D10.2 – Annual Report on SILVANUS Dissemination Activities v1

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Lead Author(s):	Lovorko Marić (MD), Alberto Miranda Garcia (ATOS), Alexandre Lazarou (Z&P), Iliana Korma (PUI), Gianpiero Lacovara (LETS), Andrea Majlingova (TUZVO), Yvonne Brodrechtova (TUZVO), Krishna Chandramouli (VTG)
Reviewers:	Domenica Casciano (Z&P), Eleni Kotali (MDS), Nathalia Stathakarou (MDS)

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List of Contributors

Partner	Author(s)
MD	Lovorko Marić
VTG	Krishna Chandramouli
TUZVO	Andrea Majlingova, Yvonne Brodrechtova
PUI	Iliana Korma
ATOS	Alberto Miranda Garcia
LETS	Gianpiero Lacovara
Z&P	Alexandre Lazarou, Domenica Casciano
KEMEA	Georgios Sakkas
WUT	Wojciech Mazurczyk, Krzysztof Cabaj
RINI	Jelena Levak, Sandra Bortek
UISAV	Zoltan Balogh, Ivana Budinska
ASSET	Marino Spilotros, Mariangela Lupo, Giovanna Mangialardi
EAI	Vincenzo Masucci

List of acronyms and abbreviations

ACRONYM	Description
AER	Aerial Firefighting Conference
AIB	Anti Incendi Boschivi
ANAS	Azienda Nazionale Autonoma delle Strade Statali
ASSET	Regional Strategic Agency for Ecological and Sustainable Development for Apulia Region
CSA	Coordination Support Action
DX.Y	Deliverable X. Y (X refers to the WP and Y to the deliverable in the WP)
EAB	External Advisory Board
EI	Expected Impact
EU	European Union
ENS	Emerging Network Security
GA	General Assembly
IA	Innovation Action
ISCRAM	International Conference on Information Systems for Crisis Response and Management
KPI	Key Performance Indicators
MVP	Minimum Viable Product
PUI	International Emergency Firefighters
SFC	State Forestry Corps
TRL	Technology Readiness Level
WFRM	Wildfire Risk Management
WP	Work Package

List of beneficiaries

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34	LETS ITALIA srls	LETS	Italy
35	Parco Naturale Regionale di Tepilora	PNRT	Italy
36	FUNDATIA PENTRU SMURD	SMURD	Romania
37	Romanian Forestry Association - ASFOR	ASFOR	Romania
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50	FUNDACAO COORDENACAO DE PROJETOS PESQUISAS E ESTUDOS TECNOLOGICOS COPPETEC	COPPETEC	Brazil

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Executive Summary

The annual report on SILVANUS dissemination activities focuses on all the communication, dissemination and standardisation activities launched by SILVANUS consortium since the submission of Deliverable 10.1 – "Dissemination and Community Engagement Strategy" in February 2022, for the period until September 2022, concluding the first year of SILVANUS project. This deliverable includes dissemination event reports from workshops, conferences, and webinars either organised or participated by SILVANUS partners at events with diverse stakeholder pools and geographical regions at European and global level. Descriptions and visual depictions of communication and dissemination tools such as website and social media, newsletter, brochures, videos, and television coverage show that the project has introduced its mission, vision, and objectives to a wide number of stakeholders, including the general public interested in the topic of wildfire prevention and sustainable development. The current status with the number of attendees at events and number of followers is compared with the designated key performance indicators (KPIs) for the entire duration of the project, bearing in mind that the project is now finishing its first year and that the challenging but rewarding stage of introducing the project to a wide network of stakeholders is coming to an end.

After a detailed description of the stakeholder engagement methodology in the previous deliverable, this deliverable describes the assembling of the external stakeholder list and the External Advisory Board as two important steps in establishing a close stakeholder network. As of September 2022, there have been 99 selected external stakeholders from 14 countries with whom the project has a direct contact (as opposed to a wider network of stakeholders, e.g., social media followers and newsletter subscribers) and who are potential candidates for the formation of Sustainable and Resilient Forest Working Groups.

The collaboration with the Firelogue project (funded as the Coordination and Support Action, CSA) and other Innovation Action (IA) projects has generated fruitful outcomes, both in terms of advancing the communication and dissemination dialogue with common stakeholders through common social media campaigns, and the evaluation of impact assessment in accordance with Green Deal targets. This Deliverable explains in detail the collaborative activities conducted so far, and what is awaiting all wildfire-related Green Deal projects in the near future.

The Deliverable also presents a first draft of exploitation plans being adopted in the project end, which also includes describing the initial planning of the Centre for Adaptation Strategies and Development (CASD), a body that expands on the setup of Sustainable and Resilient Forest Working Groups. Standards and compliance for interoperability of SILVANUS platform, on the topics of fire prevention, fire detection and fighting, along with post-fire reconstruction, are elaborated in detail.

During the first year of the SILVANUS project through its communication and dissemination activities have successful raised awareness among stakeholder target groups ranging from first responders and fire fighters to public authorities, industry, academia, and the IT business sector. The next phase will focus on intensifying communication and dissemination activities by diffusing knowledge among stakeholders once the results of the SILVANUS platform development become clearer and ready to be disseminated. The awareness raising and the initial contact with stakeholders, ranging from a closer contact with the external stakeholders and the External Advisory Board, over to newsletter subscribers and social media followers, to event attendees and workshop co-presenters, are already ensuring a longevity in stakeholder engagement. The interdisciplinary stakeholder network has acquainted with the project and its objectives, which makes the process of diffusing knowledge and understanding project results in the future easier to transfer, making it more effective and eligible for constructive feedback and discussion points.

1 Introduction

Following the submission of the Deliverable 10.1 and the corresponding dissemination strategy in February 2022, the SILVANUS project has launched its communication and dissemination activities, as announced, reported and elaborated in detail in D10.1. During the first year of the project, the SILVANUS project has reached out to a core group of stakeholders, introducing the project's mission and objectives, through a detailed communication framework, which consisted of:

- Diverse communication and dissemination events (workshops, webinars, conferences, common partner events), organised and/or participated by SILVANUS representatives,
- User-friendly website and social media posts which focused on accessible and succinct messages that would convey project updates and results to all identified stakeholder target groups and the general audience,
- Newsletter with an all-encompassing summary of recent project updates, presented in a visually enticing manner,
- Promotional material such as posters, flyers, and brochures with a visually arresting format,
- SILVANUS YouTube channel which focuses on webinars and promotional videos, providing either a long- or short-form visual presentation of main project outcomes and updates,
- Scientific publications, representing the academic perspective on SILVANUS findings,
- Direct contact with external stakeholders from all stakeholder target groups – contacts collected through a common stakeholder list,
- External Advisory Board – further evolution of the Advisory Board with the joining of new members, establishment of regular contact during the project, definition of their potential contributions to the project, along with feedback from the Advisory Board members on SILVANUS project updates,
- Continuous cooperation with Firelogue,other Innovation Action projects (TREEADS, FIRE-RES) and other wildfire management projects (FireEURisk, SAFERS, FIRE-IN and FireLinks) working on common social media campaigns, creating joint key messages, and organising joint events,
- Cooperation with the Green Deal Projects Support Office and the subsequent expansion of stakeholders among the entire Horizon 2020 Green Deal project pool.

During the first twelve months of the project, SILVANUS had conveyed to its internal and external stakeholders the key messages, including the mission, vision and objectives, through the introductory newsletter, a brochure, a 2-hour webinar video, a promotional video, along with regular website and social media updates. The social media updates included short reports on regular project news and activities, dissemination of key messages, slogans, and important media articles in wildfire prevention, alongside reports from pilot site visits in Italy and France (also covered via television segments on official national channels), where the ideas and concepts of the SILVANUS platform will be implemented in practice for the first time. In the second phase of the project, which will be summarized in Deliverable 10.3, SILVANUS project plans to expand on its stakeholder pool through the development of Sustainable Working Groups, focusing on the palpable results of the project, primarily reporting on the development of the SILVANUS platform that is currently in the developing phase to reach the minimal viable product (MVP) stage.

Following the introduction, the structure of Deliverable 10.2 continues with a summary of key communication and dissemination activities – reports on events, descriptions of newsletters, brochures, videos, social media and television activities, promotional material, along with a list of press releases and scientific publications (Chapter 2). Collaboration with other Innovation Action and wildfire management projects is explained in detail in Chapter 3. Subsequently, Chapter 4 focuses on stakeholder engagement and stakeholder network strategy. Update on the development of the Centre for Adaptation Strategies and Development in Chapter 5 is followed by the description of the exploitation plan for SILVANUS platform activities in Chapter 6, which leads into the current status of standards and compliance for interoperability of SILVANUS platform in Chapter 7. The Deliverable concludes with an overview of future communication and dissemination activities in Chapter 8 with a corresponding conclusion in Chapter 0.

2 Communication and Dissemination Activities and Outputs

2.1 Events

SILVANUS initiated the dissemination activities soon after the commencement of the project, with an emphasis on introducing the project and its objectives to a wide pool of stakeholders. The following chapter summarizes the most important and diverse events from April to September 2022 where SILVANUS was presented.

Table 1 List of SILVANUS Events in the first year of the project

S. No	Event Name	Date (2022)
1	Wildfire Risk Management Clustering Event	April 5-6
2	Civil Protection and Crisis Management Conference in Dubrovnik, Croatia	April 8
3	Expolevante Exhibition in Bari, Italy	April 21-25
4	FireLinks Event	May 11-12
5	Aerial Firefighting Conference	May 18
6	ISCRAM (International Conference on Information Systems for Crisis Response and Management)	May 22
7	IUFRO Conference	May 31 – June 2
8	EU Green Week Webinar	June 3
9	Business Mission and Smart Tech Korea	June 8
10	Crowd for the Environment Conference	June 15
11	1st NOTIONES Conference: Emerging Technologies for Law Enforcement and Intelligence Services	June 15
12	Preventing mega-fires and protecting local societies – the case of North Evia	June 22
13	5th International Workshop on Emerging Network Security (ENS 2022) at 17th International Conference on Availability, Reliability and Security (ARES 2022)	August 23
14	International Conference on Content-based Multimedia Indexing in Graz, Austria	September 14
15	Fire Alarm and Fire Protection Event in Zagreb, Croatia	September 15

2.1.1 Wildfire Risk Management Clustering Event

SILVANUS has participated at the Wildfire Risk Management Clustering Event (WFRM) on the 5th and 6th of April 2022, where the H2020 Green Deal, Innovation Action and Coordination Support Action projects (FIRE-RES, TREEADS, FirEUrisk, FIRE-IN, SAFERS, Firelogue and FIRELinks) convened to discuss their cooperation and collaboration. The WFRM was an online event, organised by European Research Executive Agency (REA) and facilitated by the Coordination Support Action (CSA) project Firelogue, which is coordinated by Fraunhofer Gesellschaft.

Figure 1 Wildfire Risk Management Projects

Discussions were held on the impact assessment - how to work together on achieving the Green Deal 2030 targets related to wildfires (more on this in Chapter 3), the research integration (creation of fuel maps, fire event databases), knowledge management on research results, case study collaboration and exchange of experiences in many wildfire-affected regions where pilot demonstrations will be taking place, along with technical exploitation, and joint communication and dissemination.

The event started with partners meeting in a common room for the introduction of the clustering event. Afterwards, groups were organised in so-called break-out rooms. SILVANUS partner Z&P entered the impact assessment framework one, along with partners from Firelogue, FIRE-RES and TREEADS, as well as the SILVANUS Project Officer Nicolas Faivre. The discussions were about the Expected Impacts (EIs) that the 3 IAs are expected to contribute. After assembling the comments on EIs, including proposing a realistic and achievable set of KPIs, the most important aspects of the discussion were discussed, namely:

- Definition of each impact and more realistic KPIs in pilot areas
    - KPIs pre-identified by the IAs in relation to Green Deal call targets and
    - review of the KPIs in past/ongoing projects (EU and worldwide);
- Understanding and discussion on each IA methodology;
- 2019 baseline/sources of information/consider an average of a period.

It was agreed that a joint meeting and workshop will take place every three months between the projects to further discuss these targets.

In the dissemination break-out room, the discussion has consolidated and advanced the future joint dissemination strategies among these projects in the fight against extreme wildfire events. Stakeholder networks were discussed, and ideas on end-user outreach activities were exchanged. In the following months and years to come, it was agreed that there will be a number of innovative, approachable, and user-friendly ways in which these projects will jointly collect and disseminate their project outputs.

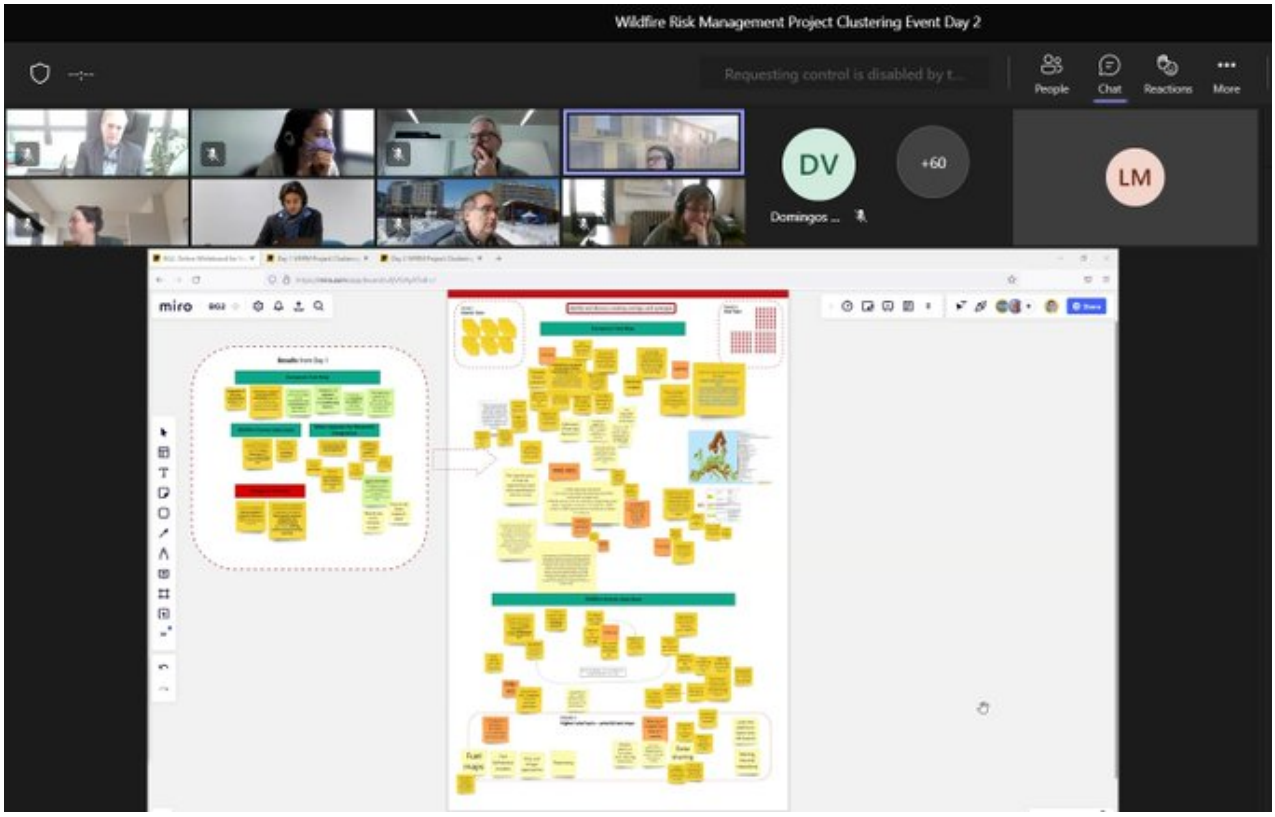


Figure 2 The Wildfire Risk Management Project Clustering Event Session

2.1.2 Civil Protection and Crisis Management Conference in Dubrovnik, Croatia

SILVANUS was presented by project partner RiniGARD on the 8th of April, 2022 at the Croatian Civil Protection and Crisis Management Conference in Dubrovnik, Croatia. The 2-day (7th and 8th April 2022) Civil Protection and Crisis Management conference was participated by around 140 leading experts representing the fire fighters, academics, researchers, law enforcement, IT and industrial members. The event included a keynote speech on Interreg Italy Croatia FIRESPILL project. Among the several presentations from different projects on the 8th April, Jelena Levak (RINI) presented the overall introduction to SILVANUS project as a first public presentation of the project in Croatia.

Figure 3 The RINI SILVANUS Presentation at the Civil Protection and Crisis Management Conference in Dubrovnik, Croatia

2.1.3 Expolevante Exhibition in Bari

The Expolevante exhibition was held from 21st to 25th April 2022 at the Nuova Fiera del Levante in Bari, Italy, with five days entirely dedicated to free time, sport and smart mobility.

On that occasion, ASSET (Regional Strategic Agency for Ecological and Sustainable Development for Apulia Region) has organised a stand to promote the SILVANUS project. A presentation of the SILVANUS project

and Consortium was displayed on TV screen with the pictures of the Gargano National Park (one of the SILVANUS pilot sites) and the logo of SILVANUS was shown in the stand.

Figure 4 Consortium partner ASSET, led by Director Elio Sannicandro, presenting SILVANUS at the Expolevante 2022, held in Bari, Italy in April 2022

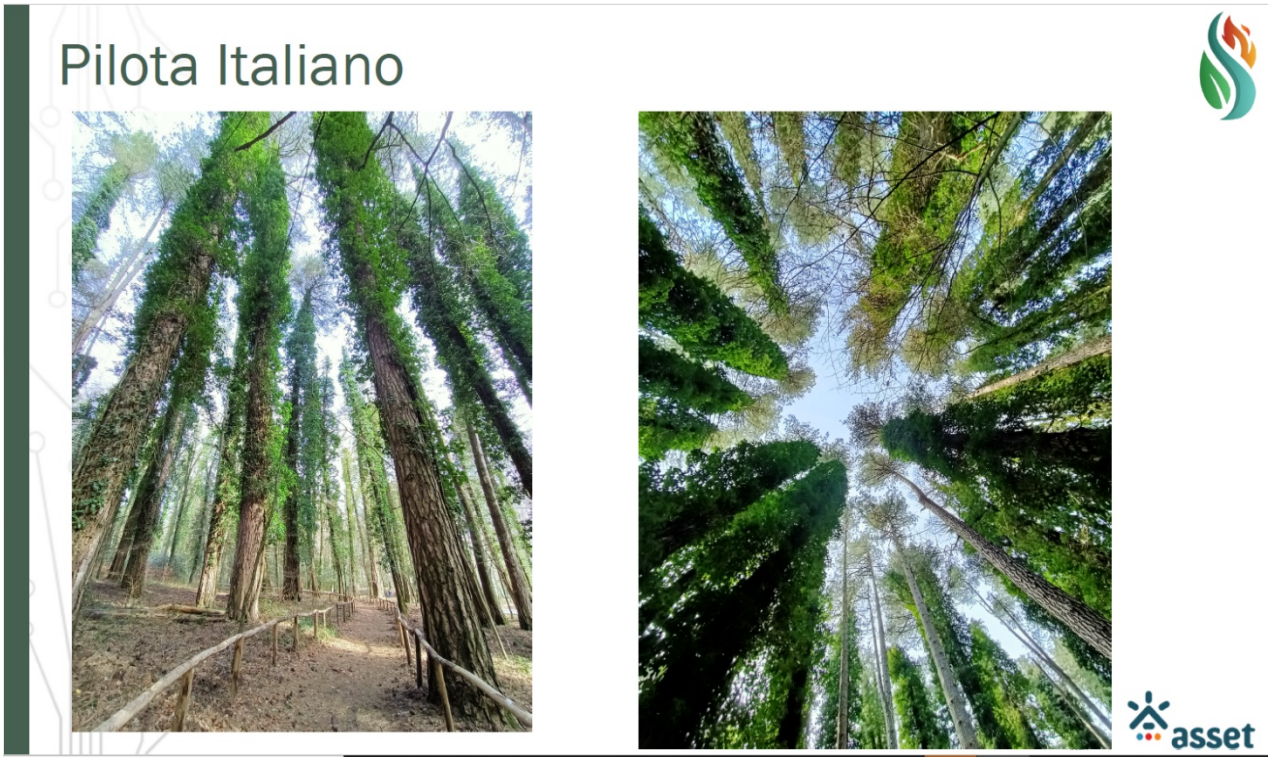


Figure 5 Excerpt from the presentation, focusing on the Italian pilot in Gargano National Park

2.1.4 FireLinks Event

The FireLinks event was hosted by the eponymous project in Arnhem, The Netherlands, on the 11th and 12th of May 2022, organised by the Netherlands Institute for Public Safety (NIPV). Three SILVANUS partners were present at the event – PUI, VTG and ASSET.

Alongside SILVANUS partners, it was participated by twenty leading experts representing the fire fighters, academics, researchers, and industrial members. The event included a keynote speech on 'Wildfires in the Netherlands' by Jelmer Dam, which outlined the challenges of wildfires encountered by the national response team. Among the several presentations from different projects, Krishna Chandramouli (VTG) presented the objectives and scope of SILVANUS to the participants and furthermore took part in a panel session to discuss the challenges and solutions that are to be developed within the project duration. On day 2, a field visit was organised, which was preceded by a keynote description of a personal experience in tackling Wildfire at Wateren (Drenthe) on 7th August 2018. The experience was shared by Theo de Jong (a fire service officer). During the field visit, several interactions with the fire fighter authorities was organised. The feedback from Prof. Elliiot from Exeter University and Dr. Xanthopolos from Institute of Mediterranean Forest Ecosystems, Athens was insightful, emphasising the open issues that exist in combating wildfires. Several comparisons and contracts were extracted between the experience of urban fires and wildfires. The need for weather and climate data services were furthermore emphasised which could have offered timely knowledge for mitigating the wide spread of fire.

Figure 6 The field visit at the FireLinks event (photo courtesy of Krishna Chandramouli)

2.1.5 Aerial Firefighting Conference

Figure 7 The Aerial Fire Fighting Scientific Conference in Nimes, France

The SILVANUS dissemination presentation at the Aerial Firefighting Conference (AER) in Nîmes, France, took place on May 18th 2022. The project was presented by Iliana Korma, the business development director of PUI (International Emergency Firefighters) during the first day of the conference in the evening session together with other EU funded R&D projects (NEMAUSUS, Firelogue and FirEURisk). The main topics of the presentation were the overall mission and objectives of SILVANUS, along with a demonstration of the eleven pilots and the technology that will be used for establishing the SILVANUS platform. The French pilot in La Jonchere St Maurice, Haute-Vienne department in the Nouvelle-Aquitaine region in France, which deals with a potential fire incident in an area where explosive material is produced, was presented in more detail. The presentation was followed by approximately 100 attendees.

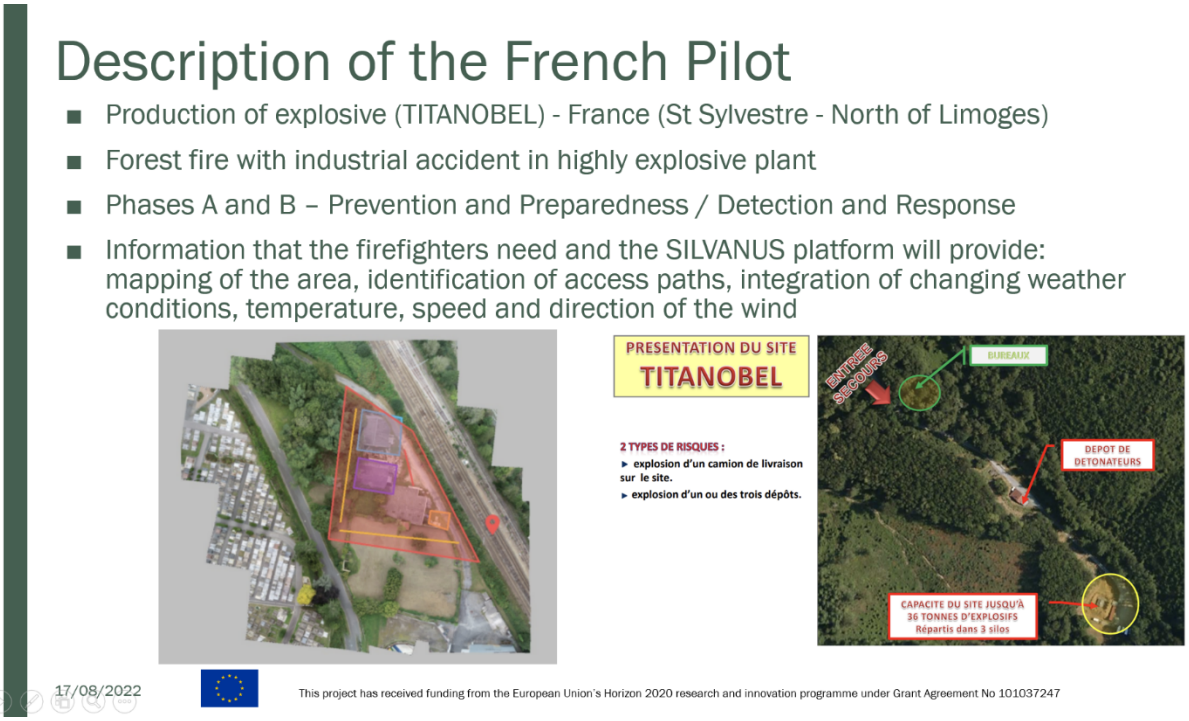


Figure 8 Excerpt from the SILVANUS presentation at AER with the French pilot description

2.1.6 ISCRAM (International Conference on Information Systems for Crisis Response and Management)

At the 19th International Conference on Information Systems for Crisis Response and Management conference in Tarbes, France, SILVANUS was presented at the workshop titled Intelligent Crisis Management Technologies (ICMT): Big Data Analytics and AI for Disaster Risk Reduction, on the 22nd of May 2022.

The workshop was attended by 45 participants of ISCRAM conference both physically and online. The SILVANUS presentation was made by Krishna Chandramouli (VTG), in which he highlighted the early-stage results from the project, across all three phases of the project activities. The participant question on the effectiveness of robot deployment to the frontline of wildfire generated an interest and subsequently facilitated the discussion on the human-robot collaboration. During the second session of the workshop, the participants were asked to provide summary feedback on the key challenges, gaps and future research interest, which were gathered by an online tool. The results of the participant feedback was consolidated by workshop chair Christina Tsouti from Draxis, which was shared as a white paper among the participants.

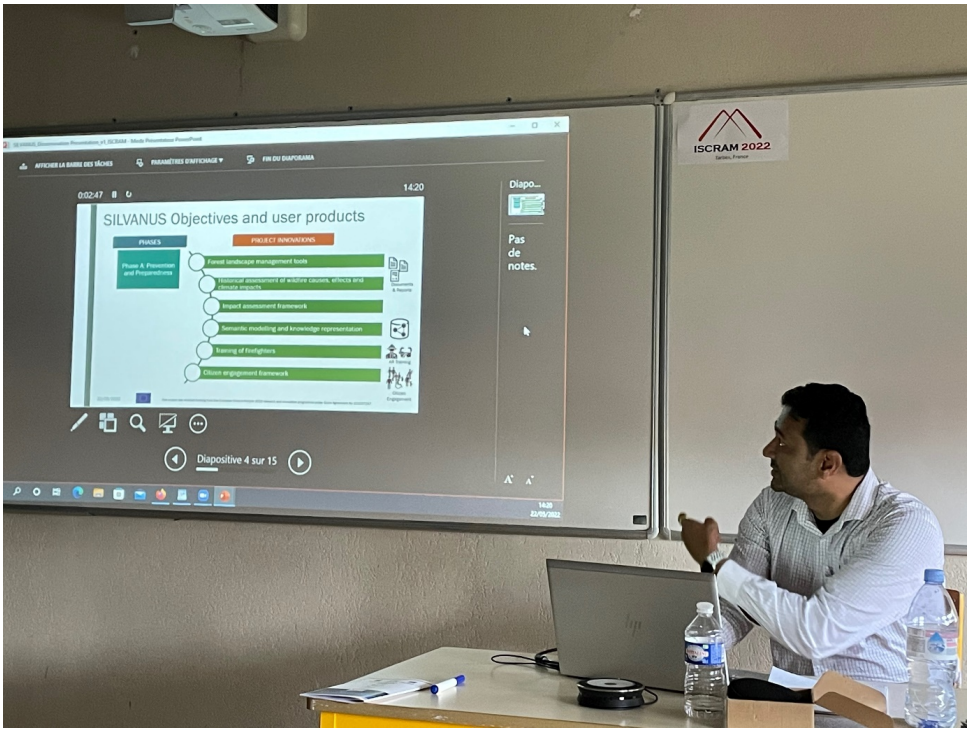


Figure 9 Krishna Chandramouli (VTG) presenting SILVANUS at the ISCRAM conference in Tarbes, France

Figure 10 Participants of the ISCRAM Workshop (including Krishna Chandramouli, the SILVANUS Technical Coordinator) in Tarbes, France, May 2022

2.1.7 IUFRO Conference

The IUFRO (International Union of Forest Researchers) conference on Risk Analysis: Socio-ecological Conflict in Forest Management took place in Nancy, France, between May 31st and June 2nd, 2022. The focus of the conference was on the potential conflicts emanating from the divergence in terms of expectations towards the forest by various actors. The risk associated with conflict situation could cause inaction, which is undesirable in the context of climate change. However, forests have a role to play in terms of mitigation and therefore should adapt to abiotic or biotic challenges. Themes concerning these issues lead to oral and poster presentations of international researchers.

