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## A Real-Time European Forest Monitoring System – (RT-EFMS)

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### Abstract

42% of European surface are forest eco-systems facing various impacts by climate change effects, leading to unpredictable outcomes and uncertainties for society and for forest-based industries, a green booster of circular economy. Forest ecosystems are not limited by geo-political borders, creating extra burden by combining and connecting expertise, competences and building knowledge-based capacities for best solutions. Throughout Europe, knowledge, expertise and long-lasting experience exists within various networks of specialists in forest and environmental research. The current tools, instruments, models and networks are insufficient to address the overall complex framework and to provide information and expertise for the adaptation to climate change and for reinforcing resilience in the eco-systems and the depending value chains. The frequencies and the dimension of these impacts require concise actions, huge capacities and competences to be mobilised in a very short manner. Adaptation strategies as well as urgent actions to manage disturbances lack good data and accessible real life-time actual information. Therefore, it is essential to develop a monitoring system that will be based upon a vibrant expert network, connecting local forest information to a European network information system, coordinated by an independent expert team. The system will digest and analyse data to provide actualised knowledge and information back to users to support their specific (local) needs. Essential tools like the Forest Information System for Europe – FISE, developed by the European Environment Agency (EEA) as well as the Copernicus earth observation programmes and many other existing inventories, models, decision support systems etc., could be further fine-tuned by feeding-in regularly actualised data on forest ecosystems. An independent expert group provides forecast information on various scenarios for accompanying forest adaptation and management strategies. Keywords: [Up to five keywords can be added here.]

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### Introduction, scope and main objectives

The main objective of this study, which had been carried out for the European Sawmill Industries Organisation (EOS) is to identify the current performance for

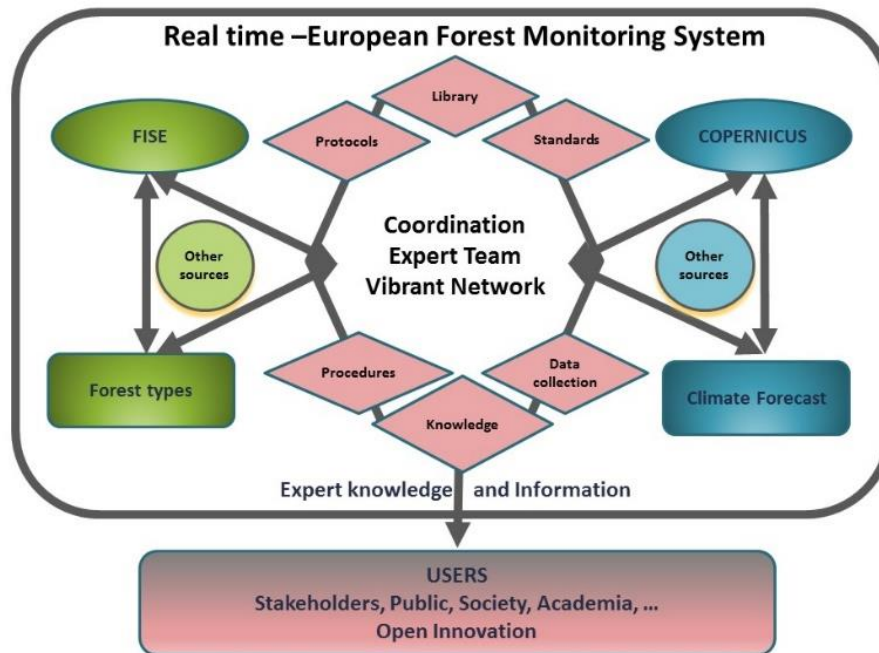
The last five years since 2015 have shown that climate change is speeding up, which can cause manifold impacts on all ecosystems and the livelihood on global scale. Therefore, a Real-Time European Forest Monitoring System (RT-EFMS) needs to fulfil several requirements from the technical and content side. Many European information sources exist, but they are largely scattered and would need to be standardised, respectively harmonised in addition special protocols should be developed. The frequency of data collection does not correspond sufficiently to the impacts by climate change effects that can be stated in relation to abiotic and biotic incidents, which can cause calamities in a pan-European dimension. Several national or regional monitoring systems in Europe exist only in local languages, which so far, do not allow tracking forest conditions and pest across EU borders. A vibrant active network to connect up-to-date local forest information to a European system would allow improving the knowledge sharing and better planning to adapt to climate change related questions and to



*Further excellent research and sciences will enlarge the understanding and validation of the knowledge.*

How to operate it?

