MANNGA Deliverable

D1.1 Plan for dissemination and exploitation, including communication activities (PDEC)

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Executive summary

This deliverable represents MANNGA's Plan for Dissemination and Exploitation, including Communication activities (PDEC), which outlines our planning in relation of these activities and identifies the main targeted audiences in each case. The present version of this living document includes updates made in M20 due to the periodic reporting phase as well as a new partner (AMU) having joined the MANNGA project via a hop-on facility call. The plan will be further detailed and fine-tuned via updates as MANNGA progresses, e.g. when significant changes occur. The focus during the first half of the project was on the communication and scientific dissemination activities. In the remaining part of MANNGA, this focus will remain the same, but an increasing attention will be paid to assessing the commercial value of our scientific results. The interaction with the other four projects funded through the Advanced Spintronics call will continue to form a strong, separate stream of MANNGA's activities, penetrating its communication, dissemination, and later exploitation strategies.

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1. Introduction

MANNGA is a three-year long project of five partners, expanded to six as a result of joining the AMU team under the HORIZON-WIDERA-2023-ACCESS-06 – Hop on Facility program (from 1.03.2024), from five European states. MANNGA seeks to explore and challenge the limits of spin-based devices and their energy efficiency. This will be achieved by combining two inherently energy-efficient technology paradigms: (i) magnonics (using spin waves – low energy magnetic excitations – to process signals and data) and (ii) neuromorphic computing (using large-scale integrated systems and analog circuits to solve data-driven problems in a brain-like manner). Thereby, the key ambition of our very forward-looking research programme is to develop and establish a novel, revolutionary class of energy-efficient spin-based components and devices for use in green high-tech data communication, processing, and storage technologies, thereby helping unlock the full potential of spintronics. This ambition will be accompanied by a range of measures ensuring that our activities and results are communicated, disseminated, and eventually exploited by all concerned parties, audiences, and stakeholders.

2. Communication

This section describes our strategic aims and targeted measures primarily for communicating about MANNGA and its activities and results to a range of external audiences, including two-way communications, where appropriate. The second part describes internal communication activities, i.e. those within MANNGA and participating institutions. One of the aims of our communication activities will be to demonstrate, without unnecessary overselling, how MANNGA's scientific research may translate into economic, environmental, and societal benefits for general public. In addition, the new partner from the Hop on Facility program adds a new communication objective to inform and promote MANNGA activities and scientific collaboration in the framework of the Horizon Europe program in the widening countries, in particular in Poland and the Czech Republic.

2.1 External communication activities towards specific audiences

The strategic aim of MANNGA's external communication activities is to establish and maintain its informational presence at all levels, starting from the interested general public through to relevant academic and research communities and to policy makers of all kinds. The aim will be achieved using the following measures.

Public website *(targeted audiences: general public, undergraduate and postgraduate students, colleagues within and outside of the institutions involved in MANNGA, relevant research communities, industries looking for exploitable IP, policy makers of various levels*). MANNGA's website (at https://mannga-project.eu/) will continue to communicate, in a concise form, all relevant material about the project, its activities and achievements, including their impacts, both immediate and perceived, to the whole spectrum of audiences. Throughout the project, the website will enable real-time, one-way communication and diffusion of the information from MANNGA to the outside world. AALTO will be primarily responsible for the website maintenance, while all beneficiaries will share responsibility for creating and providing its contents.

Social media (*targeted audiences: general public, undergraduate and postgraduate students, colleagues within and outside of the institutions involved in MANNGA, relevant research communities, industries looking for exploitable IP, policy makers of various levels*). Social media will be used as another set of communication channels, complementary to the website in that we will be able to tune the coverage through the use of appropriate media. Social media channels of the participating institutions represent the obvious initial choice of the media, which will be expanded further in the course of the project, once early career researchers are recruited at all beneficiaries. The early career researchers are expected to drive the activities in social media.

The SpinTronicFactory network *(targeted audiences: colleagues from institutions involved in the SPIDER, NIMFEIA, M&MEMS, and SWAN-ON-CHIP projects, wider European spintronics community, European policy makers*). We will use events organised by this network as our primary tool for targeted two-way communication with the other four projects (SPIDER, NIMFEIA, M&MEMS, and SWAN-ON-CHIP) funded through the Advanced Spintronics call, the wider European spintronics community, and to the European policy makers of various levels, including those in the Horizon Europe programme. MANNGA's coordinator and scientific coordinator will assume responsibility for this communication channel, without limiting participation by other researchers from MANNGA.

