



**“Paving the ground
for the second generation of a highly effective, application oriented
MicroNano Manufacturing community in Europe”**

Project Final Report

D5.3 Final Report

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1 Final publishable summary report

1.1 Executive Summary

New roles and its influence from MNMT as a solution provider to meet grand socioeconomic challenges have been demanded and are a driving force of developing new ways to create new commercial and societal opportunities based on emerging technologies. During the last two years, the ways to create those opportunities have advanced significantly, being supported by the MINAM 2.0 CSA project.

With the aim to release a Strategic Research Agenda and Roadmap in 2012 a representative set of organisations (regional clusters, ETPs and networks of excellence) had been selected. Several activities have taken place to capture the needs in the micro- and nanomanufacturing community. Conferences such as Hannover Fair, MicroNora in Besancon, 4M in Vienna, MM Live in Birmingham with a keynote presentation and much more have been used as a vehicle to maintain interactions with the community. All information can be found at: www.minam.eu

Expanding the network and a higher involvement of industrial players as well as increased visibility and appreciation among all stakeholders are the main objectives for the MINAM community. It has been shown that the gained benefit from the existing strength of being a community of networks is the main driver when talking about sustainability. Regional structures such as clusters have been identified and actively involved as a potential target group to reach regional industry and increase industry implication throughout Europe. Especially, as identified in the MINAM survey, the lack of infrastructure and the know-how on micro systems to capitalise on the new and emerging technologies of the future can only be resolved by a joint effort from industrial stakeholders, research and academic organisations and public bodies.

The MINAM 2.0 CSA project, running from December 2010 until November 2012, has supported and addressed many needs and requirements of the European MNMT community. With a strong consortium of nine partners within the project team and the involvement of many external stakeholders, meaningful results and applicable knowledge have been created which are described in the following.

1.2 Summary Description of Project Context and Objectives

While key industrial sectors in Europe are providing world leadership in developing new technologies there is still a significant potential to further enhance their competitiveness by enabling fast transfer of ideas into products. This is especially valid for new knowledge intensive and emerging industries, where MNMT (Micro- and Nanomanufacturing Technologies) play a substantial role in delivering next generation products.

The CSA MINAM 2.0 aimed to identify and reduce the barriers for faster industrial applications in such sectors and by doing so to allow MNMT to become core key-enabler in addressing tomorrow's worldwide socioeconomic challenges.

The overall key-outcome of MINAM2.0 was a **set of coordinated actions between the major European stakeholders of MNMT** (ETPs, NoEs and clusters) to further improve the implementation of the updated SRAs and Road Maps.

MINAM2.0 has established strong relationships and horizontal integration between different MNT stakeholders by developing joint strategy, activities and services for meeting the key socioeconomic challenges, offered to the MN Manufacturing community and all other application and technology oriented communities through the Sub-ETP (European Technology Platform) MINAM.

This aim is supported by achievement of the following key objectives:

- Accelerate the introduction of Micro Nano enabled products into the market through **an intensified information exchange between European Key Players in the Micro Nano Production technology area**

- **Advisory Services Roadmapping / SRA:** Ensure that (future) Micro- Nano- production capabilities are in line with the requirements of foreseeable application developments
- **Setup of a “One Stop Shop”** to the Micro Nano Manufacturing linked community
- To establish common micro- nano- manufacturing requirements and needs between ETPs, regional networks, NoE and associations, research infrastructures and ERA-Net to address the core socioeconomic challenges;
- To develop a Joint strategic research agenda SRA and roadmap for long term investment in micro and nano manufacturing technologies.
- To develop a sustainable approach for the MINAM community based on a research and commercial advisory services (RCAS) and joint research infrastructure;
- To support the implementation of the MINAM 2.0 common activity programmes defined within the project and disseminate to the MNT players through MINAM.

1.3 Main Results of the Project

1.3.1 Adjustment of micronanomanufacturing technologies with common needs for ETPs, clusters, Associations (WP1)

The activities in this work package mainly aimed to identify relevant technologies related to micro-nano manufacturing used or required in ETPs, clusters and associations.

