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A Short History of CAD, Computer Aided Design

Chris Scarlett

Owner - Designer

Enterprise Design and Innovations

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Introduction: Chris Scarlett

Educator - Designer - Product Developer

- Educator
  - SOLIDWORKS, AutoCAD and Revit Architecture at CWU, YVCC
  - Content provider for Pluralsight, Digital Tutors
- Design, consulting and training services through Enterprise Design and Innovations
- Experience: mechanical & architectural design, product development, patent drawings, proof of concept – prototype creation, image and video production.
- Catnip – Kitty Catnip, our specialty is the bud, one of the highest rated products on Amazon.

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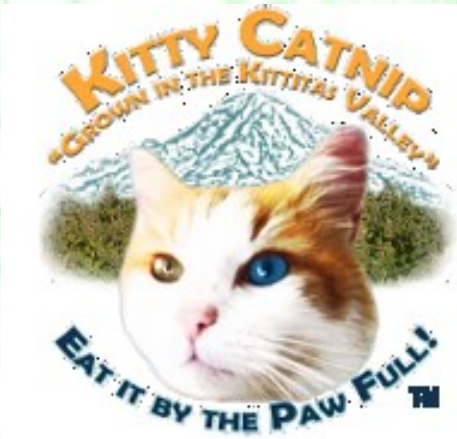
PLURALSIGHT



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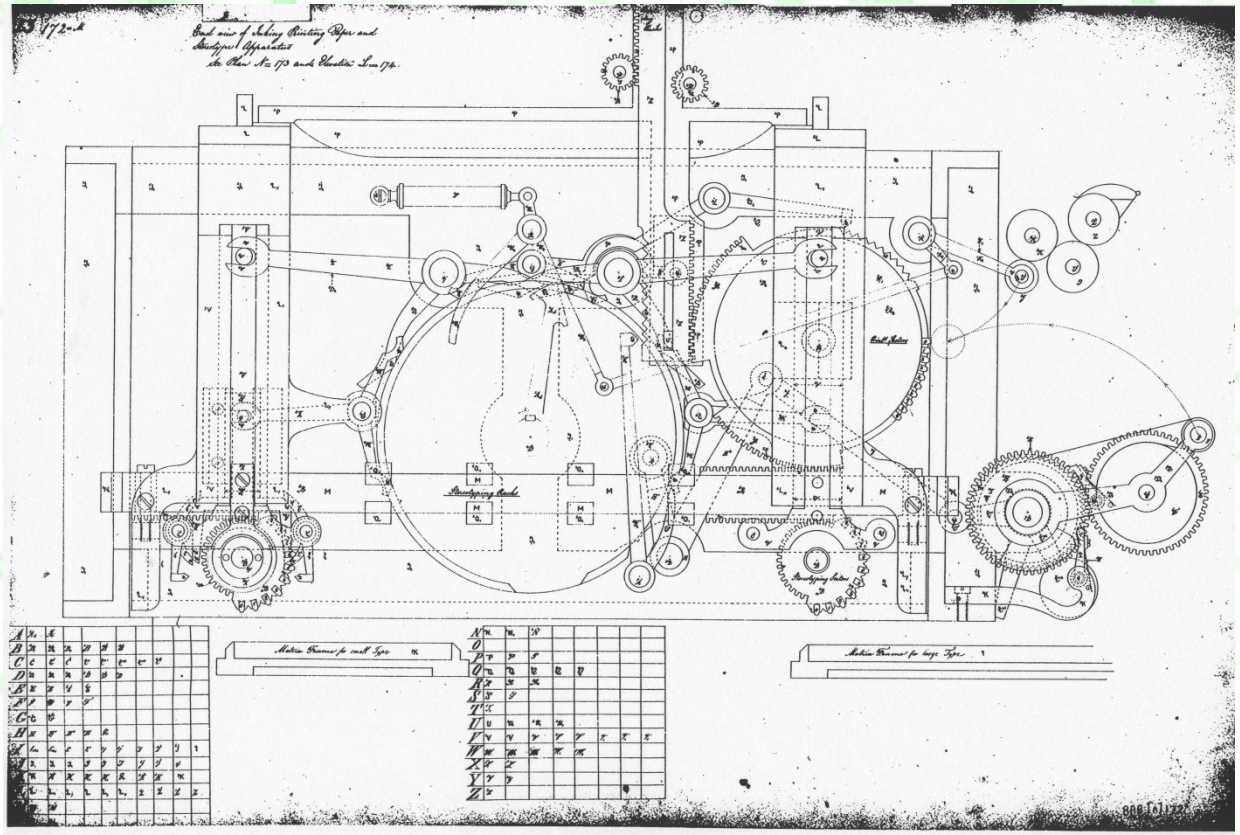
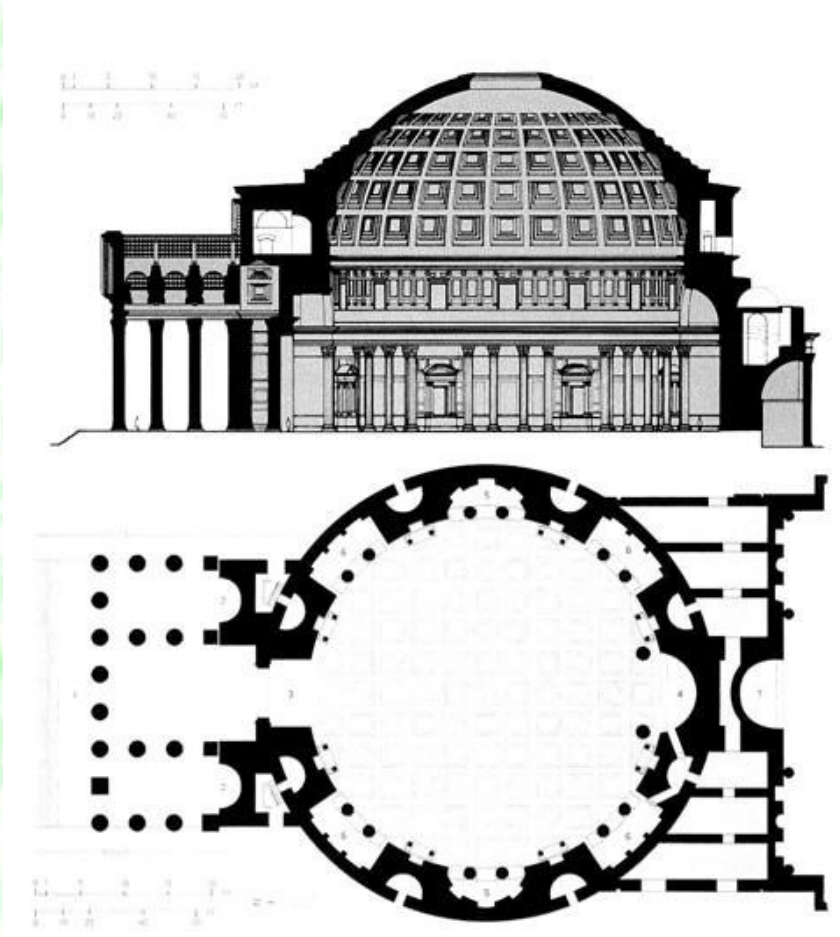
Drawings: What is a drawing?

