Autodesk Manufacturing Innovation Event, Sept. 28 2016

Hosted by Manufacturers Monthly

Aurora | LABS

The New Industrial Revolution:
WHAT DO YOU WANT TO BUILD TODAY?

AURORA LABS IS A 3D METAL PRINTER MANUFACTURER THAT AIMS TO ENABLE MASS ADOPTION OF 3D METAL PRINTING VIA NEW TECHNOLOGIES THAT SIGNIFICANTLY REDUCE PRICES AND INCREASE THE SPEED OF MACHINES

www.auroralabs3d.com

The Next Industrial Revolution

Little beginnings - big changes – Printing Revolution

Guttenburg Press in 1436

As has been noted by Elizabeth Eisenstein the American historian, the printing press “changed the appearance and state of the whole world.”

“The printing press as an Agent of Change” - 1979

vlasta2

The Next Industrial Revolution

Increasing complexity – Computing Revolution

Increasing processing power

Coupling with existing manufacturing

CNC
Robotics

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Designer Bastian Schaefer shows off a speculative design for the future of jet planes, with a skeleton inspired by strong, flexible, natural forms and by the needs of the world's, ahem, growing population. Imagine an airplane that's full of light and space — and built up from generative parts in a 3D printer.

Interactive transcript

3D printed sternum: The 'chest' story you'll hear all week. Image credit: Anatomics

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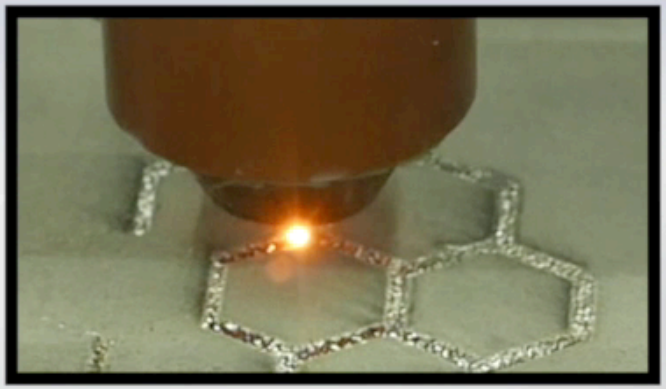
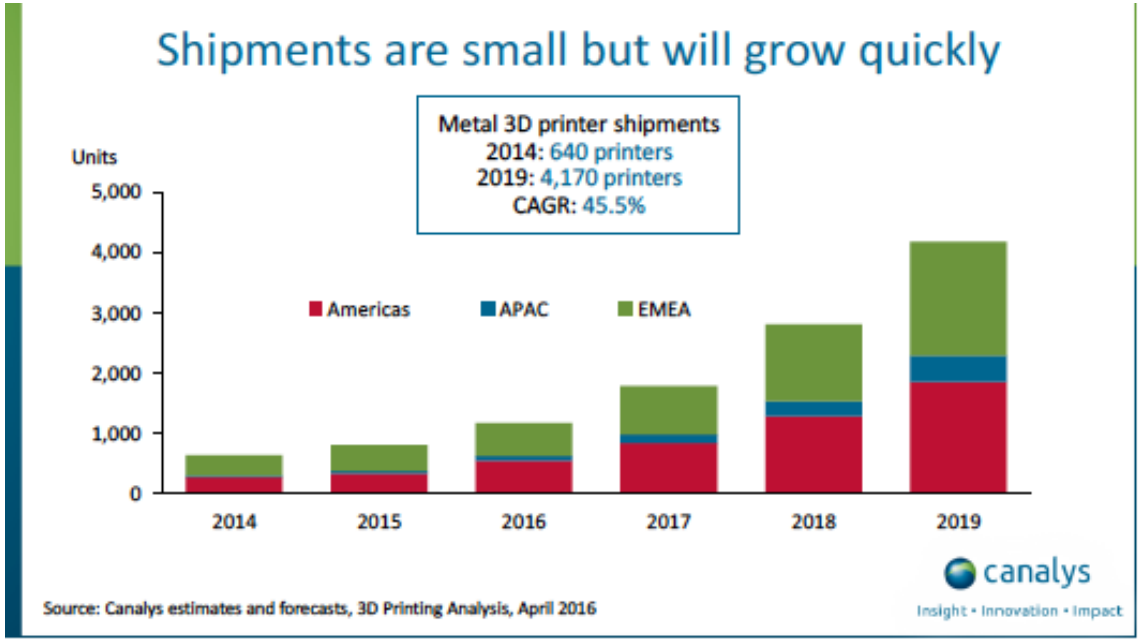


