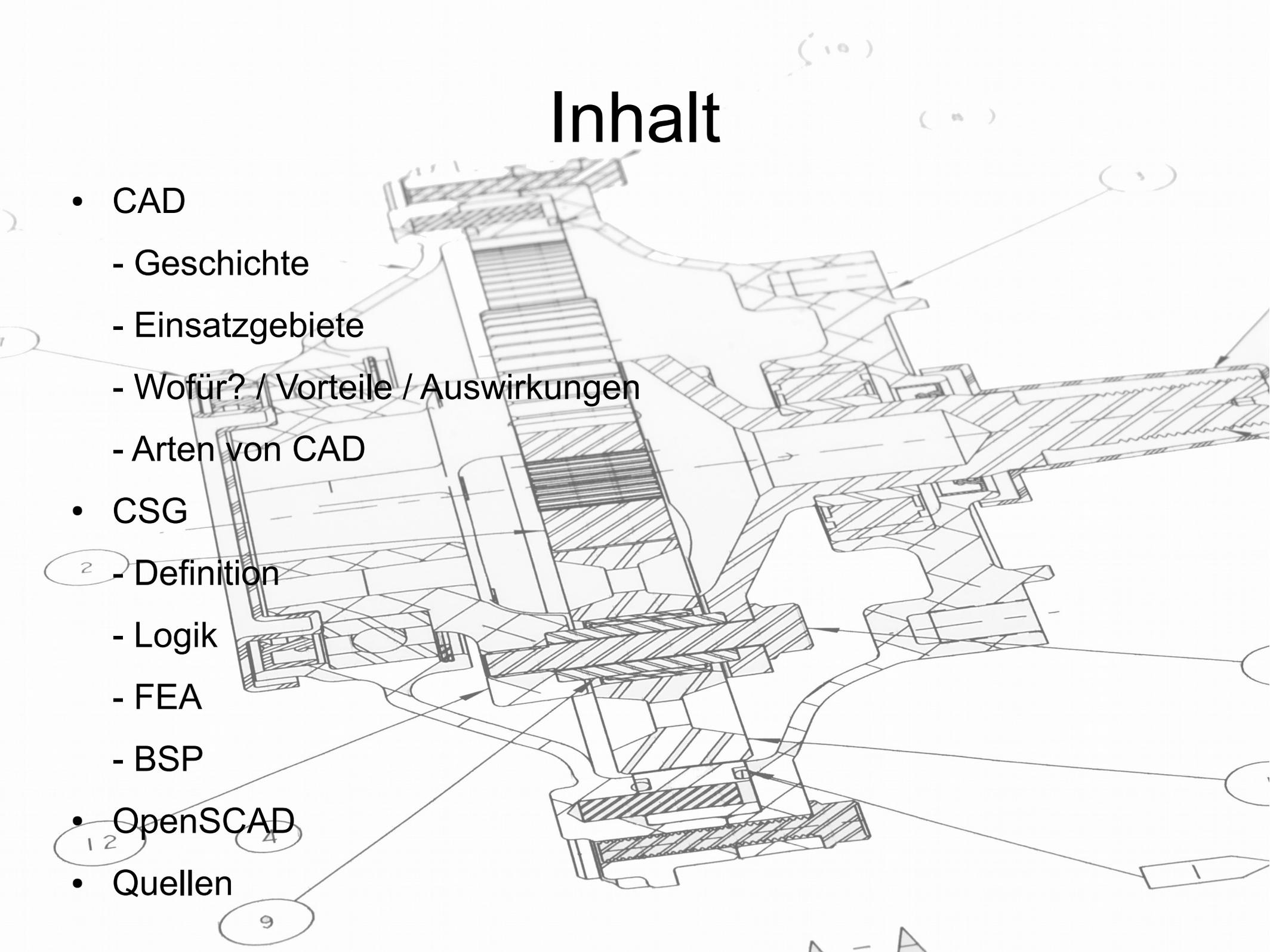


CAD & CSG

Kevin Terschluse, 04.05.2106

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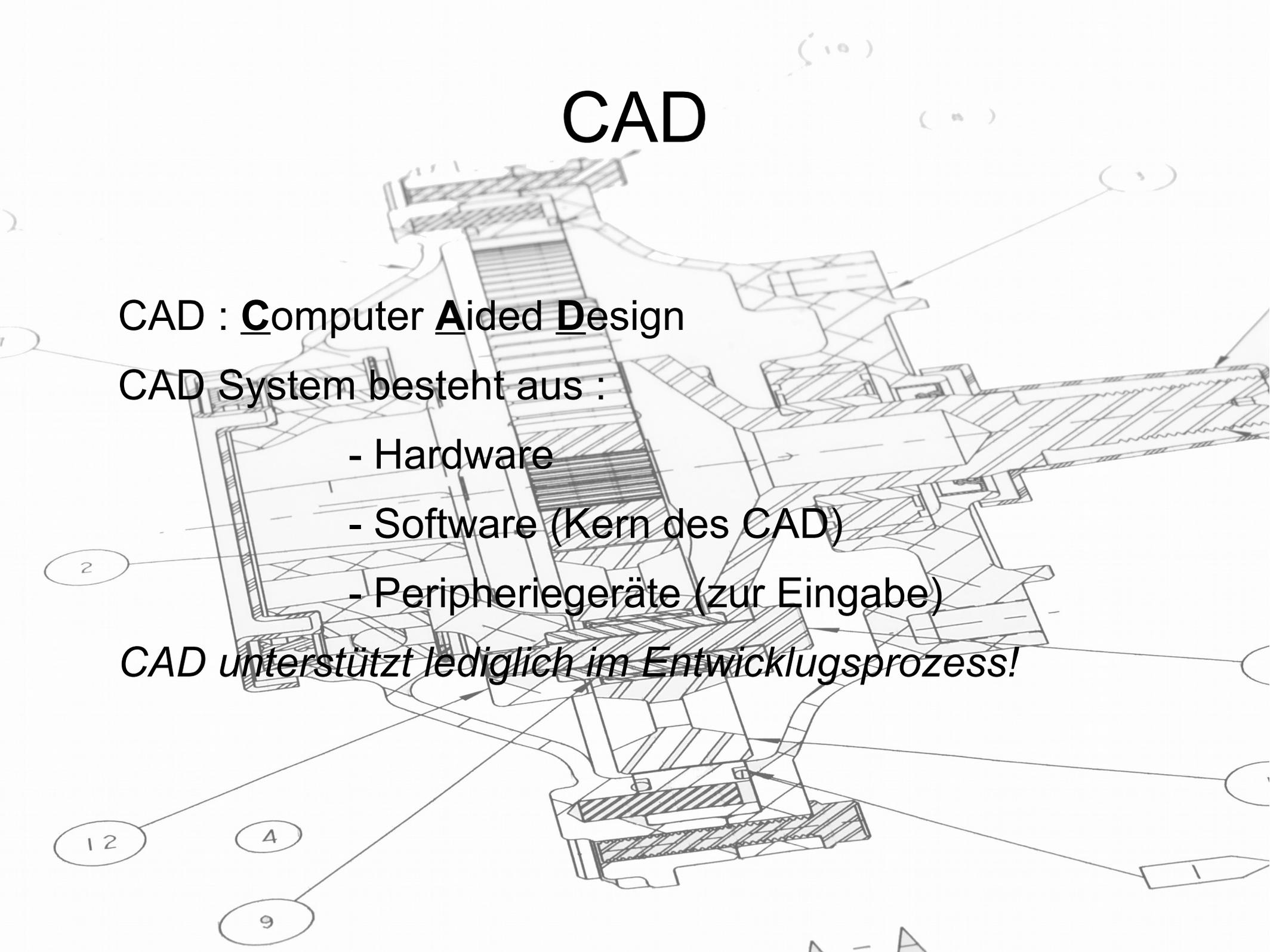
CAD

CAD : **C**omputer **A**ided **D**esign

