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0.1	2024/11/13	Initial draft of report (S Murray)
0.2	2024/11/27	Updated with consortium additions, handed over to S. Maloney (S Murray)
1.0	2024/11/28	Submitted Version



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1. Introduction

1.1 Purpose and Scope of the deliverable

ARCAFF user engagement is related to tasks within Work Package 5, Dissemination, Exploitation, and Communication, led by DIAS. The main objectives of WP5 are to optimally share the key results of the project with the space-weather community, the public, and the media to spur widespread interest, and support the wider scientific community on big data outputs. Activities are underway in all of the subtasks for the deliverable, and progress on each of these subtasks will be outlined in this report with the overarching aim to engage with potential users of ARCAFF products.

1.2 References

ID	Name
Georgoulis et al, 2021	M.K Georgoulis, et al., 2021, The flare likelihood and region eruption forecasting (FLARECAST) project: flare forecasting in the big data & machine learning era, J. Space Weather Space Clim. 11 39, DOI: 10.1051/swsc/2021023
D1.2	Project Reporting Year 1 (submitted 5 January 2024)
D5.2	Progress report of user engagement in development process 2 (due 30 November 2025)

1.3 Acronyms

Acronym	Description
AB	Advisory Board
ARCAFF	Active Region Classification And Flare Forecasting
CME	Coronal Mass Ejection
ESWW	European Space Weather Week
DIAS	Dublin Institute for Advanced Studies
NGO	Non-governmental organisation
NOAA	National Oceanic and Atmospheric Administration

PITHIA-NRF	Plasmasphere Ionosphere Thermosphere Integrated Research Environment and Access services: a Network of Research Facilities
STEAM	Science Technology Engineering Arts & Maths
SWPC	Space Weather Prediction Center
SWS	Space Weather Scales
UKSWSE	UK Space Weather Space Environment
UNIGE	Università degli Studi di Genova
UoW	University of Westminster
SWW	Space Weather Workshop
WP	Work Package

2. Report Deliverable

2.1 Dissemination

The WP5.1 Dissemination task includes activities related to the conferences and workshops, publications, and collaborations. These generally target the scientific user group such as other solar physicists who may be interested in the ARCAFF data outputs and other scientific results.

An important part of dissemination of the project results to the scientific community is promotion of ARCAFF at relevant conferences. Please see below for a list of conference and workshop presentations since the project start:

Partner	Meeting	Date	Location
UNIGE	ASI Workshop Science with current and future solar physics missions	February 2023	Rome, Italy
DIAS	International Workshop on Machine Learning and Computer Vision in Heliophysics	April 2023	Sofia, Bulgaria
UNIGE (hosts)	Space Weather Week	May 2023	Genoa, Italy
DIAS	National Astronomy Meeting	July 2023	Cardiff, UK
UoW	RSL LondonSouthEast 2023	July 2023	London, UK
DIAS	UK Space Weather and Space Environment Meeting	September 2023	Cardiff, UK
UNIGE	Dolomites Research Week on Approximation and Applications 2023 (DRWAA23)	September 2023	San Vito di Cadore, Italy
Sztaki	HUNOR IT meeting (governmental project internal meeting)	October 2023	Budapest, Hungary
DIAS	Data, Analysis, and Software in Heliophysics	October 2023	Online
UNIGE	REpresentation Advances And CHallenges (REAACH)	October 2023	Online
DIAS	ESA Heliophysics in Europe Workshop	October/November 2023	Noordwijk, Netherlands
DIAS UNIGE	European Space Weather Week 2023	November 2023	Toulouse, France



UNIGE	6th Dolomites Workshop on Constructive Approximation and Applications	September 2024	Alba di Canazei (TN), Italy
DIAS	UK Space Weather & Space Environment Meeting II	September 2024	Exeter, UK
DIAS UNIGE	European Space Weather Week 2024	November 2024	Coimbra, Portugal

A list of these presentations is also at arcaff.eu/news/presentations, and this page also includes a link to the ARCAFF Zenodo (<https://zenodo.org/communities/arcaff/>) which hosts copies of some of the key presentations given thus far.