Yvonne Brodrechtova, Klara Balikova, and Lenka Navratilova from the Technical University in Zvolen participated at the conference, presenting SILVANUS in front of sixty attendees with a special focus on the Slovakian pilot in the Podpolanie region. The name of the presentation was "Stakeholder participation in lowering risk associated with wildfire forest management – Slovakia, Podpolanie region". Within her poster presentation, Yvonne Brodrechtova briefly presented SILVANUS and its goals, followed by example of Slovakian pilot focusing mainly on the stakeholder participation and management in three technical blocs with the aim of lowering forest fire risk.

Figure 11 Yvonne Brodrecthova presenting SILVANUS at the IUFRO Conference

2.1.8 EU Green Week Webinar

The 2-hour SILVANUS webinar took place within the EU Green Week on June 3rd, 2022, following a successful application to the EU Green Week platform in April. It focused on the introduction and the objectives of the SILVANUS project, along with the demonstration of three pilots in Italy, Portugal, and Indonesia. This enabled the SILVANUS partners to present a diverse group of pilots that focused on different areas with various infrastructural challenges, such as the impact of extreme wildfire on local population, the electricity and water supply, and on forestry, underlying the holistic approach of the project, where all societal, economic, environmental, and health impacts are taken into consideration.

The webinar was introduced by the SILVANUS coordinator Michele Corleto from Uni Pegaso, and by the dissemination work package leader Lovorko Marić from Micro Digital. Krishna Chandramouli, the scientific coordinator from Venaka Treleaf, explained the main technical aspects of the project. Presentations of

Italian pilot in Gargano National Park (presented by Giovanna Mangialardi from ASSET - Regional Strategic Agency for Ecological and Sustainable Development – Apulia Region), Portuguese pilot in Cova de Beira (presented by Luisa Serra from EDP – Centre for New Energy Technologies), and Indonesian pilot in Sebangau National Park in Central Kalimantan Province (presented by Kusrini Kusrini from AMIKOM Yogyakarta) followed. The wrap-up discussion was focused on the alignment of SILVANUS goals with the main themes of the 2022 EU Green Week webinar, focusing on green transformation in environmental policy for carbon-neutral Europe by 2030 – biodiversity, zero pollution, and circular economy. The conclusions derived from the discussion were that extreme wildfire prevention (through training, land use change, forest restoration) is an essential component in preserving and restoring biodiversity, a vital contributor to a lack of widespread air and water pollution, and a benefit to the circular economy in terms of sustainable use of timber and promotion of forest resilience.

33 attendees were present at the live airing of the webinar via Microsoft Teams from countries such as Italy, Sweden, Indonesia, Portugal, Greece, and Croatia, and the recording was disseminated through the SILVANUS official YouTube channel. As of September 2022, the webinar recording has over 150 views.

The YouTube link to the webinar recording is here: https://www.youtube.com/watch?v=MX90AupQrKM&

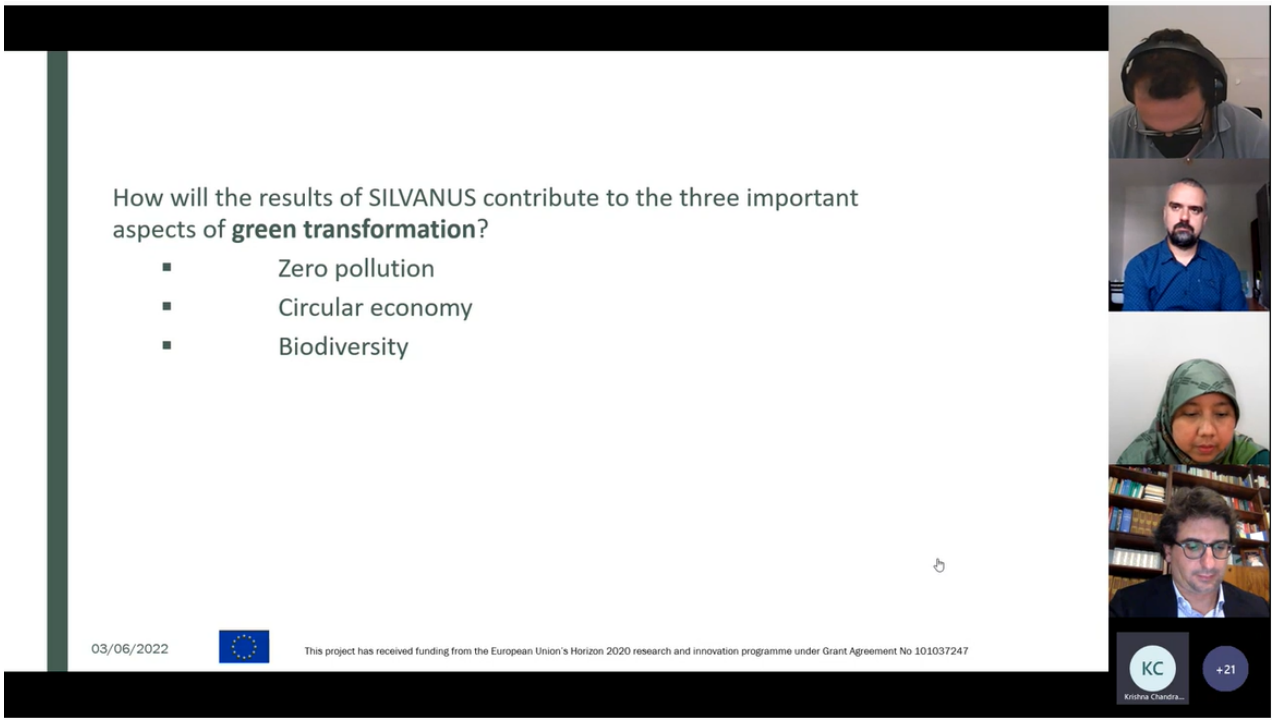


Figure 12 The SILVANUS EU Green Week Webinar, available on YouTube

2.1.9 Business Mission and Smart Tech Korea 2022

Organised by the Embassy of the Slovak Republic in Seoul and The Slovak Investment and Trade Development Agency (SARIO), SILVANUS was presented on June 8th, 2022 at the Business Mission and Smart Tech Korea conference in Seoul, by Zoltan Balogh and Ivana Budinska, representatives of the Institute of Informatics, Slovak Academy of Sciences (UISAV). The emphasis of the presentation was to introduce SILVANUS to stakeholders and to present the Slovak pilot.

The aim of the business mission was to present the results of research and development, mainly in the field of robotics and establish contacts with companies and universities in the Republic of Korea. Contacts with the academic sphere for cooperation on the development of autonomous robots were particularly important for the SILVANUS project.

Presentations provided 3 times during the visit of the Republic of Korea: a presentation at a meeting with Korean Association of Robotics and a company INTERX, presentations and informal discussions with several companies at SMART TECH KOREA 2022 and a presentation at GIST - Gwangju Institute of Science and Technology. Participants categories: SMEs, IT, Academia, cca 10 SMEs, 2 universities (at Jeonbuk National University only informal discussions were provided). The number of attendees was approximately 120.

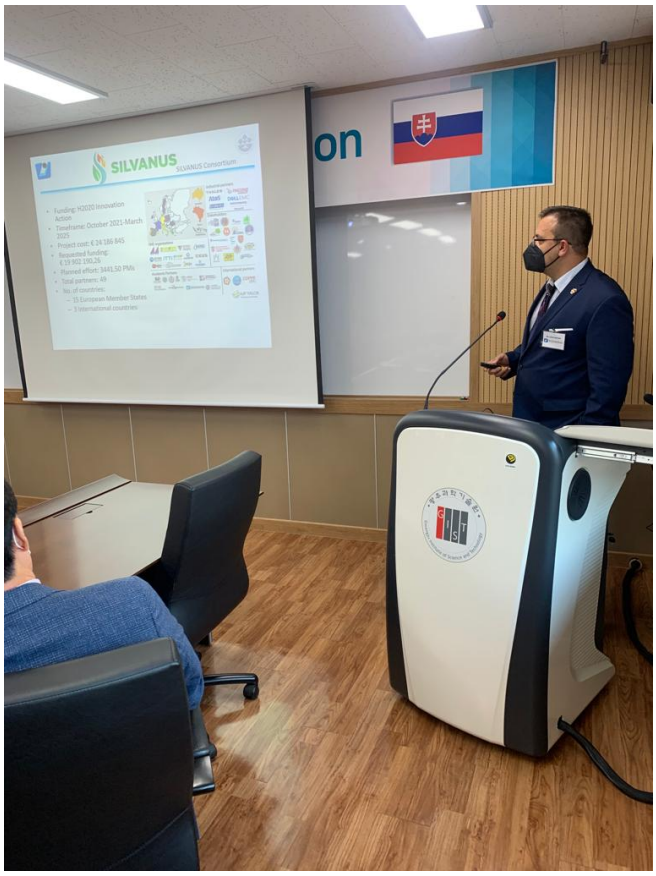


Figure 13 SILVANUS Presentation at the Business Mission and Smart Tech in Seoul, South Korea

2.1.10 Crowd For the Environment Conference

In the picturesque setting of the Royal Site of Carditello in San Tammaro, Caserta, Italy, on June 15th 2022, the final results of the project ''PON *Crowd for the Environment"* were presented. The aim of the project was the development of an innovative framework for the identification and monitoring of illegal spills, such as illegal dumps, micro-dumps or illegal releases into surface waters, and the organisation of subsequent on-site monitoring actions. The main participants were Italian volunteers, first responders, members of the Government, representatives of the health sector, and general public.

SILVANUS project flyers were distributed to dozens of attendees. The participants found the project very interesting especially due to the big number of pilots that are going to take place during its implementation inside and outside Europe.

2.1.11 1st NOTIONES Conference: Emerging Technologies for Law Enforcement and Intelligence Services

At the 1st NOTIONES Conference: Emerging Technologies for Law Enforcement and Intelligence Services on June 15th, prof. Garik Markarian from RiniGARD presented to the audience the MESH in the Sky wireless communication solution to the audience of 25 attendees and offered reference to how the technology has been adopted within SILVANUS to establish wireless pathways between the forward command centre. The overview of the technology was presented in the context of extreme wildfires and other natural disasters during which there is immediate loss of existing communication infrastructure. The wireless nodes to be

mounted on the drones (and/or) on ground robots will enable the first responders and fire fighters to establish the necessary communication services to efficiently and effectively establish coordination between individual groups of members being deployed at distance. Additionally, one of the key features of the wireless mesh communication relates to the high-bandwidth capability that facilitates the transportation of images, videos and audio signals. The wireless mesh communication has the capacity to interface with existing networking infrastructure through which the fire fighters will gain access to open Internet. Additionally, Krishna Chandramouli, VTG also shared his feedback and analysis on the need for large volume of datasets to establish benchmark for different technologies. Finally, both Prof. Markarian and Dr. Chandramouli, participated in the panel discussion and shared their views on forthcoming modern technologies in AI.

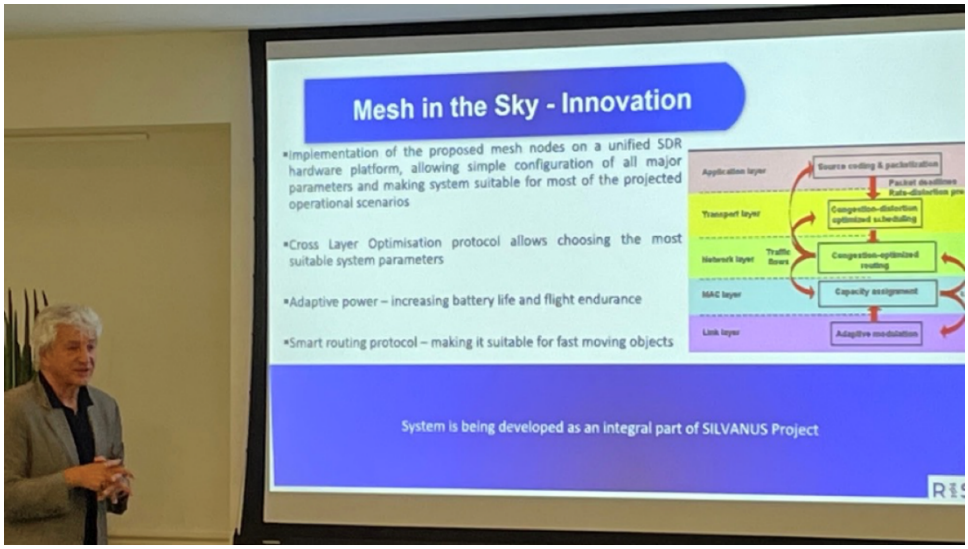


Figure 14 Prof. Garik Markarian presenting the keynote and highlighting the importance of MESH in the Sky communication

Figure 15 Dr. Krishna Chandramouli outlining the need for open datasets to benchmark technologies related to natural disasters and security services

Figure 16 Prof. Markarian and Dr. Chandramouli sharing the panel session in the conference

2.1.12 Preventing mega-fires and protecting local societies - The case of North Evia

The Greek North Evia workshop was organised by SILVANUS partners KEMEA and PSTE. The event took place on the June 22nd, 2022 at the hotel "Thermai Sylla and Spa", located at Aidipsos, North Evia, Greece. Aidipsos is the largest town in the the North Evia, the Greek pilot area for SILVANUS.

The event was a co-organization of KEMEA and PSTE. In addition, three projects contributed to this event, SILVANUS, FirEUriks and RISKPACC, thus contributing significantly to liaison and synergies with other EU funded projects.

The goal of the event was the dissemination of SILVANUS, with an emphasis on the interaction with the local people and the local society in order to strengthen the bonds between SILVANUS and local communities, and to gather input and feedback from the experience of the 2021 mega-fire in North Evia.

Thus, local stakeholders were invited to participate. In total, 46 persons participated in the event including SILVANUS partners (KEMEA, PSTE, AUA, HRT).

This daily event was divided in three parts:

a) The first part was devoted to present the 3 EU projects where KEMEA is a project partner: SILVANUS, FirEUrisk and RISKPACC, to present some key findings of the Goldammer research group on the 2021 mega-fire committee responsible for actions to prevent wildfires in Greece, to have a brief introduction of the participants, to present a similar workshop that happened in the municipality of Rafina-Pikermi in the framework of RISKPACC project, and to present the target audience the structure of the workshop.

b) In the second part, the participants were distributed in four large tables and discussed key issues from the 2021 mega-fire and for the area of North Evia related to prevention and to response. Key findings from the discussion were presented from the moderators, which were mostly from KEMEA personnel.

c) The third part focused on restoration issues, especially related to the mega-fire of 2021.

The event became widely known to the local community and the local stakeholders who were actively participating in the discussion between the round tables.

It is worth to mention that this event was the first one after the 2021 mega-fire in Greece, in which all local stakeholders managed to meet and discuss peacefully presenting their arguments, clarifying issues and actions that made during the wildfire of 2021. The immediate impact of the event is that it managed to activate the community and strengthen the bonds between local people and regain trust. The event took place in the Greek language.

Figure 17 The SILVANUS workshop in Aidipsos, North Evia, Greece

2.1.13 5th International Workshop on Emerging Network Security (ENS 2022) at 17th International Conference on Availability, Reliability and Security (ARES 2022)

SILVANUS was presented at the 5th International Workshop on Emerging Network Security (ENS 2022) in Vienna, Austria, on August 23rd, 2022. The workshop was organised by SBA Research, Austria. Paper on SILVANUS-related network security aspects & project presentation was submitted, and the project was presented by Wojciech Mazurczyk and Krzysztof Cabaj from the Warsaw University of Technology. More than 30 participants were present on each of the 4 sessions of the ENS workshop, mostly from academia and IT business, focusing on the SILVANUS presentation.

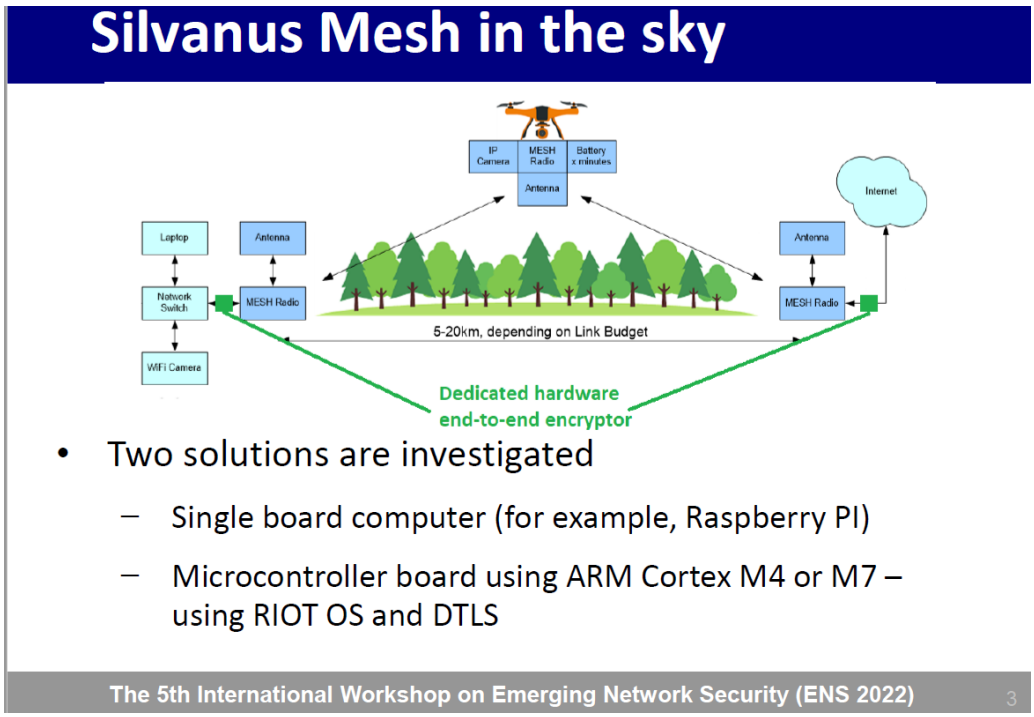


Figure 18 SILVANUS Presentation at the ENS Workshop in Vienna by WUT

Figure 19 Wojciech Mazurczyk and Krzysztof Cabaj from WUT presenting SILVANUS in Vienna

2.1.14 International Conference on Content-based Multimedia Indexing in Graz, Austria

SILVANUS held a special session at the 19th International Conference on Content-based Multimedia Indexing in Graz, Austria, on September 14th 2022, titled MSPND - Multimodal Signal Processing Technologies for Protecting People and Environment against Natural Disasters. Krishna Chandramouli from

Venaka TreLeaf, the technical coordinator for SILVANUS Project, was presenting a paper on Ecological Impact Assessment Framework for Areas Affected by Natural Disasters, whose lead author is Kusrini Kusrini from Universitas AMIKOM Yogyakarta in Indonesia, one of SILVANUS' three non-EU international partners.

The presentation of the paper was focused on depicting a forest biodiversity model as a means to quantify biodiversity, with an analysis of ecological resilience to a wildfire event.
The session was followed by a presentation of SILVANUS by Maria Eirini Pegia from Centre for Research & Technology Hellas (CERTH) paper on BiasUNet: Learning Change Detection over Sentinel-2 Image Pairs.

The participants of the conference (35 attendees for the SILVANUS presentation) were academics, PhD students and other researchers with interest in content-based multimedia indexing.

Figure 20 SILVANUS Special Session at the CBMI Conference in Graz, Austria (September 2022)

2.1.15 Fire Alarm and Fire Protection Event in Zagreb, Croatia

The Fire Alarm and Fire Protection Conference was held on September 15th, 2022, in Westin hotel in Zagreb, Croatia. Mr. Sandra Bortek, as representative of RiniGARD, presented the Silvanus project in the second part of the Conference, with a focus on mission, objectives, and the Croatian pilot. A roll-up banner of SILVANUS was demonstrated and flyers were distributed to the audience.

There were around 120 participants from Croatian IT industry, communication companies, first-responders (firefighters), companies for security and safety services, insurance company, university representatives etc.

Figure 21 Sandra Bortek from RINIGard presenting SILVANUS at the FIre Alarm and Protection Conference in Zagreb, Croatia

The abovementioned dissemination events, whether they are local or international, are on average achieving the KPI targets set by the Deliverable 10.1 (at least 50 attendees for a local event, at least 100 attendees for an international event).

2.2 Newsletter

The first SILVANUS newsletter was published in July 2022. The opening pages of the newsletter focused on the overall objectives of the project with the definition of its scope and a short visual demonstration of pilot locations. The second half summarized the messages to targeted towards three (3) critical stakeholder target groups namely (i) first responders; (ii) firefighters; and (iii)forest and land owners. along with reports from most important dissemination events (with a special emphasis on the EU Green Week webinar as outlined in Section 2.1.8). The newsletter concluded with an overview of the released and submitted Deliverable 2.1, focusing on the establishment of participatory approach for gathering feedback from the relevant stakeholders and formalising the functional requirements for the platform.

The newsletter was published on the SILVANUS website, the social media accounts (LinkedIn and Twitter), and was sent to the external SILVANUS stakeholders that were assembled through the external stakeholder list via SharePoint.

The full version of the newsletter is available here: https://silvanus-project.eu/wp-content/uploads/2022/07/SILVANUS-Newsletter-July-2022.pdf

Figure 22 Excerpts from the SILVANUS Newsletter

The second newsletter will be published in early October 2022. Topics of the next newsletter will be the summary of the General Assembly meeting in Bari and site visit to Gargano national park, short summaries of Deliverables submitted in August and September 2022, reports from the CBMI and ARES conferences, and key messages for three stakeholder target groups.

The KPI objective, as per Deliverable 10.1, is to reach an audience of 500 to 2000 newsletter subscribers and viewers on social media and the website, where newsletters will also be available. The first newsletter has reached an audience of minimally 1000 viewers, when taking into account the number of newsletter subscribers (320), and followers on social media which amount to 700.

2.3 Website

The SILVANUS website https://silvanus-project.eu/ was launched in February 2022, with a major update occurring in April, where the majority of the site map was fully established. The site map consists of:

- News - regular updates on project-related news, focusing on General Assembly meeting reports, site visits and pilot demonstrations, webinar and workshop reports, links to webinars on the official SILVANUS YouTube channel

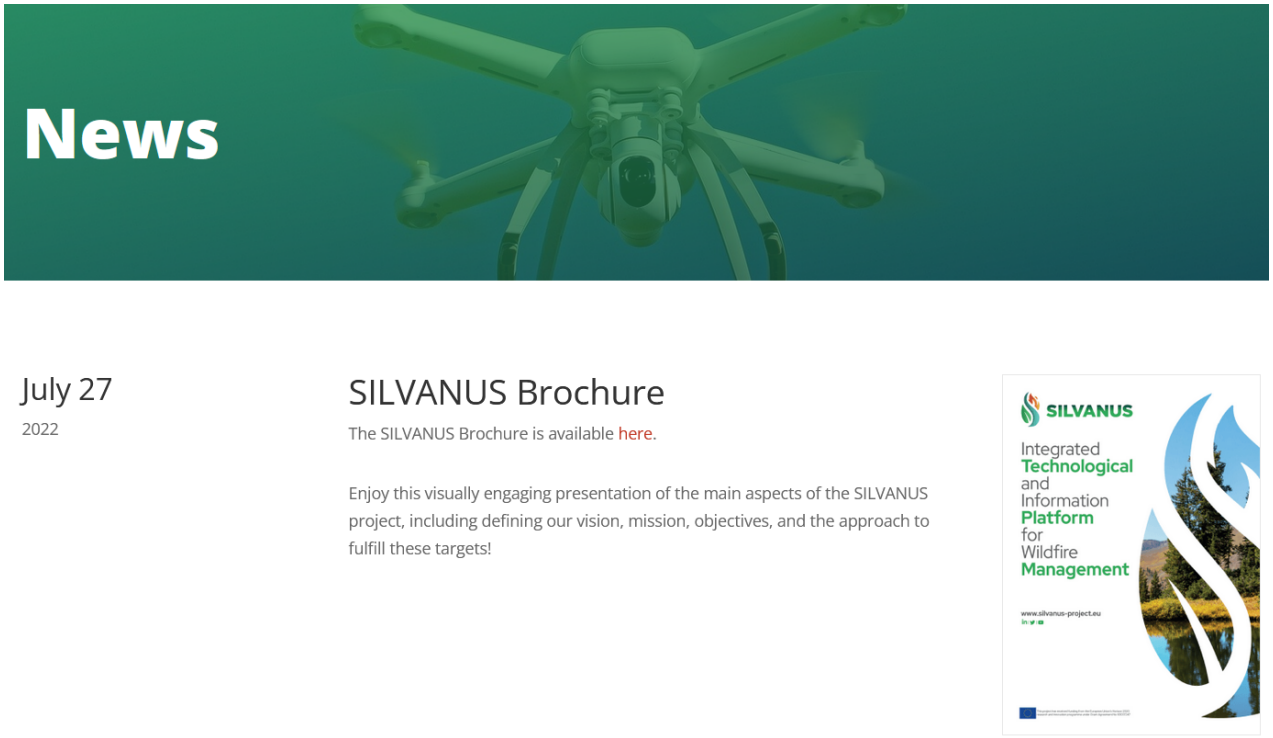


Figure 23 SILVANUS News on the Project Website

- Events – announcements and reports from dissemination events
- Results
    - Deliverables – public Deliverables available for download, edited by the main Deliverable authors and uploaded by SILVANUS system administrator
    - Pilots – detailed descriptions on all twelve pilots in eleven countries (Italy, Portugal, France, Greece, Czechia, Slovakia, Croatia, Romania, Brazil, Indonesia, Australia)
    - Resources – descriptions of resources such as the SILVANUS ontology

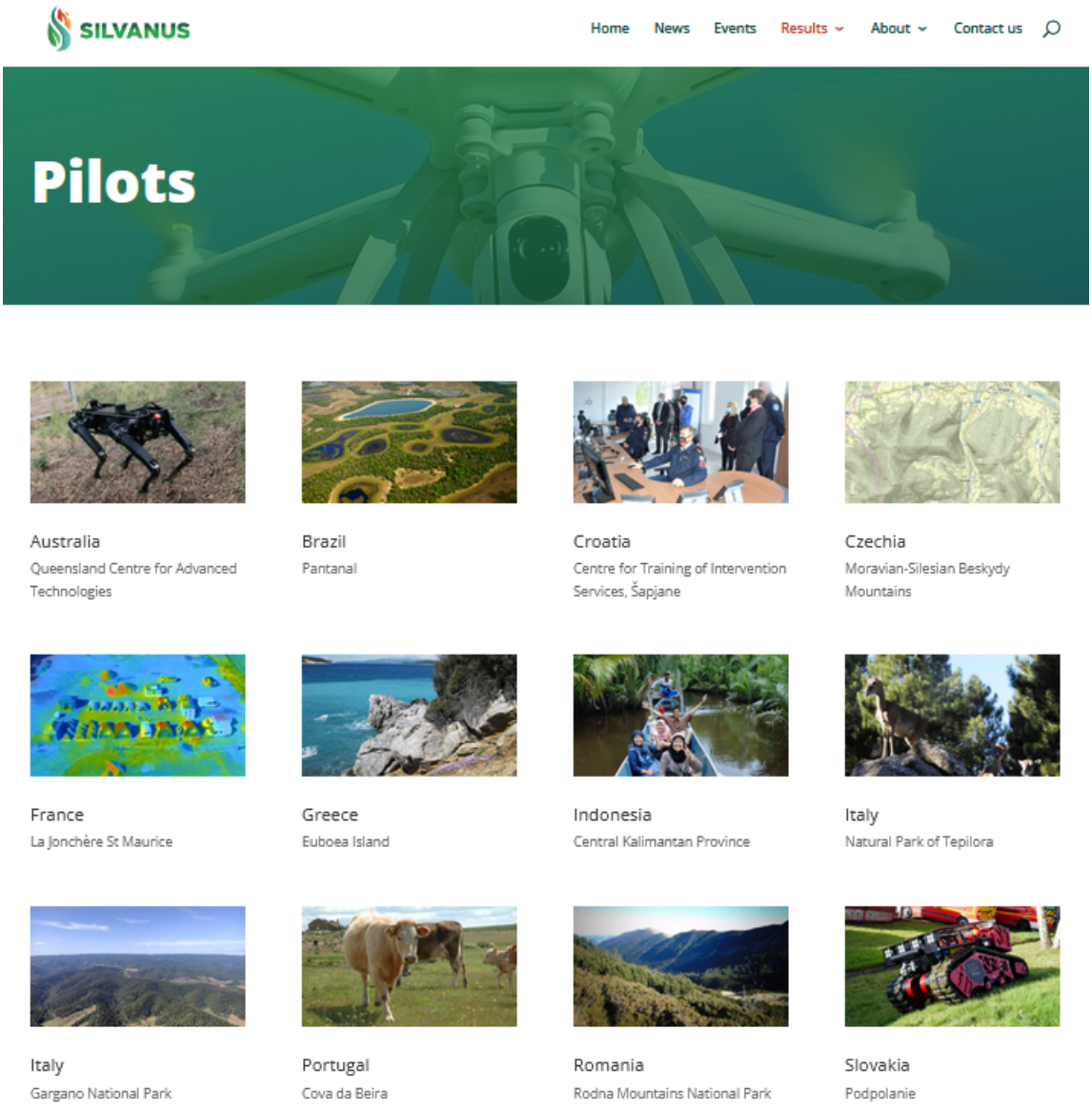


Figure 24 SILVANUS Website - Pilots

- About
  - Consortium – visual depiction of consortium partners and their locations, with respective partner logos, brief partner descriptions and links to respective websites of partners
  - Our Approach – a brief summary of SILVANUS vision, mission, objectives, and platform components