CAD System besteht aus :

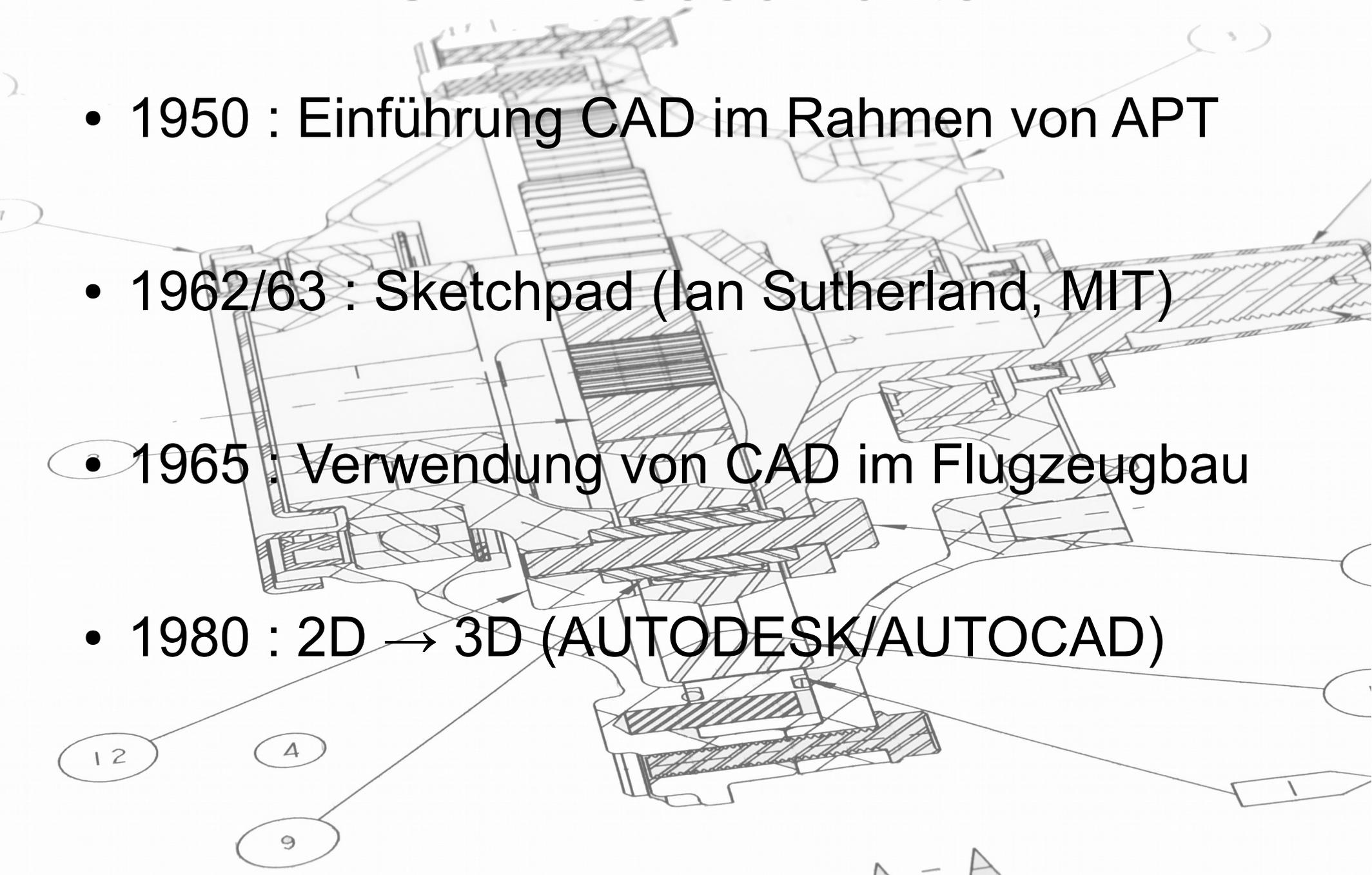
- Hardware
- Software (Kern des CAD)
- Peripheriegeräte (zur Eingabe)

CAD unterstützt lediglich im Entwicklungsprozess!



