mid Moulding Innovation Day 2023

LATI

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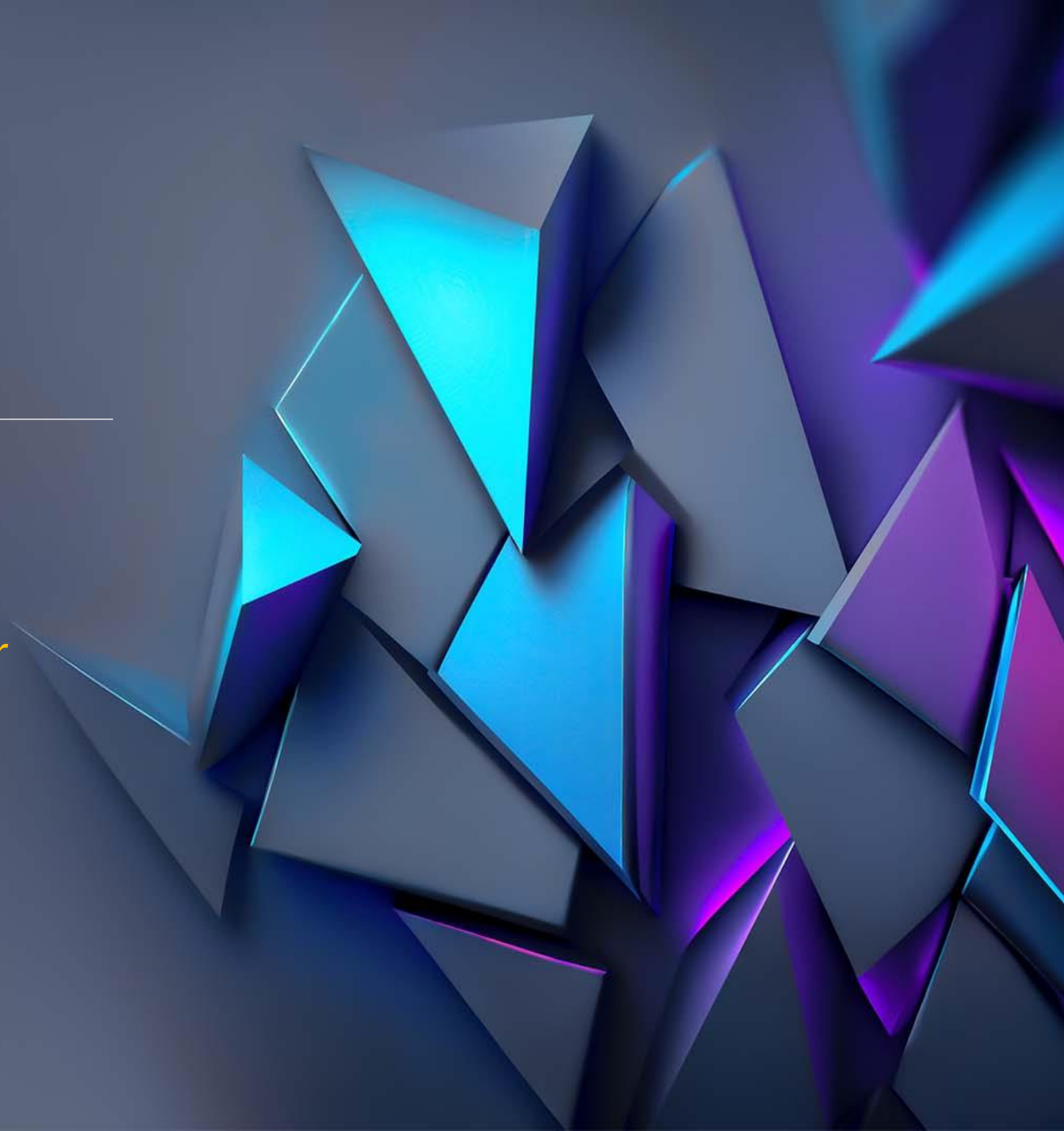
Moldex3D



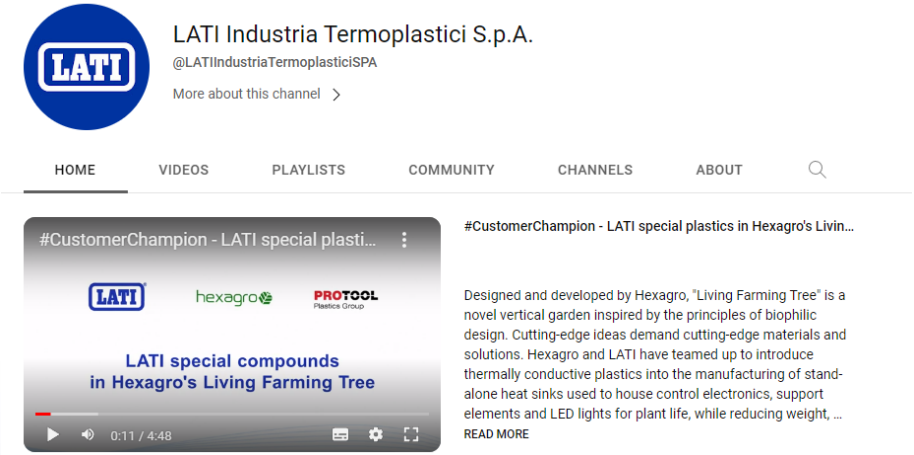
Ottimizzazione geometrica, estetica e funzionale di un dissipatore LED in compound termo-conduttivo

Moulding Innovation Day 2023

LATI HIGH PERFORMANCE THERMOPLASTICS

Hexagro è un LATI #CustomerChampion!

