Chapter 1
History of Additive Manufacturing

ABSTRACT

History of additive manufacturing started in the 1980s in Japan. Stereolithography was invented first in 1983. After that tens of other techniques were invented under the common name 3D printing. When stereolithography was invented rapid prototyping did not exists. Tree years later new technique was invented: selective laser sintering (SLS). First commercial SLS was in 1990. At the end of 20t century, first bio-printer was developed. Using bio materials, first kidney was 3D printed. Ten years later, first 3D Printer in the kit was launched to the market. Today we have large scale printers that printed large 3D objects such are cars. 3D printing will be used for printing everything everywhere. List of pros and cons questions rising every day.

INTRODUCTION

Early additive manufacturing (AM) equipment and materials were developed in the 1980s. In 1981, Hideo Kodama, see Figure 1, of Nagoya Municipal Industrial Research Institute invented two AM photopolymer rapid prototyping systems, where a mask pattern or the scanning fiber transmitter controls the UV exposure area. (Kodama, A Scheme for Three-Dimensional Display by Automatic Fabrication of Three-Dimensional Model, 1981) (Kodama, Automatic method for fabricating a three-dimensional plastic model with photo-hardening polymer, 1981)

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Figure 1. Hideo Kodama (Source: Opel designer Hideo Kodama, 2014)

Year 1983: Charles Hulls Invented Stereolithography (SLA)

Word stereolithography is still not in the most popular vocabularies such as Merriam-Webster. Therefore, common definition of this word will be:

A technique or process for creating three-dimensional objects, in which a computer-controlled moving laser beam is used to build up the required structure, layer by layer, from a liquid polymer that hardens on contact with laser light.

Year 1983 was an exciting year, when Sony and Philips introduced CDs and camcorders to the general public. Same year was also the year that *Charles "Chuck" Hull* (1939-), invented stereolithography . Three years later, in 1986, he founded company 3D Systems. This innovation has not been widely recognized by the general public as CDs and camcorders, but its impact on our lives has been profound.

When Stereolithography was developed, rapid prototyping did not exist. Creating a conceptual model, or functional prototype, took months and cost thousands of dollars. In addition, while designers and engineers were using CAD/CAM software, there was no method for that software to communicate to with first Rapid Prototyping System, SLA 1. Therefore, *Chuck* and 3D Systems also developed the .stl file format, still in use today, to complete the electronic transfer from the CAD software to the 3D printers for the purpose of printing 3D objects. \

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