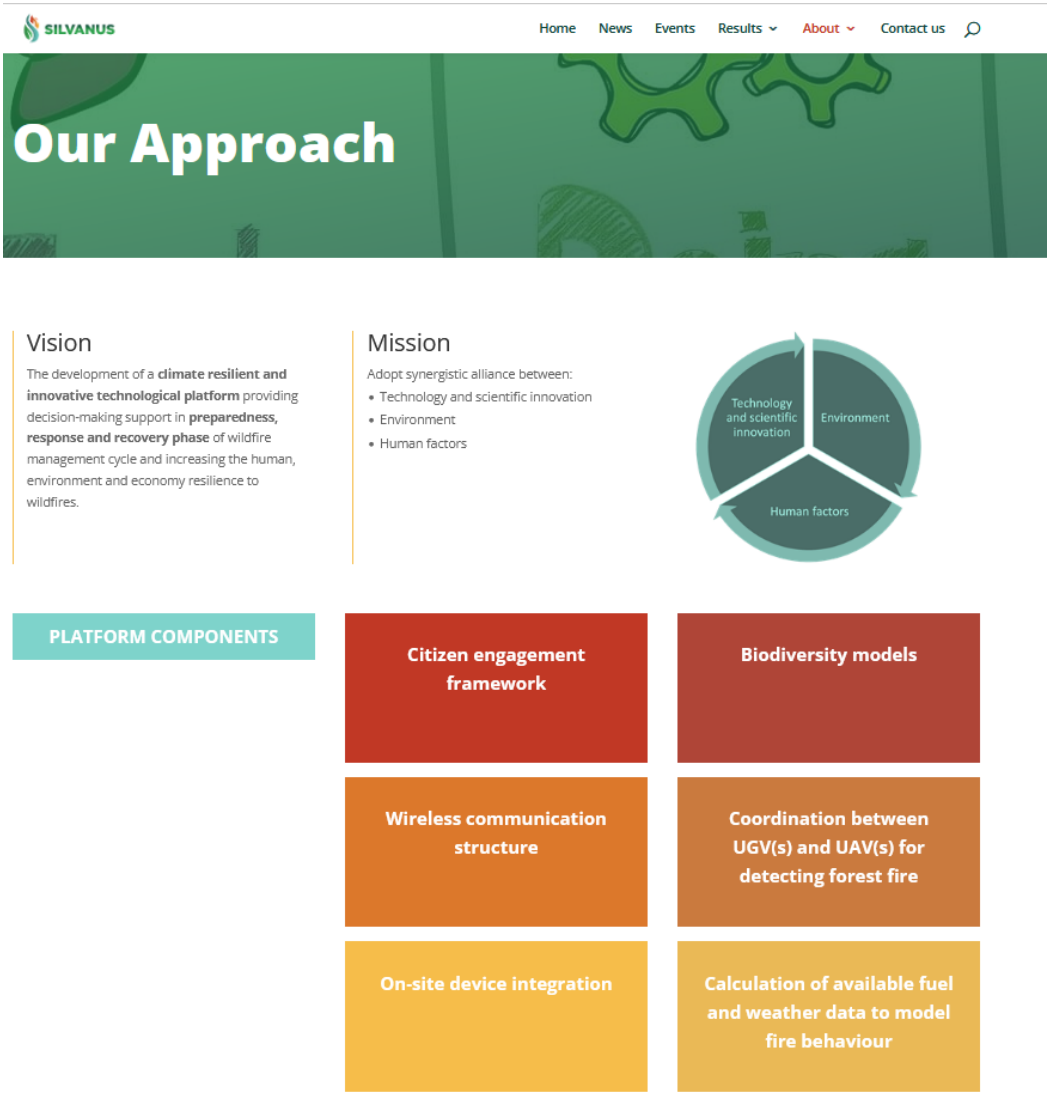


Figure 25 SILVANUS Website - Our Approach

- Work Packages – a systemic description of work packages and partners responsible for respective WPs
- WFRM Projects (Wildfire Risk Management Projects) – logotypes and links to websites of other Horizon 2020 Green Deal Innovation Action and Coordination Support Action projects

The website offers a contact form and a subscribe to newsletter form which has increased the external stakeholder pool through various contacts with start-ups developing a novel wildfire containment tool, conference organisers with an interest to cooperate with SILVANUS, etc.

There have been more than 1,500 users visiting the SILVANUS website since the beginning of 2022, with more than 3,300 views (Figure 26). Users have accessed the SILVANUS website either through direct connection (1850 views), organic search (905 views), or via referral (371 views) and organic social media (142 views) (Figure 27). Countries with highest number of views are Italy, United States, Greece and Croatia (Figure 28). The highest number of views was in May, after the biggest upgrade of the SILVANUS website.

Figure 26 Number of users visiting the SILVANUS website in 2022 (per Google Analytics)

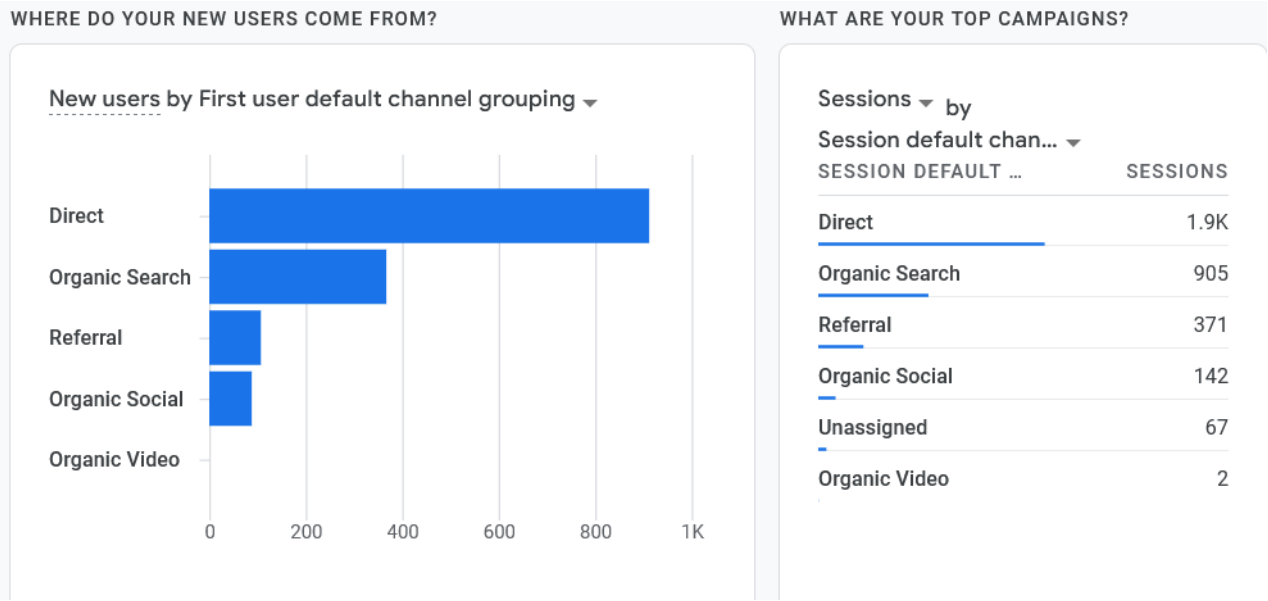


Figure 27 Number of new users per referrals and campaigns (per Google Analytics)

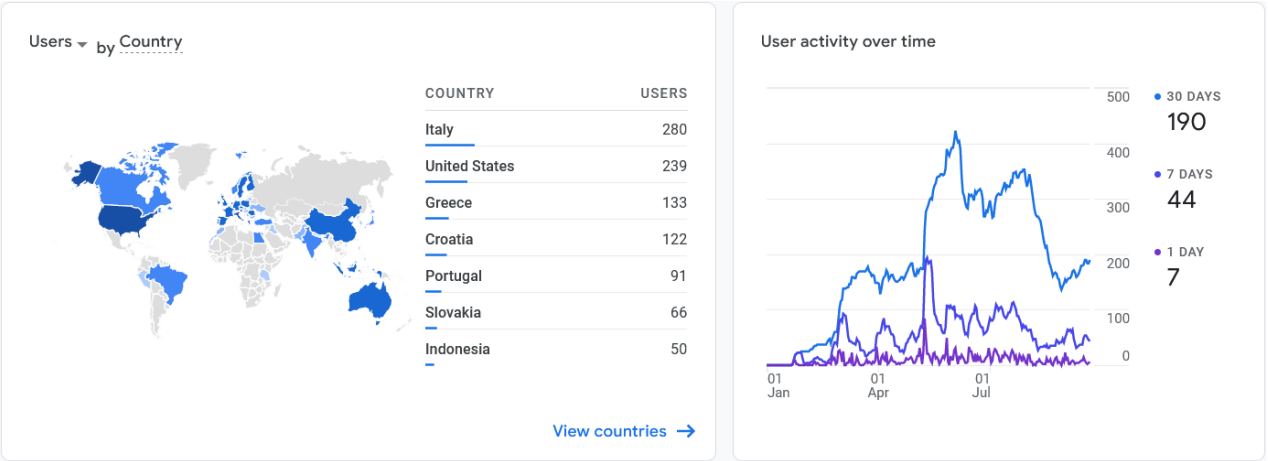


Figure 28 Users of SILVANUS website per country and user activity over time (per Google Analytics)

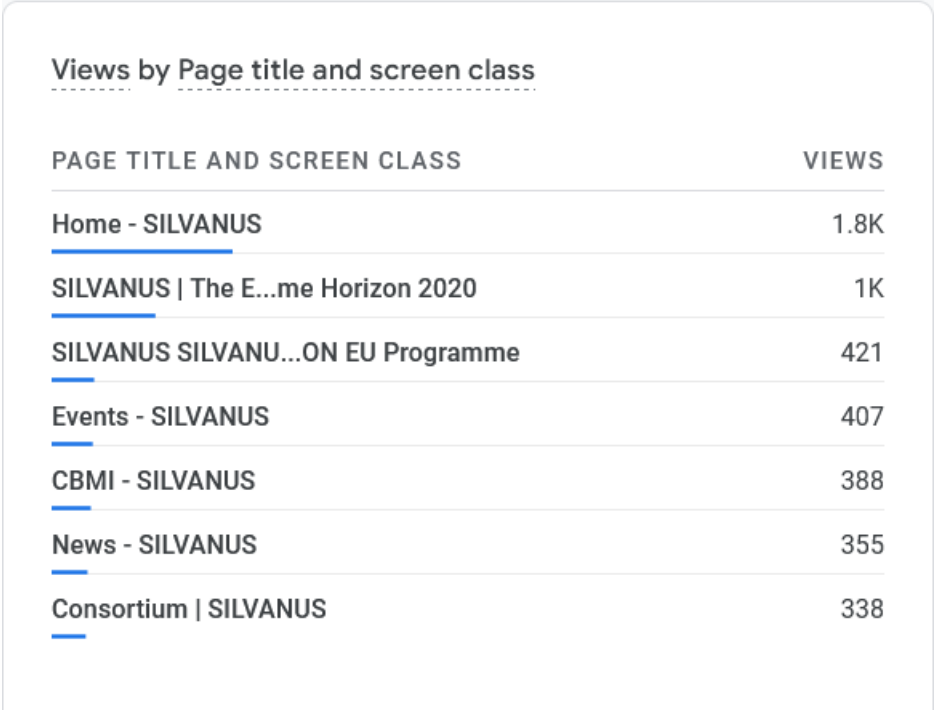


Figure 29 Views of SILVANUS Website by Page Title (per Google Analytics)

2.4 Social Media

The SILVANUS social media accounts – LinkedIn and Twitter - were opened in December 2021, after which posts were regularly published as per the Grant Agreement obligation of minimally one post per week on average.

LinkedIn posts are designed in a small essay format, from key messages conveyed to SILVANUS stakeholder target groups, presentations of promotional material, to brief reports on project meetings, pilot site visits, SILVANUS platform development, and comments on general trends in wildfire prevention.

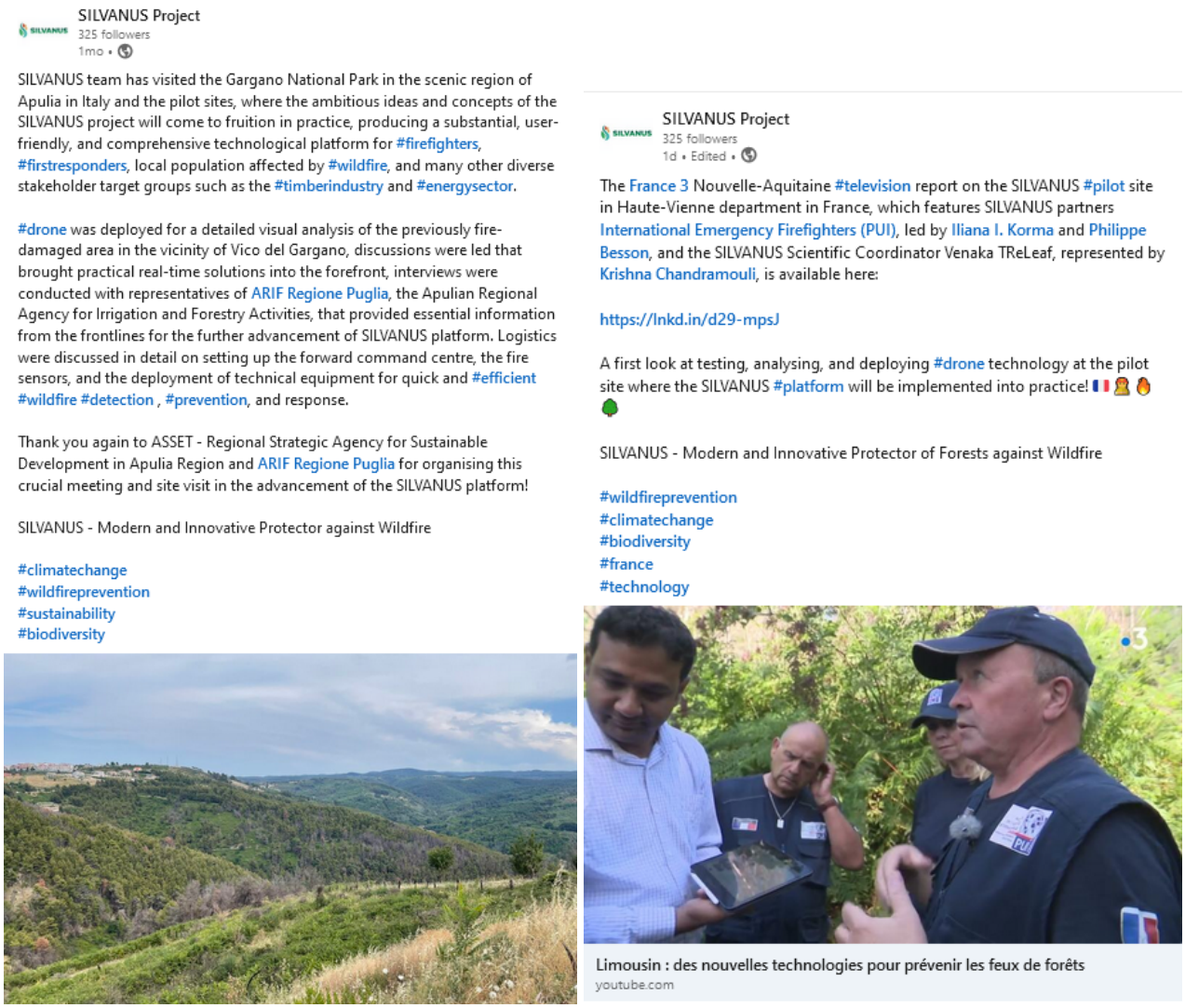


Figure 30 Examples of SILVANUS LinkedIn reports

Figure 31 depicts visitor analytics from the launching of the SILVANUS LinkedIn account in November 2021. There were 2,015 page views (1,191 views on mobile and 824 on desktop) with 665 unique visitors. Peak periods of visits to the LinkedIn account were in December 2021, March and July 2022.

As of September 2022, the SILVANUS LinkedIn account has 344 followers. The highest number of followers come from research, higher education, information technology and services, utilities, government administration and NGO sectors (Figure 34).

From December 2021 to September 2022, there are over 30 original LinkedIn posts focused on comprehensive content quality.

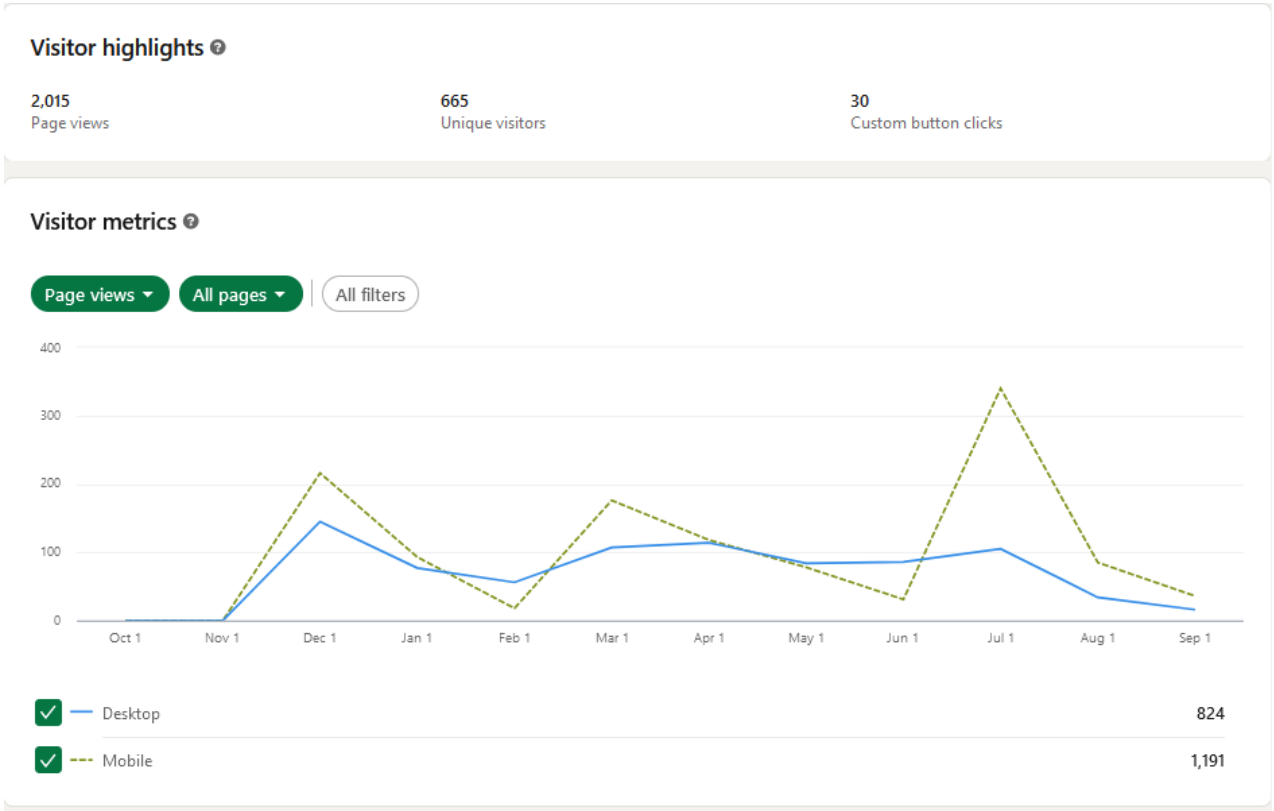


Figure 31 SILVANUS LinkedIn Account Metrics

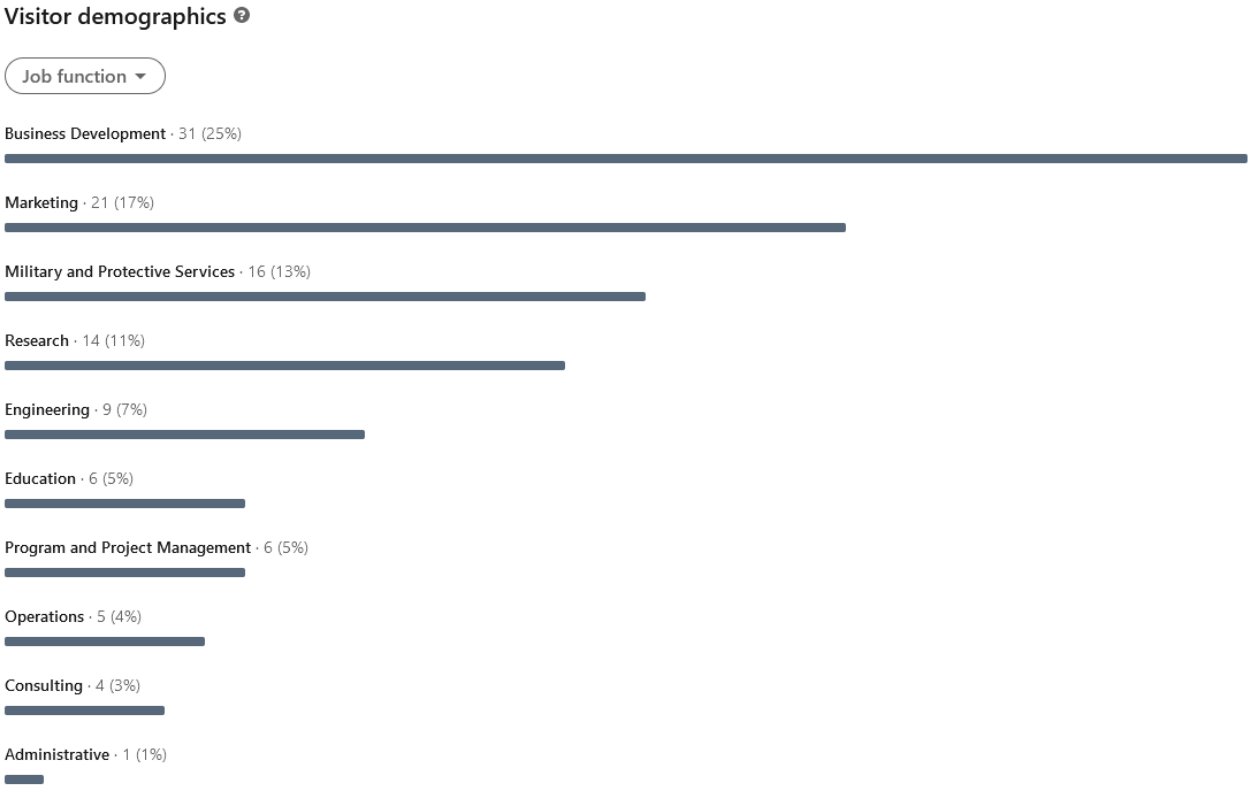


Figure 32 SILVANUS LinkedIn Visitor Demographics according to Job Function

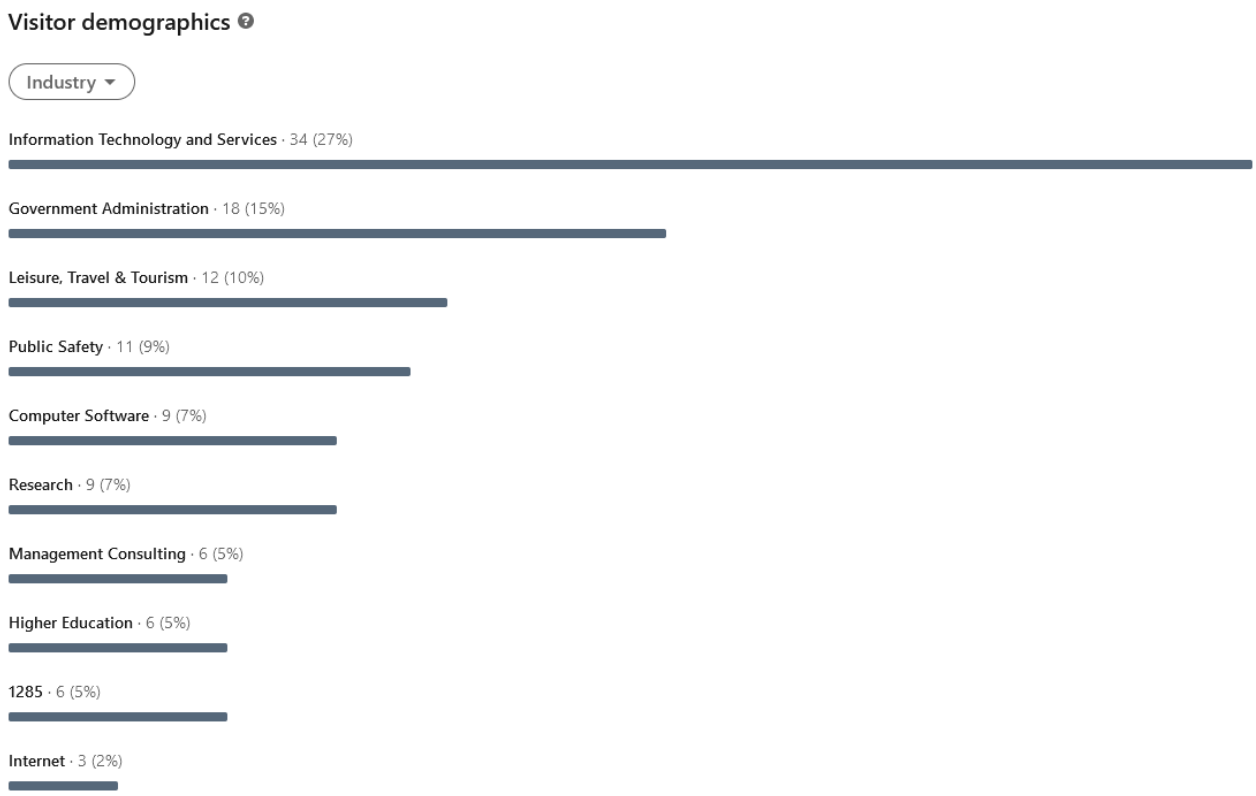


Figure 33 SILVANUS LinkedIn Account Visitor Demographics according to Industry

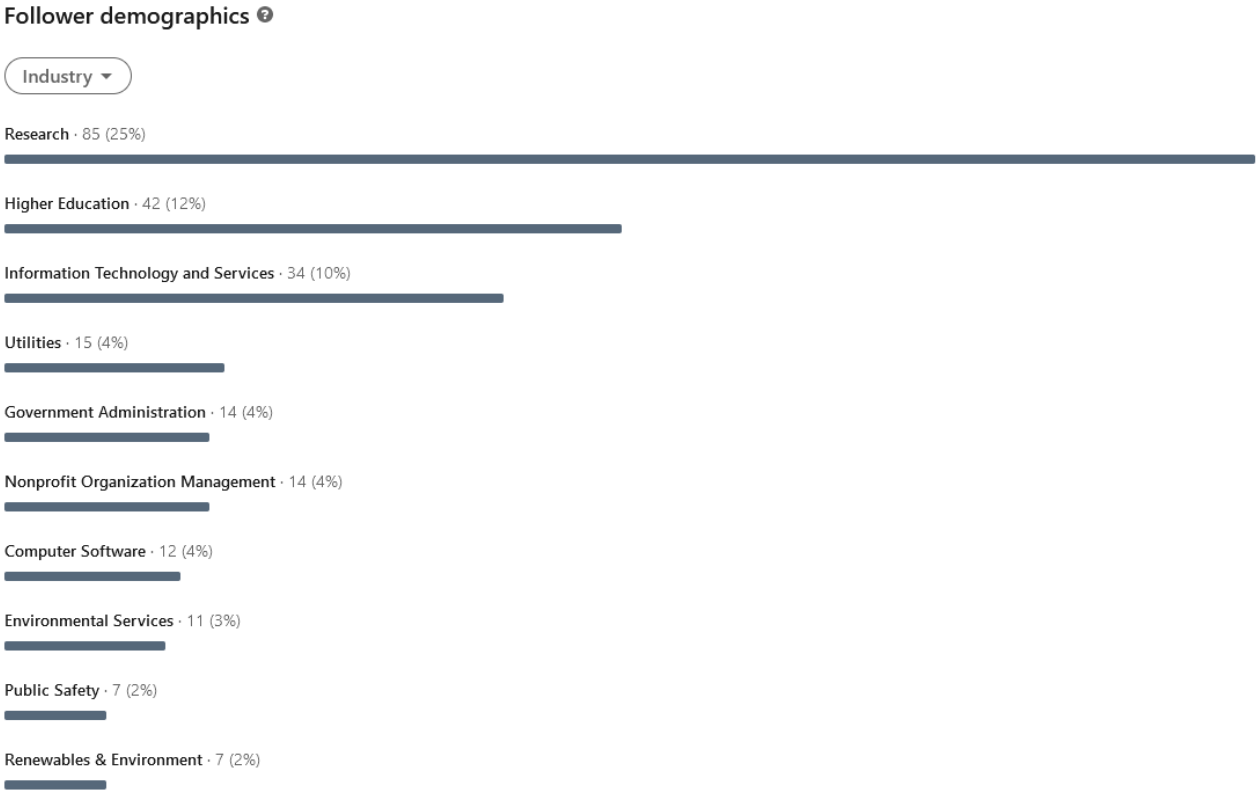


Figure 34 SILVANUS LinkedIn Account Follower Demographics

The Twitter posts are focused on three aspects of the project:

- Regular project updates, reports from project meetings, dissemination events, and pilot site visits, which included photographs and video material
- Marketing campaigns

- International Firefighters Day social media campaign, launched on May 4th and coordinated by the H2020 CSA project Firelogue, which united all of the H2020 Green Deal Innovation Action project in defining a common goal in the fight against wildfire. A common hashtag was created #EUFireProjectsUnited, while other promotional hashtags were used for the occasion to attract a diverse audience, such as #MayNoExtremeWildfiresBeWithYou

Figure 35 International Firefighters Day promotion of SILVANUS, developed by Firelogue

- Sharing of articles and scientific publications related to the topic of wildfire prevention, climate change, and biodiversity

From December 2021 to September 2022, SILVANUS Project has published 46 original tweets, keeping in line with the "one post per week" average KPI. In this period, SILVANUS has acquired 225 followers.

