Science Communication Plan of the COST Action CA18235

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1. SUMMARY

The PROBE Cost action's goal is to bridge the observational gap in observing the Atmospheric boundary layer (ABL), the layer of atmosphere closest to the Earth's surface where we all live. The first step to achieving such a goal is providing ABL profile observations of temperature, humidity, wind aerosol, and clouds from various European sites. However, to produce a step forward and fill the observational mentioned gap, we need to harmonize data and procedures and merge expertise from industry and academia. In this context, we can frame the goal of the Action's communication strategy. The communication activities focus on facilitating the communication between PROBE Cost Action members, easing the interactions between industry and academia involved in the ABL profiling. Moreover, we aim to clarify the needs of the end-users of ABL products to better tackle the still open issues in data production and distribution. Finally, we cannot leave aside to stress the importance of the Action's results to the general public, for what deals with the broader context of understanding and adapting to climate change.

The science communication coordinator (SCC)'s role in the PROBE Cost Action covered developing and maintaining the website, social media channels, and mailing lists. Besides this, the SCC developed various tools to facilitate fast chatting among probe members and was responsible for producing the multi-media content for the Action (videos, posters, infographics, images, and news articles). For facilitating the identification of new stakeholders and organizing networking activities between PROBE users focused on developing shared data and procedures, the Action decided to include the SCC in WG1 (knowledge exchange) to strategically foster with specific communication tools and strategies the exchange with end-users and stakeholders. Cooperation also with the Virtual Networking Support Manager and Grant Awarding Coordinator) was conceived to increase the visibility of the achievements of these special tools for knowledge exchange.

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2. GENERAL AIM AND TARGET AUDIENCES

The core aim of the communication and valorization of the action results are:

- Provide a precise vision of the progresses achieved by the Action and an overview of the outputs associated with the Action deliverables.
- Provide end-users with tools to exploit the potential of ABL profiling observations for their specific applications.
- Develop and affirm the Action and its website as a platform to combine researchers' and stakeholders' shared knowledge and end-user experiences.

The main objectives that we envision to achieve the specified aims of the communication plan are:

- Identify the diverse target audiences for the Action and plan specific strategies and approaches to communicate and involve them in its activities.
- Create several ready-to-use templates for establishing a standard layout characterizing the communication of the Action (logo, slide template etc.)
- Provide support in communicating WG's activities by producing dissemination material associated with the WG's outcomes and deliverables.
- Plan, organize, and coordinate online and in-person events and dissemination activities in collaboration with WG1 and COST communication office, to maximize the impact of the Action's outcome on the various interested audiences.
- Monitor the impact of the communication strategy and the resonance of the Action's dissemination activities by analyzing specific key performance parameters (KPI), as defined in Table 1.
- Produce content addressing the target of the general public and the mass media, highlighting the importance of boundary layer profiling for European society and its economy.

Table 1: Prescribed KPI for monitoring Action's relevance and visibility

Key performance indicators (KPI)	
1	Number of visits to the Action’s website
2	Number of registered users to the Actions’website
3	Number of followers on twitter
4	Number of views of webinars, introductory lectures

5	Number of assigned VMG and STSM

The broad range of applications for whom it is crucial to get reliable profiles of the ABL makes the public interested in the Action's outcomes and results very diverse. The audiences are non-homogeneous and use different languages, so they require different target-based approaches for communication. We opted to group them based on their shared interest or application.

Besides the specific application-driven type of audience, we can consider two main broad categories of audiences:

- The **internal audience** includes all the people involved in the network, i.e., people being part of the working groups or organizing the Action's event, discussions, or panels. Internal audiences correspond to the members' category on the website, having the right to access Action's documents and material that are not publicly available to anyone.
- The **external audience** includes all the people that have no direct involvement with the Action, but are aware of it, show interest, and benefit from the Action's activities like webinars, documents, and online workshops.

Table 2: List of target audiences, grouped as internal and external.

EXTERNAL AUDIENCES	Fog/icing alerts	Transport applications (airports, roads, etc), environmental protection agencies
	Air quality	Environmental protection agencies, environmentalists
	Renewable energy	Green economy companies, wind farms, energy companies…
	Urban environments	City halls, environmental agenciee, modeling community of atmospheric scientists
	researchers	Observation and modelling community of atmospheric scientists…
	International bodies and networks	ACTRIS, E-PROFILE, WMO, ICOS, SURF, INTAROS, WFIP, EUMETNET, NMHS, EUMETSAT
	Mass and specialized media	The conversation, COST journal, eurekalert….

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	General public	Science lovers, general society , specific target communities (complex terrain, cities)
INTERNAL AUDIENCES	Researchers from different European institutions	Instrument-specific community, aerosol community, ECMWF scientists etc…

For the specified audiences, we can list the key messages to be delivered using the science communication plan and activities.

