AAVID THERMALLOY

Design Centre
EUROPE Engineering

Detailed Thermal Study
Cooling Solution for SKA

(Bologna DC 08/02/2019)

INAF

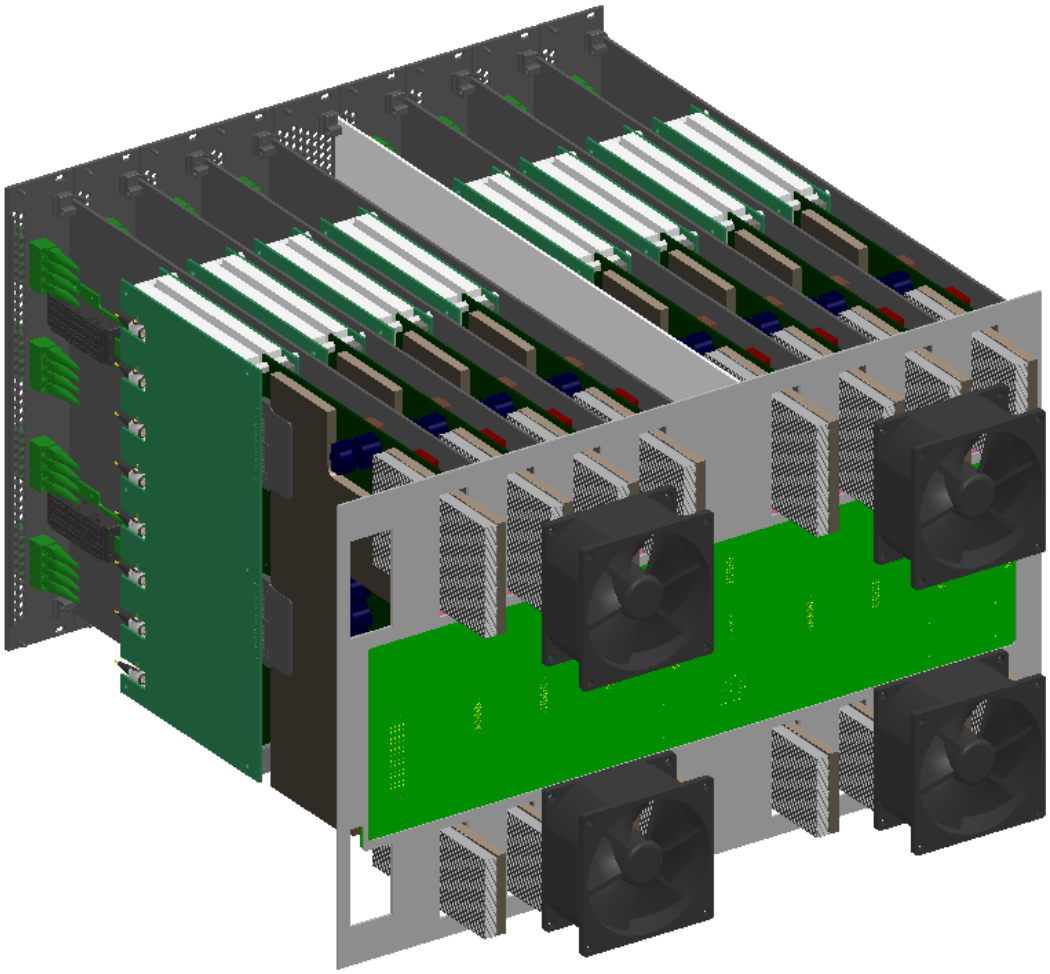
Please Note: Thermal values are calculated and as such are APPROXIMATE and for GUIDANCE only. The calculations are based on an ideal world situation and therefore do not allow for any peculiarities within the end use environment of the heatsink. Aavid strongly recommends that all customers undertake their own tests in their own application and with their own equipment as verification. Aavid accepts no responsibility for errors arising from the use of calculated figures.

