FlexWood

Flexible Wood Supply Chain

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Dissemination and Networking Final Report

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SEVENTH FRAMEWOR PROGRAMME

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Website: www.flexwood-eu.org

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1. Executive Summary

The EU-Project FlexWood (Flexible Wood Supply Chain, 2009 – 2012) aims to build a novel logistic system that provides value recovery along the wood supply chain. The dissemination of the project results is of fundamental importance to achieving the project impacts. Thus, Work Package (WP) 2000 “Dissemination, Implementation and Exploitation” is dedicated to the communication and dissemination of the project.

This report presents the activities carried out during the entire project. It includes and builds on the “Dissemination and Networking Review Period 1”, which summarised all dissemination activities of the project up until month 24.

The report is structured as follows: after an introduction to the project and WP tasks, the approach of the report is described. The main body of the report portrays dissemination coordination, material, and communication of the project during Period 1 of the project (from the previous report, then major activities carried out in the final 12 months of the project are described. A list of dissemination activities is provided in the appendix.

2. Introduction

FlexWood – Flexible Wood Supply Chain

This document is a deliverable within the context of the EU-funded Collaborative Project FlexWood – Flexible Wood Supply Chain, a project which officially began November 1st, 2009 and continues for three years. The Consortium consists of 14 partners representing nine countries and is comprised of leading SMEs, universities and research centres and associations, who each contribute complementary experience and expertise.

The overall objective is to build a novel logistic system, ‘FlexWood’, which provides value recovery along the wood supply chain. This system will integrate

- advanced quality and quantity information on wood resources measured in the forest with novel technology
- optimisation models for tactical and operational planning (bucking, harvesting, allocation of wood)
- optimisation models and enhanced processes for novel and more flexible concepts for mill production and
- improved information transfer between all stages of the wood supply chain to create new knowledge for decision making.

Within the FlexWood concept, existing solutions for value recovery opportunities in these areas will be tested and/or adapted or developed. This is followed by an interlinking of the single solutions, which allows the modelling of the entire information flow with benefits and efficiency gains in time, quality and cost. The achievement of these goals is assured through the coordination of eight interrelated Work Packages (WP).

The dissemination of the project results is of fundamental importance to achieving the project impacts. WP 2000 is present throughout the entire project duration, collaborates closely with the WP Project Management (WP 1000) and ensures that project results are disseminated

internally and externally to the various stakeholders and general public. Also included in WP 2000 is the Implementation and Exploitation Plan, which is to be developed by SMEs and industry (Task 2200).

Dissemination
WP 2000 is divided into two tasks: Task 2100 Dissemination (Europe, national, regional) and Task 2200 Implementation and Exploitation Plan.

The objectives of Task 2100 - to assure the dissemination and communication of the project both internally and externally - can be elaborated upon as to:

- Planning, coordination and review of dissemination and networking activities
- Setup and updating of web page and web portal
- Producing dissemination material: flyers, posters, press releases and articles
- Planning, organisation and execution of project representation at major events, workshops and public relation activities

The "Dissemination and Networking Final Report" summarises all the dissemination activities carried out in the project.

2.1 Objectives of the Deliverable

Dissemination and Networking Final Report

This Dissemination and Networking Final Report is a Deliverable from Task 2100 and outlines the activities carried out during the entire project. In order to have a complete, stand-alone document, this includes the Dissemination and Networking Review in Period 1 (months 1 – 24) as well as the dissemination activities of the remainder of the project (months 25 – 36).

2.2 Work Package Task Status

Both Tasks 2100 and 2200 have now been completed.

Table 1 Deliverables in WP 2000

Del. no.	Deliverable name	Delivery date	Status (pending/submitted/ accepted)
2.1	Dissemination: Package (Web Page, Web Portal, press releases and other Dissemination Material)	1 (+ regular expansions)	Submitted and on-going
2.2	Dissemination, networking and knowledge transfer implementation plan Period 1	Month 3	Accepted
2.3	Implementation and exploitation plan Version 1	Month 12	Accepted
2.4	Dissemination and networking Review Period 1	Month 24	Submitted
2.5	Dissemination, networking and knowledge transfer plan Period 2	Month 24	Submitted
2.6	Dissemination and networking Final Report	Month 36	Current Report
2.7	Implementation and exploitation plan	Month 36	Submitted

	Version 2		

Table 2 Milestones related to WP 2000

Milestone number	Milestone name	Work packages involved	Expected date	Means of verification	Status
6	Final implementation and exploitation plan	2000	Month 36	Deliverable 2.7 validated by SME and industrial partners	Done at the Final Symposium in Helsinki

3. The Approach

Following the format of the "Dissemination, networking and knowledge transfer implementation plan period 1", this report has been divided into the categories: coordination; material and presentations; and communication. There is, however, overlap between these categories. To an extent, this report also reflects updates as to how the dissemination has evolved since the dissemination plan was designed.

An overview of the dissemination activities can be found in the appendix in table form.

4. Dissemination Period 1: Month 1 – 24

4.1 Coordination

The coordination of dissemination and communication to be carried out within the context of the project can be seen as communication within the Consortium and coordination of contact with stakeholders. Optimal communication internal to the Consortium is obviously essential to the project success, but also highly beneficial to overall dissemination. Dissemination activities concerning stakeholders can be quite heterogeneous, consisting of a wide range of stakeholders from different geographic areas that are both directly and indirectly involved in forest management and the industry.

4.1.1 Consortium (internal)

Communication within the Consortium is carried out by email, over the internal website, by telephone and through meetings. A mailing list (flexall@felis.uni-freiburg.de) was set up at the beginning of the project and includes all members of the team. It is used to distribute information, organise meetings, and other similar tasks. A file repository set up on the project website makes important documents available to all partners. Another important means are teleconferences, which are held regularly between the Project Coordinator and WP managers and within WPs, including WP and Task managers. Between the Project Meetings, there have been larger Video Conferences, with ALU-FR FeLis hosting all partners. Generally, at least one member from each partner organisation attended these conferences and the minutes were recorded and circulated internally. The main video conferences were held 29.06.2010, 07.09.2010, 26.01.2011, and 19.09.2011. Smaller meetings within workgroups (within WPs or task groups) were arranged by the specific group.

4.1.2 Stakeholders

Considering the extensive scope of the project, it is not surprising that the stakeholders are very diverse. Most important is the selection of suitable distribution methods and content that reach the specific stakeholders; by necessity, this must be carried out on an individual basis. The general themes, group, regions and actors are illustrated here.

The primary cluster of FlexWood stakeholders is logically concentrated around the wood supply chain. Work Groups within the project investigate all facets of the chain, from laser scanning technologies, to harvesting, logistics and the saw mill industry. Together, the team explores the interdependencies, overlap and connections between these units, facilitating the flow of the chain as a whole. In this sense, there are two types of results from FlexWood that are interesting for stakeholders of the wood supply chain: each partner has expertise on a certain link in the chain, so the research and products of these smaller units are of interest to stakeholders of each respective field; furthermore, the project encompasses all segments of the supply chain, thus, the resulting FlexWood system as a whole is relevant for both stakeholders that are focussed on a unit of the chain, as well as stakeholders that concern themselves with the chain in its entirety.

Due to the interconnectedness of all environmental and social factors, the groups of interested and relevant parties could be extended further to include, for example, agricultural, conservation and policy work groups. These, however, play a secondary role to all other mentioned actors, especially due to the limited scope of the Dissemination WP.

Institutes, businesses and organisations involved in scientific and industrial aspects of the wood supply chain are those targeted in the dissemination of the project. This mirrors the composition of the group, which includes major organisations from both the research and industry side. In terms of manufacturing processes, the project is focussed on the saw milling industry. In addition to these sectors, it is always of benefit to inform the general public of progress in research and innovation. Institutions or organisations involved in policy are, on the other hand, relevant to a much lesser extent.

Geographically, stakeholders can vary from a regional or national to European and world-wide level. Some results have a strong regional focus, such as the project's Use Cases, which are specific to France, Germany, Sweden and Poland (although they are representative of larger regions). Other results are interesting on a world-wide level, such as forestry laser scanning research findings, which are pertinent to a closely knit group of specialised scholars, amongst others.

