

cecimo

**Voice of the European
Additive Manufacturing Industry**

**Activities Report
2018**



European Association of the Machine Tool Industry
and related Manufacturing Technologies



FOREWORD

Dear reader,

The year 2018 confirmed that Additive Manufacturing (AM) is becoming a production solution for an increasing number of businesses. European companies have once more confirmed they have a leading role to play internationally. The good news is that they are being joined more and more by new businesses, from across the value chain, eager to join the market and grow it further. This is yet another testament to the wide appeal of this technology in our region. New volume applications have been introduced, and more discussions than ever before have been centred on the success of AM.

As AM moves beyond its history of prototyping and achieves serial production, it is now all the more important that European regulators maintain a favourable policy framework for the growth of this technology in our region. To do so, CECIMO maintains constant dialogue with EU policy-makers. We provide to all AM companies in Europe with unique access to policy fora where decisions are made. As the trade association for the AM sector in Europe, we work to guarantee the concerns of the businesses in this industry are well-reflected in EU legislation. As an example, last year we helped the European Parliament to paint a more positive and realistic picture of intellectual property (IP) in AM. We were sure to put the importance of keeping supportive EU product compliance legislation on the EU agenda. We raised the relevance of this sector in upcoming trade deals with third countries. We secured new EU funding and policies to foster much-needed AM talent. And, ultimately, we continued to show that AM is ready to be embedded into existing production processes.

What we have achieved for the benefit of the whole industry could only be possible thanks to our 15 national member associations from all over Europe. I am therefore delighted to introduce to you our latest AM Activity Report for 2018.

If you are interested in joining our community, please contact Mr. Vincenzo Renda at vincenzo.renda@cecimo.eu.

I wish you a pleasant reading.

Filip Geerts



Director General
CECIMO



CONTENTS

3	Foreword
6	I. Policy Issues
6	Intellectual property rights and liability
8	Market Access Legislation
8	International Trade
9	Skills
9	Research and Development
10	II. Bringing peer organisations together
11	III. Offering the European AM community key visibility and influence
13	Aerospace
13	Automotive
13	Railways
14	Hydraulics
14	Medical
15	IV. Promoting European AM on all occasions that count
16	V. Expanding our role in shaping industry standards
17	VI. Delivering research advancements for the benefit of the industry
19	VII. Connecting with the academic community

I. KEY POLICY ISSUES

Here are the main policy developments where we played a determining role to influence regulation in favour of growing AM technologies last year.

Intellectual property rights and liability

In November 2017, the European Parliament started to examine a motion for a resolution that allegedly called into question the suitability of current EU regulations in governing IP rights and liability in AM.

The motion looked into both the industrial and consumer-based contexts. CECIMO's experts had warned how the approval of some of the measures suggested by the European Parliament would have put today's constant growth of the technology at risk, and how it would have equated to implementing premature regulation on AM. For instance, the draft version of the Parliament's motion called for the introduction of labels to distinguish between additively manufactured parts and conventionally manufactured parts used in production. If approved, measures like this would have unjustifiably suggested that AM parts are sub-optimal in comparison to conventionally manufactured ones. On the request of our members, CECIMO advocated for the removal of labelling proposals from the final document's conclusions, emphasising that AM components introduced in highly-regulated industries, such as aerospace and medical, are subject to the very same stringent certification requirements that are requested for traditional components. There is no need to label parts to indicate which technology was used to produce them. Our actions had a successful outcome. The technology was depicted more realistically in the final text of the resolution, which was approved in July 2018, in line with our members' wishes. CECIMO is continuing talks with regulators to advance its messages on other issues included in the Parliament's final resolution. These messages included avoiding a potential introduction of national copyright levy systems for AM across the EU and gave information on the need to distinguish clearly between business-to-business (B2B) and business-to-consumer (B2C) uses of AM from a legislative standpoint.

To this end, our association has established direct communication channels with EU-supported experts, addressing the effectiveness of current product liability rules. Any modification to the status quo may imply a shift of responsibilities among players in the different segments of the AM value chain. For this reason, CECIMO is collaborating with European officials in drafting product liability guidelines to fill any interpretation gap in the regulatory framework.