At the project start we placed an expression of interest to host the Machine Learning in Heliophysics conference in Dublin however were unsuccessful as a different location was chosen. Both DIAS and UNIGE placed formal bids to host European Space Weather Week (ESWW) in the coming years and both were successful with UNIGE to host in 2026 and DIAS in 2027. This is a fantastic opportunity to showcase the final results of ARCAFF as ESWW is the premier space weather conference in Europe (see Section 2.2 for further exploitation of results at ESWW).

Publications are a crucial aspect of the dissemination of ARCAFF results. Please see below for a list of publications since the project start (also at arcaff.eu/news/publications):

- Guastavino, S., et al, 2023, Physics-driven Machine Learning for the Prediction of Coronal Mass Ejections' Travel Times, *Astrophysical Journal*, 954 151, doi: [10.3847/1538-4357/ace62d](https://doi.org/10.3847/1538-4357/ace62d).
- Perracchione, E., et al, 2023, Unbiased CLEAN for STIX in Solar Orbiter, *Astrophysical Journal Supplement Series*, 268 68, doi: [10.3847/1538-4365/acf669](https://doi.org/10.3847/1538-4365/acf669).
- Burrell, A. G., et al, eds., 2023, *Snakes on a Spaceship—An Overview of Python in Space Physics*, Lausanne: Frontiers Media SA, doi: [10.3389/978-2-8325-2959-1](https://doi.org/10.3389/978-2-8325-2959-1).
- Georgoulis, M.K. et al, Prediction of Solar Energetic Events Impacting Space Weather Conditions, 2024, *Advances in Space Research*, [10.1016/j.asr.2024.02.030](https://doi.org/10.1016/j.asr.2024.02.030).
- Muñoz-Jaramillo, A., Jungbluth, A., Gitiaux A., Wright, P. J., et al, 2024, Physically-motivated deep learning to super-resolve and cross-calibrate solar magnetograms, *Astrophysical Journal Supplements*, 271, 46, doi: [10.3847/1538-4365/ad12c2](https://doi.org/10.3847/1538-4365/ad12c2).
- Legnaro, E., Guastavino, S., Piana, M., & Massone, A. M, 2024, Deep Learning for Active Region Classification: A Systematic Study from Convolutional Neural Networks to Vision Transformers, [arXiv preprint arXiv:2410.17816](https://arxiv.org/abs/2410.17816).



All of the above publications are available open access online through the publisher websites. Many are related to collaborations that have been forged by the team with other experts internationally. Not reflected in the publication list above is the UoW's involvement with the EU Horizon 202 [PITHIA-NRF](#) project, which is building a European distributed network that integrates observing facilities, data processing tools and prediction models dedicated to space weather research. It is the perfect platform to integrate ARCAFF operational outputs, and also a way for the ARCAFF team to interact more closely with other space weather research teams across Europe.

2.2 Exploitation

The WP5.2 Exploitation task includes activities related to the Advisory Board, user workshops, and product resources. These mostly target operational space weather user groups who may be interested in the forecasts that will be produced, so it is important for us to engage with these users throughout the project to ensure the final ARCAFF outputs are accessible and useful for them.

The Advisory Board (AB) was setup at the beginning of the project (see D1.2) and includes world-renowned experts in their field:

Advisory Board Member	Affiliation	Expertise
Ugo Becciani	INAF – Osservatorio Astrofisico di Catania	Information technologies; big data
Manolis Georgoulis	RCAAM of the Academy of Athens	Solar physics; solar flare forecasting; machine learning
Alexi Glover	ESA Space Situational Programme Office	Space weather services
David Jackson	Met Office	Space weather operations; research to operations
KD Leka	Northwest Research Associates	Solar physics; solar flare forecasting; solar magnetic data and instrumentation
David Pitchford	SES Engineering	Aerospace end-user

The AB has an advantageous mix of expertise covering our target scientific, operations, and industry users. The ARCAFF team interacts with the AB formally through meetings and deliverables but also at meetings, e.g., informal catch-ups at ESWW. Most interactions with our target users in general thus far have been in-person at relevant meetings and other events. We have promoted ARCAFF at local and national workshops and particularly ensured a strong presence at the annual ESWW. The ARCAFF team gave presentations at ESWW 2023 and 2024, and additionally had a booth at the Space Weather Fair at the 2024 ESWW. This was

useful to showcase project progress thus far and seek feedback from the wide range of attendees on what outputs would be useful for them.