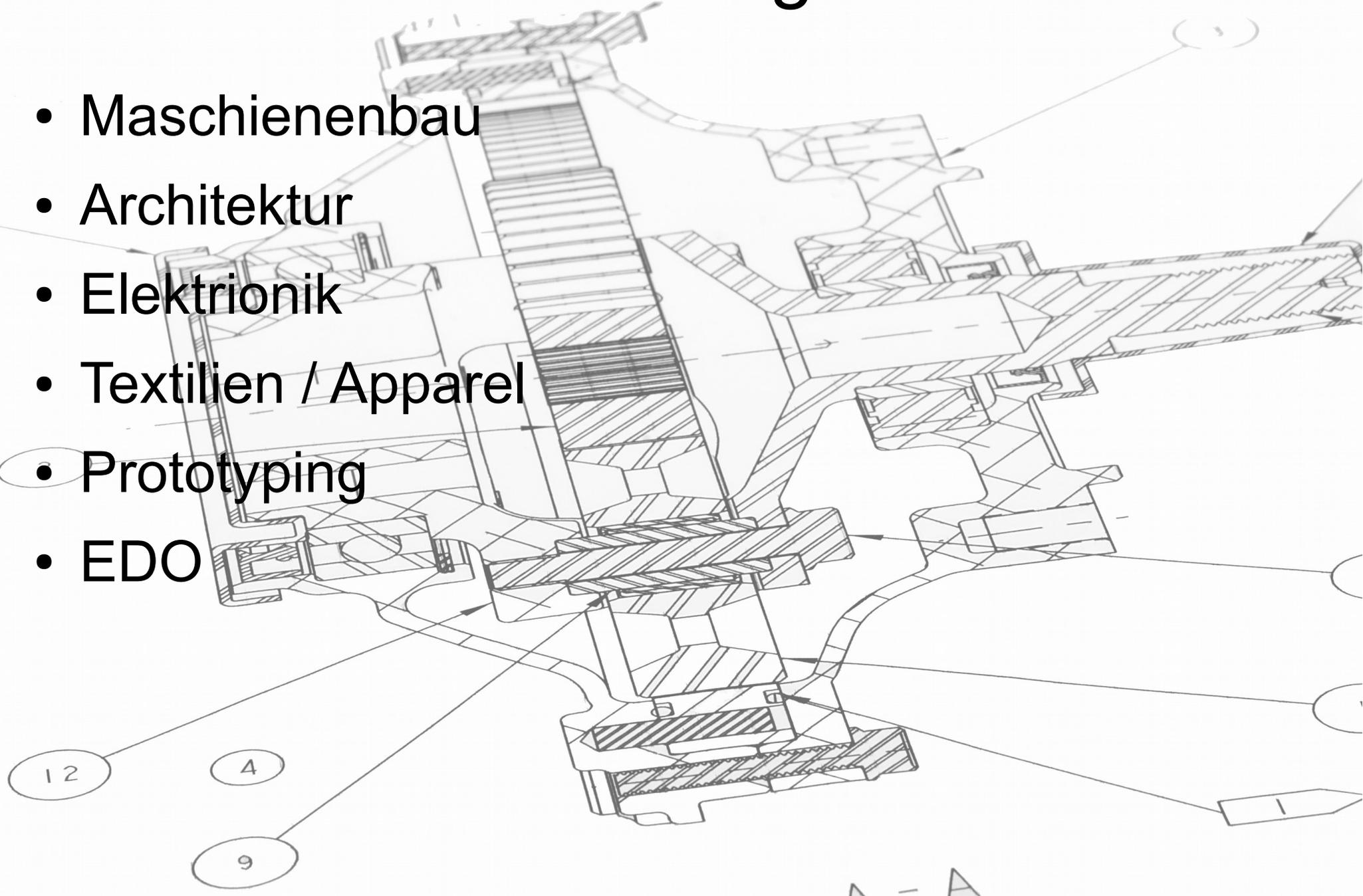
CAD : Geschichte

- 1950 : Einführung CAD im Rahmen von APT
- 1962/63 : Sketchpad (Ian Sutherland, MIT)
- 1965 : Verwendung von CAD im Flugzeugbau
- 1980 : 2D → 3D (AUTODESK/AUTOCAD)



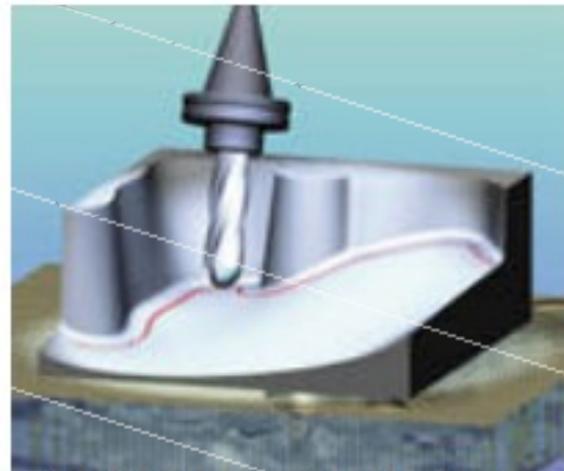
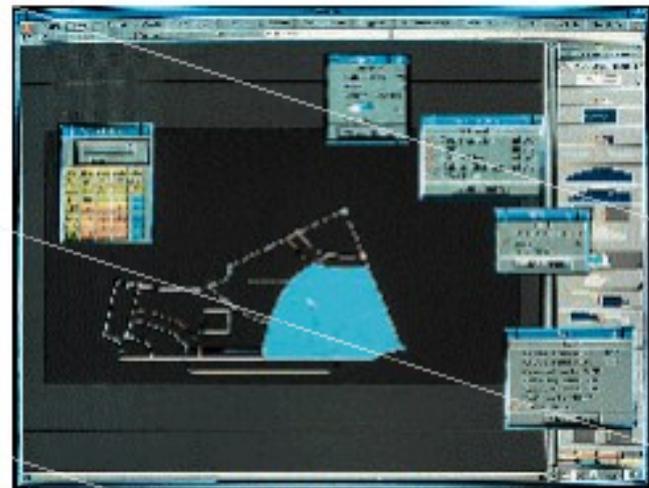
CAD : Einsatzgebiete

