Vanguard Initiative 3DP Pilot - An Introduction

Jean-François Romainville, IDEA Consult, Network Manager
The Vanguard Initiative
A Place-Based Approach leading by example to boost Regional Innovation Ecosystems

### SMEs and Intermediaries
- To increase the competitiveness of companies and scale-up regional businesses
- Project development beyond TRL 5
- Exclusive networks of pilot plants, demo-sites and partners

### Interregional Collaboration
- Promoting co-investments in European priority areas,
- Facilitating access to combined funding for co-investment projects,
- Taking advantage of better synergies between regional, national and European instruments to support interregional collaboration.

### Policy Influencing
- How to fund technology uptake activities and how to join forces to support their roll-out
- Advocating for stronger commitment to enable effective synergies between EU funding tools and instruments, with regional and national funding
42 of the most advanced industrial regions in Europe leading by example in delivering growth and jobs through industry-led interregional cooperation, co-creation, and co-investment.

5 Task Groups
- Vanguard Pilot Monitoring
- Policy Influencing
- Future of the Vanguard Initiative
- Co-Funding and Financing
- Communications

7 Pilot Projects, including 25 demo-cases
- New Nano-Enabled Products
- Bio-Economy
- Efficient Sustainable Manufacturing
- High-Performance Production through 3D Printing
- Advanced Manufacturing for Energy-related Applications in Harsh Environments
- Smart Health *(launched in 2021)*
- Artificial Intelligence *(Launched in 2021)*
The Vanguard Initiative 3DP Pilot
Rationale: 3D printing, factory-floor integrator between data and productions, to enable key transitions

EU Manufacturing SMEs

3D Printing

AI/Big data

Robotics

IOT

End-of-Life

Integrated electronics/sensors

Sensors

ICT

Etc.

Why a cross-regional initiative?

Completeness/Efficiency

Best Solutions Available

Critical Mass

Positive Externalities and Spill over effects

Smart Transition

Green Transition

Resiliency, Competitiveness
3DP Pilot objectives, in a nutshell

To address industry needs, in their ‘smart’, ‘green’ and ‘competitive’ paths...

...By enabling co-development, deployment and uptake of AM-related solutions...

...Through the timely development of cross-regional demonstration projects connecting capabilities and actors

Doing so, the 3DP Pilot will contribute to the emergence of new VCs and will reinforce existing ones
Industry Needs

- Target group: (Downstream) SMEs, Tech-suppliers and start-ups
- Looking for Expertise/Equipment, market/visibility
- ‘Demonstration’ and ‘cross-regional’

3DP Pilot ‘Treatment’

- Actors: Facility Centres, Tech-suppliers, etc.
- Benefiting from Co-development/deployment, visibility/market

Projects Implementation

- Funding support, Spill overs and feedback loops
- Towards Sustainable and Smart VCs

Illustrative KPIs

- 1 Matchmaking Tool developed
- 3 ATIP Product Watch reports drafted
- 100+ participants to all activities, 30 regions and 500+ actors connected

- Active co-development of 9 ‘AdMa Instrumental Solutions’, 4 new ideas submitted, 10+ use cases designed, etc.
- 400k EU funding for demonstration activities made available, from which 360k secured for 3DP Pilot regions
- 6+ 3DP Pilot proposals HE IAs and RIAs in preparation
- Submission: 1 IRA SME, 1 CORNET, 1 TAF (selected), 1 Trinity

- 9 ‘3DP Pilot’ SMEs-led projects, (grants: 375k €) in implementation (start: 2021)
- Generation of (bilateral) privately funded TRL7+ activities (PiPP)
Implementation – The ‘back end’

1) ‘Demo Cases’ for emerging and complex solutions (‘anticipate and develop’) and 2) ‘Direct’ connections for others

Industry Needs (suppliers, end-users, etc.)

Direct Matching Tools (3DP Pan EU, PIPP)

Connection - BVfM

Supply of Demonstration Services (RTOs, companies, etc.)