Market Access Legislation

An influx of new technologies is shaping the debate on requirements for AM systems and a variety of other products to be traded within the EU. Unveiled by the EU in May 2018, the possible revision of the Machinery Directive lies at the core of these discussions. Decision-makers have embarked on a review of its provisions. CECIMO recognises this formal EU assessment, now ongoing, may culminate in a new Machinery Directive dictating new compliance requirements to place CE marks on AM systems. In exclusive consultations, CECIMO is therefore conveying the messages of its AM members to the European institutions. We are aiming to guarantee that any possible interaction of the Directive with new digital and manufacturing technologies does not result in more uncertainty or higher compliance costs for AM machine producers. In parallel with that and after having obtained the EU's attention on this specific issue, CECIMO is preparing concrete Type-C standards within the Machinery Directive to facilitate machine manufacturers' conformity assessment process. These standards will be brought to the attention of the European Commission, which will then formally task the European standardisation bodies with a mandate to develop and issue them.

Another relevant issue in this context concerns the EU cybersecurity certification scheme. Soon to be approved by the European legislators, the scheme paves the way for an EU-wide common certificate to attest that a certain product or service is cyber-proof. The certificate would affect a large group of products with digital features, with AM products being part of the debate as well. These products will be classified under certain categories, according to the strictness of the cybersecurity certification requirements expected for them. The first list of products is slated to be drafted by European officials in mid-2019. CECIMO is in talks with the EU institutions to make sure manufacturers of AM products will not have to undergo time-consuming and costly third-party cybersecurity certification, which would severely constrain them.

International Trade

In a globalised trade environment, trade policy changes in a given market can cause far-reaching ripple effects in others. CECIMO recognises the importance of monitoring developments around the world and keeping its members informed about potential implications and opportunities behind trade measures taken globally. Our association remains committed to facilitating the cross-border trade of AM solutions – not just within EU borders, but also in relation to third countries. For instance, in late 2018, CECIMO held talks with EU trade negotiators on a nascent EU-US free trade agreement on industrial goods, where machinery products would get a central role. Currently, the export of machinery to the US is subject to a variety of tariff and non-tariff barriers. Tackling them would accelerate their trade and speed up the growth of the European sector. As a key stakeholder on the issue, CECIMO enjoys a front-row seat on EU decisions in this emerging free trade agreement. We are getting and will continue to get input from our Europe-based AM businesses on roadblocks for trade with the US, with the objective of tackling them from the very first round of deal's negotiations.

At the same time, we are monitoring developments on possible export controls for AM products which were being considered by jurisdictions other than the EU's, such as in the US where a public consultation has been carried out. The international export-control framework, which the EU observes, is entangled with decisions taken by any of its members. Because of that, we inform our businesses about the implications that modifications of export control provisions in third countries may have on EU's exporters. Also, in this regard, we contribute to the EU's formulation of contingency measures in relation to Brexit and keep our member network updated on their development.

Skills

The lack of skills in the area of AM remains one of the largest obstacles for the growth of this technology. There is an urgent need to expand the pool of European workers able to carry out AM techniques. Moreover, there is a lack of common recognition of AM skills, qualifications and competences across the EU. This generates problems, because differences among European nations in the classification of AM professional profiles, related tasks and skills acquired are reducing opportunities for the mobility of competent workers across borders. More transparency and standardisation on these aspects would facilitate the job of employers in hiring AM personnel, and would reduce the intensity of skills shortages in this area.

With this premise, CECIMO advocated for granting special EU grants to the AM sector as part of the so-called Blueprint for Sectoral Cooperation on Skills initiative. Not only was this successful, but we were also part of the only AM project proposal to be awarded EU funding under this Blueprint initiative. Together with its project partners, in late 2018 CECIMO started to investigate a common understanding of concrete tasks, profiles and occupations in AM all over the EU. This will have the ultimate effect of facilitating worker mobility in Europe and improving AM workforce development.

Research and Development

With its multi-annual research programmes, the EU is a large provider of funding for R&D projects to scale up AM technology in a multitude of ways. Several AM businesses, research centres, training organisations and consultancies make use of the funding to test new solutions or introduce new applications in several sectors. As the current large EU R&D programme, Horizon 2020, will soon come to an end, EU policy-makers are in advanced talks on the make-up and priorities of Horizon Europe, the successor from 2021 onwards. The sum at disposal for industry funding is vast, yet fixed. This means many different trade groups are advocating to divert a big share of the Horizon Europe's industry funding in their direction. CECIMO is guaranteeing that AM technology is well-represented in the debate, thanks to its long-standing role in the public-private partnership that advises the EU on manufacturing funding allocation. Driven by our members, we informed EU research officials on the specific research priorities of the AM sector today, with the aim of making sure money goes into the right topics – all while working to increase the overall expected expenditure on AM EU research. As other economic regions in the world are announcing new large-scale R&D investment programmes to advance their AM industries, it is absolutely fundamental that the EU catches up on these developments with strong AM funding commitments.