Link al video



Living Farming Tree

hexagro

LATI

PROTOOL

A proposito di LATI

Fondata: **Italia**, **1945**

Proprietà: **Familia Conterno**

Produzione
2 siti – 40.000 ton. Capacità – 2.500 prodotti attivi

HR
290 dipendenti

Turnover
>150 milioni €

Mercato
1.800 clienti, presenza globale

Innovazione
20 ingegneri in R&D e TECH

Compound e servizio tecnico

Strutturali

Elettricamente conduttivi

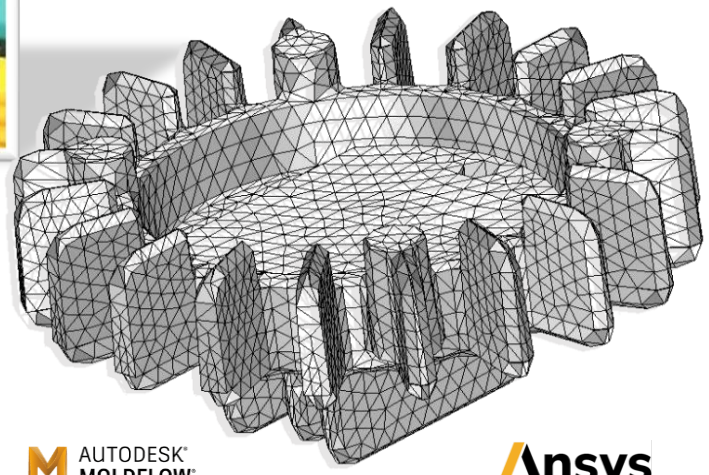
Autolubrificanti

Termicamente conduttivi

Detettabili

Alte temperature

Assistenza allo stampaggio



AUTODESK MOLDFLOW

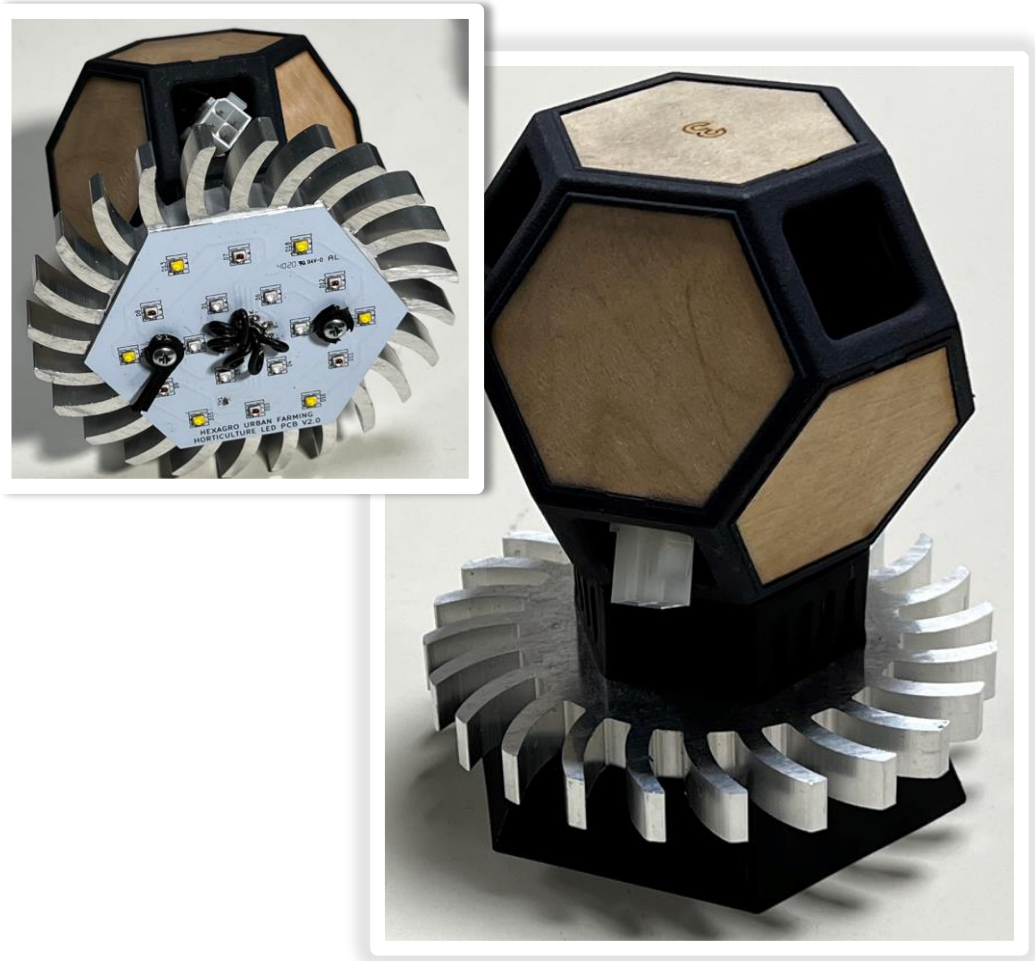
Ansys

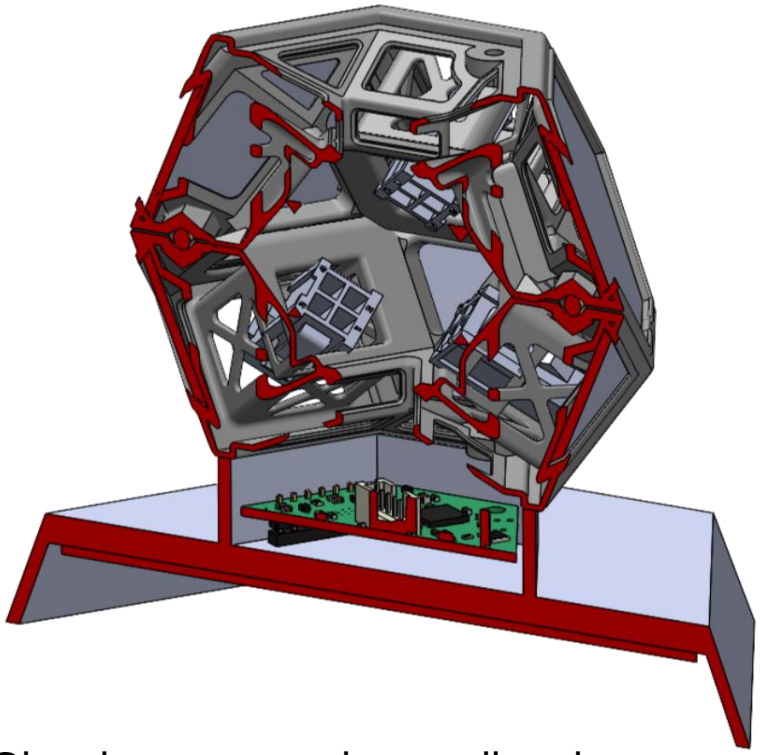
Moldex3D

Digimat

Co-design FEM CAE

Integrazione di funzioni





- Giunzione meccanica per il nodo;
- Supporto per LED PCB e la lente;
- Sede per l’elettronica;
- Dissipatore

Metal replacement

Alluminio

- Densità 2,7 g/cm^3
- Conducibilità termica (ASTM E1461-92, 3 mm)

  ~ 120 W/mK
- CLTE: 20 ppm
- Emissività: 0,22
- GWP (60% riciclato)* ~ 4 kg CO_2 eq./kg, ~ 10,8 kg CO_2 eq./dm^3

LATICONTHER 62 GR/50 (PA6, 50% graphite)

- Densità 1,5 g/cm^3
- Conducibilità termica(ASTM E1461-92, 3 mm)

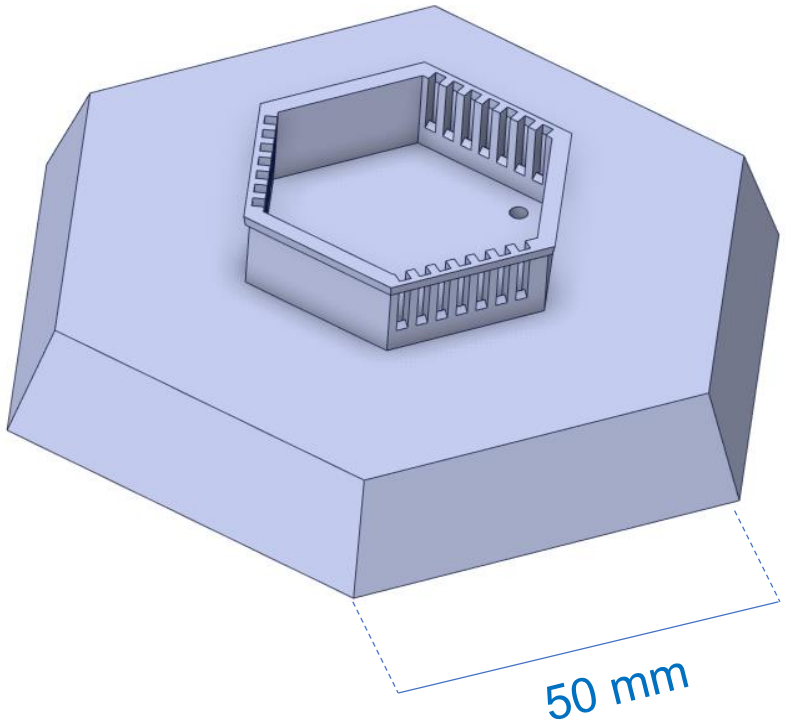
  - 12 W/mK nel piano

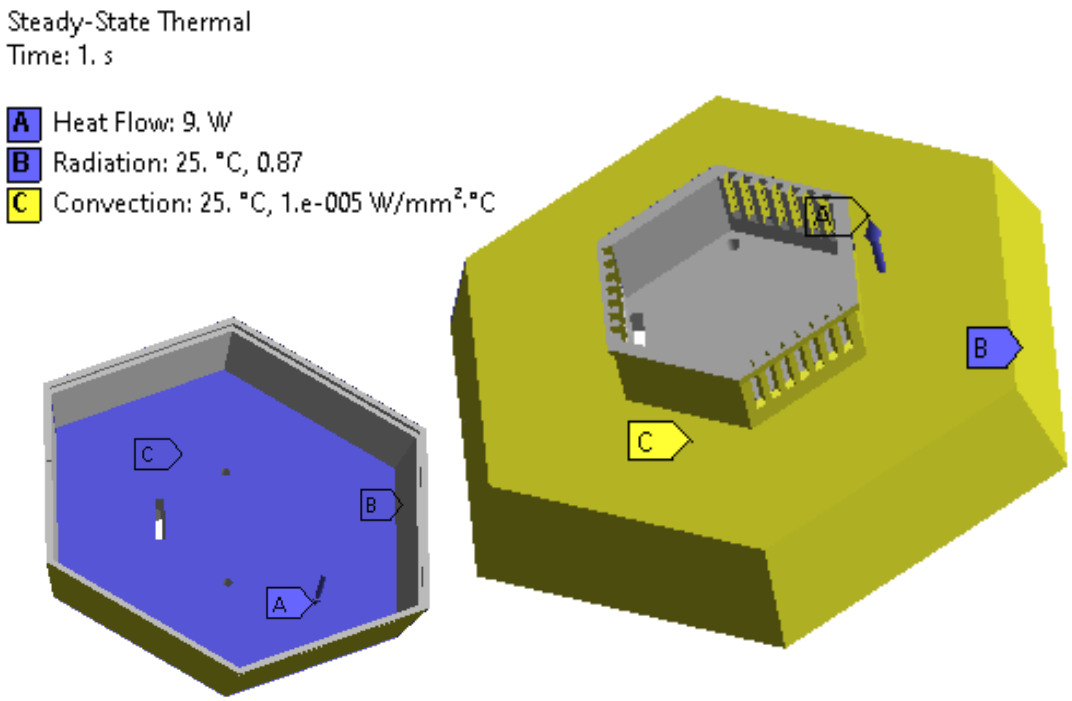
  - 2 W/mK attraverso il piano
- CLTE: 30 ppm
- Emissività : 0,87
- GWP* ~ 6,5-7 kg CO_2 eq./kg ~ 9,5 kg CO_2 eq./dm^3

* Per informazioni più complete contattare info@lati.com

Valutazione della fattibilità

Input 3D Model



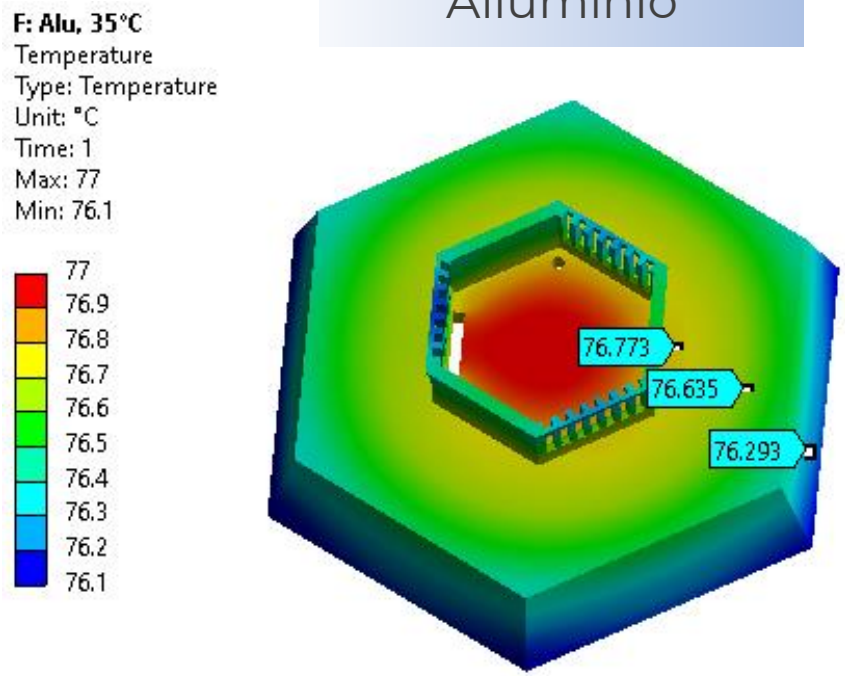


Condizioni al contorno:

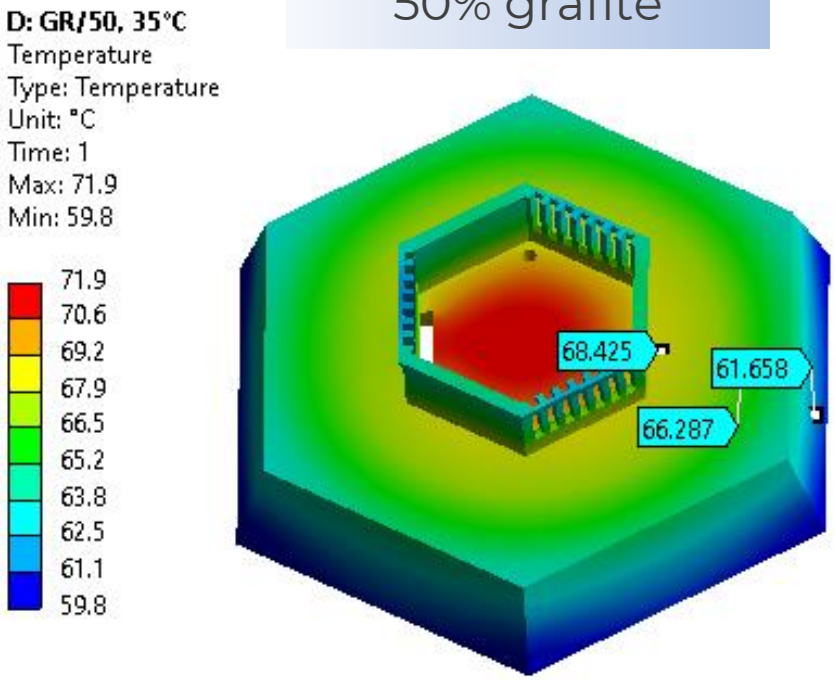
- Convezione naturale, temperatura ambiente max. 35°C
- Flusso termico: LED PCB 9W, driver 2W
- Scambio termico attraverso le superfici esterne
- Max. temperatura di sicurezza: 65°C