Co-development /deployment of solutions

Network of expertise

Critical Mass: funding, standards, awareness

9 Demo Cases

N Application-specific projects

2 ‘Cross-Demo Cases’ (Transversal) Actions (‘Awareness’ and ‘Benchmark Properties’)
### Overview of the Pilot’s main action lines in 2021 (1)

<table>
<thead>
<tr>
<th>Demo cases</th>
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<tbody>
<tr>
<td><strong>Multi-materials components by <strong>hybrid</strong> 3D Printing manufacturing</strong> <em>(Demo Case leader: Luca Tomesani, UNIBO, Emilia Romagna)</em></td>
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<tr>
<td><strong>Innovative hybrid (subtractive/additive) manufacturing approach for <strong>repairing added value</strong> damaged objects</strong> <em>(Demo Case leader: Paolo Gregori, Trentino Sviluppo, Trentino)</em></td>
</tr>
<tr>
<td><strong>Multi-material 3D printing: Structural <strong>integrated electronics</strong> in 3D printed parts</strong> <em>(Demo Case Leader: Hannes Fachberger, Profactor, Upper-Austria)</em></td>
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<tr>
<td><strong>Medical Devices and Healthcare</strong> demo case: 3D-Printed customized components for orthosis, exoskeleton and exoprosthesis...and beyond? <em>(Demo Case leader: Alberto Leardini, IOR, Emilia Romagna)</em></td>
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<tr>
<td><strong>AM in the Built Environment</strong> <em>(Demo Case Leaders: Maaike Riemersma and Theo Salet, TUE, South-NL)</em></td>
</tr>
<tr>
<td><strong>3D-Printed large parts</strong> and complex shapes (mono-material) through emerging 3DP technologies <em>(Demo Case leaders: José Antonio Dieste, Aitiip, Aragon and Giulia Marchisio, CIM40, Piemonte)</em></td>
</tr>
<tr>
<td><strong>Efficient collaborative robot</strong> through 3D printing optimization <em>(Demo Case Leader: Oscar Alonso, Leitat, Catalonia)</em></td>
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<tr>
<td><strong>Provide a toolset for maintenance</strong> for 3DP and a training course for employees to do the maintenance <em>(Demo case Leader: Coen de Graaf, Brainport, South NL)</em></td>
</tr>
<tr>
<td><strong>Additive-subtractive</strong> high precision &amp; high finish production (high-end metals): a focus on elaborating cross-regional solutions for raising awareness (among SMEs) on AM-related opportunities <em>(Demo case Leaders: Bianca Maria Colosimo, Polimi, Lombardy and Coen de Graaf, Brainport, South NL)</em></td>
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### Transversal Actions

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<th>Transversal Action 1 - Elaborating cross-regional solutions for raising awareness (among SMEs) on AM-related opportunities</th>
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<td>(Leaders: Bianca Maria Colosimo, Polimi, Lombardy and Coen de Graaf, Brainport, South NL)</td>
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<tr>
<td><strong>Transversal Action 2 - Building an international Benchmark for AM mechanical properties for various materials”</strong> <em>(Leader: Thomas Kairet, Sirris, Flanders/Wallonia)</em></td>
</tr>
</tbody>
</table>
Overview of the Pilot’s main action lines in 2021 (2)

End-2020 new ideas

• Scalability of serial-production: system approach of the AM-factory, automatization of post-production (South-NL, Brainport Development)

Ruben Fokkema, R.Fokkema@brainportdevelopment.nl

• Automated removal of support structures and surface smoothing of 3D printed metal parts (Lower-Austria, FOTEC)

Helmut Loibl, loibl@fotec.at

• 3D metal printing of catalytic reactor structures (South-NL, AddCat)

Gerald van Santen, g.vansanten@addcat.eu

• “Hyberfacturing”, Auvergne-Rhône-Alpes (France), University of Grenoble in cooperation with Baden-Württemberg (Germany), University of Stuttgart

Frédéric Vignat, frederic.vignat@grenoble-inp.fr
The concepts of ‘Demo cases’ and application-specific projects