- Maschinenbau
- Architektur
- Elektronik
- Textilien / Apparel
- Prototyping
- EDO



(10)

(8)



2

12

4

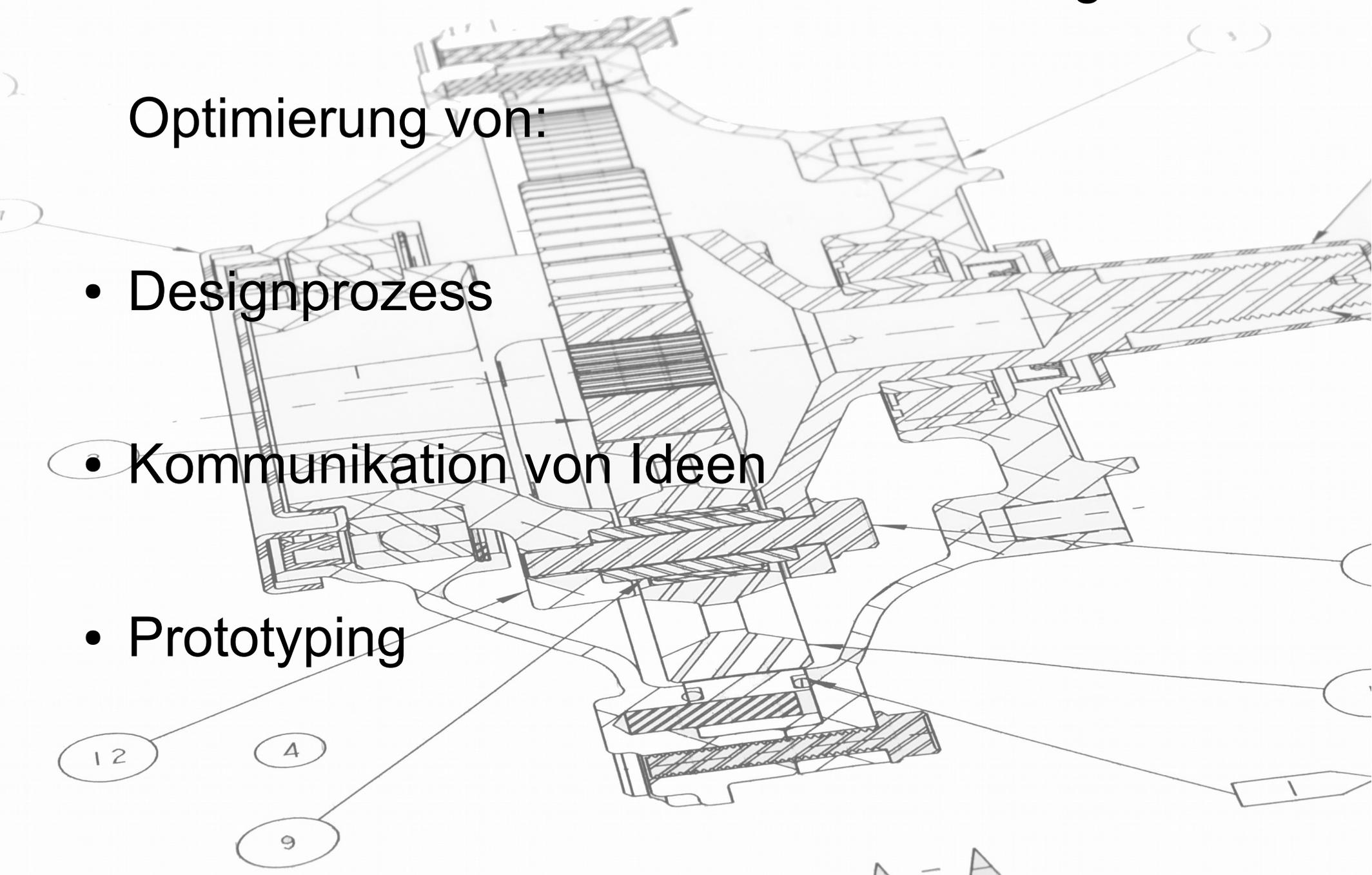
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A = A

CAD : Wofür? / Vorteile / Auswirkungen

Optimierung von:

