



D8.1: Dissemination Plan

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GLOSSARY

PM	Project Manager
PC	Project Coordinator
DoA	Description of the Action
AMO	Atomic, Molecular and Optical
AOM	Acousto-Optical Modulator
WP	Work Package

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Executive summary

The AQuRA project will organise several dissemination activities. Of these, 3 will lead to specific deliverables:

- Atomic, Molecular and Optical (AMO) how-to videos on optics system building tasks for young researchers
- Development of a multi-lingual quantum technologies teaching kit
- Organisation of a series of events: conference, workshop, and industry showcase

4 further efforts will be aimed at a general audience:

- Establishment of AQuRA website (<https://www.aquraclock.eu/>)
- Demonstration and talks for the greater public
- Social media presence
- Dissemination materials and press releases

3 further efforts will be aimed at scientists or industry:

- Presenting AQuRA progress and output at academic conferences and workshops
- Showcasing our developments at industry- and end-user targeting events
- Publication in scientific journals

This document describes the different activities and outlines who coordinates them, our plans for the organization, the targeted audience, and any deadlines or dates of planned delivery for the different tasks.

1 Introduction

This document describes the plans for the dissemination and engagement efforts for the AQuRA project. It is based on the outreach tasks and deliverables listed in the AQuRA Description of the Action (DoA) in Work Package 8 (WP8), “*Dissemination and public engagement*”, as well as on discussions with the AQuRA partners during the AQuRA Kickoff meeting which took place online on 2 December 2022.

The dissemination strategy for AQuRA is summarised in **Figure 1**. In a nutshell, for AQuRA, we consider two broad categories of target audiences: the general public and specialist audiences (consisting of an audience from industry and an audience from academia). To highlight the importance of the dissemination and engagement activities, AQuRA has a dedicated outreach officer located at UVA who coordinates the work described in this section. All engagement activities with the three target audiences are founded on the expertise and know-how of the AQuRA projects partners. On the one hand, partners have their own interests and experience in disseminating their work via various routes and outlets. On the other hand, all partners will contribute to the technical work programme of the project, which in turn provides the essential basis for the main content used in the AQuRA dissemination and public engagement activities.

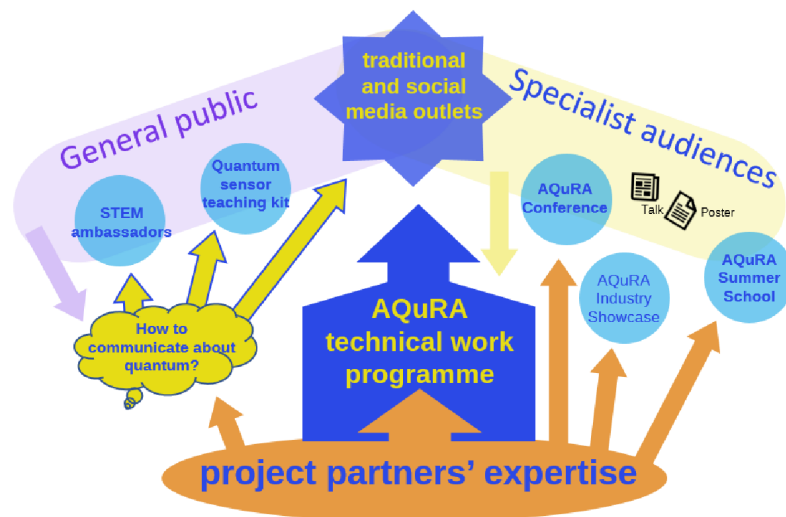


Figure 1: AQuRA dissemination and public engagement strategy with the three main target audiences (i) general public and specialist audiences from (ii) industry and (iii) academia.

WP8 of the DoA describes 5 dissemination tasks – AMO how-to videos on optics system building tasks for young researchers, Development of a multi-lingual quantum technologies teaching kit, and organisation of events (conference, workshop, and industry showcase) – have an associated deliverable. Our plans for those three tasks will be described in detail in the Sections 2, 3 and 4 below.

Of the other tasks, 5 fall in the category of outreach and popularisation for the general public; Section 5 discusses our plans for those tasks. The remaining 3 tasks are aimed at science and industry and are described in Section 6.

Each task description mentions at its beginning a deadline or date of planned delivery and the name of a coordinator who is responsible for carrying out the plan for that task. (Exceptions are Sections 4.1 and 4.2, for which the coordinator role still needs to be assigned.) The overall execution of the outreach plan will be coordinated by the UvA, the responsible WP leader for WP8.