Valutazione della fattibilità #1

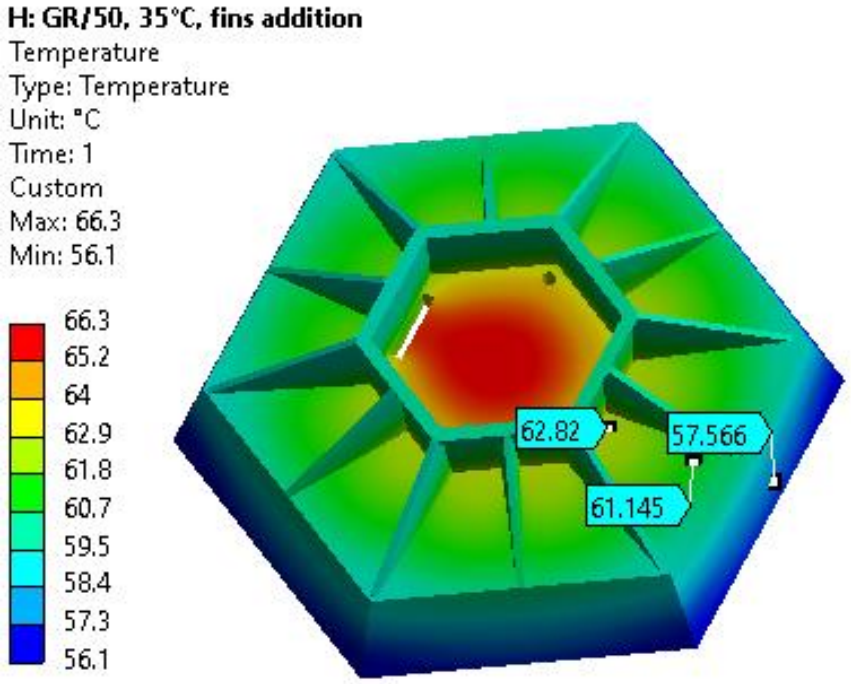
Alluminio



50% grafite

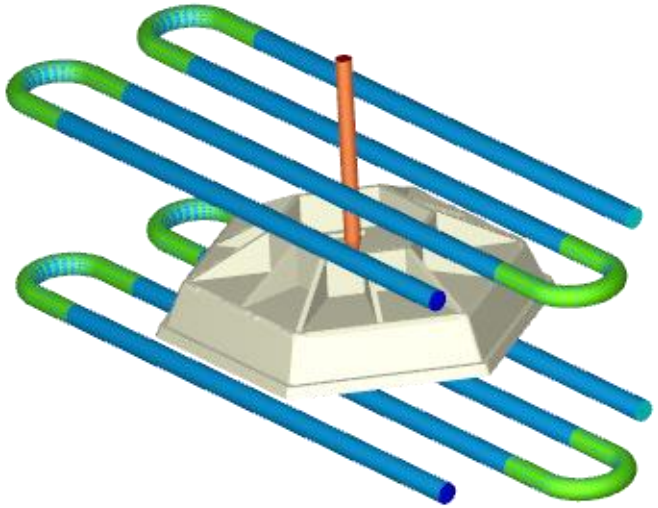


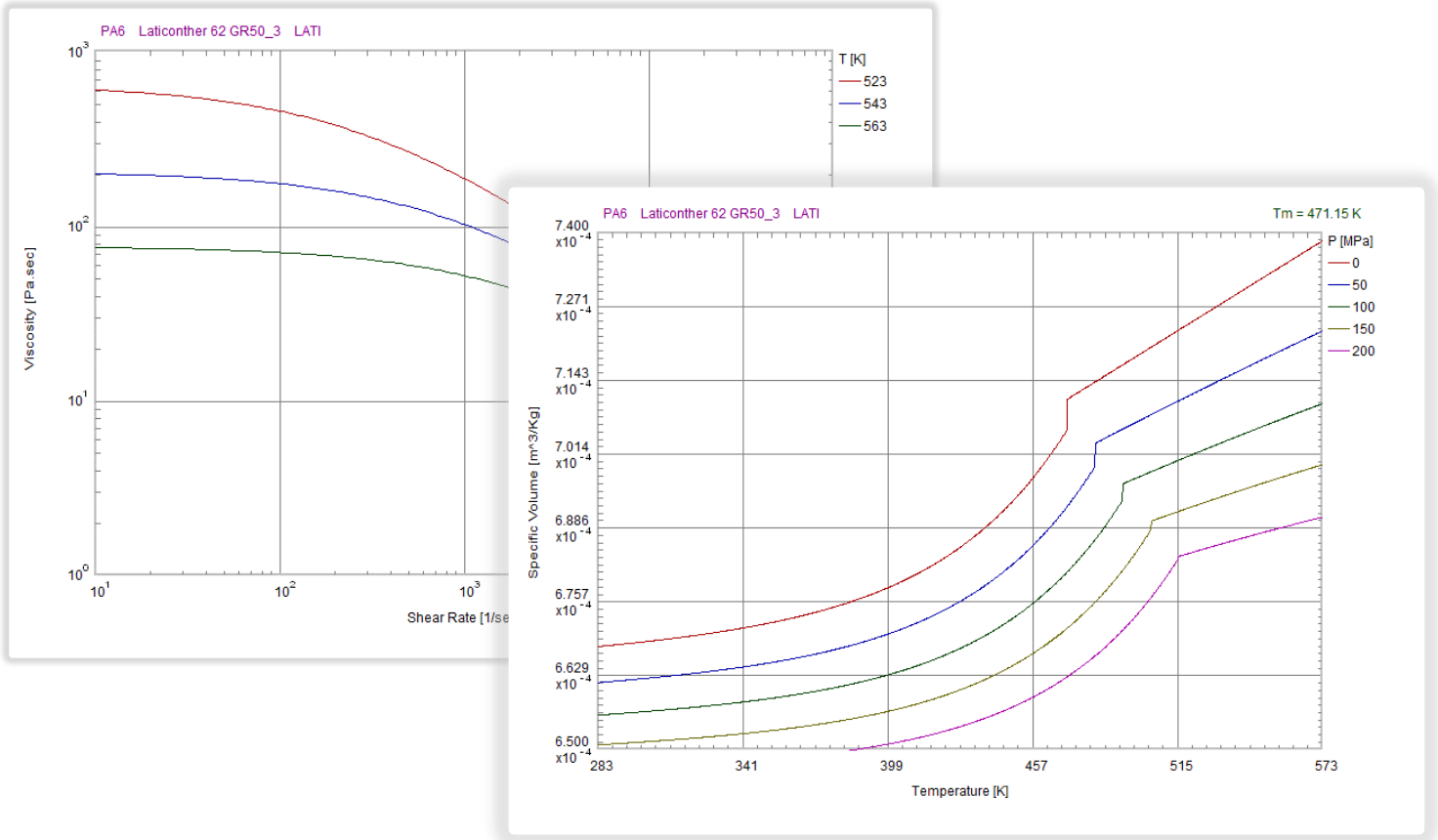
Valutazione della fattibilità #2



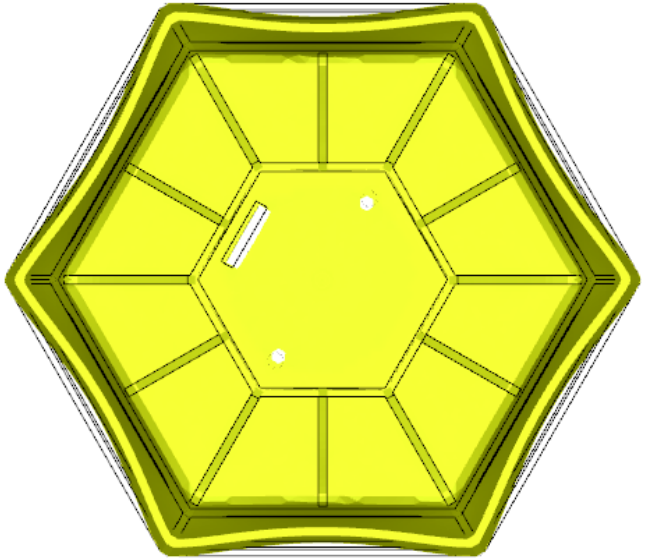
- Si aggiungono le alette per migliorare la performance termica
- La temperatura sotto il driver si abbassa di circa 10°C
- La geometria definitiva è pronta per la simulazione con Moldex3D

