

NGen & Additive Manufacturing



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CAMiNA
Canadian Advanced Manufacturing
in Nuclear Alliance

Introduction

1. About NGen
2. NGen funding programs
3. About Additive Manufacturing in Canada
4. Additive Manufacturing Case Studies
5. Additive Opportunities & Tips
6. About NGen's Additive Manufacturing Demonstration Program
7. Q & A

NGen: Who we are

- Next Generation Manufacturing Canada (NGen) leads Canada's Advanced Manufacturing Supercluster
- Committed to building world-leading advanced manufacturing capabilities in Canada
- Supporting and strengthening collaboration across Canada's advanced manufacturing ecosystem
- Supporting skills development and advanced manufacturing management capabilities
- Co-investing in collaborative, industry-led projects that have the potential to create unique competitive advantages for Canadian manufacturing
- 4,900 members and counting

NGen: Focus on Strategic Transformations

- Technology-Specific
 - AI for Manufacturing
 - Electric and Autonomous Vehicles
 - De-Carbonization
 - Circular Manufacturing
 - World-Leading Production Processes
- Enabling
 - Workforce and Skills Development
 - Leadership and Management Transformation
 - Access to Resources for Adoption, Scale-Up, and Commercialization

What we do

Funding programs

New funds announced in Budget

Collaborations

Collaboration Corner = Post your project idea

Workforce Development

TLP

Cluster Development

Canada Makes
AI 4 Manufacturing...

NGen Funding Programs

Pilot Projects & Feasibility Studies

Support for SMEs as they prove out and de-risk advanced manufacturing development and implementation projects.
Assessment Deadlines: Project between \$100k - \$500k

Past! NGen's Automotive Zero-Emissions Manufacturing Challenge

NGen invested over \$20 million as part of a challenge program to position Canada for success in the global shift to zero emission vehicles (ZEVs).

Supercluster Projects

Lead or participate in collaborative, world-leading manufacturing and technology projects.

Projects between \$500k - \$20 million:

Please note: These programs are on hold until further notice

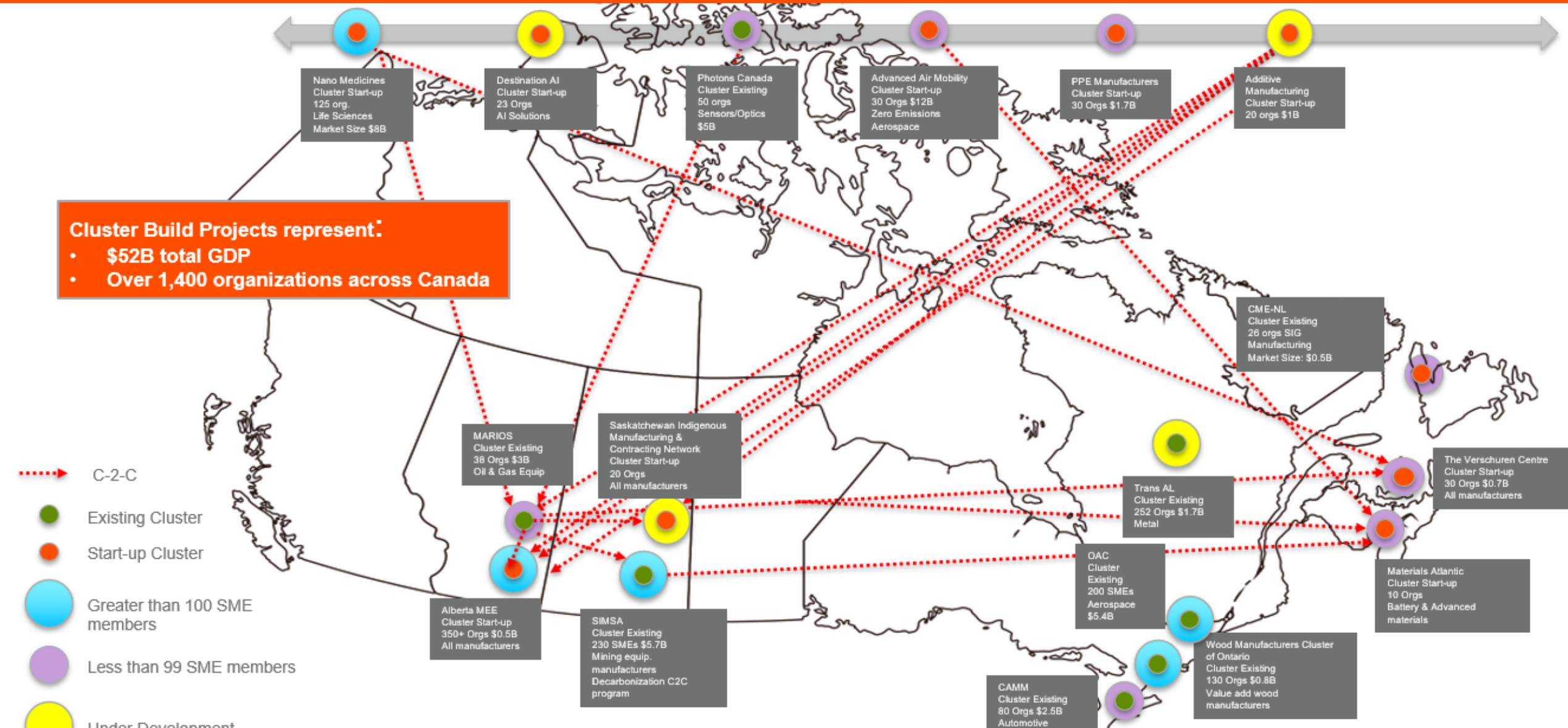
Cluster Building

Investing in Canada's industry clusters and associations.

Assessment Deadlines:

Additive Manufacturing Demonstration Program

NGen Cluster Ecosystem



NGen AM Projects to date

Company	Project
Burloak	3D Printing of Faceshields
Mosaic COVID	3D Printing of Faceshields
Canadian Additive Network	Connecting Companies involved in 3D Printing
Exergy	High Strength Metal 3D Printing
OIC	Metal 3D Printing for Orthopedic applications
Mosaic Mfg	High Volume 3D Printing solution using Pellets
Imperial Mining Group	Development of Metal 3D Printing Powder for high strength application
Reaction Dynamics Lab	3D Printing of Rocket Engine
McGuire	3D Printing of Micro Turbine
Mosaic Mfg	Automated 3D Printing farm

About Additive Manufacturing

Map showing additive manufacturing equipment at industrial, academic and research facilities across Canada



