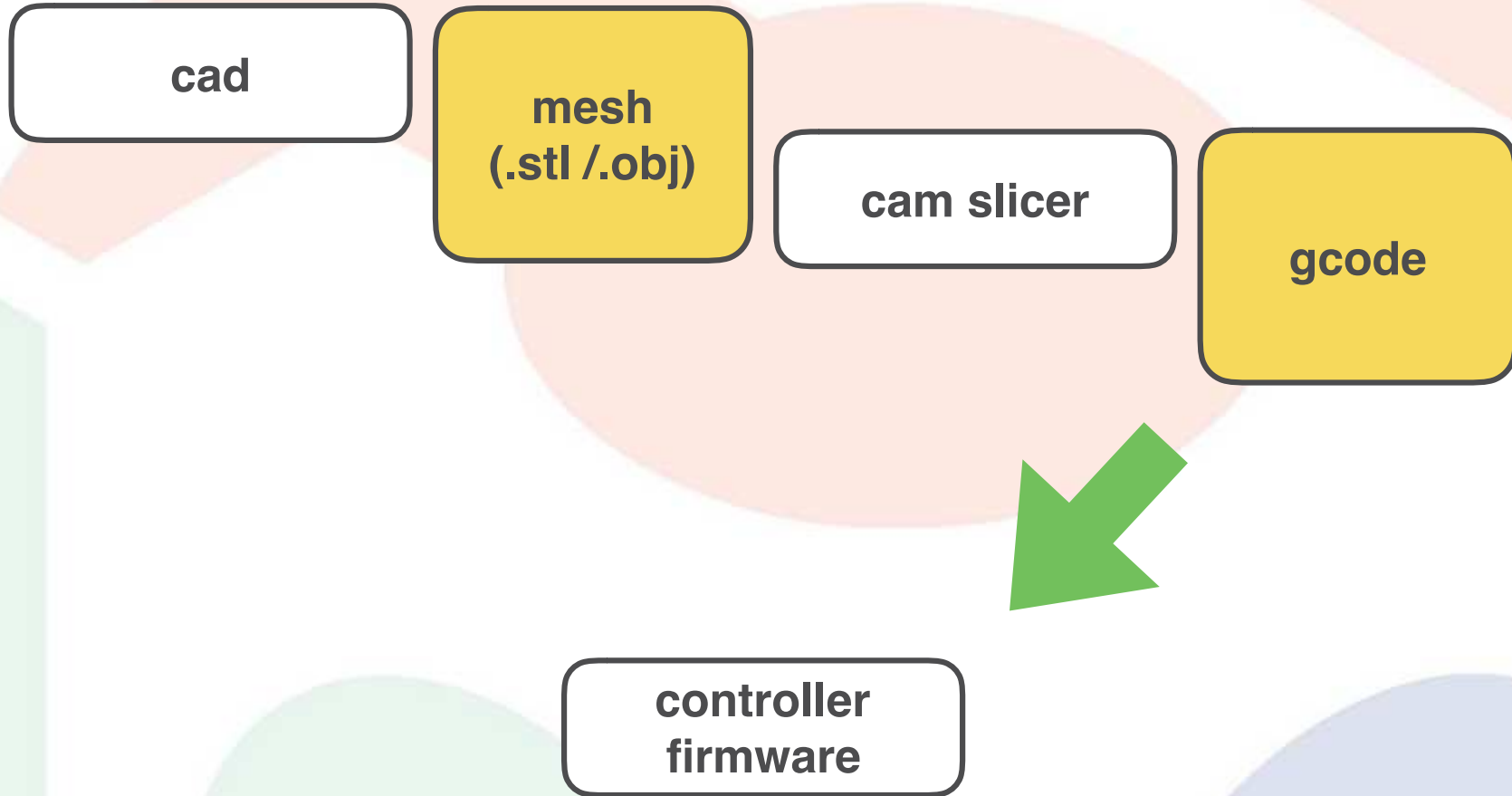


# Stampa 3D

## Tecnologia e Opportunità



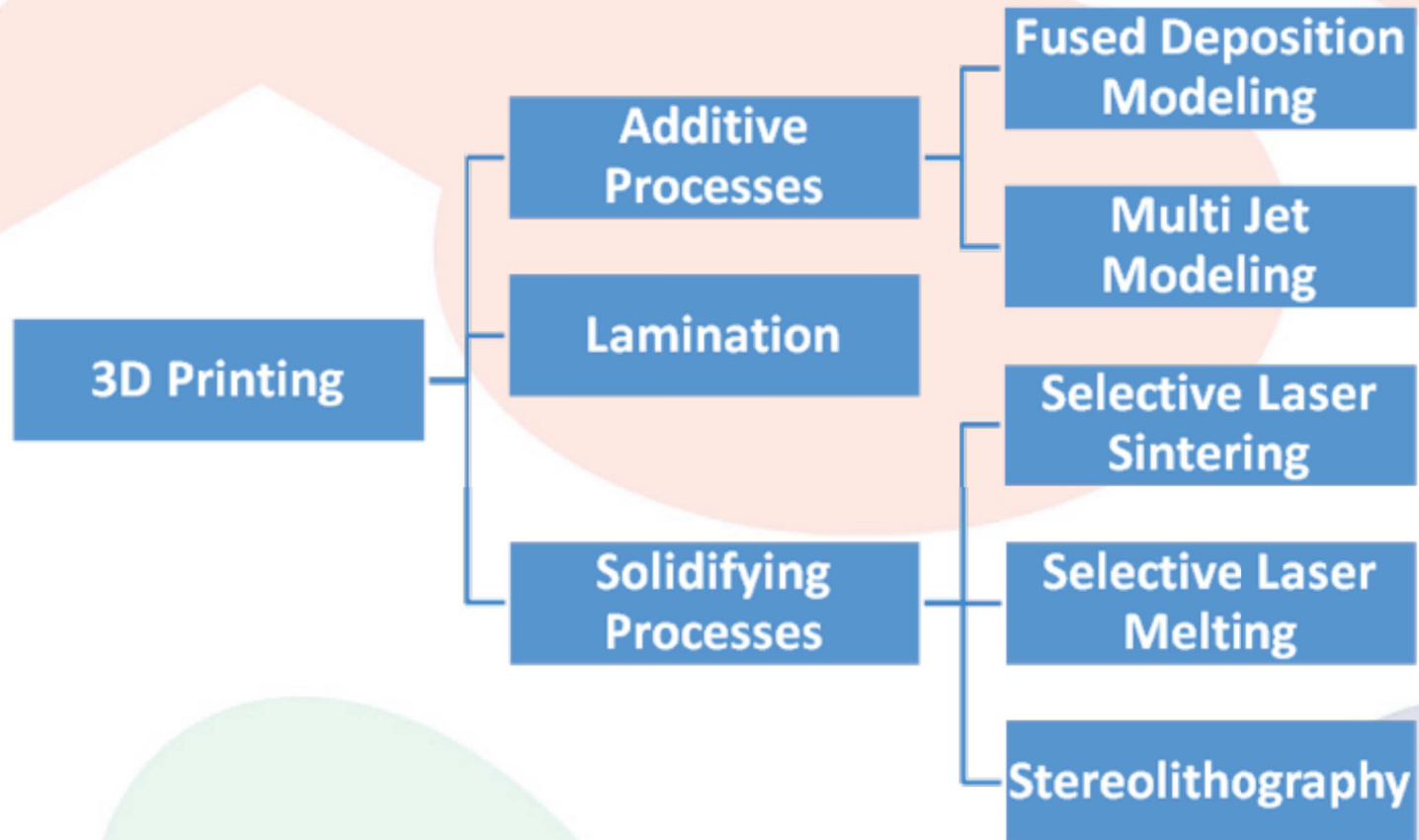
# Il processo realizzativo: dal Cad allo Slicer