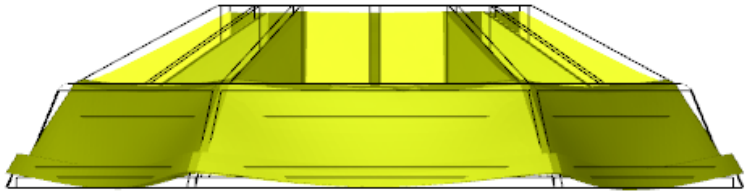
Simulazione di riempimento

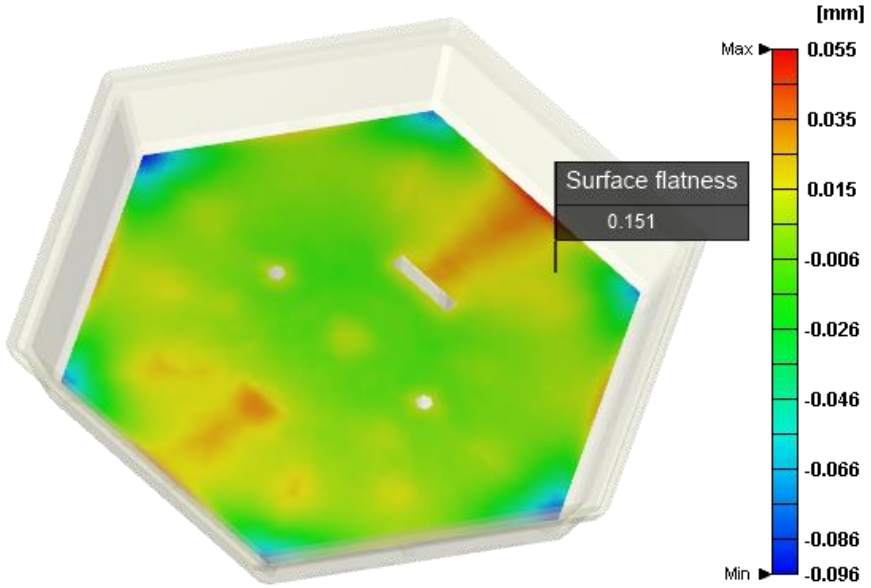




Studio delle deformazioni



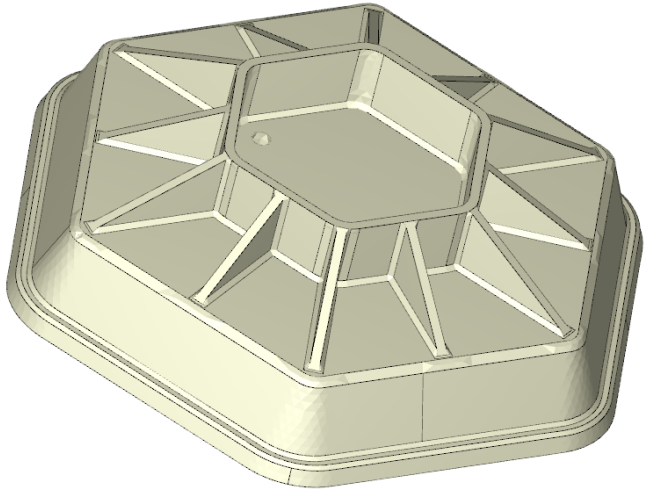




Problemi principali:

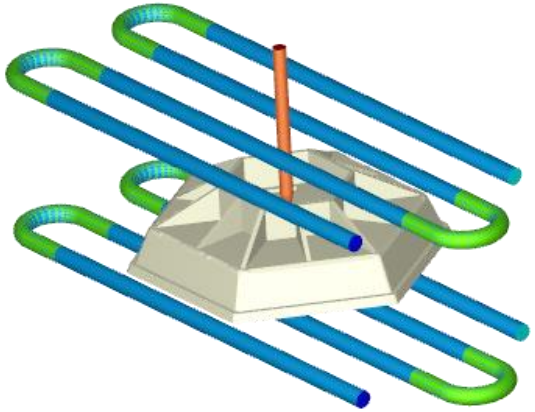
- Deformazione degli spigoli (contatto con la lente)
- Planarità da ottimizzare per migliorare la distribuzione di calore

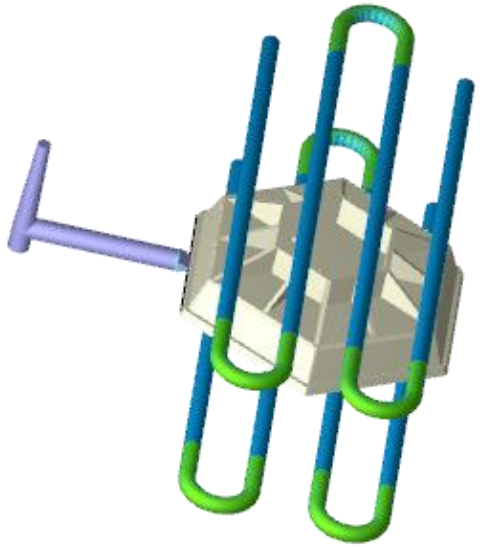
Ottimizzazione

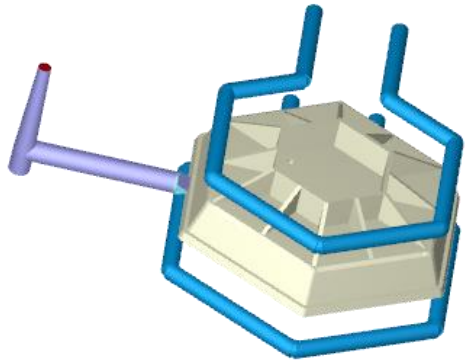


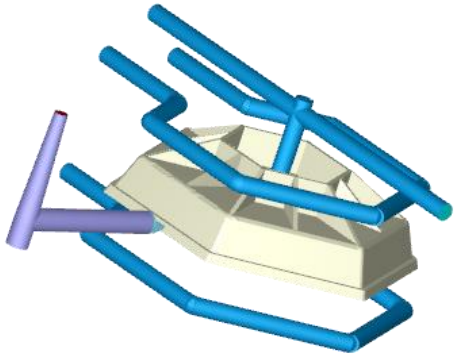
Lavorando su:

- Sistema di raffreddamento: estrazione efficiente del calore
- Sistema di alimentazione: iniezione laterale o centrale
- Geometria per migliorare la stabilità dimensionale

