Ref. Ares(2018)6479776 - 17/12/2018

SHUTTLE

D9.3 SHUTTLE web site

Project Ref. N°	786913 - SHUTTLE
Start Date / Duration	01 May 2018 / 48 months
Dissemination Level	Public
Nature	Other
Due Date	M4 – 31/08/2018
Filing Code	SHUTTLE_D9.3_SHUTTLE-web-site_R1.0.docx
Associated Materials	https://www.shuttle-pcp.eu/

Executive Summary

This document describes the structure and contents of the public website set up for SHUTTLE on 12 November 2018 with the URL https://www.shuttle-pcp.eu/ and based on WordPress. It also presents the potential future developments.

On the SHUTTLE public website you can already find details about the project, its vision and concept as well as consortium, together with the list of Advisory Board members. Through the project it will become a major tool to present the project outcomes to a wide audience, its impact on the Forensic Community and to support online events involving the members of the SHUTTLE Network+Community. On-going activities will also be regularly updated and communicated through news and events.

The SHUTTLE public website has been set up and will be maintained and updated by ARTTIC.

The content of the public website has been presented and approved by the SHUTTLE General Assembly.

Deliverable Contributors

	Name	Organisation	Role in SHUTTLE
Deliverable Leader	Noémie Planchon	ARTTIC	WP9 Leader
Editor	Noémie Planchon	ARTTIC	WP9 Leader
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Internal Reviewers	Grégory Briche	MININT-IRCGN	Coordinator

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 786913.

Summary of contributions

Contributing Partners as defined in Description of Action (DoA)	Brief Description of Contribution to the Deliverable
ARTTIC	Set up the public website and wrote the deliverable
MININT-IRCGN	Reviewed and commented deliverable

Document History

Release	Date	Reason for change	Status	Distribution
R0.1	20/11/2018	First outline	DRAFT	Coordinator
R0.2	22/11/2018	Review made by the Coordinator	DRAFT	ARTTIC
R0.3	26/11/2018	Update of the document following the review made by the Coordinator	DRAFT	Coordinator
R0.4	30/11/2018	Update of the document following the review made by the Coordinator	DRAFT	Coordinator
R1.0	30/11/2018	Final version	DELIVERED	Consortium & EC

Contents

List of Figures

List of Acronyms / Abbreviations Used in this Document

Acronym / Abbreviation	Definition
EC	European Commission
EU	European Union
DoA	Description of Action
PCP	Pre-Commercial Procurement
Q&A	Questions & Answers
RFI	Request For Information
SHUTTLE	Scientific High-throughput and Unified Toolkit for Trace analysis by forensic Laboratories in Europe
WP	Work Package

1 Purpose of this document

The purpose of this document is to present:

- The objectives of the public website and target audience
- The structure of the public website in terms of pages and sub-pages
- The key messages and initial contents per page and sub-page

2 Objectives and target audience

The SHUTTLE public website is intended to present the project, the funding, its achievements and to raise awareness of the stakeholders.

Expected visitors of the public website will be:

- Forensic Laboratories / Institutes and their associations
- Suppliers of forensic technologies
- Magistrates and legal professions
- Police
- Policy making institutions (EC directorates; ministries of interior; EU Parliament…)
- Scientific / technological / community, medical examiners (coroners, …)
- EC officials

3 Structure of the public website

The SHUTTLE public website is composed of the following pages and sub-pages:

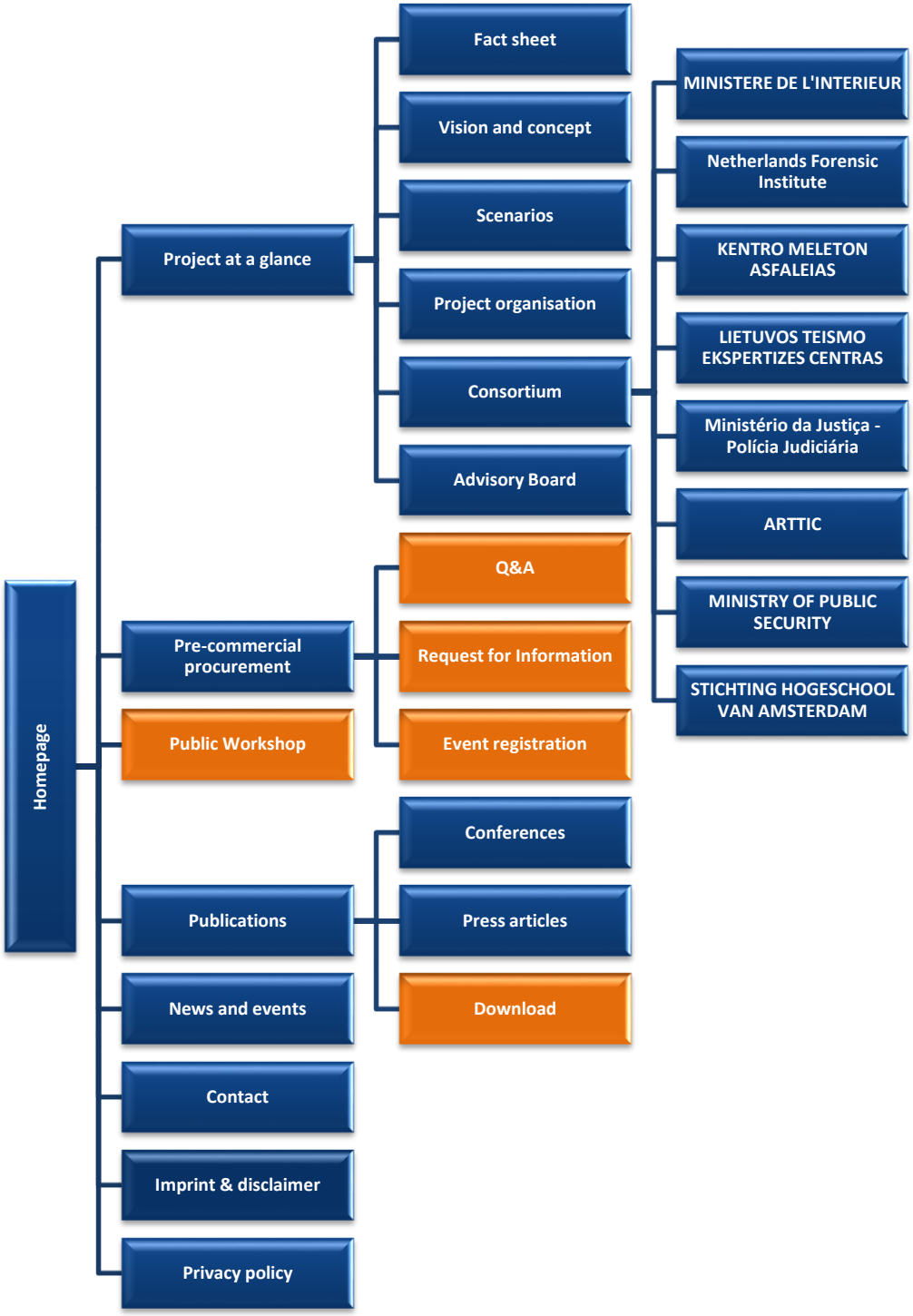

Figure 1: SHUTTLE public website structure

Legend:		
	Blue boxes	Initial content (already available online)
	Orange boxes	Potential future pages or modules

4 Logos and colour scheme

The SHUTTLE project logo is displayed on each page of the public website, together with the European Union emblem and the text referring to the EU funding, as per Grant Agreement.