# La Storia

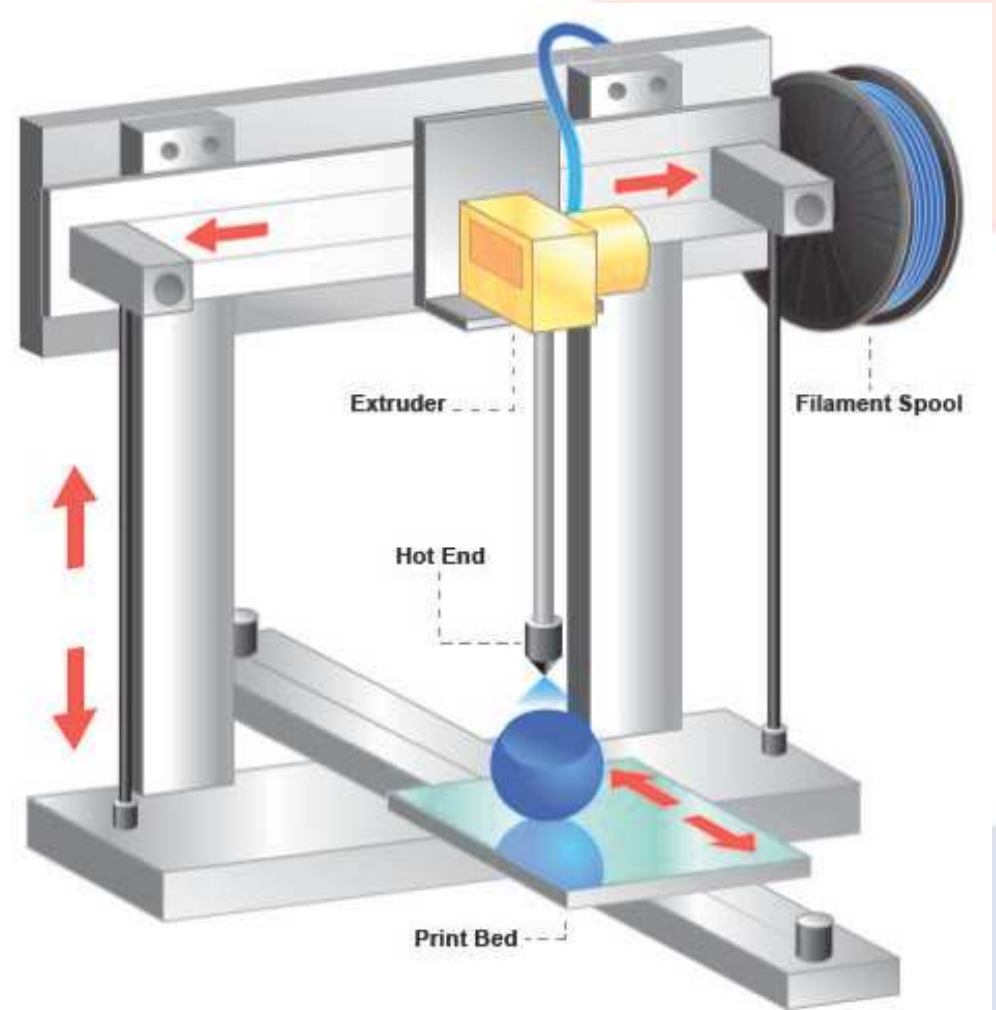
- 1980 dr Kodama layering photopolymer
- 1986 brevetto SLA Charles Hull 3d System  
founded:SLA
- 1988 Carl Deckard brevetto SLS
- 1988 Scott Crump, Stratasys: brevetto FDM
- 2004 Reprap Project
- 2009 Scupteo: online 3d Printing services
- 2012 3d printing protesi biomediche
- 2014 3d printer nello spazio
- 2016 3d printing ossa e tessuti

# Le Tecnologie



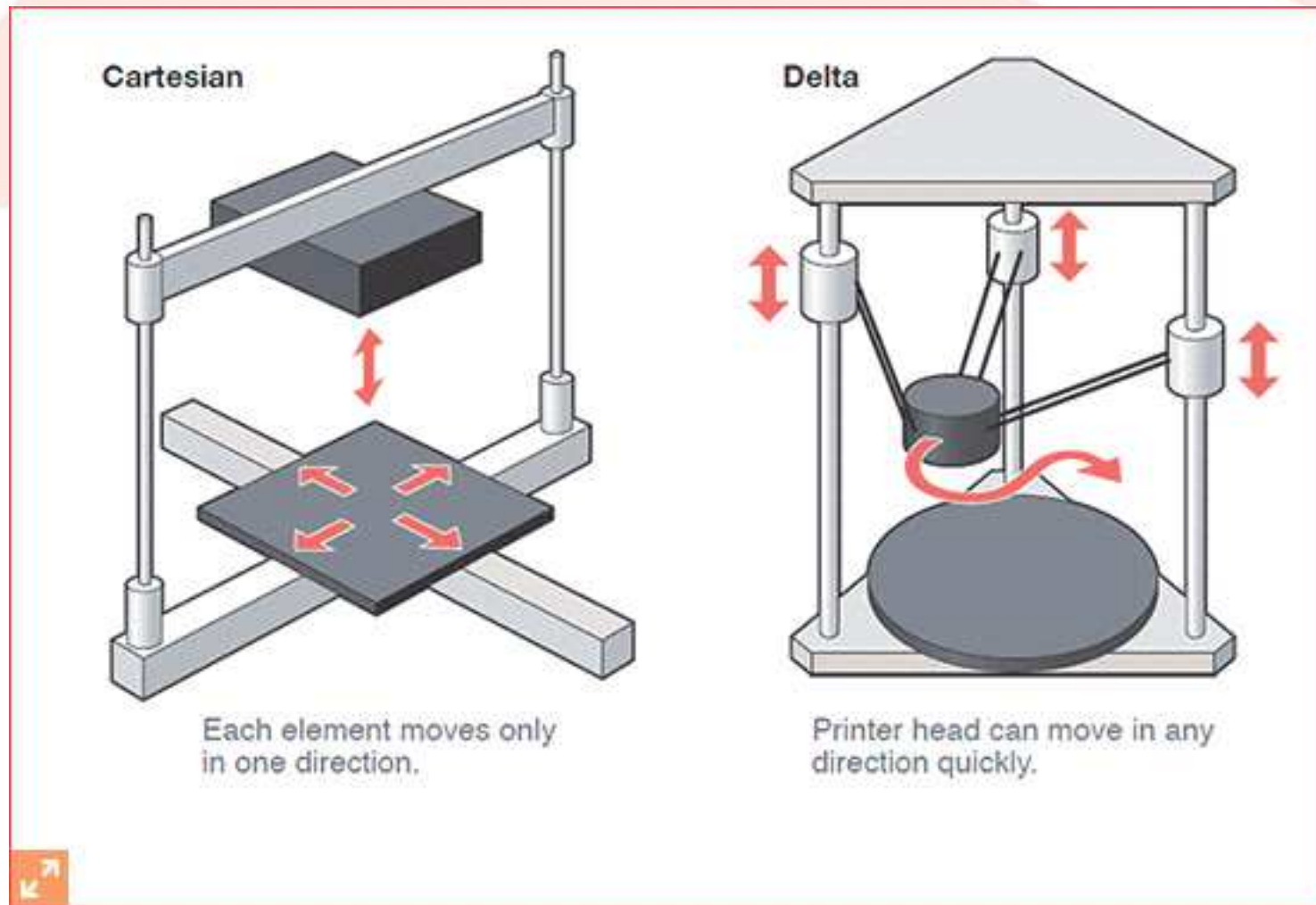
## Le Tecnologie: FDM FFF

Il Fused Deposition Modeling è il sistema più economico e maggiormente utilizzato: un filamento di materiale termoplastico viene fuso tramite una termoresistenza dentro un estrusore e depositato su di un piano eventualmente riscaldato.

