

PROPOSAL FOR ALL BUMP-BONDING MODULE

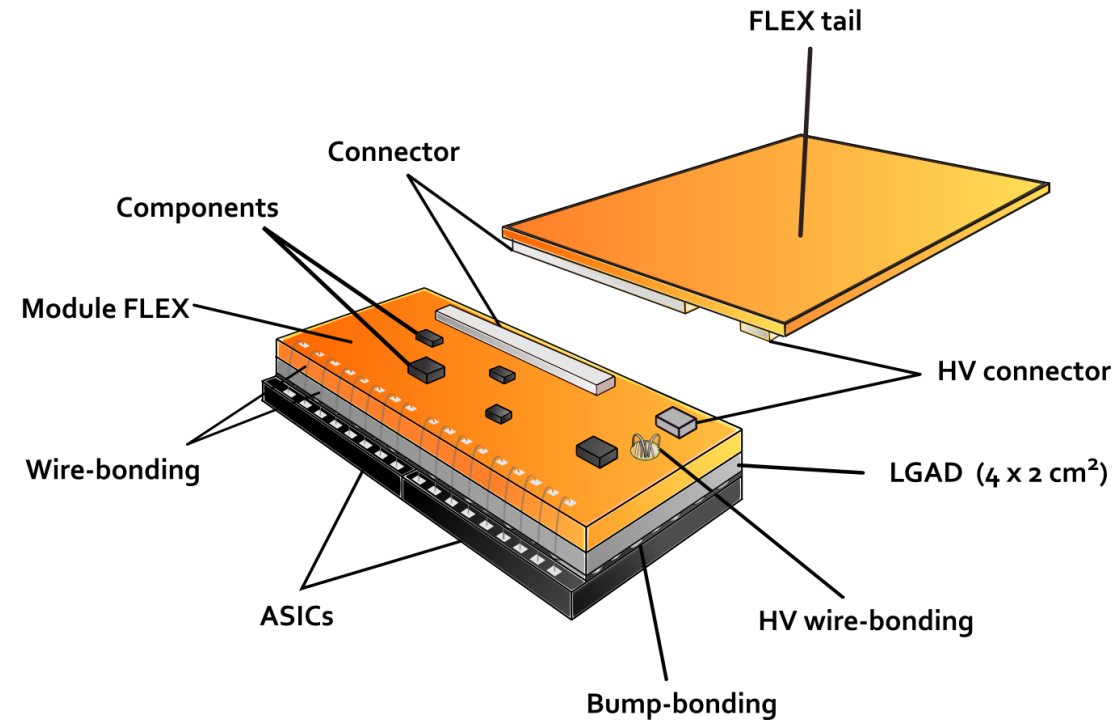
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ALTERNATIVE MODULE DESIGN



- **Baseline**
 - Wire bonding
 - ALTIROC2
 - HV line
- **Alternative module design**
 - The aim of replacing wire bonding with mechanically more robust solutions.
 - ALTIROC2 connects to module flex with bump bonds
 - HV line connects to module flex with bump bonds or conductive glue
 - Process verification
 - ALTIROC1