II. BRINGING PEER ORGANISATIONS TOGETHER

CECIMO tackles outstanding regulatory and business issues in the sector in close touch with its 15-strong member national associations and AM companies. Throughout 2018, our AM Working Group has held several meetings under the chairmanship of Mr Stewart Lane, Corporate Manager at Renishaw. The group discussed topics such as the challenges of machine manufacturers for the approval of AM components in aerospace applications with the participation of EASA's Directors.

It also tackled, with the contribution of notable experts, new AM training programmes introduced in Europe, guidelines for powder management, machine manufacturers' paths towards compliance with the Machinery Directive, critical issues for the approval of AM solutions under the new Medical Devices Directive, as well as upcoming standardisation items on AM.

Our AM Working Group (WG) features several market-leading companies in AM technology which are located all over Europe. They are joined by representatives from AM associations representing countries such as Austria, Belgium, Czech Republic, Finland, France, Germany, Italy, Portugal, Spain, Switzerland, UK, as well as by European powder metallurgy industry Directors. This unique combination of expertise allows CECIMO's AM WG to be a genuine platform for networking and exchange of relevant AM information among sector leaders.

For 2019, our WG members intend to address a variety of issues relevant to the industrialisation of the technology, together with EU policy developments that may influence, notably, the uptake of additive production methods.

What is more, it is not just in meetings that AM WG members advance discussions.

Developments are also regularly communicated digitally, with CECIMO updating its members on any emerging regulatory issue or opportunity of which they should be aware.

Finally, in December 2018 CECIMO also announced the creation of a new AM Committee within its permanent organisational structures. The Committee will be a tool to strengthen even further the effectiveness of CECIMO's actions on the ground and will act in close collaboration with the AM Working Group.

III. OFFERING THE EUROPEAN AM COMMUNITY KEY VISIBILITY AND INFLUENCE

In 2018, we also ran the fourth edition of our Additive Manufacturing European Conference (AMEC) – the highest-profile event on the technology in the European Parliament. As in the past, we have brought together leading businesses and senior officials in the EU community to take stock of the industry’s state of play and, more importantly, set out a joint vision to keep Europe as an international hub for the progress of industrial AM.

The 2018 edition of AMEC was co-hosted by the Members of the European Parliament, **Ivan Štefanec** (EPP), **Mady Delvaux** (S&D) and **Dita Charanzová** (ALDE), and moderated by **Frits Feenstra**, Senior Project Manager at TNO, and **Benjamin Denayer**, Senior Business Developer AM at Sirris. AMEC’s panel discussions were led by many high-level experts from the AM world. One of the main conclusions of the conference was that the future of AM will undoubtedly need to lie in the set-up of a process chain, where AM is considered an established technology just like any other, like casting, for instance. But today, there are several obstacles on the journey to reaching this goal.



AMEC – The Speakers



According to **Stewart Lane**, Corporate Manager at Renishaw and Chairman of the CECIMO AM Committee, there is still a need to build business cases around the technology. The sector has some way to go yet before industry – and society as a whole – grasp the true benefits of AM. Education of engineers and competent operators is indeed part of the solution. But education should not be limited to technical experts, however. Rather, as Mr Lane said, it has to permeate to the level of business leaders, too.

The implementation of AM in Europe is also about mastering with success change management within industrial companies.



Emilio Juarez, Vice President & Head of 3D Printing EMEA at Hewlett-Packard, focused on guaranteeing repeatability in the AM process. He explained how the development of close-loop process control modules is a crucial priority for industry R&D today. It will enable the continuous monitoring of the production cycle for the sake of more consistency in the entire process. Robust process monitoring will make redundant the existing need for testing every part that has been fabricated. It will speed up, Mr Juarez concluded, the path towards qualification in highly-regulated industries.

Filip Geerts, the Director General of CECIMO, underlined that the industry must tackle the automation barrier to industrialise AM. Contrary to the belief of many, AM is not a 'plug-and-play' technology. Several tasks throughout the process cycle are still done manually by technicians and operators. The industry should evolve towards a future of more automated additive processes with Industry 4.0-proof connected machines.



