

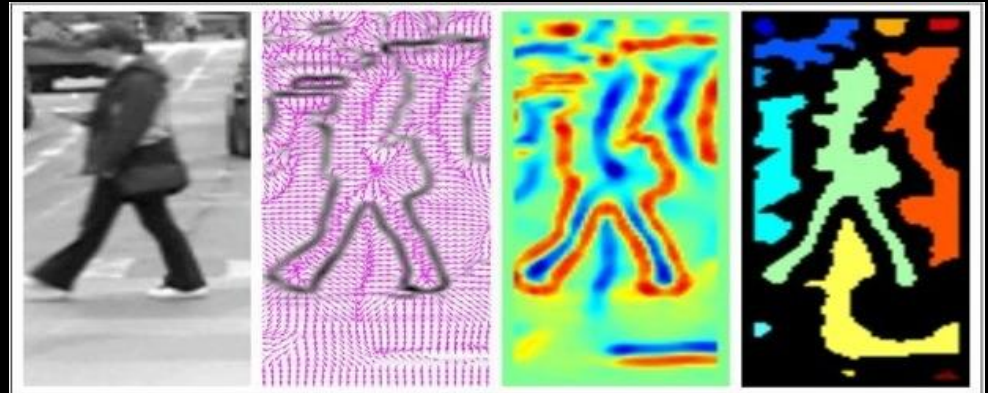
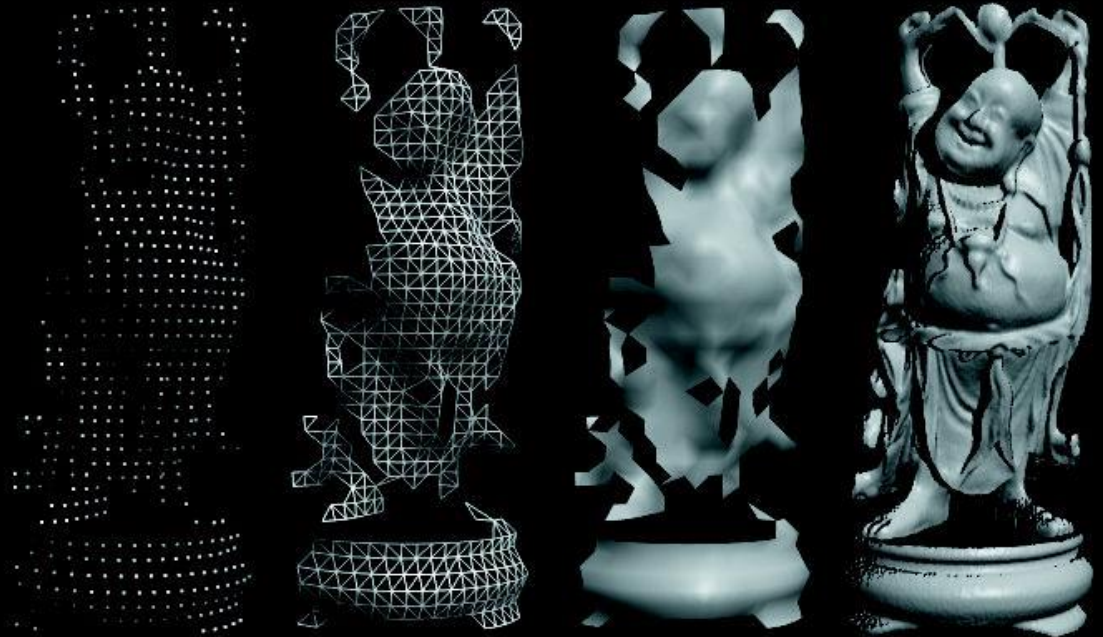


Računarska grafika

predavanja
v.prof.dr. Samir Lemeš
slemes@unze.ba

Primjene računarske grafike

- GIS
- OCR
- CAD
- CAE
- CAM
- Computer Vision
- 3D skeneri



GIS

- Geographical Information Systems
- Koristi i rasterske i vektorske podatke
- maps.google.com katastar.ba



OCR

- *Optical Character Recognition*
- Koristi rastersku sliku
- Vrši vektorizaciju
- Upoređuje vektorske oblike sa slovima
- Vrši spell-check
- Snima rezultat kao tekst (txt, rtf, doc,...)

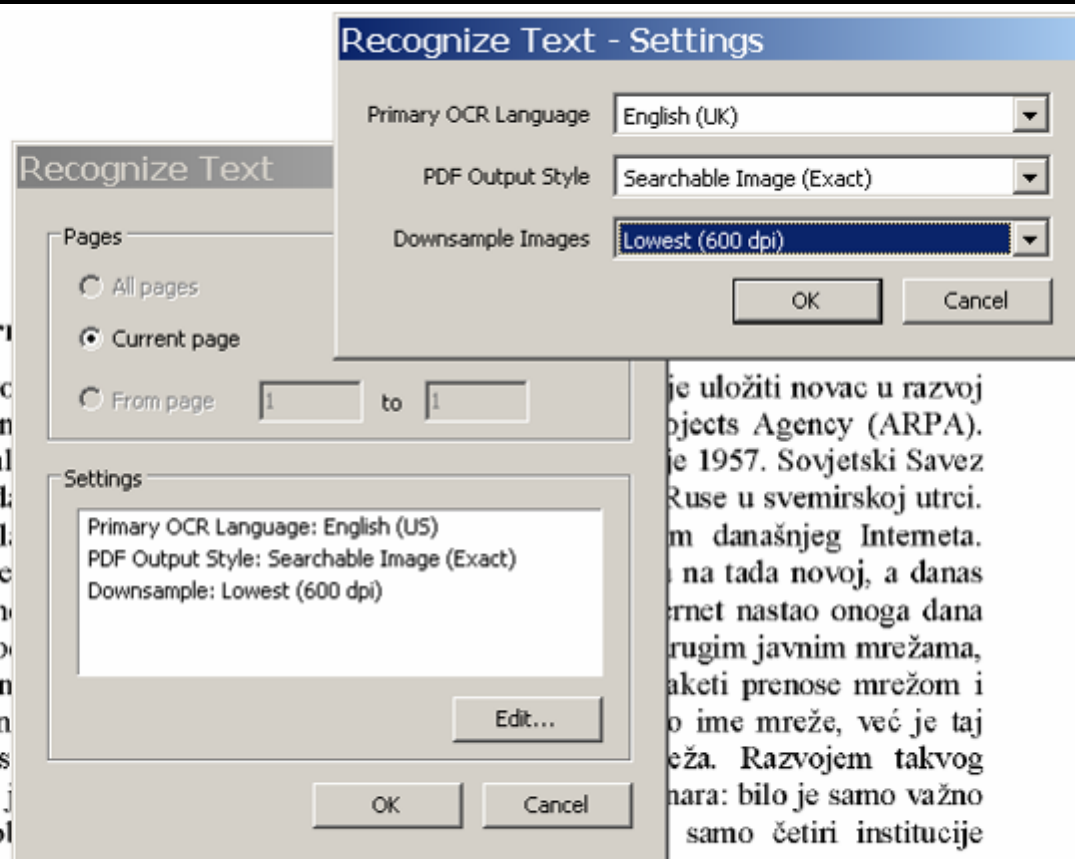


OCR

- Adobe Acrobat može izvršiti OCR iz PDF

1.1.1. Nastanak Interneta

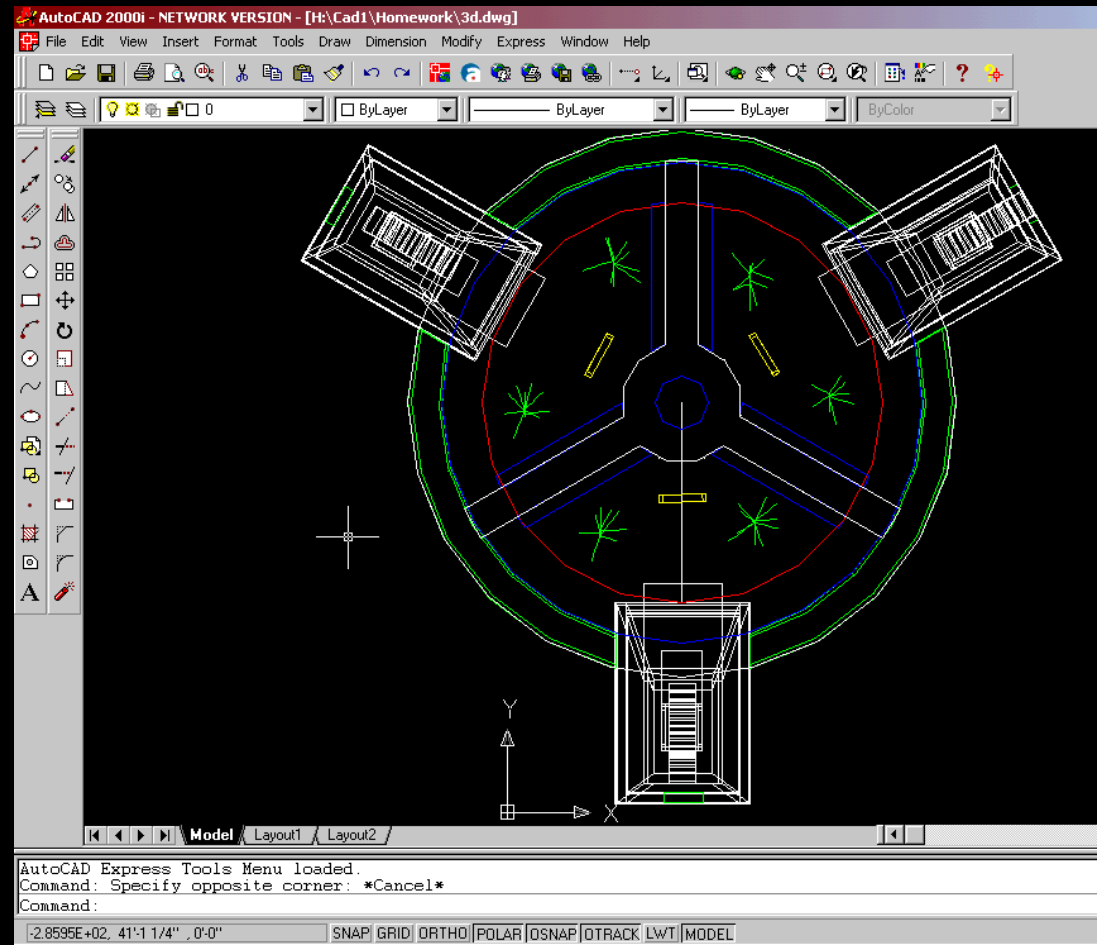
Američko Ministarstvo svoje nove mreže. Ono što su Amerikanci su osnovali i lansirao Sputnika, nadajući se. Tako je 1968. nastala ARPANet je bio eksperimentalno prihvaćenoj tehnici kada je Ministarstvo od univerzitetima i naučnim nazivan je IP – Internet pojam predstavljao protokol omogućeno je da se međusobno dolazi (uglavnom univerzitetske), dok im je 1972. bilo oko dvadeset.