Scientific conferences and workshops *(targeted audiences: wider relevant research communities)*. These will form an important channel of inward communication and will be essential for MANNGA's personnel to stay abreast about the relevant progress and results achieved elsewhere. Attendance of such events may be justified with or without presenting MANNGA's results, and relevant decisions will be approved by the beneficiaries.

Transnational Round Table on Magnonics, High-Frequency Spintronics, and Ultrafast Magnetism, TRTM (*targeted audiences: wider relevant research communities*). MANNGA will both support and exploit a new format for scientific dissemination that is being rolled out by UNEXE from 3-7 June 2024 – see https://trtm2024.sciencesconf.org/ – and will be followed by its next edition next year (from 16-20 June 2025). The format may be viewed as occupying a niche like that of publishing models that devolve assessment of a result's importance to the reader rather than to the editors and referees. The distinct feature of the TRTM's format is its non-hierarchical, bottom-up structure enshrined by its Statute. This structure considers interaction within the community and inclusion at all stages of the event organisation, promotes diversity among presenters, decouples scientific dissemination and learning opportunities from behind-the-scenes politics, removes or weakens effects of personal biases, and enables feedback from the audience to the event's future editions.

Seminars (*targeted audiences: researchers outside of the institutions involved in MANNGA from the widening countries*). MANNGA's partners will visit other research institutions and groups across Europe, to communicate and promote MANNGA's activities and results. In particular, the Hop-on partner promote MANNGA and Hop-on Facility programme to research groups in Poland and Czech Republic.

2.2 Internal communication activities

We expect a strong synergy with education activities at MANNGA's participating academic institutions. Hence, we will hold half-day open events at our face-to-face project meetings, to communicate our research and its results to interested local students and general public. Outreach managers will be available to help present MANNGA's scientific and technological discoveries and results during the events as well as other technical exhibitions and fairs. All participants of MANNGA will endeavour to publish press-releases for the public events above, as well as for major scientific breakthroughs, such as publication of a major paper.

Day-to-day research communication within MANNGA will occur through its Teams portal (maintained at AALTO by the project manager), monthly online meetings (in Zoom), as well as additional thematic ones. Among other information, the Teams portal maintains video recordings, presentations, and lists of action points from the monthly meetings.

3. Dissemination

3.1 Primary goals, strategy, target audiences

With exception of exploitable intellectual property (IP) foreground, the public disclosure of MANNGA's results will occur through standard routes, including and primarily focusing on scientific publications and conference presentations. The primary goal is to inform the various stakeholder groups about MANNGA's research results. The primary stakeholders identified and targeted by MANNGA's activities are research peers (including those from the Advanced Spintronics projects mentioned above) as well as, in a lesser degree, industry and other commercial actors, professional organisations, policymakers: anyone interested in using our results in their own work.

The primary strategy of MANNGA's dissemination activities is the focus on the scientific dissemination within the European community, expanding the scope geographically and identifying private actors for targeted dissemination, with a potential interest in exploitation of our results. In addition, the new Hop-on partner will focus on the dissemination activities in the widening countries, i.e., in Poland and the Czech Republic.

3.2 Dissemination activities and main dissemination tools

Scientific dissemination *(targeted audiences: magnonics, machine learning, and more generally scientific communities world-wide)*. Effective and speedy scientific dissemination of research results has become a prerequisite of success in modern scientific world, and so, it has been identified as a priority in MANNGA's PDEC, given the fierce competition in its field. The mainstream dissemination will take place via publication of (while providing appropriate open access to) our scientific breakthroughs in high impact international journals, e.g. those published by Springer Nature Publishing Group, AAAS, APS, EPS, IoP, AIP, ACS, IEEE, etc, and promoting them via talks presented at scientific meetings and conferences at national and international level, e.g. International Conference on Magnetism (ICM), Magnetism and Magnetic Materials (MMM), Intermag, Joint European Magnetics Symposium (JEMS), Magnonics Conference, Neural Information Processing Systems

(NeurIPS), IEEE International Conference on Machine Learning and Applications (ICMLA), IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), events organised by projects funded in the Advanced Spintronics call, and in universities and industrial laboratories.

Each of MANNGA's proposed publication or presentation will be expected to seek approval from the other involved teams prior to the intended submission, in accordance with provisions of the grant and consortium agreements. In particular, the prospective publications and presentations will be examined internally on potential patentability. MANNGA's participants will always acknowledge the European support in their published papers and presented talks, a list of which will be maintained at our website, together with the preprints and slides of presentations. MANNGA will also use targeted dissemination of our results to selected scholars and groups (in particular, those involved in the Advanced Spintronics funded projects listed above) that can make the best use of the information. At last, but not least, MANNGA's activities and results will be promoted at personal level by the members of the participating teams. This will include the transfer of knowledge via the mobility of early stage and experienced researchers, who will move to different groups in academia or industry during or after the project.