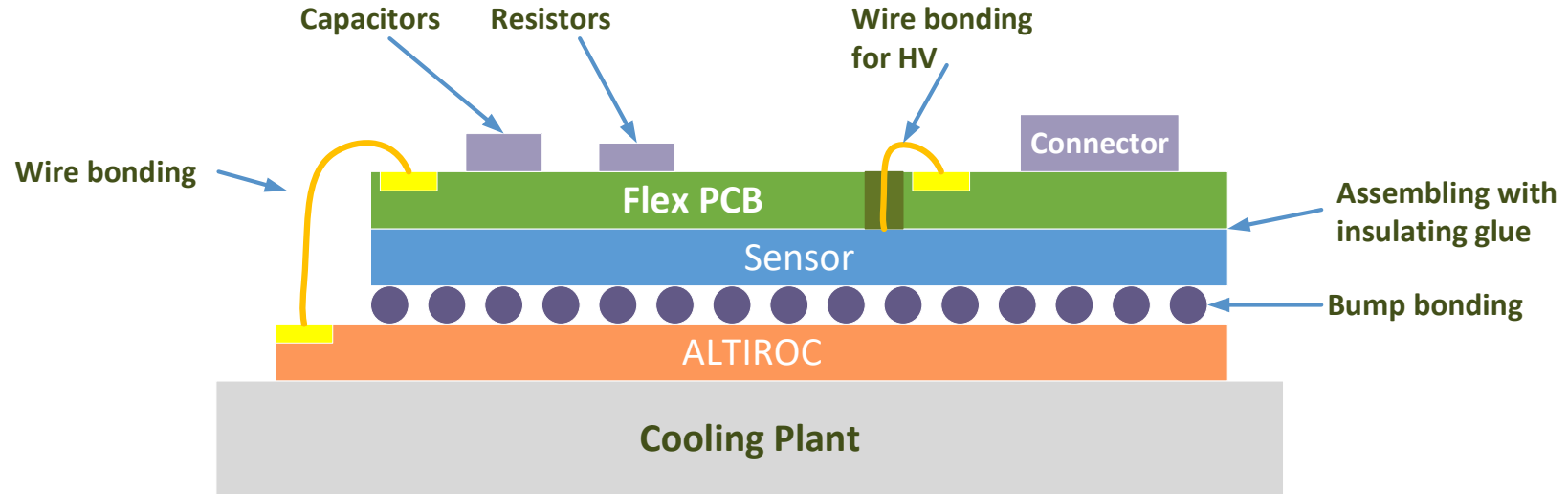


From HGTD TDR

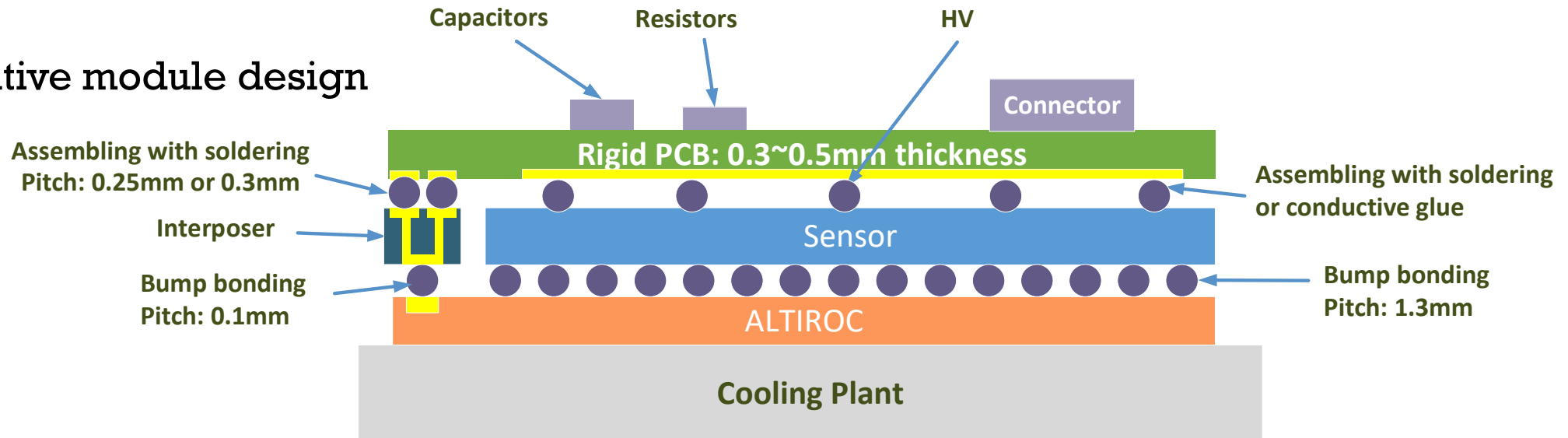
FROM WIRE-BONDING TO ALL BUMP-BONDING



■ Baseline



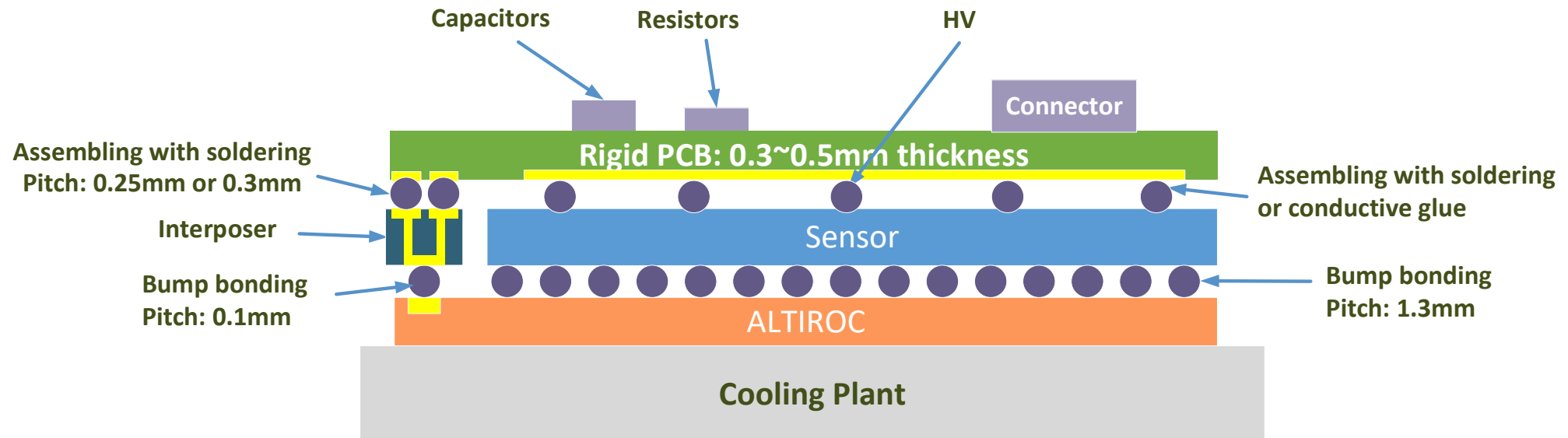
■ Alternative module design



ALL BUMP-BONDING



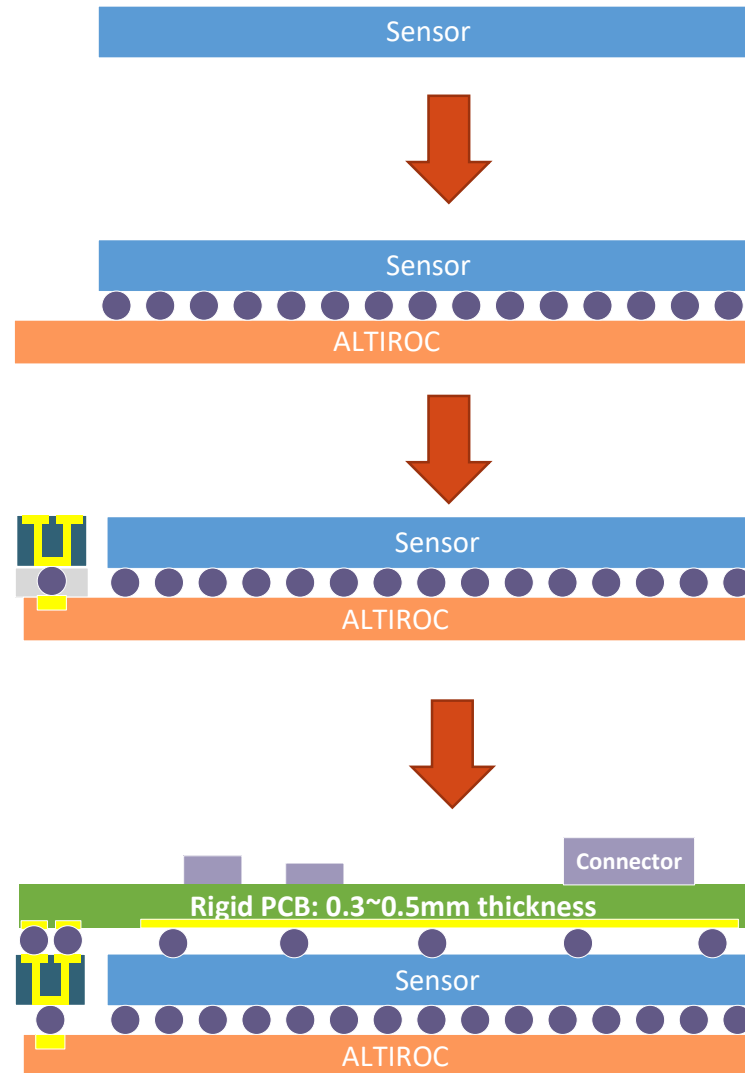
- All bump-bonding scheme
 - Use interposer to match the height difference (about 300um)
 - Transform the pitch from 0.1mm to 0.25mm or 0.3mm to match the PCB processes
- Remove the wire-bonding for HV
 - Make pads at the bottom of PCB
 - Use soldering or conducting glue to connect the HV
- Rigid PCB makes the assembling easier and more reliable



PRELIMINARY FLOW



1. Sputtering nickel and gold on the upper surface of sensor
2. 1st bump-bonding Sensor to ALTIROC
3. 2rd bump-bonding Interposer to ALTIROC
4. 3rd bump-bonding PCB to sensor and interposer



Add underfill at the bottom of interposer



PCB production and assembling

PLAN AND COSTS



- Process verification with ALTIROC1
 - If the wire-bonding pads of ALTIROC can follow the rules below, the bump-bonding can share the pads with wire-bonding.
 - Otherwise wire-bonding pads and bump-bonding pads should be different pads

Table 1 Minimum Re-passivation Copper Pillar Dimensions (um)

Parameter	Symbol	Value (um)		
		Minimum	Recommended	Maximum
PI Opening	D1	15	-	-
PI Opening to Bump Diameter	D2	7.5	-	-
Bump Diameter	D3	50	-	-
Bump Pitch	D4	70	-	-
Pad to PI Opening Overlap	D5	7.5	-	-
Space Between Bumps	D6	20	-	-
Bump edge to Die edge	D8	25	-	-
Bump height	H	-	-	80

