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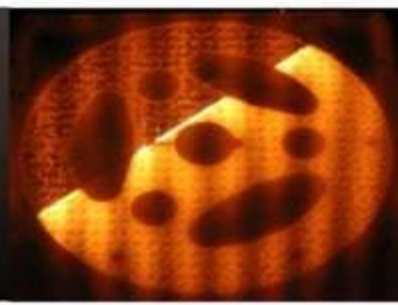
Arcam AB®

Metal Additive Manufacturing

It's in planes
It's in bodies
It's in production!



Transforming Industry

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Our objective is to change how metal products are manufactured, ***transforming the industry*** *from conventional processes to* ***Additive Manufacturing***

User benefit - Performance

Design freedom to produce products with
new, unique properties

- Weight reduction (aero)
- Advanced cooling (aero)
- Bone ingrowth (implant)

Increased performance,
making the product
more valuable

User benefit - Cost

Efficiency to
replace present technology

- No tooling cost
- Shorter lead time
- Less material use, more efficient

More efficient production,
reducing product cost

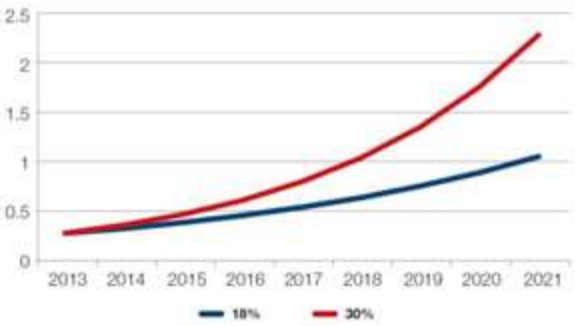
Fast growing market

Additive Manufacturing in metals **grow fast**, at about 50% p.a.

Additive Manufacturing in metals is **well established** for implants and aerospace

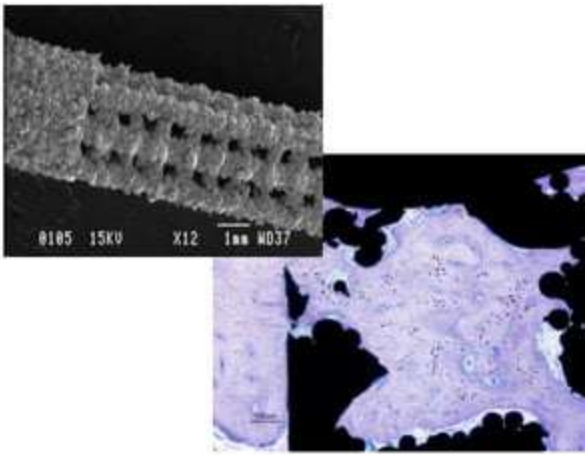
We are in the **beginning of a long growth journey**

Market growth 2013–2021 in USD billion for the market for AM in metal, with 18 and 30 percent annual growth



How it started

- First contacts with University of Gothenburg / Biomaterials in 2004
- Project to study bone ingrowth in EBM-manufactured parts initiated in 2005
- Arcam founding partner of Biomatcell in 2007



BIOMATCELL

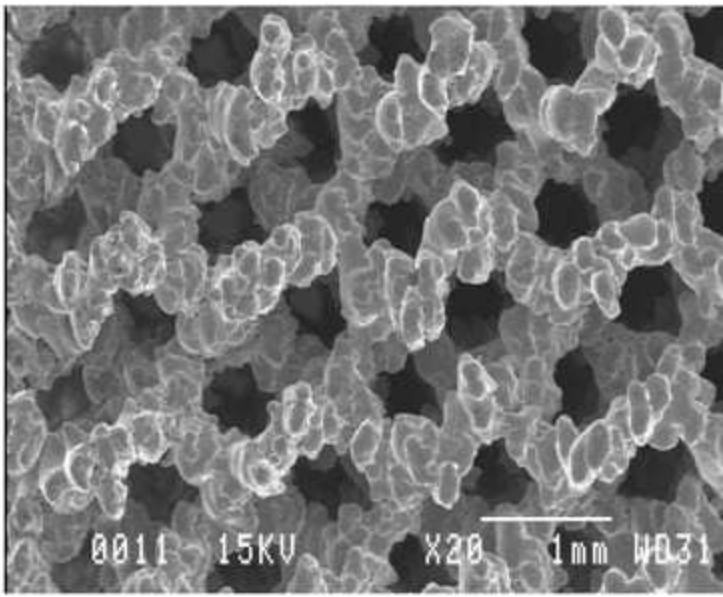
VINN Excellence Center
of Biomaterials and Cell Therapy