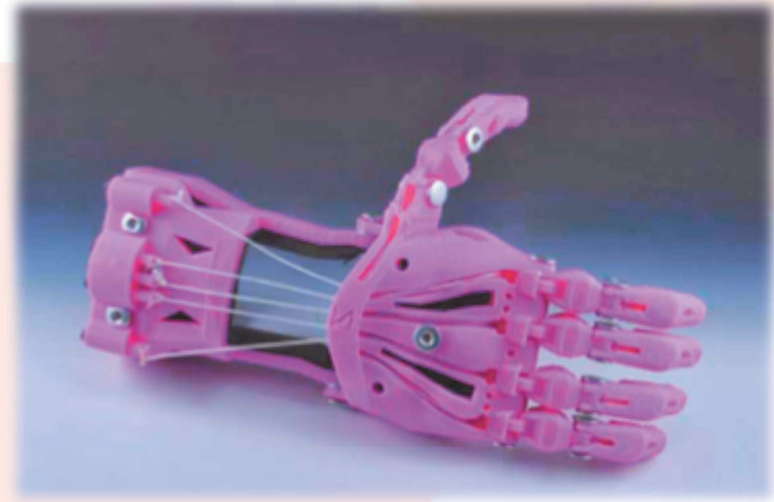


# Meccaniche FDM

## Cartesiane vs Delta

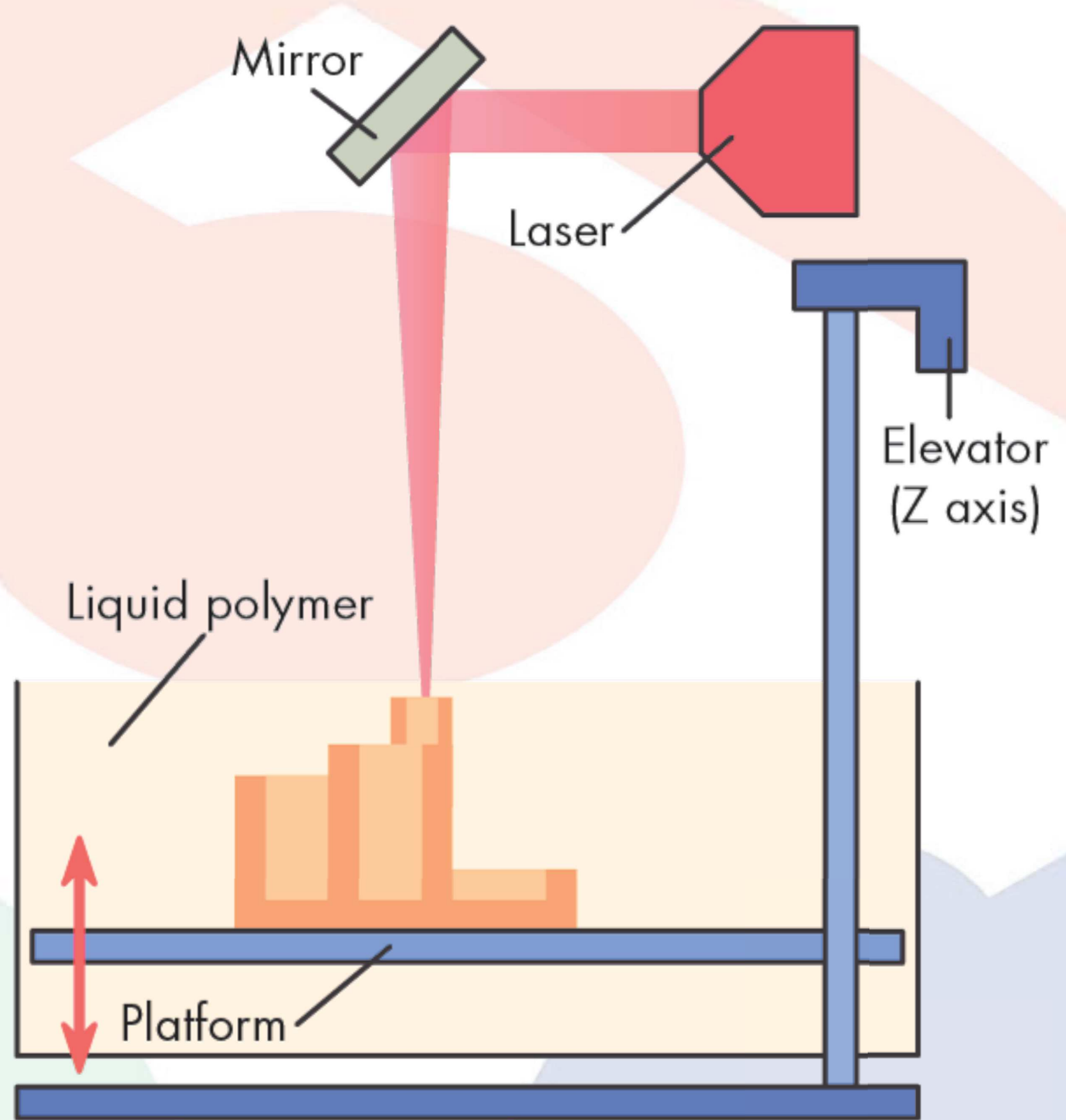


# FDM



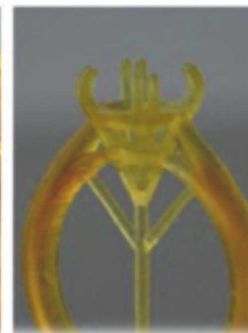
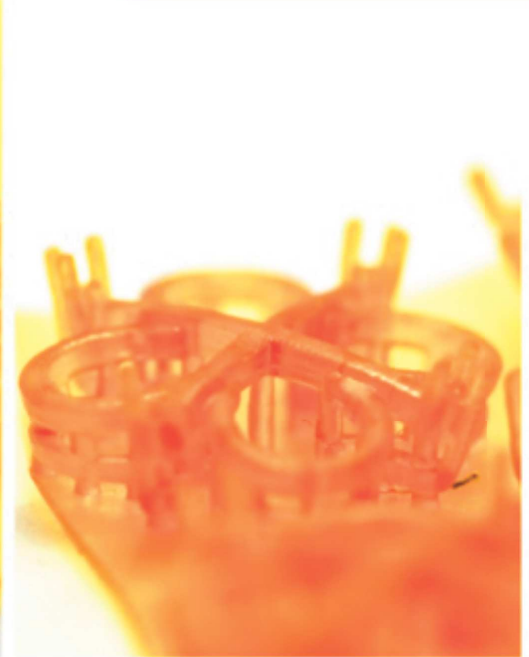
# Le Tecnologie: SLA

SLA o Stereolithography è il processo in cui un fascio di laser UV orientato da specchi polimerizza un layer di fotopolimero o resina.