4.1.3 Planning of dissemination and networking activities

A national dissemination plan was developed by each partner, as each is responsible for the dissemination to be carried out in their respective country. Each partner sketched an outline of their activities, identified the national target groups, major events and workshops they plan on attending in the first year, public relation activities and publications within the first period. The second "Dissemination, networking and knowledge transfer plan", encompassing the remainder of the project, is currently in draft form.

4.1.4 Implementation and Exploitation Plan

This Task was taken over by VTT in month 23 of the project and is in its first phase. The approach for the Task has been discussed at Project Meeting 4 in Cork, Ireland. VTT has designed a questionnaire and collected input from partners. The questionnaire is (in some cases) being translated and has been sent by each partner to relevant stakeholders.

4.2 Material and presentation

Dissemination and presentation material is available in the form of a project webpage, flyer, poster, power point, press release and texts.

4.2.1 Website

A webpage for internal and external use has been set up by UCC, filled and updated by ALU-FR FeLis and can be viewed at www.flexwood-eu.org. The website includes general information about the project and is continuously updated to include current project information, reports, technical papers and results. The website is in English, but includes the flyer with several languages (see “flyer”) to download. Since the acceptance of many reports is pending and the majority of reports are due in the final phase of the project, the information posted has been limited; however, a solid basis has been developed for the second period.

Partners have access to other features available on the website, such as a file repository, where they post documents that should not be accessible to the public. This includes, for examples, the minutes from working groups and technical concepts. All project meeting presentations, information and minutes can be downloaded from the file repository, as well as administrative documents and deliverables. In relevant cases, it is used by WPs and Tasks as a platform to exchange preliminary results.

Each partner can post documents in the areas of the site for Consortium internal use and are also responsible for content posted on the site. The Task 2100 leader, ALU-FR FeLis, is mainly responsible for keeping the rest of the site updated, with UCC providing assistance. The content collection and website updates will continue to be carried out until the end of the project.

In addition to the project website, further online project presentation includes:

Websites of the respective partners: ex. ALU-FR FeLis & FCBA:
http://www.felis.uni-freiburg.de/projekte-en/Projekt1?set_language=en

http://www.fcba.fr/etudes_phares/resultat.php?id_fich=3607

A sub-website for polish audiences:
http://www.ibles.pl/projekty/7pr/flexwood

The site of the 'Natural Sciences and Engineering Research Council of Canada Strategic Network on Value Chain Optimization' in the section 'Activities & Networking / Around the World':
http://www.reseauvco.ca/en/research/around-the-world/.

The web portal is still under development and is only available to internal project members. It will also be set up to demonstrate the various pieces of software in the knowledge generation

process across the supply chain. After the FlexWood system is complete, it will be tested by stakeholders and later viewable on the website.

4.2.2 Dissemination material: flyers, posters, press releases and articles

The layout of project material is particularly important for the memorability of the project. A professional, attractive and uniform design was developed for the project presentation and will be applied until the end of the project. An appropriate logo was chosen from a number of sketches created by a media designer. The final product was used as basis for the corporate design concept developed by ALU-FR FeLis. This has resulted in a uniform, memorable appearance of the project information and results, as can be seen in the flyer, presentation, poster and letter templates.

The FlexWood flyer has been widely distributed by all partners on an individual basis and at many regional and international conferences and events. Some of these events can be found in the dissemination list in the appendix.

Figure 1 FlexWood flyer (outside)

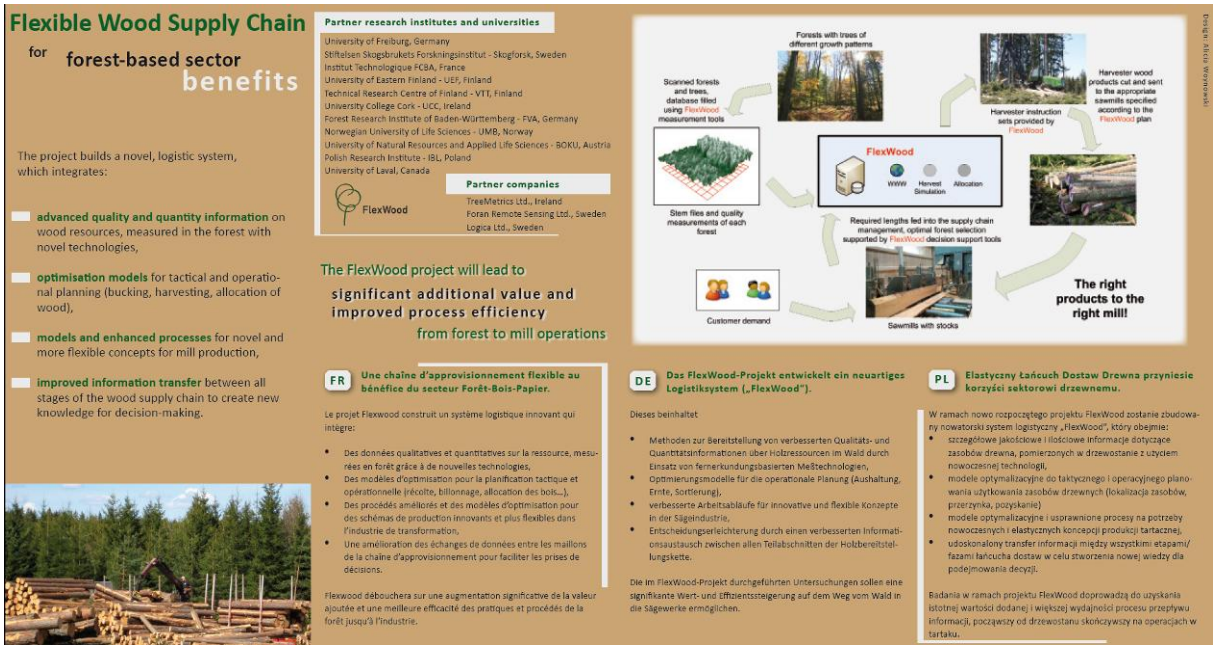

Figure 2 FlexWood flyer (inside)

The flyer is folded in four equally sized partitions; Figure 1 folds “in” from left to right, so that the front and back of the flyer are the final and third quarter, respectively. Figure 2 is visible after fully opening the flyer. The major facts, aims and benefits of the project are displayed. Four major languages (English, French, German and Polish) were chosen; the flyer was not translated into all languages of the project to avoid clutter and because English is widely understood. Designed by Alicia Unrau (formerly Woynowski), ALU-FR FeLis.

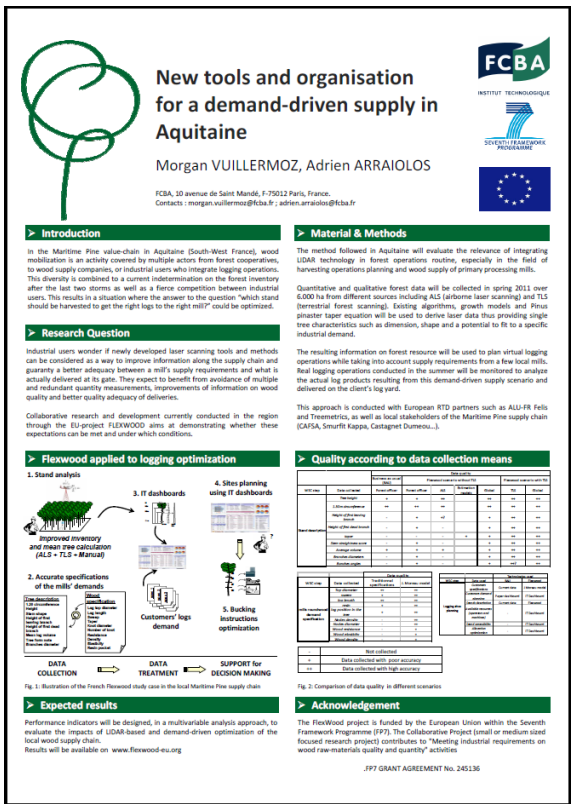

Figure 3 The layout of the FlexWood poster

The poster was designed by Andreas Fritz, ALU-FR FeLis; this example is from the partner FCBA.

Figure 4 FlexWood power point template used for project presentations

Designed by Alicia Unrau (formerly Woynowski), ALU-FR FeLis.

To establish a standard for the Deliverable of the project, a deliverable template is to be used as a base in reporting (as can be seen in this document) and can be adjusted as required. In addition, for formal letters, from both the coordinator and partners, a letter template is available. Press release text has also been made available to all partners for the respective organisation's internal and external distribution.