- Designprozess
- Kommunikation von Ideen
- Prototyping



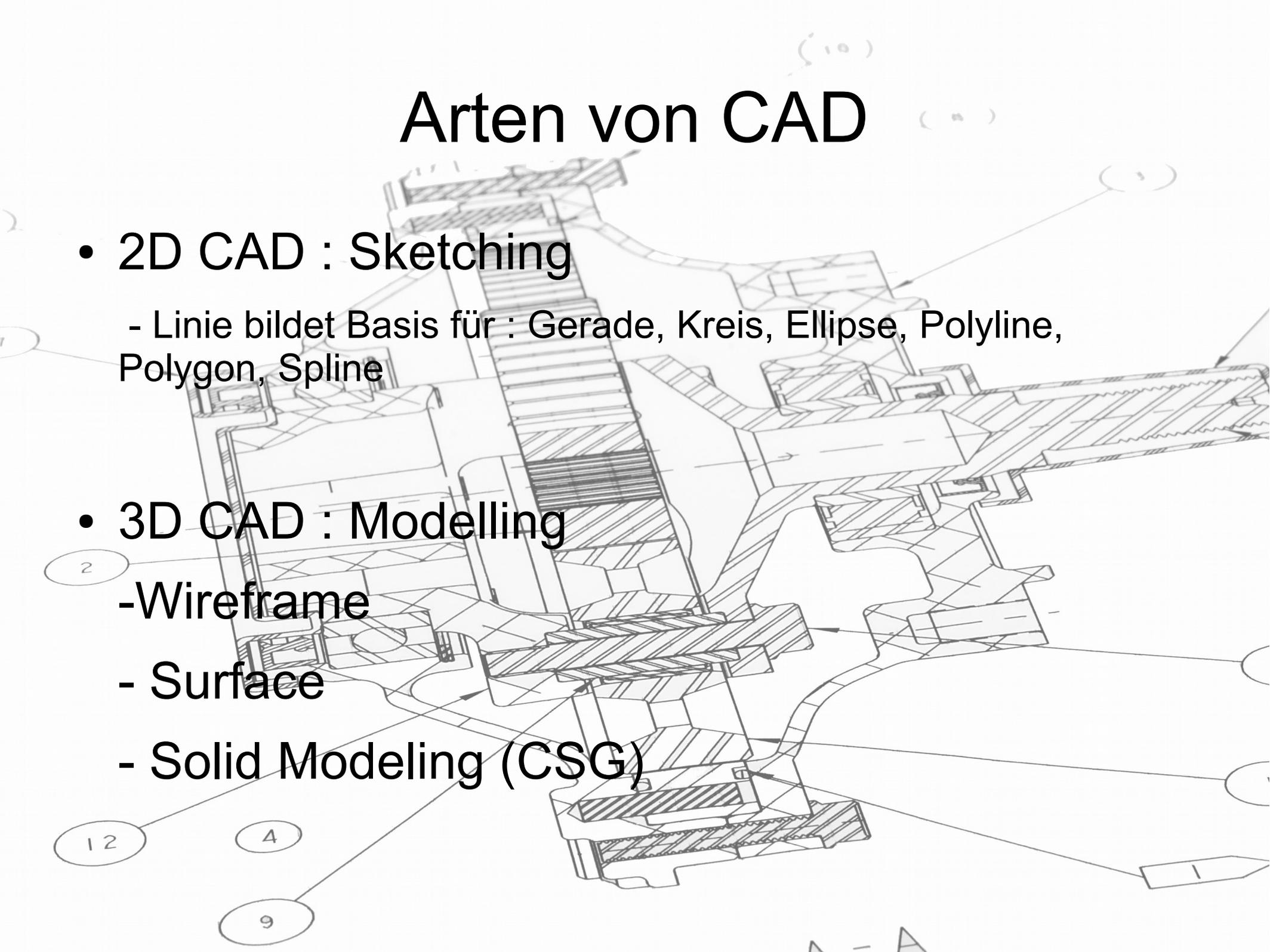
Arten von CAD

- 2D CAD : Sketching

- Linie bildet Basis für : Gerade, Kreis, Ellipse, Polyline, Polygon, Spline

- 3D CAD : Modelling

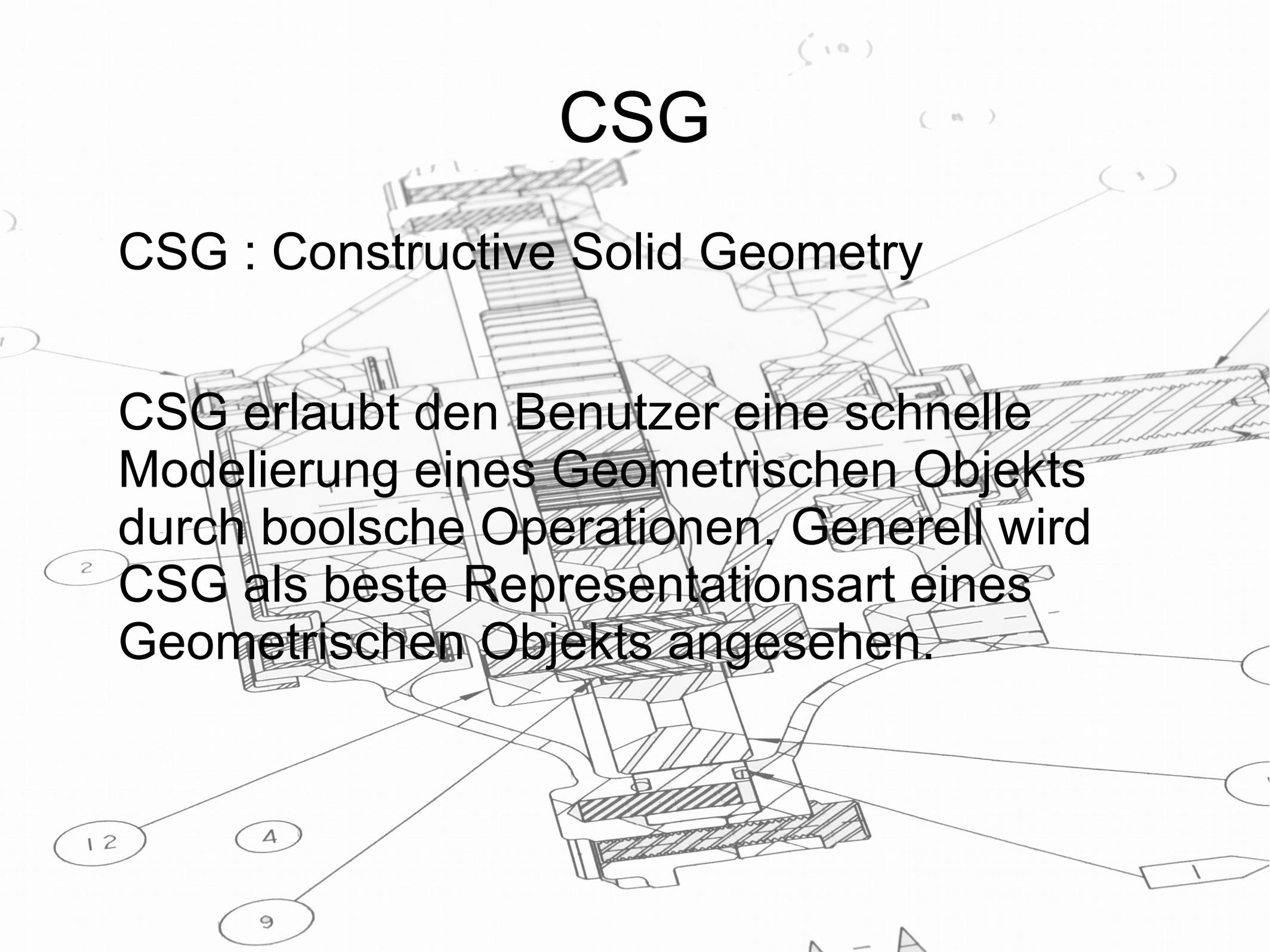
- Wireframe
- Surface
- Solid Modeling (CSG)



