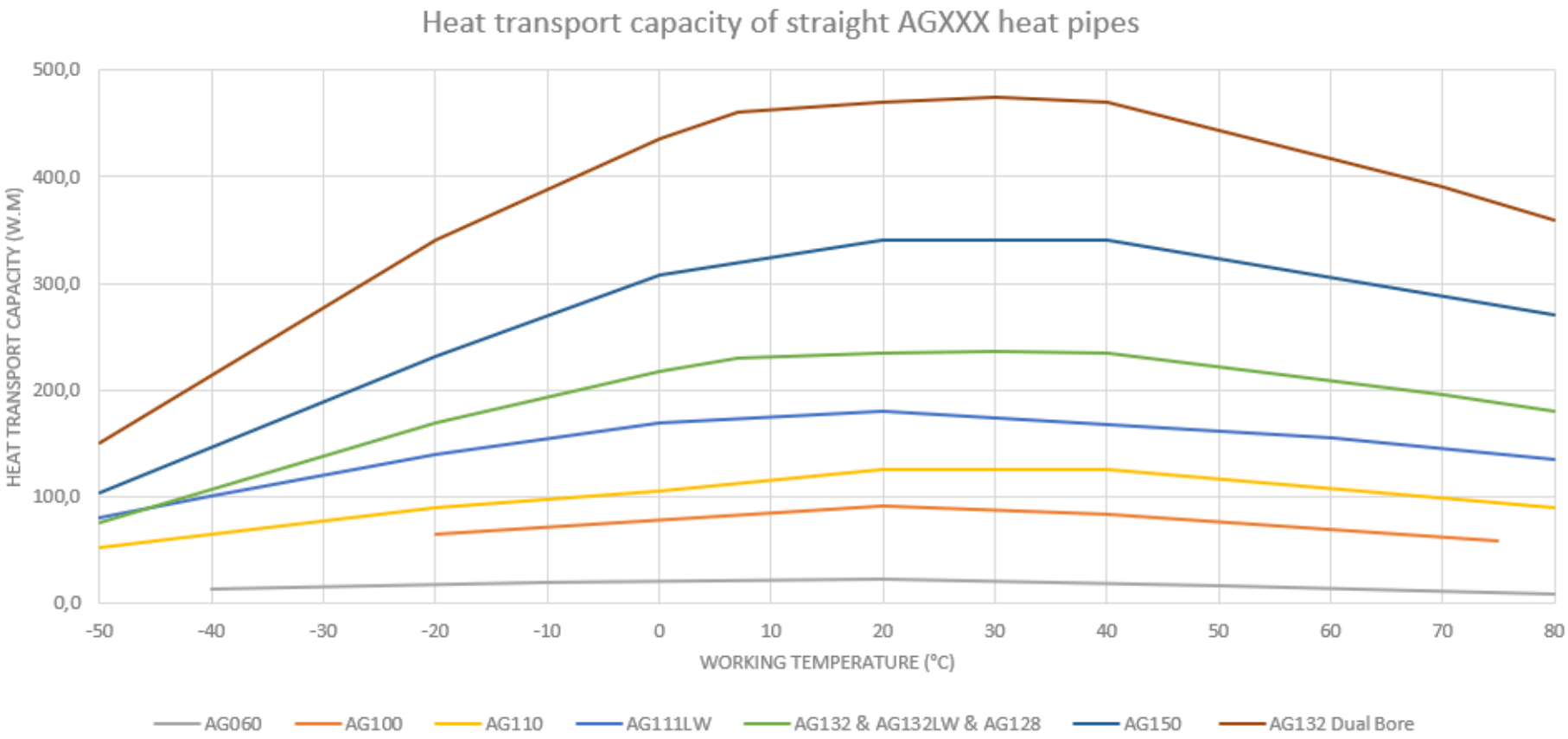
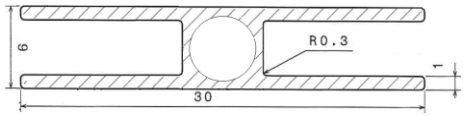
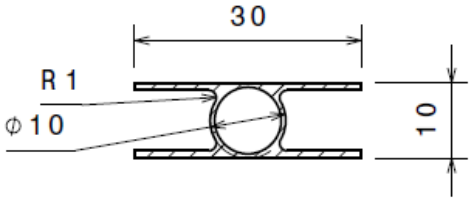
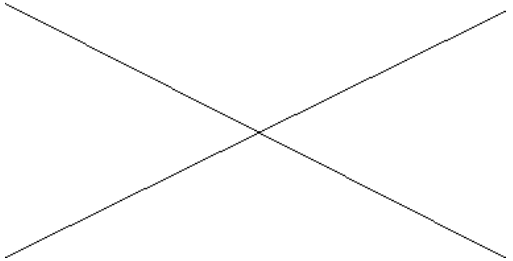
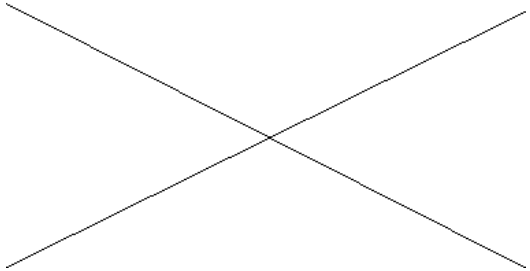


Figure 1: Heat transport capability – NH3

Available HP profiles			
			
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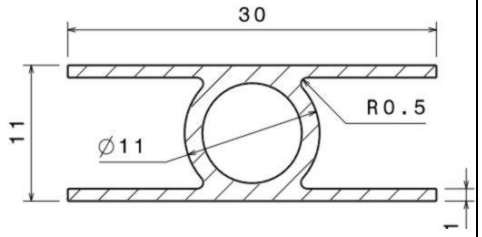	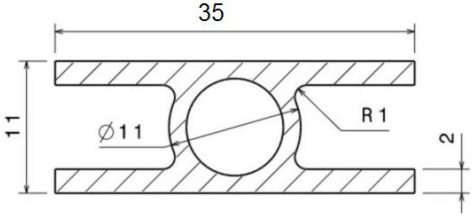	