As the project progresses, results will be presented in the form of scientific papers, which will inform the scientific community in peer-reviewed journals, and posters to be submitted at suitable events.

4.3 Communication

Communication with stakeholders has taken place through several means since the beginning of the project; an Advisory Board has been established, there has been individual contact with major stakeholders, presence as major conferences and events and the organisation and attendance of meetings and workshops.

4.3.1 Advisory Board

The Advisory Board members are sent periodic updates of project activities and are encouraged to comment on the progress of the project. In addition, many of the members are in direct contact with specific partners, usually the partner who nominated them and work within similar fields.

Table 3 List of the Advisory Board Members

Name	**Organisation**
Mr. Didier Pischedda	ONF – Office National des Forêt (France)
Mr. Martin Müller	Superintendent for logistics Bayrische Staatsforsten AöR (Germany)
Dr. Carsten Merforth	Holzindustrie Pfeifer GmbH (Germany)
Dr. Michal Zasada	Dean of Faculty of Forestry at Warsaw University of Life Science (Poland)
Andreas Kleinschmit von Lengefeld*	FTP (international)
Prof. Eldon Gunn	Dalhousie University (Canada)
Prof. Andres Weintraub	University of Chile (Chile)
Prof. Glen Murphy	Forest Engineering, Oregon State University (USA)
Mr. Pekka Ulvas	Koskisen Oy (Finland)
Ms. Katarina Levin	SCA (Sweden)

* Andreas Kleinschmit von Lengefeld has since left this position at the FTP. His successor will be asked if he is willing to be a member of the Advisory Board.

All members were invited to attend Project Meeting 2 in Bordeaux, France, in November 2010. Four members were able to attend: Mr. Didier Pischedda, Dr. Michal Zasada, Prof. Eldon Gunn and Prof. Glen Murphy. This was very beneficial, as the members could give direct feedback to the presentations and take part in the discussions.

Figure 5 Project Meeting 2, Bordeaux, France, attended by four Advisory Board Members

The Board members were also invited to Project Meeting 4, but due to time and resource constraints none were able to attend. Didier Pischedda provided the team with feedback to the Periodic Report prior to the meeting; this was discussed and has been commented on by all WPs. As an alternative to meeting attendance, which often proves difficult, it has been decided to request feedback from the members to the upcoming Deliverables. This is also in line with the external reviewer's suggestion that reports from the members be requested. At the end of the project, all members will be invited to the Final Project Meeting and the subsequent workshop.

4.3.2 Direct Dissemination

In addition to the Advisory Board Members (described above), all partners in the project have networks through which they communicate with individual stakeholders on a regular basis. Although the website provides a means to follow progress, direct contact was more prominent in the first portion of the project, as most written reports are due in the final phase of the project. Some of the more formal meetings can be found in the appendix under the rubric "seminar / presentation / workshop".

Moreover, the half-yearly meetings were used to interact with stakeholders by combining the Project Meetings with an excursion. This was beneficial in developing project ideas, interacting with industry and exploring similarities and differences between different regions. Each of the following excursions took place in a Use Case area of the project and involved presentations and valuable discussion between the FlexWood Consortium and local stakeholders.

Project Meeting 1 Excursion Österbybruk, Sweden, May 3rd, 2010

The excursion had two major focusses: Swedish forestry (forest planning, information handling, logging and transport of roundwood), as well as Logica's planning tool VSOP (relevant to industry demand, forest stands and operations). These were presented in cooperation between Korsnäs (http://www.korsnas.com/en/), the partner Logica and the hosting partner SkogForsk.

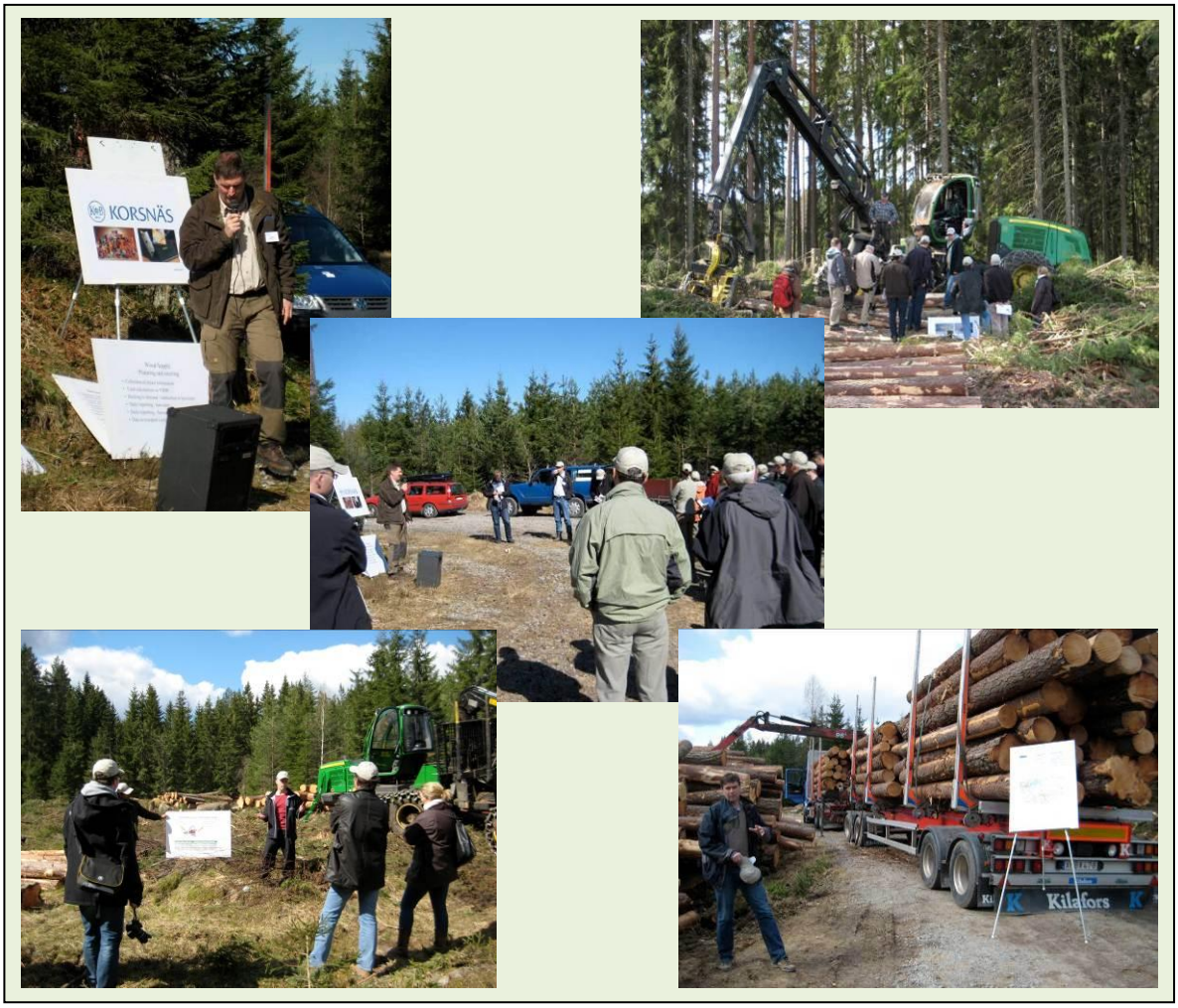

Figure 6 Project Meeting 1 Excursion Österbybruk, Sweden, May 3rd, 2010

Project Meeting 2 Excursion Aquitaine, France, November 17th, 2010

The excursion included a presentation, discussion and tour of the sawmill Lesbats Scierie D'Aquitaine (www.lesbats.com). Here, the topics following topics were presented and discussed: log reception and evaluation of the "quality" of supply; wood supply requirements and expectations; and process and resulting products (Maritime Pine). In addition, a harvesting site recently impacted by the 2009 storm and sanitary problems (bark beetle in 2010) was presented by industrials. The activities, roles, needs and expectations of forest resource owners, harvesting and exploitation and transport were discussed. The hosting partner was the FCBA.

Figure 7 Project Meeting 2 Excursion Aquitaine, France, November 17th, 2010

Project Meeting 3 Excursion Niepolomice, Poland, May 17th, 2011.