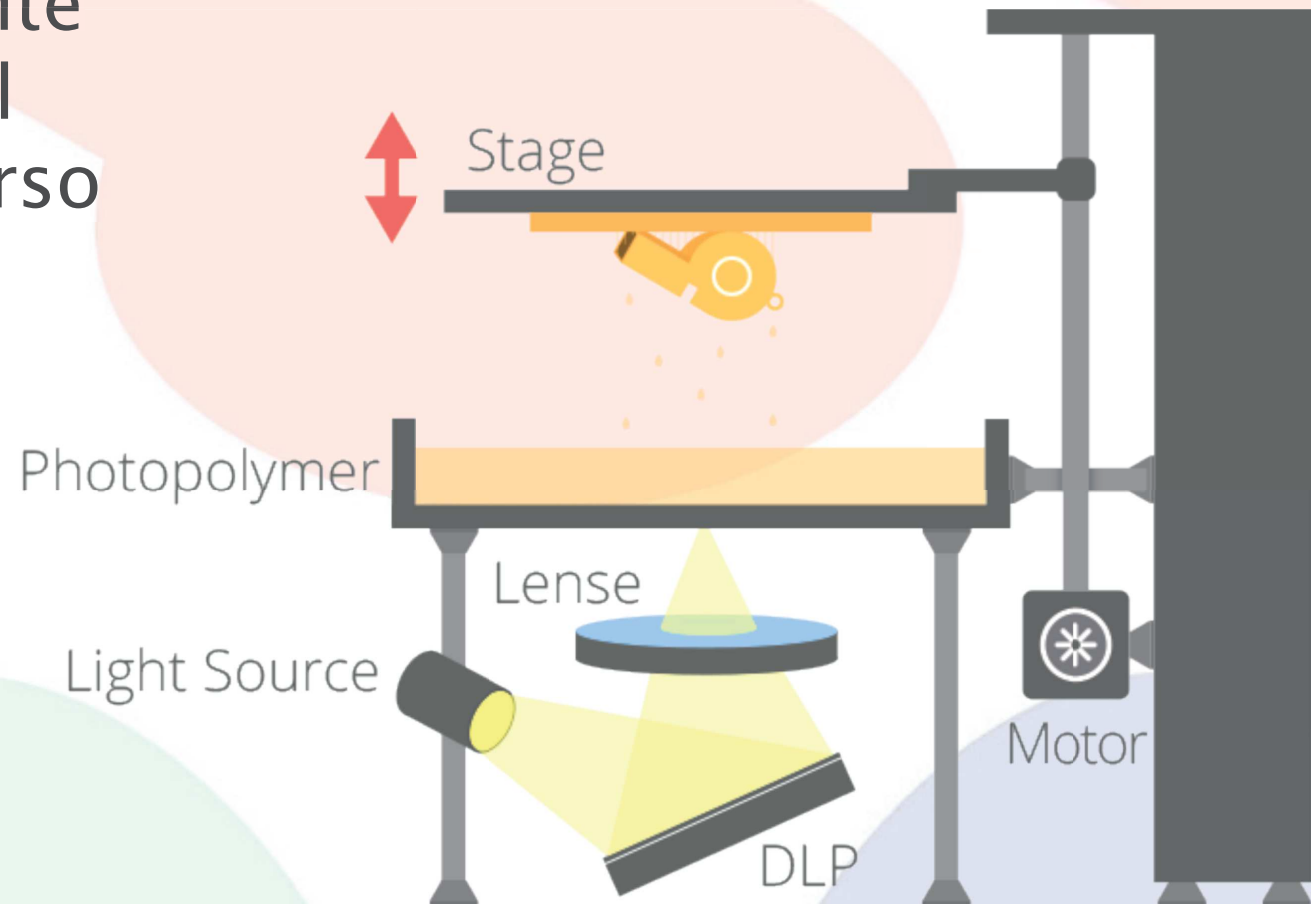


# Le Tecnologie: SLA



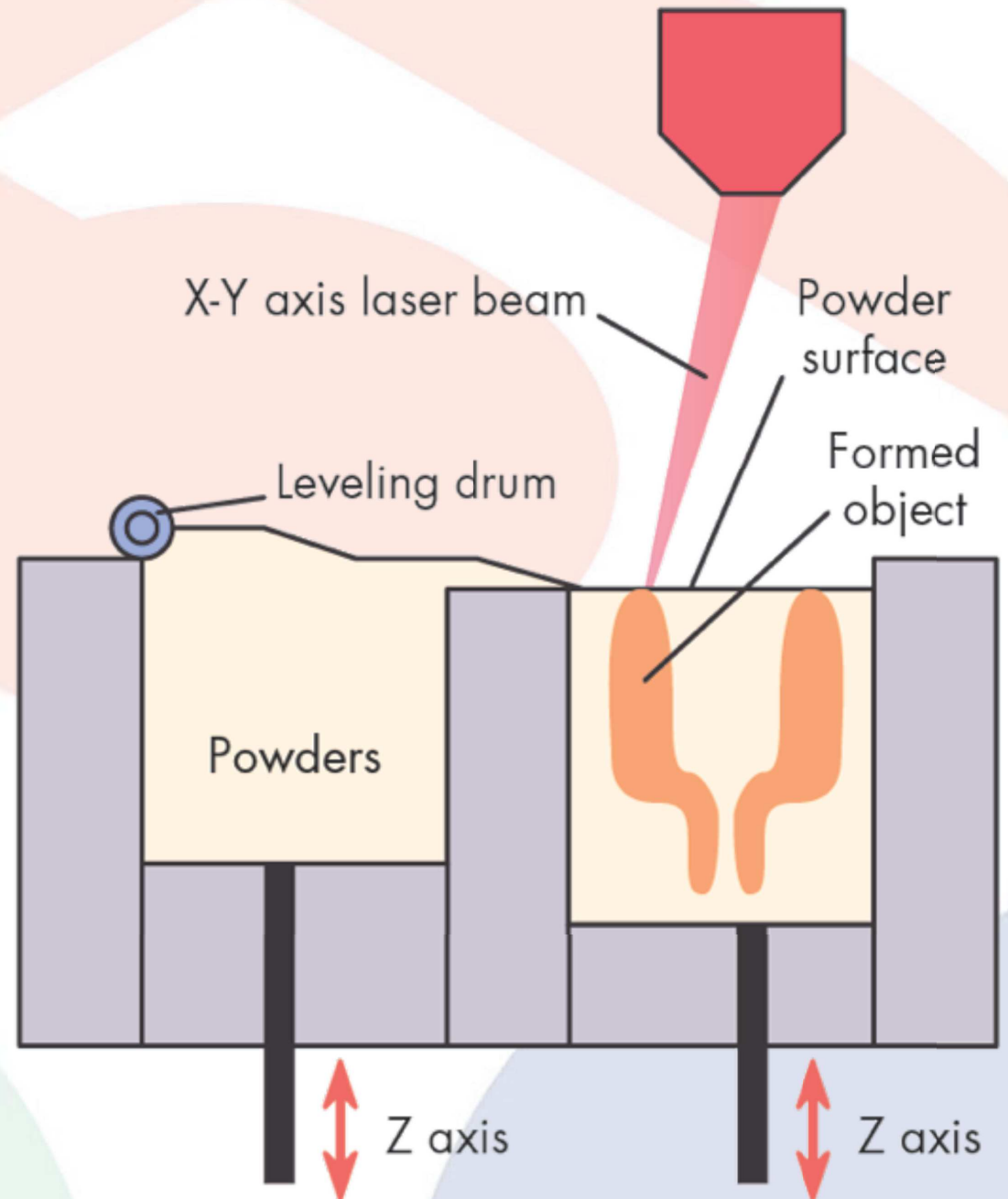
## Le Tecnologie: DLP

DLP è una variante che processa il polimero attraverso esposizione a immagini

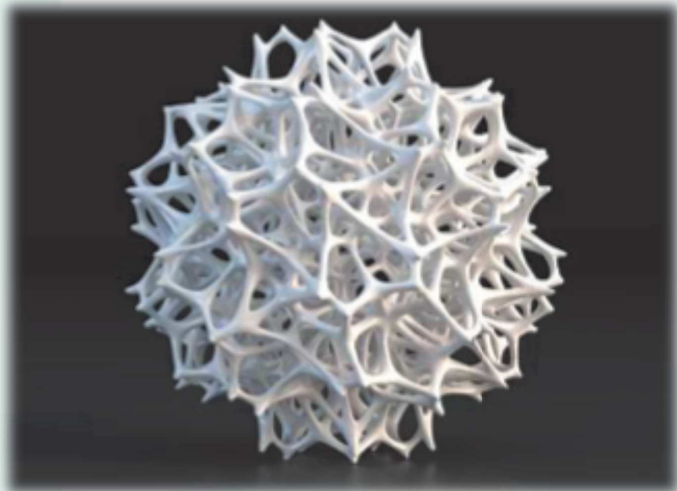


## Le Tecnologie: SLS

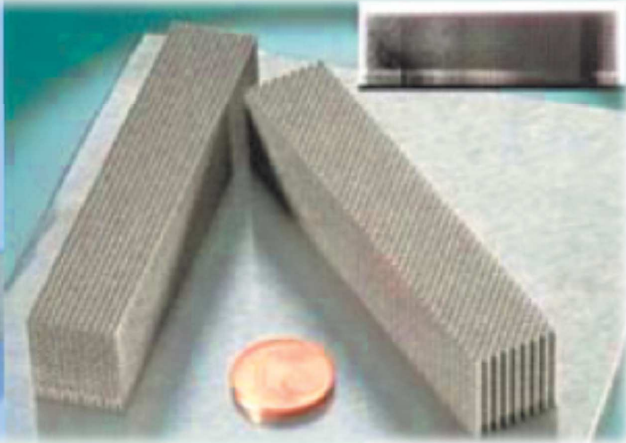
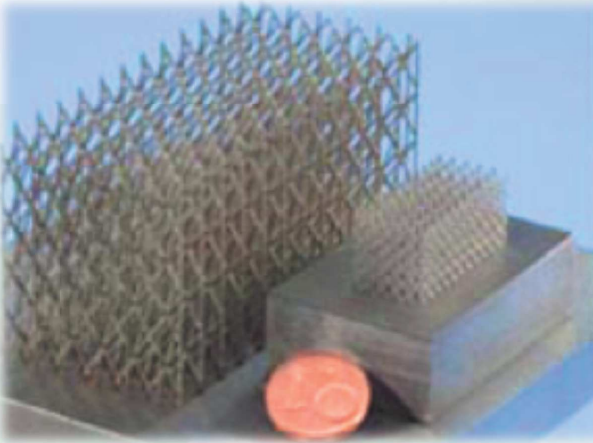
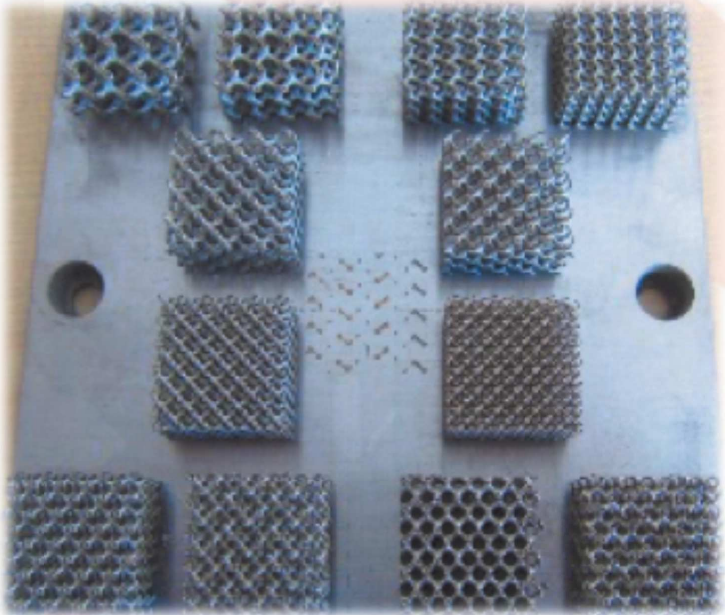
Sintering o SLS è il processo in cui viene steso un layer di polvere polimerica da un Roll ed un laser polimerizza ogni sezione. Vari materiali disponibili – nessun utilizzo di supporti – superfici rugose