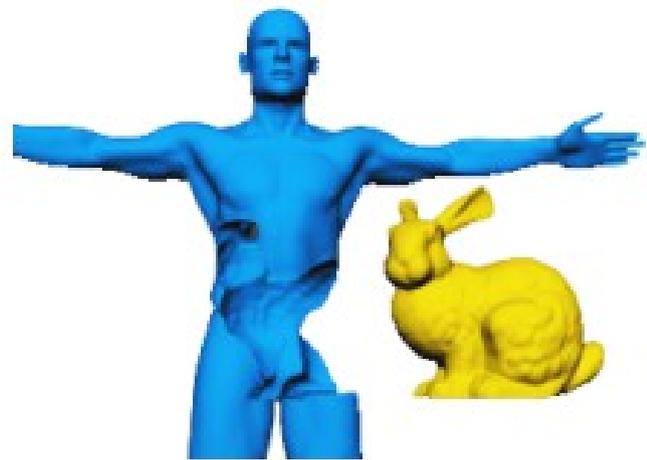
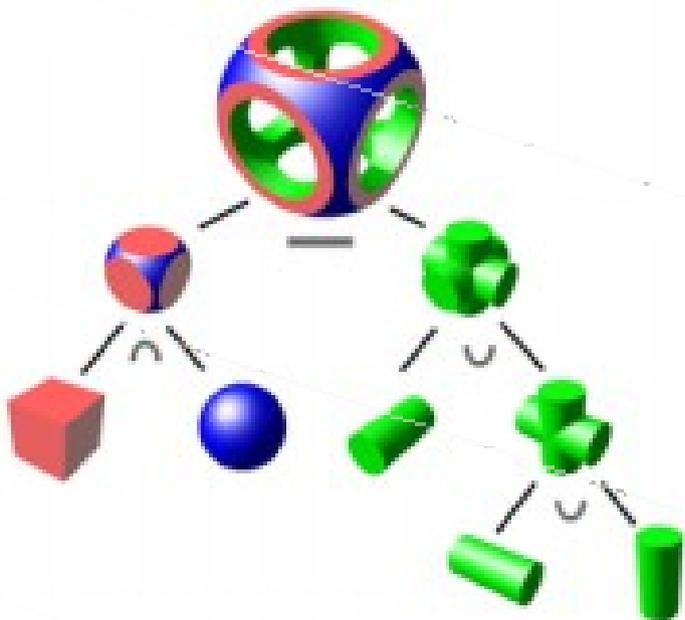
CSG

CSG : Constructive Solid Geometry

CSG erlaubt den Benutzer eine schnelle Modellierung eines Geometrischen Objekts durch boolesche Operationen. Generell wird CSG als beste Repräsentationsart eines Geometrischen Objekts angesehen.