Figure 2: SHUTTLE project logo

Figure 3: EU emblem

The colours used for the website were chosen in line with the SHUTTLE project logo. These colours were carefully chosen to be the project's visual identity to be used in all future communication material.

5 Illustrations

All the illustrations have been provided by the SHUTTLE partners and represent activities that are relevant for the project.

6 Technical details and features

The website has been realised using the open source WordPress (https://en.wordpress.com/).

The site has been optimised for work with all browsers and resolutions. Care was taken to allow for viewing using mobile devices as well.

The main navigation bar is in a horizontal position. The website pages re-adapt when viewing on a narrow screen, such as a smartphone, making all elements appear successively in a single column.

An internal search engine has been implemented, as well as a contact form that, when submitted, will send an email to the Project Management Office (ARTTIC).

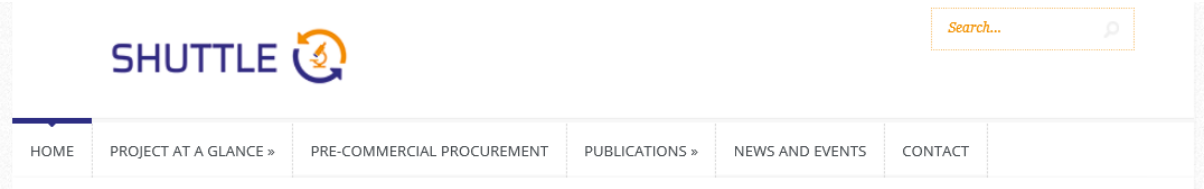

Figure 4: Main navigation bar

7 Homepage

The Homepage section presents the main information about the SHUTTLE project.

Figure 5: Homepage section

8 Project at a glance

The section Project at a glance contains 6 pages, described in the following chapters.

8.1 Fact sheet

It is the main page of the section, where key information and figures on the project are given.

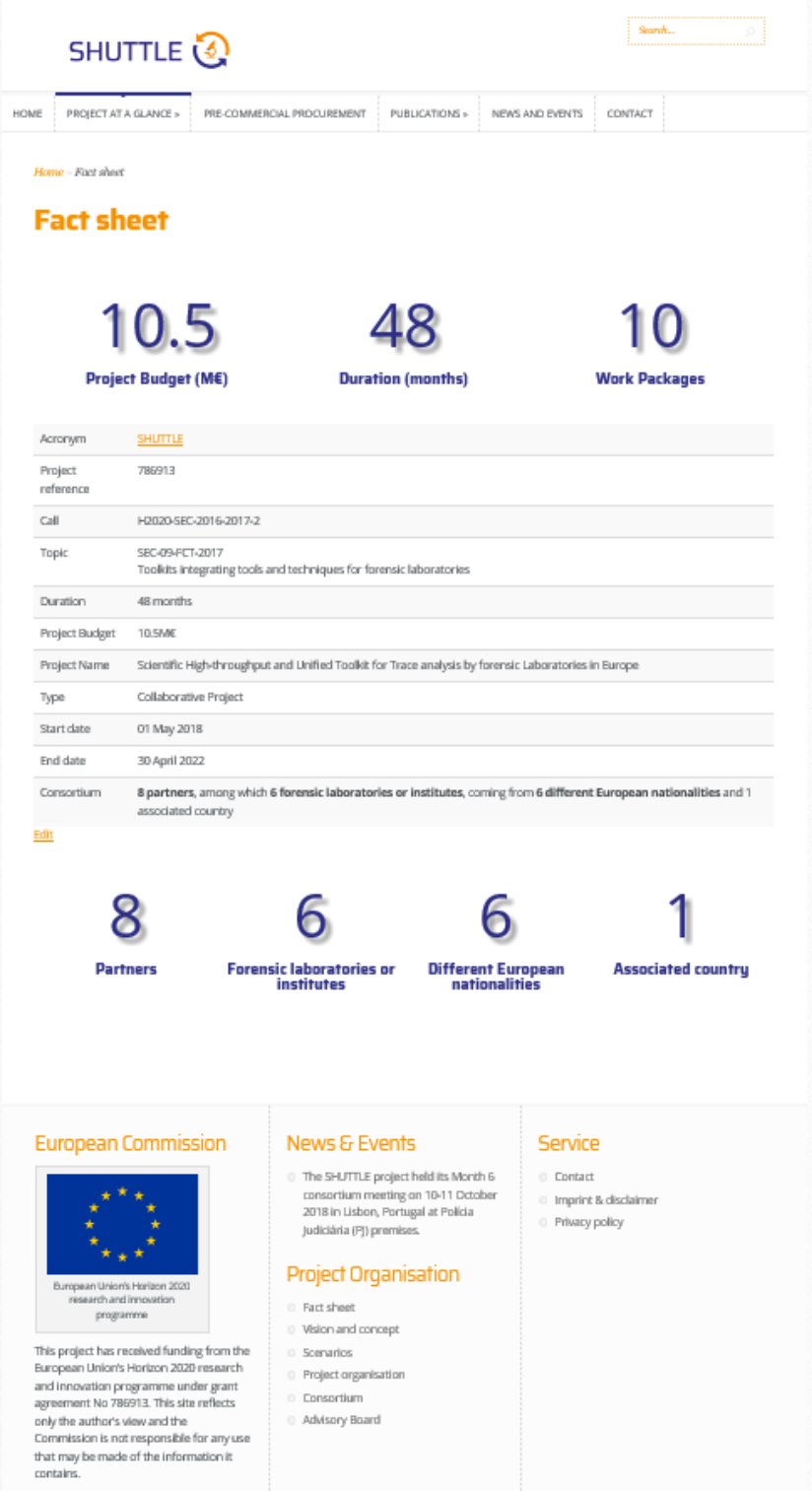

Figure 6: Fact sheet section

8.2 Vision and concept

On this page, the project vision and concept are detailed.

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Vision and concept

Vision

SHUTTLE will automate a significant part of forensic microtrace evidence examinations. The SHUTTLE **toolkit** will mainly consist of an **automated microscope** that will acquire high quality images of recovered microtraces. Images will be processed automatically and an overview of available microtraces will be reported. In first instance, we will focus on blood, skin cells, gunshot residues (especially NC), hairs, fibres and saliva. **Algorithms** to classify additional microtraces, or to classify microtraces more accurately can be developed by users and added as plug-ins to extend the range of microtraces that can be classified. The data will be stored in a computer **database**, thereby facilitating future data analysis, such as provenance of microtraces and forensic comparisons.