For the period between December 20th 2021 and March 15th 2022, SILVANUS had 19 impressions per day (number of times users saw a particular Tweet), with the most popular Tweet having 1018 impressions.

This followed by a major increase in activities – between March 16th and June 14th, the SILVANUS Project Twitter account had 112 impressions per day, with the most popular Tweet having 1357 impressions.

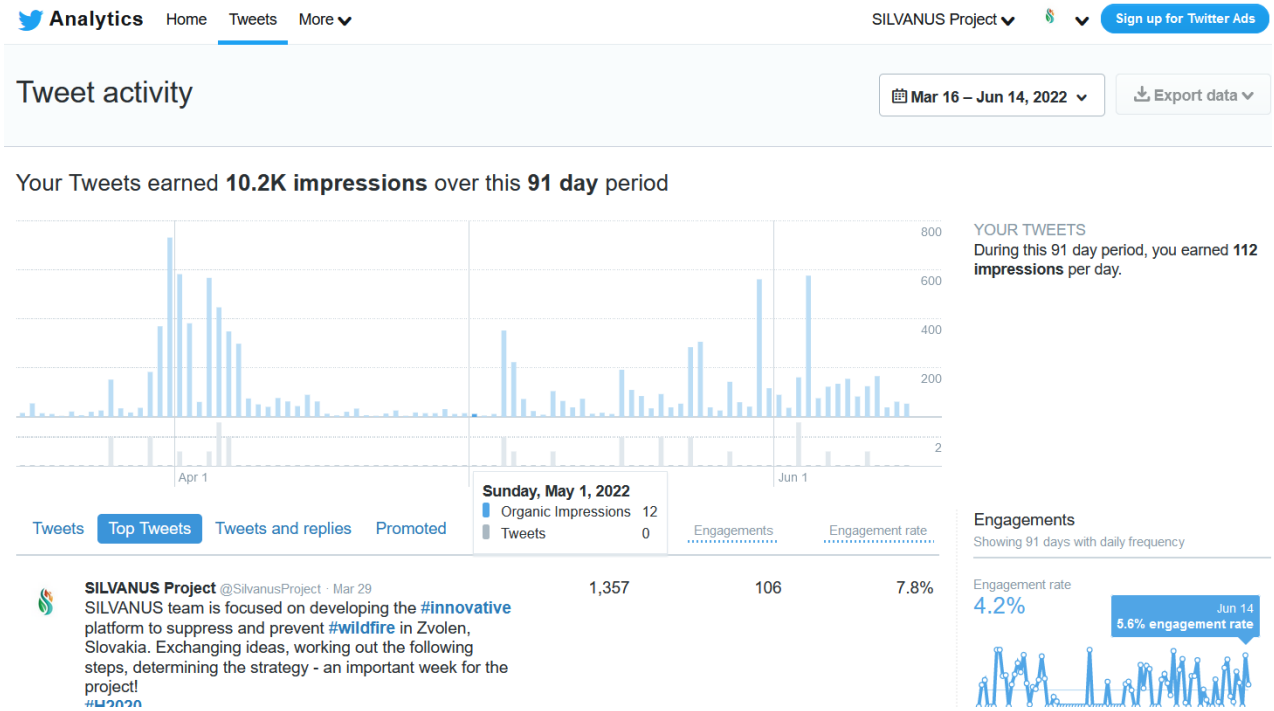


Figure 36 SILVANUS Project Twitter Account Analytics between March and June 2022

During the summer 2022 period (between June 15th and September 13th), there were 85 impressions per day on the SILVANUS Project Twitter account, while the most popular tweet had 963 impressions, while the tweet with the highest number of engagements (total number of times a user has engaged with a tweet, e.g. by clicking on hashtags or pictures) had 757 impressions and 101 engagements.

Figure 37 SILVANUS Tweet with the highest engagement rate - report from the Gargano Pilot Site in Italy

2.5 Television

2.5.1 RAI TV/TGR Puglia Interview with Mr. Marino Spilotros from ASSET and Television Coverage of the General Assembly SILVANUS Meeting in Bari, Italy

During the General Assembly meeting of SILVANUS, which was held in Bari and the Gargano National Park, Italy, between the 5th and 8th of July 2022, Marino Spilotros from ASSET was interviewed on the Italian Puglia TV station about the project, where he explained the SILVANUS activities and outcomes.

The interview with Mr. Spilotros was conducted at the RAI TV studio for the TG3 Puglia channel on July 5th, 2022. Link for the full interview (in Italian) is available here: https://www.rainews.it/tgr/puglia//notiziari/video/2022/07/ContentItem-baba6dc7-8918-4bd6-95e0-42a92b700c32.html

Figure 38 Interview with Marino Spilotros for TGR/RAI, SILVANUS Project Manager from ASSET

The assembly meeting included an excursion to the Gargano National Park, one of the project's pilot sites, where the SILVANUS team met with the Civil Protection, the Park Management Authority, the Regional Agency Irrigation and Forestry Activities (ARIF).

The event ended in partnership with the Orienteering World Championships scheduled in Gargano National Park from July 8 to 16. The coverage of Italian television was very wide as they included both national and regional TV stations (TGR, RAI, Telebari, Tnorba TV, TRM TV, Antenna Sud).

A special TV coverage was filmed on the first day of the SILVANUS General Assembly (GA) meeting on July 5th, and was published by four different regional TV stations – Telebari, Tnorba TV, TRM TV, Antenna Sud - on July 6th. As an example, the article in Italian and a short YouTube clip is available here:

https://www.antennasud.com/bari-ed-il-parco-del-gargano-protagoniste-del-progetto-silvanus/


Integrated
Technological
and
Information
Platform
for
Wildfire
Management
Marino Spilotros
Coordinatore progetto
TRM
TRM network


TG NORBA 24
A. G. MARASCHIO

Figure 39 TV Segments on SILVANUS from TRM and Antenna Sud

These TV interviews have reached an audience of at least twenty thousand (up to a hundred thousand viewers), well above the targets set for SILVANUS-themed videos, which amount up to two thousand views per video, with at least 10 TV interviews for the duration of the project.

2.5.2 France 3 Nouvelle Aquitaine TV Segment on SILVANUS

The French TV Channel "France 3 Nouvelle Aquitaine" aired a TV segment on SILVANUS on August 19th, 2022. The aim was to make a television report on the SILVANUS pilot site in Haute-Vienne department in France, featuring SILVANUS partners Pompiers de l'Urgence Internationale (PUI France), led by Iliana I.Korma and Philippe Besson, and the SILVANUS Scientific Coordinator Venaka TReLeaf, represented by Krishna Chandramouli. Through this television coverage, the two partners managed to have a first look at testing, analysing and deploying drone technology at the pilot site where SILVANUS platform will be implemented in practice within 2023. The duration of the TV segment is 3 minutes and 32 seconds. The filming took place on 9th of August.

Link to the full video (in French): https://www.youtube.com/watch?v=wyn3TFIlr4g

Figure 40 France 3 TV Report on SILVANUS Pilot Site Visit

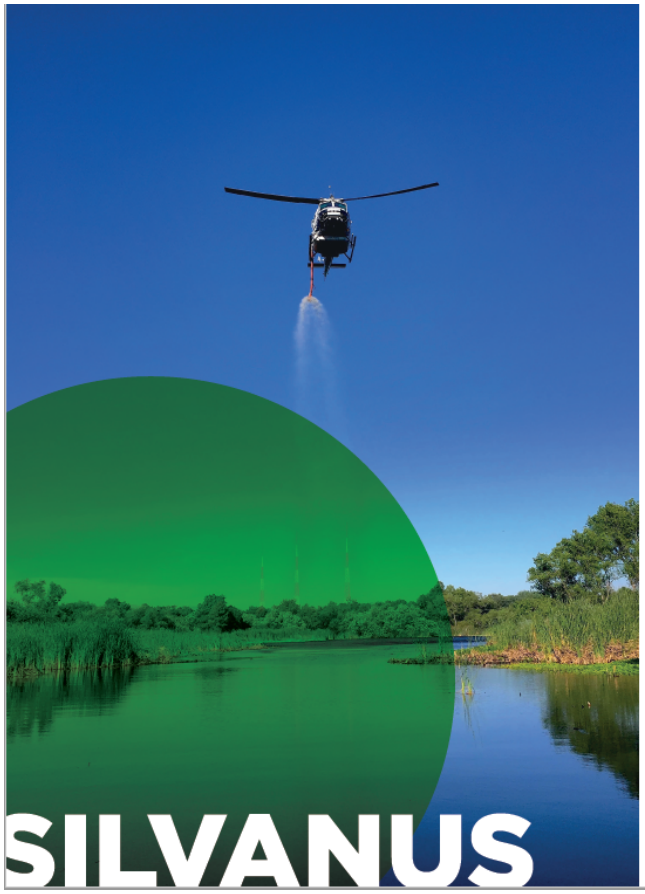
2.6 Promotional Material (Flyer, Brochure and Poster)

The SILVANUS flyer was developed in April 2022 and disseminated at the events (Wildfire Risk Management Clustering Event, Crowd for the Environment Conference) as a short and to-the-point first look at the project, describing the mission, vision and platform components.

Figure 41 SILVANUS Flyer

The SILVANUS brochure was released to stakeholders via website and social media in July 2022. It was developed by Micro Digital and the Uni Pegaso graphic design team, based on the visual material provided by SILVANUS partners. The brochure offers a visually engaging depiction of SILVANUS mission, vision, platform components, the general approach, objectives, pilots, the description of the three phases of

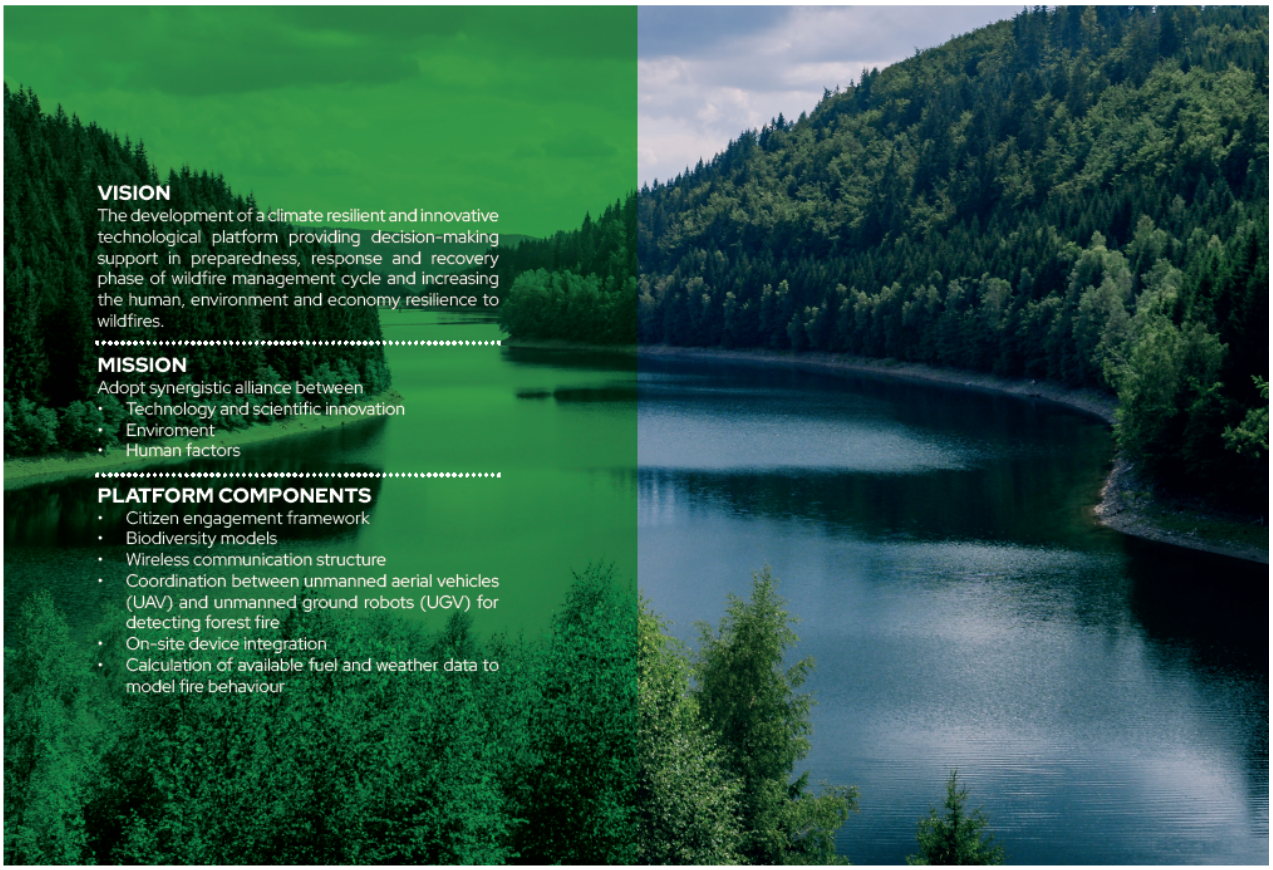
SILVANUS platform (Phase A – prevention and preparedness, B – detection and response, C – restoration and adaptation).



SILVANUS - A Holistic and Innovative Approach to Wildfire Management

Funded by the EU Horizon 2020 Green Deal program and coordinated by Università Telematica Pegaso, **SILVANUS** project includes 49 partners from the European Union, Brazil, Indonesia, and Australia, bringing together a large consortium of interdisciplinary experts from four continents to combat the threat of forest fires and improve forest resilience against climate change.

The key output of the project is the release of a climate resilient forest management platform to prevent and suppress forest fire. **SILVANUS** relies on environmental, technical and social sciences experts to support regional and national authorities responsible for wildfire management in their respective countries. **SILVANUS** scientists and research engineers will aid the civil protection authorities to efficiently monitor forest resources, to evaluate biodiversity, to generate more accurate fire risk indicators, and promote safety regulations among the local population affected by wildfire through awareness campaigns.



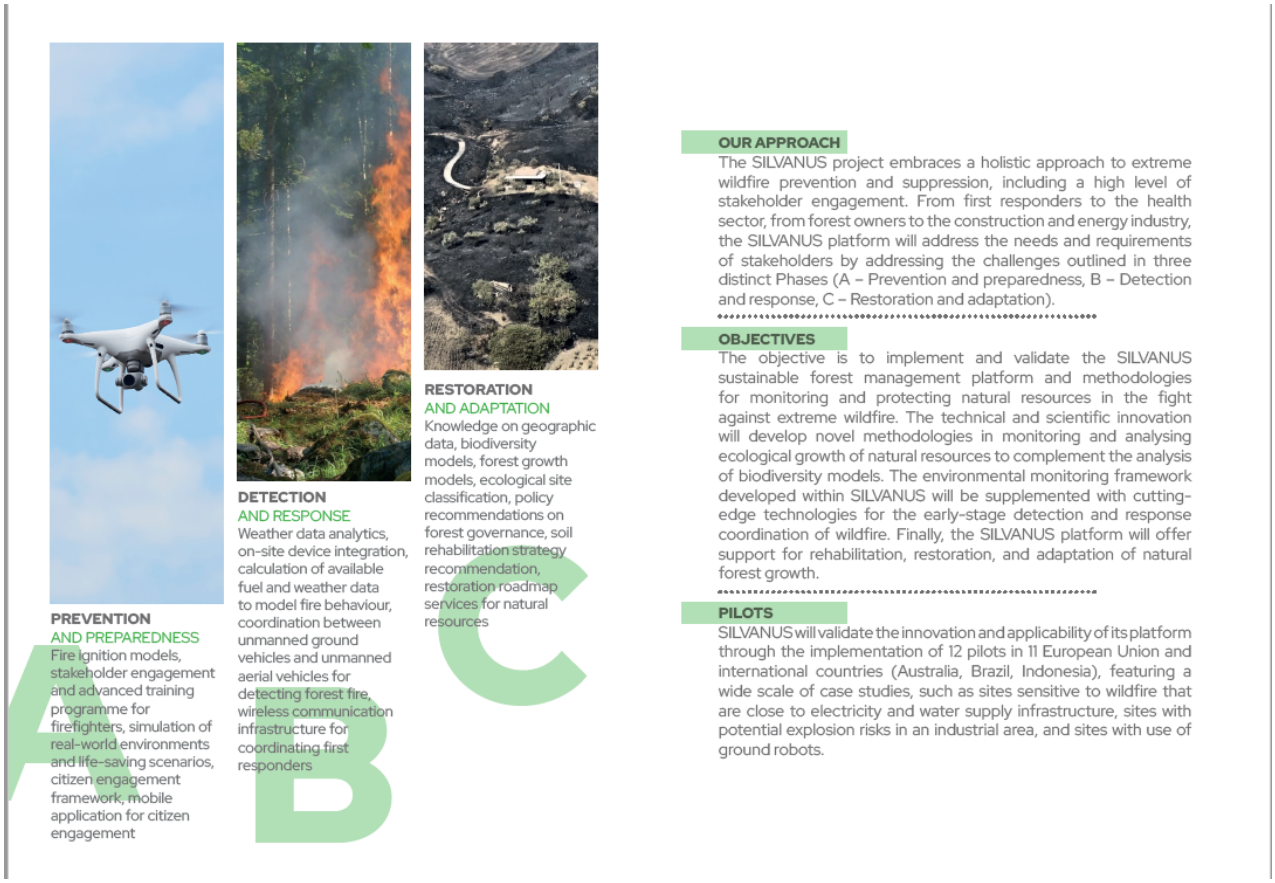


Figure 42 Excerpts from the SILVANUS Brochure

The brochure is available here: https://silvanus-project.eu/wp-content/uploads/2022/08/SILVANUS-Brochure-ebook-quality.pdf

The SILVANUS roll-up was developed by the Uni Pegaso graphic design team, with input by Micro Digital. It features the logo and title of the project, with a list of 49 partners in SILVANUS Consortium.

Figure 43 SILVANUS Roll-Up

The dissemination poster template was developed by Micro Digital.

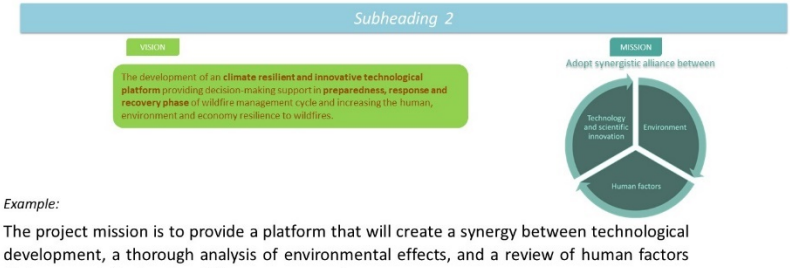
TITLE (HEADING)

Subheading

Example of introductory text:

SILVANUS is a Horizon 2020 Green Deal project, named after the Roman deity of woods and uncultivated lands, whose main objective is to create a **climate resilient forest management platform** to prevent and combat forest fire. The project consortium includes a wide range of environmental, technical and social science experts from eighteen countries and four continents, who will support regional and national authorities responsible for wildfire management in their respective countries.
SILVANUS experts will help authorities to efficiently monitor forest resources, to evaluate biodiversity, to generate more accurate fire risk indicators, and promote safety regulations among the local population affected by wildfire through awareness campaigns.

Illustration explanation



Example:

The project mission is to provide a platform that will create a synergy between technological development, a thorough analysis of environmental effects, and a review of human factors that are crucial factors in wildfire management.

Subheading

Example:

This interdisciplinary approach helps to address challenges and improve solutions – from a logistical, technological, and educational perspective – in three specifically defined stages. These are:

- Phase A – Prevention and Preparedness,
- Phase B – Detection and Response,
- Phase C – Forest Restoration Policies.

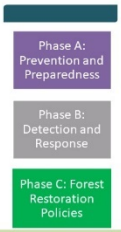
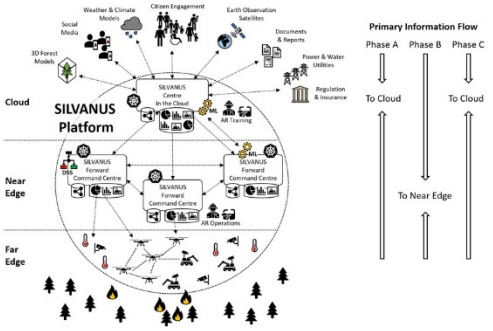


Illustration title

Conclusion



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101037247

Author, Institution, City, Country

Figure 44 SILVANUS Poster Template

The target for the promotional material is to have between 500 and 2000 flyers, brochures and posters either downloaded through website and social media, or distributed and displayed at major conferences and events, over the course of the entire project.

2.7 Press Releases

The press release after the launching of SILVANUS project in October 2022 was published and sent to various publications and newspapers (Sweden, Italy), partner websites (e.g. Z&P, AMIKOM, Terraprima, University of Borås, EAI, KEMEA, HB, RINIGard), and the CORDIS site.

The General Assembly project meeting in Bari was covered by numerous national, regional and local state Italian television (more information in Section 2.5.1). The published press releases have acquired an audience of at least ten thousand people (up to a hundred thousand as the maximum possible number).

SILVANUS partner RiniGARD has published an article about the project in the Croatian magazine "Zaštita" (eng.: Protection – Fire Alarm and Fire Protection) titled "Sustainable and innovative wildfire management" in July 2022, written by Sandra Bortek. The article is available here: https://zastita.info/hr/casopis/clanak/silvanus-projekt---odrzivo-i-inovativno-upravljanje-sumskim-pozarima,26209.html

The estimated target for press releases are at least 30 in total with a minimum of 200 press publications, with an estimate of 5000 readers on average for the duration of the project.

2.8 Scientific Publications

The following is a list of scientific publications during the first year of the project that have acknowledged SILVANUS and are written by SILVANUS partners:

- **Using Satellite NDVI Time-Series to Monitor Grazing Effects on Vegetation Productivity and Phenology in Heterogeneous Mediterranean Forests** by Duarte Balata, Ivo Gama, Tiago Domingos and Vânia Proença from Instituto Superior Técnico, University of Lisbon and Terraprima for Remote Sensing Magazine, May 2022
- **SILVANUS: An Integrated Technological and Information Platform for Wildfire Management – North Evia pilot area** by Georgios Sakkas and Vassiliki Varela from KEMEA, Iosif Vourvachis and Alexandros Giordanis from HRT, Stelios Andreadis, Ilias Gialampoukidis, Stefanos Vrochidis, and Ioannis Kompatsiaris from CERTH, Konstantinos Demestichas and Spyridon Kaloudis from AUA, Roula Kechri and Konstantinos Meletis PSTE, June 2022
- **Performance Evaluation of DTLS Implementations on RIOT OS for Internet of Things Applications** by Krzysztof Cabaj, Wojciech Mazurczyk, Karol Rzepka and Przemysław Szary from the Warsaw University of Technology, August 2022
- **Ecological Impact Assessment Framework for Areas affected by Natural Disasters** by Kusrini Kusrini, Arief Setyanto, Gardyas Bidari Adninda, Renindya A Kartikakirana, Rhisa A Suprapto, Arif D Laksito and I Made A Agastya from AMIKOM, Andrea Majlingova and Yvonne Brodrechtova from TUZVO, Konstantinos Demestichas from AUA, Krishna Chandramouli and Ebroul Izquierdo from VTG for CBMI 2022 Conference in Graz, Austria, September 2022

2.9 Video

The first promotional SILVANUS video is telling a story – how will the SILVANUS platform help in achieving a quicker and more effective response to extreme wildfire, emphasising a holistic approach, taking into account safety of households, communities, and property, durability of infrastructure, quick response of firefighters, and biodiversity restoration. The 2-minute video is introducing a visual storytelling element to encompass all of the aforementioned activities and objectives. The footage was compiled from videos filmed by SILVANUS partners VTG, AMIKOM, Terraprima, CSIRO and MD. Footage locations include pilot sites of Gargano National Park in Italy, Sebangau National Park in Indonesia, Cova da Beira in Portugal, along with locations in the Croatian Northern Adriatic.

The link is available here: https://www.youtube.com/watch?v=p1KLHa4fA7o

Figure 45 Footage from SILVANUS Promotional Video

3 Collaboration with Horizon 2020 Coordination Support Action, Green Deal and Innovation Action projects

The collaboration of SILVANUS with the Horizon 2020 Innovation Action projects (TREEADS, FIRE-RES) and other wildfire management projects (SAFERS, FIRE-IN, FireLinks, FirEURisk) is primarily coordinated by the Coordinaton Support Action Project Firelogue. This cooperation was formally initiated during the Wildfire Risk Management Clustering Event in April 2022, described in Chapter 2.1.1. The event was followed by monthly meetings in May, June and September, led by Firelogue, and will be regularly held for the duration of all Innovation Action projects (until mid-2025).

During the monthly meetings, topics of joint collaboration and experience sharing are described in detail. The main topics of discussion are:

- common social media campaign events, discussion on common hashtags (#EUFireProjectsUnited),
- exchanging ideas on making the best overview of dissemination events through dissemination event reports,
- common stakeholder engagement,
- organisation of joint workshops.