je uložiti novac u razvoj Projects Agency (ARPA). je 1957. Sovjetski Savez Ruse u svemirskoj utrci. m današnjeg Interneta. na tada novoj, a danas rnet nastao onoga dana rugim javnim mrežama, aketi prenose mrežom i o ime mreže, već je taj eža. Razvojem takvog nara: bilo je samo važno samo četiri institucije

CAD

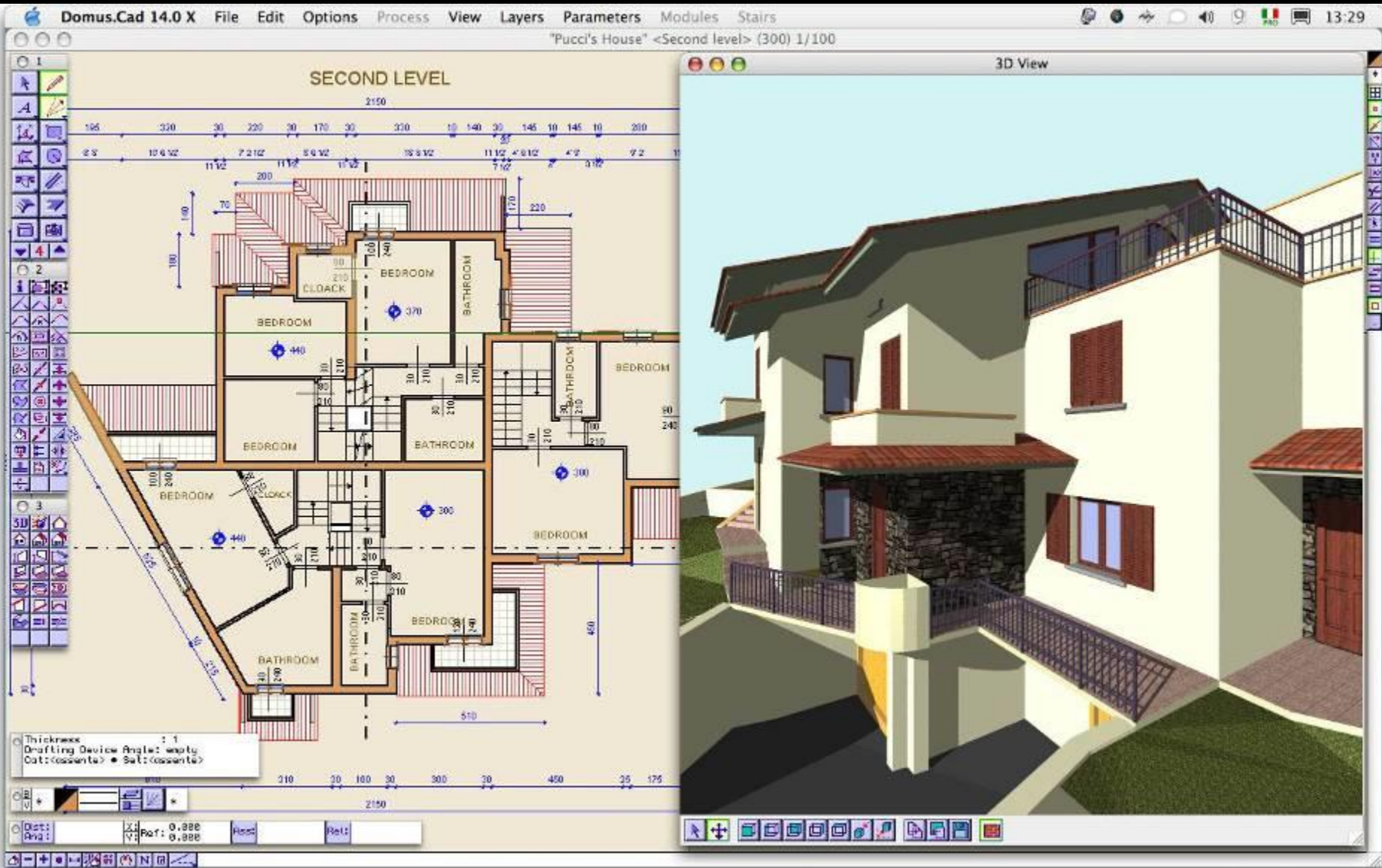
- Computer Aided Design
- Računarom podržano konstruiranje
- 2D drafting
izrada tehničkih crteža
- 3D modeliranje



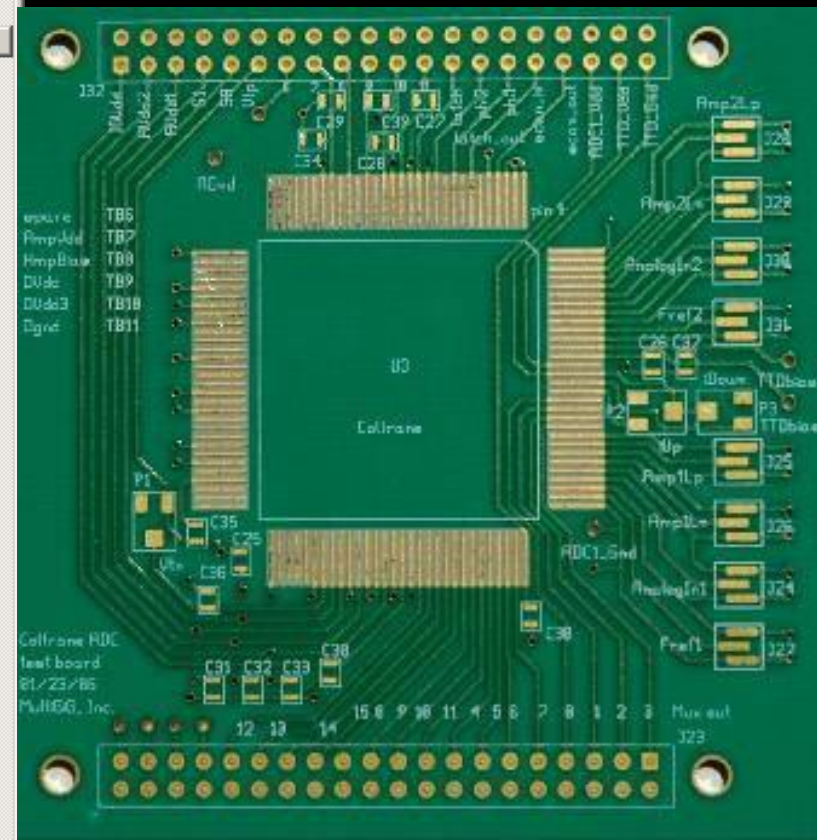
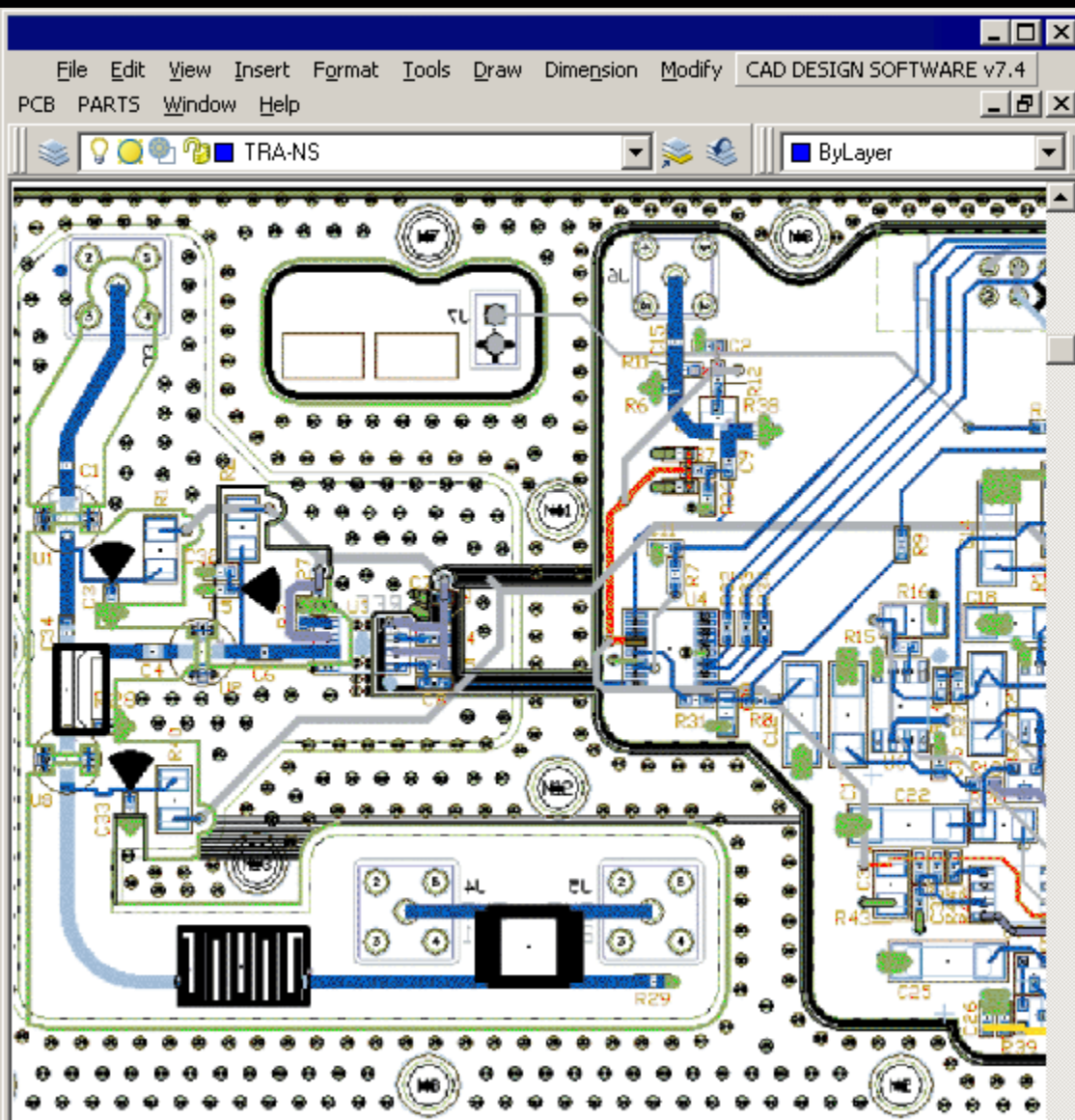
CAD