- So that information can be directed from a designer, mechanical designer, architectural designer to the builders.
- Drawings were created with measurements and constraints so that objects can be created to the designers specifications. Without a lot of direct intervention.



Drawings: What is a drawing?

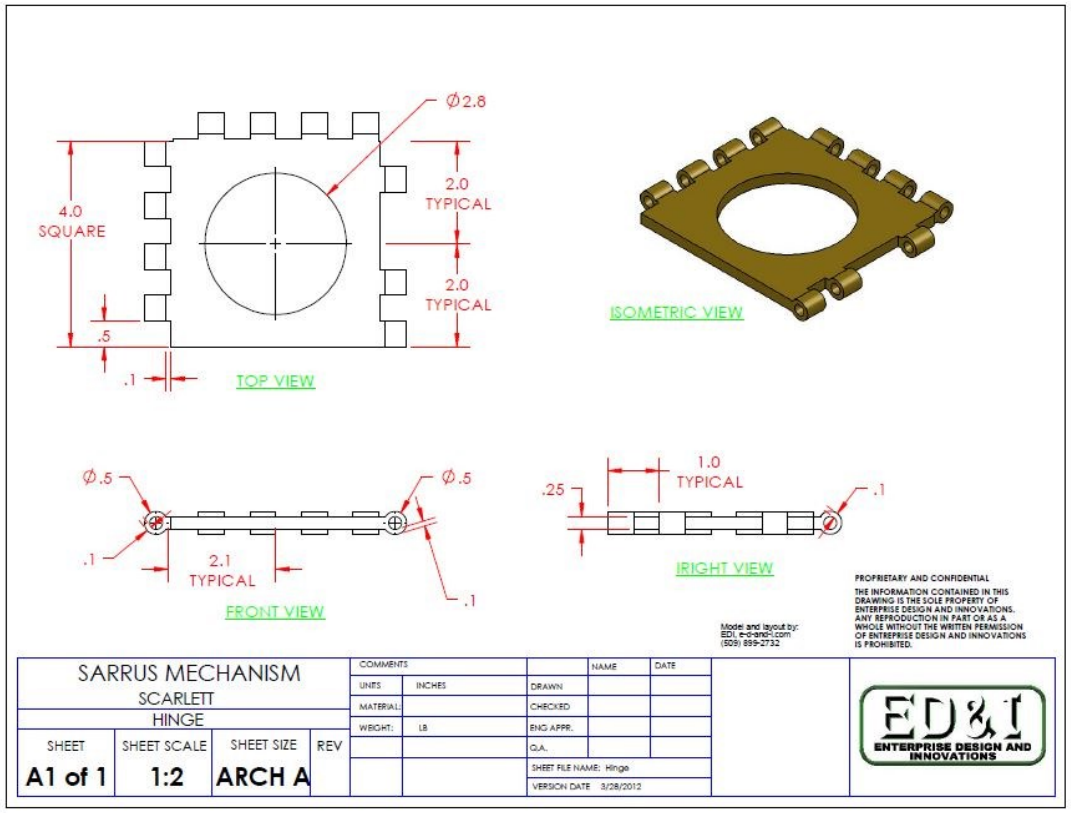
- Roman ruins show some building plans etched on nearby walls.
- Designers had to be close to their work, just like today. More direct communication back then.
- Then came paper scrolls, the designer’s life started to become a lot easier.



Drawings: A product that conveys information about building something

In this age it could be defined as:

- Paper drawings with constraints and dimensions
- Solid Model with constraints and dimensions to be exported to a CNC machine or 3D printer or similar.



Design and Drafting – a Short History

1500s

- Drafting machines,
  - Easy drawing of parallel and perpendicular lines
  - With scale rulers
  - Popular until the advent of CAD in the late 70s to late 90s.

[Drafting Machines Images.]

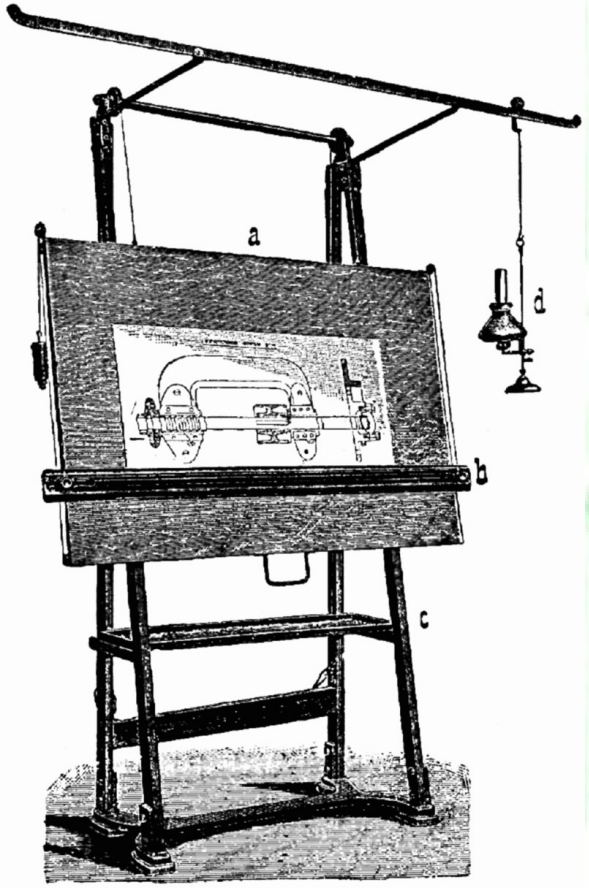
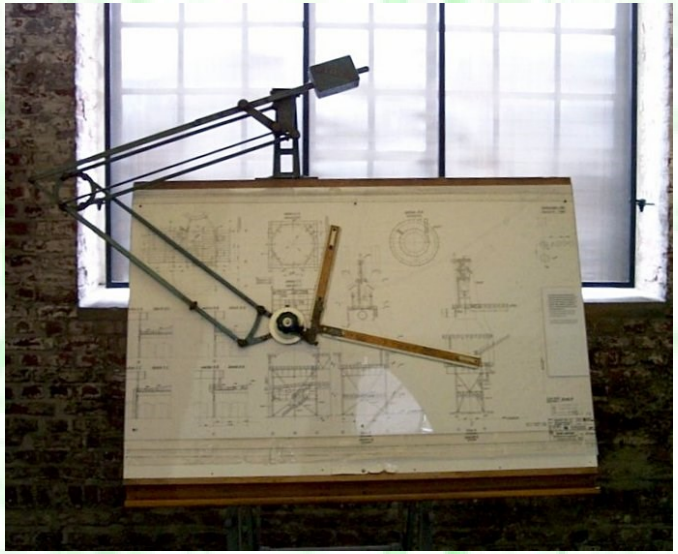