SHUTTLE aims to solve two major issues in forensic microtrace evidence investigation.

First, current **analyses are subjective** and require a high level of expertise and training of examiners. SHUTTLE will render analyses more objective and scientific. Second, microtrace evidence **analyses are time consuming and hence expensive**. This limits the number of cases in which analyses can be carried out.

Introduction of the SHUTTLE toolkit will have several advantages for forensic laboratories and their customers. The automation will allow a more efficient work flow, while the obtained results are more objective. The objective nature of the analyses and the available database will enable national or even international exchange of data.

Wide implementation of the SHUTTLE toolkit will **homogenise the procedures for microtrace evidence examination** in laboratories throughout Europe and hence facilitate better international collaboration and exchange of data. Laboratories may use data in a shared database for their database searches. In a similar way, data acquired by several laboratories can be used to calculate background populations and the calculation of the evidential value of the results. They may ask for help from international colleagues by just indicating a reference to the key under which data is stored in the joint database.

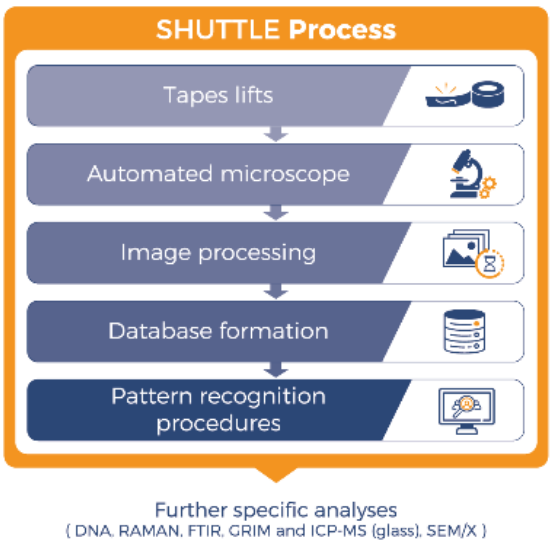
The **standardisation of working procedures** will form an excellent educational tool, as police officers and forensic can improve their knowledge by studying samples in the database. The SHUTTLE toolkit will also form a major incentive for Research and Development studies, e.g by enabling discrimination and background studies.

Concept

So far, all the trace analysis lean on the "Microscopist eyes". It's time-consuming, selective and hardly objective due to the complexity of the process.

The **SHUTTLE toolkit** will contain **4 tools** which will help to solve the current difficulties. Each of them, as well as their fluent interaction, is required for optimal operation.

- Microscopic grade **tape**. Tapes have been used to recover microtraces for several decades. Their popularity is based on easy handling, low cost and efficiency for many types of microtraces. A current disadvantage of tapes is that microscopic images acquired through tapes do not yield optimal image quality. Therefore, relevant microtraces are often transferred into glass slides to improve image quality. The tender will include the supply or development of a tape that allows imaging quality comparable to glass slides and facilitate analysis on surfaces much larger than can be achieved by standard glass slides.
- An **automated microscope** that will form the *eyes* of the SHUTTLE toolkit. It will acquire high quality images of microtraces that have been recovered using the developed tapes. The microscope will use a number of illumination modes for optimal discrimination and classification of microtraces. The microscope allows spectrometric colour analysis. The classification will be aided by advanced polarisation analysis. The required spatial resolution is moderate, but the total field of view is large, while acquisition time must be acceptable. The SHUTTLE microscope will be operated using clear and intuive software. The software allows the definition of a standard analysis procedure. In addition, there is a feature for advanced users that allows data acquisition using non-standard parameters.



- Algorithms for **image processing** that will form the *brain* of the SHUTTLE toolkit. The algorithms will process the images acquired by the microscope and classify the different types of microtraces present in the tape. The results of the algorithms are a table that contains a number of parameter vectors for every microtrace, such as the coordinates on the tape, the colour, polarisation characteristics, morphology, and class (e.g. 'blood', 'fibre', 'glass', etc.). These algorithms can be executed via a GUI (graphical user interface). Via this GUI, users can execute the algorithms developed within the SHUTTLE project. In addition, the can develop and share additional algorithms and plug them into the GUI. Such additional algorithms may serve to classify additional microtraces, or to make a better subclassification. As an example, the SHUTTLE toolkit might classify a microtrace as a 'hair', while additional algorithms can discriminate and classify 'scalp hairs, 'pubic hairs', 'body hair', or even discriminate hairs from different animals.
- A **database** and search algorithms, that will form the *memory* of the SHUTTLE toolkit. This database will contain the data (raw, processed or both) acquired by the microscope and processed by the image processing algorithms. The database structure is made in such a way that the data acquired by the SHUTTLE toolkit can be related to data acquired by other techniques. To achieve this, it is possible to add into the database parts that contain data from e.g. FTIR, MSP, dye analysis, etc. The database contains a robust back-end and a user-friendly front-end. The front-end should have the same look and feel as (or even be integrated with) those for instrument and the image processing routines. The database will focus on experimental data and will (as is currently foreseen) not contain case information (such as case identifiers, names of suspects and victims) to prevent security and privacy issues. The search algorithms should allow searches for similar samples in the database. The search algorithms yield numbers or probabilities that can be used to calculate the evidential value of a result, e.g. using Bayesian statistics.

The aim is to make a powerful and versatile toolkit to solve the major issues in forensic microtrace evidence investigation. Additional specifications will be set on privacy issues, training, user-friendliness, long-term sustainability and integration with other techniques.

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News & Events

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Figure 7: Vision and concept section

8.3 Scenarios

This page provides three scenarios on the use of the SHUTTLE toolkit. These scenarios explain how the SHUTTLE consortium intends to implement the toolkit into the forensic practice.

Note: these scenarios do not cover all aspects of the toolkit and include elements that may not be implemented during the current project. However, the SHUTTLE toolkit to be developed should be prepared for these features.