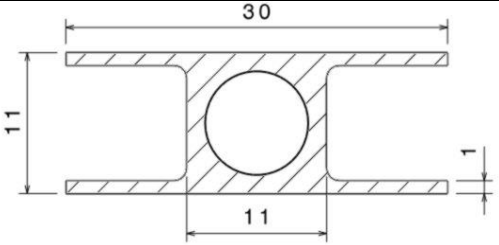	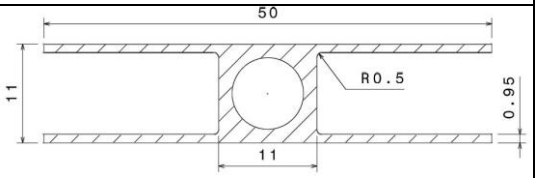
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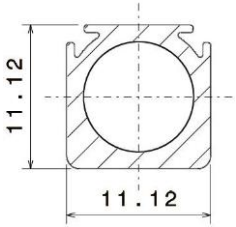	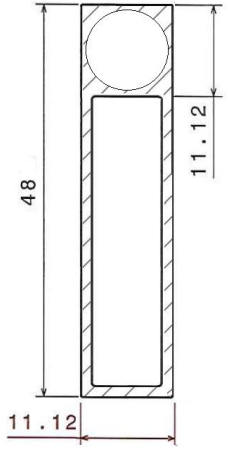	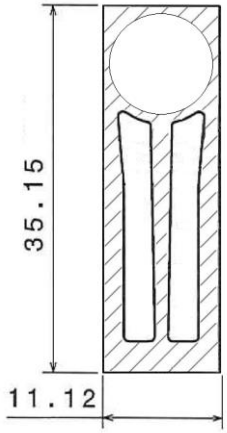	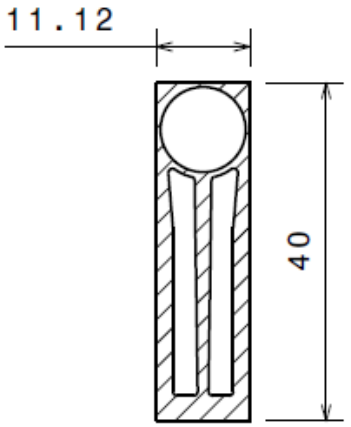
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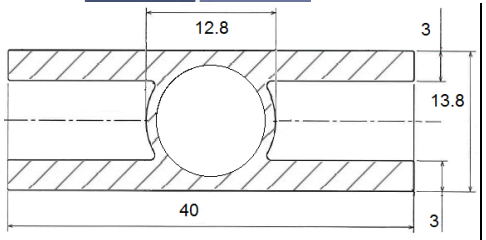	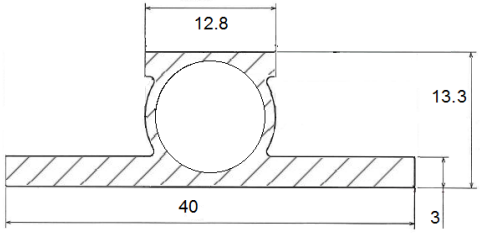		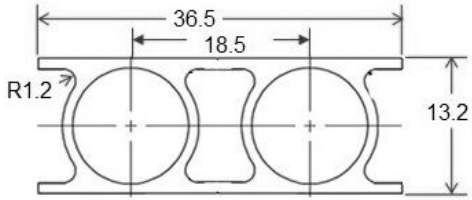