For the organization on European level, two reports have been prepared: One report investigated on the state-of-play of European technology Platforms (ETP) in relation to MINAM. Common technology needs and bottlenecks have been identified and quantified. 40% of the ETPs analyzed stated a significant interest in MN-manufacturing. The complete report has been submitted as deliverable D1.1. The second basic report provides an analysis of potentially relevant Networks of Excellence (NoE) and Associations, in order to understand their strategies in terms of technology development wrt. micro-nano manufacturing. This report has been delivered as D1.2.

In order to obtain the same kind of knowledge on the regional clusters, these clusters have also been carefully analyzed. D1.3 reports on the expertise available at the investigated clusters, D1.4/D1.5 gives information on the market needs and micro-nanotechnology needs for each regional cluster.

Finally, and as a major outcome of this project phase, a SWOT analysis has been done based on the a.m. works. The result is a short list of conclusive points underlying the strengths and weaknesses in MN-manufacturing.

For the work done, new connections to ETPs, clusters and associations organizations have been established by the MINAM 2.0 consortium and existing links have been refreshed; this in itself was one of the objectives of this work package.

1.3.2 Common Activity Programme to Meet the Socioeconomic Grand Challenges (WP2)

The objective of this phase was to define joint horizontal activities between ETPs, NoE, associations and regional clusters in order to coordinate their actions. The work was based on engaging relevant ETPs and other stakeholders such as regional clusters in developing a joined strategic research agenda, in roadmapping and in consolidating and improving access to joint research infrastructures in micro and nano manufacturing.

As a first step, and based also on the previous MINAM SRA and roadmpping, survey results and other SRAs, the MINAM2.0 consortium had generated an intermediate document -the “MINAM position paper”. The decision to prepare such document was strongly motivated by the need to ensure the visibility of the MINAM2.0 consortium as soon as possible. This position paper had been presented first at the ManuFuture conference 2011 to the ManuFuture and Effra related community in October 2011, providing a first summary of the key findings. This position paper represented also a kind of framework for the draft version SRA and Roadmap to be prepared.

During the following development of the final versions of the roadmap (D2.4) and of the Research Agenda (D2.2), regional clusters had been massively involved; this focus was not initially planned, but was one of the findings during Work Package one. Additional workshops had been run, since clusters showed a real interest and commitment to the MINAM activities. This supported also the goal to achieve industrial relevance.

Using the results achieved so far, the findings described above with WP1, and the inputs from ETPs and clusters, a joint Strategic Research Agenda (SRA) and Micro and Nano Manufacturing Roadmap have been elaborated, discussed with the community and published on the MINAM website. These documents represent two of the main MINAM 2.0 results.

As an additional result of this Work Package a link to European Research Infrastructures (such as EUMINAFab) was established by MINAM2.0, resulting in joint appearances at several fairs and a strategy paper (D2.5 and D2.6).

1.3.3 Sustainability (WP3)

Work in this Work Package addressed two linked activities.

Firstly the provision of a Research and Commercial Advisory Service (RVAS), a service available to all stakeholders looking for support in all areas of MN-manufacturing.

This service is available via the MINAM web portal and aimed at helping companies, especially SMEs, in the efficient commercialization of micro-nano technologies. This RCAS would be an online portal to the MINAM 2.0 community, offering a suite of technology transfer services, including: lists of research centers, SMEs and start-up companies; lists of available infrastructures that could accelerate the development of micro-nano manufacturing; expert advice (knowledgebases).

Secondly the definition of a MINAM2.0 sustainability approach. This approach shall ensure the sustainability to continue the activities and secure the objectives achieved in the previous workpackages. This lead to a collaborating and supported MINAM platform providing valuable, relevant information and services to the MN community.

The resulting recommendation is to build a sustainable MINAM community upon three pillars:

- an industry specific information hub,
- a European-wide cluster network and
- an umbrella function at European policy shaping level

Having this in mind, the MINAM platform will continue working especially with the regional clusters (as a meta-cluster organization). The next workshop with relevant stakeholders is planned for early 2013.