CSG Logik



12

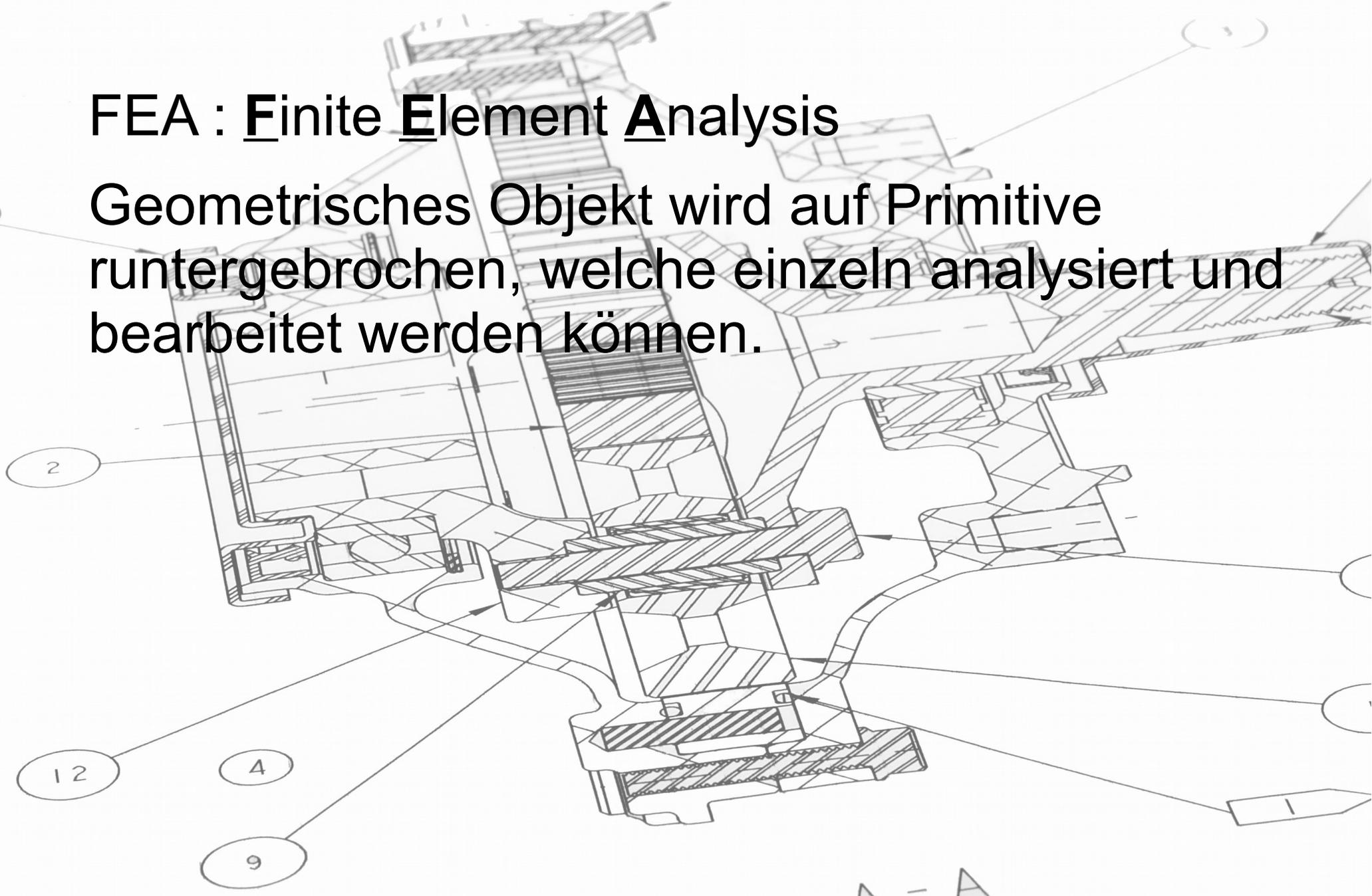
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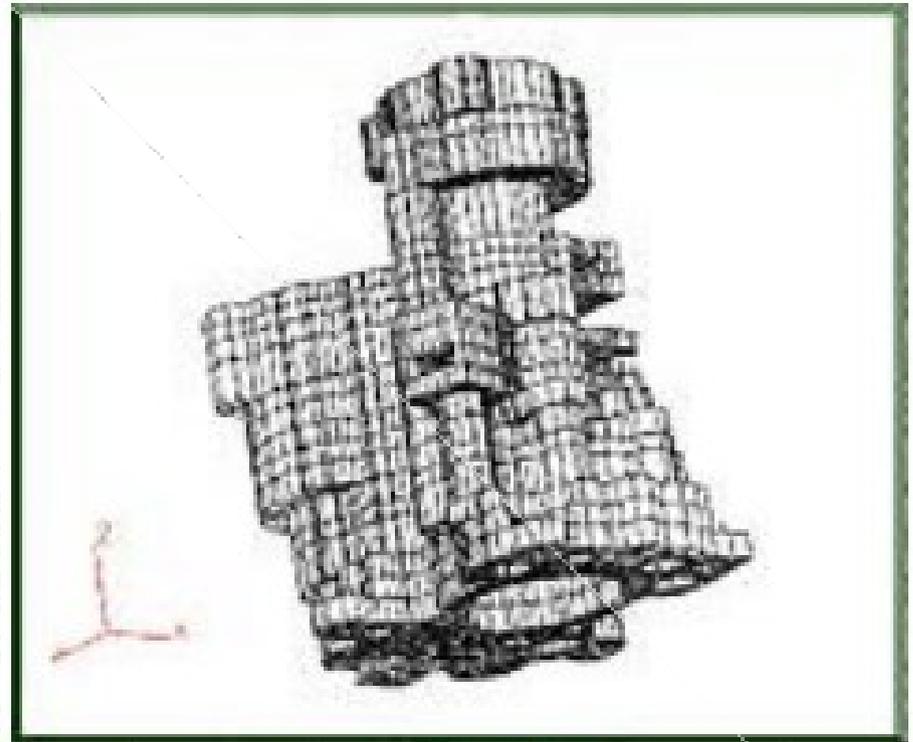
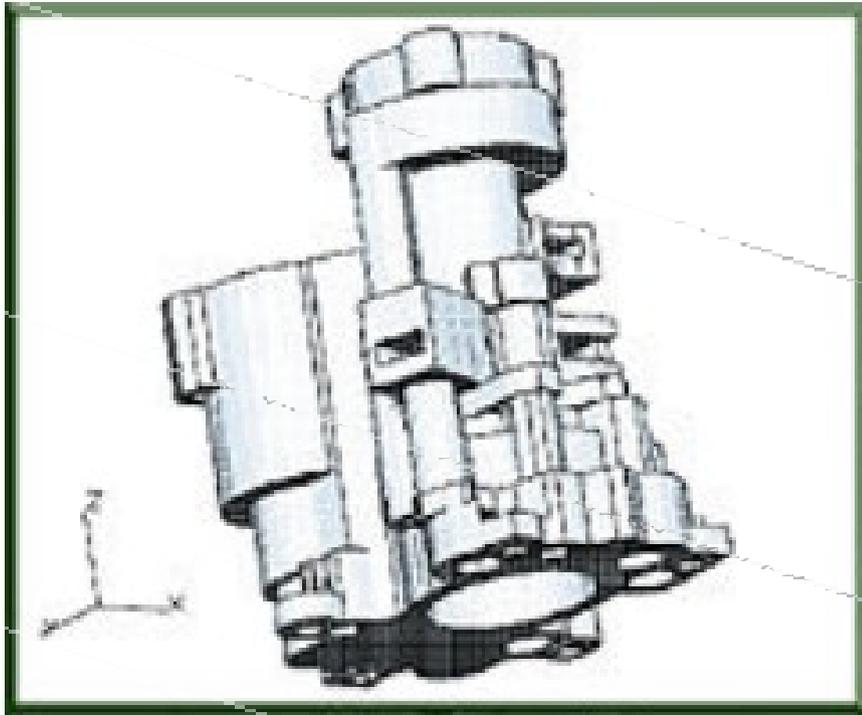
FEA

FEA : Finite Element Analysis

Geometrisches Objekt wird auf Primitive runtergebrochen, welche einzeln analysiert und bearbeitet werden können.