Key messages for the internal audience:

- The network is the primary tool for developing collaboration.
- The collaboration will produce relevant results that will be beneficial for all partners.
- Information can be distributed through the network and reach stakeholders and end users utilizing the communication tools developed (website, mailing lists, etc)
- The science communication coordinator is the reference point for finding relevant information and overcoming issues and difficulties encountered in the dissemination activities. Moreover, it is the contact point to raise interest in exciting perspectives and possibilities that can pop up from anyone in the network.

Concerning the key messages for the external audiences:

- ABL profiling is crucial for monitoring a region of the atmosphere that is poorly observed from satellites and surface sensors.
- ABL profiling in urban environments will help improve the parametrizations of the surface-atmosphere exchange over the complex urban terrain, contributing to better urban planning strategies to improve air quality and mitigate climate change.
- Fog is an environmental hazard. High-resolution profiling of humidity and temperature can improve fog prediction in numerical weather prediction models, bringing direct, substantial improvements in transport applications (air traffic, roads etc., solar energy sector)
- Accumulation of pollutants close to the surface is highly dependent on the atmospheric stability and the ABL height. ABL profiling will contribute to raise air quality alerts in polluted areas like cities, impacting the life of large amount of population.
- Renewable energy applications and the forecast of renewable energy availability will crucially benefit from the high resolution ABL profile observations because weather strongly impacts the availably of renewable energy sources.

All researchers have their own independent responsibility to communicate with their own peers. In the same way, also project partners have their own responsibility to communicate, besides their own contribution to the project, also its mail goal and objectives.

For delivering the aforementioned key messages and achieving the described communication goals, we framed a set of activities in the PROBE Cost Action framework, exploiting various dissemination techniques.

Table 3 shows a list of main actions that require dissemination during the grant period and the promising techniques for mastering dissemination for each. A detailed description of the techniques can be found in the following sections.

Table 3: PROBE Cost Action activity type and dissemination techniques.

Activity	Dissemination technique	Recurrence	Preparation in advance	Target audience
CORE, MC meetings	Email, event creation on website	Every 6 months	Not necessary	internal
WG and sub-WG /task group meetings	Event creation on website, email announcement, newsletter, social media	Often without regularity, depends on the workflow of the WGs	Yes, 4 weeks or longer	Internal and external
Workshops/ training schools/ conferences	Event creation on website, email announcement, newsletter, social media, external mailing lists	low	Yes, 4 weeks or longer	Internal and external
VMG/STSM calls	Post on the website, announcement via email, social media	low	Yes, 4 weeks or longer	Internal
News from partners, stakeholders (es: job offers, announcements etc)	Short notice, social media, post on website	often	Not always	Internal and external
Broad dissemination to general public	Social media, multimedia products, newspapers	low	Yes, 8 weeks or longer	external

3. PLAN FOR THE COMMUNICATION OF ACTION RESULTS

In this section, we describe the platforms and channels used routinely for communication purposes with the timeline and recurrence indicated in Table 3.

1) WEBSITE

The HOST platform (https://host.it/) hosts the PROBE Cost Action website (www.probe-cost.eu). The website is the core container of the Action, and it is two-folded. The public section shows various menus, grouping:

- General information about PROBE organization and COST Association (**what is PROBE** menu)
- **PROBE resources**, organized in terms of publications, virtual mobility grants, deliverables, video and photo gallery etc.
- **News**: the regularly posted information on activities from the Action and advertisements are published here. This publication area also includes multimedia content like videos, info-graphics, etc.
- **Activities**: describes all past and future events, the event types, and the activities developed within each working group.
- **Get in touch**: an area for people that want to get more involved with all the information to reach PROBE.

A login menu item allows access to a reserved area, structured with two different levels of access:

- **Users**: people registering to the website will then receive the newsletter and will have access to some documents,
- **Members**: they belong to the internal audience that will have access to documents not yet public and to some PROBE-specific material (templates, logos, etc.). For WG leaders, login as members also gives the possibility to create events, send emails to the whole network via the website, or upload documents (minutes of the meetings etc.).

The SCC is responsible for maintaining the website, the users' and members' administration, security, and updates.

2) SLACK

PROBE takes advantage of the slack platform, which provides a digital workspace to foster communication, discussion, and exchange among members and WGs.

Probe's slack has various channels, some of which deliver crucial general information and some dedicated to specific WGs, task groups, and particular purposes (communication, ECIs, EGU conference, for example.)

3) COMMUNICATION TOOLS: CANVA, FLOURISH, COOLORS, TINYWOW, ANSWERTHEPUBLIC, UNSPLASH, LNK.BIO

For preparing multimedia content for the Action, the SCC routinely makes use of a set of tools:

- CANVA: an online platform to create multimedia and graphical content to create any material (video, posters, cards, social media dedicated posts) with direct access to

media (photo, audio, video) libraries and the additional possibility to plan the publication of the content by synchronizing the PROBE accounts in the platform.