This excursion was led by the local forest district authorities in cooperation with the hosting partner IBL. The Niepolomice Forest District was portrayed; the State Forest Information System and timber marketing presented and on-site demonstrations were made by the authorities.

Figure 8 Project Meeting 3 Excursion Niepolomice, Poland, May 17th, 2011

4.3.3 Involvement with scientific and user federation bodies

Considering the project context, it was deemed not a viable or efficient use of resources to cooperate closely in the development phase of the project with standardisation bodies. However, members of scientific and user federation bodies will be invited to the final workshop.

4.3.4 Presence at major stakeholder and scientific events, presentations, conferences and workshops

The project partners were very active in attending conferences within the first 24 months of the project. Since the FlexWood system is still under development, it has been the idea behind the project and the separate research unit research and results that has been communicated and discussed. The list is much too long to be handled in detail here; the complete list can be found in the appendix.

Conferences/Seminars/Workshops

The conference and seminar presentations can be summarised as such:

Regions:

Local conferences in diverse countries in Europe, where partners have established connections to stakeholders: France, Germany, Sweden, Finland, Norway, Poland, Austria,

International conferences with global audiences; in addition to the countries above, these include: China, Korea, Canada, Spain, New Zealand, Australia, Latvia, South Africa, Chile, Denmark, Switzerland, Bangladesh, amongst others.

Examples of representation at major conferences include: FORMEC 2010 (July 2010, Italy), XXIII IUFRO World Congress 2010 (August 2010, Korea), SilviLaser 2010 (September 2010, Germany), 4th Forest Engineering Conference 2011 (April 2011, South Africa) and Silvilaser 2011 (October 2011, Australia).

Type of audience:
In accordance with the subject and goals of the project, the main types of audience within the wood supply chain have been the Scientific Community and Industry.

Size of audience:
The audience size varies between 1 and approximately 3000. Both conferences that reach a large audience and conferences/presentations with much smaller audiences are important; whereas the former raise awareness for the project on a higher level, the latter target specific stakeholders and are often implementation-oriented.

4.4 Continuous updates and quality control

Video Conferences and Project Meetings provided regular dates at which Dissemination was discussed and reviewed. This ensured that the resources could be focussed on the relevant dissemination means and any issues could be cleared up quickly.

5. Dissemination Period 2: Month 25 – 36

While an extensive list of the many dissemination activities carried out in the final 12 months of the project can be found in the appendix, in the following paragraphs, the main events that were included in the plan for period 2 will be described. These include the last two meetings of the project and the IUFRO conference. A joint journal article is still in the discussion phase, as is the possibility of a video.

5.1 Project Meetings

There are two meetings that took place in the final 12 months of the project. These were held in Brussels, Belgium and Helsinki Finland. The presentations of each are available.

5.1.1 Project Meeting 5 in Brussels, Belgium, June 4th to 6th, 2012

The second last project meeting was held in Brussels at the beginning of June. The first two days were internal for project partners and on the final day, June 6th, the project was presented to several members of the EC forestry team and external guests. The agenda of the meeting was as follows:

Wednesday June 6th, 2012	**SDME 1F**	**9:00 – 12:00**
FlexWood Project Presentation *To be attended by the EC and External Guests*		
9:00	**General introduction to FlexWood**	Barbara Koch, Coordinator
9:30	**Industrial requirements**	Morgan Vuillermoz, FCBA
9:45	**The FlexWood approach**	James Little, UCC
10:15	***Coffee break***	
10:45	**Integrated FlexWood modules:**	
	Forest inventory	Matti Maltamo, UEF
	Harvesting and logistics	Gert Andersson, SkogForsk
	Mill Production	Arto Usenius, VTT
11:30	**Demonstrated Use Cases**	Krzystof Jodlowski, IBL
12:00	***End of presentations***	

This was the first major event at which the FlexWood platform was presented to external parties. It was positively received and a valuable discussion resulted.

5.1.2 Final Symposium in Helsinki, Finland, September 26th to 28th, 2012

The final meeting of the project was held in Helsinki, Finland from September 26th to 28th. On the 26th an internal project meeting took place and this was followed by a symposium on the 27th and an excursion on the 28th. The invitation and agenda for the second two days can be found below:

FlexWood Coordinator:
Prof. Barbara Koch,
FeLis Department,
University of Freiburg
Germany

Registration
To attend the FlexWood Symposium, please send an email to **alicia.unrau@felis.uni-freiburg.de** by **August 27th** and mention whether you will also be attending the excursion. You will then be sent further information regarding hotel booking etc.

FlexWood Symposium
Thursday September 27th 14:00 – 18:30
Venue: Congress room Aleksis, Hanasaari, Helsinki

14:00	**Aims and approach of FlexWood** *The concept applied in bringing together industrial requirements, forest inventory, harvesting, logistics and mill production*	Barbara Koch, FeLis
14:20	**Use Cases** *Demonstrating the concept on the Use Cases in Poland, Germany, Sweden, France*	Krzystof Jodlowski, IBL Martin Opferkuch, FobAwi Gert Andersson, SkogForsk Morgan Vuillermoz, FCBA
15:45	**The FlexWood Portal** *Linking forest and industry*	James Little, UCC
16:00	Coffee break	
16:30	**Practical applications** *Aerial Laser Scanning* *The Forest Warehouse* *ALS & logistics in VSOP system*	Ulf Söderman, FORAN Garret Mullooly, TreeMetrics Magnus Eriksson, Logica
17:15	**Panel Discussion** *Reaction from forest organisations and industry*	Expert Panel
18:15	**Closing remarks**	Barbara Koch, FeLis
18:30	End of Day 1	

FlexWood Excursion
Friday September 28th 8:00 – 17:30
ALS & TLS field demonstrations, saw mill Koskisen Oy

8:00	Hotel pick-up
9:30	Arrival at UPM Kymmene forest stand in Janakkala
	Presentation of area based and single tree interpretation of the area using Aerial Laser Scanning by Matti Maltamo, University Eastern Finland
	Demonstration of Terrestrial Laser Scanning by TreeMetrics
12:00	Lunch and travel to saw mill
14:00	Visit to saw mill Koskisen Oy
16:00	Departure from saw mill
17:30	Arrival at hotel & end of Day 2

FlexWood Project Partners

www.flexwood-eu.org

Design: Alicia Unrau

The presentation of results were discussed with an expert panel during the symposium consisting of:

Uli Schweiß (Forst BW) – Germany - Technical production and marketing – Harvesting, Contracts, Logistics

Katarina Levin (SCA) – Sweden - Sawmill manager (Pine 1miom³) formerly involved in Logistics and bucking instructions

Didier Pischedda (ONF) – France - Harvesting Operation and Logistics (selling 15 mio³ per year)

Tomasz Zavila-Niedzwiecki (IBL) – Poland - Director of the Forest Research Institute

The six questions that were posed to the panel were:

- Question 1: Is the FlexWood concept logical/consistent for you?
- Question 2: Which components of FlexWood are most interesting / relevant for you / your organization?
- Question 3: Where do you see the greatest benefits in the framework of Business as usual or a new production/marketing strategy?
- Question 4: Do you think the FlexWood concept (or which components?) could be introduced within the next 5 years?
- Question 5: Which aspects of FlexWood might be an obstacle for the implementation?
- Question 6: Who should organize/take the lead in a possible implementation?

The events were also attended by Advisory Board Members Glen Murphy and Michal Zasada. On the final day an excursion was made to view TLS and ALS in the field, as well as to a saw mill.

5.2 IUFRO Conference

Several FlexWood partners represented the project at the IUFRO Conference Division 5 Forest Products from July 8th to 13th, 2012 in Estoril, Portugal. This conference was geared towards the production side of the wood supply chain and so was attended by the partners Laval, ALU-FR FobAwi & IWW, FVA, VTT, BOKU and FCBA. The FlexWood project occupied an entire session with approximately 35 participants and this was hosted and introduced by Luc LeBel from the partner Laval.

The following pages show the abstracts of the projects.

OP160

Demand-Driven Wood Supply: A Flexwood Study Case In Aquitaine (France)

Morgan VUILLERMOZ, Adrien ARRAIOLOS
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In the Maritime Pine supply-chain in Aquitaine, wood mobilization is handled by multiple actors from forest cooperatives, wood supply companies, or mills who integrate logging operations. This diversity is combined to a current indetermination on the forest resource and a fierce competition for round wood between users. This results in a situation where the answer to "which stand should be harvested to get the right logs to the right mill?" could be optimized.