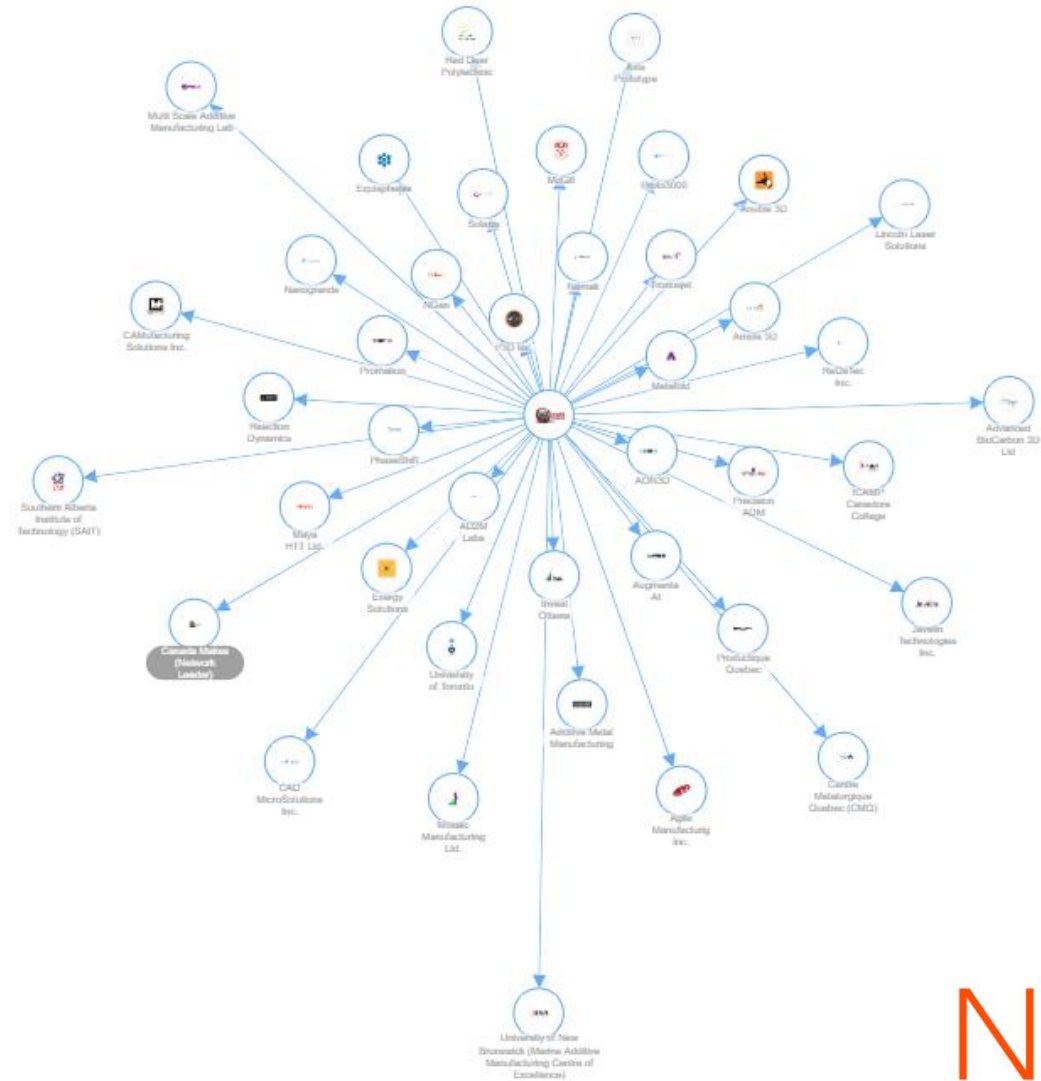
About Canada Makes



Canadamakes.ca

AM Demo Program

54 AM demonstration projects last year



AM Case study: Oscillating unit

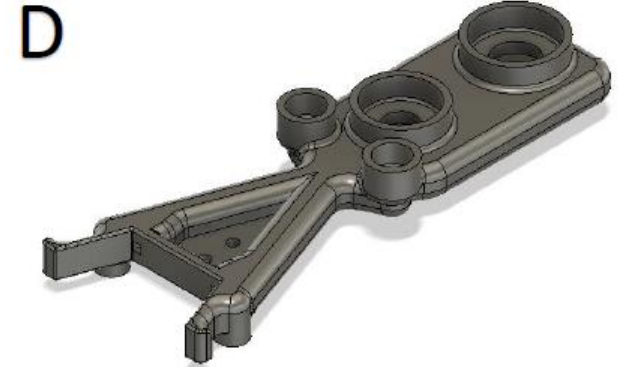
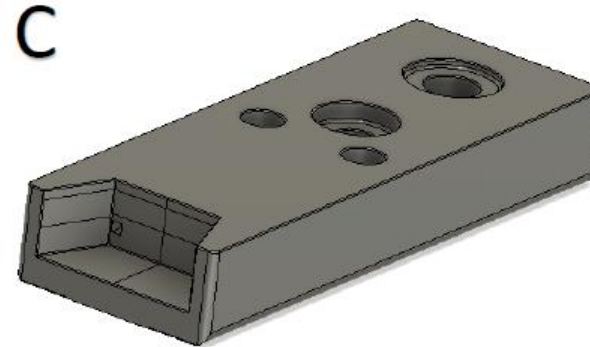
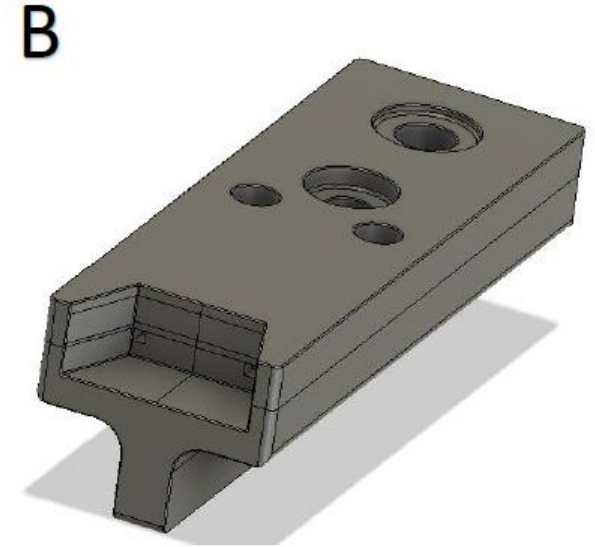
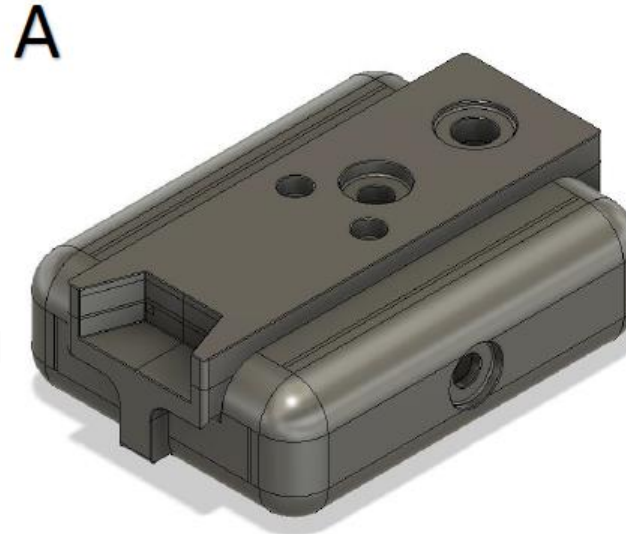


AEM Power Systems Inc.

A - The initial STEP file provided by AEM contained critical internal features that had been design optimized and could not be changed.

B & C - AMM was able to offer design alternatives through several different iterations.

D - AMM took the approach that it would only print what was necessary to achieve the intended result and focus the design around the critical features. This allowed for the unit to be substantially decreased in size/mass whilst maintaining the integrity of the channel design.