1. Specifications

INAF, in cooperation with SanitasEG, is developing a RACK for the Square Kilometre Array (SKA), the world's largest radio telescope with eventually over a square kilometer of collecting area. For this application INAF needs a cooling system for the electronics of the SUB-RACK. Each telescope mounts 4 SUB-RACKs.
The SUB-RACKs units includes 8 boards, 1 power supply unit and 1 main board, with a power of 800 W equally distributed on each board:

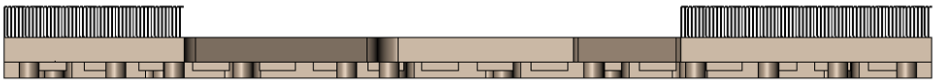
- $P_{BOARD} \approx 100$ W for each Board
- $P_{SUB\text{-}RACK} \approx 800$ W for each SUB-RACK

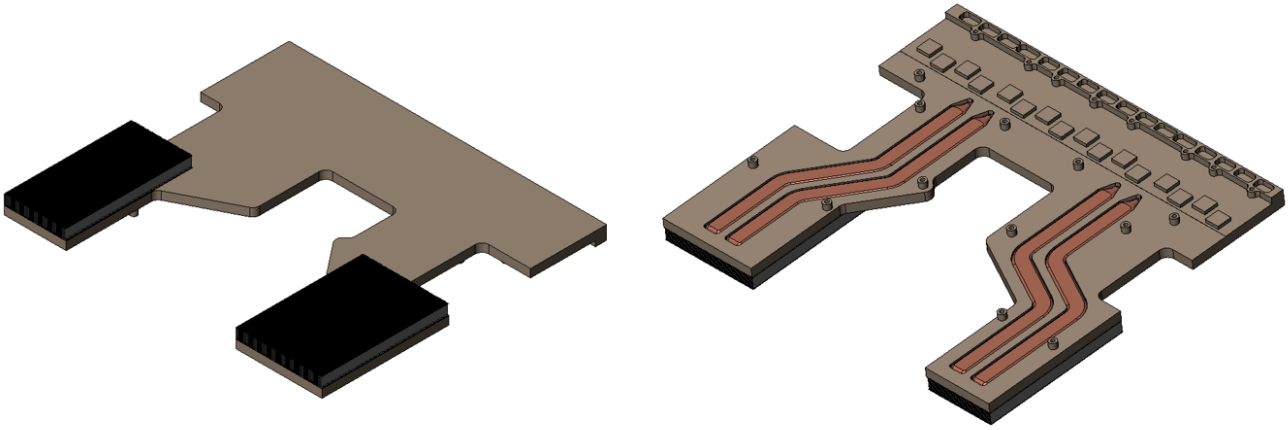
The SUB-RACK will be cooled with an air solution. AAVID will use an Heatpipe System directly in contact with the electrical components on the boards, in order to extract the heat from the board. The ambient temperature considered for the cooling system is 40 °C.



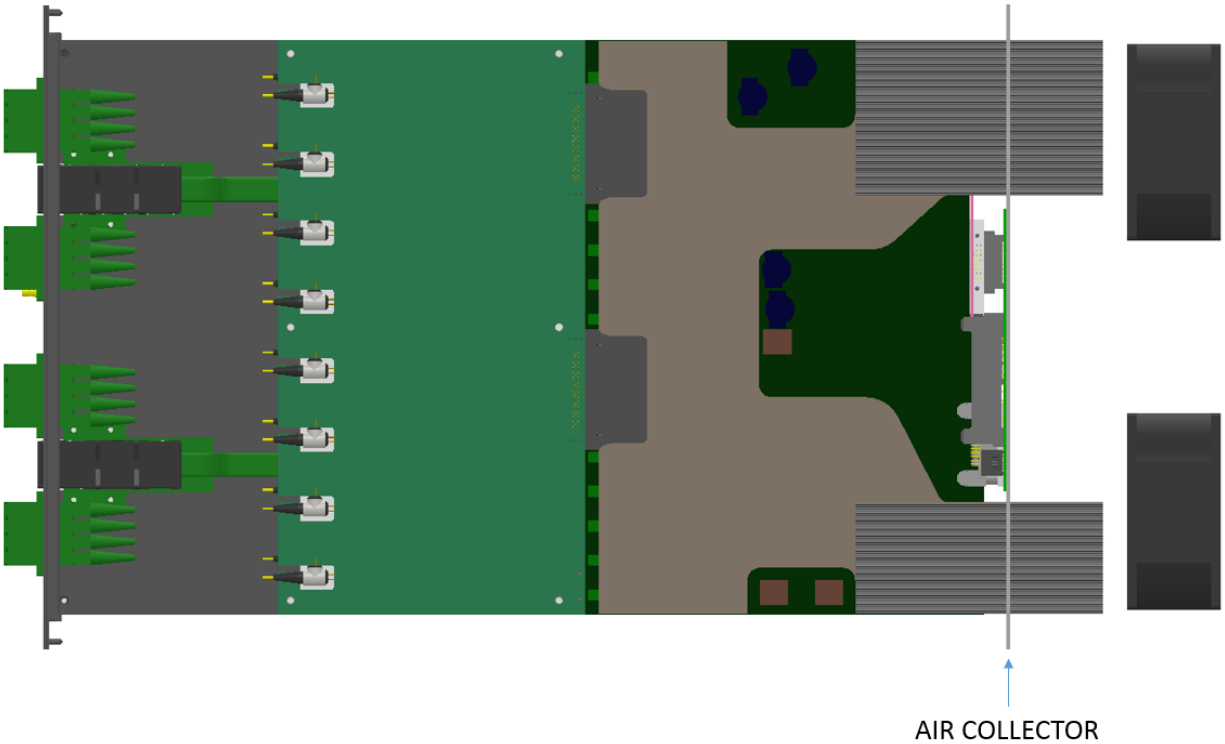
AAVID proposed an Extractable Heatpipe System: an heatpipe system with fins incorporated, extractable with the board