Trabecular structures

Understanding

Why to build Trabecular structures

How to build Trabecular structures



Trabecular structures, Why?

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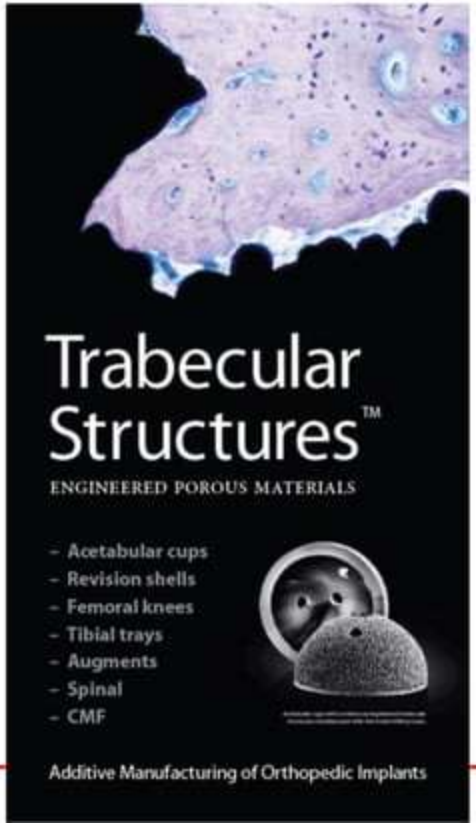
Understanding

The value of **product differentiation**

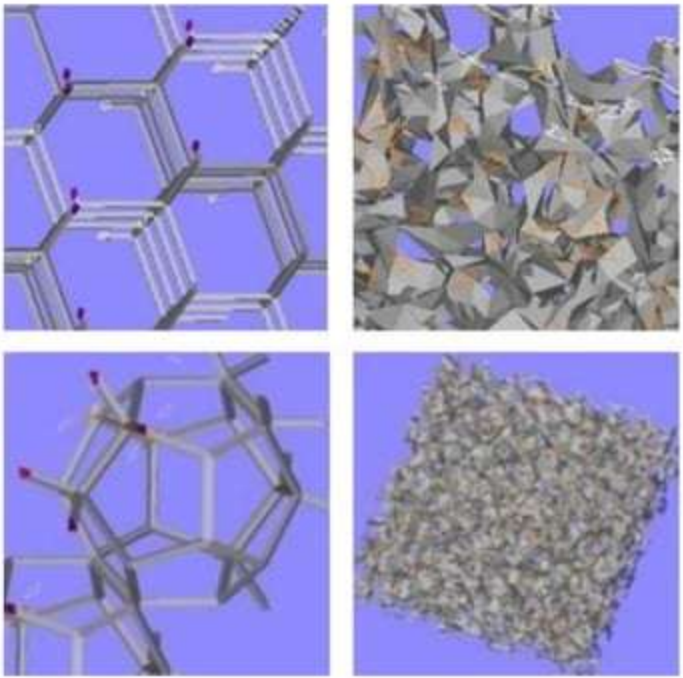
The value of perfect **bone ingrowth**



Trabecular structures, How!

Creating design methodology and software to build trabecular structures.

Learning how to clean structures



Skepticism – to overcome

- Can the AM material really be used, is it same as conventional Ti?
- OK, it fulfils all specs, but is it biocompatible?
- Aha, Italian companies use it, how about someone else?
- Oh, it has CE approval, how about FDA?
- Alright, you have CE and FDA approval, how about SFDA? Japanese approval …..?