Fig. 2. Mechaniſche Zeichentafel. *a* Reißbrett. *b* Reißſchiene. *c* Geſtell. *d* Bewegliche Lampe.



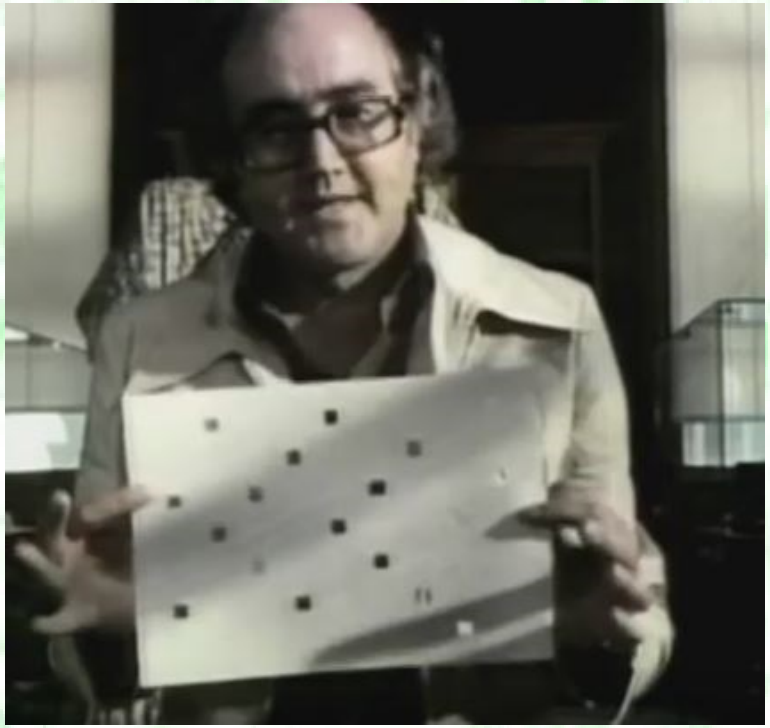
Design and Drafting – a Short History

1940s and 50s

- Development of numerical controls for machine tools at MIT
  - precursor to CNC machines run by computer controllers.
  - It defines how a tool moves
  - Similar process to how a 3D printer works.

[YouTube - James Burke on Automated Looms]

[Wiki on Numerical Control]