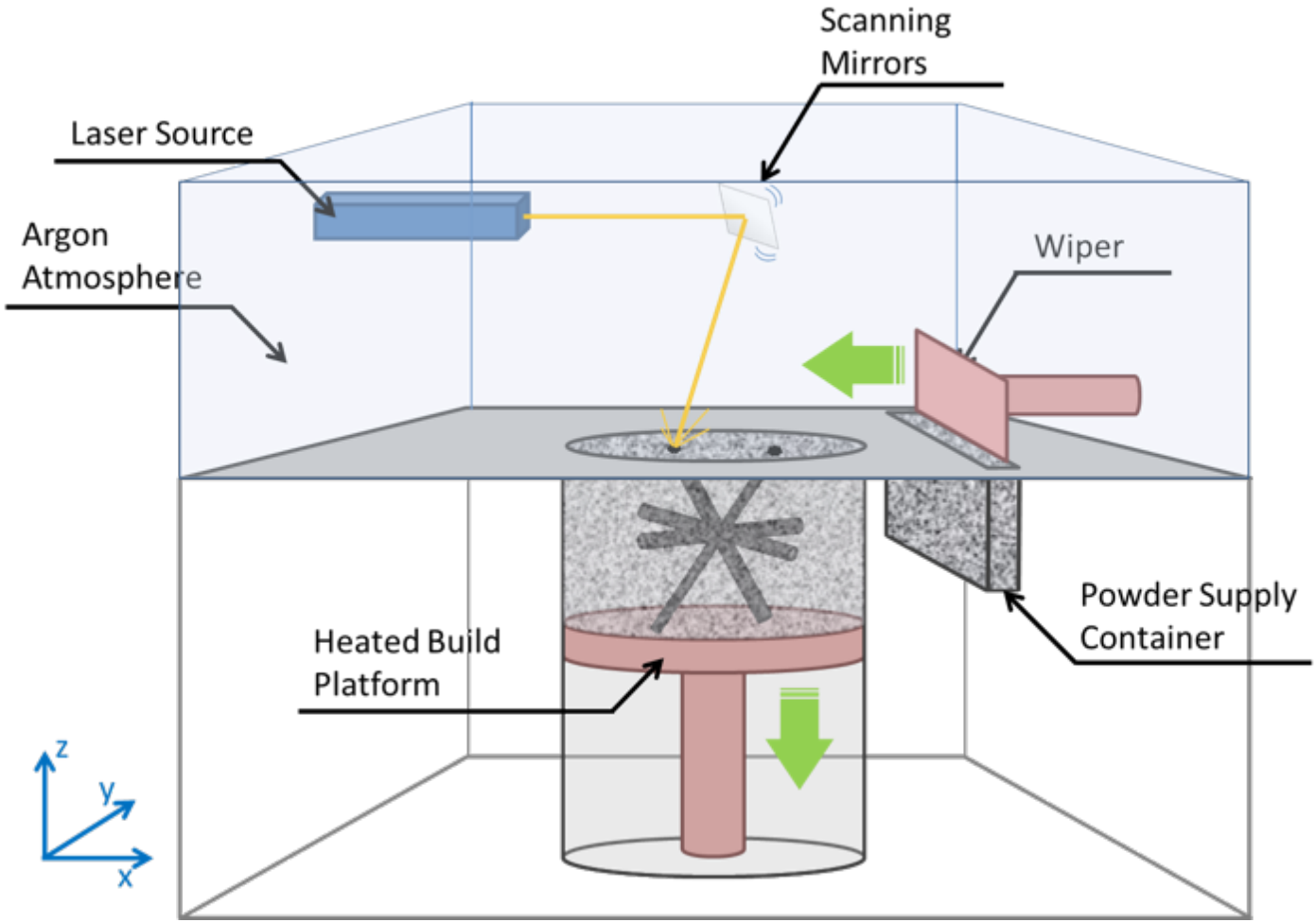
Seeing is Believing

The Next Industrial Revolution

– Additive manufacturing in all it's forms

- Plastics
- Resin
- Metal





Not representative of our printers laser scanning process

Michele Garibaldi

WHO USES 3D METAL PRINTING?

According to a PwC survey of US manufacturers, **two of three companies are already adopting 3D printing** in some way[1].