- Univerzalni alati (geometrija, kotiranje, šrafure, tekst, vrste linija)
- Specijalizirani softver (mašinstvo, građevinarstvo, arhitektura, elektrotehnika, hidraulika, štampane ploče, geodezija,...)
- 3D model služi kao osnova za CAE
- Od 3D modela se lako dobiju 2D presjeci i pogledi

CAD

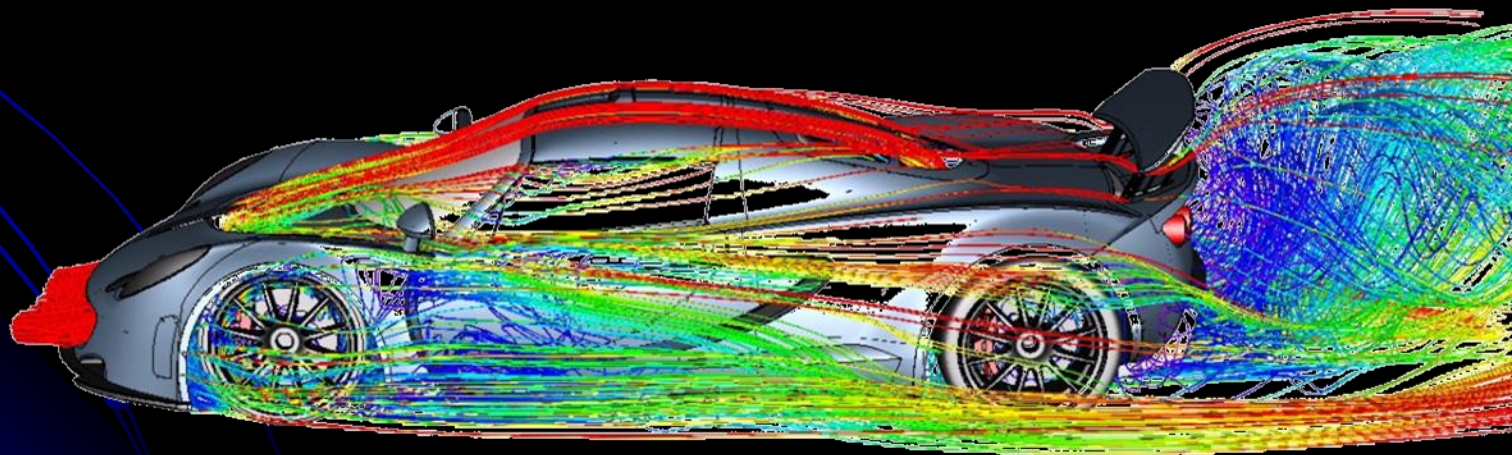


CAD