Computer Aided Design – a Short History

1957

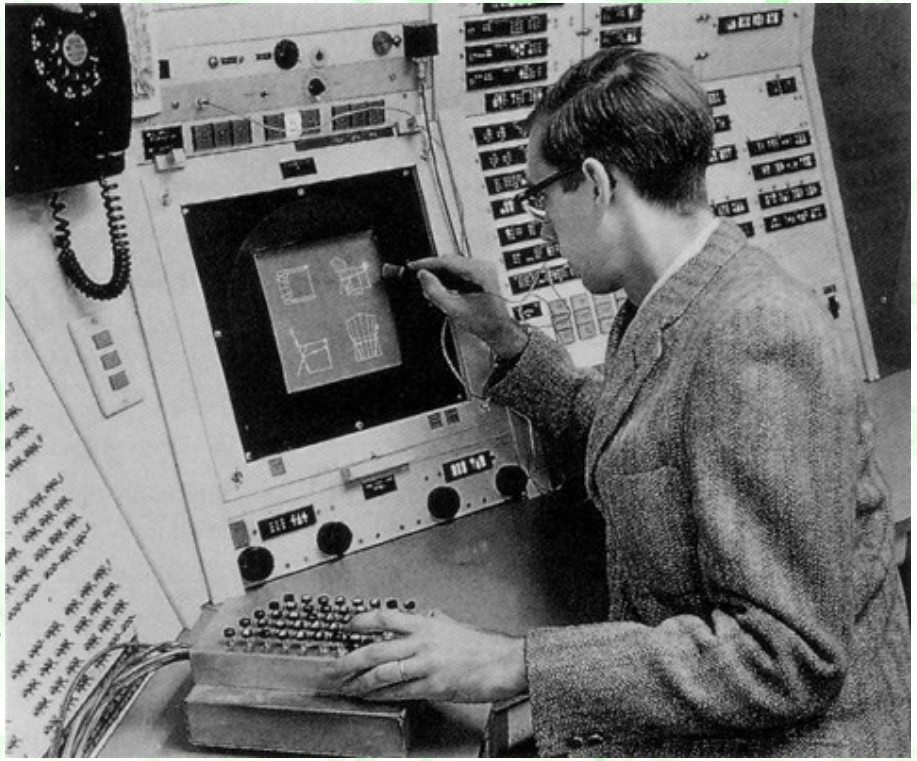
- Patrick Hanratty
  - the father of CADD/CAM (Computer Aided Design and Drafting – Computer Aided Manufacturing)
  - At GE
  - Developed PRONTO (Program for Numerical Tooling Operations)
  - the first commercial CNC programming system. But you also needed numerical design.

DE News

Computer Aided Design – a Short History

1963

- Sketchpad, First CAD software/hardware machine
- Ivan Sutherland - PhD thesis at MIT,
  - First with a GUI, light pen on a CRT computer monitor,
  - Lines between points
  - Machine size of a small house.
  - Early adapters, auto and aircraft manufacturers.



YouTube Sutherland-Demo-1

YouTube Sutherland-Demo-2

YouTube Sutherland Demo-3, The Arts Mechanical

Computer Aided Design – a Short History

1965

- Digigraphics division of Control Data Corporation
  - First commercially available CAD system
  - Hardware/software came together.
  - Late 60s crowded field in industry, others include IBM 2250, Information Displays, Adage AGT-30. Computervision

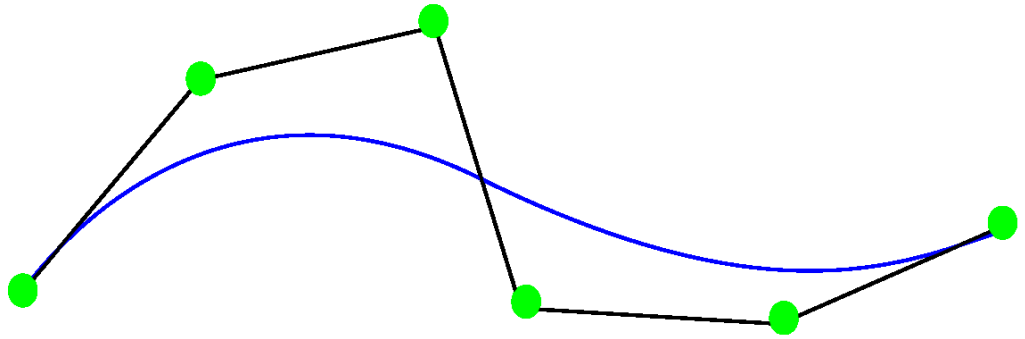
[Wiki on Digigraphics]

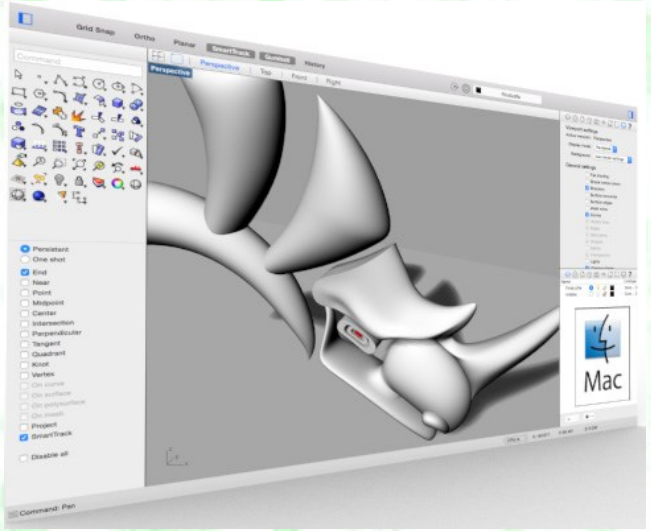
[Bitsaver on Adage AGT-30]