Based on internet searches and Aurora's direct contacts, some of the major organisations that use 3D metal printing include:

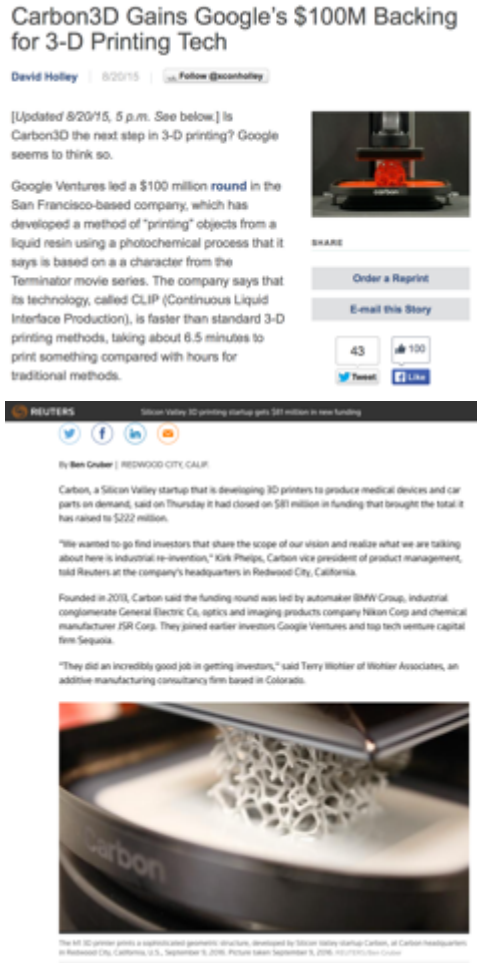
BOEING
GM
AIRBUS
Ford
SIEMENS
NASA
GE
ALCOA
SPACEX

1. PWC – 3D printing and the new shape of industrial manufacturing

Note: Aurora Labs does not claim the above Companies endorsement

Plastic 3D printing innovators

- **Carbon 3D** – Founded in 2013 it raised $100m USD in a raising led by Google Ventures and has recently raised an additional $81m USD led by GE, BMW, Nikon and JSR. Its point of differentiation from others in the market is its ability to print at approx. *100x the speed* of competing processes in plastic.



Carbon3D Gains Google's $100M Backing for 3-D Printing Tech

David Holley | 8/20/15 | Follow @sconholley

[*Updated 8/20/15, 5 p.m. See below.*] Is Carbon3D the next step in 3-D printing? Google seems to think so.

Google Ventures led a $100 million round in the San Francisco-based company, which has developed a method of "printing" objects from a liquid resin using a photochemical process that it says is based on a character from the Terminator movie series. The company says that its technology, called CLIP (Continuous Liquid Interface Production), is faster than standard 3-D printing methods, taking about 6.5 minutes to print something compared with hours for traditional methods.

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REUTERS

Carbon, a Silicon Valley startup that is developing 3D printers to produce medical devices and car parts on demand, said on Thursday it had closed on $81 million in funding that brought the total it has raised to $222 million.

"We wanted to go find investors that share the scope of our vision and realize what we are talking about here is industrial re-invention," Kirk Phelps, Carbon vice president of product management, told Reuters at the company's headquarters in Redwood City, California.

Founded in 2013, Carbon said the funding round was led by automaker BMW Group, industrial conglomerate General Electric Co, optics and imaging products company Nikon Corp and chemical manufacturer JSR Corp. They joined earlier investors Google Ventures and top tech venture capital firm Sequoia.

"They did an incredibly good job in getting investors," said Terry Wohler of Wohler Associates, an additive manufacturing consultancy firm based in Colorado.

Complexity is free

- The cost of printing a 10kg block of Inconel 718 is roughly the same as printing an Inconel 718 turbine blade or other complex shape.

- Tipping point for redesign revolution

Current 3D metal printing cost vs high speed 3D printing

- Typical 3D printing bureau charge out per kg - $2,000.00 to $3,000.00
- The potential cost of a high speed machine is as low as $0.50 - $2.00 per kg
- High cost parts, such as pumps or valves, weighing 300kg and currently costing up to $80,000.00 could be printed for $4,500.00

Some features of the new landscape

- Increased productivity
- Distributed manufacturing
- Omni-factories –
  - infinite automation
- Greatly reduced transport footprint
- Increased localisation
- Increased customisation
- Increased speed of development
- Reduced cost of development

S-Titanium Pro Beta machine

What's next?

- Dystopian Nightmare or Utopian Dream?
- The place for governments
- Shift from production, information and service based economy to Information and service based
- Possibility of increased leisure time for all
- Probably in-between the two extremes

Voltair - *Each player must accept the cards life deals him or her: but once they are in hand, he or she alone must decide how to play the cards in order to win the game.*

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THANK YOU FOR YOUR INTEREST

CONTACT US:

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