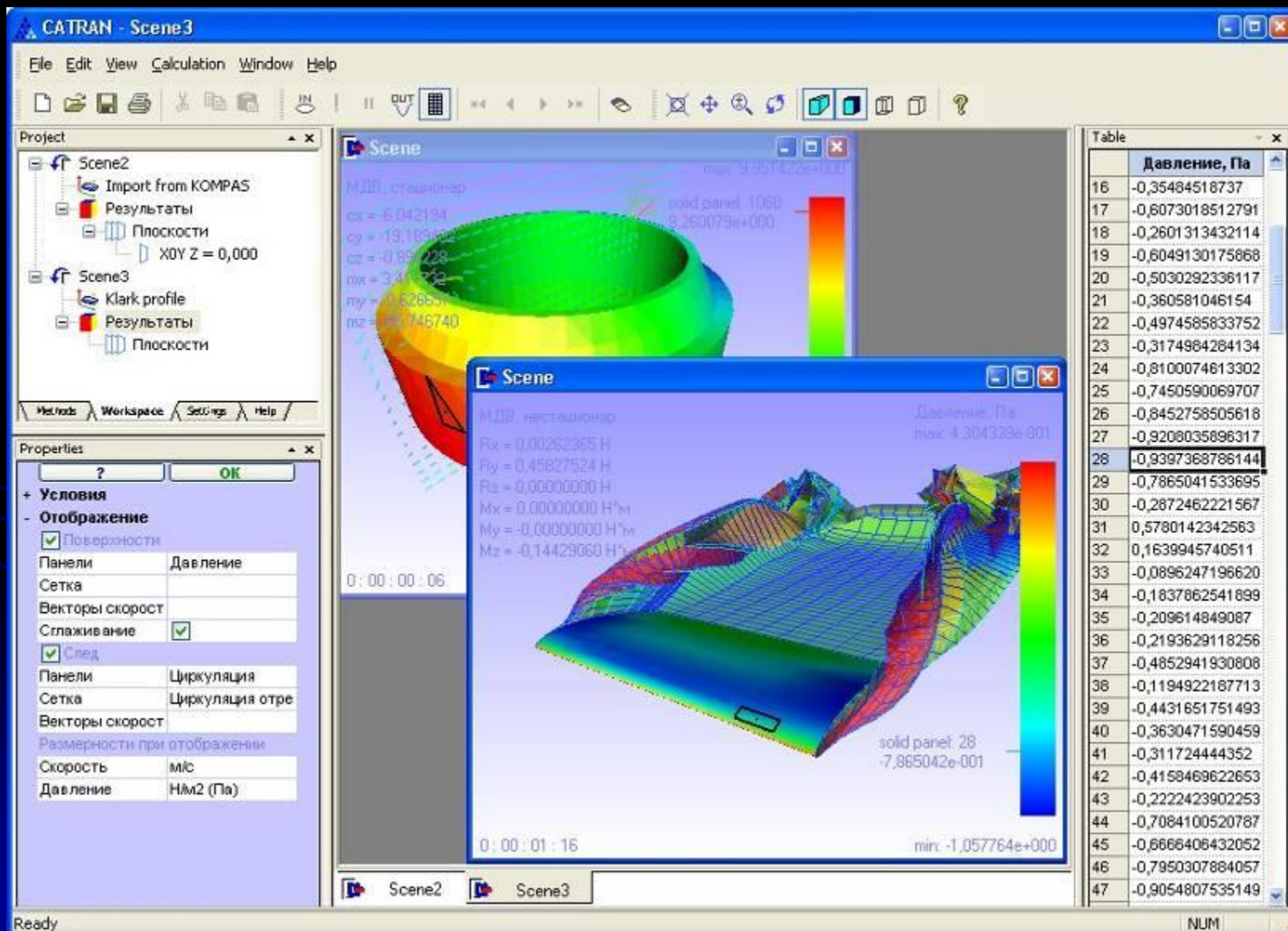


CAE

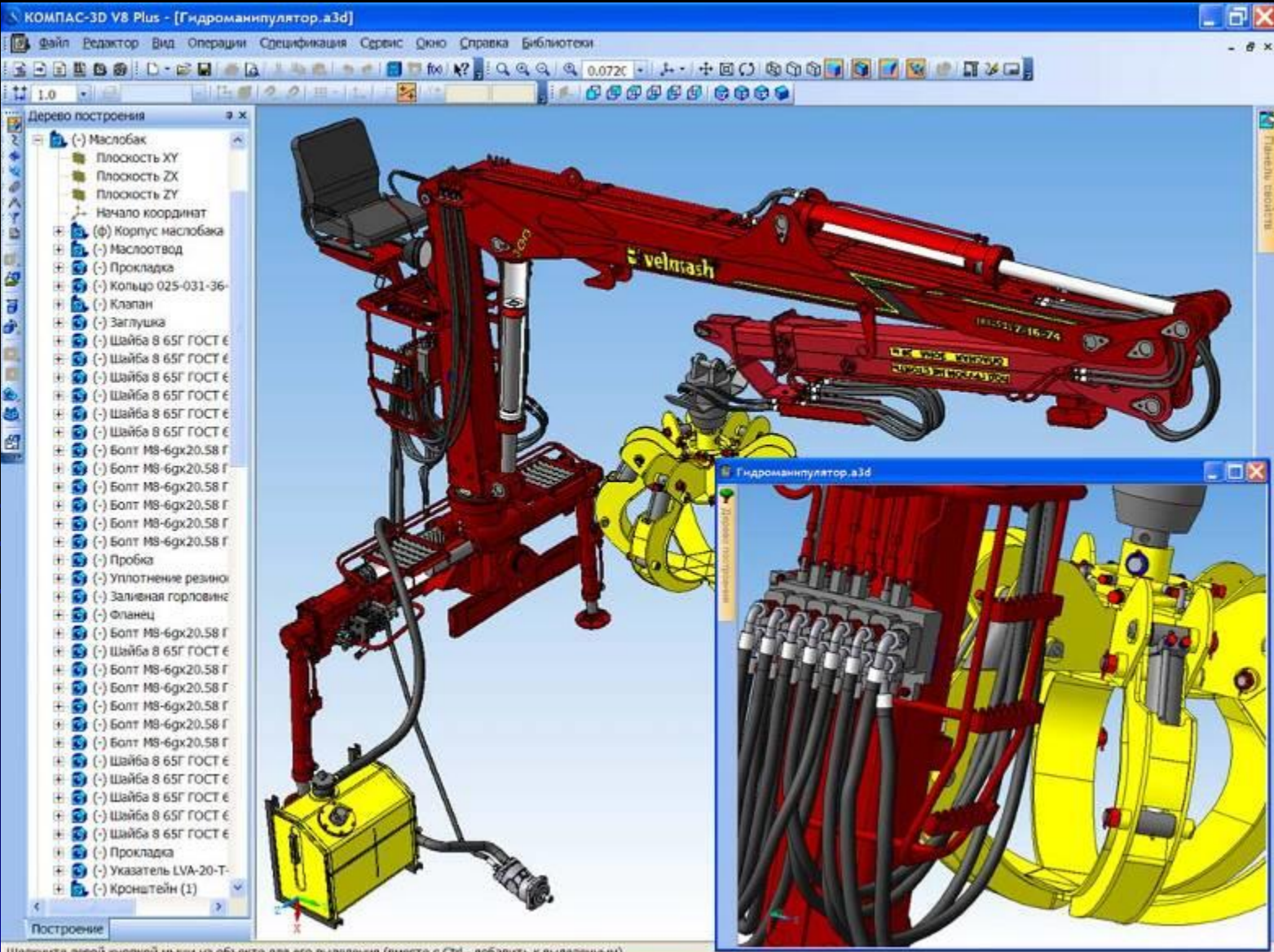
- Computer Aided Engineering
- Analiza i proračun CAD modela
- Metod konačnih elemenata
- CFD – Computational Fluid Dynamics



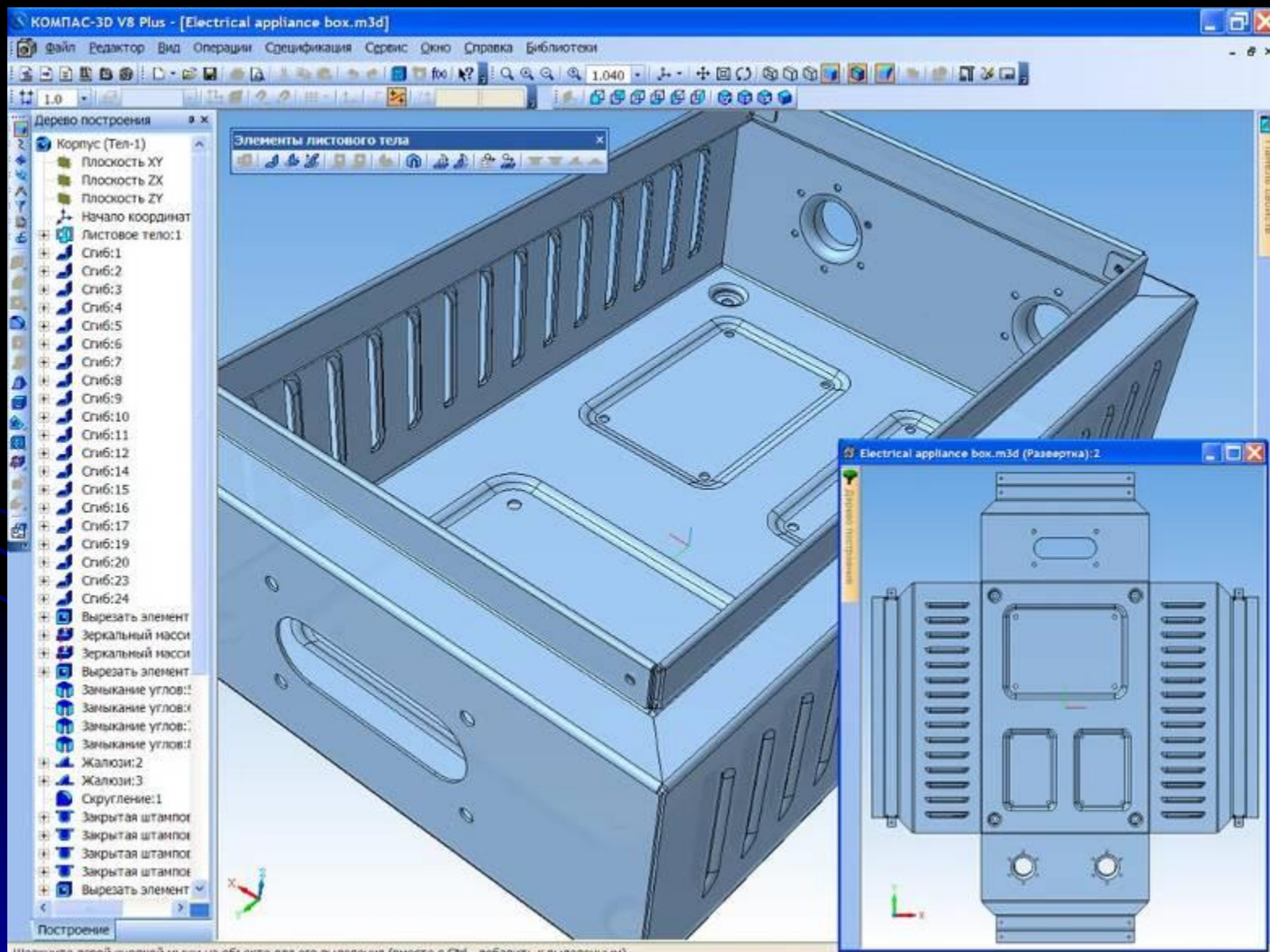
CAE



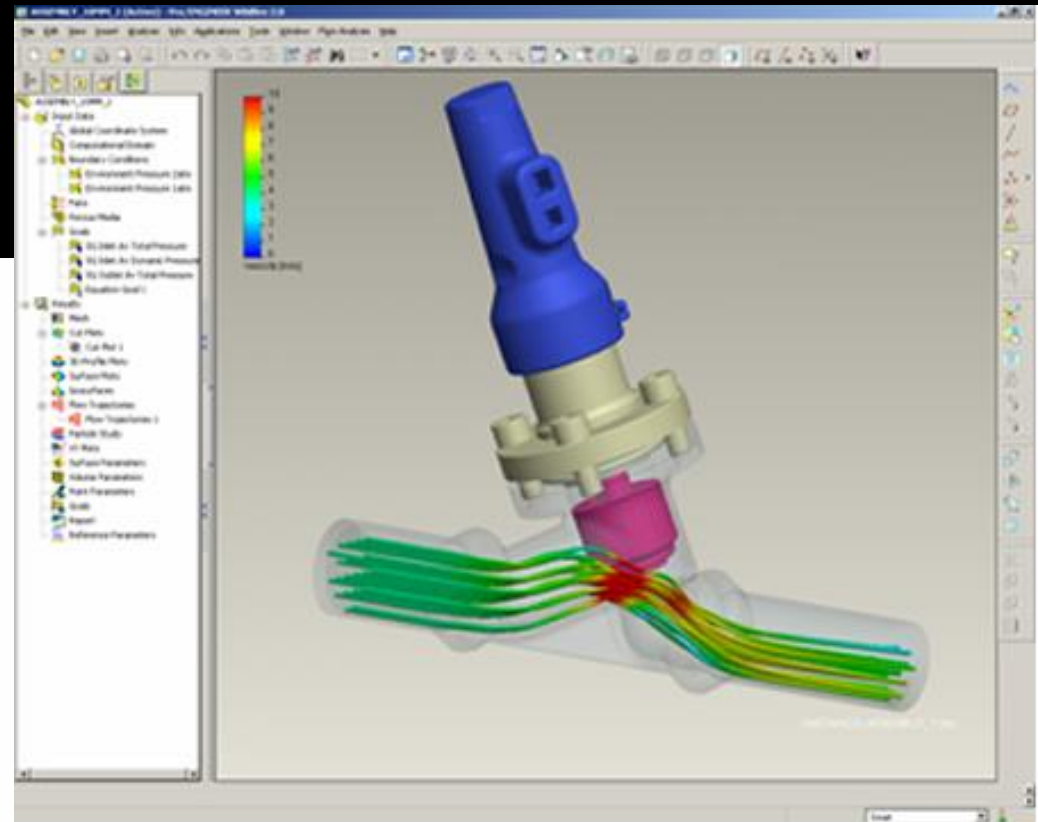
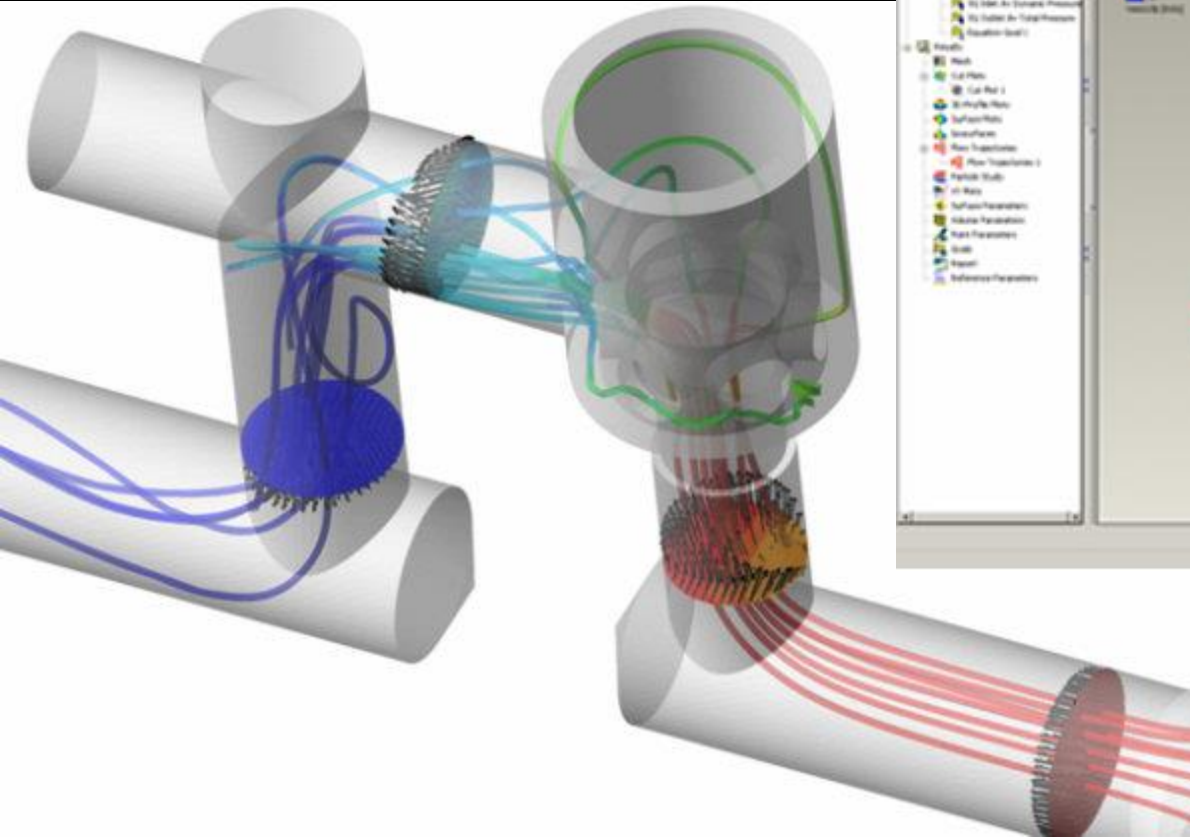
CAE