Appropriately protected MANNGA's results will also be disseminated via its website. To enable exploitation of the results beyond the project duration, the project website will be maintained for at least five years after the project's end.

4. Exploitation

Our planned exploitation activities will involve measures to enable relevant actors and organisations to contribute to creation of the desired economic, environmental, and societal impacts from MANNGA's results, and we identify such activities as another priority of MANNGA. However, efficient exploitation of MANNGA's results requires that the results be generated first and then relevant suitable exploitation mechanisms and activities be identified. The ambitious, high risk / high gain nature of MANNGA's research plan does not allow these steps to be undertaken until after the first scientific deliverables have been produced. Hence, we focus below on exploitation activities related to the most reliable research results, delivery, nature, and value of which could be foreseen most clearly.

4.1 Expected results and target audiences

Commercial exploitation (*targeted audiences: large companies and small and medium-sized enterprises (SMEs) involved or interested in manufacturing and / or usage of LPE YIG films, 3D YIG structures, hardware components and devices for computing, machine learning, other ICT, microwave and magneto-optical signal processing, hardware and software for machine learning and neuromorphic computing*). These existing connections of Pasqal NL and INNOVENT beneficiaries will serve as a starting point for MANNGA's exploitation activities. In particular, this concerns the client bases of Pasqal NL (a quantum and machine learning computational software company that designs novel algorithms and builds solutions with industrial applications) and Matesy GmbH (INNOVENT's spin-off company), which include the automotive, fine chemical, electronics, financial, pharmaceutical, and higher-education sectors. MANNGA's research will naturally lead to additional

business opportunities for Pasqal NL and INNOVENT. Pasqal NL hopes to benefit from MANNGA beyond commercialising the developed solutions. Pasqal NL's current (public) client portfolio includes Airbus, BMW, Covestro, Janssen Pharmaceutical and others. In addition to these European industry-leaders, several more clients are involved in multi-year projects on topics such as machine-learned materials discovery, computational drug design and more.

MANNGA's specific outputs expected to have greatest potential value for exploitation include (i) processes for LPE YIG growth, (ii) technology of fabrication and integration of 3D YIG structures, (iii) designs of mANNs and their constituents, and (iv) machine learning algorithms and software for mANNs' training; at the time of writing, the corresponding foreground IP holders are (i) INNOVENT, (ii) MLU, (iii) UNEXE and AALTO, and (iv) Pasqal NL. Naturally, INNOVENT and Pasqal NL will be the first to exploit their own new results in (i) and (iv), respectively. MLU's plans for commercialisation of their methodology (including its developments in MANNGA) in (ii) are also well-advanced, including a strategy of actively protecting IP at MLU. Hence, much of MANNGA's collective effort will be on exploitation of our results in (iii), which are also likely to be largest in both number and variety.

Once MANNGA's first results have been produced, it is foreseeable that at least some of the industrial players would be interested in the whole portfolio of our IP, starting from fabrication of the LPE YIG and 3D YIG structures through to the design and fabrication of complete mANNs, and to software for their operation. This would call for a coordinated approach, which will be regulated using MANNGA's consortium agreement. This will allow the highest level of protection for all participants both individually and collectively, following the rules established by the EC and the participating institutions. MANNGA's consortium agreement will govern disclosure of confidential information and ownership of the IP foreground to be generated.

MANNGA's Scientific Project Committee will be responsible for surveying the IP management. Decisions on the protection, filing and prosecution of foreground IP shall be taken by the Committee, within 15 days from the date of receipt of the query. Divulgation of foreground IP in form of a patent shall only be undertaken with the agreement of the Committee, which shall not be unreasonably withheld. Participants will have a period of three months to present their objection to divulgation as a patent. Thereafter, in the absence of any objection the participants wishing to divulge may proceed. Each participant shall meet the costs of protecting its own IP, its prosecution and enforcement. The cost sharing of joint IP prosecution and enforcement shall be agreed by the involved participants. Participants co-owning patents shall enter into a co-ownership agreement prior to any exploitation thereof.

5. Final remarks

In summary, this Plan lays down the main principle of the communications, dissemination, and exploitation activities in MANNGA. Once the deliverable is submitted, the Plan will be reviewed and amended at the meetings of the Scientific Project Committee, held quarterly.