? Questions
? Excuses
? Evasions
? Challenges

Breakthrough!

- First implant customer, Adler Ortho, in 2006

- First product on the market, Fixa Ti-Por, 2007

Additive in Orthopedics

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Around 100 **EBM** systems **in production**
AP&C preferred powder supplier for AM and coatings
DiSanto provides contract manufacturing

Lima Corporate
Orthopaedic motion

jri Innovation in Practice

Exactech
Surgeon focused. Patient driven.™

爱康医疗
AKMEDICAL
3D打印骨科世界

Broad acceptance and use

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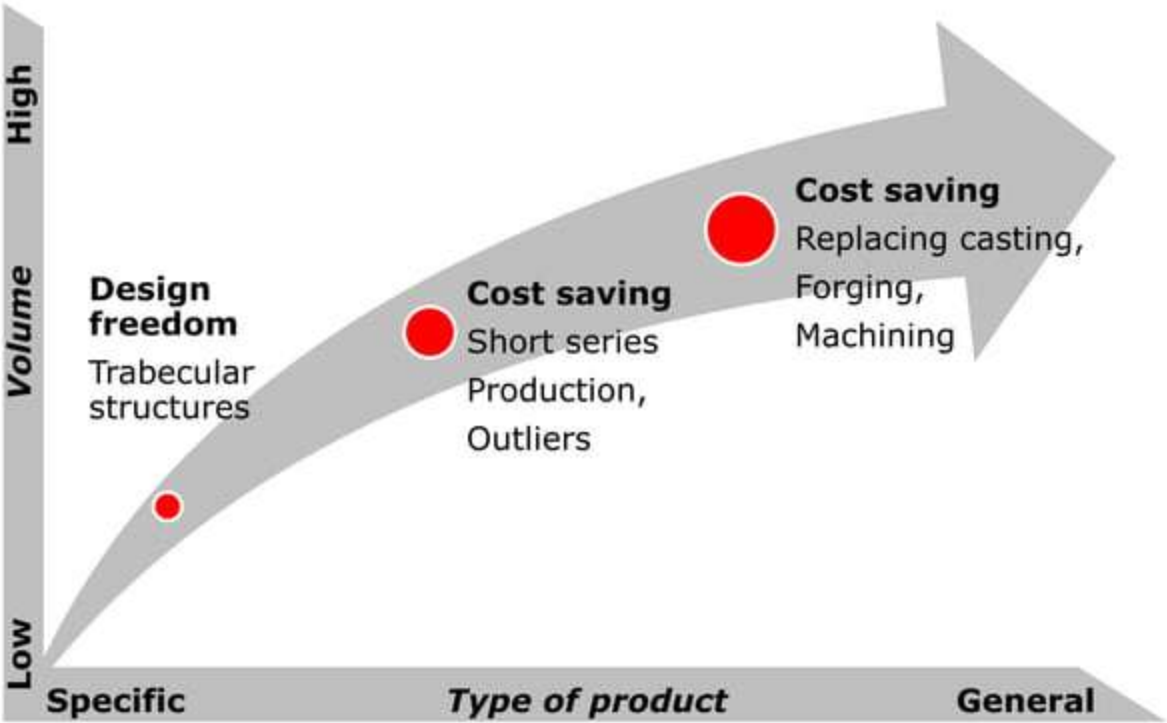
Transforming the Ortho industry



The Aerospace industry

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All of the major aerospace companies embrace Additive Manufacturing