- **Industrial/End-users need for demonstration services in specific areas (technologies-materials-challenges)**
- **Value Proposition and Clients.** 'Multisided platform' offering:
  - End-users: Access to BVfM demonstration services and support in project implementation
  - Facility Centres/technology providers: Broadened customer base and knowledge/expertise
  - Investors: Lowered risk and high return on (portfolio of) projects
- **Costs and Investments.**
  - Selection, Coordination and Management
  - Tangible and Intangible Innovation-related Investment
- **Revenue generation:**
  - Membership fees
  - Project fees/return

- **Business Model ‘Demo Case’**
  - Phase 1: Demonstration Activities provided by a cross regional network of actors
  - Phase 2: Industrial uptake, impacting VCs cross regionally

- **Business Model ‘Application-specific project’**
  - Value Proposition and Clients. Demonstrated, certified and commercialised new products/processes
  - Costs and Investments.
    - Phase 1: demonstration activities (40% private co-funding; remaining costs to be covered by in-kind contributions other partners and public funding)
    - Phase 2: industrial uptake (approximately 60% private co funding and the remaining by public/private sources in the form of debt (lending) or equity or subsidy (depending on industrial risk)
  - 'Cross regional' I in tangible and intangible assets, along/across VC(s)
  - Revenue generation.
    - Products commercialisation through existing private legal entity (single SME) / entities (VC consortium)
The 3DP Pilot ‘Portfolios’ of projects – Illustrative overview in early 2021

- Hybrid
  - Blowers
  - Spoiler
  - Surfboard
  - Suspension part

- Repairing added value
  - Moulds 1
  - Moulds 2

- Healthcare
  - CAFO

- Robots
  - Auto
  - Mach & tool
  - Agri

- Maintenance
  - Steady rest

- Struct. Electronics
  - Gripp3D (Grippers)
  - Gstorage
  - Auto

- Large Parts
  - AGRIAM (Agric)
  - INSECTAM (Food)

- Built

- Add/Subtr
  - List of 20 previously identified cases

‘Funding Note 1’ - In 2020, 375k public grant secured for demonstration projects in Pilot Regions (incl. 240k for ‘demo cases’- directly generated projects)

‘Funding note 2’ - Forward looking perspective: targeted actions to embrace regional and EU funding opportunities
Always open to New Ideas - Process and results so far

- 5 new ideas submitted in end-2019, 5 new demo cases implemented in 2020
- New application-specific projects outside the scope of demo cases were also generated (new demo cases in the future?)
- 4 new project ideas submitted in end-2020, 3 under active development
- Submission remains open here
Example 1 – The cross-regional deployment of lightweight components in the automotive industry, an example of ‘integrated’ service offer from the Pilot (from project design to VC impacts)

Industrial needs and network of expertise identified (*Demo Case created and Elaborated, 2016*)

Creating the network, Connecting Demand and Supply (*Plenary Meetings and smaller group discussions, 2017-2018*)

First Industrial Project Implemented, TRL 6 (*Regional funding secured, 2018*)

Further analytical investigations (*ATI-based product report*)

Application-specific projects identified (*Promotion, Hybrid Materials Tour, 2019*)

Business Plans Finalised (*Support from DG REGIO Pilot Action, 2019*)

Funding secured for 2 projects TRL 6-8 (*3DP Pan EU and Regional Funding, 2020*): 5 companies (incl. tier-1 automotive supplier and OEM), 3 research centres and two specific applications, for VC impacts on sustainability and competitiveness
Example 2 – Structural integrated electronics and Robotics, showcasing 1) the 3DP Pilot’s agility to answer emerging industrial needs and 2) interrelations with other tech fields

Industry needs identified
Project Idea Submitted
(Plenary meeting, end-2019)

Network of service providers and use cases (Demo case meetings, 2020)

Identification of application-specific projects (Demo case meetings, 2020)

Funding secured for one project TRL6-8 (3DP Pan EU), led by an SME active in sensitive automation, towards smarter VC
Example 3 – The cross-regional deployment of large parts with complex shapes, an example of 3DP Pilot’s positioning in the TRL’s scale

Industrial needs and network of expertise identified *(Demo Case created and Elaborated, 2016-2017)*

‘Kraken’ project and evolving industry needs *(Plenary Meetings and smaller group discussions, 2017-2018)*