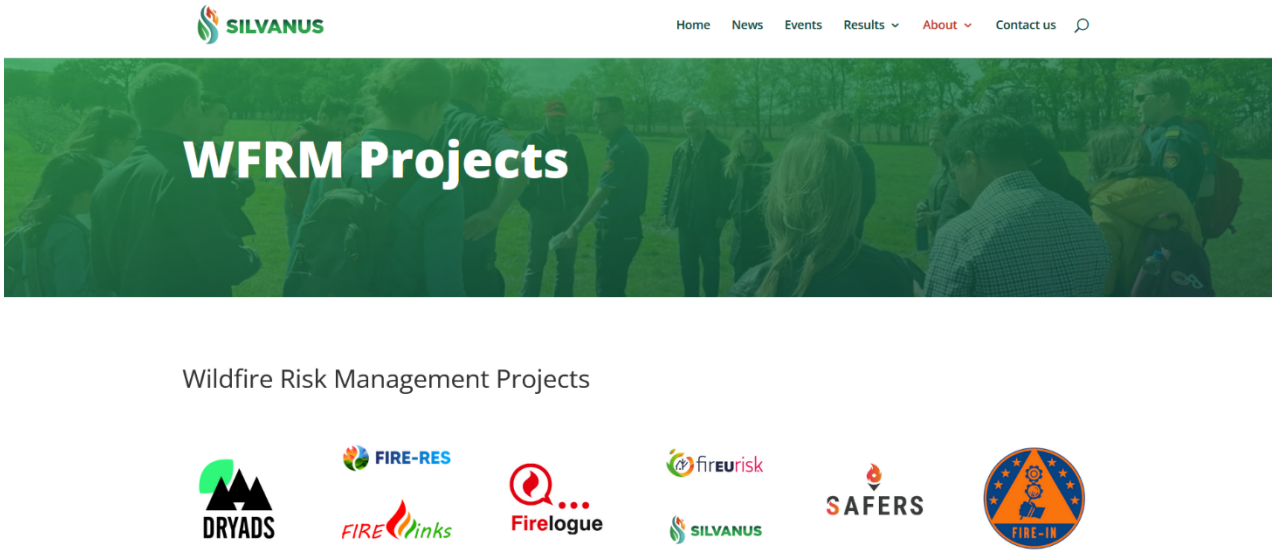


Figure 46 WFRM Projects on the SILVANUS Website

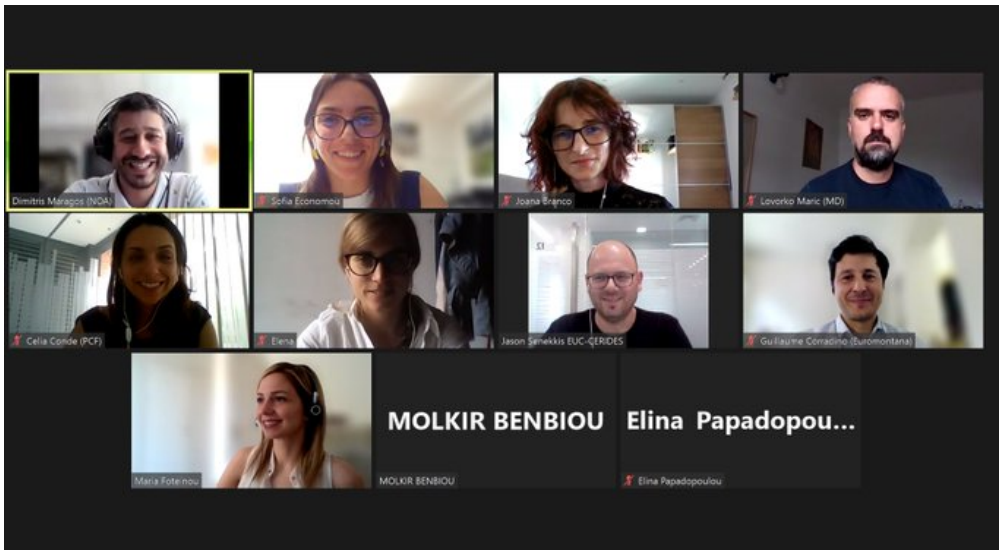


Figure 47 The June meeting between #EUFireProjectsUnited communication teams

3.1 International Firefighters Day Campaign and Promotional Video Development

The International Firefighters Day event, which took place on May 4th, derives from these meetings and contacts. Firelogue had promoted the Innovation Action and other wildfire management projects on its social media accounts, while individual projects made their own campaigns and promoted posters (developed by Firelogue) on their respective accounts in honour of the International Firefighters Day, where the #EUFireProjectsUnited was disseminated for the first time. The campaign was a success and produced an increase in the number of followers.

Figure 48 International Firefighters Day, #EUFireProjectsUnited

A common EUFireProjectsUnited promotional video is in developing stages, which will feature the key messages from all H2020 IA projects. Krishna Chandramouli, the SILVANUS technical coordinator, has filmed a 30-second video featuring SILVANUS key messages, with a brief visual presentation of SILVANUS in the background. This was sent to the Firelogue team, which will merge all the videos from IAs (that follow the same format) into one concise common promotional video.

A new social media campaign in the vein of International Firefighters Day, which will feature the most important individual IA project key messages for the first year, is planned for autumn 2022. The plan for this campaign is to take place on the International Day for Disaster Risk Reduction on October 13th.

Individual projects will introduce the other respective H2020 wildfire management projects through their social media accounts. As an example, FirEURisk conducted a social media campaign promoting SILVANUS in July 2022.

Figure 49 FirEURisk promoting SILVANUS on Twitter

A joint workshop is planned in December 2022, which will focus on the project results and will depict a common framework between the H2020 IA projects, and how the results of individual projects will merge and create a joint strategy in fighting extreme wildfire.

3.2 Green Deal Support Projects Office

The Green Deal Support Projects Office organised the first Working Group meeting on June 8th, 2022. The office focuses on 17 projects focused on climate change adaptation and biodiversity:

- GDC 1.1 Preventing wildfires: Firelogue, FIRE-RES, SILVANUS, TREEADS,
- GDC 1.3: Information drive climate pathways: TransformAr, ARSINOE IMPETUS, REGILIENCE;
- GDC 7.1: Restoring biodiversity: WaterLANDS, MERLIN, SUPERB, REST-COAST,
- GDC 9.2: Climate adaptation at urban and regional lelve: CityCLIM, REACHOUT, I-CISK, RethinkAction, LOCALISED, ARSINOE.

The mission of Green Deal Support Projects Office is to facilitate coordination between projects under the Horizon 2020 Green Deal Call and maximise their positive impact in the long term, for both the projects and their stakeholders.

The purpose of the meeting was the opportunity to learn about the various Horizon 2020 Green Deal projects that are also outside of the wildfire management scope. Along with SILVANUS, projects present at the meeting were ARISNOE, City Clim, TREEADS, Firelogue, FireRES, I-CISK, IMPETUS, LOCALISED, and MERLIN.

The purpose of the meeting was to identify synergies that may provide a basis for possible collaboration between the Green Deal projects, including data sharing, organisation of events that would lead to expanding the respective stakeholder networks of all projects, etc.

A previous similar collaboration between projects under a H2020 call on nature-based solutions resulted in high-value joint products, which included a handbook for practitioners, a database of joint monitoring indicators, a joint scientific paper on latest advances and business models for nature-based solutions.

The participants were split into breakout groups to identify synergies, according to:

- geographical focus of case studies
- themes
- processes
- stakeholders

The ideas that resulted from the breakout group discussions were:

- identification of common challenges, similar case studies, sharing stakeholder networks,
- knowledge sharing activities including stakeholder engagement,
- avoiding stakeholder fatigue by coordinating communication with stakeholders,
- sharing stakeholder networks and how to deal with GDPR in organising joint workshops that would achieve an expansion of stakeholder network for all projects,

SILVANUS sent a short presentation slide to the Green Deal Support Office for it to be presented to the representatives of other Green Deal projects.

The following key activities is to have an online non-public workshop where all of the aforementioned projects will be featured, a second Working Group meeting in the fall of 2022 to refine the WG Action Plan draft, and by the end of 2022 to finalise the Action Plan on how the projects will collaborate with each other, and how the stakeholder engagement will improve. SILVANUS has volunteered to lead the subgroup dealing with the stakeholder network expansion among all Green Deal projects.

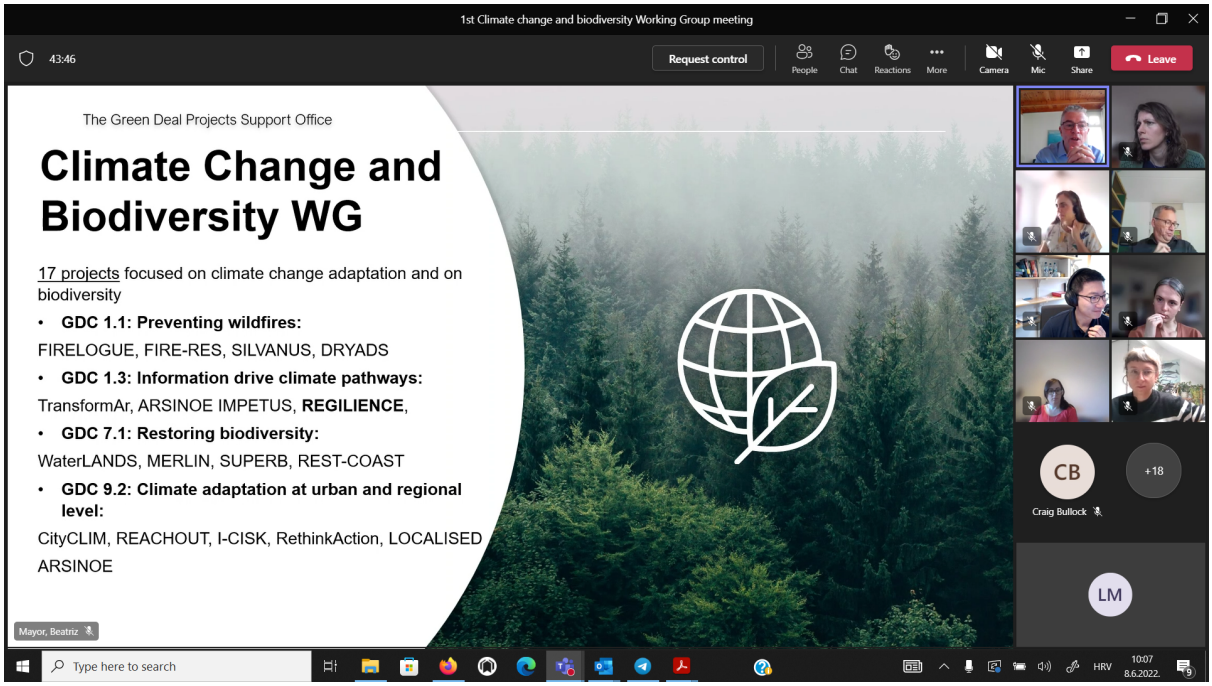


Figure 50 The Green Deal Supports Office Meeting in June 2022

SILVANUS has access to the Green Deal Support Office private network platform, with following features:

- A shared calendar of different relevant events happening in Europe until the end of the year
- Overview information about Green Deal Projects
- Contact details of projects' coordinators and Communication WP leaders

3.3 Collaboration with Horizon 2020 Coordination Support Action Firelogue – Impact Assessment Groups

Following the Wildfire Risk Management Clustering Event in April 2022, TREEADS, FIRE-RES, and SILVANUS initiated their collaboration under the coordination of the CSA Firelogue, as stated in section 2.1.1. During the first year of SILVANUS project, two workshops have been organised by Firelogue, on May 18th and September 8th. These workshops focused on discussing the solutions that each project will bring to reach the Green Deal Expected Impacts and how they plan to assess their contribution. Firelogue's objective with these workshops is to align the three IAs and define a common impact assessment framework to be able to measure the joint contribution that the projects bring towards reaching the Expected Impacts.

After the first meeting, based on each project introduction and presentation of each project outputs, the second meeting, held on 19th May, dealt with the following topics:

- In-depth and definition of each EI;
- Revision of 2030 targets/Achievability;

- Definition of the scale of the impact (from pilots to EU scale);
- Discussion of the EI feasibility;
- Considerations of the added value that the clustering events could bring, and definition of next steps.

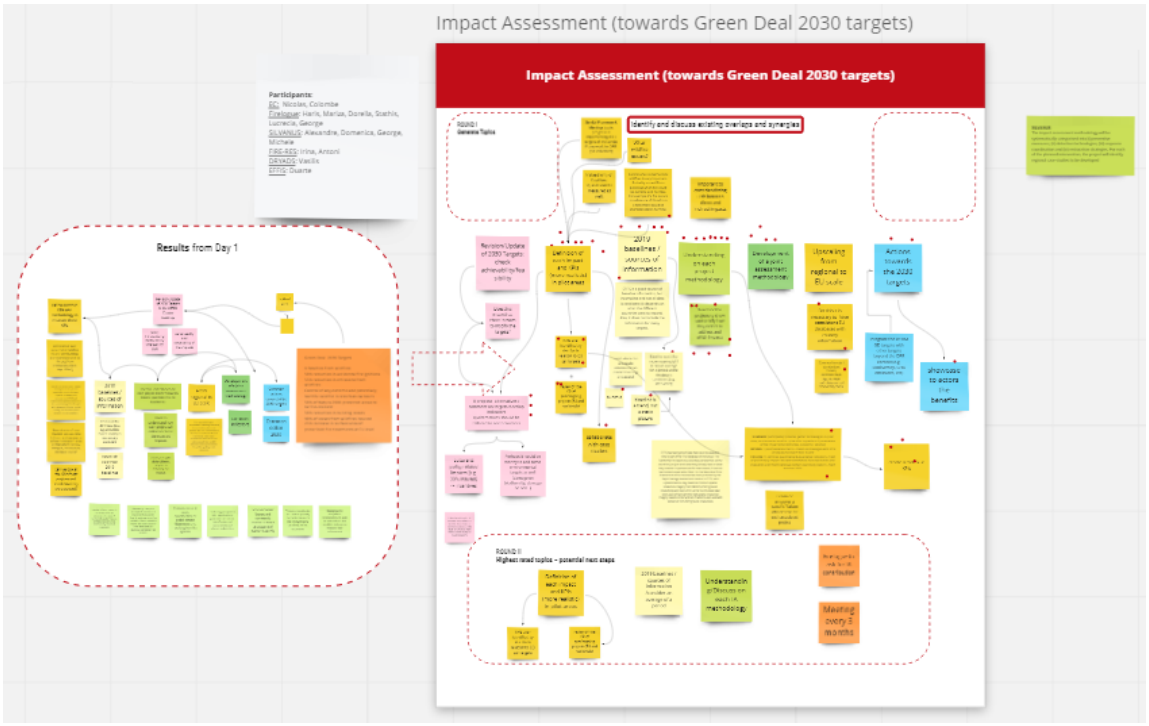


Figure 51 May of 19th meeting between the Impact Assessment Groups of Firelogue, TREEADS, FIRE-RES, and SILVANUS

In order to succeed the Green Deal objectives to confront forest fires, KPIs have been identified by the IAs, and an agreement of a common baseline was discussed.

Firelogue distributed to the IAs a document to be filled with measurable requirements and information on the methodology to be followed for a coordinated evaluation of technologies' impacts with respect to their contribution towards the expected impacts defined by the EC. The document is described in Deliverable D2.3 "Report on SILVANUS formal assessment methodology" and in Firelogue's D3.1 "Impact assessment harmonization".

The third meeting, held on 8th September had as focal points the following:

- Discussion of the current state of action of SILVANUS, and previsions of what will be the next steps;
- Discussion of a document of Impact Assessment Extrapolation provided by TREEADS;
- In occasion of the Fire across Boundaries Conference (October 4th -7th) attended by Firelogue, EI were distributed in working groups (WG)
- Decision of next steps and action points.

The WGs suggested by Firelogue for the Fire across Boundaries Conference (the focus is connecting fire ecology research and management across geographic and disciplinary boundaries) have been approved after suggestions and additions from the IAs, and are composed as it follows:

WG_Civil Protection:

1) 0 fatalities from wildfires.

4) Control of any extreme and potentially harmful wildfire in less than 24 hours.

3) 55% reduction in emissions from wildfires. (Health)

8) 25% increase in surface area of prescribed fire treatments at EU level

WG_Society

2) 50% reduction in accidental fire ignitions.

3) 55% reduction in emissions from wildfires. (Health)

7) 90% losses from wildfires insured.

WG_Environment

3) 55% reduction in emissions from wildfires. (Emissions)

5) 50% Natura 2000 protected areas to be fire-resilient.

8) 25% increase in surface area of prescribed fire treatments at EU level (Policy)

WG_Infrastructures and WG_Insurances

6) 50% reduction in building losses.

7) 90% losses from wildfires insured

Along with the development of SILVANUS and the other IAs technology and demonstrations, information and public deliverables will be shared among the partners, and future clustering events will be held to further co-operate to reach the common goals.

4 Stakeholder Engagement and External Advisory Board Update

The external stakeholder list was assembled by SILVANUS partners, and categorized by the level of influence and interest that individual stakeholders have in the fields of wildfire prevention, sustainable development, biodiversity, and grouped within the stakeholder target groups defined in Deliverable 10.1. As of September 2022, there were 99 external stakeholders named by SILVANUS partners – either named individually or by the organisation, with whom the Consortium is keeping close contact, mostly in the form of sending project updates, webinar and workshops, videos, and newsletters. These stakeholders, depending on the level of interest, will be candidates for the Sustainable and Resilient Forest Working Groups.

Table 2 shows the number of collected and contacted external stakeholders per stakeholder target group. Stakeholder target groups were identified in Deliverable 10.1. The most represented stakeholder target groups are research organisations/think tanks (15), forest governance associations (13), policy makers (12), and firefighting associations (11).

Table 2 Number of Stakeholders within the Identified Stakeholder Target Groups

Stakeholder Target Group	n
First Responders	7
Firefighting Associations	11
Forest and Land Owners	7
Forest Governance Associations	13
Industry	1
Timber Industry	1
Energy and Construction Industry	2
Academia	5
Research Organisations and Think Tanks	15
Infrastructure, Transport and Road Network	2
Local Residents and Communities Affected by Wildfire	1
Policy Makers	12
Civil Society Organisations	7
Health Sector	1
Public Administration	5
Other	7

According to the matrix of stakeholder impact, depicted and explained in Deliverable 10.1, there are four types of stakeholders with:

- High Influence / High Interest
- High Influence / Low Interest
- Low Influence / High Interest
- Low Influence / Low Interest

According to Table 3, SILVANUS stakeholder list has the following number of stakeholders, according to their rate of influence and interest.

Table 3 External stakeholders of SILVANUS per rate of influence and interest

Level of Influence and Interest	n
High Influence / High Interest	58
Low Influence / High Interest	22
High Influence / Low Interest	6
Low Influence / Low Interest	2

Regarding the relationship between SILVANUS consortium (i.e. the Consortium partner responsible for managing the relations) and the external stakeholder, as per D10.1, there are three types of relationship defined:

- Strong (no to little effort needed)
- Medium (some effort needed)
- Weak (to be built)

Table 4 Number of external stakeholders according to the level of relationship

Level of Relationship	n
Strong relationship (no to little effort needed)	27
Medium relationship (some effort needed)	53
Weak relationship (to be built)	2

Table 5 Number of External Stakeholders per Type (Public or Private)

Type of Stakeholder	n
Public	70
Private	4
Public/Private	2
Other	10

Table 6 Number of external stakeholders per main area of action (regional/national/international)

Main Area of Action	n
National	55
International	3
Regional	26

According to Countries with the highest number of external stakeholders are Greece (28), Portugal (13), Croatia (10), Poland (9), Sweden (9), Slovakia (7), Italy (4), Cyprus (4), Czechia (4), Romania (3), Indonesia (3), Australia (1), United Kingdom (1), Japan (1).

Table 7 External stakeholders per country

Country	n
Croatia	10
Cyprus	4
Czechia	4
Greece	28
Indonesia	3
Italy	4
Japan	1
Poland	9
Portugal	13
Romania	3
Slovakia	7
Sweden	9
Australia	1
United Kingdom	1

The SILVANUS Consortium has established and expanded the list of of External Advisory Board (EAB) members as identified at the start of the project. The project has established communication with all EAB members in through outlining the activities of the project. The project will undertake a continuous approach in engaging with external stakeholders with whom the project partners will have a constructive relationship in receiving feedback on the overall project progress.

The successful launch of the project was disseminated to the EAB members, and first feedback was received from the EAB members on project development. Non-disclosure declarations have been signed by four EAB members. A General Assembly meeting in November plans to host three EAB members, where feedback can be given to early SILVANUS platform demonstrations.

5 Centre for Adaptation Strategies and Development (CASD) – Current Status

To ensure sustainability of the international collaboration among the partners during and after the SILVANUS project implementation, the self-sustainable Centre for Adaptation Strategies and Development (CASD) is going to be launched within the next three years.

The establishment of CASD is going to be formalised within the project implementation phase.

The establishment of the CASD, its legal form and finding the ways of its financing in the future, were the subject of two meetings and negotiations. First meeting dealing with CASD establishment was at the SILVANUS General Assembly meeting in Zvolen, Slovakia, in March 2022. Second meeting was held in Bari, Italy, during the GA meeting, in July 2022.

During the meeting in Zvolen, a provisional CASD Management Board was established.

CASD Management Board members:

- Michele Corleto (UNIPEGASO),
- Krishna Chandramouli (VTG),
- Mircea Segarceanu (ASFOR),
- Francisco Gala (ATOS),
- Georgios Sakkas (KEMEA),
- Lovorko Maric (MD),
- Monica Florea (SIMAVI),
- Marco Mancini (CMCC),
- David Bowden (DELL),
- Kusrini Kusrini (AMIKOM),
- Kostas Demestichas (AUA),
- Sofia Tsekeridou (INTRA),
- Andrea Majlingova (TUZVO),
- Lenka Navratilova (TUZVO).

Along with the Management Board members, CASD includes representatives as the advisory board members, project partners and external stakeholders.

The vision of CASD is to bring together fragmented efforts from national and international organisations to build synergies, share knowledge, experiences, and expertise among the community to address the challenges of wildfires.

CASD as a Centralized Knowledge Repository and Business Commitment provides

- Development of adaptation strategies and regional policies required to prevent forest fires and restore the burnt area of the forest.
- Continuous monitoring of technology and market trends that are relevant for the work conducted in the SILVANUS project and informing the project partners on the updated state of the art.
- Counselling.
- Co-operation and Networking.
- Coaching and Co-working.
- Assistance when applying for the projects, grants.
- Organizing the conferences, seminars, workshops, trainings, courses, etc.

CASD strategic objective is to create ideal conditions for project partners and external stakeholder collaboration to be able to successfully implement their adaptation strategies.

CASD measurable indicators are

- Number of outputs in the form of strategies, recommendations, plans, objectives (per year).
- Number of events organized / co-organized by the Centre (per year).

- Number of participants in the Centre's programs (per year).
- Number of traineeships carried out (per year).
- Number of business/technology/research partnerships concluded and mediated (per year).
- Number of Clients of the Centre using consultancy (per year).
- Number of participants in conferences, seminars etc., organized by the Centre (per year).

Target groups: SMEs, research institutions, universities, public administration bodies, nature conservancy bodies, firefighters, and rescuers, etc.

Localization: Technical University in Zvolen, T.G. Masaryka 24, 960 01 Zvolen, Slovakia (rooms A402, A404)

Figure 52 TUZVO main building

Legal Form: during SILVANUS project implementation, it has the form of integral organisational part of the TUZVO.

CASD financing: CASD establishing and operating costs are going to be covered from TUZVO budget in the project implementation phase. After project implementation, operating costs are going to be covered by the incomes from the CASD activities, e.g., counselling fees, training fees, conference/seminars fees, other projects funding (national, international). CASD could apply with relevant partners for a European application, especially Horizon European CSA, too.

The diverse representation of international and European partners within the project provides an ideal platform to launch such an initiative. The SILVANUS project will also extend invitation to the European community of users and liaise with CSA project to build synergies with other projects.

The CASD **Founding Agreement** is under preparation by a Slovak commercial lawyer now. In the upcoming SILVANUS Plenary meeting in Athens (29 November – 1 December 2022), it is going to be introduced and discussed with the SILVANUS partners.

6 Exploitation Plan for SILVANUS Platform Activities – Current Status

6.1 Exploitation Plan

This document is the initial report within D10.2 of the Integrated Technological and Information Platform for wildfire Management (SILVANUS) project 101037247.

Its key objective is to initially describe the project exploitation plans and offer recommendations for SILVANUS consortium members to undertake, that will enrich the scope SILVANUS project results in targeting the commercial needs of the wildfire management and forest landscape management solutions. The recommended actions will include the need for sustainability of SILVANUS components beyond the scope of the project to be able to reach a high Technology Readiness Level (TRL) solution.

This plan is conceived to conduct an effective transfer to the market of the project developments. As a living document, it would be updated with any relevant changes coming from a twofold approach: both consortium (partners and technologies) and the market & stakeholders.

In detail, the objectives of this document are:

- To identify the project's exploitable items from both perspectives:
  - Commercial
  - Non-commercial
- To describe the initial joint and individual exploitation plans.
- Set up the base lines for a sustainable exploitation strategy.

As mentioned before, the document and its inputs will evolve during the project progress. Below is depicted the overall roadmap for the business-related activities to be conducted during SILVANUS:

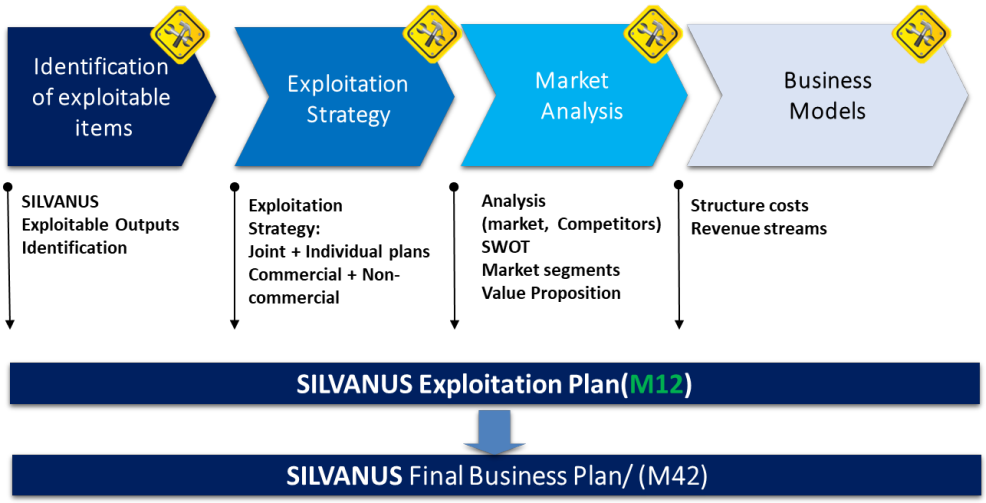


Figure 53 SILVANUS exploitation and business strategy

The extensions on this deliverable D10.2 will be D10.3, D10.4 and D10.6. Each iteration will include additional progress to the project business activities identified in the roadmap above.

6.2 Exploitable Items

The adoption of user centric approach has enabled the SILVANUS platform to be conceptualised and designed addressing the needs of the stakeholders. The extensive review of user needs as documented in D2.1, has provided the consortium partners with necessary insights into the challenges of wildfire management requirements across the stakeholders. A high-level summary of the different core components to be developed, deployed, and validated is presented below. As an integrated technology platform, SILVANUS components will be deployed across three types of infrastructure namely (i) cloud; (ii)

edge-cloud and (iii) far-edge. For each stage of the deployment, different business needs will be addressed resulting in customised exploitation plan for each of the project results.

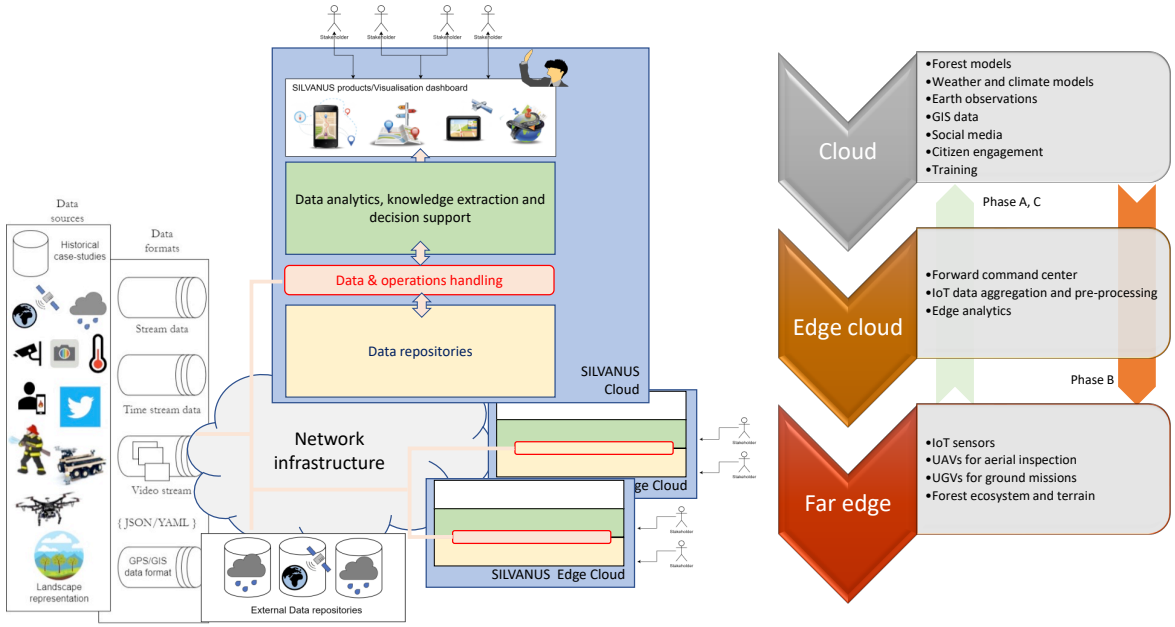


Figure 54 SILVANUS platform

The following section enumerates all different project results eligible to be exploited and commercialised.