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Scenarios

This section provides a number of scenarios on the use of the SHUTTLE toolkit. ***These scenarios explain how the SHUTTLE consortium intends to implement the toolkit into the forensic practise****. Note that these examples do not cover all aspects of the toolkit. Also note that the scenarios include elements that may not be implemented during the current project. It is e.g. not foreseen that the SHUTTLE toolkit will be in use at non-specialised police laboratories during the project. Also, the implementation of a national or international database is not yet planned. However, the SHUTTLE toolkit to be developed should be prepared for these features.*

Scenario 1 Revenge:

An unknown man is found dead in a quiet, residential area late in the evening. His clothing is recovered and taped by the police to collect micro traces. The tapes are analysed in the next hours by the SHUTTLE microscope that has been acquired by the police station. The police laboratory worker is not specialised in trace evidence, but has been trained to use the SHUTTLE microscope. The **images are automatically saved in a national database**, and a trace evidence examiner in the national forensic laboratory evaluates the data. Many pieces of glass are found on the clothing. Most of these are so small that they can hardly be seen by bare eye. Also, many black fibre traces have been recovered from the man's coat. The origin of these fibres is unknown, but their location and distribution indicate that they originate from an attacker. The police hypothesises that the incident may be related to a burglary a few blocks from the place where the victim was found. Policemen recover shards of glass originating from the broken window. During this investigation, they also note the black sweater of the inhabitant. The tapes, shards and the sweater are all sent to the forensic lab for further study. The analyst isolates a number of glass particles from the tapes: the SHUTTLE toolkit can *classify* glass, but not *discriminate* between glass from different sources. Isolation is also however straightforward, as the coordinates of the particles are stored in the dataset acquired by the police. Some reference fibres ('known material) from the sweater are also analysed by the SHUTTLE toolkit. **The analyst compares the properties of the fibres from the sweater and those on the tapes**, and finds they match in all investigated aspects. In addition, glass comparison also results in a match. Confronted with this information, the owner of the sweater admits that he chased a burglar that had entered his house, caught him, and kicked him until he collapsed.

Scenario 2 Dark matter:

A woman is stabbed in a racially motivated attack in a shopping mall. The attack, caught on CCTV, lasted less than a second and did not involve any direct contact between the victim and the attacker. The CCTV footage leads to the arrest of a suspect within a few hours. The knife, found on the crime scene, the clothing (sweater, trousers) of the suspect, and tape lifts from the suspect's hands are sent by courier to the forensic lab. In the laboratory, the clothing is taped. Also, the traces found on the knife are transferred to tape. **All tapes (knife, suspect's clothing and hands) are analysed by the** SHUTTLE microscope**.**

This analysis shows that the hands of the suspect contain several polyester fibres with an intense dark colour. Identical fibres are found on the handle of the knife. A European wide database search for these fibres reveals that similar fibres have been found in a glove that was analysed by a different SHUTTLE microscope in an unrelated case elsewhere in Europe. It is hypothesised that the suspect wore gloves during the attack but discarded them afterwards. Instantly, policemen search the road from the shopping mall to the suspect's home. In a trash can, two gloves are found. These are taped and analysed by the SHUTTLE toolkit. Between the many fibres on the tapes, **the SHUTTLE toolkit locates small spots that are classified as blood**. The analyst cuts out the area of the glove where the blood traces originated from. DNA analysis reveals a profile matching that of the victim.

Scenario 3 Casual encounter:

In a case investigation, **the suspect and the victim are neighbours and may have a legitimate contacts** in the hours before the victim was killed. Due to these earlier contacts, it becomes of paramount importance to discriminate the trace distribution after the possible legitimate encounter and an attack. The forensic expert asks forensic students of a national high school to carry out reconstructions. The students reproduce the scenarios put forward by the suspect and by the prosecutor. During these tests, the students wear highly fluorescent clothing to facilitate easy analysis. After the tests, tape lifts of the clothing are taken and analysed by the SHUTTLE toolkit present at the high school. The fluorescence enables quick and easy classification of the transferred traces. Within 30 days, the students report on the distribution of fibres traces following a fight and a casual encounter (as described by the suspect). **The images provided by the students, created using the SHUTTLE toolkit, clearly show where transferred fibres can be expected**. The forensic expert compares these images with the distribution of fibres found in the case and concludes that the trace distribution is consistent with a legitimate encounter, but not with the scenario put forward by the prosecution.

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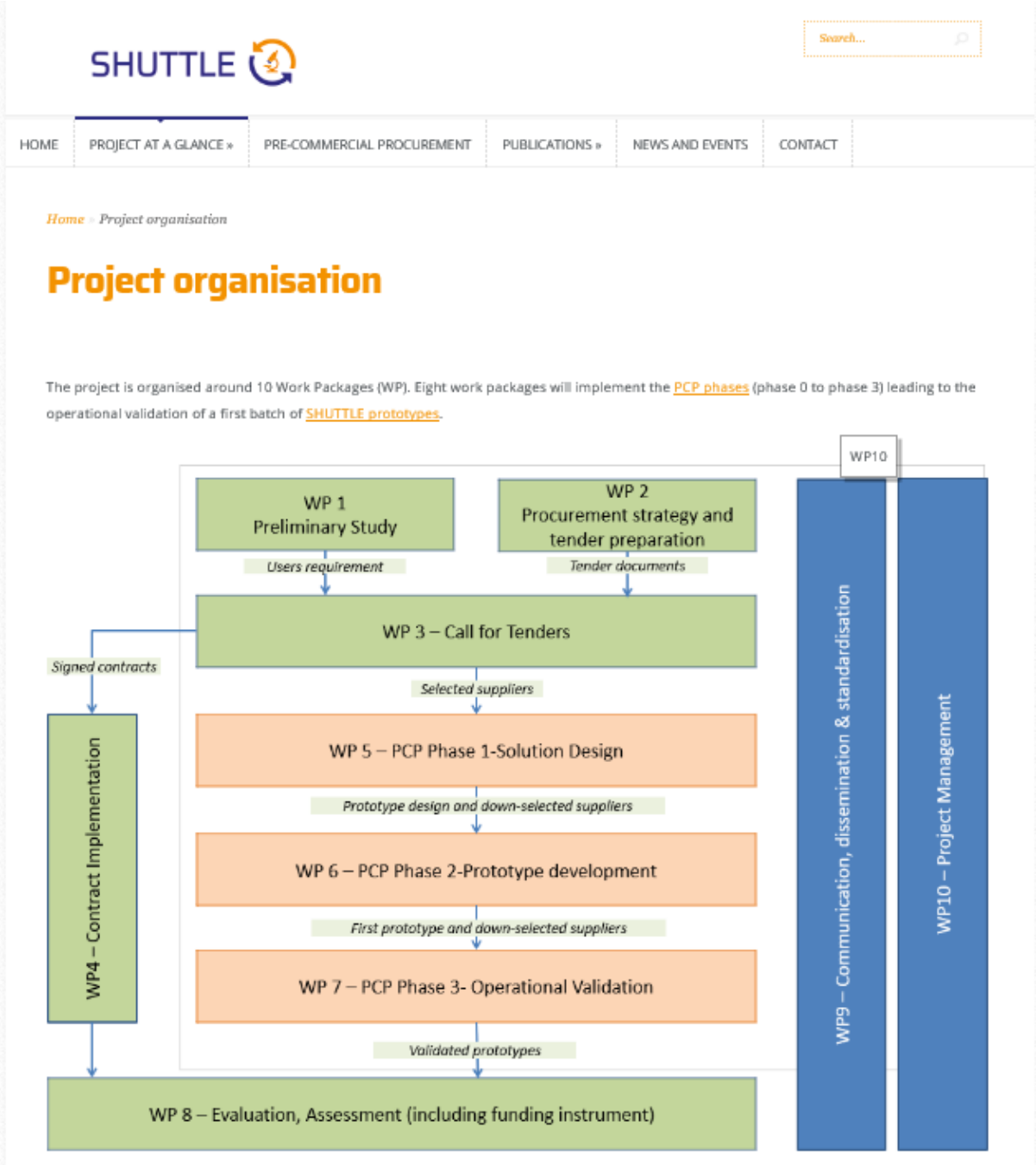
Figure 8: Scenarios section

8.4 Project organisation

On this page, the structure of the project is detailed with the list and contents of each Work Package (WP) of the project.