2 AMO how-to videos on optics system building tasks for young researchers

Coordinator: UvA (with contributions from all partners)

Planned date of delivery: M42

Deliverable: D 8.2

2.1 Description

We have found that, when educating young researchers, there is a severe lack of simple instructions on basic AMO topics. To fill this gap, we will produce a series of short ‘how-to’-videos, primarily aimed at young researchers describing techniques in AMO physics, specifically on the use of crucial optical elements and on precision measurement with ultracold atoms. Examples of topics for the videos include how to collimate a laser beam, inject an optical fibre or align a double-pass AOM. The videos will be released via an AQuRA

YouTube channel, via partner social media channels and on the AQuRA website. Videos will be produced in the English language, subtitles will be provided in the local languages of all the partners (Dutch, Danish, French, Polish, Finnish, German).

Each partner will contribute at least 1 video (such that in total, at least 9 videos will be produced). The exact production path may differ per partner, but may include:

1. Assisting partners with a professional production team.
2. Assisting partners by their in-house development teams.
3. Partnering with a relevant youtuber for production (e.g. Huygens Optics <https://www.youtube.com/@HuygensOptics>)

Even if produced by different partners, all partners will coordinate with the outreach officer to ensure a consistent look and feel to the series.

2.2 Plan

The timeline for each individual video may vary between the different partners. However, each step will be executed no later than the month indicated below:

- M26: Decide on the topic of the video.
- M26: Request quotation from video-editing companies to produce the videos
- M27: Decide on the topic of the video.
- M27: Send topic of the video to partners to prevent duplicate topics at different partners
- M27: Select a video editing company to produce the videos
- M30: Discuss with a video editing company.
- M31-33: Filming and animation.
- M34-35: Editing and creating subtitles.
- M36-38: Send first version to the partners for comments; further editing into final video.
- M38-39: Creating subtitles, preferably by native-speaking partners.
- M42: Delivery, publication on AQuRA website and YouTube channels.

3 Development of a multi-lingual quantum technologies teaching kit

Coordinator: UvA (with contributions from all partners)

Planned date of delivery: M18 (basic version), M36 (final version)

Deliverable: D 8.3

3.1 Description

To engage the general public at an educational level, we will develop a teaching kit as a tool for teaching secondary school students about precision timing and quantum sensing. We aim to provide straight-forward teaching guidance and handout material available in pdf format for download from the AQuRA website in English and in the local languages of the AQuRA partners (Dutch, Danish, French, Polish, Finnish, German). This will allow a high degree of flexibility for teaching personnel on how to best integrate the teaching material in their courses. On the one hand, we will offer complimentary soft-or hard copies (on demand) of a comic booklet on precision timing that was authored in collaboration with artist Helen Greetham during the lifetime of the iqClock project. On the other hand, we will conceive an interactive approach based on the “Museum in a box” concept where tokens with RFID chips

trigger the presentation of audio-visual content. Once the content is available, the material will be disseminated at school visits, geared towards encouraging students to consider career pathways related to STEM subjects. Specifically, the material will be used by the AQuRA STEM ambassadors (see section 5.1).

3.2 Plan

- M9: Each partner nominates a responsible person for development of the teaching kit.
- M10-12: Decide on contents of the teaching kit.
- M11-13: Basic version of teaching kit developed (in English).
- M14: Send the first version of the basic teaching kit to AQuRA partners.
- M15-17: Further editing into the final version of the basic teaching kit.
- M18: Delivery of basic version, publication on AQuRA website.
- M19-28: Final teaching kit developed (in English).
- M28-31: Translations to local languages of AQuRA partners.
- M32: Send first version to partners for comments.
- M33-35: Further editing into the final version of the teaching kit.
- M36: Delivery, publication on AQuRA website.

4 Organisation of events (conference, workshop, and industry showcase)

Coordinator: UvA (with contributions from all partners)

Planned date of delivery: M42

Deliverable: D 8.3

To strengthen the visibility and encourage the extension of existing networks among project partners, a key element of the AQuRA dissemination strategy will include the organisation hosting of three dedicated events for the targeted specialist audiences:

1. To address the academic community, we will organise a scientific conference as a satellite event to a major European timing conference, preferably EFTF 2024. See section 4.1.
2. To support the next generation of specialists in the field of optical atomic clock development, we will co-organise a summer school on optical atomic clock technology aimed at PhD students and early career researchers. See section 4.2.
3. With the strong presence of our industry partners in this project, we plan a major industry showcase, organised by partner CNRS, at the end of the AQuRA project in Paris. See section 4.3.