Figure 2.2a: The ARCAFF both at the Space Weather Fair as ESSW 2024 in Coimbra, Portugal.

We also attended the new UK Space Weather Space Environment (UKSWSE) Meeting in 2023 and 2024, which has a research-to-operations focus aiming to bridge the gap between the more scientific-focused ESWW and user-focused US Space Weather Workshop (SWW). Attendees at UKSWSC have a stronger interest in operational space weather forecasting, which is an excellent group to get feedback on our operational system development plans. We will showcase the final results at both ESWW and UKSWSE in 2025 in addition to attending SWW in spring 2025 to reach a wider international audience.

2.2.1 User Workshop

In June 2024 DIAS co-hosted a special user workshop with colleagues from the US NOAA Space Weather Prediction Center (SWPC) and the Institute for Defense Analyses Science and Technology Policy Institute (STPI). The team were approached to host the European consultation to guide the current review of the potential revision NOAA Space Weather Scales (SWS) being undertaken by SWPC and STPI so it was an excellent opportunity to sponsor

the workshop and include an informal consultation on user interests in the ARCAFF flare forecasting products.

The NOAA scales are the primary resource for space weather users internationally, with over 86,000 subscribers to their alerts worldwide. Many other national agencies have adapted the scales for their local impacts, see e.g, the UK impacts published by the Met Office¹. However, space weather capabilities, end users, and those users' needs have evolved since the scales were first introduced in 1999. As such, NOAA has been seeking feedback on potential changes to the scales to make them more valuable for users across the world and held workshops throughout 2024 across several continents, with Dublin covering the European community. NOAA wants to ensure that any update to the scales will be informed by the needs and interests of key stakeholders across the international space weather community.



Figure 2.2b: The “Revising the NOAA Space Weather Scales Workshop” took place on June 24-25, 2024 at the Clayton Hotel Burlington Road in Dublin, close to DIAS headquarters.

There were 30 attendees at the workshop with varying backgrounds in research, operations, industry, and government:

Entity	Sector
British Geological Survey	Research, operations (public sector)

¹ <https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales>

Dublin City University	Research
Dublin Institute for Advanced Studies	Research, research to operations
EirGrid	Power grid end-user
Enterprise Ireland	Government funder
European Space Agency	Interfacing with all sectors
Geological Survey of Ireland	Research, operations (public sector)
German Aerospace Center	Aviation, human spaceflight
Science and Technology Policy Institute	NGO
Irish Air Corps	Military end-user
Met Eireann	Forecasting, operations (national meteorological service)
Met Office	Forecasting (national meteorological service)
NOAA SWPC	Forecasting (national meteorological service)
Royal Observatory of Belgium	Forecasting, research
Royal Netherlands Meteorological Institute	Forecasting (national meteorological service)
SolarMetrics Limited	Aviation and aerospace end-user
Swedish Institute of Space Physics	Forecasting, research
UK Dept of Energy Security and Net Zero	Power grid end-user, emergency managers
UK Space Agency	Interfacing with all sectors
World Meteorological Organization	International cooperation and coordination

The agenda for the workshop included dedicated sessions to each scale as well as a special discussions on the May 2024 storms and informal discussions about other communication methods:

Monday June 24 2024	
1030–1100	Morning Refreshments (optional)
1100–1115	Welcome <ul style="list-style-type: none"> - Prof. Peter Gallagher, Head of Astronomy & Astrophysics, Dublin Institute for Advanced Studies, Ireland - Mr. Juha-Pekka Luntama, Head of ESA Space Weather Office
1115–1145	Around the Room Introductions
1145–1215	Introduction to the NOAA Scales Project <ul style="list-style-type: none"> - Mr. Bill Murtagh, NOAA Space Weather Prediction Center Program Coordinator