# Le Tecnologie: SLS

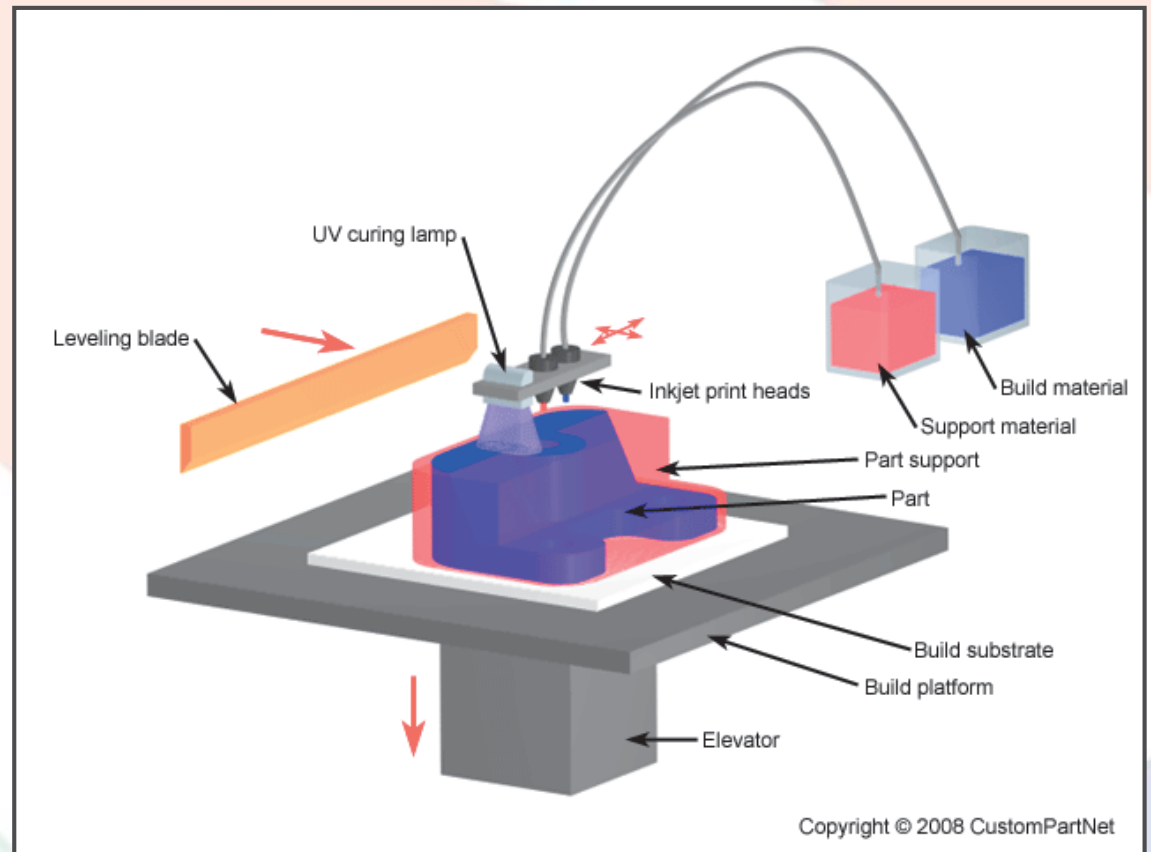


# Le Tecnologie: SLM

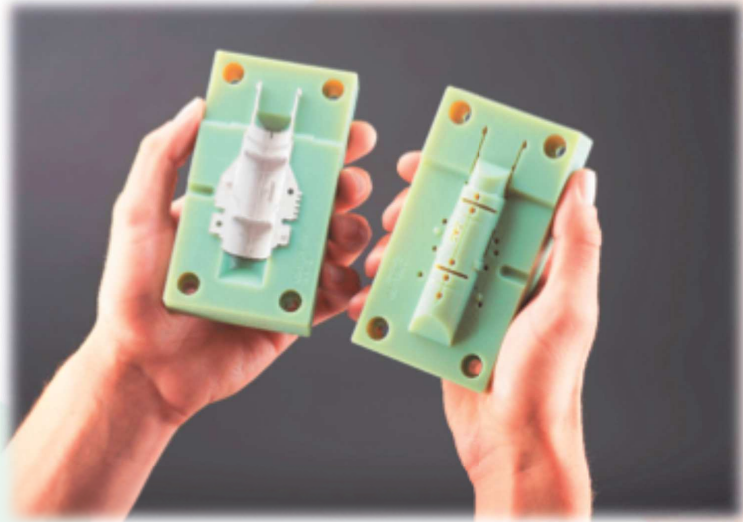


# Le Tecnologie: Inkjet

Material Jetting è un processo in cui un resine semiliquide mescolate a colore vengo polimerizzate tramite luce uv. La resina viene depositata a microstrati tramite centinaia di ugelli