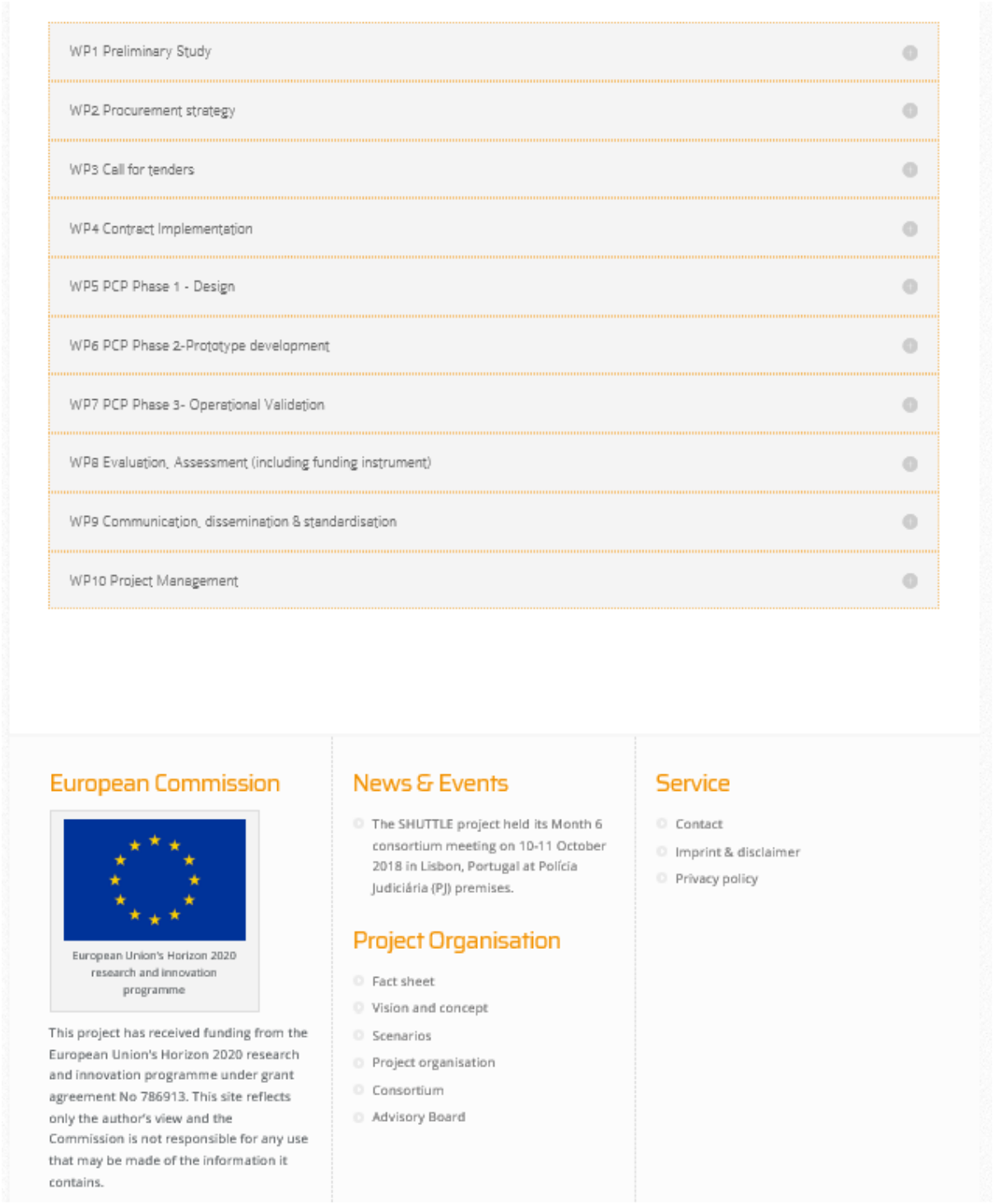


Figure 9: Project organisation section

8.5 Consortium

On this page, a map showing the location of the partners involved in SHUTTLE can be found. The partners' logos are listed on the map and below. A click on one of the logos directly redirects the visitor to the description of the organisation and its role in the project, with a link to the organisation website.