Industrial users wonder if newly developed laser scanning tools and methods can be considered as a way to improve information along the supply chain and reach a better adequacy between demand (logs specifications in terms of dimensions and quality) and what is actually delivered at the mill gate. Through its local study case, one of the goal of the FLEXWOOD project is to demonstrate whether these expectations can be met and under which conditions.

The method evaluates the relevance of integrating LIDAR technologies in supply operations, for a better understanding of the resource, including mechanical properties, to be matched to a better description of demand.

Quantitative and qualitative forest data were collected in 2011 over 6 000 ha from different sources including ALS and TLS (airborne and terrestrial laser scanning). Existing algorithms, quality models and allometric functions were used to process laser & field data thus providing characteristics such as dimension, shape and capacity to match specific industrial needs. The resulting information was used to simulate logging operations while taking into account supply specifications from a few local mills. Real logging operations were also monitored to compare the simulation with truly harvested log products.

Indicators were designed, combined with a qualitative analysis, to evaluate this demand-driven approach. A comparison of two scenarios, "Business as usual" and Flexwood, is planned to be done in early 2012 with some of the operators involved in the decision making process on a daily basis. Results will be presented and discussed in the presentation.

Keywords: LIDAR, Demand-driven supply, Wood quality

OP161

Procedures to match laser based forest resource information with industrial wood requirements

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Despite several attempts in the past to move the decision to allocate the right raw material for specific products upstream to an earlier stage in the wood supply chain in order to increase efficiency in the wood industry, these decisions are currently mainly still taken downstream at the wood yards of the wood processing industry. This is due to lack of information about the forest resource and incomplete information chains. Relatively good volume information goes along with fairly poor quality information. Already today – depending on the type of forest resource – the forest industry can make use of technologies like terrestrial (TLS) and aerial (ALS) laser scanning to gain the necessary information to overcome this gap.

Therefore allocation procedures are described following the objective to increase the information on the forest resource derived from laser scanning data in order to match it with the raw material requirements of the wood processing industry.

Tree quality information based on dimensional parameters of external features like branchiness, sweep, ovality and taper are to date assessable by TLS. ALS gives information on tree height and crown parameters. Combining these information sources allows retrieving stand quality information and amalgamating quality classes which is necessary to match forest resource with industrial demand.

With the currently rising capabilities to predict internal wood quality from automatically detected external features, the industry is increasingly in the position to define its raw material requirements more specifically and precisely. The respective procedures need to be in place to transfer this information upstream to the forest and match it with the resource information gained from or enhanced by laser scanning data. These are the prerequisites to allocate the right material to the right customer early in the wood supply chain.

Keywords: round wood quality, wood supply, forest resources, standing quality assessment, laser scanning

OP162

Converting product requirements into wood raw material specifications

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The stages involved in converting the wood raw material into final products influence on each other. To obtain a good economic result, the chain must be seen in its entirety. The wood raw material has to be chosen taking into account the requirements of the final products. Wood raw material to be harvested has to match the specifications of the products to be manufactured. The incompatibility between the wood raw material, semi-finished products and final product may cause a lot of waste and considerable economic losses. Consequences are also loosing markets due to decrease of customers' satisfaction.

VTT has developed WoodCIM® model system for optimisation supply chains from the forest to the end products. The model system is a tool for research. It has been implemented in industrial environment for supporting long term and operative decision making. The paper demonstrates thorough industrial case studies executed by industrial implementations of WoodCIM®:

- how to convert product requirement into wood raw material specifications
- how to determine log orders to be harvested
- variables influencing on the miss-match between wood product requirements and available wood raw material specifications
- economic losses in profit to be realised through miss-match

Future concepts for stronger integration of wood raw material harvesting and primary (sawmill) and secondary (production of wooden components) manufacturing phases will be presented.

Keywords: supply chain, value yield, simulation, optimisation, wood products, wood raw material

OP163

Quality assessment on standing beech trees, logs and sawn timber – a trial on knottiness

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In the Flexwood project a system should be established to provide information on trees and logs that will match customer demands in subsequent processing stages. Scanning technologies have improved rapidly in the last years and are already implemented in practice. This is not only true for Aerial Laser Scanning (ALS) for inventory purposes, but especially also for Terrestrial Laser Scanning (TLS). Both systems have been developed and tested mainly in even structured conifer stands. However, broadleaved stands are more heterogeneous in structure and quality and therefore these stand types are still a challenge for ALS and TLS. In particular when detailed individual tree information close to the ground is required, TLS would be the technology to apply as ALS is not able to provide such information. Besides external quality characteristics of a tree trunk such as curvature, ovality and diameter, branch scars can quantitatively be analysed from TLS data. Such branch scars reveal already internal quality information on roundwood produced from such trees. The external scar characteristics are closely related to the percentage of knot free and knot containing wood which is relevant for grading round wood into quality classes according to current round wood grading standards.

In this approach single trees were scanned by a TLS system for complete three-dimensional representation. From TLS, branch scar information such as width, height and Chinese beard height could be identified. After felling the trees, branch scars were manually as-

sessed on the round wood prior to scanning of the logs with an industrial Computer Tomography (CT) scanner. The exterior knot information from the TLS scan is then matched with the manually assessed branch scar on the log and with the interior knot information obtained by CT scanning. This approach aims at developing a system, which can provide reliable information about knottiness already on the standing tree with the background information of the interior knot information from CT scanning. In this case different branch scar sizes and shapes were considered, reflecting recent and long time over healed knots. To verify the internal knot measurements by CT the logs were sawn into sawn flitches of 35 mm thickness and knots were measured on both sides of the boards.

Keywords: beech; wood quality; TLS; CT, knottiness

OP164

How to describe wood supply chains and evaluate their agility and personalisation capabilities?

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The objective of the Flexible Wood Supply Chain research project (www.flexwood-eu.org) is to propose a novel Wood Supply Chain (WSC) that increases value recovery through higher agility and personalisation capabilities, as well as aerial/terrestrial laser scanning for forest inventory and enhanced optimisation models in procurement activities and in the demand definition by the mills. To support the design of this novel WSC, a framework for describing different WSCs in a generic way and assessing their agility and personalisation capabilities was developed. The framework focusses on operational planning and execution of the procurement activities from the sourcing of standing timber to the delivery of harvested timber at demand sites.

In this presentation, we introduce the developed framework consisting of five main components: external environment, competitive business and supply chain strategies, supply chain structure, enablers and practices, and performance. It includes, in particular, a description of the actors involved in the WSC, their planning and execution processes, the decoupling points used and the information, material and financial flows within the WSC. Moreover, according to the four dimensions of an agile supply chain by Christopher (2000), the framework includes a qualitative assessment methodology of the WSC agility capabilities based on a 0-4 increasing score of how well each of these four dimensions are developed along the main processes within a WSC. The assessment of the personalisation capabilities is based on the localisation of the decoupling points along the WSC and their respective order fulfilment cycle time.

The framework was applied in case studies of WSC in six countries (Canada, Chile, France, Poland, Sweden and USA) where fieldwork collected information from more than 85 local actors and experts. Results are presented, in particular, for the planning and execution standard processes based on an adaptation of the Supply Chain Operations Reference (SCOR) model, models of planning systems, personalisation options and a generic list of operational planning decisions, pricing mechanisms and decoupling points. We also discuss the agility capabilities evaluated in the cases and those required according to supply/demand uncertainty. The framework should prove useful to organisations interested in analysing their WSC and identifying actions that could improve their agility and personalisation capabilities.

Keywords: Wood supply chain, decoupling point, SCOR model, agility, personalisation

Reference: Christopher, M., 2000. The agile supply chain: competing in volatile markets. Industrial Marketing Management, 29(1): 37-44.

OP165

Integrating small non-industrial private forest ownership (sNIPF) in novel logistic concepts

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Advanced harvesting and logistic concepts are primarily developed for and used by bigger and professionally organized users like state or private forest companies, sawmills, pulp and paper industry or integrated forest based enterprises. They have the financial resources, the organizational structure and also the manpower to operate advanced IT-based systems in order to shape the material and information flows according to their needs and they therefore have the full benefit.

Small forest holdings represent a substantial part of the forest resources in most European countries. However, not all private forest owners may be integrated into modern logistic systems in the same way due to differences in the forest ownership structure, the involvement of small non-industrial private forest ownership (sNIPF) in the wood supply to the industry and the equipment and communication media in use. As a consequence, to create flexible logistic systems it is therefore of high priority to integrate their operations.