Honeywell

Avio Aero
A GE Aviation Business

Rolls-Royce

SAFRAN
AEROSPACE · DEFENCE · SECURITY

GKN AEROSPACE

AIRBUS

Pratt & Whitney
A United Technologies Company

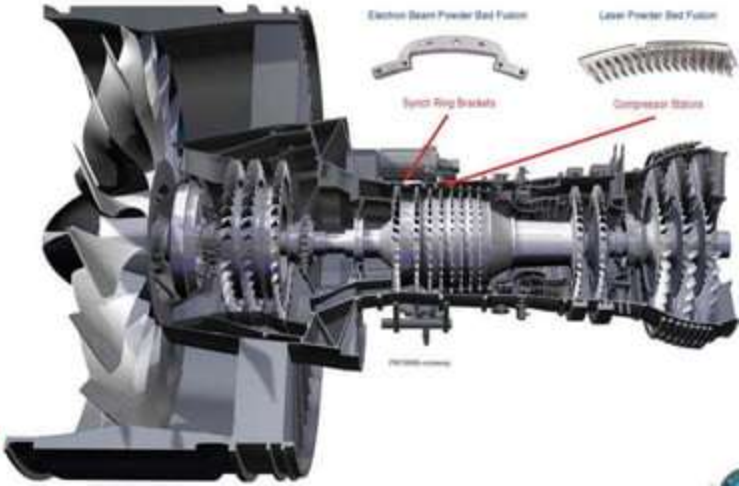
Additive in Aerospace

"Rolls produce for the first flying A350 engine"

"GE produce TiAl for the GE9X engine"

"Pratt & Whitney manufacture for the GTF, currently in production"

"ABC making business jet components"

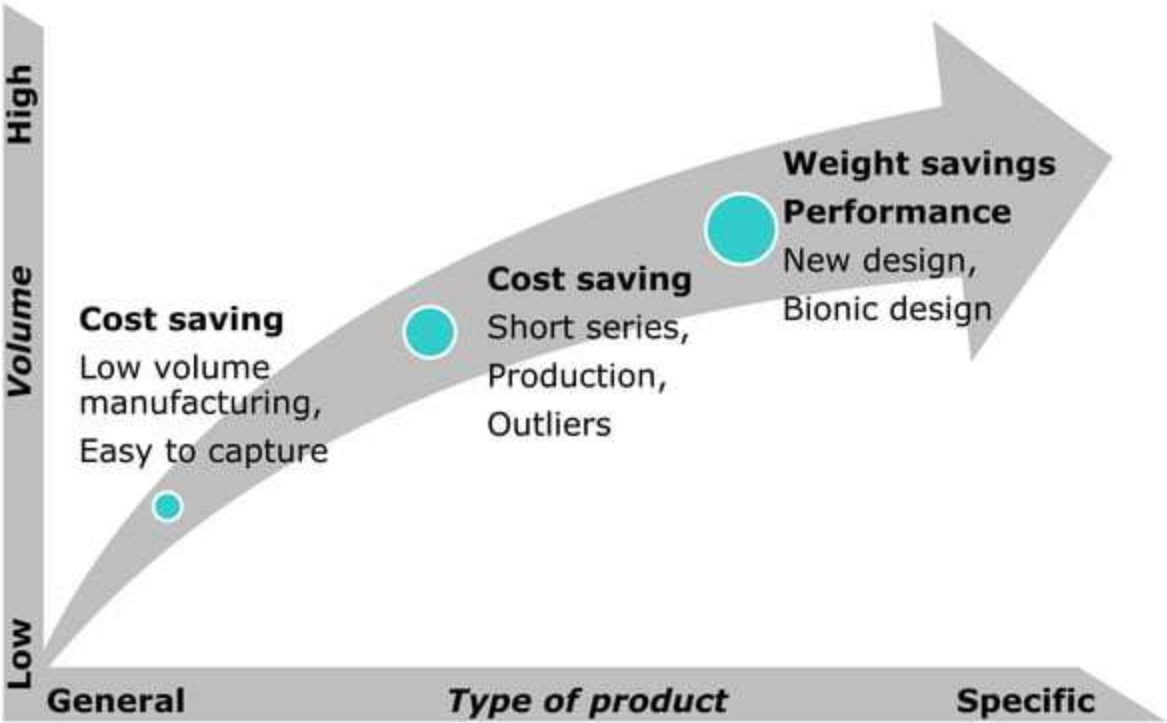


Aerospace potential, example

One component example

Future estimates for blades = 58 to 146 machines

Transforming the Aero industry



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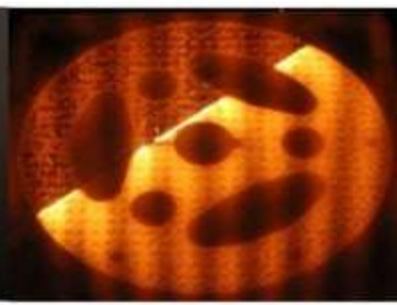