CAE

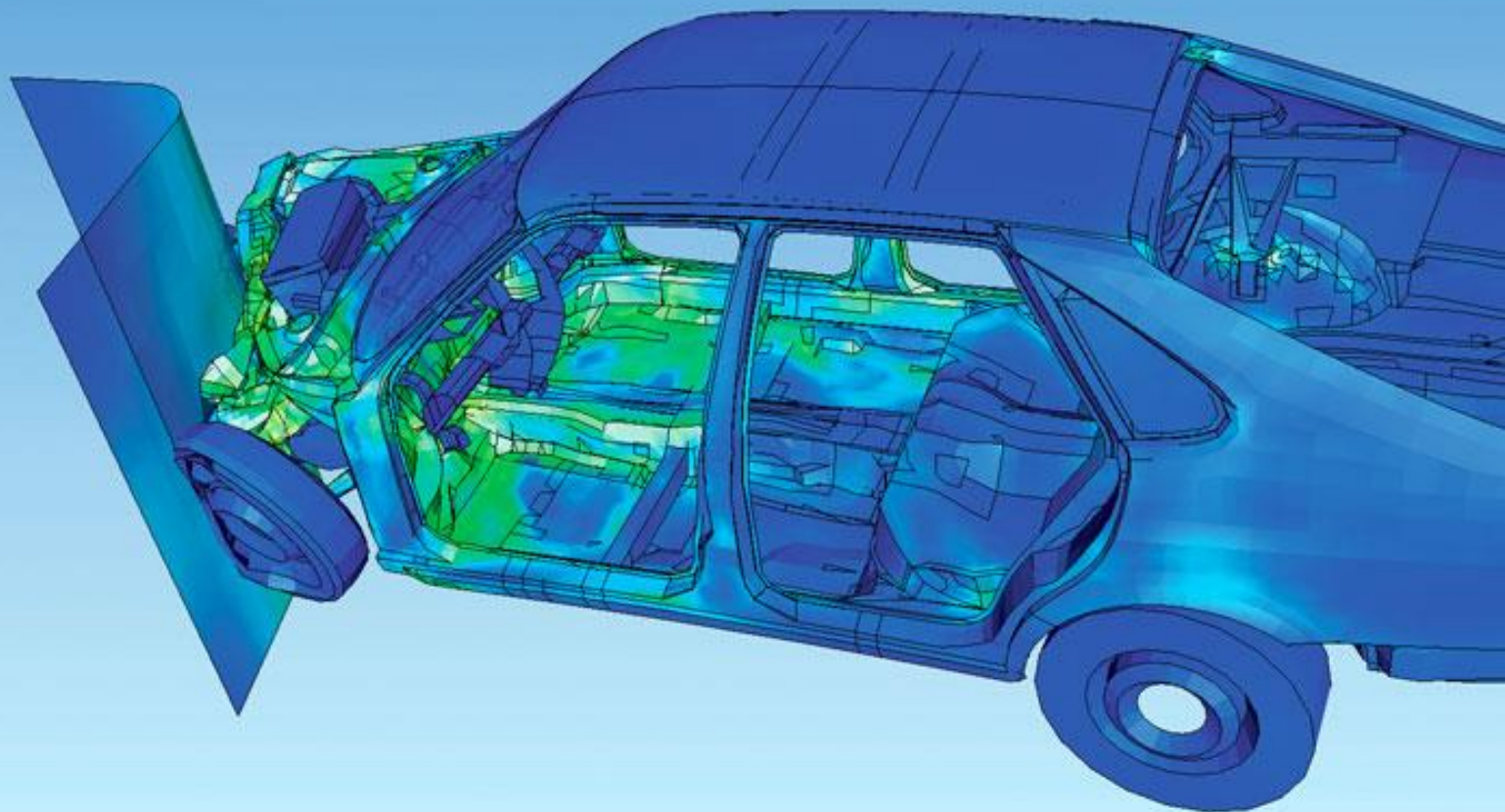


CAE



CAE

SAAB model in GLview

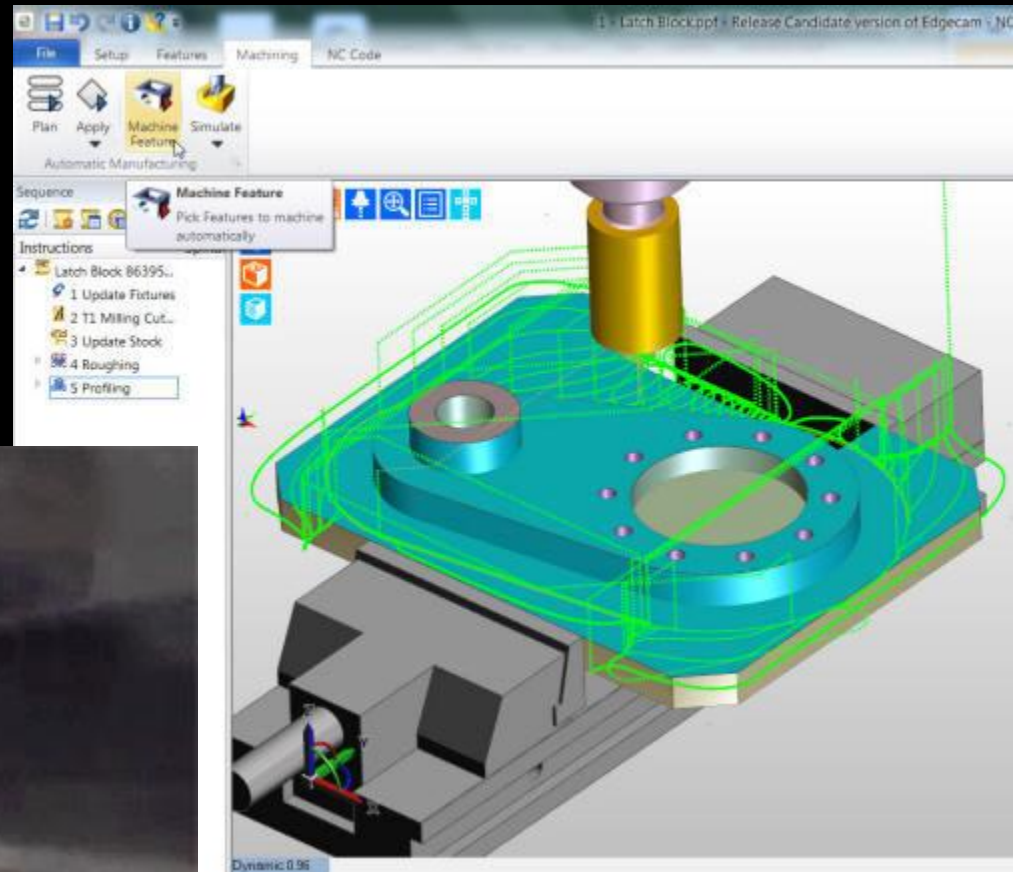


www.3d-visual.com

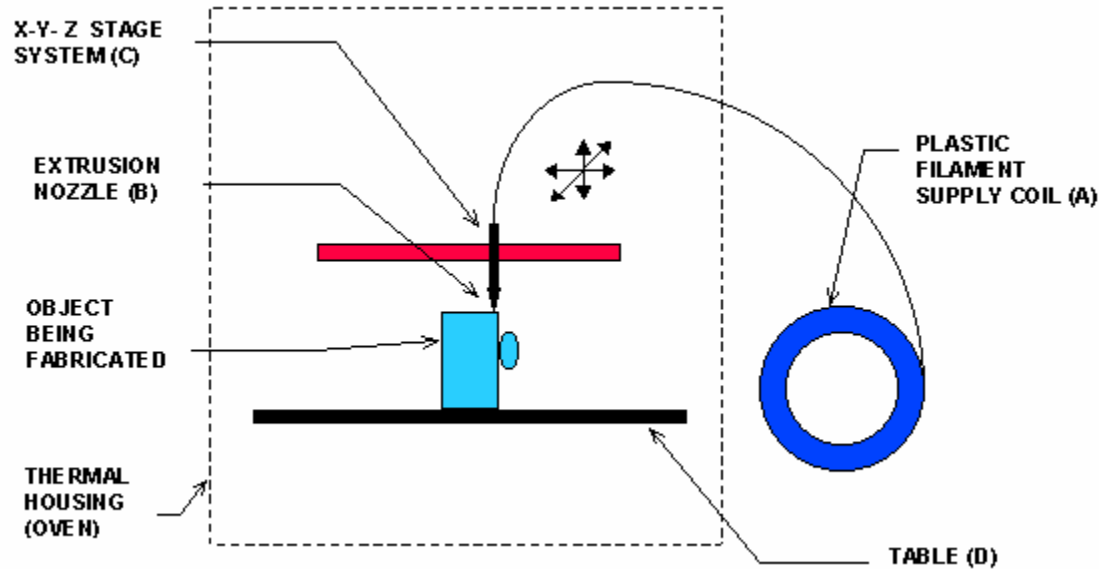
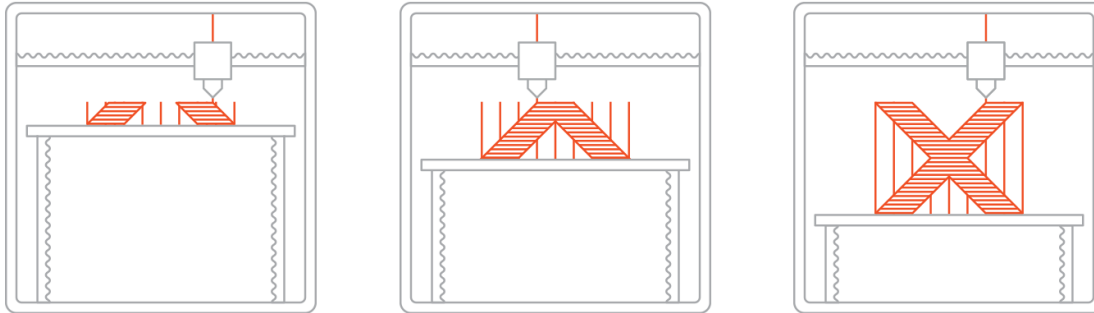
GLview Pro 6.3.2 2009.11.26
h32b.d09