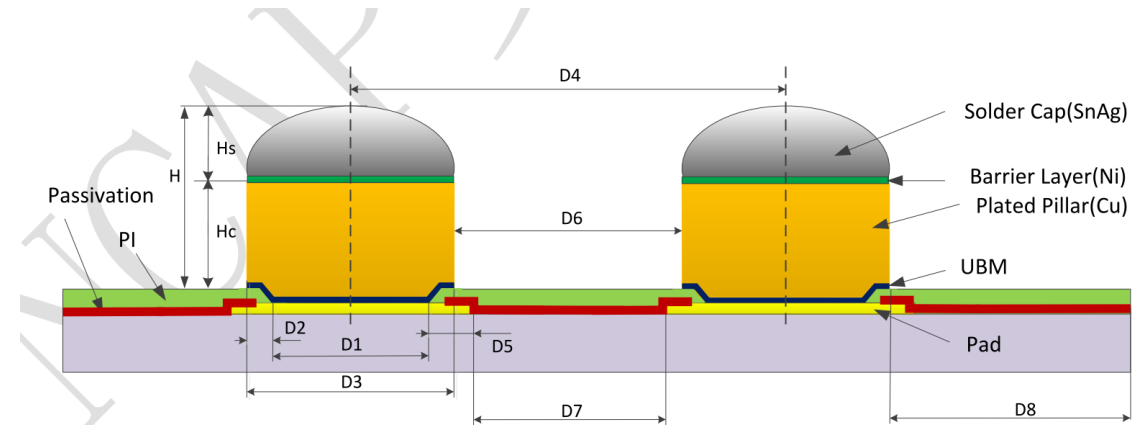


Figure 1 Re-passivation Copper Pillar Structure

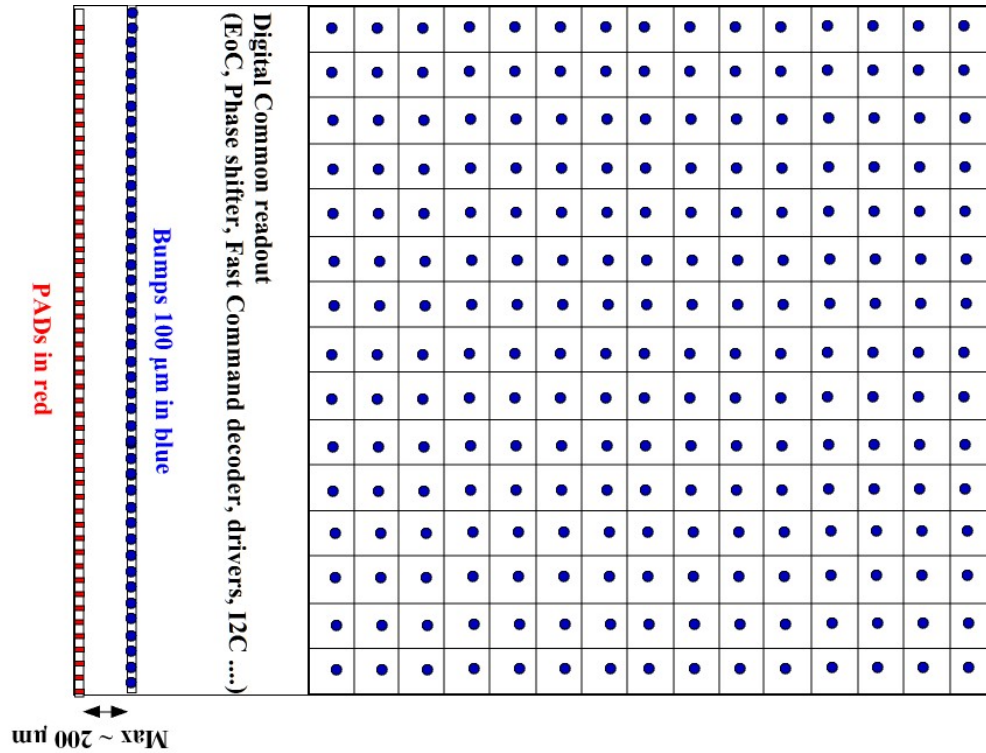
From company internal file

- The costs of interposer: should be less than \$72, 000

THANKS TO YOUR ATTENTION

VIEW