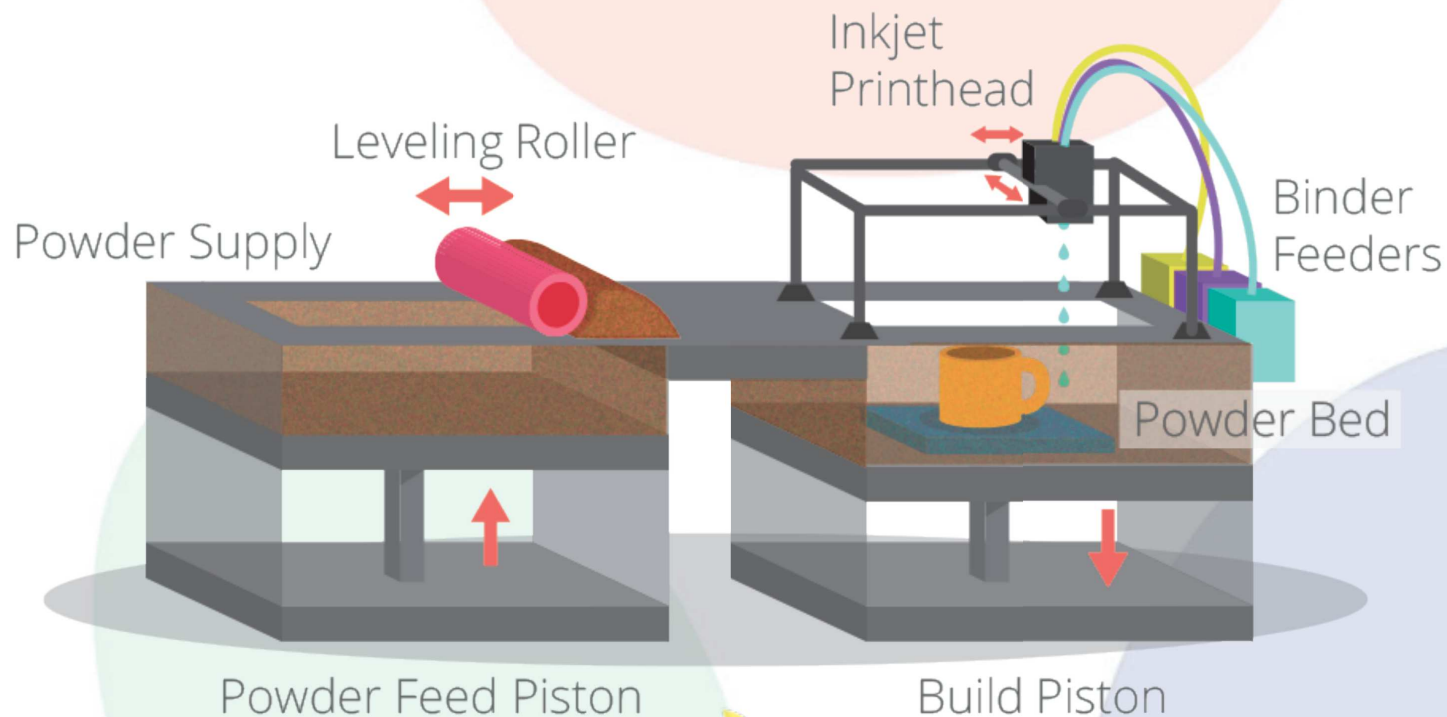
# Le Tecnologie: Inkjet



# Le Tecnologie: Inkjet

Binder Jetting è un processo in cui le polveri vengono addensate tramite dei leganti. I leganti sono depositati tramite micro ugelli simili a quelle delle stampanti inkjet

## Inkjet: Binder Jetting



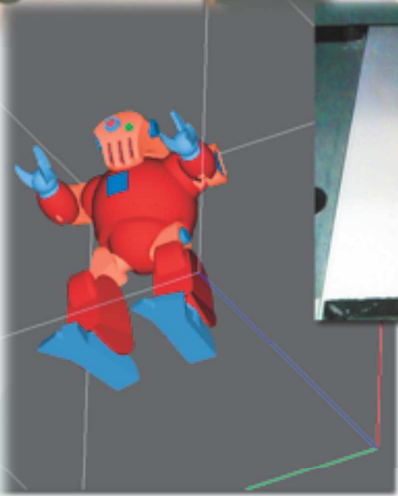
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# Le Technologie: Inkjet



# Le Tecnologie: confronto

	FDM	SLA	SLS
Feed Stock	Plastic filament	Polymer (light sensitive) resin	Metal and polymer powder
Materials and Costs	ABS, PLA, nylon, PC, PVA, woodlike...	Similar to PP to low end ABS	Alumide, stainless steel, ABS, titanium
Precision	25-75 microns	25 microns	150 microns
Part strength	Medium	Low	High
Material Availability	Easily available and cheap	Easily Available but is expensive	Not easily available and is expensive
Price	USD 4000 onwards	USD 4000 onwards	USD 500,000 onwards

# Le Tecnologie: confronto



Desktop FDM

Industrial FDM

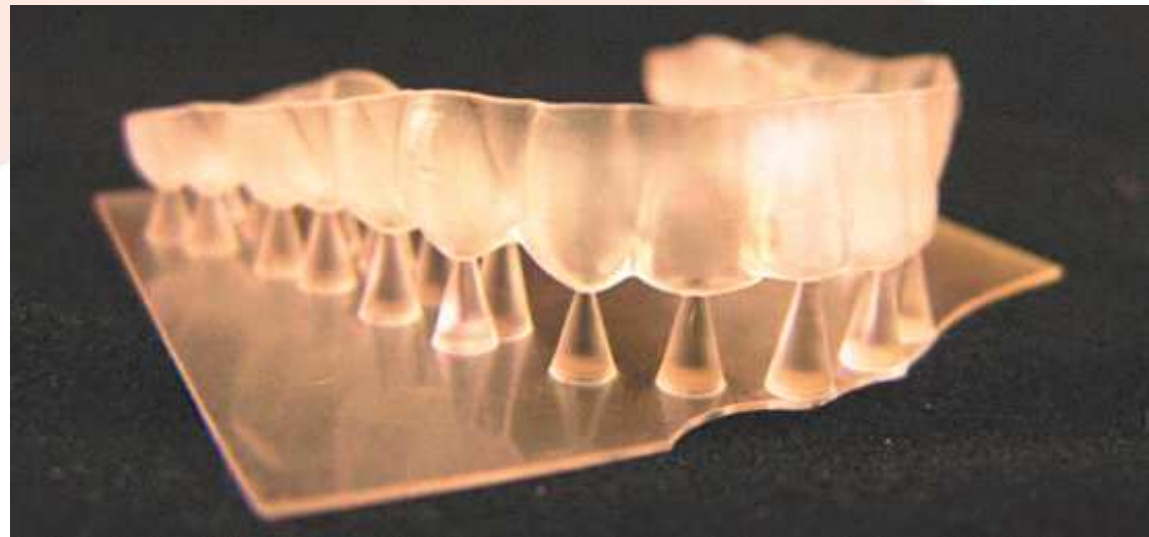
Desktop SLA

Industrial SLA

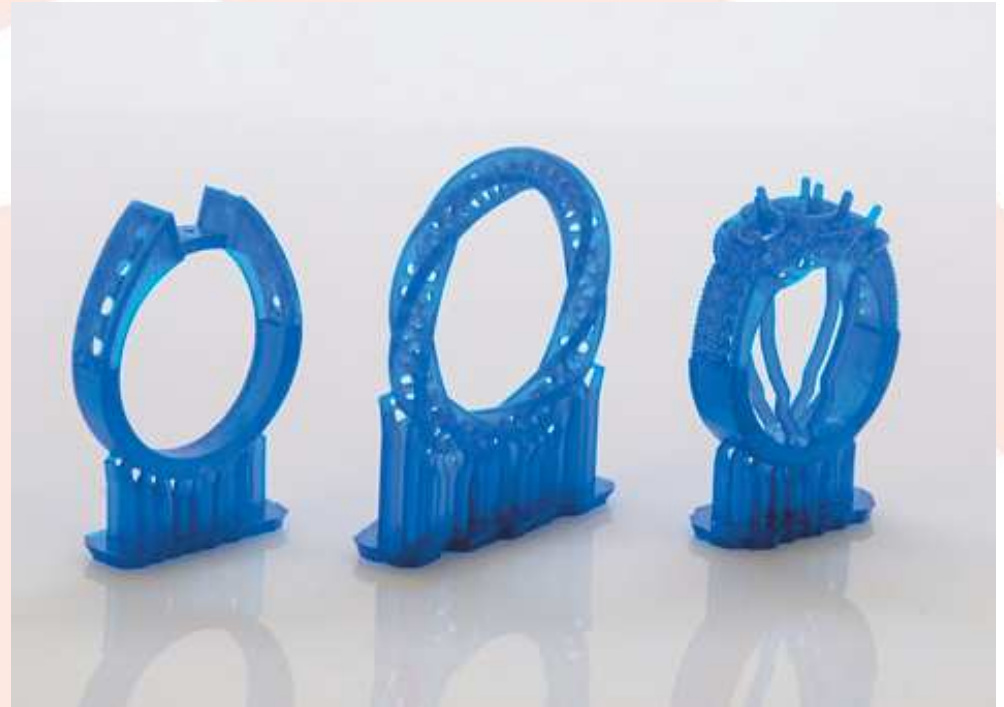
Industrial SLS



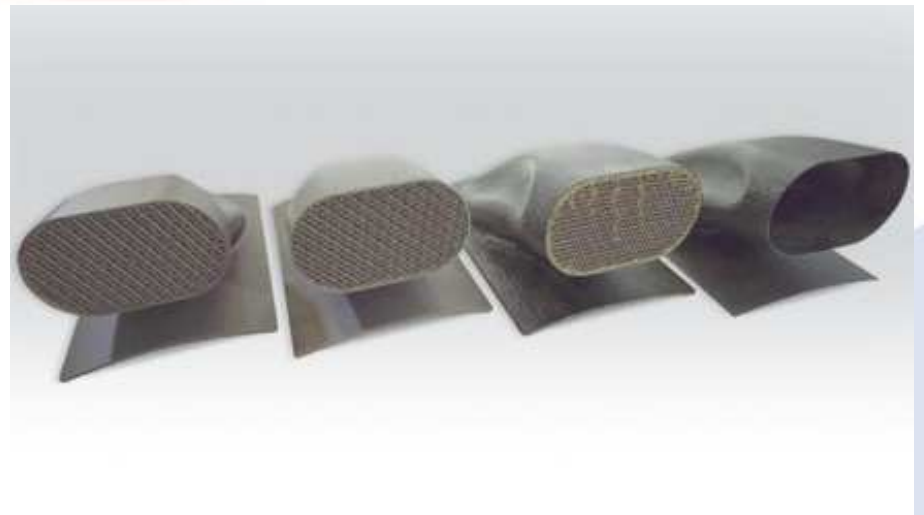
# Applicazioni Biomedica: odontotecnica protesi