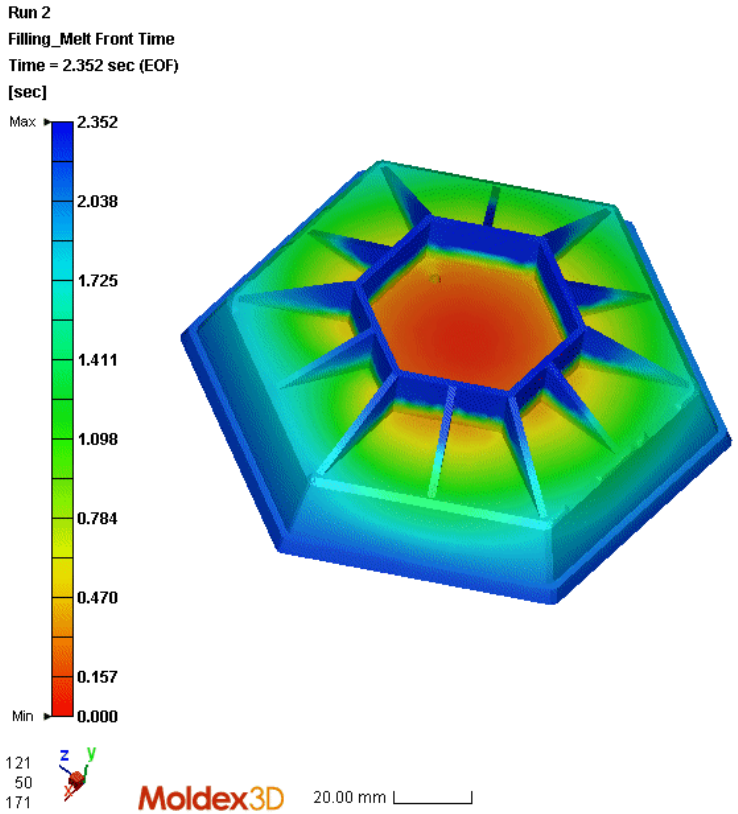


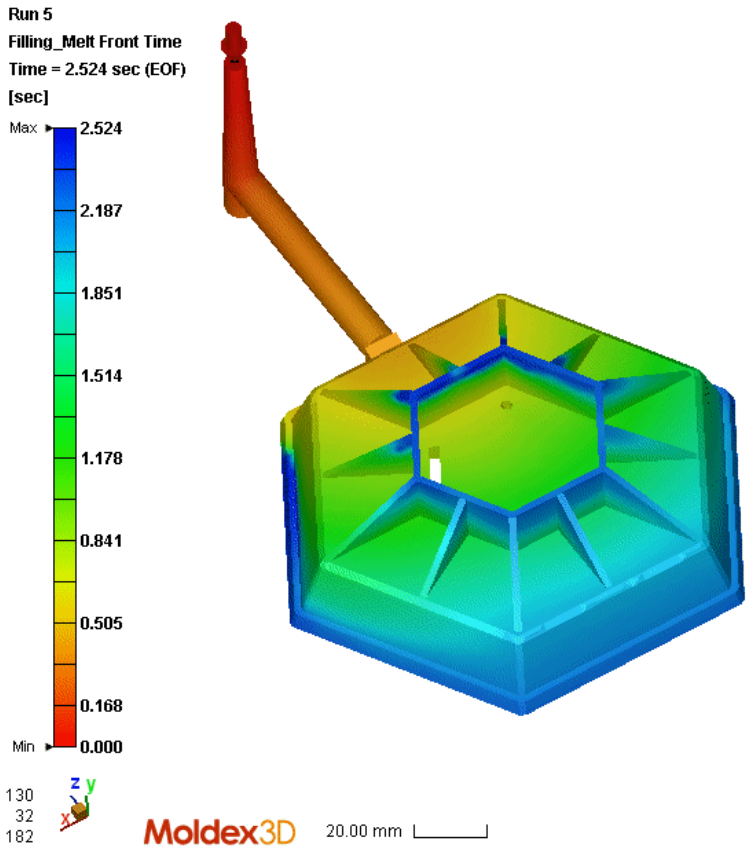




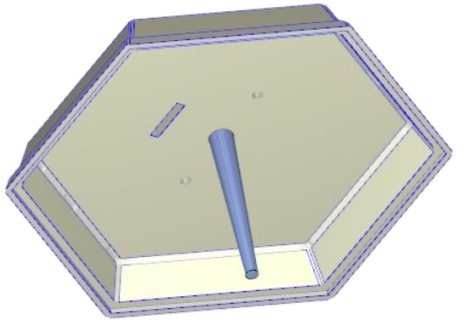


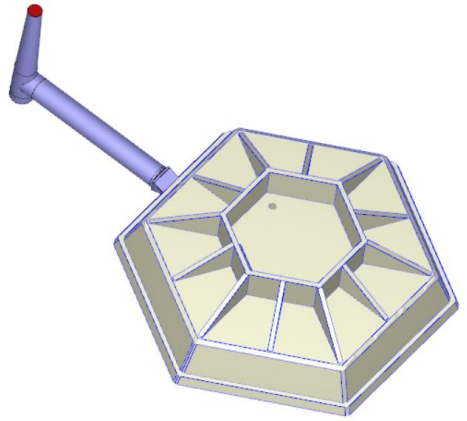
Configurazioni a confronto

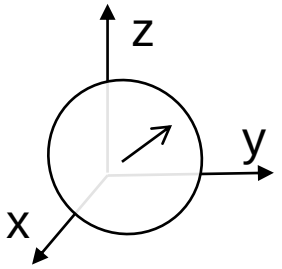


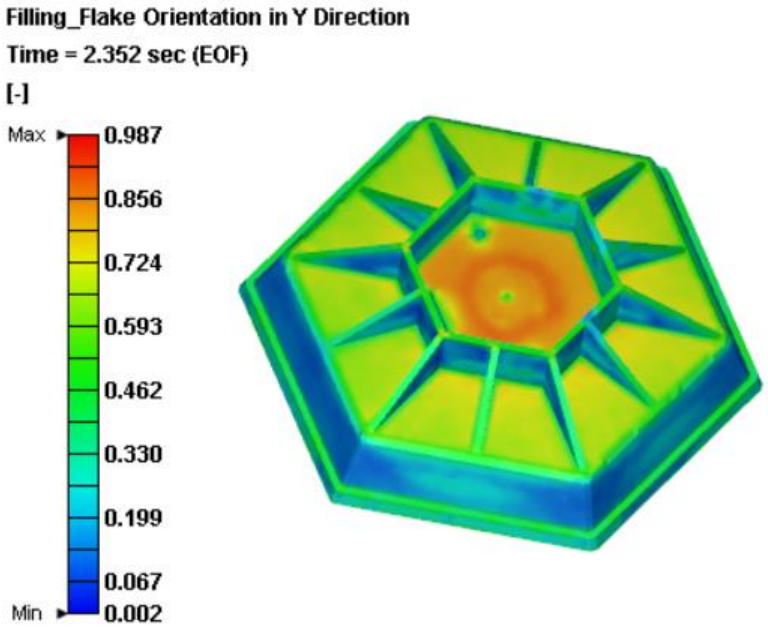


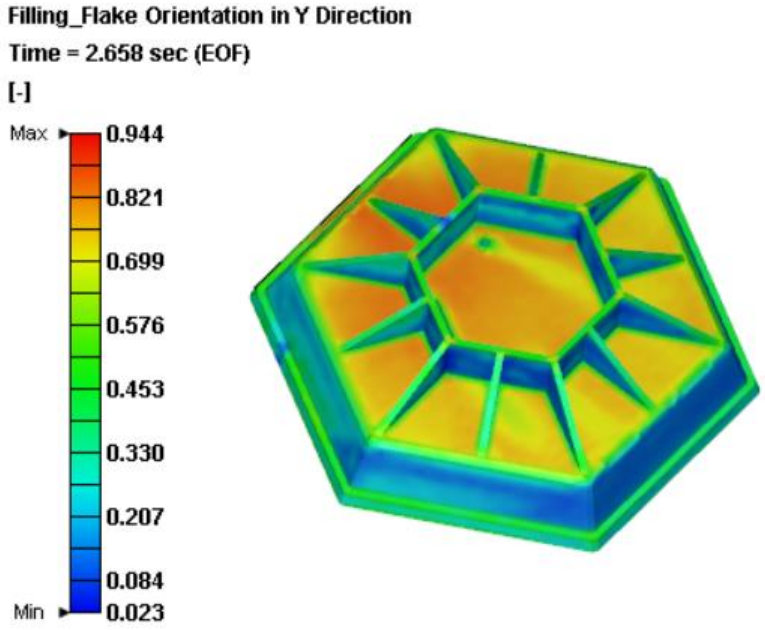
Orientamento dei flakes di grafite



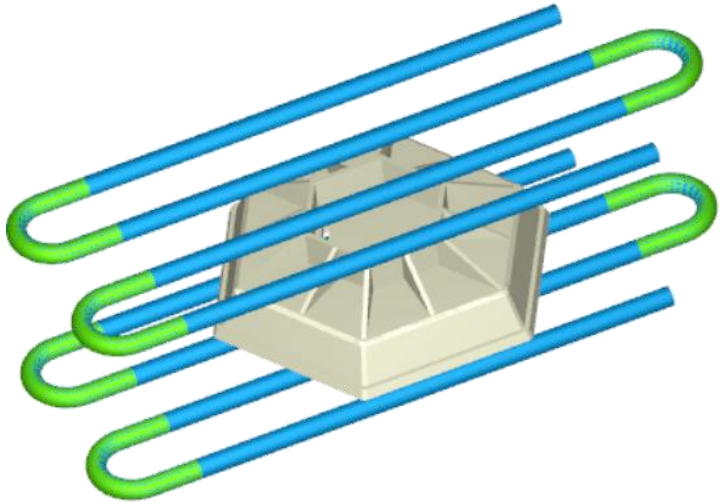


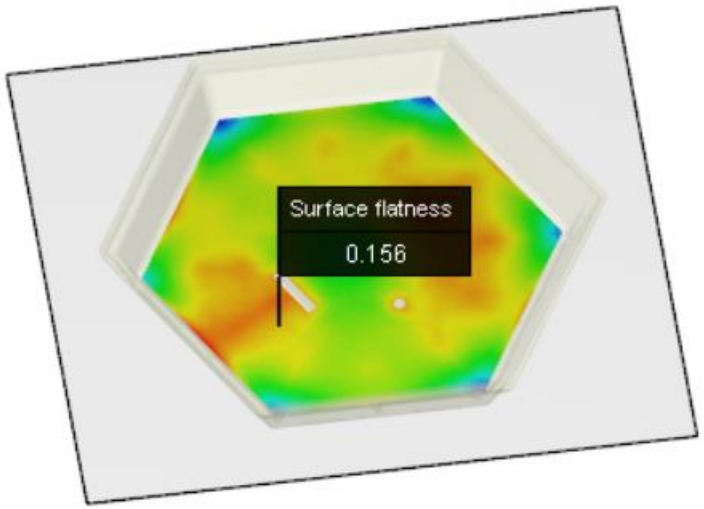


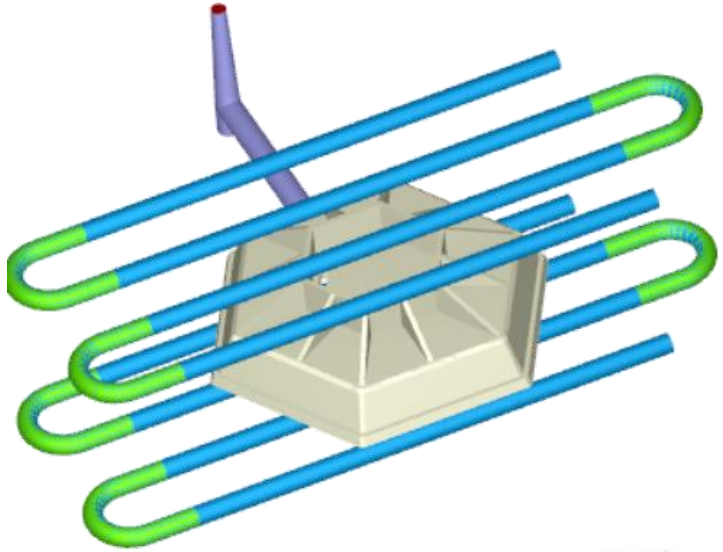


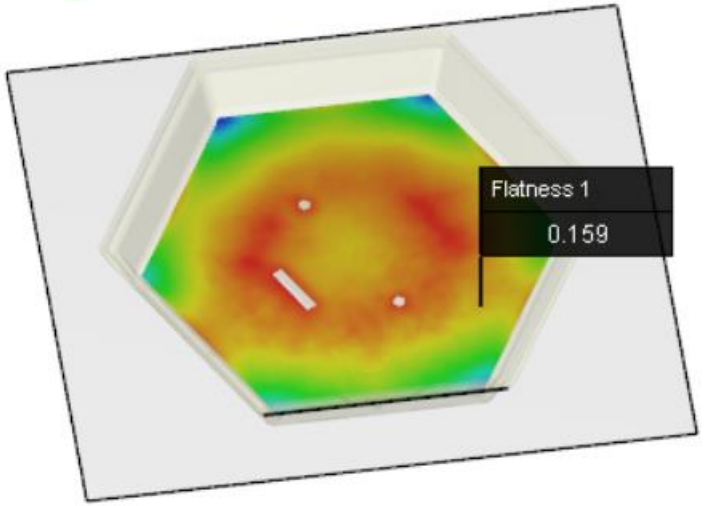


Planarità della superficie di contatto

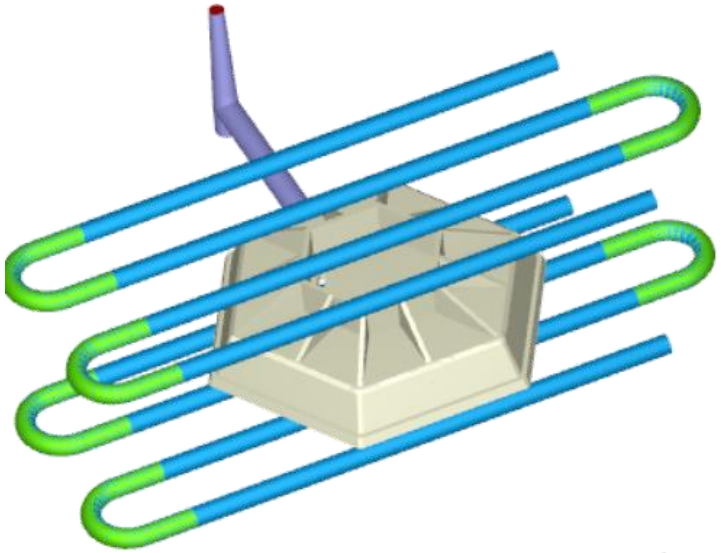


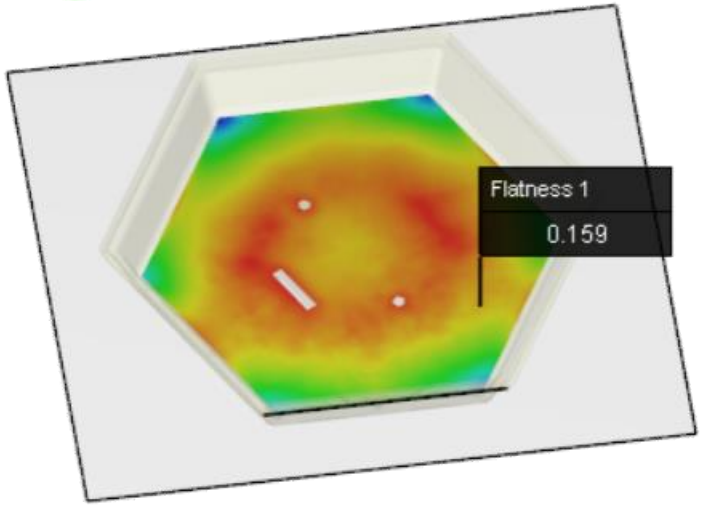