SMN +0.000e+000 SMX -6.701e+000
h32b.d16
VMN +0.000e+000 VMX -7.528e+001

CAM

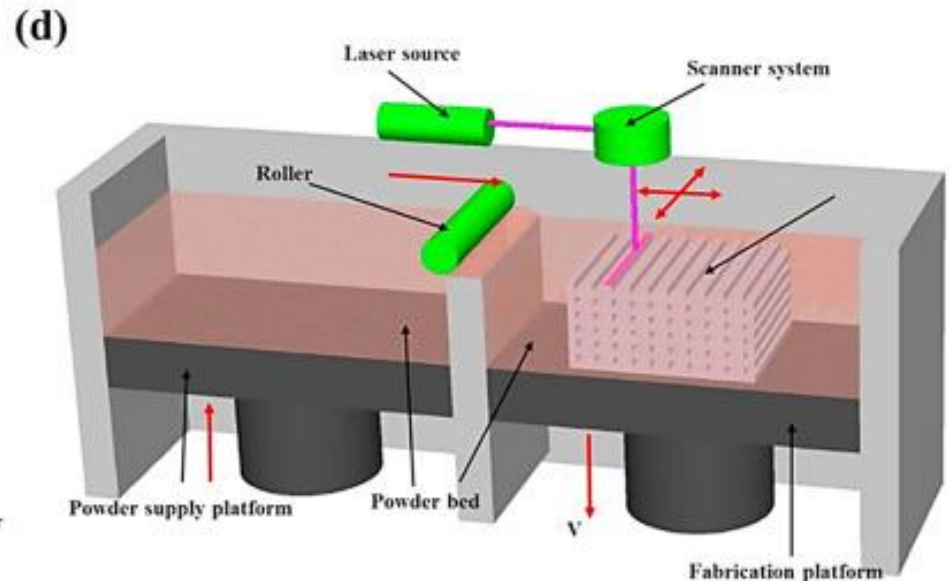
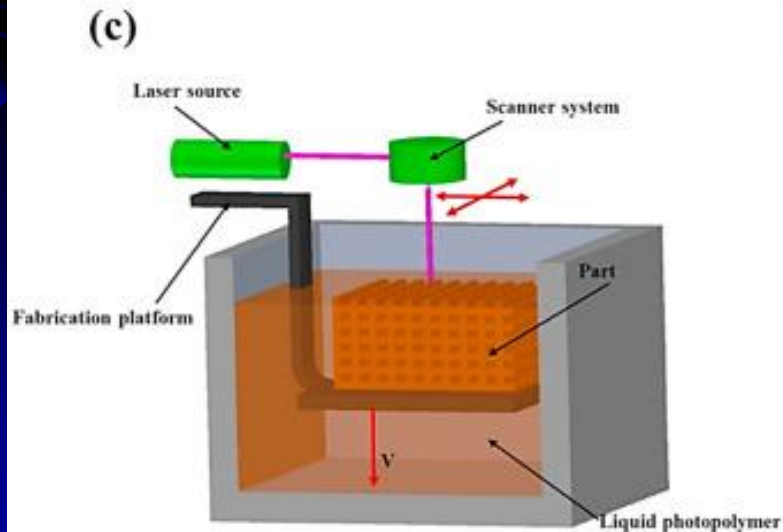
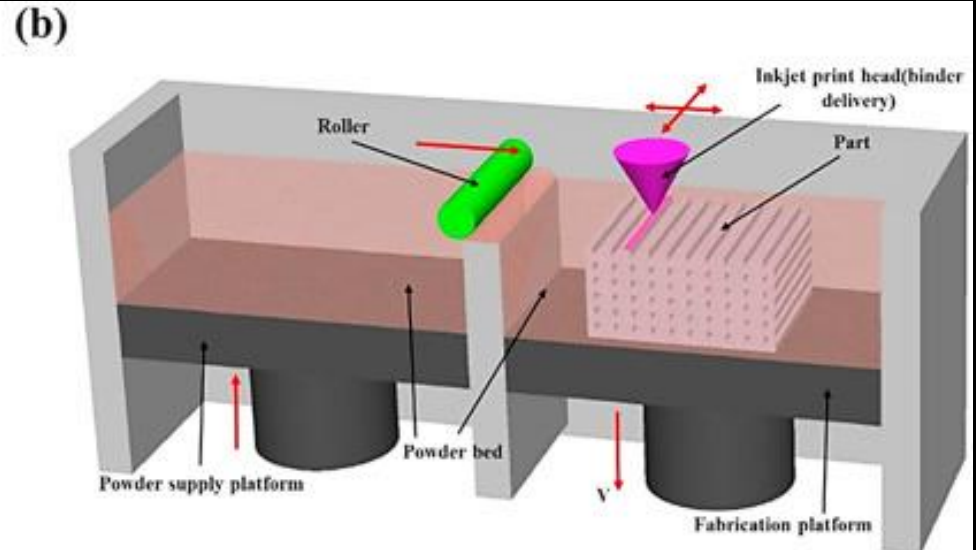
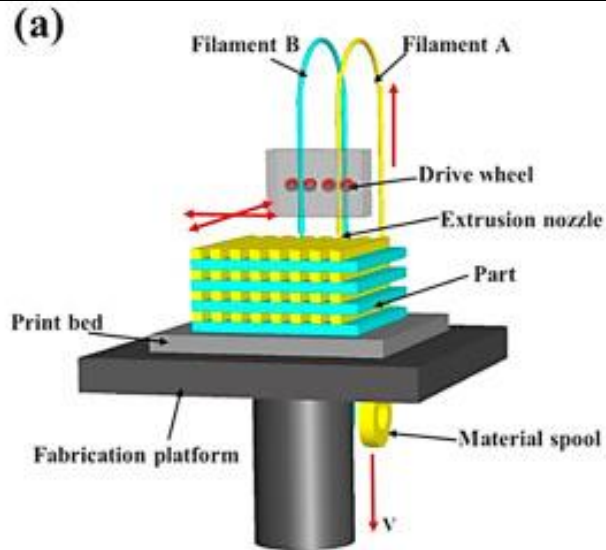
- Computer Aided Manufacturing