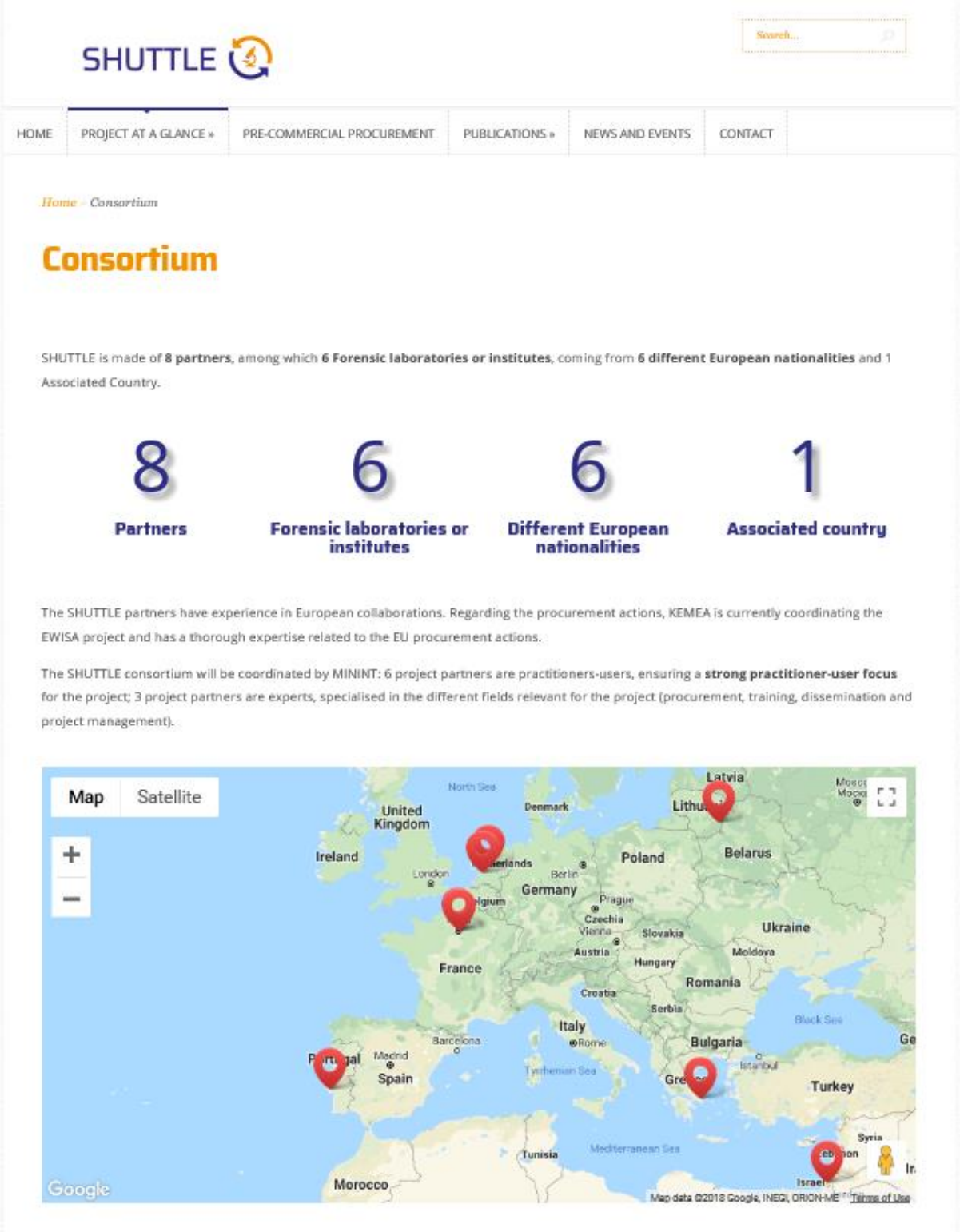
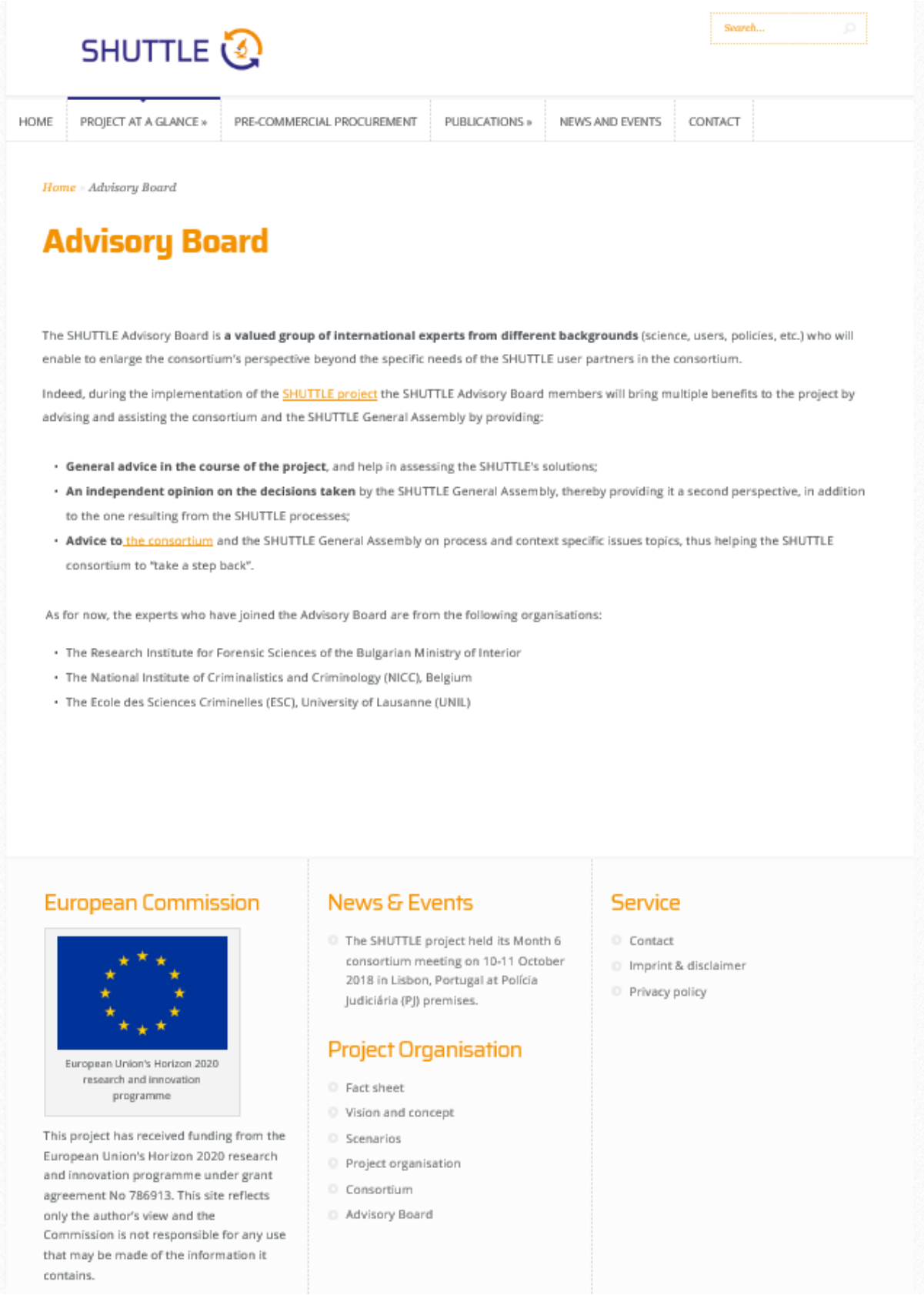


Figure 10: Consortium section

Each partner is then detailed in one page. The content was provided by the partners themselves.

8.6 Advisory Board

On this page, the SHUTTLE Advisory Board is presented with its members.



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Advisory Board

The SHUTTLE Advisory Board is **a valued group of international experts from different backgrounds** (science, users, policies, etc.) who will enable to enlarge the consortium's perspective beyond the specific needs of the SHUTTLE user partners in the consortium.

Indeed, during the implementation of the SHUTTLE project the SHUTTLE Advisory Board members will bring multiple benefits to the project by advising and assisting the consortium and the SHUTTLE General Assembly by providing:

- **General advice in the course of the project**, and help in assessing the SHUTTLE's solutions;
- **An independent opinion on the decisions taken** by the SHUTTLE General Assembly, thereby providing it a second perspective, in addition to the one resulting from the SHUTTLE processes;
- **Advice to** the consortium and the SHUTTLE General Assembly on process and context specific issues topics, thus helping the SHUTTLE consortium to "take a step back".

As for now, the experts who have joined the Advisory Board are from the following organisations:

- The Research Institute for Forensic Sciences of the Bulgarian Ministry of Interior
- The National Institute of Criminalistics and Criminology (NICC), Belgium
- The Ecole des Sciences Criminelles (ESC), University of Lausanne (UNIL)

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Figure 11: Advisory Board section

9 Pre-commercial procurement

On this page the pre-commercial procurement process and timeline are described. Further information will be provided at the appropriate time throughout the project.