These results can be categorized in four (4) groups:

- **Software/developments.** This group makes a reference to all tangible project results delivered as a demonstrable component to the stakeholders.
- **Services**. This group will consolidate project results which has the potential to result in commercial services (direct or side-services) to be offered to the end users of the project solutions, which aims to improve customers' effective use of SILVANUS results.
- **Knowledge**. This group includes the project know-how (described in detail in deliverables and papers), methodologies or the SILVANUS platform architecture.
- **Brand**. Positioning of the SILVANUS name as a flagship reference within the wildfire and forest landscape management community for wildfire Management services market.

Table 8 groups the project results following a two-fold approach: commercial and non-commercial exploitation. All these results will widely detailed in the corresponding individual exploitation fiches that each partner is generating for that purpose.

Table 8 SILVANUS exploitable results

Commercial exploitation	Non-commercial exploitation

• **Software/Developments**
  ▪ **SILVANUS platform (as a whole)**
  ▪ **SILVANUS components (sole components)**
• **Services built around the SILVANUS solutions**
• **Knowledge (Know how)**
  ▪ **Training (tailor made courses)**
• **Brand. SILVANUS as a market reference**
	• **Knowledge (Know how)**
	  ▪ **Training**
	  ▪ **Re-use of results in other projects**

Following the need to establish a systematic approach for aggregating the feedback from SILVANUS consortium on the potential for exploitation of project outcomes, a well detailed exploitation fiche template has been generated at this initial stage of the project and has been distributed to all consortium partners. By the time this report is written the consortium partners are completing and submitting the relevant report to the exploitation manager. The information included in the template will reflect the technical development of the project results, as being carried out across WP2-WP8.

SILVANUS

Exploitation fiche

Project Number	
Project Title	
Programme	

Deliverable type	Report | Prototype | Demonstrator | Other
Dissemination level	PU | CO
Submission date	

Responsible partner	
Editor	
Revision	

The SILVANUS project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101037247.

4.1 Value proposition

Problem statement	Describe the problem statement that your solution is addressing and
Benefits	Indicate: • Benefits for the target users if adopting your solution • Indicate the added value for the target users (Why you are different and worth buying)
Unfair advantage	What is it that gives you an advantage in front of the competition?

4.2 Target users

Target user 1	Describe which is the intended user(s) of your solution, considering: • Market addressed • Specific industry more suited for the component • Specific size of organization being targeted (e.g. SME, SMB, Large company) • Geographical area • Role in the organization (e.g. security analyst, CIO, researcher, etc) • Other segmentation criteria
Target user 2	
...	

4.3 Competition

- Indicate similar existing solutions in the market or in the R&D field.
- For each identified competitor, indicate its strengths and weaknesses.

Figure 55 SILVANUS exploitation fiche

Among other information, the fiches aim to cover, as described the below, the related areas:

Component name	Name of the component
Functionality	Describe briefly the functionality of the component.
Key features	
Expected TRL	
Licence	
Owner	
Component manager	
Problem statement	
Benefits	
Unfair advantage	
Target user 1	
Target user 2	

#	Name of competitor solution	Company	Strenghts	Weaknesses	Solution unfair advantage
1					
2					
3					

Figure 56 SILVANUS exploitation fiche in detail

In order not to extend unnecessarily this document, some example of these exploitation fiches, generated by the partners, have included as part of Annex I.

6.2.1 Software/Developments

This section recounts in Table 9 all the minimum viable products (MVP), classified and described in the context of User Products (UPs), which have been identified by the consortium and initially described in D8.1 Report on SILVANUS reference architecture. By the time this document was written, partners were also generating the exploitation fiches of all individual tangible results or developments of the SILVANUS project. As mentioned above, all these project's components are categorized as eligible for commercial exploitation as they can effectively deliver a concrete value proposing to the final adopters or potential customers.

As an initial approach to the project MVPs, this list may vary once the technology developments evolve during the project.

Table 9 SILVANUS MVPs & User Products

Type of License	Tool Name	Owner	License name
TBD	**Biodiversity profile mobile application**	VTG	TBD
TBD	**AR/VR training toolkit for trainers**	SIMAVI	TBD
TBD	**Citizen's engagement programme using mobile app**	MDS	TBD
TBD	**Fire danger risk assessment**	CMCC	TBD
TBD	**Fire detection based on social sensing**	CERTH	TBD
TBD	**Fire detection from IoT devices**	CTL	TBD
TBD	**Fire inspection using UAVs and UGVs**	CSIRO/TRT/3MON	TBD
TBD	**Fire spread forecast**	EXUS	TBD

6.2.2 Services

Understood as the main services provided to the potential adopters of the solution. The SILVANUS project postulates its commercial offer with eight (8) different services:

Table 10 SILVANUS service offering

Type of License	Tool Name	Owner	License name
TBD	Participatory approach methodology to consolidate needs and requirements form the stakeholders	TUZVO	
	Review and assessment of forest landscape models affecting the causes of wildfire ignition	AUA	

Type of License	Tool Name	Owner	License name
	Weather forecast and prediction models affecting the spread of wildfire	CMCC	
	Methodologies for modelling data driven approach to estimate fire spread	EXUS	
	Modelling of biodiversity index metrics considering socio-economic and ecological resilience of forests	AMIKOM	
TBD	Wildfire impact assessment framework	Z&P	
	Training methodology using AR/VR for wildfire response and rescue operations	SGSP/SIMAVI	
	Citizen engagement methodology for promoting awareness on wildfire impact	HB	

Alongside to these main services, the SILVANUS project will be in the position to also provide a set of side services such as: consulting and advisory services, system integration and deployment, training and maintenance, help desk and support among others. These side services can be included as part of the commercial offers and are eligible to be provided by one or several partners depending on their interest to participate in the commercial offer.

6.2.3 Knowledge

This section collects all non-commercial exploitable items identified, ranging from knowledge transfer to Master courses or PhD thesis. Table 11 shows the so far identified examples:

Table 11 SILVANUS non-commercial exploitable items

Activities	Benefits	End user
Knowledge Transfer	Knowledge Transfer of the project results to other EU projects	Other EU projects
PhD thesis	Use of the some of the project assets (. Also collaborated with the project pilots	Academic community
Master courses	Related to the language, and pilot scenarios. The courses can be related to some of the project assets.	Students enrolled in MsC programs
Talks, Papers	A detail description of all these non-commercial activities will be described in the dissemination report	Industry and academia

6.2.4 Brand

One of the most valuable non-tangible results of the project is the brand. When a brand is widely recognised it can help differentiating a product from other market solutions. The project logo can be an example of the identifiable elements of SILVANUS brand.

Based on the planned project presence and interaction with different stakeholders from different industries along the whole project dissemination and communication activities, the aim of the project is to become a recognisable solution among a fire prevention ecosystem audience. A fine grain detail of this dissemination activities can be found in this very same report in Section 2.

6.3 Individual exploitation

6.3.1 Individual exploitation plans

This section provides a description of the approach of SILVANUS consortium members to the individual exploitation of their exploitable items and developments of the project.

The consortium has generated a template to be fulfilled by each consortium member with legitimate expectation to individually exploit their project results. The template is constructed under the form of a questionnaire with three main domains with several questions (see Table 12)

- **Profile and motivation**. To include a brief description of each participant, their motivations to join the consortium and some background tips.
- **What and why**. This part describes the assets developed during the project, what is the interest of the organization in these assets and what benefits for the other of participants.
- **Roadmap with timeline**. This part includes a description of the timeline of the assets' adoption, how the impact will be measured and a brief competitors' analysis.

Considering the consortium partners backgrounds are diverse and come from different domains (industrial partners, academic and research partners), this template covers a multi-angle and very wide perspective of the individual exploitation strategy.

This initial version is eligible to evolve during the project lifespan. A final iteration will be eventually included, if major changes appear, in the final report D10.6 SILVANUS final report on dissemination and exploitation due by M42.

Table 12 SILVANUS individual exploitation plan questionnaire

	QUESTIONS
PROFILE AND MOTIVATION	**1. Partner profile:** brief introduction about your organization, explaining your background (technical or business) and what is your field of operation.
	2. Your motivation to participate in the project and commitment: why did you join consortium and your role in the project.
	3. Means to achieve your objectives: show that you have necessary background (resources, dedicated department or working group, infrastructure).
	4. Opportunity which appeared/appears: your participation is the result of the real need of your customers (for industrial partners) or internal needs (for user partners). For academic partner mention if SILVANUS is in line with other projects (continuation) and reuse of know-how. Are there any other opportunities in the pipeline when project finished?
WHAT AND WHY	**5. Exploitable assets and results:** Describe what assets (whether this involves specific components, tools, knowledge, methodologies, skills, etc.)
	6. Rationale: Explanation of why you are interested on those assets (the added value they provide), how do you plan to exploit them (academically or industrially: e.g. provide as commercial solution, certification services, standardization, consultancy, further R&D, positioning)
	7. Your Value Proposition towards Joint Exploitation of SILVANUS: what do you expect from project partners, what benefits will you deliver to the rest, what components/interest do you share with other partners.
ROADMAP WITH TIMELINE	**8. Roadmap: the timeline plan you have for using those assets:** (what, where, to who, e.g. meeting with board to present them in 6 months, inclusion in your portfolio etc.). Provide concrete actions for months M36-M42 and maybe for after the project.
	9. Measurement: how do you plan to measure impact of planned actions for the last year of the project
	10. Positioning: if you can provide any comparison to competitors or alternatives to your asset or market figures as a reference point it would be more than appreciated

By the time this document is written several partners already provided their initial individual exploitation plans, included in this document in Annex III.

6.4 Joint exploitation

6.4.1 Intellectual property rights (IPR)

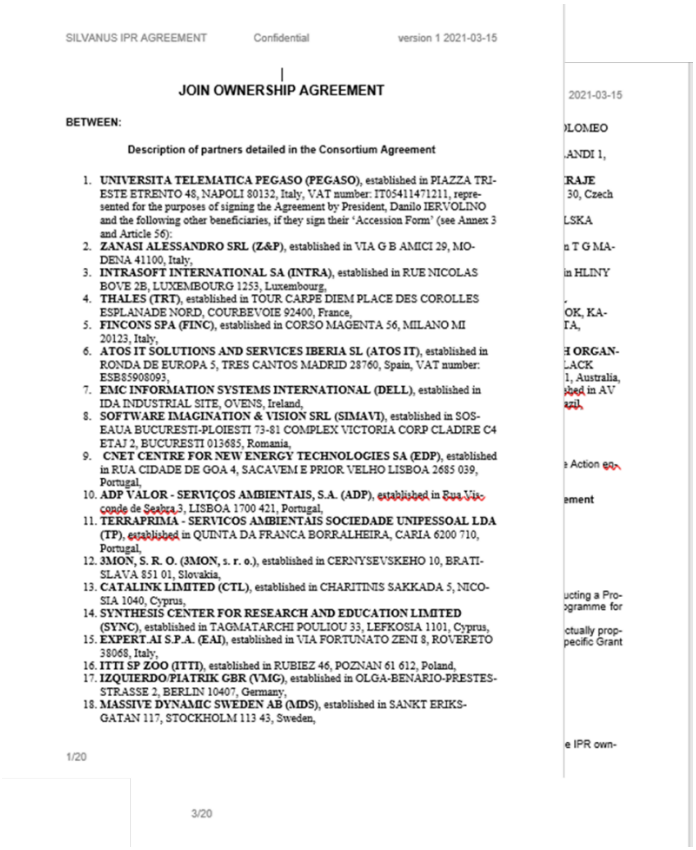
As part of the activities conducted by the consortium with a special focus on the joint exploitation of SILVANUS project results, the consortium partners have been working in the creation of a document which describes in detail the **Intellectual Property Rights (IPR)** of the project results.

The main purpose of this document, articulated under the shape of an agreement, is to reflect the distribution (in %) of the intellectual property rights per component.

The rationale of this document is to generate, coordinate, validate and agree the distribution of the IPR ownership that each party (all consortium partners with one or mor exploitable items eligible for commercial exploitation) claims to have been developed during the project itself.

The final output of this action (a signed agreement by the consortium partners) will be eventually used as a basis for the compensation schemes under the shape of a commercial agreement.

By the time this document is written, the agreement is under discussion as a first step prior to validation by the partners. After that, the percentage of ownership should be also agreed and eventually push the document through the final step - the signature process of a legal representative of each of the organization.



SILVANUS IPR AGREEMENT Confidential version 1 2021-03-15

JOIN OWNERSHIP AGREEMENT

BETWEEN:

Description of partners detailed in the Consortium Agreement

1. **UNIVERSITA TELEMATICA PEGASO (PEGASO)**, established in PIAZZA TRIESTE ETRENTO 48, NAPOLI 80132, Italy, VAT number: IT05411471211, represented for the purposes of signing the Agreement by President, Danilo IERVOLINO and the following other beneficiaries, if they sign their 'Accession Form' (see Annex 3 and Article 56):
2. **ZANASI ALESSANDRO SRL (Z&P)**, established in VIA G B AMICI 29, MODENA 41100, Italy,
3. **INTRASOFT INTERNATIONAL SA (INTRA)**, established in RUE NICOLAS BOVE 2B, LUXEMBOURG 1253, Luxembourg,
4. **THALES (TRT)**, established in TOUR CARPE DIEM PLACE DES COROLLES ESPLANADE NORD, COURBEVOIE 92400, France,
5. **FINCONS SPA (FINC)**, established in CORSO MAGENTA 56, MILANO MI 20123, Italy,
6. **ATOS IT SOLUTIONS AND SERVICES IBERIA SL (ATOS IT)**, established in RONDA DE EUROPA 5, TRES CANTOS MADRID 28760, Spain, VAT number: ESB85908093,
7. **EMC INFORMATION SYSTEMS INTERNATIONAL (DELL)**, established in IDA INDUSTRIAL SITE, OVENS, Ireland,
8. **SOFTWARE IMAGINATION & VISION SRL (SIMAVI)**, established in SOSEAUA BUCURESTI-PLOIESTI 73-81 COMPLEX VICTORIA CORP CLADIRE C4 ETAJ 2, BUCURESTI 013685, Romania,
9. **CNET CENTRE FOR NEW ENERGY TECHNOLOGIES SA (EDF)**, established in RUA CIDADE DE GOA 4, SACAVEM E PRIOR VELHO LISBOA 2685 039, Portugal,
10. **ADP VALOR - SERVIÇOS AMBIENTAIS, S.A. (ADP)**, established in Rua Visconde de Seabra 3, LISBOA 1700 421, Portugal,
11. **TERRAPRIMA - SERVICOS AMBIENTAIS SOCIEDADE UNIPESSOAL LDA (TP)**, established in QUINTA DA FRANCA BORRALHEIRA, CARIA 6200 710, Portugal,
12. **3MON, S. R. O. (3MON, s. r. o.)**, established in CERNYSEVSKEHO 10, BRATISLAVA 851 01, Slovakia,
13. **CATALINK LIMITED (CTL)**, established in CHARITINIS SAKKADA 5, NICOSIA 1040, Cyprus,
14. **SYNTHESIS CENTER FOR RESEARCH AND EDUCATION LIMITED (SYNC)**, established in TAGMATARCHI POULIOU 33, LEFKOSIA 1101, Cyprus,
15. **EXPERT.AI S.P.A. (EAI)**, established in VIA FORTUNATO ZENI 8, ROVERETO 38068, Italy,
16. **ITTI SP ZOO (ITTI)**, established in RUBIEZ 46, POZNAN 61 612, Poland,
17. **IZQUIERDO/PIATRIK GBR (VMG)**, established in OLGA-BENARIO-PRESTES-STRASSE 2, BERLIN 10407, Germany,
18. **MASSIVE DYNAMIC SWEDEN AB (MDS)**, established in SANKT ERIKSGATAN 117, STOCKHOLM 113 43, Sweden,

1/20

3/20

Figure 57 IPR agreement draft version v0.1

The main outcome of this agreement is a table with the percentage of ownership per component and partner. In that sense the table takes into account to different types of participants:

- Lead developers: main contributors to the development of a component/asset
- Contributing parties: supporting the lead developer as a side contributor to the development of a component/asset

The distribution of this intellectual property ownership can be summarized as follows:

- A single partner developing the component (100% of the IPR assigned).
- Two or more partners contributing (% distributed among all contributors based on their individual efforts) in the development of the component

Name of component	Lead developer	Contributing parties	IPR %
			0%
			XX%
			100%
			100%
			100%
			100%

Figure 58 IPR agreement % distribution table example

A draft version of this document is attached in this document as Annex II.

6.4.2 Legal structure

One of the discussions to be held by the consortium is to decide whether or not the viability of the setup of a new legal structure will effectively transfer the project results to the market.

This establishment of a new legal structure could be under the shape of the main possible legal partnership structures, namely:

- **New Legal Entity or Foundation**: a new legal entity responsible for any of the commercial operations.
- **Joint Venture** is a business agreement in which two or more partners acting together and sharing resources in pursuit of a business or in relation to a specific project.
- **Supply Chain**: consists of a number of partners that contribute to the delivery of a component, product or service with no central structure.

At this early stage of the project, it is premature to initiate this discussion. The consortium will decide the convenience of the set up of a new legal structure at a later stage when additional information is available (e.g. maturity level of the project developments and partner approach to the commercialization of the project results).

6.4.3 Exploitation agreement

Regardless of all the above-mentioned options, there is an intermediate option for the commercial collaboration of the consortium partners under the shape of an exploitation or commercialization agreement. This agreement is flexible enough (bilateral or multilateral) to facilitate a rapid tackle of any commercial opportunity the consortium may identify.

This exploitation agreement will help to cope with any potential commercial opportunity that may appear, using the document as a legal basis validated by the participants.

The agreement describes in detail the different roles and responsibilities of each of the participants in the event of a commercial opportunity. It also makes reference to the legal aspects such us: termination and early termination, liability, duration, among others.

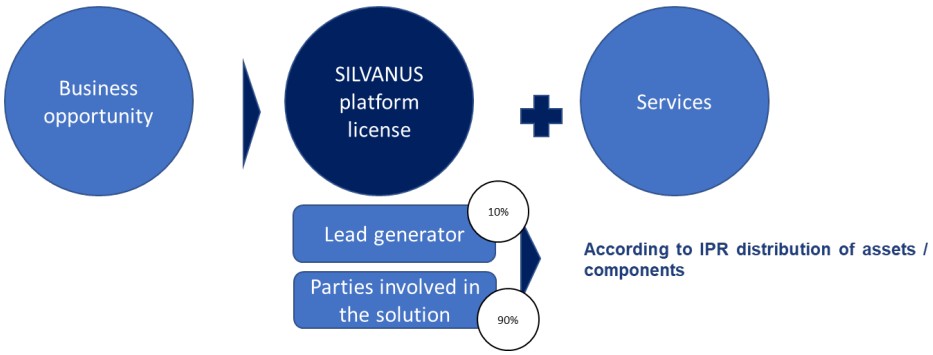


Figure 59 SILVANUS compensation scheme

As part of the exploitation agreement, the result of the IPR agreement (ownership table) will be included, once approved by the partners, in the compensation scheme to facilitate the benefits distribution among all partners participating in a commercial opportunity, as depicted in Figure 59 SILVANUS compensation scheme

The current version of this agreement is under generation and in an early stage. Comments from partner will enrich the legal text. A mature version of this agreement is expected to be ready for validation during the second year of the project and will be included as part of the content of the second dissemination and exploitation report as an annex.

6.5 Next steps

In the next iterations of the annual report, the consortium will pay special attention to other relevant topics such as the **Business Model Generation**, generated under the umbrella of the Canvas methodology. This is a quite intuitive and visual approach under the shape of nine (9) building blocks, which represent the main nine dimensions of any business model, summarized below:

- Value proposition
- Customer Segment
- Distribution channels
- Customer Relationships
- Revenue streams
- Key activities
- Key Resources
- Key Partners
- Cost Structure

Market analysis will also be analysed once the commercial offer is a bit clearer. An external and internal analysis will be conducted including both the demand and the offer sides. Also, a review of the initial SWOT analysis will be performed within the Standards and Compliance for Interoperability of SILVANUS Platform.

This new report version will also address all progress on the activities initiated in the first report and how they could support an efficient transfer to the market of the project results.

7 Standards and Compliance for Interoperability of SILVANUS Platform – Current Status

The overall complexity of the SILVANUS platform with the integration of several heterogeneous data sources and software/hardware components integrated relies extensively on the need to comply with international standards for extensively interoperability. However, in the context of forest fire management, it is vital to note the notion of standards extend beyond software/hardware and necessitates the consideration of standard operating procedures in the event of a wildfire. The need to coordinate effort between multiple fire fighter teams, who are often combating the fire in isolation needs to be considered. Additionally, the need to establish human evacuation and safety procedures also play a vital part in damage limitation caused by wildfires. Therefore, for the rest of the chapter, a balanced approach between the need for synchronising between operational procedures and the identification of international standards is being reported. The overall operational procedures and relevant standards have been consolidated across three phases of the project namely (i) Phase A – prevention and awareness raising; (ii) Phase B – detection and response; and (iii) Phase C – rehabilitation and restoration. Each of the phases have been outlined below in relevant sub-sections.

7.1 Fire Prevention and raising awareness (Phase A) activities of SILVANUS

The study was focused by first analysing the state of the art in Italy and then extended to the European and world panorama. At present, the study with regard to Italy, where several Pilots are present, has been carefully and thoroughly completed. The European panorama is being completed and developed also on the basis of what WP2 and WP3 are highlighting in which the objective is to gather environmentally sustainable and resilient forest models, as well as to provide a framework for the assessment, mitigation of forest fire development and impact, study and selection of forest landscape models and specifications to be adopted in SILVANUS pilot sites, identifying and describing approaches that incorporate multiple spatial and temporal processes, such as biotic and abiotic disturbances, as well as human management and interventions, and provide information that can be used by the general public on the broad topic of forest fire prevention.

	Total fires		Fires due to human causes		
	% fires due to natural causes	% due to human causes	% intentional fires	% fires due to negligence	% fires due to unknown causes
Spain	4	96	55	23	15
France	2	98	21	77	<10
Greece	4	96	19	21	51
Italy	1	99	26	54	19
Portugal	1	99	26	19	54
Turkey	11	89	9	47	31
Average North Med.	**4**	**96**	**26**	**40**	**28**

Figure 60 Average number of fires and area affected per year between 2009 and 2018. Source: WWF from the official statistical series of the Mediterranean countries and the European Forest Fire Information System (EFFIS) [Data source: report "Mediterranean on fire," Antonello Pollutri ed. WWF, July 2021]

The Italian State Forestry Corps (SFC), on behalf of the Government, conducted an in-depth investigation into the main causes of forest fires, in order to outline an articulated picture of the phenomenon and undertake actions aimed at preventing and fighting them. The investigation covered the entire national

territory and was carried out by the SFC with the collaboration of the Forestry Offices in the ordinary statute Regions and the Fire Services of the Autonomous Regions and Provinces. Five categories of causes were considered: natural, accidental, negligent, intentional, and doubtful, which were broken down into a range of reasons in relation to the social, economic and production profiles of the various territories. A study of all the fires that have broken out on the national territory since 2000 shows that the percentage of arson fires exceeds 50%. This is followed by fires of a culpable nature. The figure that puts natural fires at 1% is very significant. At an international level, several associations and some important public companies have committed themselves to the issue of fire prevention. As far as associations are concerned, it is important to mention the example of WWF, which recently conducted an important study 'Mediterranean in flames' (available online) on the causes of fires. This study shows that if fires are to be reduced, both in number of ignitions and in terms of hectares of land burned, action must be taken on several fronts; that is, reducing the accident rate and ending impunity, reducing the flammability of the landscape, improving civil defence capacity, improving fire management governance, and combating climate change.

At a strategic level, again with a view to fire prevention, there are various solutions. These include, characterisation of the historical fire regime and classification of fire types with the identification of critical risk thresholds, risk mapping based on hazard and vulnerability analysis also in relation to the ecosystem services provided by the forest, etc. In general, it can be said that the prevention plans are structured as listed below. It should be clarified that this study is the result of the work carried out within the Silvanus Consortium within the framework of WP2 and WP3.

7.1.1 Fire Danger Prediction and Warning Systems

This section was drafted in coordination with WP2 and WP3, which aimed to gather environmentally sustainable and resilient forest models, as well as to provide a framework for assessment, mitigating the development and impact of forest fires, and studying and selecting forest landscape models, and related specifications to be adopted in SILVANUS pilot sites by identifying and describing approaches that incorporate multiple spatial and temporal processes, such as biotic and abiotic disturbances, as well as human management and interventions, and provide usable information to the general public on the major issue of forest fire prevention. Forest fires are caused by certain factors that induce conditions favourable to fire (predisposing factors) and by other factors, mainly related to human behaviour, that trigger combustion (determining factors). Hazard prediction methods are based on the relationship that has been found between predisposing variables and fire initiation. Precipitation, wind, low humidity, high air temperature and atmospheric instability are among the basic meteorological variables for forecasting, which expresses the fire predisposition of a given area over a defined period. Fire danger prediction methods, depending on their scientific approach, can provide an indication based on measurements taken on the same day, or also take into account a previous period of varying extent. Fire danger forecasting is an activity that considers the temporal variation of the danger, and therefore focuses less on constant environmental factors in the medium to long term and more on variable factors, on the basis of which it allows prevention activities to be modulated and sized over time.

Hazard forecasting allows, in other words, the timely preparation of preventive actions and manifests its usefulness in numerous areas of combat and prevention. Spotting teams and means spotting fires is an activity to be carried out, with different technical methods, when the probability of a fire is high. Effective forecasting of the danger can offer the possibility of adjusting the spotting, especially over vast territories where conditions of maximum fire spread often do not occur uniformly. Sighting by aerial means: this type of sighting is carried out by aerial means and is especially suitable where there are vast forest areas with poor road connections and low anthropic pressure, as it allows large areas that cannot be easily reached from the ground to be controlled.

These conditions do not exist in Italy, but where the terrain is very rugged and with frequent valley incisions, it can be very effective. Some aircraft, capable of carrying small loads of water or retardants, can directly extinguish sighted outbreaks: this technique, which is being introduced in Italy even though it has not yet

become established, is known as armed spotting. Sighting from the ground: if the area to be sighted is easily travelled, with reliefs from which to extend the view over large areas, it is preferable to carry out sightings from the ground using the most varied methods and means. Sighting from the ground can be mobile or fixed.

Choice of forecasting method: In order to define which method is best suited to the territorial reality, the relationship between meteorological factors and the degree of fire danger must be taken into account, considering their continuous variation in space, determined by the succession of different stationary conditions (vegetation, soil, orography, etc.). Some of these variables change with the season, with wind sometimes taking on the role of the main predisposing factor, while at other times soil water balance or fine fuel moisture may be more important.

Identification of danger thresholds: meteorological danger indices are normally expressed by continuous or discrete numerical variables and the numerical data is made to correspond to quality classes to which different danger levels correspond. This allows the situation to be grasped more immediately, especially by operators or the public. Sometimes, the qualitative classification is proposed by the authors themselves, while in other cases, especially with physically calibrated indices, it is appropriate to define index thresholds for different hazard classes, suitable for the area in which the forecast is to be made.

Network of meteorological stations: the calculation of fire danger forecast indices is based on measurements of point meteorological variables, obtained from a network of meteorological stations that must be placed in precise locations and equipped with specific sensors.

The number and location of the necessary meteorological stations depend on the meteorological scenarios that characterise the area during the period of maximum fire frequency: it would therefore be advisable to configure the survey network only after having carried out a specific study of the meteorological and fire risk situation in the area.

7.1.2 For prevention purposes, drone applications are becoming more widespread in several European countries. In particular:

Italy: a solar-powered drone has been developed in Italy that can fly autonomously for eight hours and automatically report even very small fires (30 centimetres in diameter). It can scan more than 500 hectares of land every hour and requires no dwell time due to battery life (operating altitude: 120 metres - flying speed: 40 km/h). Developing companies: New Production Concept Srl (Npc) and Vector Robotics.

Poland: Hybrid electric drone powered by hydrogen fuel cells. 2.5 hours of flight time independent of the time of day and the sun. Allows work in a static position. Almost silent operation of an electric platform. (link: www.harrisaerial.com/harris-carrier-h6-hydrone).