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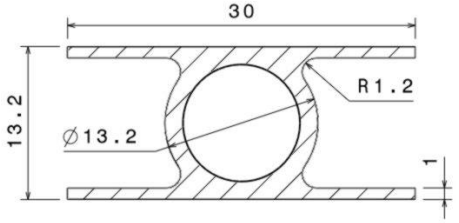	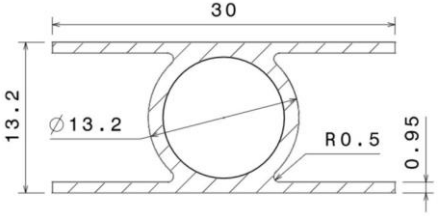	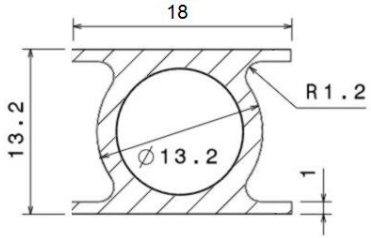	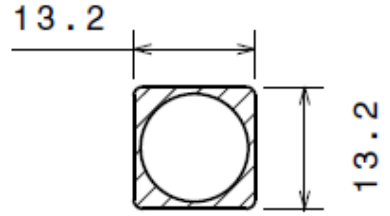
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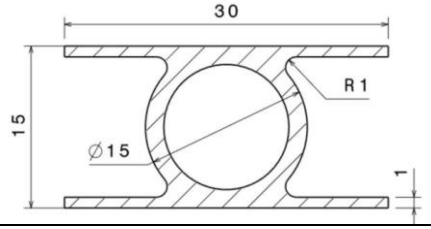	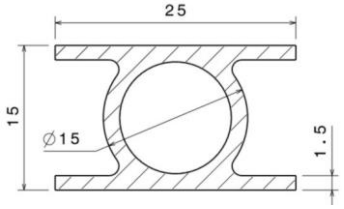	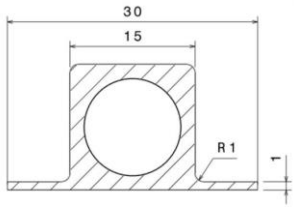	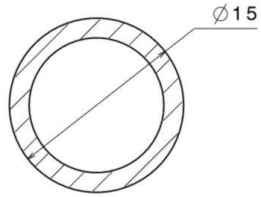