Mission Statement

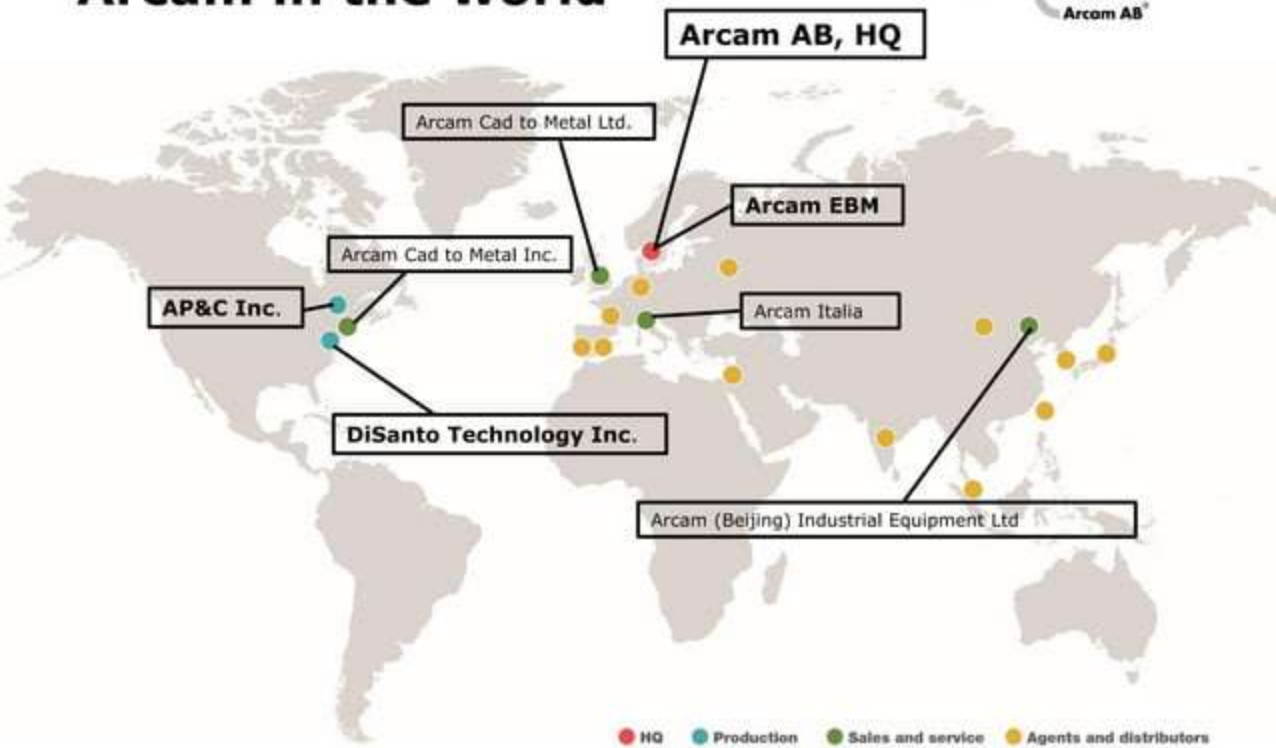
"Arcam provides cost-efficient ***Additive Manufacturing*** *solutions for* ***production*** *of metal components."*

Focusing on:

- Aerospace components
- Medical implants

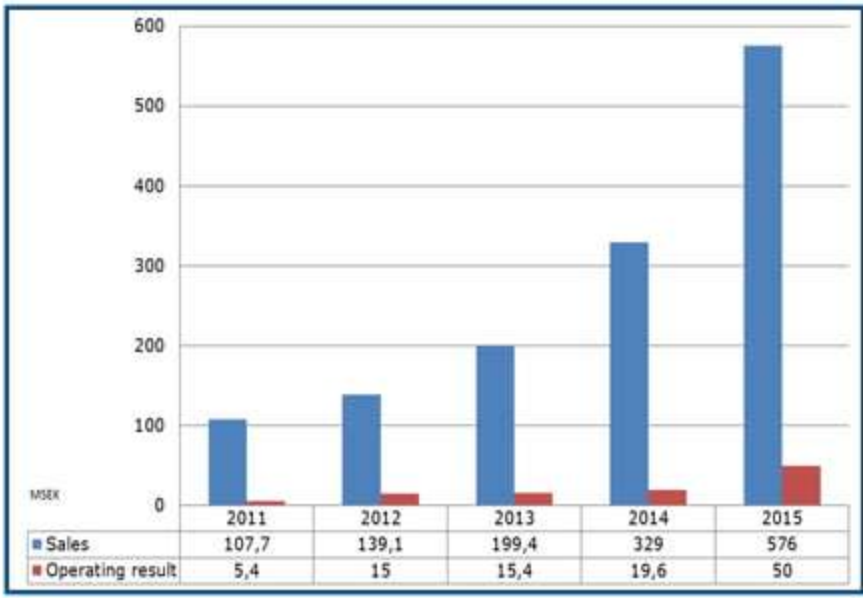
Products & Services

Arcam in the world



On a growth track

"Strong increase in revenue and sound finances give us a solid foundation for continued growth"



	2011	2012	2013	2014	2015
Sales	107,7	139,1	199,4	329	576
Operating result	5,4	15	15,4	19,6	50

Long term objective

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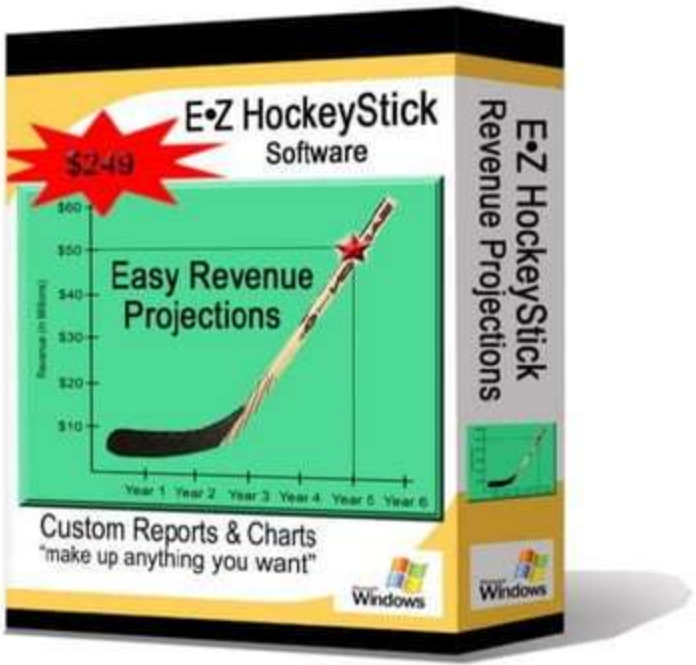
to **industrialize** Additive Manufacturing offerings, providing the robust production processes that the industry demand

The future


E•Z HockeyStick
Software
$249
Easy Revenue
Projections
$60
$50
$40
$30
$20
$10
Year 1 Year 2 Year 3 Year 4 Year 5 Year 6
Custom Reports & Charts
"make up anything you want"
Windows
E•Z HockeyStick
Revenue Projections
Windows

Disruptive opportunities

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Significantly **lower production cost** through

- Tool-less production
- Lower material cost
- Integrated validation
  - Validation tools, in-process monitoring etc
- Integrated complex structures

Disruptive opportunities

Significant **product values added** through

- Design freedom
- Customization
- Differentiation
- Integrated complex structures

Conclusions

- Competition is casting, forging and machining
- Significant potential for lower cost manufacturing
- Significant potential for improved products

AM will be the **most important** supplier to the **aerospace industry** and the **largest** supplier to **the implant industry**

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