They have the great advantage of being environmentally friendly and in many cases low-noise (resulting in almost zero disturbance to local fauna). Their disadvantage, however, continues to be the difficulty of recharging in the event of overflights lasting longer than the battery life.

However, the policy of raising public awareness continues to be of particular importance in the logic of associations and governments. Indeed, in many countries, a great deal of energy is expended by both voluntary associations and government bodies to educate the public on the practices needed to prevent fires from starting and spreading.

7.1.3 STANDARD AND REGULATIONS RELATED TO PHASE A

It is considered appropriate, in order to be able to guarantee the interoperability of standards within the SILVANUS platform, to devote a paragraph to the present standards in the field of fire prevention.

Below is a list of international standards that are recognised and from which very important information can be drawn for the development of the platform.

Table 13 Standards and regulation in fire prevention

Standardization body	Standard Code	Standard Title	Description
DIN	DIN 14011	Firefighting and fire protection - Terms and definitions	Aid in the development of coordinated firefighting procedures using simple and universally recognised language
ITU	ITU-R BT.1774-2	Use of satellite and terrestrial broadcasting infrastructure for public warning, disaster mitigation and relief	very useful standard for facilitating collaboration between the different teams involved in rescuing the population, as well as in fighting, in the event of a large fire threatening built-up areas
ITU	ITU-R S.1001-2	Use of fixed satellite service systems in the event of natural disasters and similar emergencies for alarm and rescue operations.	very useful standard for facilitating collaboration between the different teams involved in rescuing the population, as well as in fighting, in the event of a large fire threatening built-up areas
ITU	ITU-T E.119	Requirements for Security Confirmation and Disaster Relief Message Service	very useful standard for facilitating collaboration between the different teams involved in rescuing the population, as well as in fighting, in the event of a large fire threatening built-up areas
ITU-T	ITU-R M.1042-3	Disaster communications in satellite and amateur services	very useful standard for facilitating collaboration between the different teams involved in rescuing the population, as well as in fighting, in the event of a large fire threatening built-up areas
ITU-T	ITU-T H.785.0	Digital Signage: Requirements for Disaster Information Services	very useful standard for facilitating collaboration between the different teams involved in rescuing the population, as well as in fighting, in the event of a large fire threatening built-up areas
ITU-T	ITU-T E.108	Requirements for mobile messaging service for disaster relief	very useful standard for facilitating collaboration between the different teams involved in rescuing the population, as well as in fighting, in the event of a large fire threatening built-up areas
ITU-T	ITU-T Y.4102	Requirements for IoT devices and the operation of IoT applications during disasters.	very useful standard for facilitating collaboration between the different teams involved in rescuing the population, as well as in fighting, in the event of a large fire threatening built-up areas
ITU-T	ITU-T X.1055	Guidelines for the management and risk profile of telecommunications organisations	very useful standard for facilitating collaboration between the different teams involved in rescuing the population, as well as in fighting, in the event of a large fire threatening built-up areas

ISO	ISO 31000	Risk management -- Principles and guidelines	is a guide that provides general principles and guidelines for risk management. It can be used by any public, private or social organisation, association, group or individual, and is not specific to any industry or sector. ISO 31000 can be applied throughout the entire life cycle of an organisation, and can be adopted for many activities such as defining strategies and decisions, operations, processes, functions, projects, products, services and assets. It can also be applied to any type of risk, for both positive and negative consequences. Being a guideline, it is NOT certifiable.
ISO/AWI	ISO/AWI 16641	Guidelines for preventive measure against fires in rural and wildland areas	This document is intended to provide guidelines for preventive measures for fighting fires in rural and wildland areas, to protect life and property, thus helping to reduce social, economic, and environmental damages and losses. This document is intended to be applied to rural and wildland areas subject to the occurrence of fires, as for instance public or private environmental preservation areas, areas destinated to agriculture and livestock, and tree plantations areas for industry.
ISO/IWA	ISO/IWA 31:2020	Risk management	Guidelines on the use of ISO 31000 in management systems
ISO	ISO 22328-1:2020	Safety and resilience - Emergency management	General guidelines for the implementation of a community-wide early warning system for disasters
ANSI	ANSI/ASTM E 1546	Guidance for the development of fire hazard assessment standards	Standard for fire risk management in urban and rural areas
NFPA	NFPA 1141	Standard for Fire Protection Infrastructure for Land Development in Wildland, Rural, and Suburban Areas	This standard provides requirements for the development of fire protection and emergency services infrastructure to make sure that wildland, rural, and suburban areas undergoing land use changes or land development have the resources and strategies in place to protect people and property from fire dangers and allow fire fighters to do their jobs safety and effectively.

7.2 Fire detection and response (Phase B) activities of SILVANUS

7.2.1 Fire Brigade

At the international level, the various national fire brigades are involved in:

a) cooperation with the regions in fighting forest fires with the help of ground and airborne means;
b) b) reinforcing the regional contingent of Fire Fighting Operations Directors (DOS) by qualified Fire Brigade personnel
c) coordination of fire-fighting operations, in agreement with the regions, also with regard to the deployment of voluntary fire-fighting groups (Anti Incendi Boschivi, AIB)
d) organisation and dispatch of dedicated forest fire-fighting teams
e) Participation in the national and regional coordination structure;
f) AIB assessment, research and experimentation activities (operational assessment of forecasting systems, analysis of fire risk indices and their applicability, study of fire spotting and monitoring systems, study of prescribed fire techniques, joint development of Decision Support Systems for the management of events, etc.)
g) Collection, processing and transmission of daily and periodical data on fires and the establishment and maintenance, on this basis, of an AIB database, according to the indications and needs of the Region.

7.2.2 Local authorities with forest fire-fighting competences

Each local authority with ~~AIB~~ specific expertise in fire prevention and firefighting in forest nature reserves has structured itself or is structuring itself to cope with active firefighting by setting up its own AIB active firefighting service, based on the activity of the teams of Civil Protection Volunteers with AIB specialities, operationally coordinated by the necessary reference figures. These teams may belong to the organisation, to municipal or inter-municipal groups made available to the organisation through a specific deed with the relevant municipalities, or to Voluntary Associations affiliated with the organisation itself or formally recognised by it. In all the territorial realities distributed throughout the country, the forest fire-fighting bodies are in close contact with the regions to which they belong.

7.2.3 Volunteer Corps

Among those operating in civil protection, the volunteer corps plays a fundamental role as a precious resource and a recognised instrument of citizen participation in tackling calamitous events.
It is therefore particularly decisive to provide volunteers with specific technical and operational training aimed at improving their ability to intervene on the territory, considering that civil protection activities take on the meaning of a public service aimed at safeguarding citizens, property, infrastructures and the environment from damage caused by calamitous events.

7.2.4 Air fleet

Internationally, air fleets are operated by fire brigades, civil protection systems and, in some cases, national armies. The air fleet consists of:
- Canadair CL-415 aircraft;
- Erickson S-64 helicopters;
- Aircraft belonging to other State Administrations (such as the Italian Army, Navy, National Fire Brigade and Harbour Offices) and temporarily employed by the Civil Protection Department for AIB;
- Écureuil AS 350 B3 helicopters;

For the purposes of AIB combat, State aircraft can be used for activities of:
- Reconnaissance/Surveillance;
- Armed Reconnaissance;
- Containment;
- Suppression;
- Clearance

7.2.5 Backfire and active fire and selective extinction

Counter-fire: a very widespread technique at European level for fighting fires, it involves the use of flame fronts of varying intensity, which consume fuel before the fire front passes and are aimed at definitive extinguishing, fire management or team safety. This type of firefighting must be carried out under the control of the Director of Extinguishing Operations, if the need arises, using specific techniques by specially trained and educated personnel with suitable equipment.
Selective extinction: Recent planning approaches tend to privilege and use the resistance and resilience characteristics of stands as a method of prevention and protection of forest ecosystems. These approaches direct prevention interventions by differentiating them in terms of objectives and methods in relation to forest characteristics. Consequently, the approach to extinction also tends to vary. In fact, the Fire Control criterion, which considers all active pest control interventions of equal importance and in any case, there is a tendency towards complete and immediate extinction, is superseded.

Following the maturation of concepts that highlight the differentiation of the territory and forest characteristics, it is necessary to set up extinction suited to fire smart management, modulating it according to the location and environmental requirements. Active control thus understood can be called 'selective extinction'. In implementing it, the use of resources to be deployed is defined. While in some cases total extinction will be appropriate, in others it may be acceptable for the flame front to be only partially reduced or even only guarded. Selective extinction can be most effective in areas where prevention has been carried out. This type of approach to active firefighting must involve highly specialised figures both in the field of forest firefighting and in the knowledge of forestry and ecology.

Table 14 Innovations in the forest fire response market

Technology / procedure	Country	Partner	Status or link	Description	Advantages	Handicap
UGV firefighting capabilities	Croatia	Croatian Firefighting Association	Operational	Ground monitoring and fire fighting vehicles designed to extinguish fires in life threatening and inaccessible areas. The vehicles are equipped with the latest firefighting technologies.	No danger for fire-fighters Integrated newest technologies	Not accessible in short time Needs pesial education and training to use
Modelling wildfire behaviour	Croatia	Croatian Firefighting Association	In development	GIS based wildland fire spreading simulator	Estimating of direction and scope of wildland fire	Not implemented in HVZ applications Needs new functionalities
Technology: Engage IMS CAD	Greece	KEMEA	Operational. Link: https://workspace.fire-in.eu/en/challenges-resources/reviewed-solutions/engage-ims-cad-	ENGAGE IMS/CAD (Incident Management & Computer Aided Dispatch) ENGAGE IMS/CAD is an integrated call centre solution for public safety organisations that provides all the tools for call and incident management, computer	Resource and response planning, resource management, near real-time tracking of all resources and their status,	Resources not yet integrated by other agencies (under tender)

			incident-management-computer-aided-dispatch	aided dispatch, operational resource management and data integration of disparate critical information. By combining advanced search, filtering of current and historical data and geo-correlation of data, operations are enhanced with situational awareness, decision support and electronic recording of incident information and related actions of the organisations involved. ENGAGE IMS/CAD is currently used by the Hellenic Fire Brigade nationwide, interconnected with human, air and ground resources.	mobile version for field use	
Technolodgy: 112GR Alert	Greece	KEMEA	Operational. Link: https://www.civilprotection.gr/en/112-emergency-communications-service	112GR alert service. As part of an integrated emergency communication agency, 112 comprises an inbound and an outbound operational service. The outbound service enables alerts to be received through multiple technologies and communication channels in the event of imminent or ongoing incidents or dangerous situations that pose an immediate threat to the health and safety of citizens, so that they can take protective action.	Solution's main communication channel is Cell Broadcasting. Acting as a message beacon, it broadcasts the message with priority, making it available to anyone connected to the GSM cell being used.	No confirmation of reception on Cell Broadcasting. High SMS delays due to SMSC bottlenecks during a crisis. SMS are only available for a sent address
Technolodgy: 112Incoming Calls	Greece	KEMEA	Operational. Link: https://www.civilprotection.gr/en/112-emergency-communications-service	In Greece, 112 is available 24 hours a day, 7 days a week and can put the caller in touch with: Police Fire brigade Emergency Medical Services Coast Guard	Incidents are dispatched simultaneously	

				the European missing children hotline 116000 and the national children's hotline SOS 1056. When a person dials 112, specially trained operators immediately answer the call. The operators speak Greek, English and French. Depending on the emergency reported by the caller, the operator routes the call to the appropriate emergency service.		
Mobile turbine rescue and firefighting system	Poland	SGSP	TRL8	Project DOB-BIO6/06/113/2014 „Mobile turbine rescue and firefighting system" is succesfully closed. System is comprised in fire engine and mobile turbine structurally integrated. The turbine allows to distract water jet on terrain in fire.	High volume of water to be supplied to the fire scene. High performance of water supply to the fire zone.	Possible difficulty in advancing the vehicle at the front of the fire (the possible fall of a tree could trap the machine inside the fire). Technological right does not allow to use the system outside Poland. Ministry of National Defense is the system owner and has only rights to give permissions to use the system. System requries intensive supply of fuel.
Camera-based system in forest observation towers (Forester)	Poland	SGSP	TRL9, system Forester, Bosch MIC 7000 HD	High resolution cameras installed in forest observation towers. Common identification of fire hazard in two or more forest observation towers allows to detect the hazard and indicate its probable location.	High resolution. Possibility to locate the fire origin place. System way of working.	The need to buy the technology components (cameras) as well as to install them on forest observation towers. To indicate fire origin place, two cameras are required.

UAVs with RGB cameras and/or termovision cameras	Poland	SGSP	DJI M30T, DJI Matrice 300 RTK, DJI Matrice 200/210, DJI Mavic 2 Enterprise, DJI Mavic Air, DJI Mini, DJI Inspire, DJI Phantom 4, Yuneec Typhoon H520, Yuneec Typhoon H, Autel Evo II, Parrot Bebop Thermal	Ready-to-use technical solutions accessible directly from producers. Such kind of equipment is supplued to State Fire Service of the Repubic of Poland and volunraty fire services in Poland.	Relatively cheap solutions. Easy to use. Such solutions are commonly used by fire services and UAVs amathors.	The need to buy the technology components (UAVs and cameras) as well as to train relevant operators. The system allows to indicate a way to location of fire and see general overview of wildfire scene.
A comprehensive logistic security system for multi-entity rescue operations	Poland	SGSP	TRL8	Project DOB-DOBR-BIO4/047/13419/2013 „ A comprehensive logistic security system for multi-entity rescue operations" is succesfully closed. IT system to support organisation of multi-entity rescue operations by i.a. action planning, action management, and getting information about rescue resources accessible to use.	Coordination of multi-entity wildfire response supported by IT system.	Ministry of National Defense is the system owner and has only rights to give permissions to use the system.
High performance water-foam cannon	Poland	SGSP	https://www.supermarketstrazacki.pl/dzialko-strazackie-wodno-pianowe-dicodoplus-15000-l-min-z-glowica-ster-elektr.html	High performance water-foam cannon to be used as end of fire hose line, with or without direct service by firefighters.	High performance: 15000 l/min. Electric control possible.	Relatively high cost of the solution (approximately 35,000.00 EUR).
Mapan LAS (by Krameko)	Poland	SGSP	https://www.krameko.com.pl/mapan.php	GIS platform integraed to Polish forest administrators (the State Forests).	Geospatial analysis concidering wildfire layers.	Commertial collution to by bought from echnology provider (Krameko)

Sighting with infrared detectors: fire detection systems based on the ability to detect infrared rays emanating from hot bodies have been developed using this principle. Such systems can also be used at night and function even in the presence of smoke, which does not dull the signal. The sensor is influenced

by a precise infrared band and when it is stimulated by sufficient radiometric energy, the alarm mechanism is triggered; therefore, the system is automatic and can detect outbreaks of a few square metres up to 10 km. Closed-circuit television sighting: Fixed points can be equipped with devices that allow sighting without the need for human presence on site. The devices that transmit the signal from the remote sighting point to a receiving station, where the images are observed by the operators in charge, are based on cameras that operate mainly in the visible range.

Figure 61 Example of an infrared fire detection system

7.2.6 STANDARD AND REGULATIONS RELATED TO PHASE B

This section reports, as a result of research work, on the relevant international standards identified and providing specific information regarding phase B (fire response).

Table 15 Description of Standards[1]

Standardization body	Standard Code	Standard Title	Description
ANSI	ANSI/APCO/NPSTC 1.104.1	Standard channel nomenclature for public safety interoperability	very useful standard for facilitating collaboration between the different teams involved in rescuing the population, as well as in fighting, in the event of a large fire threatening built-up areas

[1] *Reference: Sakkas et al., 2020. Deliverable D1.1 Standardisation Landscape: Gaps and Opportunities. STRATEGY Project.*

ASI	ÖNORM S 2412	Safety Management System - Terms and Definitions	Putting the safety of fire-fighting operators at the forefront is essential to avoid injuries and/or fatalities during all phases of a fire. Organising training for fire-fighting operators is necessary
CEN	CEN/TR 17512:2020	Personal protective equipment - Smart clothing - Terms and definitions	Putting the safety of fire-fighting operators at the forefront is essential to avoid injuries and/or fatalities during all phases of a fire. Organising training for fire-fighting operators is necessary
CEN	CEN ISO/TR 11610:2004	Protective clothing - Vocabulary (ISO/TR 11610:2004)	Putting the safety of fire-fighting operators at the forefront is essential to avoid injuries and/or fatalities during all phases of a fire. Organising training for fire-fighting operators is necessary
CEN	EN 135:1998	Respiratory protective devices - List of equivalent terms	Putting the safety of fire-fighting operators at the forefront is essential to avoid injuries and/or fatalities during all phases of a fire. Organising training for fire-fighting operators is necessary
CEN	EN ISO 16972:2020	Respiratory protective devices - Vocabulary and graphic symbols (ISO 16972:2020)	Putting the safety of fire-fighting operators at the forefront is essential to avoid injuries and/or fatalities during all phases of a fire. Organising training for fire-fighting operators is necessary
CEPT	CEPT/ECC/REC/(16)03	Cross-border coordination for broadband public protection and disaster relief systems (BB-PPDR) in the 698 to 791 MHz frequency band	very useful standard for facilitating collaboration between the different teams involved in rescuing the population, as well as in fighting, in the event of a large fire threatening built-up areas
DIN	DIN 14011	Fire-fighting and fire protection - Terms and definitions	Aid in the development of coordinated firefighting procedures using simple and universally recognised language
ITU	ITU-R BT.1774-2	Use of satellite and terrestrial broadcasting infrastructure for public warning, disaster mitigation and relief	very useful standard for facilitating collaboration between the different teams involved in rescuing the population, as well as in fighting, in the event of a large fire threatening built-up areas
ITU	ITU-R S.1001- 2	Use of fixed satellite service systems in the event of natural disasters and similar emergencies for alarm and rescue operations.	very useful standard for facilitating collaboration between the different teams involved in rescuing the population, as well as in fighting, in the event of a large fire threatening built-up areas

ITU	ITU-T E.119	Requirements for Security Confirmation and Disaster Relief Message Service	very useful standard for facilitating collaboration between the different teams involved in rescuing the population, as well as in fighting, in the event of a large fire threatening built-up areas
ITU-T	ITU-R M.1042-3	Disaster communications in satellite and amateur services	very useful standard for facilitating collaboration between the different teams involved in rescuing the population, as well as in fighting, in the event of a large fire threatening built-up areas
ITU-T	ITU-T H.785.0	Digital Signage: Requirements for Disaster Information Services	very useful standard for facilitating collaboration between the different teams involved in rescuing the population, as well as in fighting, in the event of a large fire threatening built-up areas
ITU-T	ITU-T E.108	Requirements for mobile messaging service for disaster relief	very useful standard for facilitating collaboration between the different teams involved in rescuing the population, as well as in fighting, in the event of a large fire threatening built-up areas
ITU-T	ITU-T Y.4102	Requirements for IoT devices and the operation of IoT applications during disasters.	very useful standard for facilitating collaboration between the different teams involved in rescuing the population, as well as in fighting, in the event of a large fire threatening built-up areas
ITU-T	ITU-T X.1055	Guidelines for the management and risk profile of telecommunications organisations	very useful standard for facilitating collaboration between the different teams involved in rescuing the population, as well as in fighting, in the event of a large fire threatening built-up areas

7.3 Forest Restoration and post fire rehabilitation (Phase C) activivites of the project

The destruction of vegetation by fire is followed by natural processes of recovery and regrowth, which can lead, within a few seasons, to the reconstitution of the previous vegetation. This regeneration is, in most cases, a self-succession, i.e., the plants present regrow quickly and the more heliophilous species, benefiting from the temporary reduction in the cover of shrub and tree canopies, find favourable conditions for great demographic explosions. In general, in the phases following a fire there is an increase in annual species, which persist in the vegetation stand until the coverage of the burnt area by woody plants is complete again.

Considering the vegetation before the destructive event as stable for a certain period and therefore characterised by a high degree of order (low entropy values), after the fire there is considerable disorder and the vegetation switches to a condition of high entropy: the long regenerative phase after the fire can be interpreted as the result of an input of order into the system.

However, not all types of vegetation show the same ability to re-establish conditions prior to a disturbance event such as fire. Firstly, even though, as mentioned earlier, almost all natural ecosystems can be considered disturbed by fire, they should, based on their current state and distribution, be divided into two groups: ecosystems that are more stable as they are dynamically approaching their potential and ecosystems with variable frequencies of disturbance. The effects of a fire on the ecosystem and, consequently, its resilience (understood as its autonomous capacity to recover) and homeostasis are extremely variable and dependent on numerous factors, the main ones being the type of fire, the type of vegetation and the stationary conditions.

These factors are, therefore, by no means independent of each other: they influence each other and their degree of interaction results in complex and variable responses, which condition vegetation recovery processes in an equally variable manner. In many ecosystems, fire controls the age, structure, and species composition of a plant community, but also acts with different frequency and intensity, depending on the type of vegetation and climatic situations. Thus, vegetation composition and structure depend on climate, geographical region and fire frequency and intensity, while fire frequency and intensity in turn depend on vegetation structure and climatic regime. Each of these factors must, therefore, necessarily be considered and understood to define and predict vegetation recovery processes.

Fire, like other recurrent forms of disturbance, is characterised by its regime, which defines the conditions of disturbance to which an ecosystem is subjected and is determined by various components, such as:

- seasonality: This component refers to the time of year in which a fire occurs and, therefore, defines some important climatic variables related to it, in particular: maximum temperatures, humidity and precipitation;
- frequency: The effect produced on the ecosystem at a given time represents the result of the properties of all the fires that have previously occurred. Frequency must be distinguished from fire interval, which, on the other hand, refers only to the time elapsed between the last fire and the previous one.
- Intensity: defined as the energy released by a fire, i.e. technically the temperature developed per metre of fire front, is one of the most important disturbance characteristics. It is closely correlated to the amount of fuel burned and the speed at which the flames spread.
- area covered: the size of the burnt area plays an important role in the processes of recolonisation of a community: a fire that spreads over only 100 m2 has different effects on plant communities compared to a fire that spreads over 100 ha or more.

These differences can be traced back to changes in fire intensity and the margin effect on recolonisation processes.

7.3.1 Vegetation types and post-fire reconstruction

The structure, spatial heterogeneity and floristic composition of a vegetation formation can influence the fire regime, and this, in turn, the process of vegetation cover recovery. Structure and spatial heterogeneity determine the amount of fuel available, hence the fire intensity and the degree of variability of fire conditions respectively. The floristic composition determines the degree of flammability of the vegetation and, in turn, also the degree of resilience of the community, i.e., the reproductive and competitive capacities of the species that make it up, especially in relation to the biological forms:

- therophytes: they are facilitated by the denudation of the soil, which favours colonisation by dissemination;
- geophytes: these are resistant, as the heat of the fire does not penetrate the soil for more than a few centimetres;
- hemicryptophytes: they are damaged;
- chamaephytes and phanerophytes: they are heavily damaged in their aerial part; their survival is linked to their ability to emit suckers, the vulnerability of the rhizome, and seed production.

Secondary successions: in most Mediterranean ecosystems, the composition and structure of post-fire plant communities is similar to that existing before the fire: a condition defined as self-successional, since there is no real succession of species as can be observed in secondary successions. The dynamics of vegetation following disturbance due to a stable condition is essentially described as a deterministic process: groups of species follow one another in occupying space, with each stage making it possible for the next stage to develop, until an equilibrium condition (mature stage) is formed, which tends to reproduce itself over time.

7.3.2 Post-fire dynamics of plant communities

The effects of fire on plant community dynamics can be assessed by analysing the changes induced in floristic composition (presence/absence, floristic richness, frequency, biological forms) and structure (species cover, biomass, stratification). The effects on each of these parameters may vary, as described above, depending on the characteristics of the fire.

- Changes in floristic composition: the numerous studies carried out on forest formations, shrub communities and garrigue formations in many Mediterranean countries have shown that the re-establishment of the original plant community occurs rapidly, and that the floristic composition existing before the fire is not profoundly altered by the passage of the fire: most of the species present immediately after the fire constituted the plant community existing before the fire. Floristic richness also does not appear to change significantly, and its development after the fire shows a fairly similar general trend in the various Mediterranean ecosystems.

- Changes in structure: After the passage of fire, the recovery of the ground cover and the re-establishment of a structure similar to that which existed before the fire occur fairly quickly, and in any case depend on the structural complexity of the original plant communities. The development of a plant community's structure can be described by analysing various characters such as cover, stratification, biomass as well as diversity and biological forms.

7.3.3 NEWS ON THE REFORESTATION AFTER THE FIRE

The overall analysis of the data obtained from the SILVANUS Consortium stakeholders and partners, as well as from research carried out in industry and organisations, did not reveal any significant innovations, compared to what was already present and employed, concerning the topic of reforestation following fire. However, the subject of novelties concerning reforestation and restoration of the land following forest fires will be the focus of attention during the continuation period of the Silvanus project.

7.3.4 STANDARD AND REGULATIONS RELATED TO PHASE C

It is considered appropriate, to ensure the interoperability of standards within the Silvanus platform, to devote a paragraph to standards in the context of the reconstruction of a forest after the passage of a fire. In this case it should be noted that, unlike the other two phases, both the national legislation taken into consideration (Greece and Italy) and the international standards present are not extremely specific. Collaboration within the Consortium to extend research and define specific standards will be the objective in future editions.

Table 16 Standards and regulation in the reforestation phase

Standardization body	Standard Code	Standard Title	Description
ISO/TS	ISO/TS19677:2019	Guidelines for assessing the adverse impact of wildland fires	Impact of wildland fires and firefighting activities on the environment (air, water, soil, wildlife, and vegetation). It further addresses the impact of

		on the environment and to people through environmental exposure	wildland fire effluents on exposed human population, including firefighters, as well as food production, land, sea and air traffic, and the built environment. It also describes the environmental impacts of firefighting activities. The wildland fires covered include both natural wildland fires and man-initiated fires, including prescribed burning and agricultural fires, but not peat fires nor coal seam fires. This document is intended to serve as a tool for the development of standard protocols for: — the assessment of local and remote adverse environmental impacts of wildland fires; — the assessment of the effects of smoke and gas exposure on firefighters and exposed human populations. It provides guidance for incident commanders and other responsible or affected parties when decisions regarding firefighting strategies, tactics, and restoration are made. It is intended principally for use by firefighters and investigators, insurance providers, environmental regulatory authorities, civil defence organisations, public health authorities and landowners. This document does not include specific instruction on compiling and reporting the information needed to assess environmental damage caused by a fire incident, nor does it include specific sampling methodologies and analysis requirements. These topics are the focus of documents in the ISO 26367 series. This document does not address either fire damage to the built environment, direct acute toxicity issues, which are covered by other ISO standards, nor does it address economic impact, although the impact of climate change is discussed in Annex D.
UNI/EN/ISO	UNI EN ISO 14050:2020	Environmental Management - Vocabulary	The standard defines the terms used in the documents in the field of environmental management systems and tools to support sustainable development. These include management systems, audits and other types of assessment, communications, climate footprint studies, greenhouse gas mitigation and climate change adaptation.
ISO	ISO 14055-1	Environmental management	Guidelines for establishing good practices for combating land degradation and desertification

Greece: National Law 3208/FEK A 303/24/12/2003 on the protection of forests and other related matters. Regulatory issues: Updating of older laws, Protection of the forest heritage and biodiversity, Creation of a forest register, Prohibition of deforestation, Criminal provisions.

Italy: Framework Law No 353 of 21 November 2000

The provisions of this law are aimed at the preservation and protection from fire of the national forest heritage as an irreplaceable asset for the quality of life, protection of forest and grazing areas, provisions for post-fire reconstruction, criminal provisions.

A broad range of review on the different standards, which have considered different phases, will be further considered in the design and development of the platform.

8 Future Communication and Dissemination Activities and Outputs

8.1 Events

8.1.1 The 9th International Civil Protection Conference, SAFEGreece, September 2022

SILVANUS will feature at the 9th International Civil Protection Conference where stakeholders from Greece will be present at all administration levels, as well as first responders, civil protection, and industry representatives.

8.1.2 Fire Across Boundaries Conference, October 2022

The EUFireProjectsUnited roundtable has been scheduled for October 4th, and will take place in an in-person format. The topic of the roundtable is "Future wildlife risk scenarios addressing the expected impacts by the Green Deal related to building resilience into European landscapes". The event will be recorded.

The roundtable will be moderated by Eduard Plana on behalf of Firelogue, while participants will be representatives of TREEADS, FIRE-RES, SILVANUS, FirEUrisk, SAFERS, and Pyrolife.

8.1.3 9th International conference on Forest Fire Research, Coimbra, November 2022

A joint session of Innovation Action projects and the Firelogue CSA is planned for the International Conference on Forest Fire Research in Coimbra in November 2022, with an emphasis on project results, SILVANUS platform development, and joint actions to promote the outcomes of all projects.