Based on the demonstration cases of the Flexwood project, the structure, the operational methods applied today, the specific preferences and future needs of small non-industrial private forest owners and cooperatives are explored and mapped using enquiries and a process modelling approach. Possible links of their operational methods to the Flexwood concept are identified and the respective improved processes are modelled, the advantages compared to the existing operations are stated and – if applicable – quantified.

Keywords: small-scale forestry, small non-industrial private forest ownership (sNIPF), wood supply, logistic systems, material and information flow.

6. Appendix: Dissemination list

Conferences

Type of activity	Main leader	Title	Date	Place	Type of audience	Size of audience	Countries addressed
Presentation	VTT	Sawmill Industry Days	31/10/2012 – 01/11/2012	Hämeenlinna, Finland	Industry	NA	Finland
Presentation	ALU-FR-Felis	Presentation of project idea and results to scientific community	17/10/2012	Brasil	Scientific Community	NA	Brasil
Presentation	All	FlexWood symposium	29/092012	Helsinki	Industry / Policy makers	Approx.. 20	International
Conference	ALU-FR-Felis	FlexWood session at the Forstwissenschaftliche Tagung FoWiTa	19/09/2012 – 22/09/2012	TU München/Weihenstephan, Germany	Scientific Community, Industry	35	Germany
Conference	ALUFR-FobAwi	Forstwissenschaftliche Tagung (FoWiTa)	19/09/2012 – 21/09/2012	München/Freising, Germany	Scientific	NA	Germany, Austria, Switzerland, Czech Republic, a.o.
Presentation	FVA	Forstwissenschaftliche Tagung (FoWiTa); „Der Blick von Außen nach Innen-Verschneidung von terrestrischen Laserscans mit Daten eines CT-Scanners zur Ableitung der inneren Qualität von Bäumen im Bestand“	19/09/2012 - 22/09/2012	TU München/Weihenstephan, Germany	Industry/ Scientific	35	Germany
Conference	ALU-FR FeLis	Silvilaser 2012	18-09-2012	Vancouver	Scientific Community, Industry	120	international
Presentation	UMB	ForestSAT; Valuation of information obtained from different forest inventory methods – a case study	11/09/2012 – 14/09/2012	Corvallis, Oregon, USA	Scientific Community, Industry	NA	International
Presentation	UMB	ForestSAT; Tree species classification in boreal forests with hyperspectral data	11/09/2012 – 14/09/2012	Corvallis, Oregon, USA	Scientific Community, Industry	NA	International
Presentation	UMB	ForestSAT; Characterizing	11/09/2012	Corvallis,	Scientific	NA	International

		forest species composition using multiple sensors and inventory approaches	– 14/09/2012	Oregon, USA	Community, Industry		
Presentation	FVA	The 5th Conference on Hardwood Research and Utilisation in Europe; "Quality assessment of beech logs using CT-scanning technology"	10/09/2012 – 11/09/2012	Sopron, Hungary	Industry/ Scientific	NA	International
Presentation/Conference	UEF	The SNS-meeting in Forest Inventory and Forest Planning,	17th-19th August 2012	Lycksele/ Sweden	Scientific	100	Nordic and Baltic countries
Presentation	UMB	IEEE International geoscience and remote sensing symposium, remote sensing for a dynamic world; Effects of tree crown delineation in individual tree species classification with hyperspectral and lidar	22/07/2012 – 27/07/2012	Munich, Germany	Scientific Community	NA	International
Conference	ALUFR-FobAwi	IUFRO Div 5 2012	08/07/2012 – 13/07/2012	Estoril, Portugal	Scientific Community,	NA	International
Presentation	VTT	IUFRO Conference Division 5 Forest Products; Converting product requirements into wood raw material specifications	08/07/2012 – 13/07/2012	Estoril, Portugal	Scientific	35	International
Presentation	VTT	IUFRO Conference Division 5 Forest Products; Optimisation of production planning and process control supported by scanning of internal round wood properties	08/07/2012 – 13/07/2012	Estoril, Portugal	Scientific	35	International
Presentation	Laval	IUFRO Conference Division 5 Forest Products; How to describe wood supply chains and evaluate their agility and	08/07/2012 – 13/07/2012	Estoril, Portugal	Scientific	35	International

		personalisation capabilities					
Presentation	FCBA	IUFRO Div 5 2012	12/07/2012	France	Scientific Community, Policy makers, Industry	NA	International
Presentation	FCBA	COST ICT	05/07/2012	France	Scientific Community, Policy makers, Industry	NA	France
Presentation	FVA	IUFRO Conference Division 5 Forest Products; "Quality assessment on standing beech trees, logs, and sawn timber – a trial on knottiness"	08/07/2012 – 13/07/2012	Estoril, Portugal	Scientific	35	International
Presentation	FCBA	Project results presentation at "Commission Professionnelle Approvisionnement"	28/06/2012	France	Industry	NA	France
Presentation	FCBA	FORESEE project meeting	12/06/2012			NA	France
Presentation	FCBA	FOREXPO, Aquitaine	07/06/2012	France	Scientific Community, Policy makers, Industry	NA	France
Presentation	All	FlexWood Presentation	06/06/2012	Brussels	Policy makers	Approx.. 20	International
presentation	FCBA	National Federation of the Pulp and Paper Industry	10/05/2012	France	Industry	NA	France
presentation	FCBA	French Use Case @ Integration of ICT tools & methods in Forest Operations	10/05/2012	France	Scientific Community, Industry	NA	France
Presentation	UEF	The Finnish Society of Forest Science	19th April, 2012	Helsinki, Finland	Scientific	50	Finland, Czech Republic, Spain
Presentation	UEF	Seminar of Remote Sensing based Utilization of Forest Resiources, Tornator	26th January 2012	Joensuu, Finland	Industry/ Scientific	50	Finland
Conference	Logica	Mobilt GIS i Skogen ESRI Sweden	26/11/2011-27/11/2011	Stockholm	Industry	50	Sweden

Presentation/Conference	UEF	Finnish Remote Sensing Days	24th-25th November, 2011	Helsinki, Finland	Scientific	50	Finland, Estonia
Presentation/Conference	UEF	LiDAR Coordination Meeting	November, 2011	Oregon, USA	Scientific	50	USA
Conference	ALU-FR - FeLis	A method for linking TLS- and ALS-derived trees, Silvilaser 2011	17/10/2011	Hobart, Australia	Scientific/ Industry	120	World-wide
Conference	ALUFR-FobAwi	Silvilaser 2011	16 – 20 Oct 2011	Hobart, Australia	Scientific Community	120	worldwide
Presentation/Conference	UEF	Silvilaser 2011	17/10/2011-20/10/2011	Hobart, Australia	Scientific/ Industry	120	World-wide
Presentation/Conference	UEF	Silvilaser 2011	17/10/2011-20/10/2011	Hobart, Australia	Scientific/ Industry	120	World-wide
Presentation/Conference	UEF	The SNS-meeting in Forest Inventory and Forest Planning	17/08/2011 - 19/08/2011	Lycksele/ Sweden	Scientific	100	Nordic and Baltic countries
Conference	ALUFR-FobAwi	Council on Forest Engineering COFE	12/06/2011-15/06/2011	Québec, Canada	Scientific	160	North America / World-wide
Conference (with a proceeding) and Summer School	ULaval	34th Council on Forest Engineering Annual Meeting & Value chain optimization summer school; A SCOR-based framework to portray wood supply systems – Preliminary results from the United-States, France and Chile	12/06/2011-17/06/2011	Quebec City, Canada	Scientific/ Industry	30	Australia, Canada, Finland, France, Germany, New Zealand, Norway, South Africa, Sweden, Switzerland, USA
Conference	UMB	Forest planning	12/04/2011 - 13/04/2011	Drøbak, Norway	Scientific/ Industry/ Policy makers	66	Norway
Conference	ALU-FR FobAwi	4th Forest Engineering Conference 2011	05/04/2011-7/04/2011	White River, South Africa	Scientific	100	South Africa, EU, Europe non-EU, North America, South America, Australia, NZ
Conference 4th Forest Engineering Conference - Adapting to Structural Change	ULaval	SCOR-based framework to portray a wood supply system - Presentation and application in wood supply chain of different	05/04/2011-07/04/2011	White River, South Africa	Scientific/ Industry	20	Australia, Canada, Denmark, Finland, France, Germany, Latvia, New Zealand, Norway, South Africa, Sweden, Switzerland, etc