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Pre-commercial procurement

Public procurement is the process whereby public authorities purchase equipment and services from the commercial sector. **Pre-commercial procurement is a special form of public procurement which is adapted to research and innovation**: public authorities in **a step-by-step process** select organisations which offer to carry out research and innovation activities. After a first early prototyping stage, a reduced group of finalists is retained to deliver the final prototypes. Based on the outcome, then a commercial procurement phase starts. For more information, please click on "show information" below.

Pre-commercial procurement (PCP) action

show information

Process and timeline

The SHUTTLE project started in May 2018. During the first months of the project, the consortium members will define the requirements for the SHUTTLE toolbox. **Starting from November 2018**, the consortium will organise an open market consultation to connect with relevant companies to probe industry interest and be informed on the state-of-the-art. These will be published in a **tender around June 2019**. Received tenders will be reviewed by the consortium and **a number of companies will be awarded a contract (January 2020)** to produce a concept design, consisting of detailed design specifications of hardware and software. **The providers of the most promising concept designs will be invited (November 2020)** to build a prototype and through an operational validation possibly a larger range of products. Please note that the mentioned dates are according to current planning and might be adjusted due to circumstances.

Figure 12: Pre-commercial procurement section

10 Publications

The dissemination activities of the SHUTTLE partners will be listed in the 'Publications' page. When possible, partners will also be encouraged to advertise their dissemination material (presentations, conference papers, scientific publications, etc.) on the SHUTTLE project website.

10.1 Conferences

On this page, all conferences in which SHUTTLE partners participate are listed.

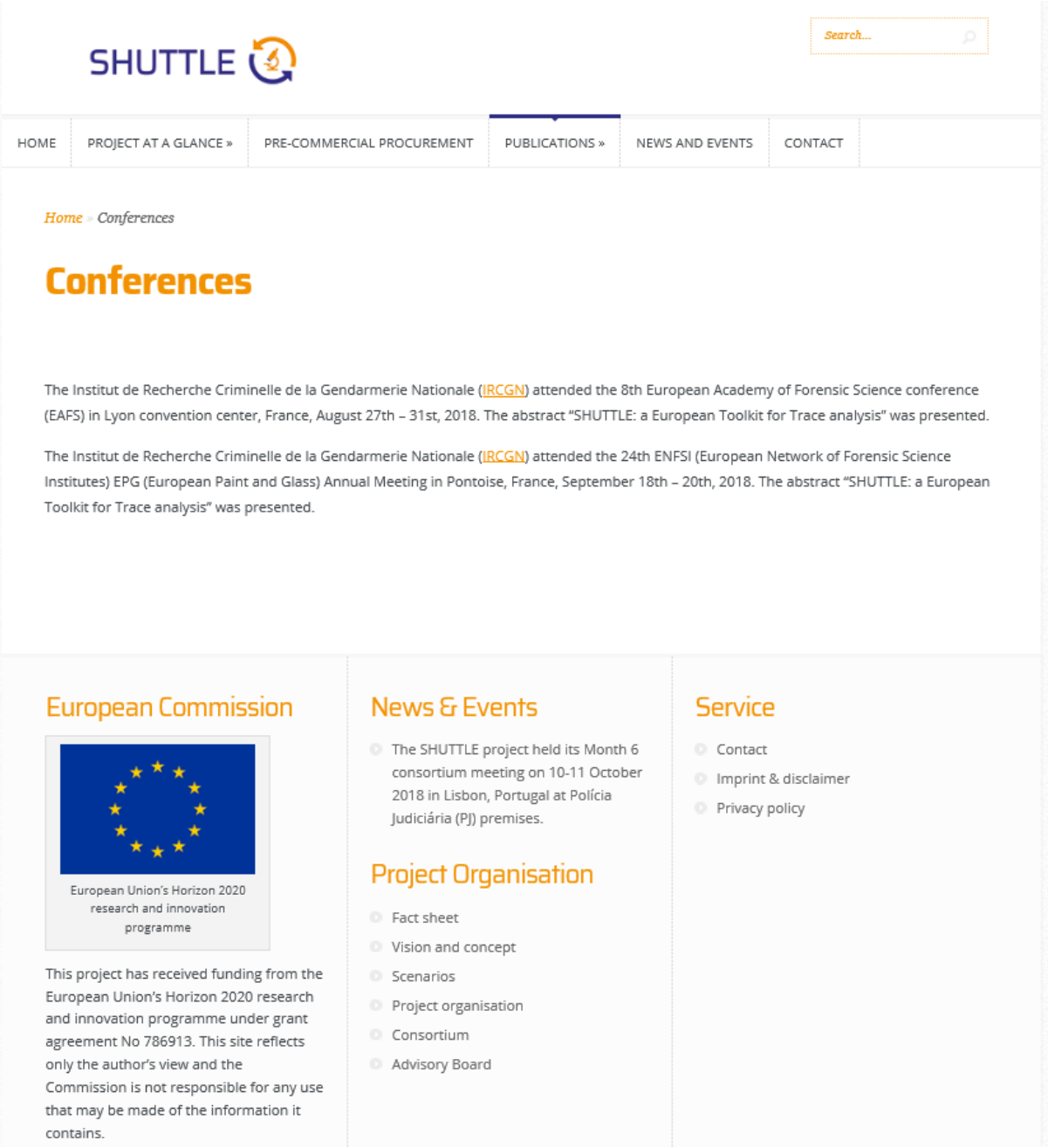

Figure 13: Conferences section

10.2 Press articles

Links to press articles published by consortium members will be available here. It is currently empty as no press article has yet been published.

Figure 14: Press articles section

11 News and events

This page provides information on past and upcoming news and events related to SHUTTLE, such as project meetings, participation in international conferences, etc.