8.1.4 SILVANUS General Assembly Meeting in Athens, Greece, November 2022

The SILVANUS General Assembly meeting will include a session with three members of the External Advisory Board, where up-to-date project results will be discussed and important feedback from the EAB on the features of the SILVANUS platform will be collected and debated.

In 2023, events such as the AER Firefighting Conference (Pacific Northwest Wildfire Conference and Exhibition in Seattle in April), ISCRAM (20th International Conference on Information Systems for Crisis Response and Management in Omaha, Nebraska in May), IUFRO (The Forest Treasure Chest Delivering Outcomes for Everyone in Cairns, Australia), the EU Green Week 2023, the International Congress on Fire in the Earth System in July (Granada, Spain) will potentially include SILVANUS, as this is an opportunity to catch up with the stakeholders that were present and that were introduced with SILVANUS in 2022, and to further expand the stakeholder network in the European Union and beyond.

8.2 Dissemination Material (Newsletter, Video)

The next newsletter is expected to be issued in late September 2022, with a summary of activities beginning with the General Assembly meeting in Bari, Italy, in July 2022, and the corresponding pilot visit site to the Gargano National Park. A summary of recently submitted Deliverables will also be available. Brief event reports (CBMI Conference in Graz, the ENS 2022 Conference in Vienna, etc.) with corresponding photographs will be included. Key messages for stakeholder target groups named in D10.1 will be summarized, with each newsletter focusing on three target groups.

The next SILVANUS promotional video, which will be developed in mid-2023, will focus on:

- the 12 pilot sites in 11 countries,
- the results derived from pilot developments,
- the advancements of SILVANUS platform based on research and testing made on these sites.

8.3 Website and Social Media

As SILVANUS project results develop further and as the project enters the implementation phase with the platform reaching the MVP stage, there will be more updates included on the SILVANUS social media accounts, depicted through a visually enticing presentation and accessible key messages. Interactive discussions with stakeholders via social media are to be expected, especially after the formation of Sustainable and Resilient Forest Working Groups. After LinkedIn and Twitter accounts, an Instagram account that would attract a younger audience will be opened.

Further social media campaigns for Zero Emissions Day and International Day for Disaster Risk Reduction (a joint campaign with Firelogue and Innovation Actions) hope to expand the stakeholder network. The following slogans and hashtags will be included for the social media campaigns:

- Protecting the Divinity of Nature by Innovation and Technology
- For the Mutual Benefit of Forests and Humankind
- Preserving Forests and Improving the Quality of Life
- Holistic Approach Equals Prosperity, Health, and Sustainability for Forests, Humankind, Property, and Infrastructure
- Forests are not our backyard
- Ignite creativity and innovation, not cigarettes
- SILVANUS – Modern and Innovative Protector of Forests Against Wildfire

As SILVANUS enters its second year, the dissemination campaign will be more focused toward particular stakeholder target groups (e.g. industry, local communities, first responders), where the key messages and SILVANUS platform components will be conveyed in an accessible language.

Conclusion

SILVANUS has entered its first year of development with an established communication and dissemination strategy where the basic C&D tools were assembled in the first year of the project – website and social media accounts, press releases, promotional material (brochures, flyers, posters, videos), along with online webinars and dissemination presentations held at various international conferences that explain the mission, vision, and objectives of the project.

The stakeholder network has significantly expanded since the submission of Deliverable 10.1. Along with social media followers (over 350 on LinkedIn and 230 on Twitter), which are in line with achieving the KPIs by the end of the project as defined by D10.1 (1000 followers on LinkedIn by the end of the project, 500 on Twitter), a close stakeholder list with one hundred members serves as a basis for the formation of Sustainable and Resilient Forest Working Groups. The relationship with the External Advisory Board Members has evolved and is now ready to enter a phase where tangible and concrete feedback will be accumulated.

Concise and regular communication with the CSA and Innovation Action projects was established and maintained throughout the first 12 months and is about to enter a new period with another joint social media campaign, a joint workshop by the end of 2022 and at least two international conference sessions. Social media campaigns involving new visual presentations, slogans and hashtags are in preparatory phase. Website will become more interactive with the introduction of SILVANUS platform components.

As SILVANUS passes its introductory phase and turns more actively towards presenting its results and outcomes, through the depiction of its platform, the dissemination tools and key messages will be more numerous and active.

Through these activities, SILVANUS hopes to achieve and surpass the expectations of its stakeholders, and through its exploitation plan, which is now in its beginning stages, to engage stakeholders in the topic of wildfire prevention in an interactive and educational way that will emphasise the accessibility, effectiveness, and sustainability of the SILVANUS platform.

The first year of the SILVANUS project and its corresponding communication and dissemination activities have concluded with successful awareness raising among stakeholder target groups ranging from first responders and fire fighters to public authorities, industry, academia, and the IT business sector. The next phase will focus on intensifying communication and dissemination activities by diffusing knowledge among stakeholders once the results of the SILVANUS platform development become clearer and ready to be disseminated. The awareness raising and the initial contact with stakeholders, ranging from a closer contact with the external stakeholders and the External Advisory Board, over to newsletter subscribers and social media followers, to event attendees and workshop co-presenters, are already ensuring a longevity in stakeholder engagement. The interdisciplinary stakeholder network has acquainted with the project and its objectives, which makes the process of diffusing knowledge and understanding project results in the future easier to transfer, making it more effective and eligible for constructive feedback and discussion points. The next annual report on dissemination activities will therefore bring to the forefront a high number of innovative and accessible C&D events and tools.

9 ANNEXES

9.1 Annex I

9.1.1 Extension fiches

Component name	Fire detection based on social sensing
Functionality	The main functionalities of this component include: (i) the real-time collection of tweets based on user-defined search criteria, e.g. keywords, (ii) the extraction of locations in order to geotag the posts, (iii) the extraction of visual concepts from Twitter images, (iv) the detection of fire events according to tweets, and (v) visualization of posts and events on a map-based Web application.
Key features	The key feature of this component is that it offers a full stack solution for detecting fire incidents with social sensing, from retrieving real-time social media data to analyzing and visualizing them. Another feature that distinguishes this component from other competitive solutions is the incorporation of a social media analysis toolkit that extracts further knowledge from the posts' textual and visual content and does not stay limited to the original information that Twitter provides. Finally, it is dedicated to fire events, while most market products concern the monitoring of a brand.
Expected TRL	7
License	Open source – Apache Software License 2.0
Owner	Multimedia Knowledge and Social Media Analytics Laboratory (MKLab), Information Technologies Institute (ITI), Center for Research & Technology, Hellas (CERTH)
Component manager	Stefanos Vrochidis <stefanos@iti.gr>

Commercial Assessment of the extension

Value proposition

Problem statement	Wildfires, especially now with climate change, cause immense damages in human properties and result in many casualties. Thus, the detection of wildfires in an early stage is becoming a necessity and any source of information can be valuable. The component exploits crowdsourced data from social media platforms, in particular Twitter, and offers an early-stage fire-event detection module that collects, analyzes and clusters tweets about fire incidents.
Benefits	• Alternative source of information • Automatic way to monitor social media • Highly focused on the topic of fires • Rich knowledge extraction (e.g. textual and visual concepts) • Timely notification of fires that are reported on social media • Improved situational awareness with the spatiotemporal distribution of active fires as reported on social media

Unfair advantage	• Identification of most affected areas based on online activity • Dedicated to fire-related posts • AI is involved to extract further knowledge from the original social media data • Does not rely on the limited geoinformation provided by Twitter, but involves automatic geotagging

Target users

Target user 1	**Firefighters, fire agencies** The component can significantly assist in the early-stage detection of fires (in case an incident or an indication for reckless burning or arson is reported first on social media) as well as in the improvement of situational awareness (spatiotemporal distribution of active fires as reported on social media).
Target user 2	**Local municipalities, prefectures, regions, local/regional civil protection authorities** The component can timely inform about most affected areas and citizens in danger, raising the situational awareness and contributing in better emergency response.
Target user 3	**Journalists** The component can serve as an additional source of information when reporting fire-related news. Journalists already search for social media data, but manually; thus they would benefit from an automated way.
Comment	Most parts of the component are language-independent (except textual analysis, which can still be trained to a new language though), so it is able to support the above users anywhere around the world.

Competition

#	Name of competitor solution	Company	Strengths	Weaknesses	Solution unfair advantage
1	Mediatoolkit https://www.mediatoolkit.com/	Mediatoolkit (Zagreb)	Large selection of crowdsourced information (Twitter, Facebook, YouTube, websites, blogs, forums) Data analysis dashboard displaying summary reports	Focused on brand mentions tracking	Spatial distribution of collected and analyzed information that can assist more in situational awareness

			Ability to create custom alerts		
2	PromptCloud https://www.promptcloud.com/	PromptCloud (USA/India)	Highly customized Web scraping services	Geoinformation provided solely by social media APIs (very limited) No spatial visualization of posts	Automatic extraction of locations mentioned inside the post text and geotagging Fire events (based on social sensing) visualized on a map
3	Tweetmap https://www.heavy.ai/demos/tweetmap	HEAVY.AI (USA)	Rich analytics and map-based view	Too generic; requires manual search in order to view fire-related tweets	High-level knowledge extracted with textual and visual analysis of social media content Dedicated on tracking fire incidents

Distribution model

Distribution model	Direct sales The component will not be sold through intermediary channels, but will become available directly from CERTH.
Customer contact	Target users will be reached with dedicated emails and through the institute's communication channels, such as websites, social media accounts, newsletters, etc.
Promotion means	Apart from the aforementioned communication channels, the component will also be advertised in conferences, tech events and trade shows. Promotional coupons and discounts could also be offered to existing contacts, e.g. partners (especially end users) from ongoing or completed research projects.

Delivery model

Delivery model	There is high flexibility on how the solution can be served to the customer, always considering their needs and preferences. It can be hosted on our premises, or it can be set up on the customer's premises, or it can be hosted on a cloud infrastructure.

Customer relationships

Customer relationship	Since the solution is highly customizable, the customer will be significantly involved in its development, taking into strong consideration their requirements. Furthermore, training sessions will

	be offered after the component is launched. Customer service and maintenance will be offered initially for free (duration to be agreed from both sides) and later on additional charge.

Financial Model

Cost structure	Capex/Opex structure: N/A (CERTH is a public non-profit organization) Cost estimation: 25-50K € for production (depending on customer's selection of features) and 10K €/year for maintenance
Revenue structure	Pricing model: value-based Indicative market price: 30-120K € (depending on customer's selection of features) Revenue estimation: 15K €/year

9.2 Annex II

9.2.1 IPR agreement

JOIN OWNERSHIP AGREEMENT

BETWEEN:

Description of partners detailed in the Consortium Agreement

1. **UNIVERSITA TELEMATICA PEGASO (PEGASO)**, established in PIAZZA TRIESTE ETRENTO 48, NAPOLI 80132, Italy, VAT number: IT05411471211, represented for the purposes of signing the Agreement by President, Danilo IERVOLINO and the following other beneficiaries, if they sign their 'Accession Form' (see Annex 3 and Article 56):
2. **ZANASI ALESSANDRO SRL (Z&P)**, established in VIA G B AMICI 29, MODENA 41100, Italy,
3. **NETCOMPANY-INTRASOFT SA (INTRA)**, established in RUE NICOLAS BOVE 2B, LUXEMBOURG 1253, Luxembourg,
4. **THALES (TRT)**, established in TOUR CARPE DIEM PLACE DES COROLLES ESPLANADE NORD, COURBEVOIE 92400, France,
5. **FINCONS SPA (FINC)**, established in CORSO MAGENTA 56, MILANO MI 20123, Italy,

6. **ATOS IT SOLUTIONS AND SERVICES IBERIA SL (ATOS IT)**, established in RONDA DE EUROPA 5, TRES CANTOS MADRID 28760, Spain, VAT number: ESB85908093,
7. **EMC INFORMATION SYSTEMS INTERNATIONAL (DELL)**, established in IDA INDUSTRIAL SITE, OVENS, Ireland,
8. **SOFTWARE IMAGINATION & VISION SRL (SIMAVI)**, established in SOSEAUA BUCURESTI-PLOIESTI 73-81 COMPLEX VICTORIA CORP CLADIRE C4 ETAJ 2, BUCURESTI 013685, Romania,
9. **CNET CENTRE FOR NEW ENERGY TECHNOLOGIES SA (EDP)**, established in RUA CIDADE DE GOA 4, SACAVEM E PRIOR VELHO LISBOA 2685 039, Portugal,
10. **ADP VALOR - SERVIÇOS AMBIENTAIS, S.A. (ADP)**, established in Rua Visconde de Seabra 3, LISBOA 1700 421, Portugal,
11. **TERRAPRIMA - SERVICOS AMBIENTAIS SOCIEDADE UNIPESSOAL LDA (TP)**, established in QUINTA DA FRANCA BORRALHEIRA, CARIA 6200 710, Portugal,
12. **3MON, S. R. O. (3MON, s. r. o.)**, established in CERNYSEVSKEHO 10, BRATISLAVA 851 01, Slovakia,
13. **CATALINK LIMITED (CTL)**, established in CHARITINIS SAKKADA 5, NICOSIA 1040, Cyprus,
14. **SYNTHESIS CENTER FOR RESEARCH AND EDUCATION LIMITED (SYNC)**, established in TAGMATARCHI POULIOU 33, LEFKOSIA 1101, Cyprus,
15. **EXPERT.AI S.P.A. (EAI)**, established in VIA FORTUNATO ZENI 8, ROVERETO 38068, Italy,
16. **ITTI SP ZOO (ITTI)**, established in RUBIEZ 46, POZNAN 61 612, Poland,
17. **IZQUIERDO/PIATRIK GBR (VTG)**, established in OLGA-BENARIO-PRESTES-STRASSE 2, BERLIN 10407, Germany,
18. **MASSIVE DYNAMIC SWEDEN AB (MDS)**, established in SANKT ERIKSGATAN 117, STOCKHOLM 113 43, Sweden,
19. **FONDAZIONE CENTRO EURO-MEDITERRANEOSUI CAMBIAMENTI CLIMATICI (CMCC F)**, established in VIA A IMPERATORE 16, LECCE 73100, Italy,
20. **EXUS SOFTWARE MONOPROSOPI ETAIRIA PERIORISMENIS EVTHINIS (EXUS)**, established in 73-75 MESOGION AVENUE, ATHENS 11526, Greece,
21. **RINIGARD DOO ZA USLUGE (RINI)**, established in KUSLANOVA 2, Zagreb 10000, Croatia,
22. **MICRO DIGITAL DOO ZA INFORMACIJSKE TEHNOLOGIJE (MD)**, established in RUDESKA CESTA 177, ZAGREB 10000, Croatia,
23. **POLITECHNIKA WARSZAWSKA (WUT)**, established in PLAC POLITECHNIKI 1, WARSZAWA 00 661, Poland,
24. **HOEGSKOLAN I BORAS (HB)**, established in ALLEGATAN 1, BORAS 50190, Sweden,
25. **GEOPONIKO PANEPISTIMION ATHINON (AUA)**, established in IERA ODOS 75, ATHINA 11855, Greece,
26. **ETHNIKO KENTRO EREVNAS KAI TECHNOLOGIKIS ANAPTYXIS (CERTH)**, established in CHARILAOU THERMI ROAD 6 KM, THERMI THESSALONIKI 57001, Greece,
27. **PANEPISTIMIO THESSALIAS (UTH)**, established in ARGONAFTON FILELLINON, VOLOS 38221, Greece,
28. 28. **ASSOCIACAO DO INSTITUTO SUPERIOR TECNICO PARA A INVESTIGACAO E DESENVOLVIMENTO (IST)**, established in AVENIDA ROVISCO PAIS 1, LISBOA 1049 001, Portugal,

29. **VELEUCILISTE VELIKA GORICA (UASVG)**, established in ZAGREBACKA 5, VELIKA GORICA 10410, Croatia,
30. **USTAV INFORMATIKY, SLOVENSKA AKADEMIA VIED (UISAV)**, established in DUBRAVSKA CESTA 9, BRATISLAVA 845 07, Slovakia,
31. **POMPIERS DE L'URGENCE INTERNATIONALE (PUI)**, established in 1 AVENUE DE L ABATTOIR, LIMOGES 87000, France,
32. **THE MAIN SCHOOL OF FIRE SERVICE (SGSP)**, established in SLOWACKIEGO 52/54, WARSZAWA 01-629, Poland,
33. 33. **AGENZIA REGIONALE STRATEGICA PER LO SVILUPPO ECOSOSTENIBILE DEL TERRITORIO (ASSET)**, established in VIA GIOVANNI GENTILE 52, BARI 70126, Italy,
34. **LETS ITALIA SRLS (LETS)**, established in VIA PARINI 164, MODENA 41123, Italy,
35. **PARCO NATURALE REGIONALE DI TEPILORA (PNRT)**, established in VIA ATTILIO DEFFENU 69, BITTI 08021, Italy,
36. **FUNDATIA PENTRU SMURD (FptSMURD)**, established in STRADA GHEORGHE MARINESCU 50, MURES TIRGU MURES 540136, Romania,
37. **ASOCIATIA FORESTIERILOR DIN ROMANIA ASFOR (ASFOR)**, established in SOS PIPERA 46 A SECTOR 2, BUCURESTI 020112, Romania,
38. **KENTRO MELETON ASFALEIAS (KEMEA)**, established in P KANELLOPOULOU 4 ST, ATHINA 10177, Greece,
39. **ELLINIKI OMADA DIASOSIS SOMATEIO (HRT)**, established in EMM PAPA 5, THESSALONIKI 54 248, Greece,
40. **ARISTOTELIO PANEPISTIMIO THESSALONIKIS (AHEPA)**, established in KEDEA BUILDING, TRITIS SEPTEMVRIOU, ARISTOTLE UNIV CAMPUS, THESSALONIKI 54636, Greece,
41. **OSPEDALE ISRAELITICO (OIR)**, established in P ZZA SAN BARTOLOMEO ALL ISO 21, ROMA 00186, Italy,
42. 42. **PERIFEREIA STEREAS ELLADAS (PSTE)**, established in YPSILANDI 1, LAMIA 35131, Greece,
43. 43. **HASICSKY ZACHRANNY SBOR MORAVSKOSLEZSKEHO KRAJE (FRS MB)**, established in VYSKOVICKA 40 ZABREH, OSTRAVA 700 30, Czech Republic,
44. **HRVATSKA VATROGASNA ZAJEDNICA (HVZ)**, established in SELSKA CESTA 90A, ZAGREB 10000, Croatia,
45. **TECHNICKA UNIVERZITA VO ZVOLENE (TUZVO)**, established in T G MASARYKA 24, ZVOLEN 960 01, Slovakia,
46. **OBCIANSKE ZDRUZENIE PLAMEN BADIN (Plamen)**, established in HLINY 426 7, BADIN 976 32, Slovakia,
47. **YAYASAN AMIKOM YOGYAKARTA (AMIKOM)**, established in JL RINGROAD UTARA, DESA CONDONGCATUR, KECAMATAN DEPOK, KABUPATEN SLEMAN, PROPINSI DAERAH ISTIMEWA YOGYAKARTA, SLEMAN 55283, Indonesia,
48. **COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANISATION (CSIRO)**, established in CLUNIES ROSS STREET CSIRO BLACK MOUNTAIN SCIENCE AND INNOVATION PARK, ACTON ACT 2601, Australia,
50. **FUNDACAO COORDENACAO DE PROJETOS PESQUISAS E ESTUDOS TECNOLOGICOS COPPETEC (COPPETEC)**, established in CENTRO DE TECNOLOGIA BLOCO H, RIO DE JANEIRO 21949900, Brazil,

hereinafter, jointly or individually, referred to as" Parties" or "Party" relating to the Action entiled

Integrated Technological and Information Platform for wildfire Management

in short

SILVANUS

hereinafter referred to as "Project" or "Action"

WHEREAS:

The Parties, having considerable experience in the field concerned and are conducting a Project to the Funding Authority as part of the Horizon 2020 – the Framework Programme for Research and Innovation (2014-2020).

The Parties wish to specify or supplement binding commitments regarding intellectually property rights (IPR) handling among themselves in addition to the provisions of the specific Grant Agreement and Consortium Agreement.

NOW, THEREFORE, IT IS HEREBY AGREED AS FOLLOWS:

Purpose

1.1 The purpose of this IPR Agreement is to specify with respect to the Project the IPR ownership of all results developed within the Project.

1.2 The "SILVANUS" Grant Agreement and the "SILVANUS" Consortium Agreement are integral parts of this agreement and its content prevails should this agreement contain clauses contradicting them.

1.3 The agreements made herein settle only the purpose defined in section 1.1 and not any future contracts or contracts, which are currently negotiated between some Parties.

Definitions

Words beginning with a capital letter shall have the meaning defined either herein, in the Rules or in the Grant Agreement including its Annexes, or in the Consortium Agreement.

Component: each result (whatever kind or nature, including hardware, software, etc...) developed during the Project lifespan by one or several Parties (Lead or contributing parties).

Lead Developer. means the Party that has developed or led the development of a Component

Contributing Parties: means all Parties that have helped to the development of a Component.

IPR %: Is the respective share of property of a Component by a Party contributing to the development of it.

IPR Ownership

Section 8 and specifically subsections 8.1 and 8.2 of the Project Consortium Agreement, and Grant Agreement Art. 26 settle the ownership of Results.

In addition to the Grant Agreement and the Consortium Agreement, this document settles that "*Generation of Results"* means that an owner has developed through substantial effort, research, time, and expense, specific software components (Components).

A Result developed solely by one party shall be owned wholly by the Party that generates it. However, if a Result is jointly generated by two or more parties and it is not easy to ascertain the share of work of each Party; or separate each party's intellectual contribution to the creation of the Result, then the Result will be jointly owned by the parties in their respective contribution.

The following table lists the percentage of ownership for all Components generated in the Project, whether owned by a single Party or distributed among several contributing Parties.

Table 17 Software components and other materials of SILVANUS

Name of component	Lead developer	Contributing parties	IPR %
			0%
			XX%
			100%
			100%
			100%
			100%

			100%
			100%
			XX%
			XX%
			XX%
			100%
			100%
			XX%
			XX%
			XX%
			0%
			XX%
			XX%
			100%
			100%
			100%
			XX%
			100%
			100%

Date:

Name:

Function:

Representing the following body:

Signature:

9.3 Annex III

9.3.1 Individual exploitation plans

Individual Exploitation Plan of Catalink Limited (CTL)

	QUESTIONS
PROFILE AND MOTIVATION	1. **Partner profile**: Catalink (CTL) Limited is a software development SME founded in 2017, in Nicosia, Cyprus. The company has established a multi-disciplinary team, offering expertise in data science, machine learning, semantic technologies, multimedia analysis, decision making, as well as project management. Catalink engineers deliver cutting-edge solutions for learning and reasoning from incomplete, large and heterogeneous sets of data, delivering solutions for trends prediction, anomaly detection, and situation awareness. Under this umbrella CTL has designed CASPAR, a domain agnostic framework for the automated retrieval & fusion of heterogeneous enterprise data into domain-specific semantic models, to enable the discovery of new knowledge & facilitate the extraction of actionable insights. The company has also cultivated broad expertise in computer vision, image processing and multimedia applications, such as human activity recognition, driver monitoring, fleet management and traffic management from wearable and surveillance cameras (CCTV), as well as semantic segmentation for crisis event detection in visual content based on content-based image retrieval and dynamic texture recognition. Under this concept, CTL has developed a smartphone application, named IRIS for the continuous monitoring of the state of a driver during the whole duration of a driving session. The application detects the face of the driver, extracts the facial landmarks and estimates the drowsiness of the driver based on how long the eyes are kept closed and the frequency of yawning, raising an alarm when necessary. Catalink places emphasis on its R&D activities, rendering them the foundation of its service and product portfolio. Its members have strong experience in successfully carrying out research in ICT at both national and international level. Catalink has established synergies with several stakeholders from industry and academia, which guarantees its ability to always deliver novel, cutting-edge and high-quality research activities.
	2. Your motivation to participate in the project and commitment: Catalink's motivation to participate in SILVANUS project is to design and develop highly customable software for stakeholders that want to fight forest fires with the use of Artificial Intelligence (AI) and semantic reasoning. For that purposes Catalink targets at contributing to SILVANUS with cutting edge AI tools, as well as IoT devices and semantic reasoning. AI tools will deal with the early detection of fire forest with the detection of fire and smoke particles within images and videos taken from

	CCTV cameras, social media and UAVs. A Raspberry PI will be used as a gateway to enable the communication between the edge devices and cloud. Last but not least, a semantic reasoning framework will be provided to the partners so that the platform may connect all pieces together and make sophisticated decisions by leveraging semantic reasoning.
	3. **Means to achieve your objectives**: Catalink Ltd possess all the necessary resources in order to achieve the aforementioned activities. More specifically, the company is located in a modern building in Nicosia, fully renovated so that it can satisfy CTL activities; namely 2 servers for storage and communications purposes; 1 cluster of GPUs to deploy the aforementioned services and products; several laptops and personal computers. The company has also secured several governmental and private capitalist schemes that facilitate the functioning of the company, followed by a carefully designed well-balanced cost structure. As far as the personnel is concerned, CTL employees highly experienced management leaders, experienced software engineers, and boasts that is sustains a satisfactory communication channel with target customers.
	Opportunity which appeared/appears: Our participation is SILVANUS is the result of the real need of Cypriot and Greek customers (for industrial partners), such as policy makers, firefighters, public authorities and companies that develop AI and ICT tools to help them deal with the raising problem of detecting and extinguishing fires in these areas. Market growth in the development of AI tools that detect new fire events and notify the respective people to extinguish them is significantly increasing, creating favorable prospects for profit. Furthermore, the competition in fire detection market is quite low, as the problem has recently raised so much attention and there are not so many companies that develop this kind of technologies so intensively. Contrary to previous decades, the legal and political environment is quite healthier in both local and international markets, allowing data acquisition and manipulation in remoted forest areas. Last but not least, there are a lot of indications that the positive trend that raised the last year in the market will continue next years and promises a prosperous future for companies that want to delve more into fire detection AI tools, that leverage IoT technologies and semantic reasoning frameworks.
WHAT AND WHY	**Exploitable assets and results**: Catalink Ltd aspires to develop a great dealt of AI tools and IoT devices that will be used to detect and spot the ignition of fires in wild forests. The company will be able not only to leverage the AI tools as a set of services for detecting and spotting fire forest but will also be able to exploit them individually by selling it in ICT companies to merge them as an ad-hoc asset. Catalink also aspires to leverage the semantic reasoning framework that will be used to fuse all information together and extract semantic knowledge out of multiple sources. Last but not least, an IoT device will be encapsulated in a portable kit that could seamlessly deployed in desired areas.
	Rationale: We are interested on developing AI, IoT and semantic reasoning assets, with specific attention on the development of the portable kit that will contain a lightweight version of the AI tools, not only in order to get profit from them but also to help modern societies and puclic authorities to deal with the alarming raising of fire events worldwide. Most of the aforementioned assets will be exploited industrially by selling them individually in companies that also work on this domain or by merchandizing the IoT kit.

	Your Value Proposition towards Joint Exploitation of SILVANUS: CTL expects to collaborate with several industrial partners from SILVANUS project, such as DELL and INTRA, in order to encapsulate the edge fire detection component in lightweight and portable kit and merchandize it with its customers in Cyprus and Greece. There is also the possibility to form a joint spinoff with other SILVANUS partners after the end of the project and leverage a potential asset that might have been developed by more than one partners. Potential collaboration with universities might also be considered so that the company may exchange knowledge with domain experts and further advance the aforementioned assets.
ROADMAP WITH TIMELINE	**Roadmap**: the timeline plan you have for using those assets: The roadmap will include the final development of the exploitable assets, validation testing, updates to the prototype based on the outcomes from the validation test, and finally marketing and sales within the initially targeted markets. CTL plans to release the aforementioned exploitable assets mainly in Greek and Cypriot public authorities, first responders and ICT companies that develop similar technology. We plan to meet with the target stakeholders as soon as we have a Minimum Value Product (MVP), possibly due on M30 of Silvanus project. Demonstration and update cycles are expected to follow before proceeding with the first agreement with any of the target stakeholders. Further investigation of international target stakeholders will follow in order to upscale clientele.
	Measurement: The impact of the planned actions will be measured the last year of the project by setting up appropriate Impact indicators including: i) The size of the stakeholders that we have approached and demonstrated our exploitable assets (at least 10 users); ii) The number of Products, Processes and Methods that will follow the introduction of our exploitable assets; iii) The start-ups and/or spin-offs that have been jointly created with other SILVANUS partners and are expected to be commercialized after the end of the project; iv) the consultations that have followed the release of CTL's exploitable technologies, modules and platforms and provided to interested parties.
	Positioning: Currently, there is no competition in Greece and Cyprus that provides ready-to-install solutions to detect fire incidents in forests.