MINAM 2.0 managed to position the European MNMT community as well recognized provider for key enabling technologies (KET). The achieved increased visibility is the basis for increased awareness and new investments within this strategic industry.

1.3.4 Dissemination (WP4)

First of all, a new logo for the MINAM community has been created. This logo is also the basis for the MINAM 2.0 project logo. The new logo was used in all communications and dissemination activities (D4.2).



Figure: Updated MINAM logo

A second important task was the coordination with the Nanofutures CSA, which is running in parallel to the MINAM 2.0 project. In order to minimize overlap and to maximize efficiency of both projects, a joint Workshop was held on January 21st, 2011 (D4.1: Minutes). During the WS, actions have been defined and agreements have been made in order to secure this.

In addition, a Satellite Group had been established. The Satellite Group was an advisory board to MINAM 2.0. The group consisted of nine members from ETPs, clusters etc. The details are given in D4.6 “Satellite Group”.

Last but not least, a broad set of additional dissemination activities have taken place via numerous ways. Two groups of dissemination activities can be identified:

- Broad, anonymous dissemination activities such as: Creation and updates to the website (D4.3), newsletters (D4.4 and D4.5) and roadshows (D4.10). All mentioned activities have made MINAM, its potential and its objectives visible to a broad community.
- Direct, targeted dissemination activities: These activities were covered mainly through several workshops, where the “core” community of MN-manufacturing was not only informed, but also asked to contribute to the objectives of MINAM (D.4.1 “Nanofutures coordination”, D4.7 “Cluster Workshop”, D4.8 “ETP workshop” and D4.9 “European decision makers”).

All measures led to a Europe wide recognition of MINAM among the relevant stakeholders, which was proven when more than 40 participants were present to the final MINAM2.0 workshop on 8th/9th of November 2012 in Brussels.

All in all, MINAM 2.0 had been presented at 38 events and conferences.

1.3.5 Description of the expected final results and their potential impacts and use

First of all, MINAM 2.0 has created or renewed links and synergies between European stakeholders directly or indirectly involved in micro-nano manufacturing. This enables a couple of additional results, which in turn will lead to considerable socio-economic impacts.

MINAM 2.0 aimed (and MINAM continues to aim) consequently at increasing the European competitiveness in Micro-Nano Manufacturing by:

- Enhancing the awareness of European industries about the potentialities of Microsystems and Nanosurface technologies to answer socio-economic issues
- Enhancing the competitiveness of SMEs to address niche market by deeply involving European SMEs clusters
- Facing the competitiveness from Asia/Pacific and United States by establishing sustainable links between research centres and innovative industries
- Convince investors to play with Europe by involving the regional clusters which are a meeting point between investors and industry

MINAM 2.0 will also contributed to improving the implementation of the SRAs and roadmaps through relevant European and National research initiatives in the NMP field.

Finally, MINAM2.0 will, by fostering transfer of MN technologies into production, products and markets, contributing to solutions for the grand societal challenges. It is well recognized that Micro- and Nano- Manufacturing Technologies (MNMT) are key enabling technologies expected to impact significantly on future economic development. But their impact on societal issues is at least equally important:

- MNMT stimulates new products and services, create and secure employment in Europe and improve living conditions, including of people who presently lack autonomy as a result of age, illness or accidents.

- MNMT also contributes greatly to meeting ecological challenges and achieving sustainable development, innovatively and economically.
- MNMT will also contribute to global security by proposing answer to the new threats such as terrorism or industrial and environmental risks.

Since MINAM 2.0 is a CSA (Coordinating & Support Action), its core objectives are not of scientific nature. The results are also not directly exploitable. As a consequence, reaching the MINAM 2.0 targets strongly depends on the stakeholder community and its awareness with regards to MINAM 2.0, its objectives and results. Therefore, dissemination activities played a vital role within the project; apart from the events listed below (details t.b. found as D4.10), also two newsletters and the website contributed to this aim.