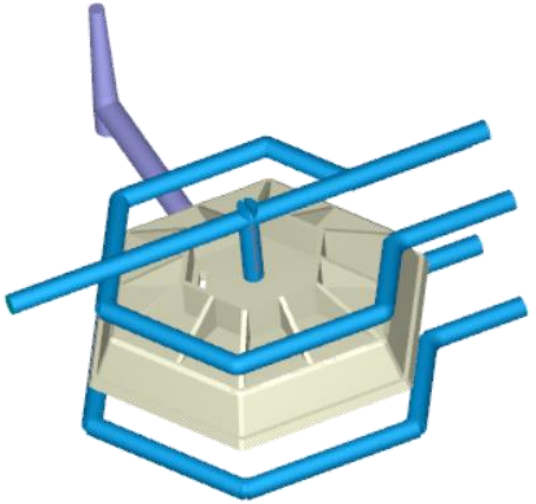


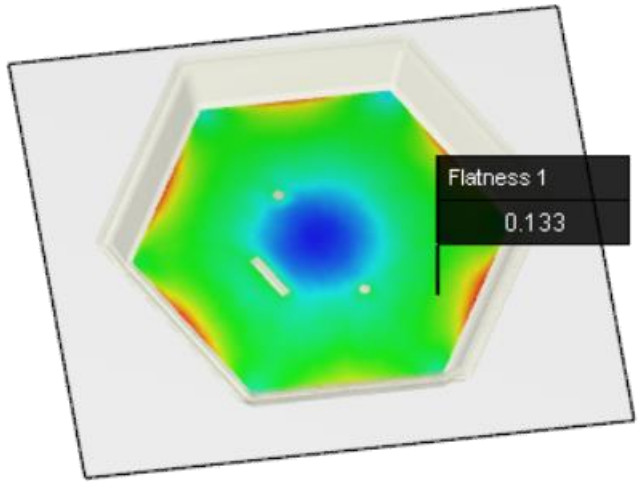


Planarità della superficie di contatto

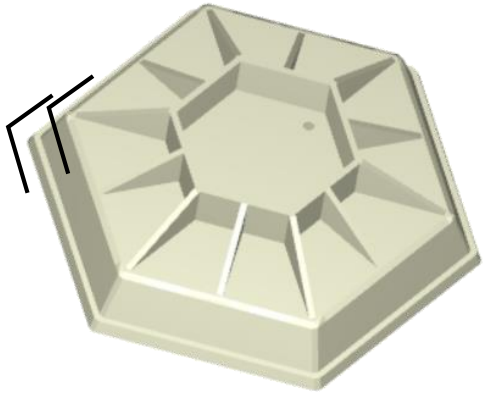


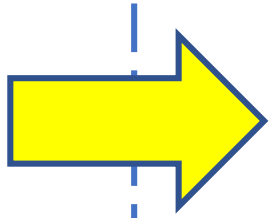


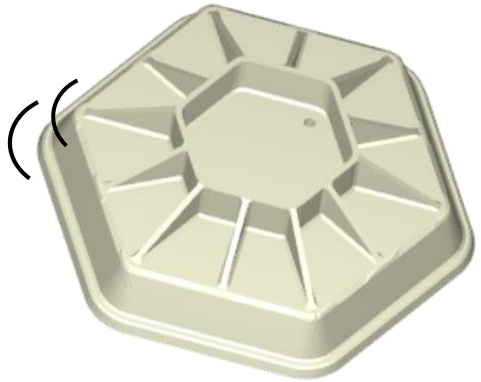


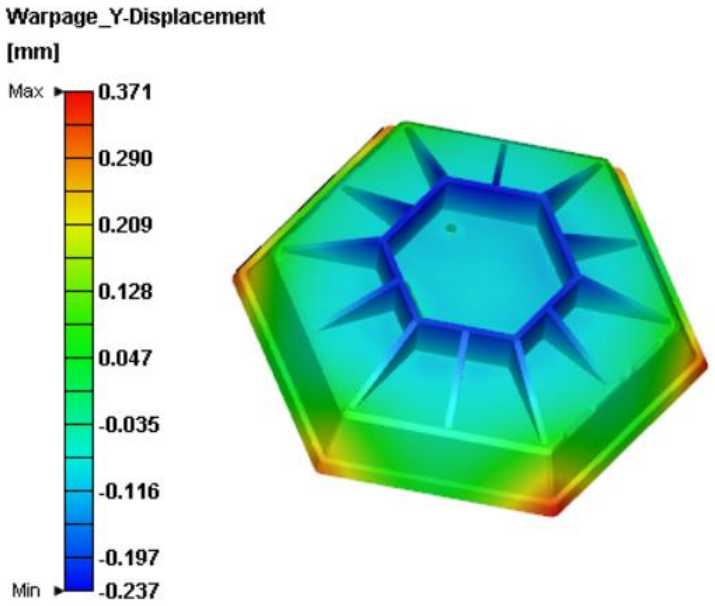


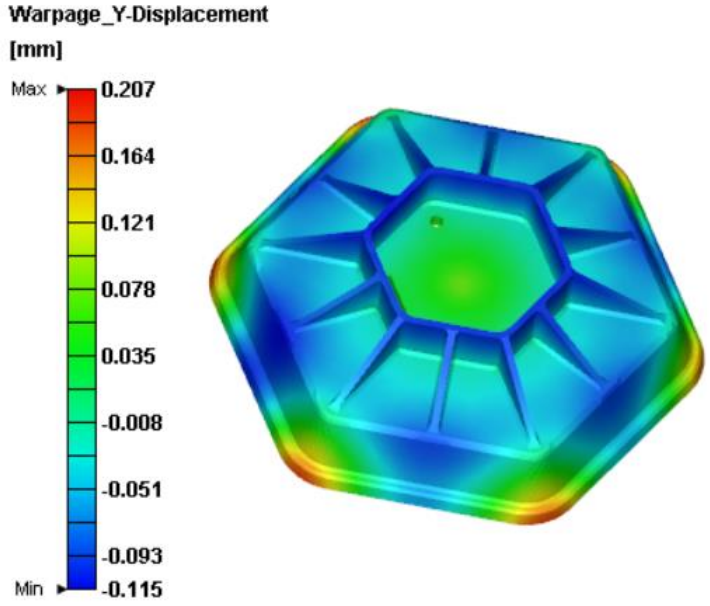
Spostamento sugli spigoli







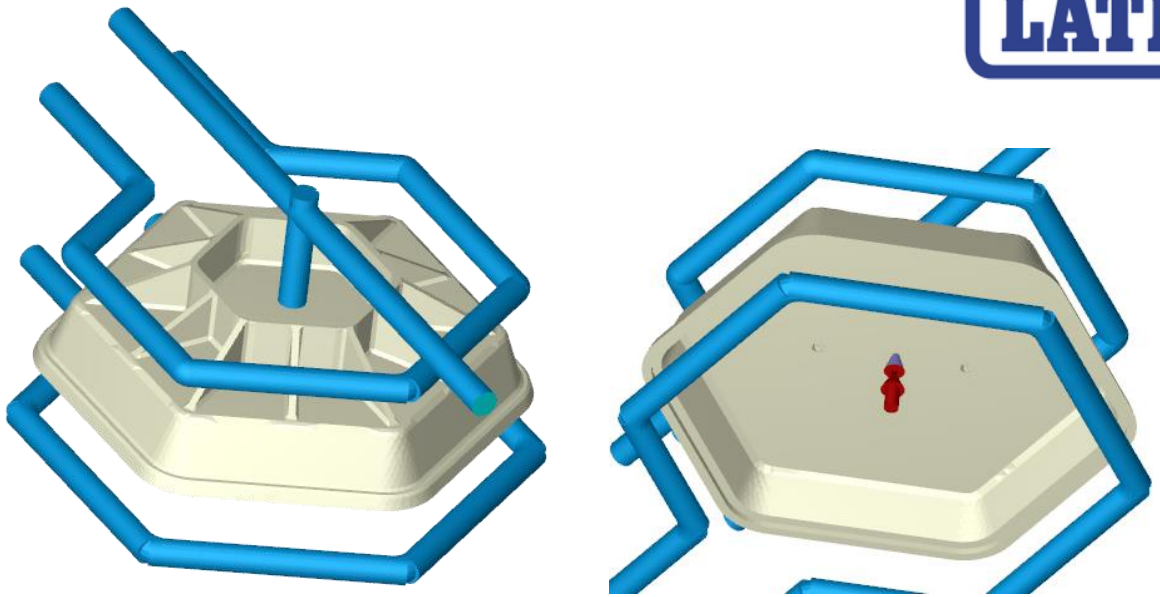


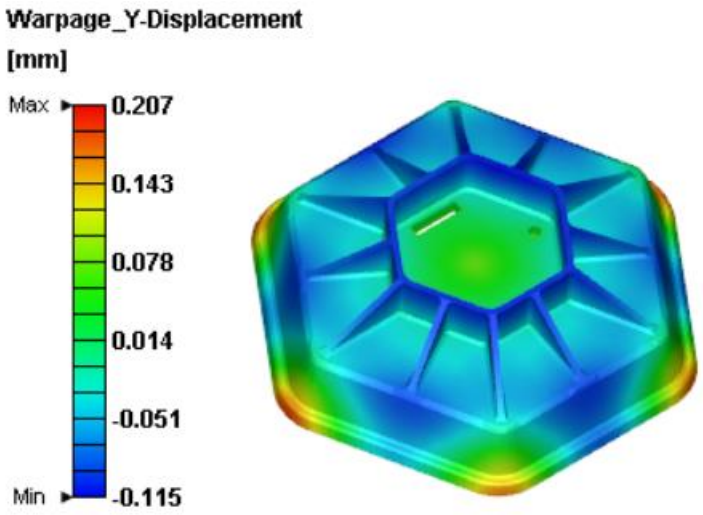


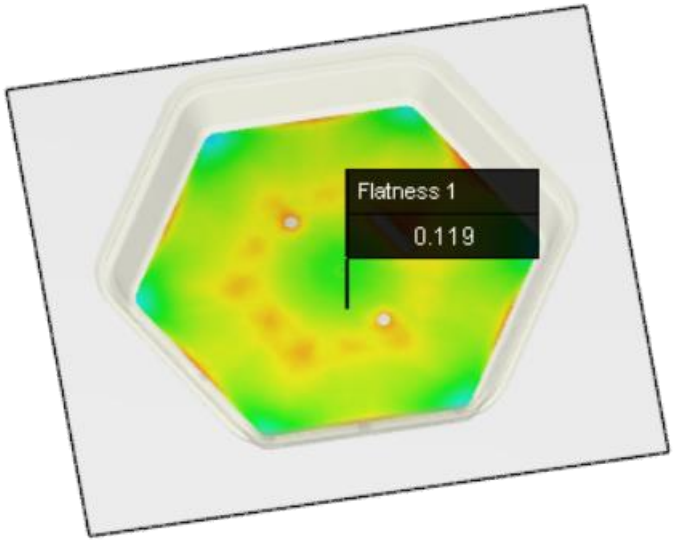
Configurazione finale

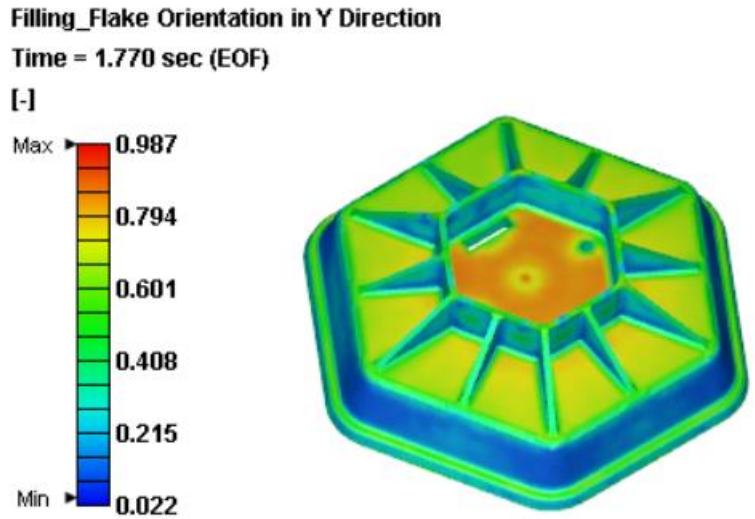
- Geometria modificata
- Sistema di raffreddamento specifico