- FLOURISH: online platform associated also with CANVA that allows the creation of animated graphics and new data visualization tools.
- COOLORS: a platform to pick or build a color palette for the creation of media content
- TINYWOW: a digital platform that allows multiple file conversions
- ANSWERTHEPUBLIC: an online tool that allows to learn what people want to know about the word provided in input in the search.
- UNSPLASH: an additional database of free images for content creation.
- LNK.BIO: a tool that allows the users to share a list of links on Instagram.

4) YOUTUBE

On youtube (https://bit.ly/3U9kh5F), the Action shares online webinars, a series of introductory lectures that aim to introduce users to the usage of the profiling instruments, and PROBE outreach videos dedicated to the general public.

5) TWITTER, INSTAGRAM, FACEBOOK, LINKEDIN

PROBE is present on these social media to reach different target audiences. While Twitter (@CostProbe) is used to reach out mainly to scientists, partner institutions, and some companies, the Linkedin account tries to target possible new stakeholders in the business area (for example, green deal companies, renewable energy businesses etc.).

Finally, Instagram and Facebook are used to increase the Action's visibility among the general public and the young generations.

In most of the posts/activities shared on social media, PROBE and COST programme are tagged. Moreover, we adopt a planning strategy for posting on social media based on the best posting times for each social media. The planning is possible through the tool CANVA, described before.

4. PLAN FOR THE DISSEMINATION OF ACTION RESULTS

The PROBE Cost Action puts great effort into multiple initiatives to disseminate the Action's results and knowledge to the various target audiences.

PROBE helped increase the visibility of the 15 publications submitted to international journals (primarily open access) and could cover the publication costs for 2 of them.

To foster the visibility of the PROBE related papers, PROBE promoted an inter-journal special issue (AMT/GMD inter-journal SI) on Profiling the atmospheric boundary layer at a European scale (https://amt.copernicus.org/articles/special_issue1209.html).

Moreover, the SCC proposed and lead as convener the session "Profiling the atmospheric boundary layer (ABL) in collaboration with the Grant Awarding Coordinator and a team of mainly ECI PROBE members: “From harmonized measurement networks to multidisciplinary applications" at the EHU 2022 General Assembly (https://meetingorganizer.copernicus.org/EGU22/session/43886). The session hosted 24 submissions focusing on:

- Networks and renewable energy
- Air quality and aerosol layer profiling
- Retrievals and data assimilation
- New applications

and the conveners tried to especially welcome contributions from ECI and ITC countries.

Besides the official international events, WG1 and the SCC proposed and organized a series of webinars, workshops and training schools, in particular:

- 4 introductory lectures
- 4 workshops
- 2 training schools
- 11 subgroup meetings
- 5 general meetings

The conferences and meetings mentioned above contributed to the actuation of WG1 tasks T1.1, T1.2, and T1.3 contributing to achieving the deliverables “D1.1 List of identified relevant stakeholders”.

Identifying relevant stakeholders gave the possibility of organizing the first PROBE Cost Action stakeholder event. Participants could express their needs for ABL measurements, and fruitful discussions helped fulfill the deliverable “D1.2: Report on user requirements from different stakeholders”. Curiously, one of the participants got to know PROBE through the YouTube channel.

Finally, the SCC and the WG1 produce a seasonal newsletter to inform the PROBE Cost Action network about the outcomes and main activities planned and developed.

The SCC also coordinated the development of an outreach video project to explain the importance of the boundary layer and why it is vital to study its properties to the general public. The video won a **prize for science communication** from the Italian Association of Atmospheric Sciences and Meteorology (AISAM, www.aisam.it) and was subsequently shared on the main COST news (https://www.cost.eu/what-do-we-know-about-atmospheric-boundary-layer/).

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5. PLAN FOR THE VALORISATION OF ACTION RESULTS

The recent (first in person after the pandemic) general meeting in Evora strongly contributed to exploiting the action's results for specific target audiences.

In the upcoming worrying climate change scenario, the outcomes of the PROBE COST Action could be particularly beneficial in specific areas like cities, regions with a complex topography and located at high latitudes. New research directions thus expand towards employing the acquired expertise to improve ABL observations in challenging environments and for specific renewable energy applications. Besides this, new connections to the model community should push toward the data assimilation of more ABL observations and improve the model parametrizations.

To realize these steps forward in research, intensive reach out to new communities should be addressed through a detailed communication and dissemination strategy. On one side, reaching out to the citizens of cities involved in pilot studies and small communities living in the mountains could increase connections and ensure that the research planned can be beneficial for the end-users. At the same time, to involve the model community, a different language and effort have to be put into practice to capture modelers' needs and fulfill them.