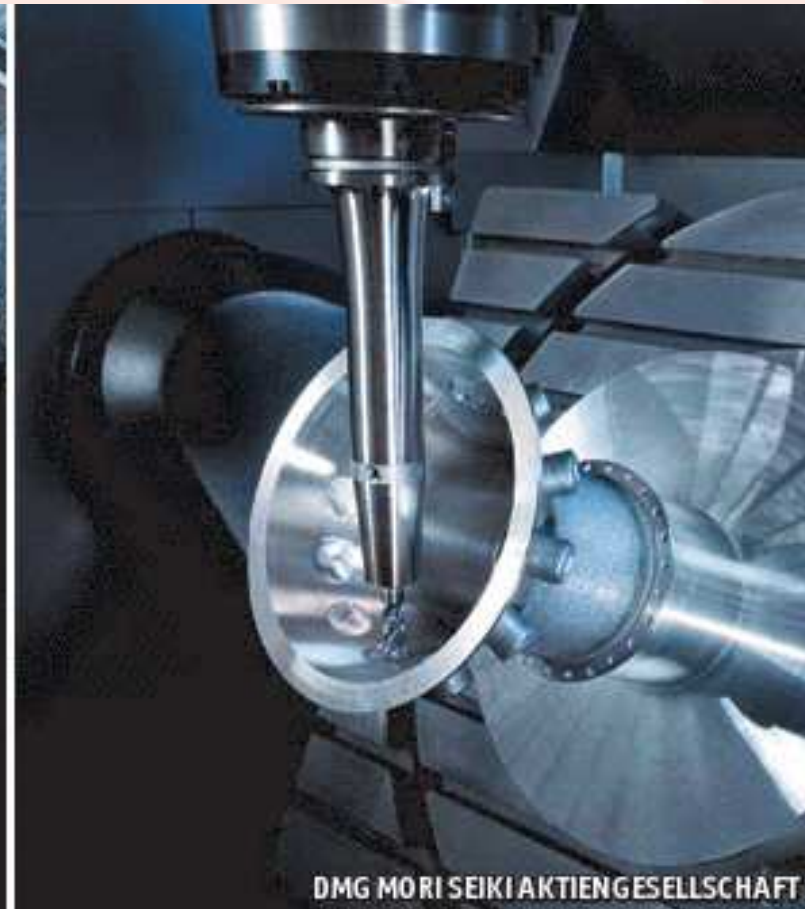
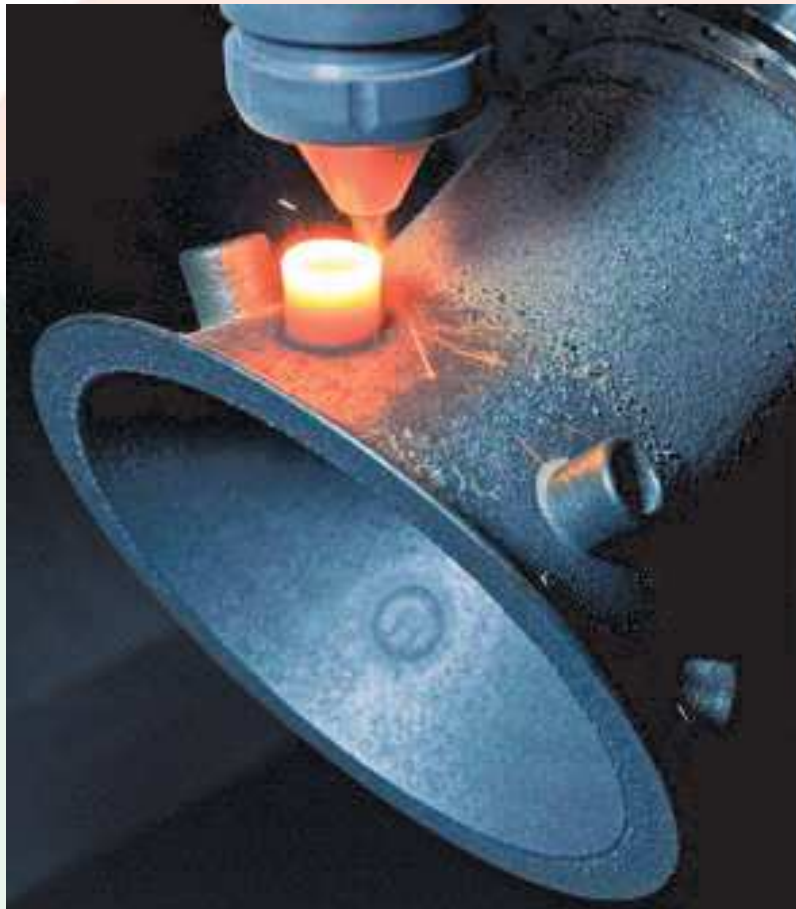
# Applicazioni: Gioielleria