There is no need to start from scratch as the currently developed tools, models, systems can be combined and jointly further developed enhanced in conjunction with the RT-EFMS.



Kleinschmit von Lengefeld, A.; Cavalli, R.; Schüller, S.; Melegari, S.; 2020; EOS study

Graphic 2: Model on organisation and structure of an RT-EFMS

- The beating heart of the RT-EFMS is a vibrant network of experts appointed in a personal capacity, who are connected among all European local levels.

- The vibrant network is coordinated independently as an inter-service platform for all interested stakeholders, actors, interested parties and the public at large. The coordination team will be connected with all relevant units, expert specialist groups, stakeholders. The governance and neutral

operation of the RT-EFMS should be supervised by the EU Commission services.

- Existing and future thematic expert groups will be part of the actions and provide vice-versa information and knowledge to better understand processes and impacts as well as to facilitate the provision of solutions, which could be tailor-made applied on local / regional level.

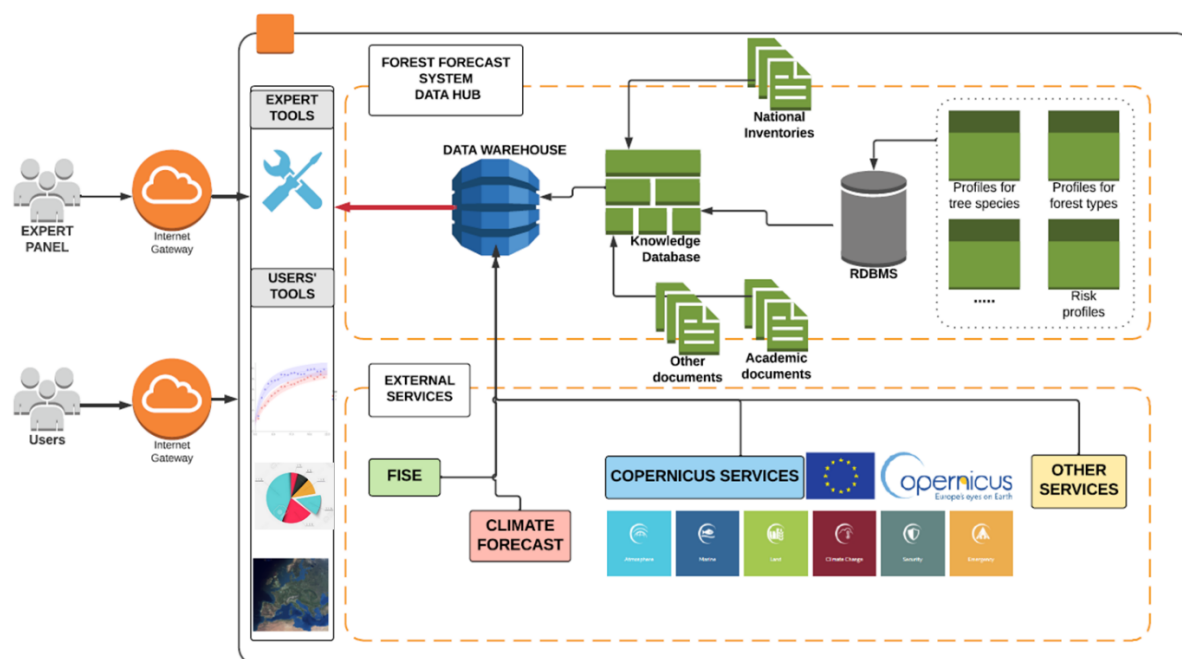
Next steps:

In general, a more detailed analysis on the existing systems, tools and models and on how they could fit into a RT-EFMS is needed. For operating a RT-EFMS, a vibrant operating network (graphic 2 and 3) of connecting key stakeholders and actors to the system is needed.