Florian Feucht, Head of Additive Manufacturing Application and Sales at DMG MORI/Realizer, highlighted the importance of ensuring a regulatory level playing field between AM and other manufacturing technologies. While selling machines to specific industries does not prove complex from a regulatory standpoint, Dr Feucht emphasised that regulatory requirements do pose challenges when it is a spare part – such as a laser – being supplied to AM end-users. AM technology is therefore subject to an unjustifiably bigger regulatory burden than other technologies. Especially for companies with a global footprint, this is problematic. Another example is about limitations on the flow of data feeding back to the machine manufacturer. They should be removed, said Dr Feucht, as there is no proof they are well-founded. In general, he reckoned these stricter regulatory requirements appear to have emerged from an undue perception of the difference between AM and other subtractive technologies.

AMEC also allowed for a wide-ranging discussion on the status of the technology in different application sectors, some of which can be seen on the next few pages.



Aerospace

Miguel Castillo Acero, Vice President of Technology Development at Aernnova, gave an insight into AM in the aerospace industry – one of its largest end-users. Thanks to topology optimisation software, additive technologies are already capable nowadays of producing lightweight, performant parts that reduce the aircraft's weight and fuel consumption. Safety remains a core aspect in this business, because there are very stringent part approval regulations in place. AM components have shown they can meet these strict safety requirements, and are therefore of real value for aircraft businesses. Dr Castillo Acero also put emphasis on the importance of standardisation. For each and every new factor introduced in AM production, a re-qualification of relevant aspects is triggered. More standards on materials, for example, would support aircraft makers and their supplies. He also praised AM's benefits for the business of aerospace maintenance, repair and overhaul (MRO). At Aernnova, especially for spares obtained with very expensive raw materials, AM reduced the total time-span for spare part production – from the moment the powder enters the factory to where the spare part is delivered to the airline – to one month, from an original time-span of one year.

Automotive

Roberta Sampieri, Product Development Manager at FCA EMEA, shed light on AM's state of play in the automotive industry. The technology has taken several important steps since its invention. It has moved from aesthetical prototyping, its original use, to functional prototyping thanks to new materials. This has drastically reduced time-to-market, as solutions can be tested and validated in considerably less time than before. Yet, there are still several barriers for AM to move into volume automotive production. Among these, there certainly is process speed. An automotive factory produces a rather high number of parts per day. Pre- and post-production aspects – such as loading a build platform and cleaning the machine for the next job – are time-consuming tasks that impact on the suitability of current AM technologies for high-volume production in the automotive industry. That is why, as Ms Sampieri remarked, more automation in the additive process is key to unlocking greater opportunities for the technology in automotive production.



Railways

Stefanie Brickwede, Head of 3D Printing at Deutsche Bahn and Managing Director of the Network 'Mobility goes Additive', explained the use of AM in train operation and maintenance in her company. The attention remains on the introduction of additively-manufactured spare parts into trains. Deutsche Bahn relies on a network of service bureaus which have fabricated more than 4,500 AM parts so far – two thirds of which have already gone into trains. AM's benefits for the production of spare parts for train operation lie in the dramatic reduction of time needed to make them available. For spares done traditionally, lead time can take up to two years in some cases. AM brings down lead time by a huge amount, thereby injecting confidence into the ability to keep trains on-time. Substantial cost savings are also guaranteed. For instance, switching to producing dust caps with AM has generated €15,000 in savings per year. Other benefits can be seen in the introduction of customised parts, such as Braille signposts for visually-impaired people.



Hydraulics

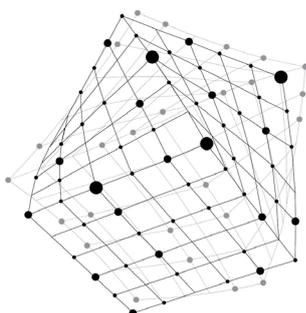
Valeria Tirelli, CEO at Aidro Hydraulics & 3D Printing, described the progress of AM in the hydraulics sector. Due to the importance of volume production, very little design innovation has taken place in the sector. In some cases, designs still in use today date back to 70 years ago. An SME that can enjoy flexibility in introducing new technologies, like Aidro, is challenging this conservative approach with AM. Lower weight and easier integration of sensors into the final machinery product are two examples of the technology's benefits in hydraulics. Yet, with flexibility also comes challenges to investment. For Ms Tirelli, jumping into AM requires a clear strategic approach from an SME, which goes beyond the purchase of machines and – importantly – involves the provision of skills. There is a continuous need for new talents. Existing designers, too, must be open-minded and ready to change their traditional design approaches in order to leverage AM's potential. Another key problem with that, she explained, is the difficulty to acquire vendor-agnostic design software skills. A better integration of designer input in the development of the design software would be helpful. It would ensure that software coming to the market is made while taking into consideration the mindset of the designer, who is its final user.