4.1 Conference

Coordinator: TBD

Deadline: Spring 2024 (M18)

Description: We will host an academic conference to cater for the dissemination of the scientific results of AQuRA. It will be an opportunity to bring the leading groups for the development of transportable quantum clocks from around the globe together in Europe. In

order to reach a large audience, we plan to organise this conference as a satellite event to a major European timing conference, preferably to EFTF 2024 or 2025.

Plan:

- M7: During the AQuRA Consortium Meeting on 13 June 2023 in Munich, an organisation committee and coordinating partner will be appointed for the organisation of this event.
- M8: Determine date, location and topic of the conference. Announcement on AQuRA website and social media channels.
- M9-10: Preliminary program and securing speakers.
- M11-17: Practical conference organisation.
- M18: Delivery and reporting.

4.2 Workshop

Coordinator: UMK

Deadline: July 2023 (M8)

Description: The AQuRA project team will organise a summer school at UMK in Toruń on 10-12 July 2023, titled “School on charged particle trapping”. The event is organised in cooperation with the EU ITN “MoSaiQC” which involves a number of partners also present in the AQuRA project. In close collaboration with the MoSaiQC PM, UMK will develop a program, invite participants and make sure that all practical matters are taken care of. To strengthen the awareness of gender issues in physics and technology, we will invite an expert on STEM gender issues to give a presentation and guide a discussion during one of the sessions of the workshop.

Plan:

- M5: Date, location, topic and title of the summer school were chosen.
- M6: Announcement on AQuRA website and social media channels.
- M6: Together with MoSaiQC PM, preliminary program and securing speakers.
- M6: Secure expert speaker for STEM gender session.
- M6-7: Together with MoSaiQC PM, practical conference organisation.
- M8: Delivery and reporting.

4.3 Industry showcase

Coordinator: CNRS / Syrte

Deadline: Spring 2026 (M41)

Description: CNRS will host an industry showcase in Paris at the end of the project in Spring 2026 with several hundreds of participants. This will be a continuation of the Industry Workshops initiated in Phase I of the iqClock project, including workshops with horizontal communities (companies within the same sector) and, separately, with vertical communities (companies up and down a single supply chain).

Plan:

- M27-29: Determine date and location for the industry showcase.
- M30-33: Invite companies and academic institutes to participate.

- M34: Finalise line-up of companies and event program.
- M35: Announce showcase on AQuRA website.
- M36-40: Practical event organisation.
- M41: Delivery and reporting.

5 Further popular science and outreach efforts

5.1 STEM ambassadors program

Coordinator: Ineke Brouwer (UvA-PM)

Deadline: continuously

Description: Among the project partners, we will designate interested students and postdocs (also beyond the immediate personnel of the project) as STEM ambassadors for quantum technology. The programme will kick-off with a training session led by the work package lead UVA and comprise regular meetings (online) with the participants. This activity will target at least 500 secondary school students across the project partners during the lifetime of the AQuRA project. By delivering this activity, we would hope to increase the understanding of quantum sensing technologies among school students and demonstrate how these technologies are instrumental in addressing future challenges in navigation, positioning, and timing. Most of all, this activity will be geared to encourage a career path in quantum technologies, in particular for currently underrepresented groups in this field. We will evaluate this activity to determine the success of the engagement and to influence future engagement projects. Specifically, the AQuRA partners will make use of the multi-lingual quantum technologies teaching kit developed by AQuRA (see chapter 3 and deliverable D 8.3).

Plan: Each partner will designate at least one STEM ambassador. The UvA-PM will organise a training session for the STEM ambassadors and organise regular meetings with participants. The local STEM ambassadors from each partner will organise and report on school visits. The majority of these visits will take place in M38-42, as the teaching kit will be available after M37.

5.2 AQuRA website

Coordinator: Ineke Brouwer (UvA-PM)

Deadline: continuously

Description: The AQuRA project website functions as the central hub for all outreach activities by providing links to externally hosted content, downloads of teaching materials, scientific publications, a record of past and future events and contacts to the project team. An initial version of the website (www.aquraclock.eu) was launched at the start of the project. It has been designed and written to appeal to a wide audience. It aims to describe the focus and goals of the AQuRA project, and to advertise and document the outreach activities. Furthermore, it presents the involved partners, open positions, contact information and AQuRA appearances in national and international media. The website will allow visitors to download public dissemination materials and open access publications with the goal to raise awareness for quantum technology and to encourage engagement with the project.

Plan: The website will be continuously updated by the PC (Florian Schreck, UvA) and PM (Ineke Brouwer, UvA), to keep the contents current and add new media appearances. All AQuRA partners have been instructed to send suitable publishable materials to the outreach officer for publication. This page will also contain a link to scientific articles that result from the AQuRA project.