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Once mounted on the board, part of the fin pack will protrude from it, passing through an air collector designed to channelize the airflow in between the fins.

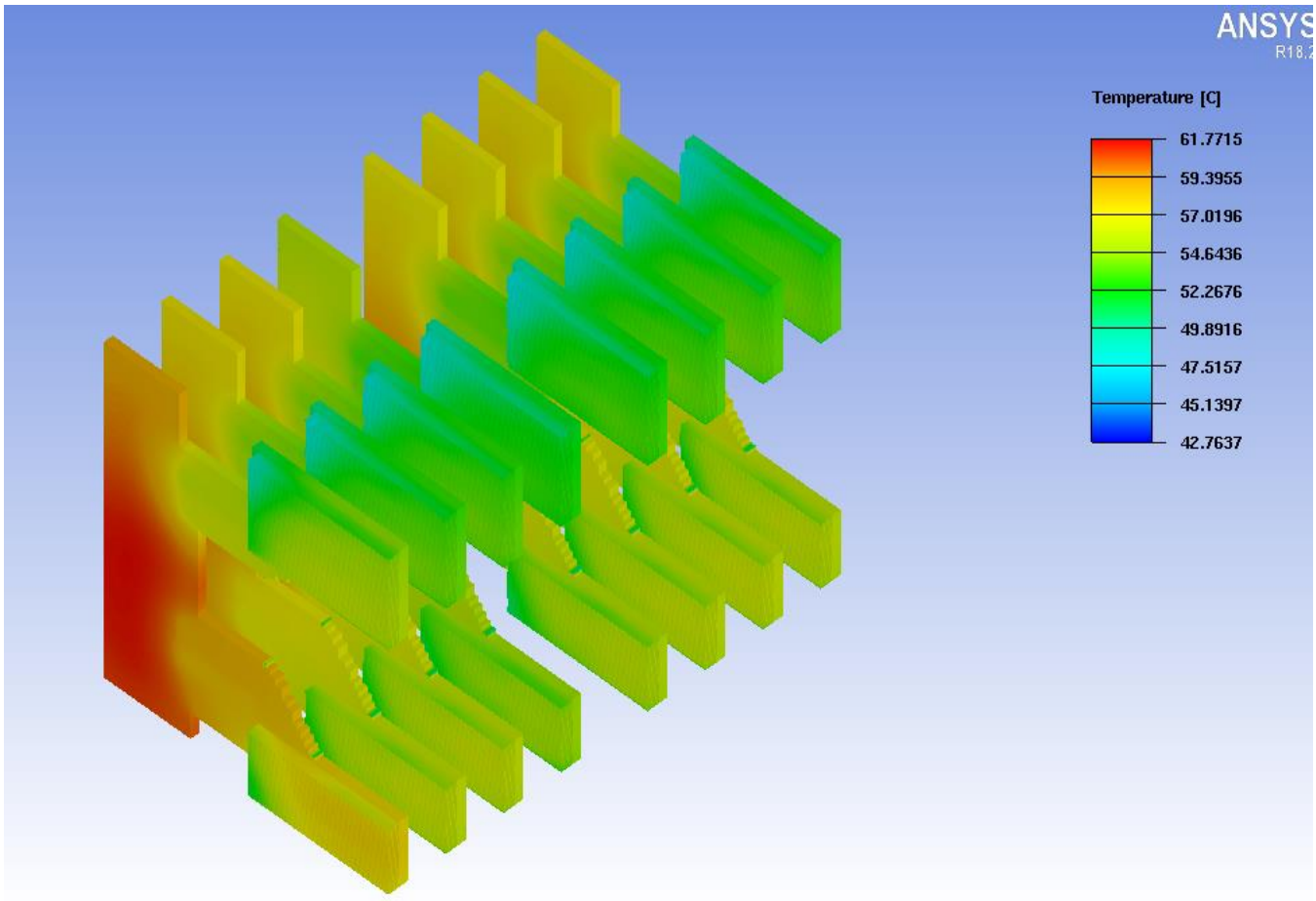


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2. Thermal Design

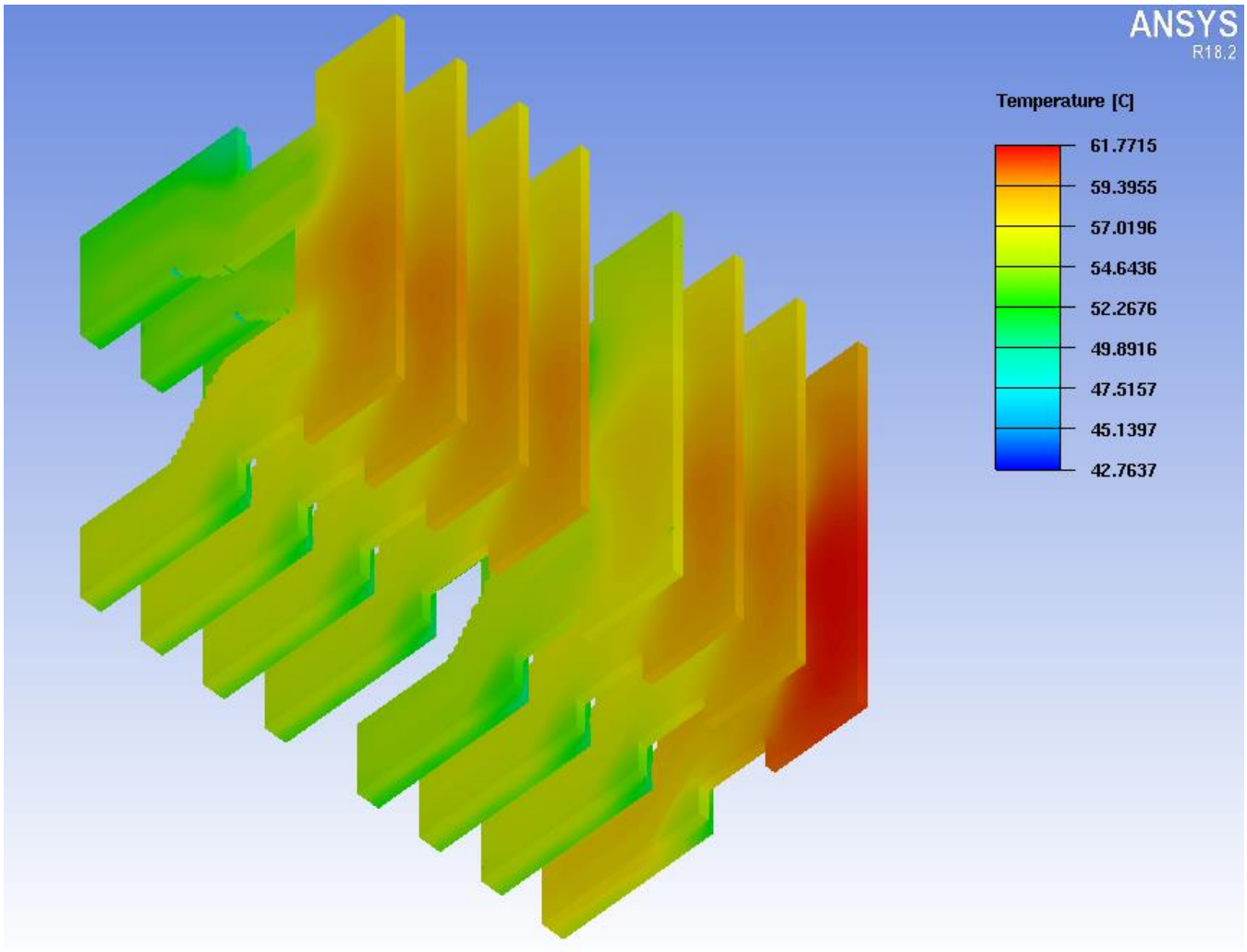
The thermal performances are

SOLUTION	T_{AMB}	T_{MAX}
	[°C]	[°C]
Extractable Heatpipe System	40	61.8



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Due to the typical precision of a simulation, an error of 5-10 % should be considered. We strongly recommend to validate thermal calculation by testing prototypes

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