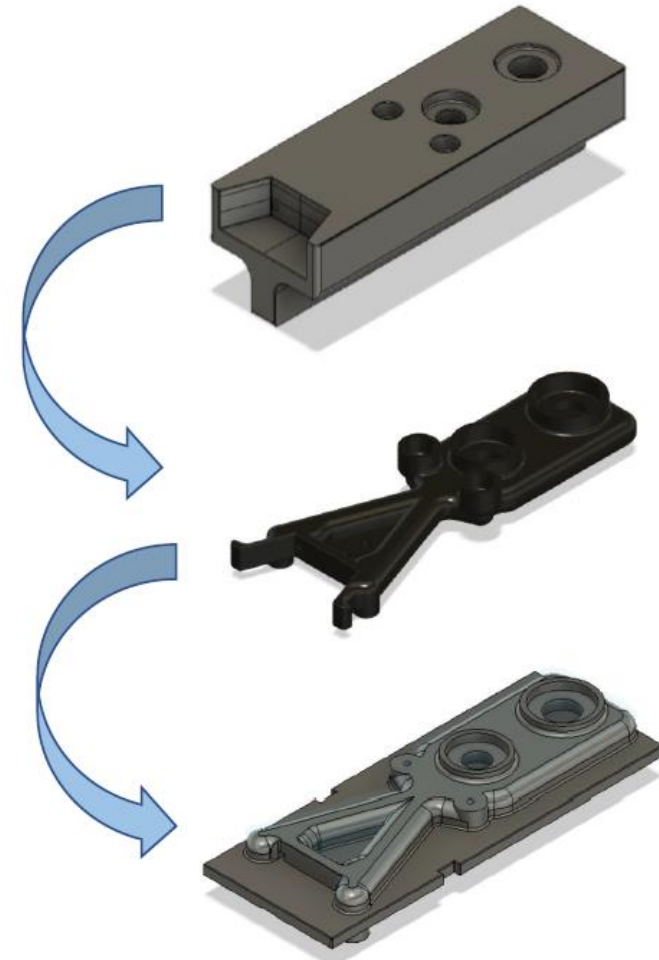
AM Case study: Oscillating unit

After multiple CAD design iterations, a final design that allowed for the following reductions;

- Weight 70%
- Print time 57%
- Price 58%

Benefits of additive manufacturing are;

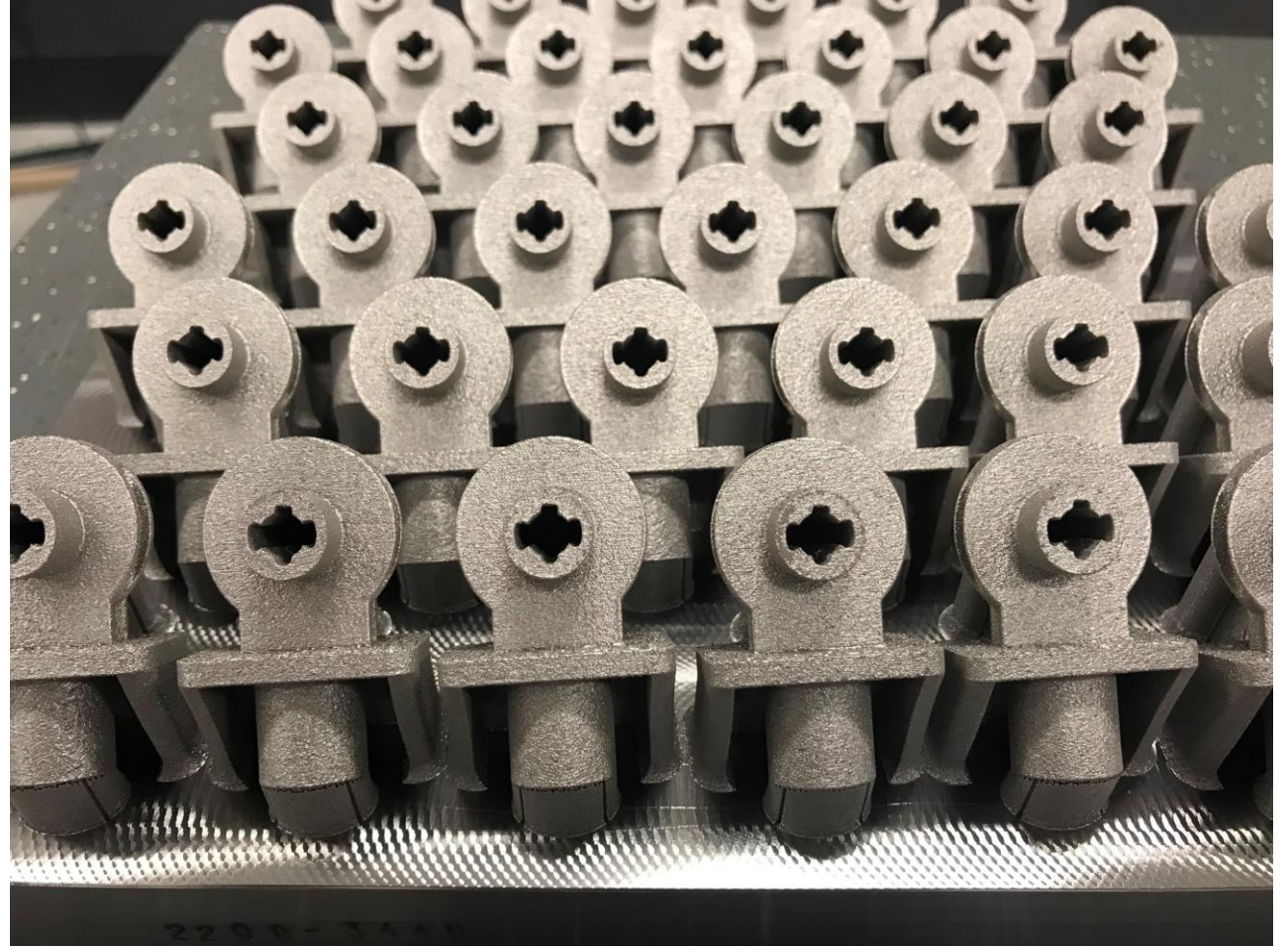
- Design freedom
- Speed to market
- Part consolidation avoiding assemblies and tolerance stack up
- Mass reduction
- Thermal management opportunities
- Complex geometries