1215–1300	Preliminary Interview Observations on Revising the NOAA Space Weather Scales - Dr. Daniel Pechkis, IDA Science and Technology Policy Institute
1300–1400	Lunch
1400–1430	Lessons Learned from May 2024 Geomagnetic Storm - Mr. Bill Murtagh, NOAA Space Weather Prediction Center Program Coordinator
1430–1530	Geomagnetic Disturbances with a focus on the G-Scale - Who uses the G-scale? - How is the G-scale used? What decisions are made based on the G-scale? - What do people like and dislike about the G-scale? - Should the G-scale change? If so, how can it be improved? - What are the consequences of not having the G-scale? - How can the space weather community best support users interested in induced-currents, communications, spacecraft launch & operations, navigation, animal migration, aurora, etc.?
1530–1600	Break
1600–1645	Continuation of Geomagnetic Disturbances with a focus on the G-Scale discussion
1645–1700	Look ahead to Tuesday

Tuesday 25 June 2024	
0900–0915	Welcome
0915–1100	Solar Proton Radiation with a focus on the S-Scale - Who uses the S-scale? - How is the S-scale used? What decisions are made based on the S-scale? - What do people like and dislike about the S-scale? - Should the S-scale change? If so, how can it be improved? - What are the consequences of not having the S-scale? - How can the space weather community best support users interested in communications, spacecraft launch & operations, navigation, and human health, etc.?
1100–1130	Coffee Break
1130–1300	Radio Blackouts with a focus on the R-Scale - Who uses the R-scale? - How is the R-scale used? What decisions are made based on the R-scale? - What do people like and dislike about the R-scale? - Should the R-scale change? If so, how can it be improved? - What are the consequences of not having the R-scale? - How can the space weather community best support users interested in communications, spacecraft launch & operations, and navigation etc.?
1300–1400	Lunch

1400–1500	Additional Scales or other methods for communication <ul style="list-style-type: none"> - Are there new space weather scales that the space weather community should consider? - Are there better approaches than scales to meet user needs?
1500–1530	Break
1530–1600	ARCAFF project Continuation of Additional Scales or other methods for communication discussion
1600–1630	Wrap-up and Closing Remarks <ul style="list-style-type: none"> - Prof. Peter Gallagher, Head of Astronomy & Astrophysics, Dublin Institute for Advanced Studies, Ireland - Mr. Juha-Pekka Luntama, Head of ESA Space Weather Office - Mr. Bill Murtagh, NOAA Space Weather Prediction Center Program Coordinator

The R-Scale discussion on the second day was the perfect setup for discussion about flare forecasting with ARCAFF afterwards and the promotional material and survey tablets (see below) were on display throughout the workshop as a conversation starter during the breaks. Some high-level topics of discussion are summarised below:

- Everyone agreed that the “R-scale” title related to radio blackouts is misleading as it really is simply indicating solar flare information, i.e., M- and X-class forecasts.
- Most users are happy with the current format flare forecasts although there was some discussion regarding outputs for “expert” vs “end” users. The ARCAFF time series forecasts for example could be very useful for foresters and other “expert” users who have a better understanding of flare processes. On the other hand the current point-in-time forecasts can be too much information for an average industry end-user who would prefer a simplified “yellow/amber/red” scale rather than any flare class or probability information. This discussion arose when non-expert attendees were interested to learn from a case-study example that a long-duration M2 flare could be more impactful than an impulsive X1 - they only care about the impact so prefer that kind of information disseminated into a general warning by the operational forecasting centre.
- None of the users had any issues with the use of machine learning for forecasting, in fact the operational centres welcomed this since they have seen considerable improvements in this area in the field of terrestrial weather forecasting. They were keen to learn more about how this is implemented in ARCAFF and how the results will compare to current operational benchmarks.
- Case studies are particularly useful for end-users when trying to explain the importance of using space weather forecasts to their superiors. The May 2024 storm was an excellent example of increased interest amongst government policy makers and funders when they were shown the real time impacts on critical infrastructure. Putting the meaning of forecasts in context by comparing to previous events is also very helpful for end-users who don't fully understand the forecast products.