‘Integration’ TRL3-5-project results’ into the demo case *(Demo Case Discussions, 2018-2019)*

Application-specific projects identified *(Webinars on Funding Opportunities, 2020)*

Funding secured for 2 projects TRL6-8, led by SMEs active in the Agri (machine parts) and Food sectors, contributing to Smarter and more sustainable VCs *(3DP Pan EU, 2020)*
Overview of progresses and bottlenecks

Learn and Connect

Analysis - Matchmaking

- More regions (29) and actors (incl. direct contribution from private actors)
- Delivering added value to partners and addressing needs: revised tools
- 3DP Pan EU (DG GROW) matching tools
- 3 ATI-based products reports secured and drafted

Project Design

- Product/application-specific Business Model and Business Plan fully finalised
- 'Platform' Business Model and Business Plan fully finalised (+ 1 TAF project selected)
- 5 new demo cases implemented + 4 new ideas submitted
- More than 15 new application-specific projects generated and calculated

Project Implementation

- 3DP Pilot as a leverage to generated and secure funding for demonstration projects
  - 3DP Pan EU; Liliam; Infra-regional funding
  - In 2020, 375k grants secured for innovation activities
  - 9 application-specific projects funded and in implementation
  - Generation of (bilateral) demonstration projects (privately) funded

Feedbacks Loops

- Continuous lobbying efforts at EU level: I3, etc.
- Continuous lobbying efforts at ‘infra’ regional level: IT-SE/IT-NL projects, etc.

Vanguard Pilot Funding Model, but lack of resources for ensuring sufficient coordination for projects design (in a context of structural funding gaps and increasing needs)

Lack of structural funding solutions for cross-regional demonstration projects
### Costs and associated funding needs: 3DP Pilot insights based on a selection of cases (1/2)

<table>
<thead>
<tr>
<th></th>
<th>Application-specific projects</th>
<th>‘Platforms’ (one demo case and/or broader overarching platform)</th>
</tr>
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<tbody>
<tr>
<td><strong>Consortium and activities</strong></td>
<td>Industry-led (one or more companies) cross-regional partnership. Type of companies: from start-up to medium-sized company.</td>
<td>Multi-sided platform enabling generation and implementation of demonstration projects in key emerging areas</td>
</tr>
<tr>
<td><strong>Role of regions</strong></td>
<td>SMEs from the region in the lead and/or Facility Centres providing demonstration services.</td>
<td>Facility Centres and technology providers part of the network.</td>
</tr>
</tbody>
</table>
| **Phase 1 costs and funding needs** | - From **80k to 400k/project**  
- 40-50% Private co-funding/contribution (funding mainly SMEs own costs) and public **grants** 50-60% (from 40k to 200k) | - Selection, Coordination and Management (252k€/year) (exl. Investment in new equipment).  
- **Grant** (800k-1M€) needed to support is activities during the first four years of existence. |
| **Phase 2 costs and funding needs** | - Costs of industrial uptake estimated from **250k to 4M** (depending on the project)  
- Private contribution (equity or debt) from 40% to 60% (depending on the project) to be complemented by government supported **equity/loan** (or private grant) |                                                                                                                                                                                            |
| **Results**           | IRR higher than 56% and EBITDA above 4M€ at year N+3 (one exemplary case) |                                                                                                                                                                                            |
## Costs and associated funding needs: 3DP Pilot insights based on a selection of cases (2/2)

<table>
<thead>
<tr>
<th>Stage of development of the company</th>
<th>Company with low bankability</th>
<th>Company considered bankable</th>
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<tr>
<td><strong>Investment costs</strong></td>
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<tr>
<td>&lt; or = €2.5m</td>
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<td><strong>Technological risk involved in the project</strong></td>
<td>TRL 5-8 TRL 8-9 TRL 5-8 TRL 8-9</td>
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<td>Financing mix Phase 1</td>
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<td><strong>Equity</strong></td>
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<tr>
<td>Government related</td>
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<tr>
<td>Private sources</td>
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<td><strong>Grant</strong></td>
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<td><strong>Loan</strong></td>
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<tr>
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<tr>
<td><strong>Financing mix Phase 2</strong></td>
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<tr>
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<td><strong>Market risk</strong></td>
<td>Low High Low High</td>
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A focus on Funding Opportunities