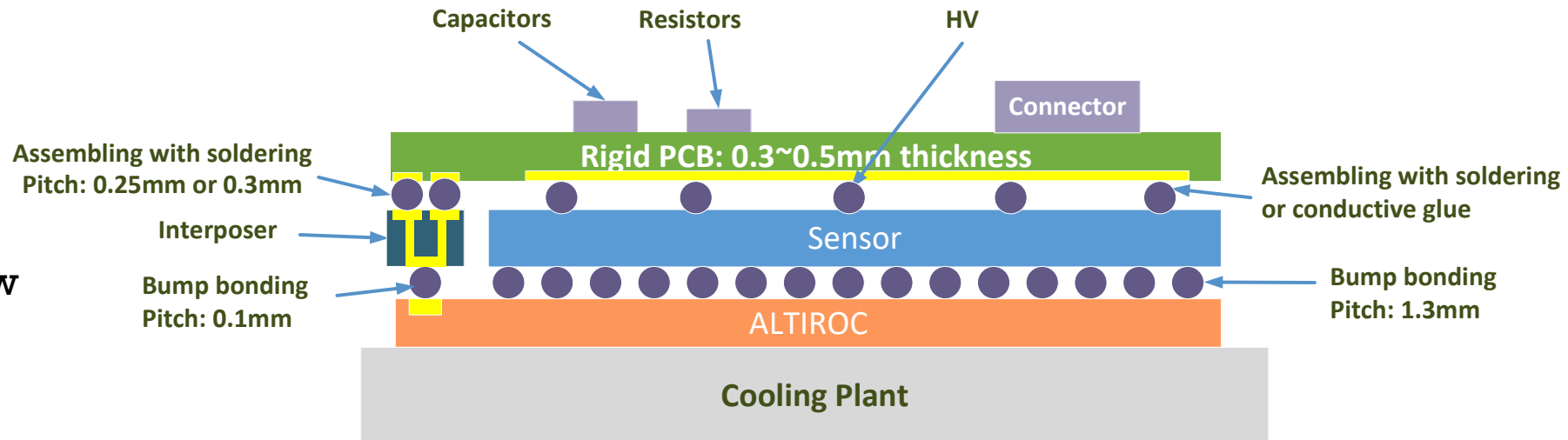
Top view



From Laurent



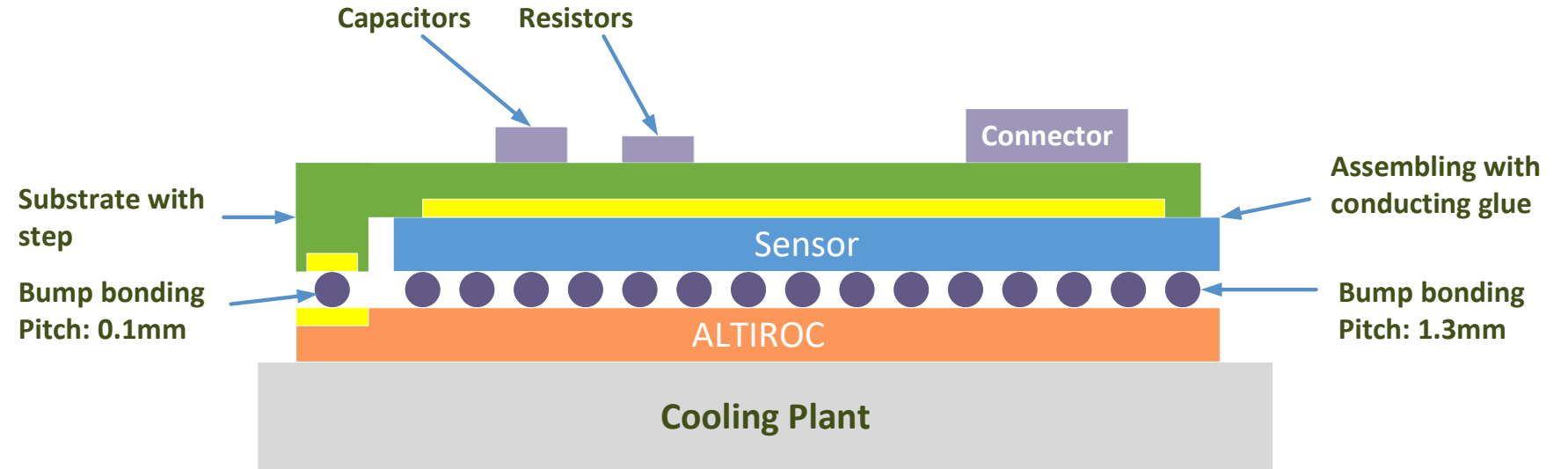
Side view



THE THOUGHT OF GIVING UP



- limited by the accuracy of processes (thickness)



- limited by the minimum pitch for flex PCB
- and processes