		countries					
Conference	Logica	Presentation at SkogForsk U-konf10	11/02/2011 - 12/02/2011	Umeå	Industry	200	Sweden, Finland, Norway
Presentation at Conference	IBL	New methods of inventory data collection at the example of FlexWood project	26/01/2011 - 28/01/2011	Ustroń-Jaszowiec, Poland	Scientific/ Forest Service	40	Poland
Conference	Loigca	Presentation of Flexwood project on Logica User meeting for forest customers	25/11/2010	Gävle	Industry	50	Sweden
Conference	Logica	Presentation of Flexwood project on RIU forest conference	11/11/2010	Skinnskatte berg	Industry	40	Sweden
Conference	Logica	Presentation of Flexwood on ESRI forestry conference	27/10/2010	Stockholm	Industry	30	Sweden
Conferences Nordic-Baltic Conference on Forest Operations	Skogforsk	Scrutinizing the wood supply chain – reporting from work in progress	20/10/2010-22/10/2010	Biri, Norway	Scientific	20-40	Finland, Norway, Sweden, Latvia, Poland
Conference	ALU-FR - IWW	Silvilaser 2010	14/09/2010 - 17/09/2010	Freiburg, Germany	Scientific	200	World-wide
Conference	ALU-FR FobAwi	XXIII IUFRO World Congress 2010	23/08/2010 - 28/08/2010	Seoul, Korea	Scientific	2734	World-wide
Conference Symposium FORMEC 2010 - Forest Engineering: Meeting the Needs of the Society and the Environment	Skogforsk	Scrutinizing the wood supply chain – reporting from work in progress	11/07/2010-14/07/2010	Padova, Italy	Scientific	20	24 countries from Europe, Asia, USA, Canada and New Zealand
Conference	ALU-FR FobAwi	FORMEC 2010	11/07/2010 - 14/07/2010	Padova, Italy	Scientific	119	European Union, Europe non-EU, Asia, North America, New Zealand
Conference	Logica	Presentation at SkogForsk U-konf10	03/03/2010 - 04/03/2010	Västerås	Industry	200	Sweden, Finland, Norway
Conference	Logica	Presentation at SkogForsk U-konf10	24/02/2010 - 25/02/2010	Jönköping	Industry	200	Sweden, Finland, Norway
Conference	Logica	Presentation at SkogForsk U-konf10	17/02/2010 - 18/02/2010	Sundsvall	Industry	200	Sweden, Finland, Norway

Seminar/Presentation/Workshop/Exhibition

Type of activity	Main leader	Title	Date	Place	Type of audience	Size of audience	Countries addressed
presentation	Laval	Seminar on the deliverables of FlexWood 5100 research mandate. The Forestry Research Institute of Sweden	21/12/2012	Uppsala, Sweden	Scientific Community	NA	Sweden
Presentation	FORAN	LIDAR for new products and services in forestry and Flexwood	31/10/2012	Holmen/Stockholm	Civil society	3	Sweden
Presentation	FORAN	LIDAR for new products and services in forestry and Flexwood	31/10/2012	Stockholm	Industry	3	Sweden
Presentation	FORAN	LIDAR for new products and services in forestry and Flexwood	28/10/2012	EoN/Linköping	Civil society	7	Sweden
Workshop	FCBA	Results of the Use Case to local industrials	25/10/2012	Aquitaine, France	Industry	NA	France
Workshops	UEF	Act Now Conference	15th-16th September	Joensuu, Finland	Civil society	4000	World-wide
Presentation	FCBA	French Use Case “FlexWood in Practice”	26/07/2012	Gascogne, France	Scientific Community, Policy makers, Industry	NA	France
Presentation	FORAN	LIDAR for new products and services in forestry and Flexwood	17/06/2012	Munksjö Billingsfors	Civil society	2	Sweden
Summer School	Laval	Value Chain Optimization Summer School; Agility and logistics systems in wood supply chains - Six international case studies	16/05/2012 – 18/05/2012	Thunder Bay, Canada	Scientific Community	NA	Canada
Presentation	ALUFR-FobAwi	Scion, NZ	15/05/2012	Freiburg, Germany	Scientific	1	New Zealand
Workshop	UMB	Presentation and discussion of	24/04/2012	Ås, Norway	Scientific	16	Norway

		workshop results			Community, Industry		
Presentation	FORAN	LIDAR for new products and services in forestry and Flexwood	15/03/2012	Gällivare allmänning	Civil society	11	Sweden
Presentation	Laval	Research work in the FlexWood project: opportunities for FORAC third research program?	15/03/2012	Quebec City, Canada	Scientific Community	NA	Canada
Presentation	Laval	Journée Expo-conférences FORAC; Logistics systems in wood supply chains: how to describe and evaluate them?	31/01/2012	Quebec City, Canada		NA	Canada
Presentation	FORAN	LIDAR for new products and services in forestry and Flexwood	27/01/2012	Luleå stift	Civil society	6	Sweden
Presentation	Laval	Institut Technologique Forêt, Cellulose, Bois-construction et Ameublement; Seminar on the deliverables of FlexWood 5100 research mandate	16/12/2011	Paris, France	Scientific Community, Industry	NA	France
Seminar	VTT, UEF	FlexWood – goals and achievements to date	12/2011	Finland	Industry/ Scientific	NA	Finland
Workshops	UEF	Act Now Conference	15/09/2011-16/09/2011	Joensuu	Civil society	4000	World-wide
Exhibition	ALU-FR-FeLis	Forest Day Karlsruhe	17/07/2011	Karlsruhe, Germany	Civil Society / Scientific	200	Germany
Summer School	ALUFR-FobAwi	Value Chain Optimization Network VCO	15/06/2011 - 17/06/2011	Québec, Canada	Scientific		North America / World-wide
Meetings with various companies	VTT	FlexWood Project in brief	01/01/2010 - 01/05/2011	Finland	Industry	2-5/meeting	Finland
Presentation at Arbeitskreis Forstlicher Luftbildinterpreten	FVA	Introduction and Progress in FlexWood	06/04/2011	Zürich	Scientific	10	Germany, Austria, Switzerland

Presentation	FORAN RS	Future dev. Flexwood concept	14/02/2011	Office, conf	Industry	1	Sweden
Presentation	FORAN RS	Future dev. Flexwood concept	07/02/2011	Office, conf	Industry	5	Sweden
Presentation	UEF	The ALS Research at UEF	15/12/2010	Joensuu, Finland	Scientific	30	Finland, Spain, China, Bangladesh
Workshop	BOKU	Value chains of small diameter hardwood	03/12/2010	Vienna	Scientific/ Industry	20	Austria
Presentation	FCBA	Presentation of the project to the two hosts of the Flexwood excursion during PM2: * LESBATS (sawmill) * CAFSA (forest cooperative)	17/11/2010	France (Bordeaux)	Industry	5	France
Presentation	FCBA	Presentation during the annual meeting of FCBA's sawmill commission	10/11/2010	France (Paris)	Industry (sawmilling)	25	France
Presentation	UEF	The use of crown metrics in tree level ALS detection	09/11/2010	Evo, Finland	Industry	50	Finland
Presentation	FCBA	Presentation at the professionnal fair "Vivons bois 2010"	05/11/2010	France (Bordeaux)	Industry (construction community)	50	France
Presentation/workshop	FORAN RS	Future dev. Flexwood concept	28/09/2010	Skeda udde Inn	Industry	Approx. 20	Sweden
Presentation at Arbeitskreis Forstlicher Luftbildinterpreten	FVA	Introduction to FlexWood	25/09/2010	Freiburg, Germany	Scientific	10	Germany, Austria, Switzerland
Presentation	FCBA	Presentation of the project to Smurfit Kappa	15/09/2010	France (Bordeaux)	Industry	2	France
Presentation	UEF	Utilization of non-parametric methods to map forest attributes using airborne laser scanning data.	25/08/2010	Soul, South-Korea	Scientific	100	World-wide
Presentation	UEF	Spearhead project meeting	22nd August, 2010	Joensuu, Finland	Scientific	30	Finland, China, Turkey, Spain, Brazil, Nepal, Russia
Exhibition	ALU-FR FobAwi	Interforst 2010	14/07/2010 - 18/07/2010	Munich, Germany	Scientific/ Industry	n/a	Germany, Europe
Workshop	UMB	Use of airborne laser scanning data and digital aerial	22/06/2010	Oslo, Norway	Scientific/ Industry	15	Norway

		photographs in vegetation mapping					
Presentations	Logica	Presentation to all present Logica Forestry customer at project meetings	01/05/2010 - ongoing	Gävle, Sweden	Industry	60	Sweden
Seminar	VTT	Finnish Wood research Ltd presentations	09/04/2010	Lahti, FI	Industry/ Scientific	50	Finland
Project steering group meeting, DigiPos -project	VTT	FlexWood Project in brief	05/04/2011	Espoo, FI	Industry	12	Finland
Seminar	VTT	The final seminar of the project SISU Puu	09/03/2010	Tampere, FI	All	200	Finland