5.3 Demonstrations and talks for the greater public

Coordinator: Ineke Brouwer (UvA-PM) and local outreach contacts

Deadline: continuously

Description: We will present our research to the greater public by speaking at schools, during the public lecture series of our universities, or at science museums, etc. We will also participate with AQuRA lectures and lab tours during the open days of our respective institutions.

Plan: The PM will make a list of local outreach contacts, one for each of the AQuRA partners. This team will coordinate these events locally. Materials used in, and useful for, these presentations – including templates and useful images – will be collected in a shared folder that is accessible to all AQuRA members. Materials that are interesting as stand-alone for a broader audience will also be published on the AQuRA website. The PM will keep a record of all activities in this category. These materials will include the AMO how-to videos (see chapter 2 and deliverable D 8.2) and the multi-lingual quantum technologies teaching kit (see chapter 3 and deliverable D 8.3) developed by AQuRA.

5.4 Social media exposure

Coordinator: Ineke Brouwer (UvA-PM) and local outreach contacts

Deadline: updated continuously

Description: Social media dissemination channels are growing in importance. We have selected the most suitable channels and maintain a consistent and informative presence. Additionally, we will create suitable internal mailing lists, for maximum effective targeting of the AQuRA community.

Plan: At the AQuRA Kickoff meeting, it was decided that we use Twitter, Facebook and LinkedIn as our main social media channels. We will have a static informative page on Facebook and a YouTube channel to post videos (see chapter 2 and deliverable D 8.2). The local outreach contacts will provide input for these profiles, and the PM will keep the profiles up to date. Internal mailing lists have already been created; further topic-specific ones (such as an outreach list) may be added in the future if the need arises.

5.5 Produce dissemination materials and press releases

Coordinator: UvA

Deadline: continuously

Description: AQuRA will disseminate, via the website and other channels, the scientific output resulting from the project. To disseminate to the wider public, press releases will be produced with every (major) scientific publication.

Plan: The AQuRA website has a subpage “Output” on which scientific publications will be linked (see section 5.2 and 6.3). For scientific publications, the local outreach coordinators will coordinate press releases and news items if deemed appropriate. For the publications that can be considered main breakthroughs, a broader press campaign will be coordinated by the PM together with the partner(s) authoring the publication. Making flyers and posters for specific activities will be incorporated in the plans for those activities if deemed relevant.

6 Dissemination efforts for science and industry

6.1 Presenting AQuRA progress and output at academic conferences and workshops

Coordinator: Ineke Brouwer (UvA-PM)

Deadline: continuously

Description: The project partners of AQuRA will use their existing networks and operation base to disseminate the project work and its outcome to their peers in academia and industry: As part of that, partners will contribute to national and international conferences and workshops (e.g. those on clocks). AQuRA promotes early and open sharing of results presented at conferences: posters, slideshows and, if available, video recordings of our latest presentations at conferences, workshops, etc. will be shared on the AQuRA website. This practice will make external parties more aware of our latest progress and ideas and enable these parties to e.g. timely start or continue collaborations with AQuRA or to profit early from our developments.

Plan: Through the AQuRA mailing list, partners will point out relevant conferences to one another. All partners will inform the PM of conference visits and exhibitions that they participated in where they have disseminated AQuRA results and share relevant posters, abstract, slideshows and videos for uploading on the AQuRA website. The PM will keep a record of all these dissemination activities.

6.2 Showcasing developments at industry and end-user targeting events

Coordinator: Ineke Brouwer (UvA-PM)

Deadline: continuously

Description: The AQuRA consortium will disseminate relevant scientific findings at industry and end-user targeting events (e.g. trade fairs and industry showcases).

Plan: Through the AQuRA mailing list, partners will point out relevant industry events to one another. All partners will inform the PM of participation in such events where they have disseminated AQuRA results. The PM will keep a record of all these dissemination activities.

6.3 Publication in scientific journals

Coordinator: Ineke Brouwer (UvA-PM)

Deadline: continuously

Description: Where possible and relevant, all scientific output and results of the AQuRA projects will be published in scientific peer-reviewed journals and made available open access as per Horizon Europe open access policy.

Plan: The project partners of AQuRA will use their existing networks and operation base to disseminate the project work and its outcome to their peers in academia and industry. As part of that, we will publish scientific results in peer-reviewed journals (with taking open access policies into account).

7 Conclusions

This document describes the plans, timelines and coordinators for the different AQuRA dissemination and engagement activities.

The dissemination plan will remain a work in progress. The document will be adapted and updated when necessary based on experiences and needs in the consortium.