Medical

Thomas Maal, Associate Professor 3D Imaging & 3D Printing and Director of Radboudumc 3D Lab, gave an insight into the deployment of AM for medical applications. There has been great progress since the technology had first been introduced more than two decades ago. AM anatomical models improve the presentation of different options for patients. The technology has also advanced dramatically in terms of oral, maxillofacial and orthopaedic surgery solutions available. The growth of AM in the latter area has become emblematic. The Radboudumc 3D Lab originally started off with just one orthopaedic application. It has now developed 100 solutions in 2018 alone. In addition, the savings in medical costs through AM should not be underestimated – as is the case in head and neck oncologic surgery and reconstruction. Thanks to AM surgical guides, the laboratory managed to save 2-3 hours from surgical interventions that normally last about 12 hours, with consequent benefits not only for the patient but also in terms of the total cost. Another area with big savings is dental prosthetics, with 60% being saved on medical costs for dental restorations.



You can find the entire version of AMEC 2018's takeaways [here](#). Be sure to follow our website and social media for more about 2019's edition.



ADDITIVE MANUFACTURING EUROPEAN CONFERENCE

IV. PROMOTING EUROPEAN AM ON ALL THE OCCASIONS THAT COUNT

Last year, CECIMO continued as a regular presence in strategic gatherings for the AM industry. Our member associations – such as MTA, Addimat and AITA – promoted their countries' actors and new commercialised solutions at Formnext 2018. At a time of great talk of the industrialisation of AM, Formnext offered an opportunity for CECIMO to test the pulse of the industry, exchange views with the organisations it represents, and advance their messages in the regulatory domain. On 29 November, upon invitation of the European Investment Bank and the European Central Bank, our Director General Mr Geerts spoke about recommended financing measures for AM skills development at the 'Investment, Technological Transformation and Skills' conference, organised by these two institutions in cooperation with the Massachusetts Institute of Technology, Columbia University and the European Monetary and Finance Forum (SUERF). Certainly, skills development is a cause we fully support at CECIMO. For this reason on 14 March – together with Altair Engineering, Autodesk and Ultimaker – we sat on the jury of the prestigious Design for Additive Manufacturing Challenge. Organised by Additive Industries and created with the intention of fostering much-needed competences in design for AM, this prize is awarded annually to the best redesigns of conventionally made parts for AM. In addition, CECIMO's Filip Geerts participated as a member of the Expert Advisory Board of the TCT Awards 2018, where ground-breaking advancements in additive technology are recognised and celebrated annually.

Furthermore, our association has been invited to speak about the state of play on European AM in a variety of conferences and magazines:

- Inside 3D Printing 2018 (Düsseldorf, 21-22 February 2018)
- Second Additive Manufacturing European Forum (Berlin, 5-6 March 2018)
- International VDI Conference "Additive Manufacturing" (Amsterdam, 25-26 April, 2018)
- European Commission expert workshop on "Aligning Advanced Manufacturing education and training with the 21st Century needs: Higher Education" (Brussels, 12 June 2018)
- Op'ed in TCT Magazine blog (3 August 2018)
- BI-MU trade fair (Milan, 9-13 October 2018)
- IndustryArena eMagazine (Issue 4, 2018)
- Tecnologie Meccaniche Magazine (December 2018 Issue)

Having entered 2019, we are now turning our eyes on the next edition of EMO, the world's largest trade fair for the metalworking sector with an average of 130,000 visitors per edition, whose brand is owned by our association. The past edition of the trade fair pointed to a growing exhibition ground for AM technology solutions. We are actively committed to keeping up a high level of interest in AM amongst EMO's visitors. It is for this reason that in the next EMO, which will be held from 16 to 21 September 2019 in Hannover, Germany, there will be a new CECIMO international AM conference to showcase the latest developments in the sector to a large audience of metalworking stakeholders and practitioners.