AM Case study: PIG (Pipeline inspection gauge)

Onstream has low volume production runs and complex components, and conventional PIG manufacturing is expensive.

By consolidating parts and improving lead times AM offered a solution to reduce costs of the newly designed PIG and improve performance, while allowing design to dictate form as opposed to manufacturing techniques.



AM Case study: PIG (Pipeline inspection gauge)

The ground-breaking project is helping to redefine the future of manufacturing for the energy sector.



AM Case study: Lightweight Robotic End Of Arm Tooling



You main ask the question, why change?

Why take the risk of replacing an Aluminum milled part by a plastic 3D Printed part?

Answering this question to early adopters took 3 years of hard work to make the point clear.

The question that customers are now asking their designers is, why machine it, let's try to 3D print it first?



AM Opportunities and Tips

The opportunities for AM

- part consolidation
- freedom of design (complexity)
- lower inventory costs
- lead times of days versus weeks
- the ability to replace legacy parts

AM Opportunities and Tips

Tips for companies looking to adopt 3D printing:

- 1- Introducing Additive Manufacturing to a company is a **cultural change**, it needs a top-down leadership and patience, learn about it where it **best fits**.
- 2- You need a **champion** in the organization to build success stories and then let it organically spread among the designers.
- 3- Understanding that **designing for Additive Manufacturing** is a skill that needs to be learned.
- 4- Understand that introducing industrial 3D printing is like adding a DeWalt cordless drill to **your toolbox**. It can make a big difference, but on its own is not going to do much, you need to know what to do with it. Introducing Additive is the same. It will give your company more ways to solve a problem and gain an edge only if you know when, where and how to use it.

NGen's Additive Manufacturing Demonstration Program

Requirements to participate:

1. Companies need to be **NRC-IRAP eligible** with a referral from their local ITA. If you do not have an ITA representative refer to the [NRC IRAP advisory services](#).
2. Companies will need to provide a CAD file of the part/coupon they want fabricated.
3. If interested in participating, you can contact frank.Defalco@ngen.ca

www.ngen.ca/blog/ngen-and-nrc-irap-partner-to-deliver-new-additive-manufacturing-demonstration-program

Thank you!

Q & A

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