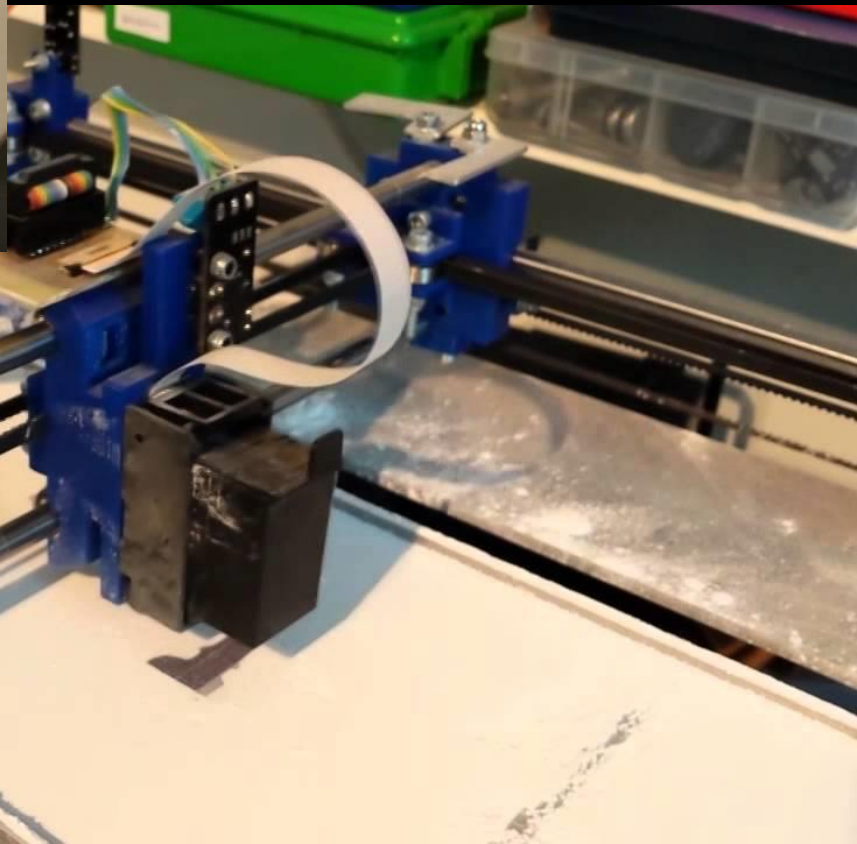
3D printeri



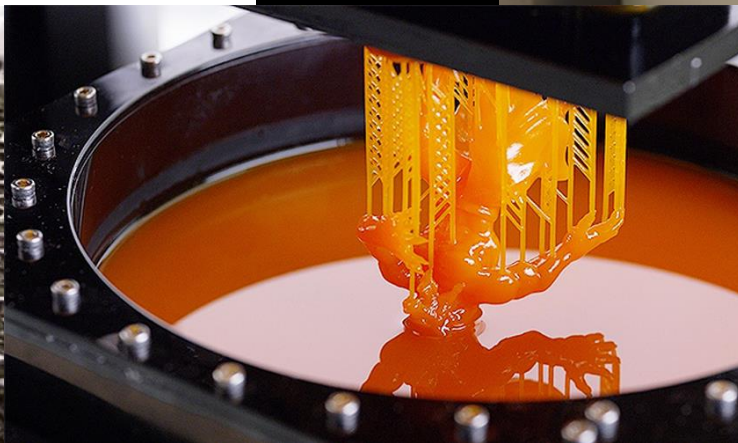
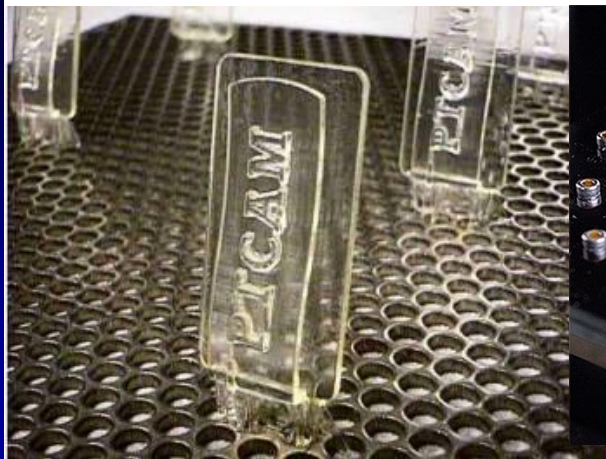
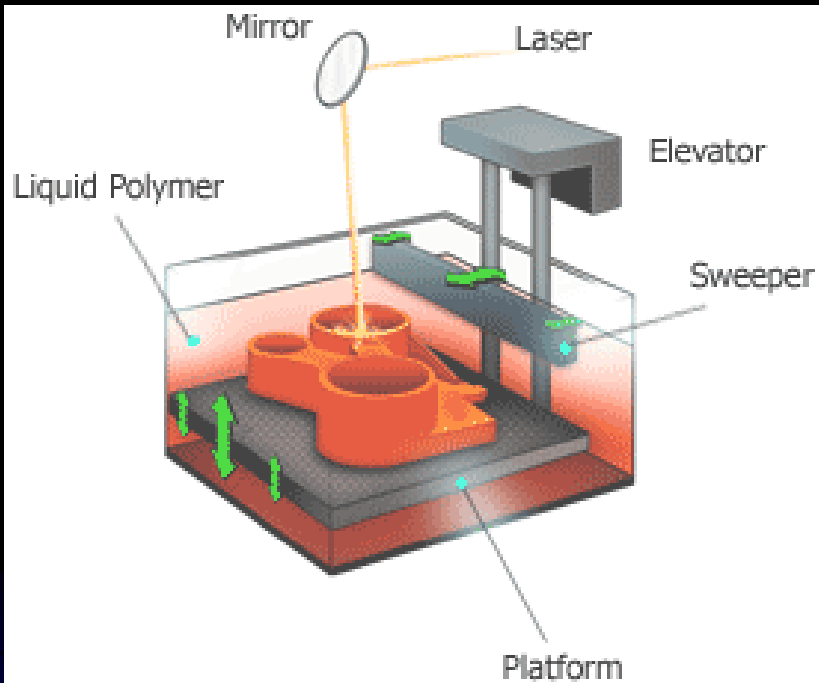
3D printeri