Event	Place	Date
EuroNanoForum 2011	Budapest (CZ)	2011, 30/05-01/06
Nanofutures WS	Venice (IT)	2011, 30/06-01/07
PPP Infodays	Brussels(B)	2011, 11/07-13/07
MST Spitzencluster Strategy workshop	Freiburg (D)	
Mstbw Cluster conference	Karlsruhe (D)	2011, 05/07-06/07
Inauguration of the Fraunhofer IPA cleanroom	Stuttgart (D)	2011, 07/07
COMS 2011	(USA)	2011, 28/08-31/08
Nano S&T Konferenz	Dalian (CHINA)	2011, 21/10-23/10
Profactory Plus WG meeting	Brussels	2011, 01/11
Nanofutures WS	Venice (IT)	2011, 20/11-21/11
The netherlands MicroNanoConference 2011	Ede (NL)	2011, 15/11-16/11
Nanotechitaly 2011	Venice (IT)	2011, 23/11-25/11
Micronarc Alpine Meeting (MAM2012)	Villars-sur-Ollon (CH)	2012, 22/01-25/01
IEEE MEMS	Paris (FR)	2012, 29/01
IPAS 2012	Chamonix (FR)	2012, 12/02-14/02
Nanofutures WS	Roma (IT)	2012, 15/02-16/02
Nanotech Japan 2012	Tokyo (JP)	2012, 15/02-17/02
NanoLive USA	Chicago (USA)	2012, 07/03-08/03

ICOMM 2012	Evanston (USA)	2012, 12/03-14/03
Medtec Europe	Stuttgart (D)	2012, 13/03-14/03
Dinner Debate “How to complete the full innovation cycle - Lessons for HORIZON2020”	Brussels	2012, 20/03
MEMS Executive congress	Zurich (CH)	2012, 20/03
MACH 2012	Birmingham (UK)	2012, 16/04-20/04
Hanover Fair 2012	Hanover (D)	2012, 23/04-27/04
Clusterkonferenz of MicroTEC Südwest	Stuttgart (D)	2012, 14/05-15/05
Lausannetec	Lausanne (CH)	2012, 22/05-25/05
Sensor + Test 2012	Nürnberg (D)	2012, 22/05-24/05
EUSPEN	Stockholm (SW)	2012, 04/06-08/06
NanoCom Training Factory at AICHEMA	Frankfurt (D)	2012, 20/06
COMS 2012	Vestfold (NO)	2012, 24/06-28/06
MedTechPharma	Nürnberg (D)	2012, 04/07-05/07
Nanodevice Seminar at X2012	Edinburgh (UK)	2012, 05/07
CIRP ICME '12	Naples (IT)	2012, 18/07-20/07
Micronora 2012	Besançon (FR)	2012, 25/09-28/09
Profactory Plus WG meeting	Aarau (CH)	2012, 04/10
World Manufacturing Forum	Stuttgart (D)	2012, 15/10-17/10
SENN2012	Helsinki (FI)	2012, 28/10-31/10
Manufacturing Conference 2012	Budapest (H)	2012, 14/11-15/11

1.3.6 Public website and relevant contacts

The projects public website can be found at:

www.minam.eu .

The contact points within the consortium are:

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2 Use and dissemination of foreground

2.1 Section A (public)

2.1.1 List of all scientific (peer reviewed) publications relating to the foreground of the project

The MINAM 2.0 project (CSA) has not produced any scientific publications.

2.1.2 List of all dissemination activities

The MINAM 2.0 project (CSA) has performed numerous dissemination activities, meeting its requirements to involve numerous stakeholders and being visible throughout the European MNMT community.

The activities can be grouped in different categories. All achievements are also filed as Deliverables.

Roadshows, workshops and exhibitions: A list is given in the .pdf version of this report, as available at the EU Commission`s reporting system SESAM.

Newsletters: Two newsletters have been published and distributed (in February 2012 and November 2012).

Website: All public deliverables, newsletters and supporting information are available at www.minam.eu.

2.2 Section B

No exploitable foreground has been produced in the project (CSA).

Not patent applications have been filed.

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