  + fontanella
- Alimentazione centrale, lato LED

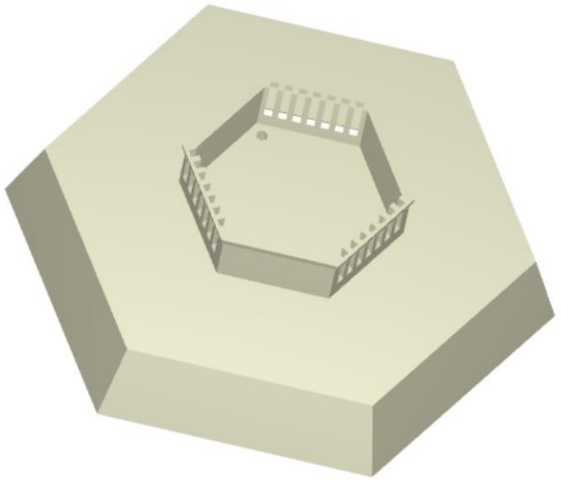




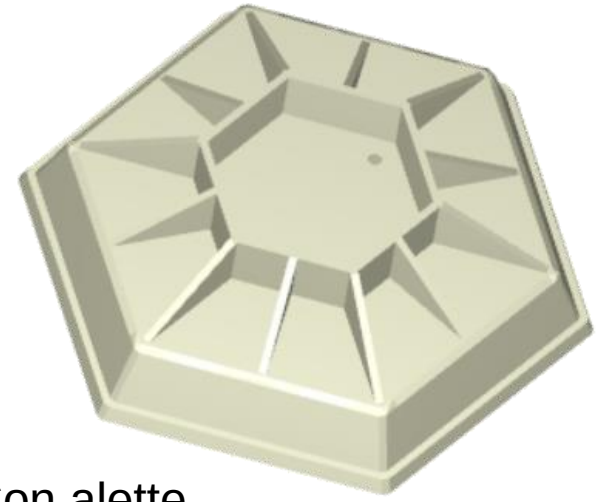




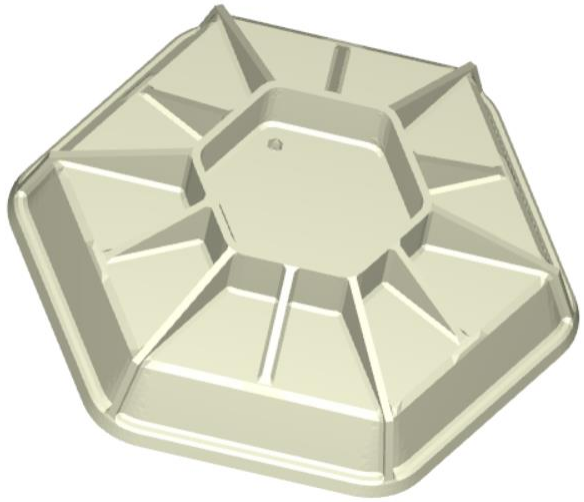
Evoluzione della geometria



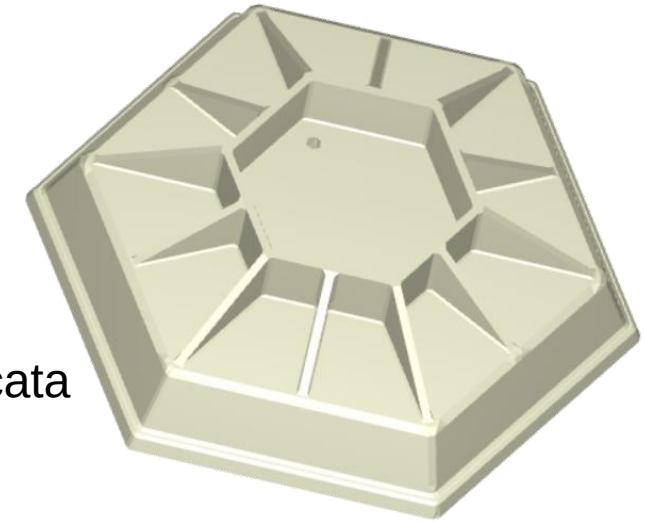
Design originale



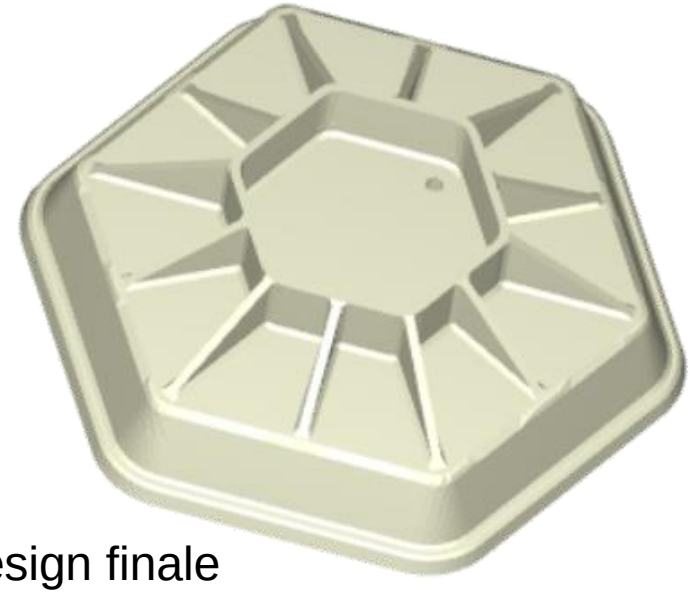
Con alette



Con nervature

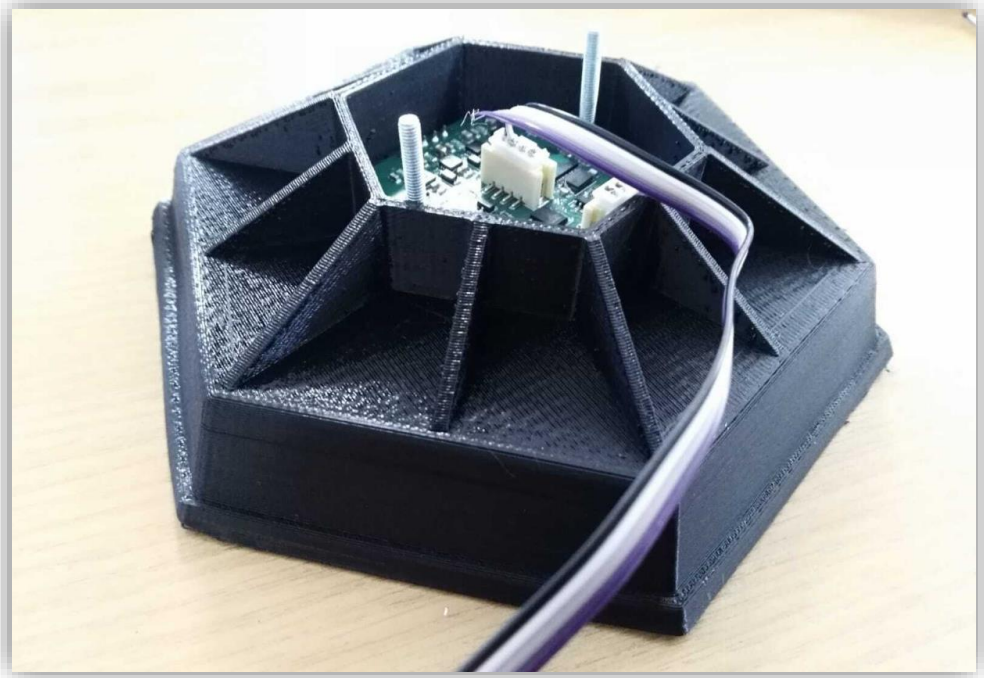


Base scaricata



Design finale

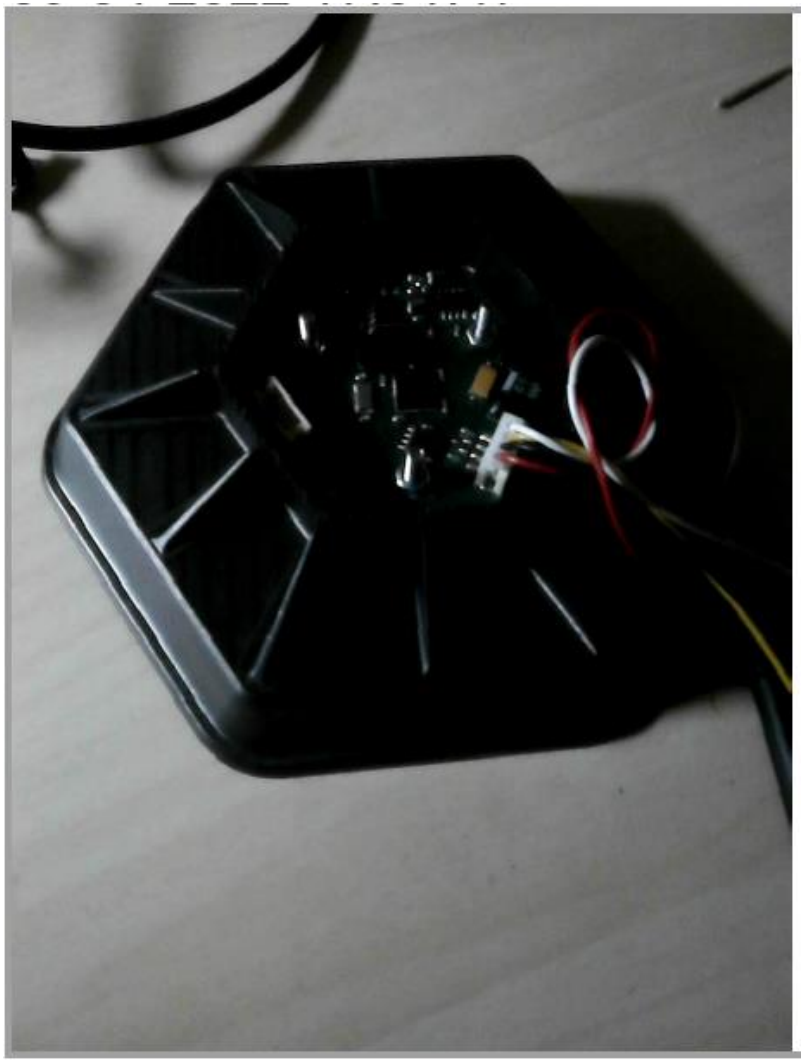