• ‘Two-way’ process:
  • Informing about opportunities and organise steps to embrace them
  • Tailor-made actions for application-specific projects, when designed

• Targeting opportunities at various levels:
  • Actions towards HE IAs and RIAs, for further developing innovations
  • Actions towards regional and inter-regional funding opportunities (Cornet, Ira SME, bi-lateral and tailor made solutions, etc.)
  • Actions towards cascade funding opportunities for application-specific projects:
    • E.g. 3DP Pan EU
    • Continuous lobbying efforts (generating own opportunities): 3DP Pan EU, I3, etc.
Cascade Funding Opportunities, 2021

3DP Pilot

Hybrid
- Blowers
- Spoiler
- Surfboard
- Suspension part

Repairing added value
- Moulds 1
- Moulds 2

Healthcare
- CAFO

Robots
- Auto
- Mach & tool

Maintenance
- Steady rest

Struct. Electronics
- Gripp3D (Grippers)

Large Parts
- Auto

Built
- Agri

Add/Subtr
- AGRIAM (Agric)
- INSECTAM (Food)

Metabuilding

WeldGala xy

Trinity

Smart EEs

List of 20 previously identified cases

Others!!!

Pulsate

Elit

Change2Twin
Interregional Innovation Investments (I3) – A focus on “Strand 1 (Innovation Actions) for mature partnerships” (DRAFT, 2021!)

• ERDF, 3 strands of actions (EUR 570M), Strand 1: 279,3M
• 3DP Pilot active contributions to generation and characterizations
• Projects: “Value chain investment” projects facilitated by interregional ecosystems; “Combination of activities, actors and strategic networking, interlinking firms, sectors and borders”
• Type of Investment: Interregional Investments in companies (TRL 6-8) to accelerate the market uptake/commercialisation. Uptake of innovative technologies/solutions/services scaling up of regional and local innovation in S3 strategic priority areas
• Eligible costs: expenditure linked to productive investments/demonstration/piloting in companies with possibility to cover part of the coordination costs up to 7%
• Applicant: Public authority on behalf an S3 quadruple helix partnership, signing the grant agreement and redistribute the grant to final beneficiaries (SMEs) composing the portfolio
• Final beneficiaries: mainly SMEs
• Total Budget: EUR 279,3 M; Budget per call is around EUR 40 M to finance around 4/5 grants (2-10 Investment projects per grant/portfolio) Average size of the grant EUR 8/10 M (value of the project portfolio in a specific value chain).
I3 – A focus on “Strand 1 (Innovation Actions) for mature partnerships” (2/2)

- Still lacking definite crucial information BUT...
- ...Coming months are obviously relevant moment for identifying/developing further our projects’ portfolios
- Next Steps:
  - Communicate on key definite characteristics when ready;
  - Elaboration of a 3DP Pilot Strategy and Action Plan (in coop with Vanguard);
  - Implementation.
In a broader landscape – Other key cross-regional AM-related initiatives (preliminary, illustrative)

‘End-users’ – Level of granularity

SMEs
Regional intermediaries
PAN EU associations

TRLs – Main focus
TRLs 3
TRLs 5

3DP Pilot
Other TSSPs partnerships: sports, etc.

AM-Motion / AM Platform

“Challenges-Solutions”
“Uptake, Partnering, Feedback Loops”

ADMA Initiative (DG GROW Project)

In 2020, progress made towards mutually benefitting collaborations!

Any interest in discussing this with us? Please contact jean-francois.romainville@ideaconsult.be
Generic next steps

• Continue the ‘smart activation’ of (downstream) SMEs: tangible and timely offer
• Link up further with other tech fields and complementary initiatives
• Generate and Secure funding (grants) for demonstration activities
• Overall, delivering added-value to all distinct types of partners

Specific next steps?

• Join Vanguard Initiative 3DP Pilot: send email to jean-francois.Romainville@ideaconsult.be
• Participate in the next 3DP Pilot plenary meeting: register here
• Participate in specific ‘demo case’ actions: see next presentation!