V. EXPANDING OUR ROLE IN SHAPING INDUSTRY STANDARDS

Standardisation is constantly singled out as a fundamental aspect for the uptake of AM. This is why, in 2018, we have intensified our involvement in the most relevant standard-shaping platforms all over the world. In July, we joined the advisory board of ASTM's new Additive Manufacturing Centre of Excellence – which also comprises the US Food and Drug Administration (FDA), NASA, Airbus, the US National Institute for Standards and Technology and a few other high-level organisations. In the Board we are the advocacy association representing the European AM sector. We expect to use this fundamental platform as a critical bridge to solidify the links between R&D and standardisation communities. This is fundamental to further maximise the industry-relevance of R&D activities. In September 2018, we also joined the ISO/TC 261 “Additive Manufacturing” as a Category A-Liaison Member. This is the ISO committee responsible for the development of standards for AM. We are one of only three organisations to be awarded this status until now. Thanks to this partnership, many European businesses will have a greater say on standardisation within the industry. This will be a boost to those ongoing efforts in standard-development for the technology.

As AM is advancing rapidly and is still in an evolving stage, we believe that consensus-based, market-driven, voluntary standards – such as those shaped by ISO – are often a better instrument than top-down, binding regulations in supporting the deployment of AM today. In light of this, participation in ISO activities will allow CECIMO to build closer links between the initiatives within the standardisation community and the EU regulatory community. 2018 also represented the year where, in collaboration with the European Commission and together with our partners in the Joint MSP/DEI Working Group, we successfully produced a comprehensive plan to foster standardisation in support of digitising European industry. We addressed ICT issues like digitisation of AM systems and drew focus to areas including material pre-processing and final part non-destructive testing.

VI. DELIVERING RESEARCH ADVANCEMENTS FOR THE BENEFIT OF THE INDUSTRY

Our association is involved in several EU-funded initiatives to advance R&D in the AM sector. Some of them were concluded successfully in 2018.

Among these is METALS, which is an EU project we have coordinated on educating the manufacturing workforce for additive technologies. Our commitment to tackling the looming skills gap has been demonstrated with the final release of a 30-hour free e-learning course on the foundations of AM. Covering technical, practical and soft-skills for the technology, the online course is available in English, German, Italian and Spanish and is the result of a profound three-year collaboration between our industry members, training institutes and local education regulators in Europe. To support that, a Memorandum of Understanding aiming to raise awareness around issues like specific EU funding for vocational training was prepared by METALS partners and endorsed by 33 actors including EOS S.r.L., Renishaw PLC, Polytechnic of Milan and many others.

Last December, we also concluded our EU-funded AM-Motion project developed in cooperation with AM leaders like Materialise, Airbus and Siemens, and coordinated by Prodirtec. We mapped standardisation gaps in materials, design, process and end-product; launched a roadmap to bring down specific barriers on the scale-up of AM in verticals like aerospace, automotive, healthcare, energy production; and prepared a report on today's situation in Europe on AM education based on a business survey and extensive consultations with practitioners. Led by CECIMO, this latter report confirmed industry concerns on the skills shortage. 52% of all firms reported to have struggled in the recruitment of competent AM staff in the recent past.

The report also investigated the most-demanded profiles in the near future, highlighting that AM materials engineers topped the hiring intentions of surveyed firms in the months to come. It looked, too, into the most-sought-after areas of AM know-how, showing that aspects like quality assurance, testing and knowledge of regulatory approval procedures all captured the largest amount of replies in the survey – perhaps a sign of the increasing presence of AM in series production.

As we are glad to see some of our EU initiatives coming to a successful end, we are also proud to see new ones being officially approved. Our EU-funded project SAM received the green light from the European Commission in August 2018. With the remainder of the project consortium comprising EWF, Renishaw, Materialise and others, we will establish an Observatory on AM skills development, design, review and deploy much-needed job qualifications in the AM sector, as well as promoting the attractiveness of the AM sector as a career choice for students at different levels.

Finally, CECIMO remains also involved in research activities to develop and promote new AM technologies. Over the course of 2018 our EU-funded KRAKEN project – which is about creating an automated, multi-material hybrid machine for parts up to 20 m long – made important progress thanks to the work of our project partners like AITIIP, FIAT's R&D centre, Acciona, VERO Software and ourselves. The subtractive and additive techniques developed in KRAKEN are currently being integrated into a single system. On the side of the different materials, we have made great advances in the preparation of a polymer AM deposition rate reaching 120kg/h, as well as a metal AM deposition rate of up to 10 kg/h. Important milestones have also been reached on the development of AM resin. We are now looking forward to taking final steps in the project and aim to officially unveil the complete system later this year.