Computer Aided Design – a Short History

1970s

- Software development - 2D to 3D
- Ken Versprille, invention of NURBS (non-uniform rational basis spline) for his Ph.D. thesis
  - Rhinoceros - Robert McNeel - Seattle,
- First 3D solid modeling Software
- SynthaVision for nuclear exposure modeling





Wiki on NURBS

Computer Aided Design – a Short History

1978

- Software development.
- Herb Voelcker's solid modeling release of the PADL (Part and Assembly Description Language) solid modeler
  - Now a difference between substance and void.
- Others included BUILD
- Consulting firm Shape Data Ltd
- Still making machines to run the software or custom applications.

[Advanced Manufacturing on Herb Voelcker]

In the early 1980s, professor Herbert Voelcker learned CNC technologies as his research team launched multiple projects in automation engineering, including developing the Machining Process/ Programming Language (MPL) aimed at setting up machine tools.

Computer Aided Design – a Short History

1970s

- Commercial products –
- Custom programs and machines were made for large companies
- computers were getting smaller, faster and more powerful.
- Software companies using current technology
- Auto-Draft, Calma, Computervision CADDS, IBM's CADAM, M&S Computing's IGDS, Unigraphics
- smaller companies and better computers many sold to large firms McDonnell Douglas and GE.

[Wiki on Calma]

Computer Aided Design – a Short History

1980 – 1985

- DEC new mini computer, MicroVAX dominated
- Large appliance,
- Fewer custom applications, off the shelf hardware and software packages
- Familiar names HP with its PE CAD, GE and CALMA, Dassault Systemes with CATIA and IBM
- Unix Workstations come in
- AutoCAD first $1000 program for the new PC.
- DEC merge with Compaq merge with HP
- 1985 Romulus-D 3D CAD software, best yet.

[Wiki on VAX](#) [Medium on Evolution of CAD](#)

Computer Aided Design – a Short History

1986 – 1989

- Hardware, Apollo Computer, Sun Microsystems, SGI, HP, DEC and IBM all competed for the new workstation market
- 1987 Apollo Computer achieved the #3
  - 1989 HP acquired it
- End of the 1980s, DEC was on the ropes
- IBM, with open source PCs was losing ground.

[Medium on Evolution of CAD]

apollo computer inc.

Computer Aided Design – a Short History

1990s

- Great competition amongst large companies
- Boeing and Catia
- Unigraphics with Pratt & Whitney and GE engines
- Catia with Mercedes-Benz, Chrysler, Renault and Honda
- Caterpillar - Pro/Engineer.
- Hardware all workstations no large computers
- PCs growing with Windows NT 32 bit Pentium
- AutoDesk with AutoCAD the leader by far.
- Turn quickly, 1993 comes SolidWorks.

[Medium on Evolution of CAD]

Computer Aided Design – a Short History

1993

- Jon Hirschtick,
  - Director of engineering at Computervision
  - MIT graduate
  - Player and instructor on the MIT Blackjack Team, Movie 21,
  - Founder of SolidWorks, 1993 with $1,000,000 from blackjack.
  - Sold SolidWorks to Dassault Systemes for 310,000,000 in stock, 1997.
  - Left SolidWorks in 2012 to found Onshape.

  Wiki on Jon Hirschtick

Computer Aided Design – a Short History

- SolidWorks, hard to gauge but probably the best-selling brand of 3D CAD software in the world
- Autodesk Revenue 2016 2.5 billion
- Dassault Systèmes S.A Revenue 2.839 U Billion, 3.39 Billion US
- SolidWorks - Get involved in the community

[SolidWorks Users Group Network (SWUGN)]

- [Seattle Area SolidWorks Power Users Group.]
- [Yakima SolidWorks Users Group (YSWUG)]

[SolidWorks World]

[SolidWorks Forum]

[Upcoming SolidWorks Events]

Computer Aided Design – a Short History

Your class website at edandi.com

Thank You!