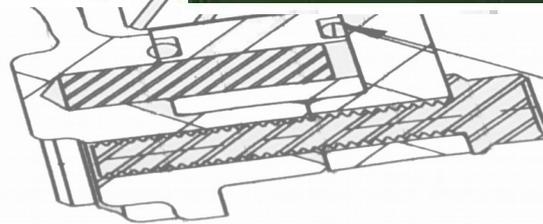
FEA



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A - A

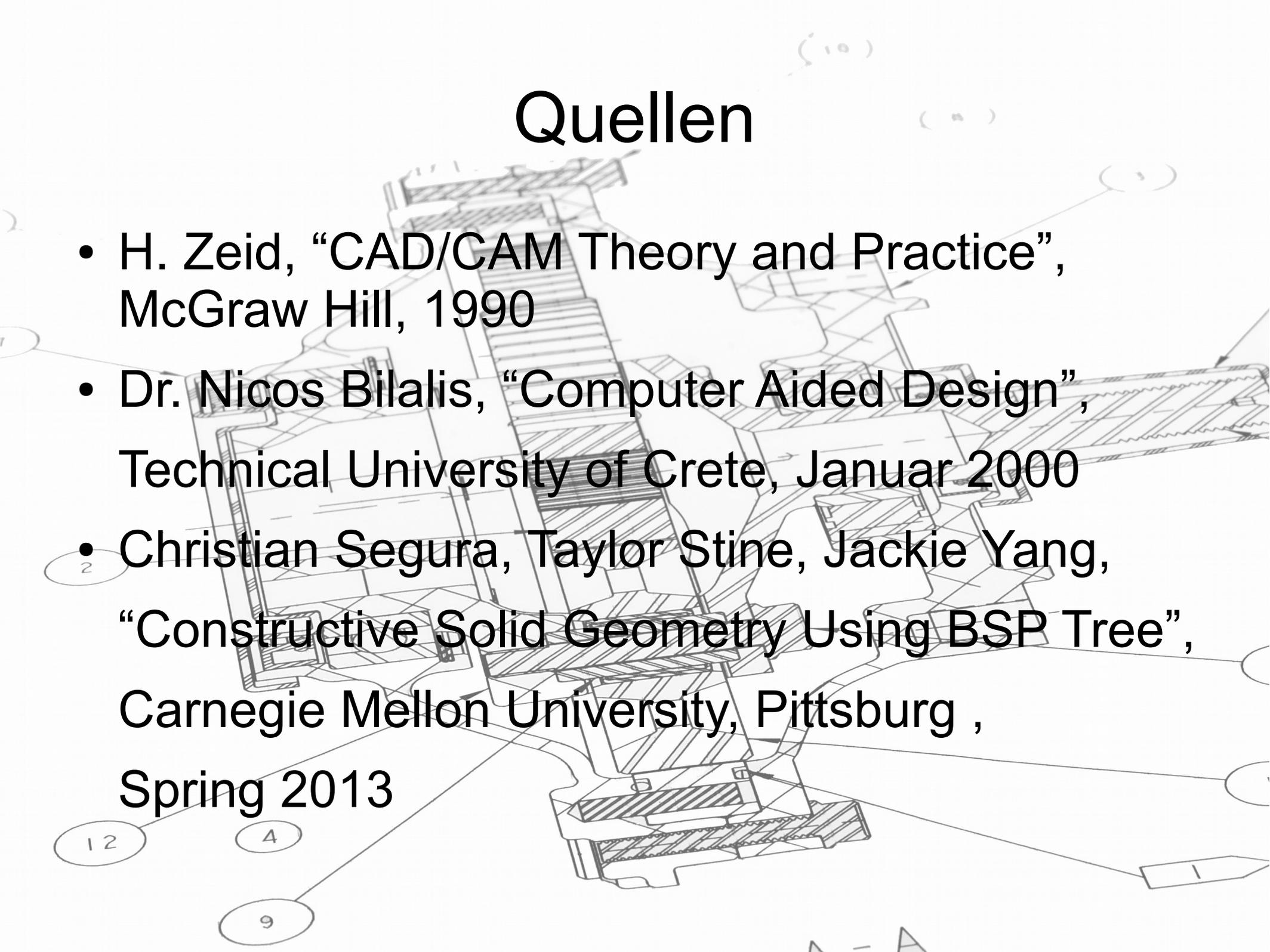
BSP Tree

BSP : **B**inary **S**pace **P**artitioning

BSP wird verwendet um die Sichtbarkeit von Objekten in einen gegebenen Raum relativ zu einen Betrachtungswinkel zu ermitteln.



Quellen

The background of the slide is a technical drawing of a complex mechanical assembly, possibly a multi-stage pump or turbine. It features various cylindrical and rectangular components, some with hatching to indicate different materials or cross-sections. Several callout circles with numbers (1, 2, 4, 9, 12) are scattered around the drawing, pointing to specific parts. The drawing is rendered in a clean, black-and-white line-art style.

- H. Zeid, “CAD/CAM Theory and Practice”, McGraw Hill, 1990
- Dr. Nicos Bilalis, “Computer Aided Design”, Technical University of Crete, Januar 2000
- Christian Segura, Taylor Stine, Jackie Yang, “Constructive Solid Geometry Using BSP Tree”, Carnegie Mellon University, Pittsburg , Spring 2013