It was clear from discussions that the R-scales and generally flare forecasting products are most suitable for (and mostly used by) forecasters in operational centres rather than industry or government end-users. More sophisticated forecasting products such as those under development ARCAFF are very welcomed by the forecasters in order to be able to provide better guidance to these end-users. It will be crucial to ensure the final ARCAFF forecasting products provided online will be accessible to forecasters.

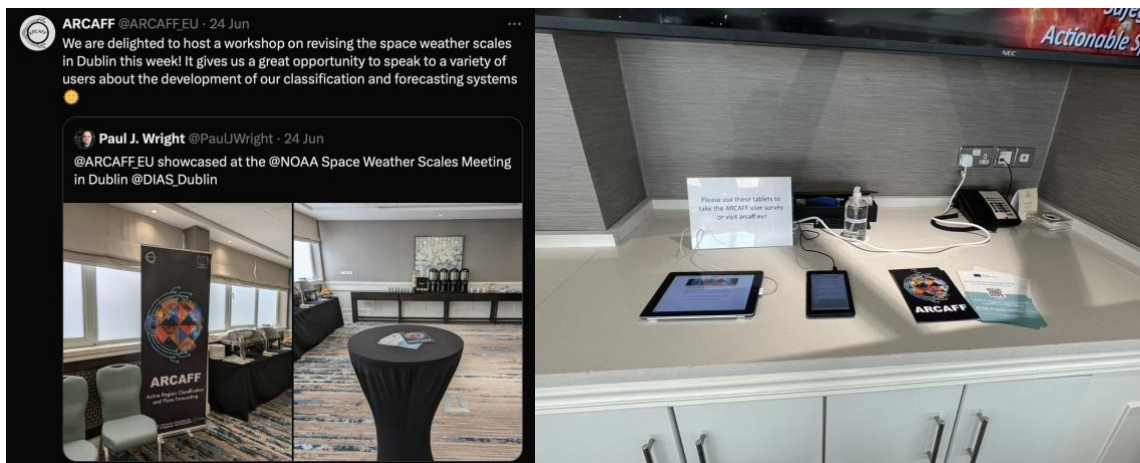


Figure 2.2b: ARCAFF promotional roll-up and leaflets (left) and tablets for the user survey (right) on display at the Revising the Scales Workshop.

2.2.2 User Survey

As part of the exploitation activities for ARCAFF we designed a user survey to get insight from the space weather community regarding what kinds of flare forecasting product is useful to them. This built on activities that some of our team worked on for the Horizon 2020 FLARECAST project. It is timely now approximately 8 years after the FLARECAST survey was produced (see Georgoulis et al 2021 for results) to see how attitudes have changed to flare forecasting products, particularly now with the increased popularity of machine learning efforts. Therefore some questions were kept the same as well as adding new questions to better tailor to the ARCAFF project objectives.

The team has used tablets at events (e.g., the Revising the Scales Workshop and ESWW Space Weather Fair booth) to enable attendees to take the survey in person. Additionally, a weblink button to the survey online is provided at the top of the main project webpage that can be taken anytime through the Google Forms platform. Thus far we have found the tablets at events have sparked further in-person discussion rather than participants taking the survey, which has provided useful feedback. However not enough users have taken the survey yet for any meaningful results. Therefore we will send the survey to targeted users and continue its promotion in the coming months to obtain more results to analyse.

The questions in the survey are outlined below, which can be found at bit.ly/arcaff-survey.