VII. CONNECTING WITH THE ACADEMIC COMMUNITY

A collection of black silhouettes of graduation caps (mortarboards) scattered across the upper half of the page against a warm, orange-gold background. The caps are in various orientations, some pointing up, some down, and some to the side.

CECIMO is about advocating for supportive AM regulations and business conditions. But we also strive to keep close contact with the academic community. This is why, in 2018, we were glad to contribute to knowledge sharing by authoring a chapter in a new book entitled 'Additive Manufacturing – Developments in Training and Education', which outlines all the latest strategies and teaching methods in the field. The book brings together the contributions of leading international experts to discuss aspects of new means of teaching, provide training programmes to gain alternative employment pathways, and highlight the need for certification by professional bodies and the use of community-oriented maker spaces to promote awareness of AM among society.

CECIMO's chapter focused on the transition from subtractive to additive manufacturing, from the perspective of skills. It illustrates findings from CECIMO's EU-funded projects on AM competences and job profiles. Delving into the skillset of the future AM workforce, the chapter points to the emergence of new skills specific to additive technologies, while emphasising the continued relevance of some other competences common in subtractive manufacturing.





cecimo

European Association of the Machine Tool Industries
and related Manufacturing Technologies

Member Associations

CECIMO Secretariat

Filip Geerts
Director General

Vincenzo Renda
Innovation Policy Officer

Olga Chilat
EU Public Affairs
Economist

Maitane Olabarria Uzquiano
Manager Technical
Regulations

Dimitra Vasilias
EU Public Affairs Manager

Elisabeth Vilain
Office Manager

Giorgia Zia
Communications Officer

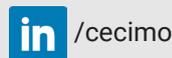
Lawrence Reddy
Jr Communications Officer

Damir Glas
Jr Public Affairs Officer



www.cecimo.eu

Avenue Louise 66,
1050 Brussels, Belgium
Tel: +32 (0)2 502 70 90



Austria: Metaltechnology Austria
Association of Metaltechnology
Industries
www.metalltechnischeindustrie.at

Belgium: AGORIA
Federatie van de Technologische
Industrie
www.agoria.be

Czech Republic: SST
Svazu Strojírenské Technologie
www.sst.cz

Danish Manufacturing Industries
Cooperation
A part of the Confederation of Danish
Industry
www.isa.di.dk

Finland: Technology Industries of
Finland
www.teknologiateollisuus.fi

France: SYMOP
Syndicat des Entreprises de
Technologies de Production
www.symop.com/fr

Germany: VDW
Verein Deutscher
Werkzeugmaschinenfabriken e.V.
www.vdw.de

Italy: UCIMU
Associazione dei costruttori
Italiani di macchine utensili robot e
automazione
www.ucimu.it

Netherlands: FPT-VIMAG
Federatie Productie Technologie /
Sectie VIMAG
www.fpt-vimag.nl

Portugal: AIMMAP
Associação dos Industriais
Metalúrgicos, Metalomecânicos e
Afins de Portugal
www.aimmap.pt

Spain: AFM - Advanced
Manufacturing Technologies
Asociación española de fabricantes
de máquinas-herramienta,
accesorios, componentes y
herramientas
www.afm.es

Sweden: SVMF
Machine and Tool Association of
Sweden
www.svmf.se

Switzerland: SWISSMEM
Die Schweizer Maschinen-, Elektro-
und Metall-Industrie
www.swissmem.ch

Turkey: MIB
Makina Imalatçileri Birliği
www.mib.org.tr

United Kingdom: MTA
The Manufacturing Technologies
Association
www.mta.org.uk

EMO

EMO® is a registered
trademark of CECIMO

cecimo is the European Association representing the common interests of the Machine Tool Industries and related manufacturing technologies globally and at EU level. We bring together 15 National Associations of machine tool builders, which represent approximately 1500 industrial enterprises in Europe (EU + EFTA + Turkey), over 80% of which are SMEs. CECIMO covers more than 98% of total machine tool production in Europe and more than one third worldwide. CECIMO assumes a key role in determining the strategic direction of the European machine tool industry and promotes the development of the sector in the fields of economy, technology and science.