3D printeri



3D printeri

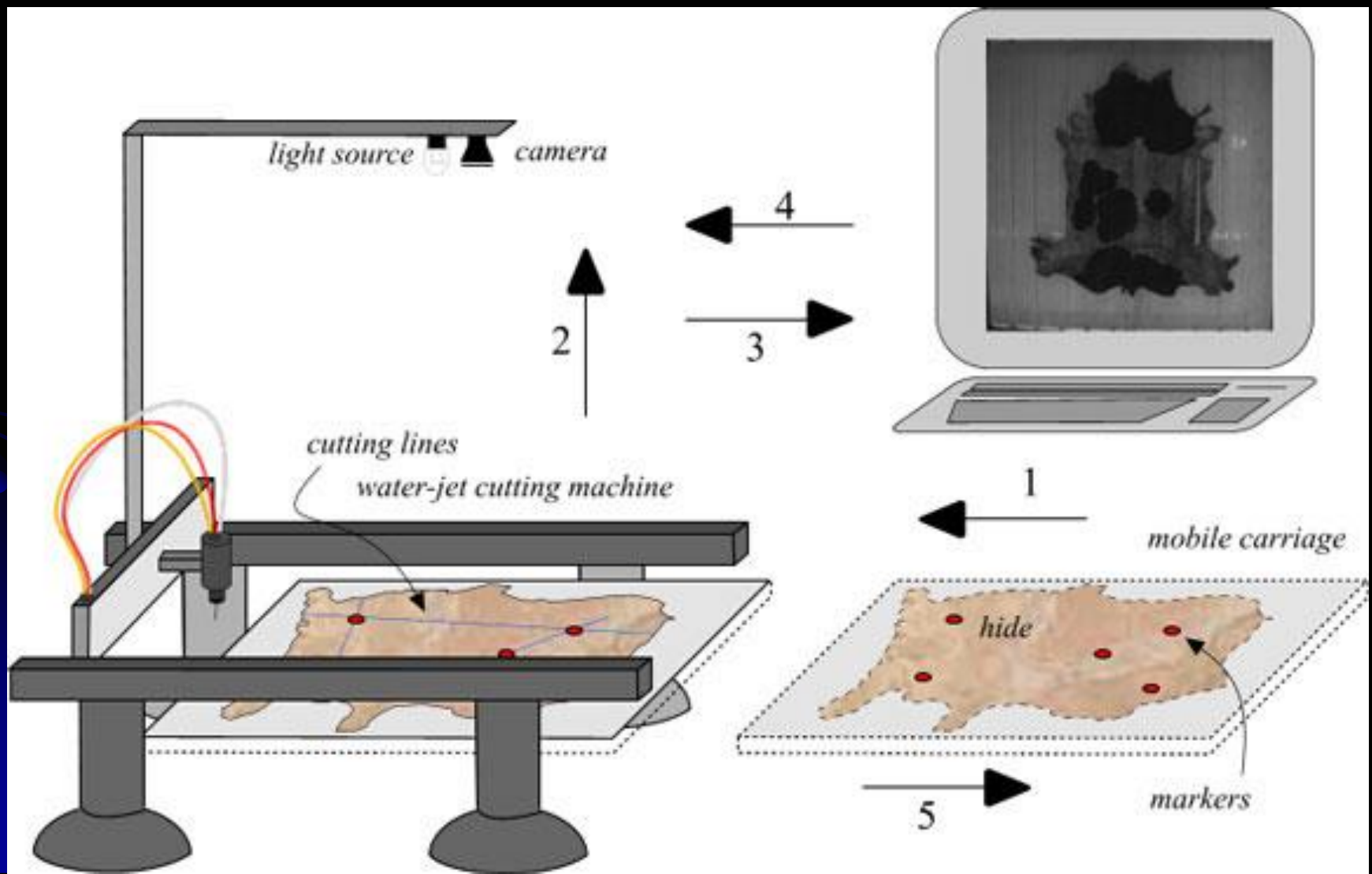


Computer Vision

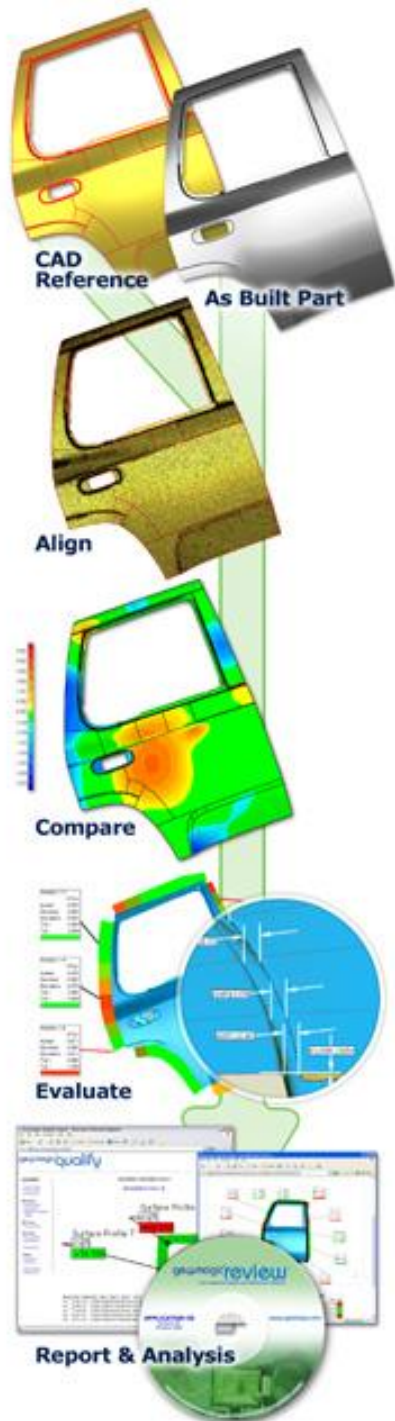
- Mašine koje mogu da "vide"
 - Kontrola procesa (roboti, vozila bez vozača)
 - Nadgledanje
 - Prepoznavanje uzoraka (pattern recognition)
 - Indeksiranje baza podataka o slikama
 - Ispitivanje proizvoda
 - Medicinska grafika
 - Vještačka inteligencija



Computer Vision



Computer Vision



Computer Vision

National Instruments

IMAQ™ Vision Builder

File Image Color Grayscale Binary Machine Vision Script Help

euro2.png - RGB - 640x480

640x480 1/1

Script

```
Begin
  Extract Color Planes: HSL - Luma
  Pattern Matching
End
```

Results ...	1	2	3	4	5
Center X	194.000	492.253	258.392	426.148	219.197
Center Y	222.000	285.219	405.788	87.700	176.537
Score	1000	817	785	761	633
Angle	0.000	297.000	196.000	347.000	134.000

Learn Template Search Template

Setup the search strategy, the number of matches you expect and their minimum score (0 to 1000).

Search Mode:

☐ Sub-Pixel Accuracy

Minimum Score:

Number of Matches:

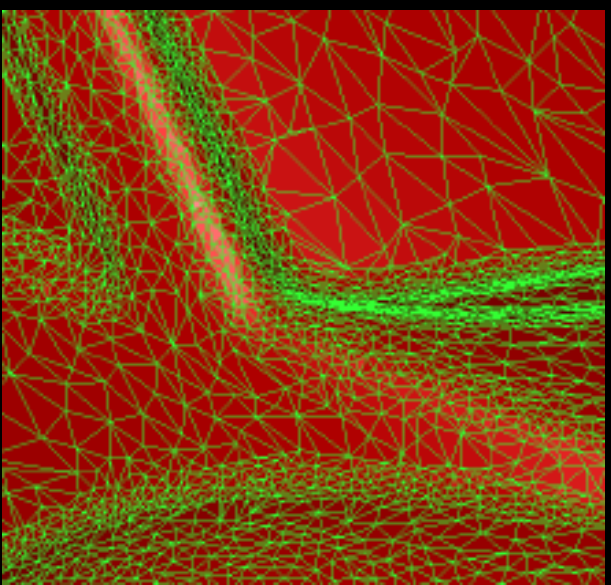
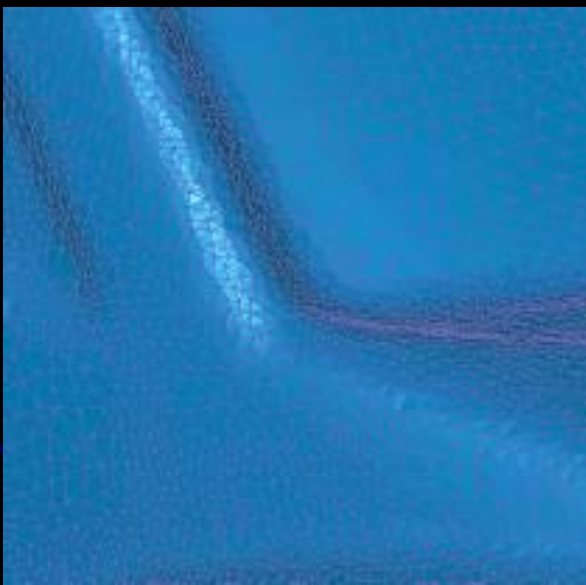
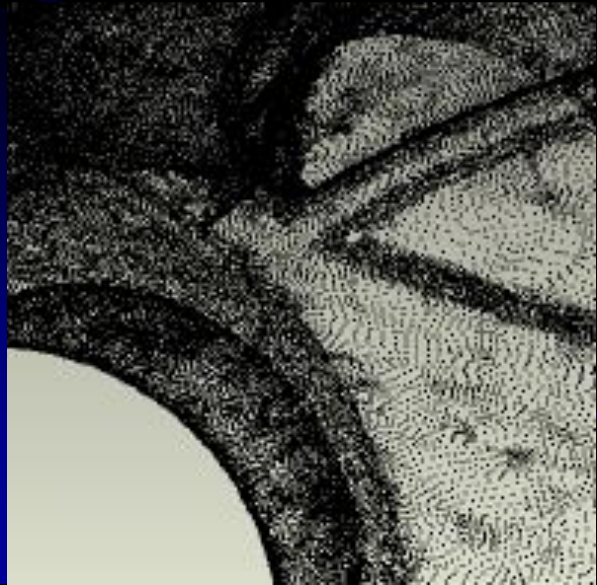
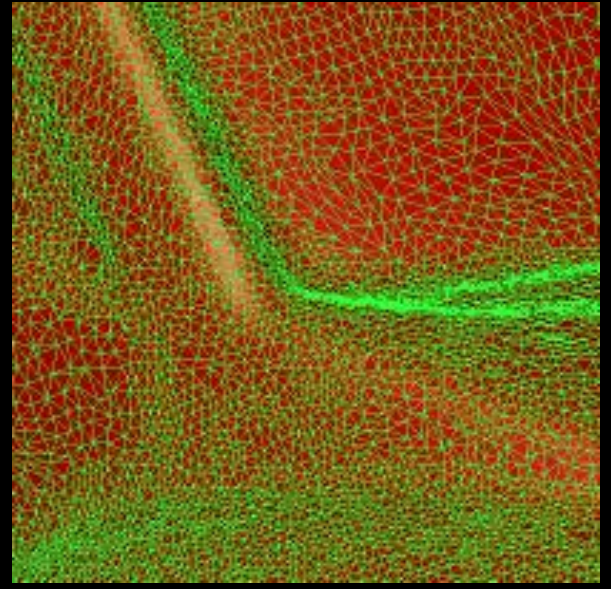
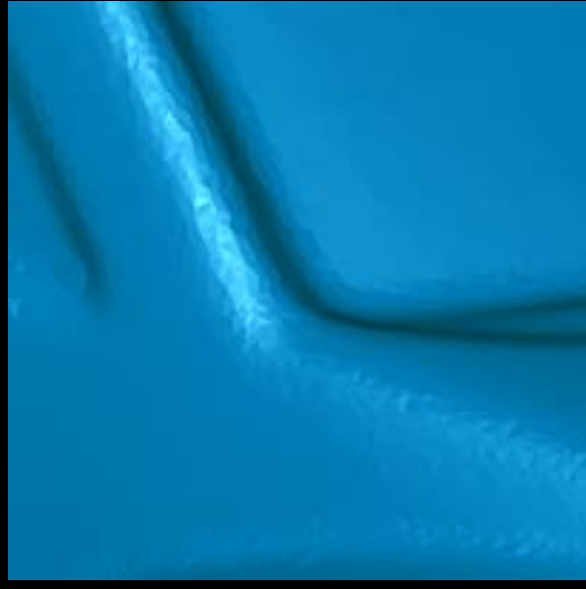
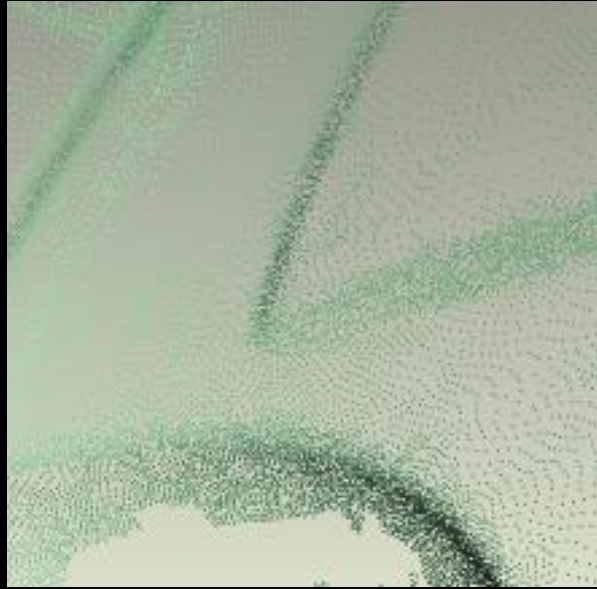
Computer Vision



3D skeneri



3D skeneri



3D skeneri