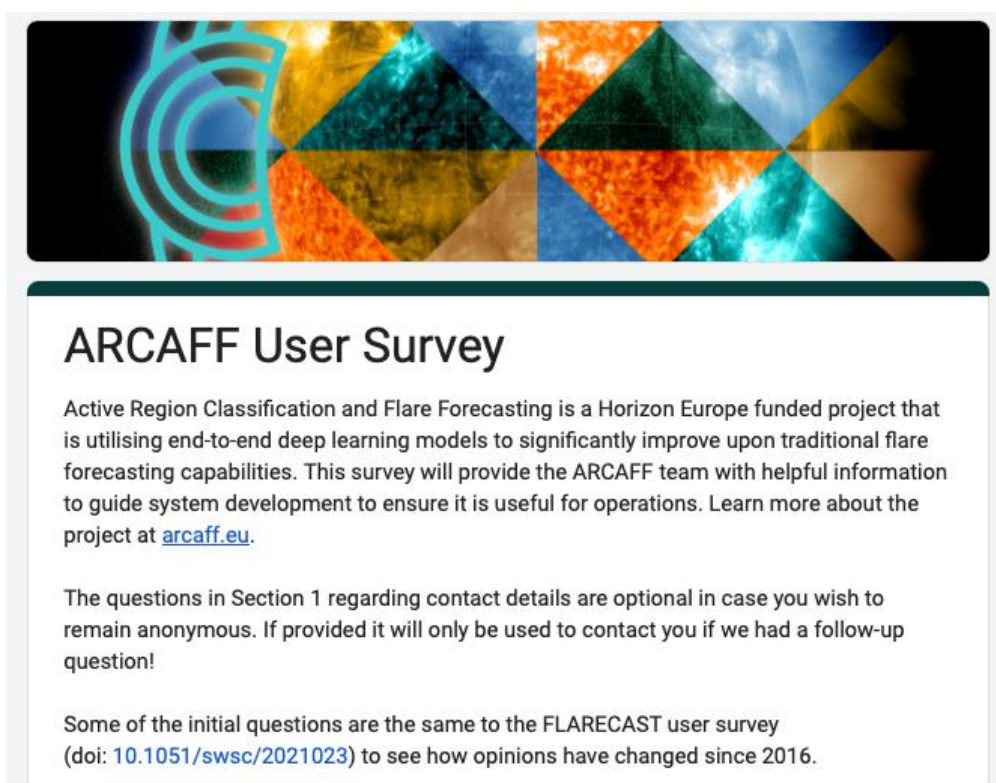


Figure 2.2.2: Short description at start of ARCAFF User Survey on the Google Forms platform.

Contact information

(survey takers can remain anonymous if they wish):

- Name
- Email address
- Institution

Current Services

- What sector do you consider yourself part of?
 - Aviation
 - Communications
 - Emergency Managers
 - Forecasting
 - GNSS
 - Human Spaceflight
 - Power Grid
 - Rail
 - Research
 - Satellite Operations
 - Space Situational Awareness
 - Tourism
 - Other
- Do you currently use flare forecast or alert services?
 - Yes

- No
 - I don't know
- If yes, how useful or unuseful are these services?
- | | | | | | | |
|------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|--------------------|
| | 1 | 2 | 3 | 4 | 5 | |
| Extremely useful | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | Extremely unuseful |
- If yes, how accurate or inaccurate do you find this service to be?
- | | | | | | | |
|------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|--------------------|
| | 1 | 2 | 3 | 4 | 5 | |
| Extremely useful | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | Extremely unuseful |
- Are you planning to use other flare forecasting services in the future?
- Yes
 - No
 - I don't know

Solar flare impacts

- Has your organisation, or your customers' organisations, ever been affected by solar flare disruptions?
- Yes
 - No
 - I don't know
- If yes, please tell us more about the disruption your organisation, or your customers' organisations have experienced below.

Forecast development

- Which factors are/would be important to you in a flare forecasting service?
(Please score the importance of each in the grid below)

	I don't know	Not at all important	Not very important	Fairly important	Very important	Essential
Ability to tailor forecast	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Accuracy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Content	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Details of potential impacts	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ease of access/method of delivery	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ease of use/understanding	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Frequency of forecasts	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Information on the uncertainty of the forecast	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Presentation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Timeliness of data	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Scientific detail	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

- Would you trust a machine-learning based flare forecast?
 - Yes
 - No
 - I don't know
- If you answered no, please let us know why that is the case. What would help increase your trust?
- Would you be interested in a more frequent forecast than the current 24-hour standard (e.g., hourly)?
 - Yes
 - No
 - I don't know



- Would you be interested in a flare nowcasting service (e.g., tens of minutes notice of a flare happening before being officially defined by GOES)?
 - Yes
 - No
 - I don't know
- Please describe below anything in particular you would like to see from a new flare forecast product!