Website

Type of activity	Main leader	Title	Date	Place	Type of audience	Size of audience	Countries addressed
Website	ALU-FR FeLis	Forest-Based Sector Technology Platform	01-02-2012	http://www.forestplatform.de/index.php/programme-und-projekte/forschungsprojektdatenbank/401-flexwood-flexible-wood-supply-chain	Scientific Community, Policy makers, Industry	Open to all	Germany, international
Website/application Web site of the 'Natural Sciences and Engineering Research Council of Canada Strategic Network on Value Chain Optimization'	ULaval	The Flexible Wood Supply Chain Project (FlexWood) - Press release - Project flyer	01/01/2011	http://www.reseauvco.ca/en/research/around-the-world/	Scientific/ Industry	n.a.	World-wide (English and French version)

in the section 'Activities & Networking / Around the World'.							
Sub-website in Polish language	IBL	FlexWood – Elastyczny Łańcuch Dostaw Drewna	2010	Internet: http://www.ibles.pl/projekty/flexwood/index.html	Open to all	Open to all	Poland
Website	FCBA	Information on FCBA's website "FLEXWOOD pour une chaine d'approvisionnement bois plus flexible"	01.11.2010	France	Forest-based sector stakeholders	N/A	France
Website/application	ALU-FR-Felis	EU-Büro des BMBF › Porträts EU-erfolgreicher Wissenschaftlerinnen:	01/08/2010	Bonn	Scientific	n.a.	Germany

Flyers

Type of activity	Main leader	Title	Date	Place	Type of audience	Size of audience	Countries addressed
Flyer	FCBA	2 page French Use Case description distributed at the final seminar of the national Intermodbois project (wood logistics and intermodal transportation)	12/07/2012	France	Scientific Community, Industry	NA	France
Flyer	FCBA	FOREXPO, Aquitaine; distribution of 2 page flyer on Use Case	07/06/2012	France	Scientific Community, Policy makers, Industry	NA	France
Flyer	ALU-FR-Felis	Distribution of flyer at Forests2011 Conference	2011-11-23-24	Leuven, Belgium	Scientific Community, Policy makers	200	international
Flyers	FCBA	Distribution of the Flexwood Flyer	01/12/2010	France	Forest-based sector stakeholders	N/A	France
Flyers	BOKU	Austrian Forest Forum	17/11/2010	Vienna	Scientific/ Industry/ Policy	Ca. 100	Austria

					Makers		
Flyers	ALU-FR-Felis	Distribution of the Flyer at Silvilaser Conference 2010	14/09/2010 - 17/09/2010	Freiburg	Scientific	150	Germany

Poster

Type of activity	Main leader	Title	Date	Place	Type of audience	Size of audience	Countries addressed
Article	FCBA	ECOFOR Network "les Echos d'ECOFOR n°22	24/09/2012	http://www.gip-ecofor.org/?q=node/365	Scientific Community, Policy makers, Industry	NA	France
Article	FCBA	Results summary for French professionals	10/2012			NA	France
Publication	UMB	Valuation of information obtained from different forest inventory approaches and remote sensing data sources	2012		Scientific Community	NA	World-Wide
Publication	UMB	Effects of tree crown delineation in individual tree species classification with hyperspectral and lidar data	2012		Scientific Community	NA	World-Wide
Publication	UMB	Characterizing forest species composition using multiple sensors and inventory approaches	2012	Scandinavian Journal of Forest Research	Scientific Community	NA	World-Wide
Publication	UMB	Tree species classification in boreal forests with hyperspectral data	2012	Transactions on Geoscience and Remote Sensing	Scientific Community	NA	World-Wide
Publication	UMB	Tree species identification using airborne laser scanning and multispectral imagery	2012	Canadian Journal of Remote Sensing, 38(2):125-138	Scientific Community	NA	World-Wide
Scientific publication	UEF	Predicting and calibrating tree size and quality attributes by	in press	Canadian Journal of	Scientific Community	NA	World-Wide

		means of airborne laser scanning and field measurements		Forest Research 42			
Scientific publication	UEF	Variable Selection for Nearest Neighbor Imputation in Remote Sensing Based Forest Inventory	2012	Canadian Journal of Remote Sensing	Scientific Community	NA	International
Scientific publication	UEF	Predicting the spatial pattern of trees with airborne laser scanning	2012	International Journal of Remote Sensing	Scientific Community	NA	International
Scientific publication	UEF	Improving species-specific plot volume estimates based on airborne laser scanning and image data using alpha shape metrics and balanced field data	2012	Remote Sensing of Environment 124: 534-541	Scientific Community	NA	Worldwide
Scientific publication	UEF	Decision support for selecting marked stands using airborne laser scanning data	2012	Manuscript	Scientific Community	NA	International
Document	Laval	Alternative logistic concepts fitting different wood supply situations and markets	2012	CIRRELT Research Document, 2012-24, 348 p.	Scientific Community, Industry	NA	International
Presentations	VTT	Representatives of Finnish woodworking industry and VTT customers	2012	Finland	Industry	NA	Finland
Article	VTT	Trade Magazines	2012	Finland	Industry	NA	Finland
Scientific publication	UEF	Silvilaser 2011: Comparison of the spatial pattern of trees obtained by ALS based forest inventory techniques	17/10/2011 – 20/10/2011	Hobart, Tasmania	Scientific Community, Industry	120	World-Wide
Scientific publication	UEF	SilviLaser 2011: Airborne laser scanning-based stem volume imputation in a managed, boreal forest area: a comparison of estimation units	17/10/2011 – 20/10/2011	Hobart, Tasmania	Scientific Community, Industry	120	World-Wide

Poster	ALU-FR-Felis	Poster session at Graduate School Day 2011	07/06/2011-08/06/2011	Freiburg	Scientific	40	Germany
Poster at Conference SilviLaser	ALU–FR IWW	An approach to combine two novel sensing-techniques for quality assessment of single trees and logs of branch diameters obtained by terrestrial laser scan data	14/09/2010 - 17/09/2010	Freiburg	Scientific	200	World-wide
Poster	ALU-FR-Felis	Poster session at Graduate School Day 2010	2010-07-10	Freiburg	Scientific	50	Germany

Article/Publication

Type of activity	Main leader	Title	Date	Place	Type of audience	Size of audience	Countries addressed
Publication	UEF	Silvilaser 2011	17/10/2011-20/10/2011	Hobart, Australia	Scientific/ Industry	120	World-wide
Publication	UEF	Silvilaser 2011	17/10/2011-20/10/2011	Hobart, Australia	Scientific/ Industry	120	World-wide
Publication	FCBA	Rapport annuel 2010 FCBA's annual report (2010) presents Flexwood in its wood supply chapter	01/04/2011	France	Forest-based sector stakeholders	N/A	World-wide
Scientific article	ALU-FR-Felis	Journal: Schweizerische Zeitschrift für Forstwesen, 06-2011	08/02/2011	Frenkendorf	Scientific/ Industry	n.a.	Switzerland, Germany, Austria
Media briefing	VTT	Woodworking industry and ICT	11/01/2011	Lahti, FI	Media	25	Finland
Article	ALU-FR-Felis	Newsletter Kontaktstelle Frauen in die EU-Forschung im EU-Büro des BMBF	10/08/2010	Bonn	Scientific	Unknown number of newsletter subscribers	Germany
Articles published in the popular press	Treemetrics	Barking up the right…	08/01/2010	Dublin	Civil Society	300000	Ireland