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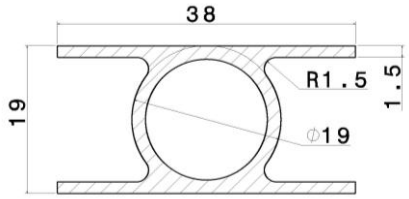	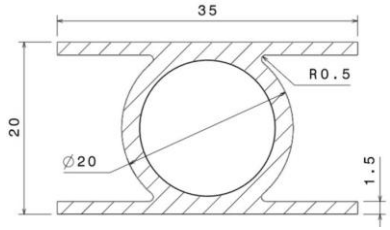	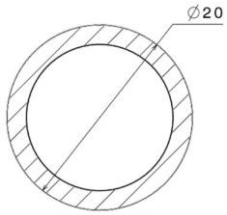	
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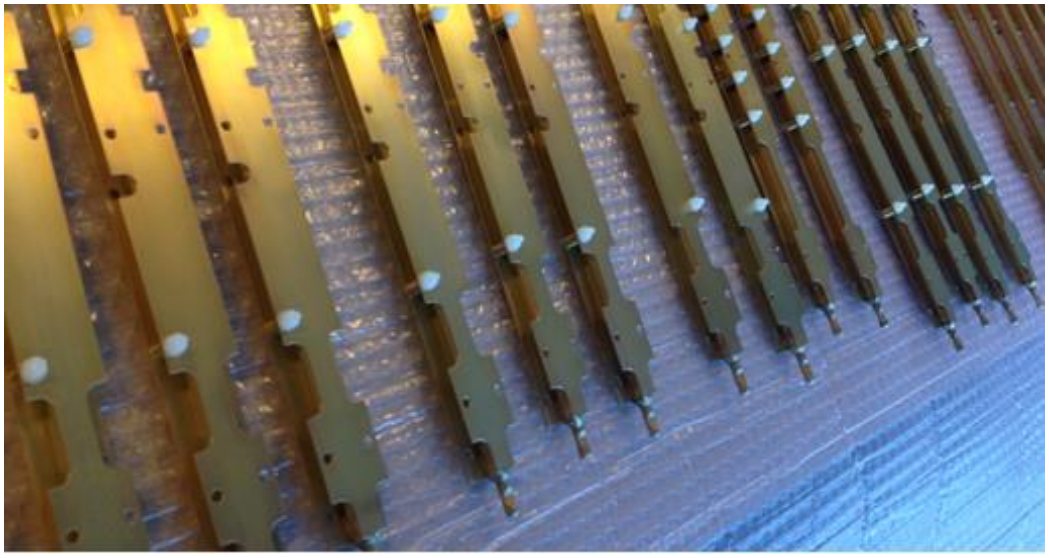
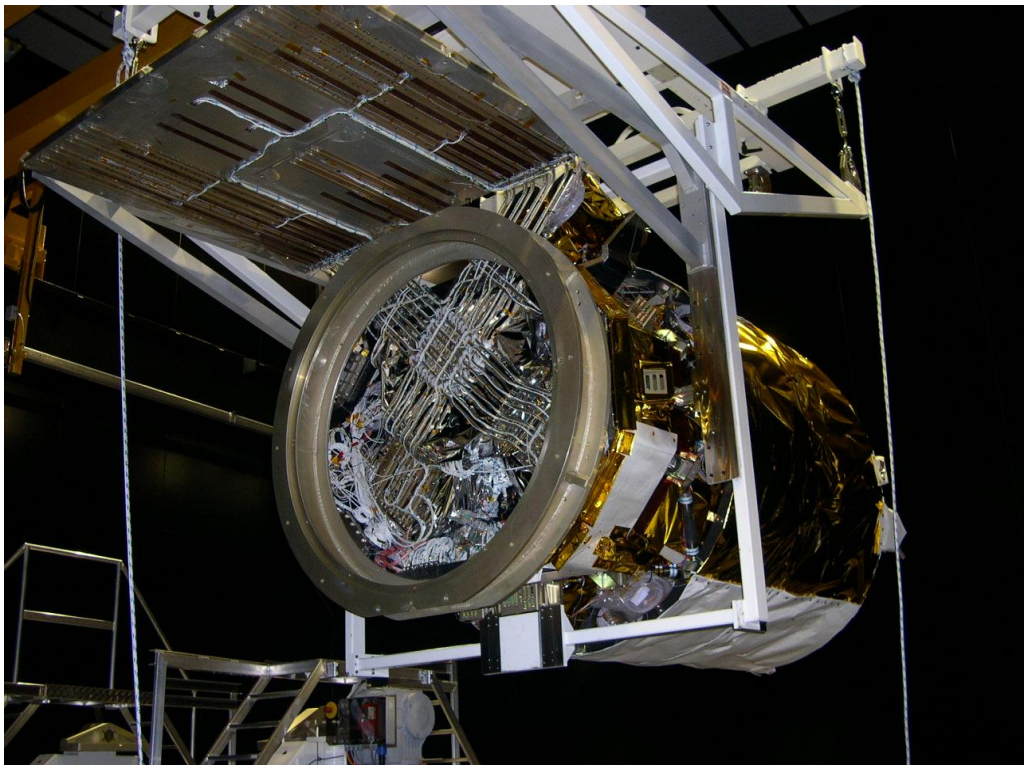


Typical AGXXX heat pipes



ESA AEOLUS – ALADIN instrument with HP network