# Applicazioni: Mold making



# Applicazioni: Rapid tooling aeronautico

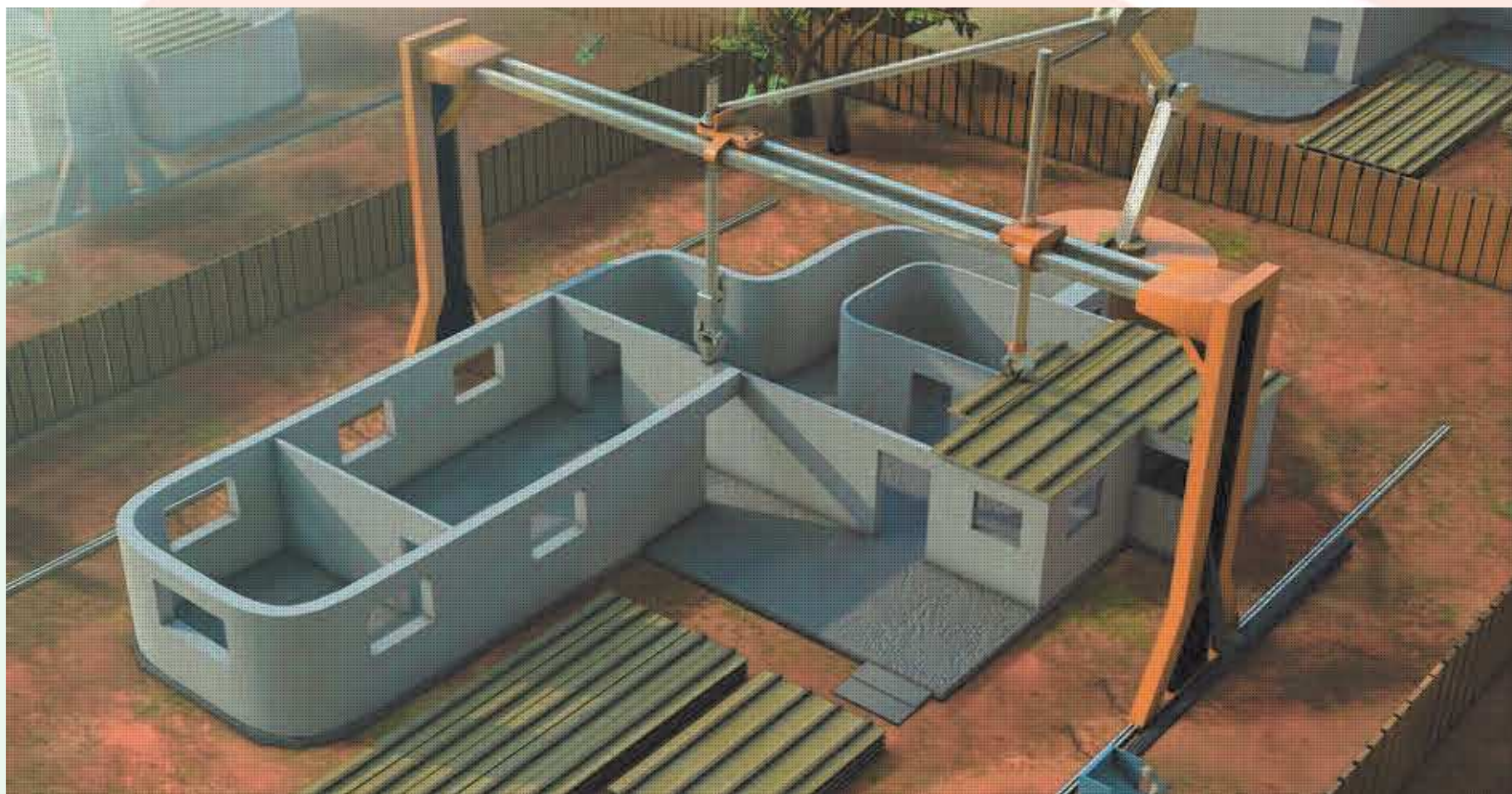


# Applicazioni: food





# Applicazioni: edilizia

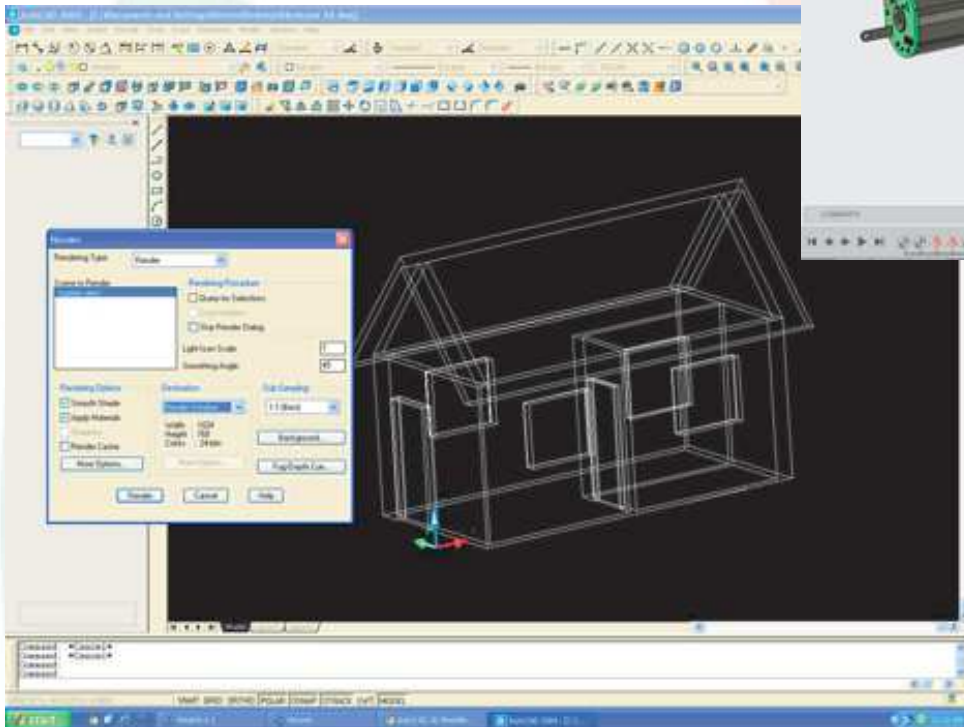
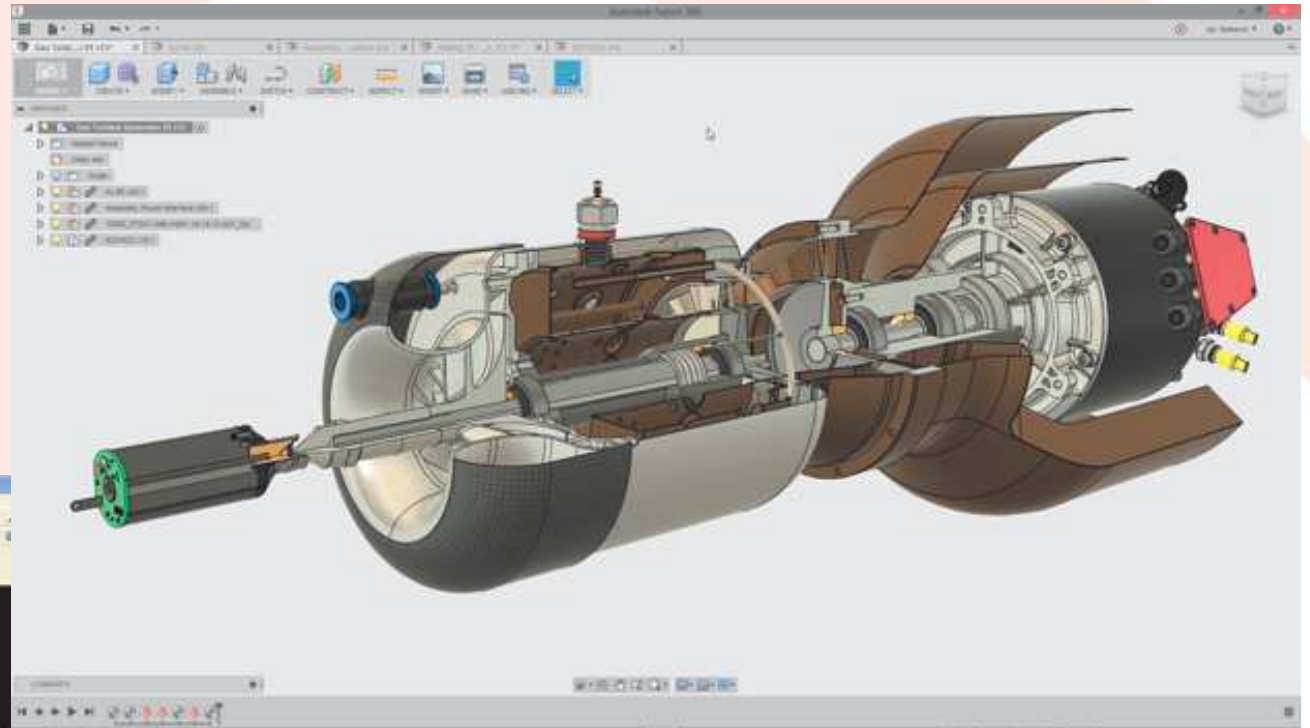


# Applicazioni: fashion



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# Software: Evoluzione



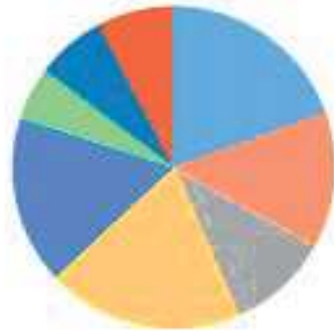
# Software: Evoluzione



# Mercato: Previsioni

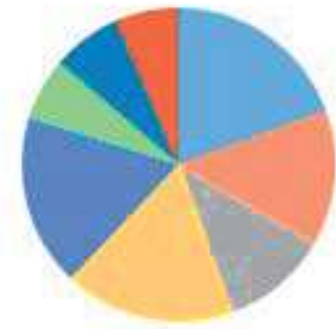
8,6 miliardi di dollari al 2020(Allied Market Research)

2014



- Consumer Products
- Industrial
- Aerospace
- Automotive
- Healthcare
- Defense
- Education and Research
- Others

2020



- Consumer Products
- Industrial
- Aerospace
- Automotive
- Healthcare
- Defense
- Education and Research
- Others

# Nuovo scenario manifatturiero



# Nuovo scenario manifatturiero

- Piccole serie e prodotti Custom
- Prototipazione rapida e Rapid Tooling
- Industria 4.0: Smart Factories
- Produzione e servizi

# Produzione e servizi: preventivazione online

- [www.i.materialise.com](http://www.i.materialise.com)
- [www.sculpteo.com](http://www.sculpteo.com)





Grazie.

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