Prototipazione



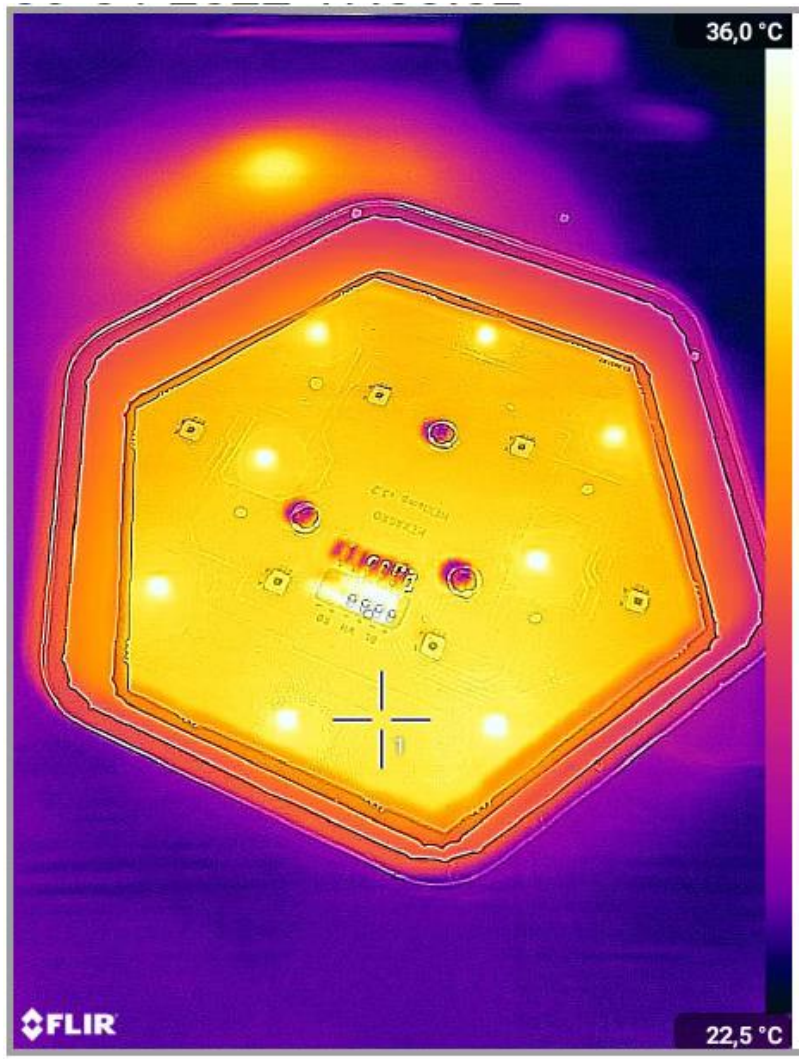
Stampato in 3D per verificare l‘assemblaggio

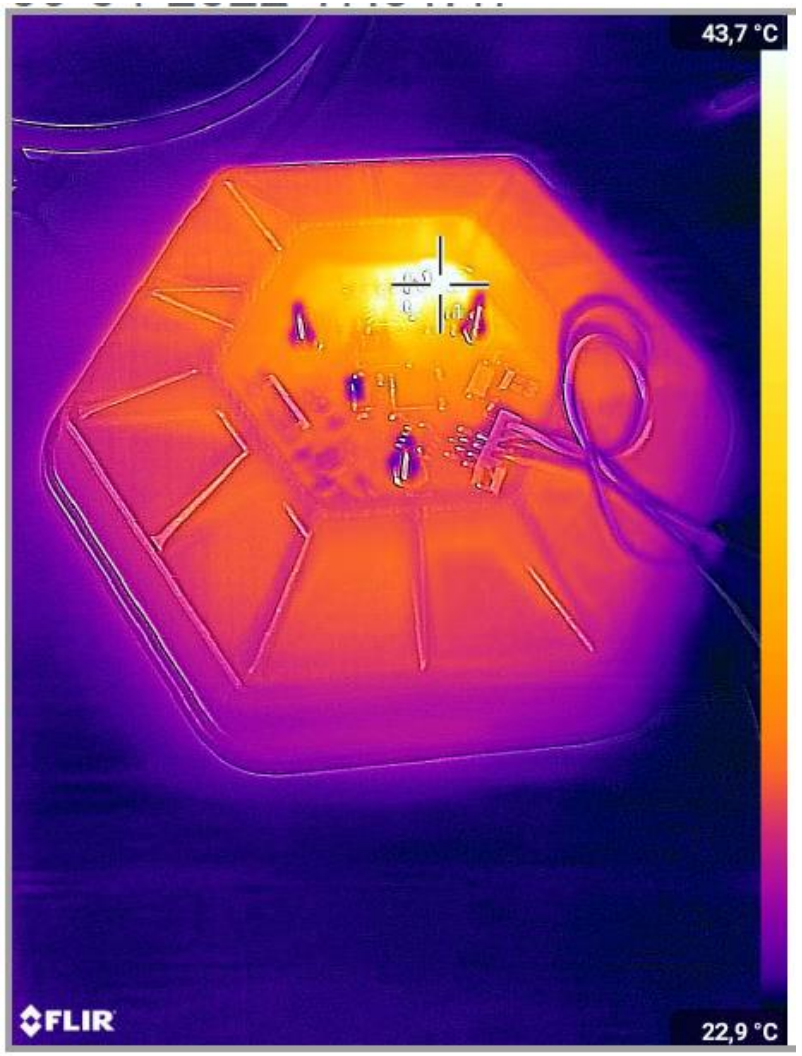
Prototipo ottenuto per lavorazione meccanica da pieno con la geometria definitiva per verificare lo scambio termico

Verifica della dissipazione

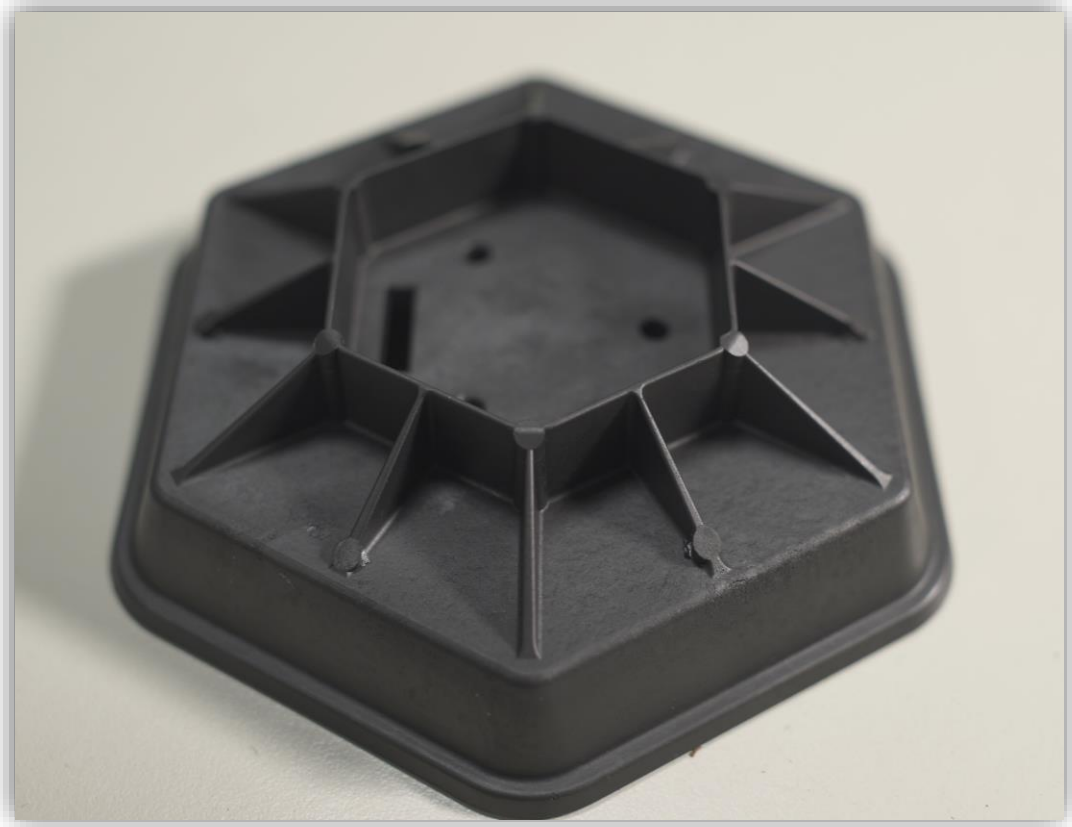


Verifica della dissipazione





Produzione



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