2.3 Communication

The WP5.3 Communication task includes general promotional activities for the project, including website updates, media and other social media activities, and any public engagement events run by the ARCAFF team. This targets a wide audience, but particularly the media and the general public.

The ARCAFF website and social media was established by DIAS at the start of the project (Deliverable 1.1) and is regularly updated with latest news and deliverable progress (see D1.2). There was increased interest by the media and wider general public in space weather after the May 2024 storms when many people across the world were able to view auroral displays. The ARCAFF team leveraged this interest to promote the project and the importance of space weather impacts in general to the media, policy makers and the general public. For example, some of the DIAS team and partners at Met Eireann (national meteorological service) appeared on Irish national television to explain how aurorae form and how to view them².

We ran several public engagement activities throughout the project to improve understanding of space weather and its impacts with the general public. DIAS run an annual astrophotography³ competition and encouraged the Irish public to submit photos they took of the May storms, which sparked a large increase in submissions from previous years and two of the winning entries of auroral displays.

² <https://www.rte.ie/news/ireland/2024/0511/1448552-northern-lights>

³ <https://reachforthestars.ie/>



Figure 2.3a Winning entries in the Reach for the Stars astrophotography competition by Patryk Sadowski (left) for the landscape category and Seanie Morris (right) for the mobile phone category.

At Dunsink Observatory two schools' workshops were developed in collaboration with the DIAS Astrophysics Education and Public Engagement Officer with a solar/space weather theme.

During the summer of 2023 DIAS worked closely with an Irish secondary school teacher to develop special content for school workshops to be run at Dunsink Observatory. Specifically the “solar day” is now a permanent part of the Transition Year (students in high school around 15-16 years old) Week offered twice a year at the Observatory⁴. There is an introductory lecture about the Sun, solar eruptions, and space weather impacts, including looking at the kinds of datasets that our researchers use in their work and some relevant mathematical exercises (e.g., calculating how fast a CME arrives at Earth). One of our solar physicists then talks to the students about their own research, and then the students spend some time working on their own project investigating what happened during some famous space weather events in history. Weather permitting, the students also have a chance to look through a solar telescope at some sunspots.

⁴ <https://www.dunsink.dias.ie/education/secondary-activities/ty-week/>



Figure 2.3b: DIAS PhD student John Malone Leigh explains to students how the aurorae are formed in the first Transition Year Week in October 2023.

During summer 2024 a primary school workshop (for students aged around 11-12) was co-developed with local Irish artists in collaboration with the Space Crafts project⁵. This is a STEAM initiative that enables deeper educational engagement with local disadvantaged primary schools students that encounter accessibility barriers to science education. During the workshop the students are introduced to the concept of magnets and magnetic fields before applying those concepts to planets and the Sun. This is followed by discussions on the impacts of space weather, and the students then apply what they have learned by creating dyed flags depicting the aurora.



Figure 2.3b: Local primary students taking part in a movement activity with their painted aurora flags at Dunsink Observatory in November 2024.

⁵ <https://www.dunsink.dias.ie/space-crafts/>



While much of the focus of communication activities has been on space weather thus far with increasing solar activity, the team have also promoted the use of machine learning in ARCAFF. A technical explainer on artificial intelligence has been included on the website for WP3 and some primary school activities shared on our education webpage (see D1.2). There will be increased activities during the final year of the project in this area, including a planned collaboration on developing secondary school educational materials.

3. Summary

WP5 is progressing well with no unforeseen issues thus far, and higher than expected interest by the general public in space weather due to the increased solar activity of 2024. Actions promoting the ARCAFF project will increase through the final year of the project as results become finalised and available online for the community to use. This will include open sharing of datasets and forecast products on our website when finalised (being developed at data.arcaff.eu), SolarMonitor.org, and the PITHIA platform, and code on our GitHub page⁶ to encourage scientific collaboration. It is planned that the final results will be showcased at ESWW 2025. Further information about these activities will be provided in D5.2.

⁶ <https://github.com/ARCAFF>