All currently existing tools and systems for data collection, interpretation and analysis are the basis and will be an essential part of it. Redundancies and duplication can (better to say shall) be avoided. Interphases and new systems on how to collect and feed-in data are required. In particular, the RT-EFMS aims at integrating timely data of all bio-economy actors included timber and paper industries in order to provide vivid pictures on the extent of timber harvest and damaged timber and as a basis for evaluating and certifying sustainable timber production and use.

## RT-EFMS Team (independent interphase-platform-hub)

The team to develop the interphase between all existing tools, services, systems, stakeholders and interested parties as well as the society at large should be build. It shall be set-up as quick as possible due to the current urgent challenges European forests are facing.



Graphic 1: Draft idea on how to involve all stakeholders, actors, existing tools and systems to a vivid network for operating the RT-EFMS. Work in progress.

## DISCUSSION

The overall expected breakthrough lies in the real-time availability of information and expert knowledge for accompanying all stakeholders for the adaptation of forest ecosystems in Europe to climate change and to provide expertise for developing best adapted management plans for boosting the resilience of forests while integrating all relevant aspects like enhanced biodiversity, land use and land use change aspects, water security and agro-forestry production.

### Examples of expected breakthroughs for European forests, forestry and the circular bioeconomy:

- To create a unique high-level knowledge hub on European Forests to enhance their environmental, social and economic performance by connecting all key actors / stakeholders / experts and interested parties as well as the society at large
- To facilitate up-to-date information and best knowledge to all stakeholders and interested parties for accompanying European forests and forestry on adaptation to climate change conditions
- To further support a reliable accounting in line with the LULUCF Regulation at EU level and in international climate fora and to develop climate adaptation strategies RELIABLE & TIMELY FACTS on forest growing stock, carbon sequestration and forest development are strongly required

- To negotiate cross-purposes between forest managers and conservation groups RELIABLE & TIMELY FACTS on forest development and health are urgently required
- To facilitate long-term investments in sustainable forest circular bio-economy applications, RELIABLE & TIMELY FACTS on forest growth, health and sustainable harvests are urgently needed

... and many more positive impacts to be expected as outcome of reinforced collaboration and exchange of knowledge!

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## CONCLUSIONS

European forest policies respect the subsidiarity principle, which reflects very well the ownership related issues of forest and the responsibilities. Some of our global challenges in relation to Climate Change negative impacts are larger than geo-political borders. The speed of time at which negative impacts of Climate Change are witnessed today require a joint engagement of political decision makers, stakeholders on International, European, national AND LOCAL level that will provide best solution for forest, terrestrial ecosystems and the livelihood of humankind. The latest developments in spatial imagery, blockchain development, ICT-based models and information sourcing allow today the creation and management of a vibrant network that will connect all important and needed actors and stakeholders. Innovation and modern ecosystem management schemes are developed including more information and can be further strengthened by widening the research and innovation field by integrating trans-disciplinary, multi-cultural teams. Existing “rural knowledge” of local environments and ecosystems is essential to store, valorise and to advance. Europe will lose wisdom and knowledge from local actors, if they are not accessible and connected in due time due to the aging society and population. Rural areas are overaged and may face a negative development with disastrous impacts on the ecosystems. This was already witnessed to some forest fires incidents in the recent past. Combined factors like abandoned ecosystems, which accumulated biomass on the ground, increased periods of droughts and heat, plus lacking knowledge of the ecosystem dynamics were the starting point for igniting catastrophes that caused human losses, ecosystems destruction and ecosystems’ degradation.

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## Acknowledgements

The study had been carried by order of the European Organisation of Sawmill Industry (EOS), which searches for finding an innovative idea and solution to address the challenges and menaces caused by climate change impacts. The three authors are grateful for having had first of all the full freedom to discuss and work on the here presented idea independently, and the opportunity to share and discuss this idea with relevant stakeholders, public bodies representatives and key networks, initiatives and larger projects on European, national and regional level in Europe throughout 2020. But, such a tool, like the RT-EFMS should also have the opportunity to connect and reach out to other regions in the world for identifying early up-coming threats and developments that will affect forest ecosystems in all global areas.