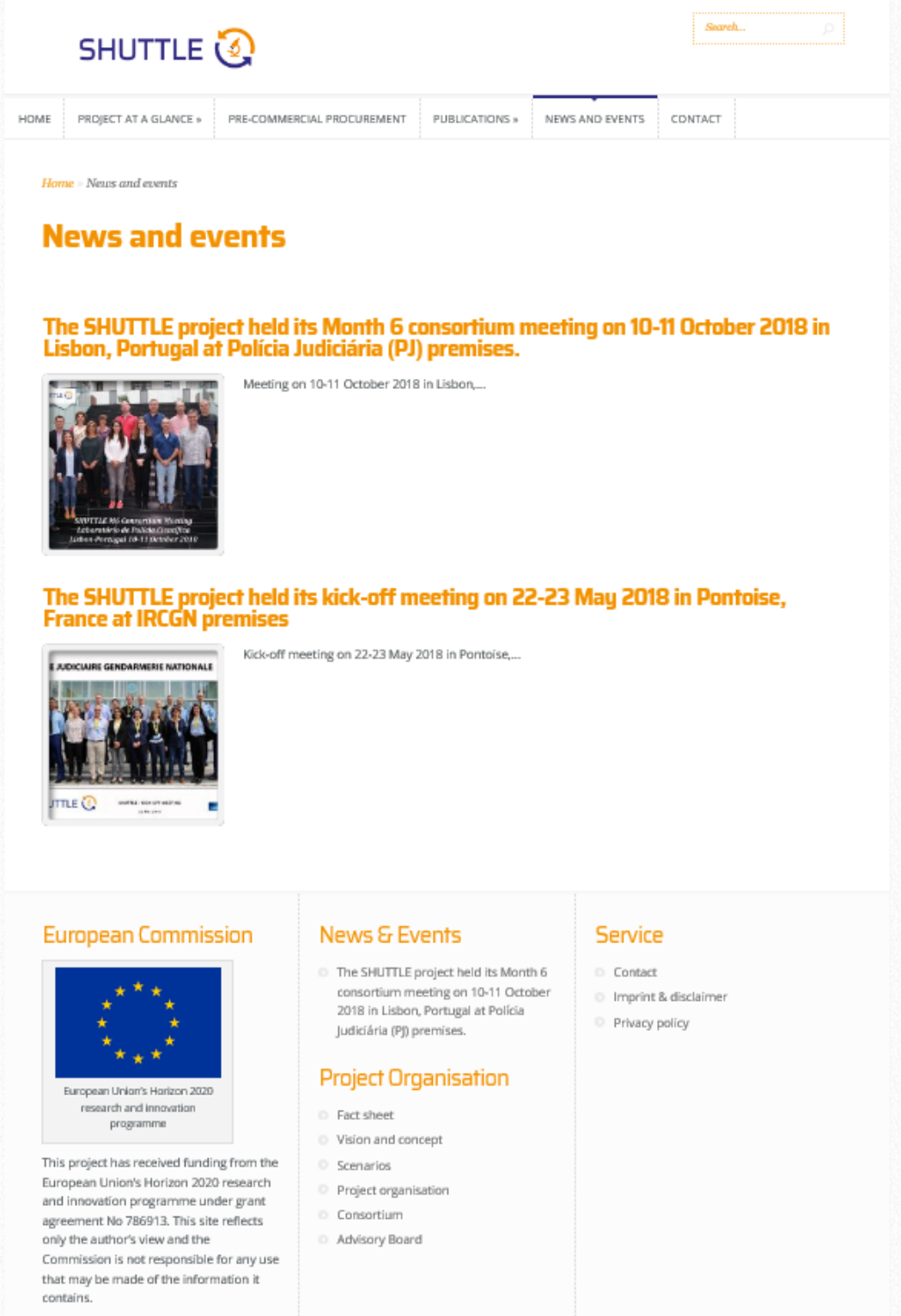

Figure 15: News and events section

12 Contact

On this page there is a contact form for visitors to ask questions or get in touch with the project partners. All messages sent via the contact form will be redirected to ARTTIC who manages the public website back office and who filters them.

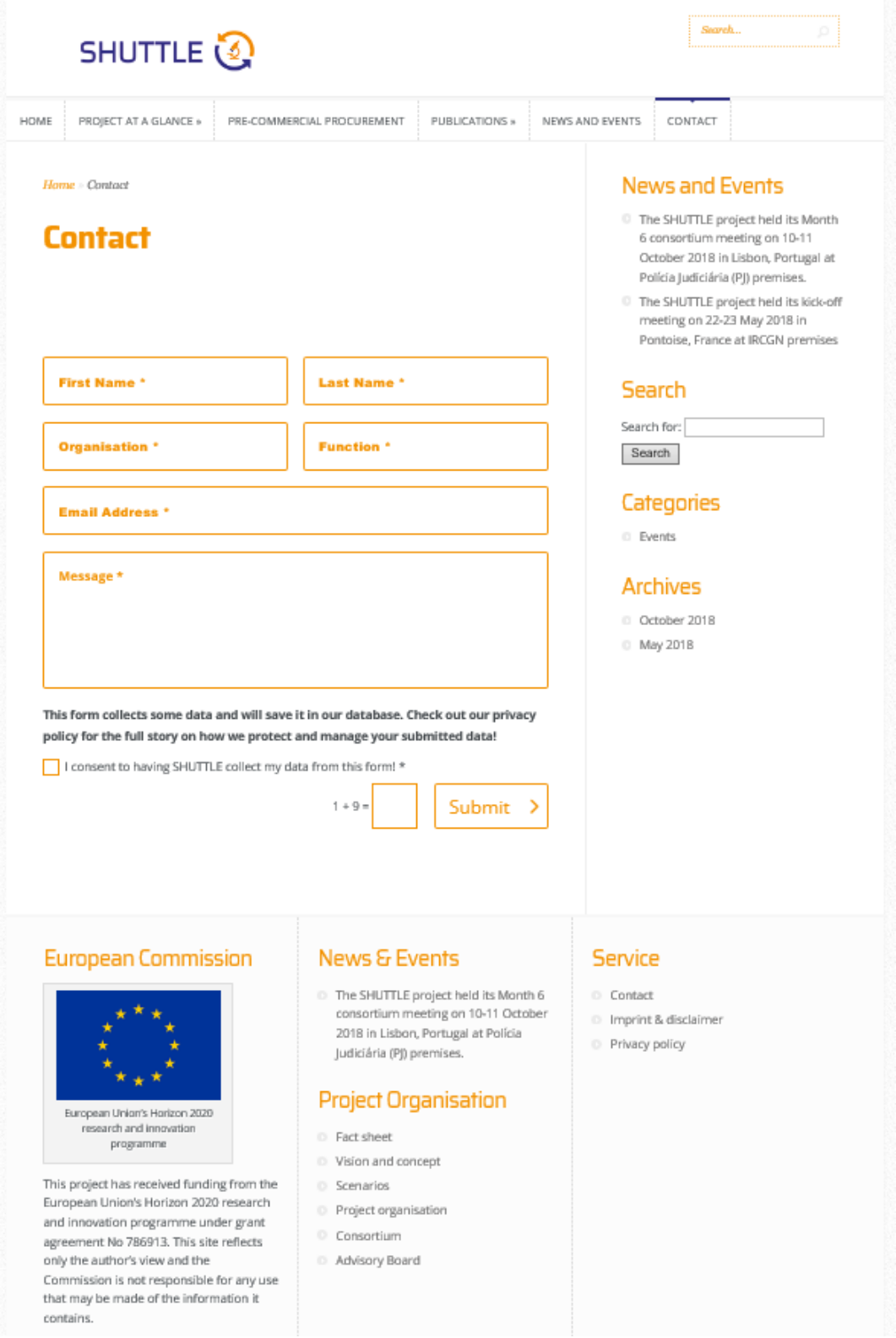

Figure 16: Contact section

13 Evolution of the public website and planned future developments

13.1 Public workshop

The project will organise a public workshop during its lifetime. Dedicated pages will be created to advertise it.

13.2 Download

All project communication and dissemination material will be made available for download.

13.3 Q&A, Request for Information and Event registration

The SHUTTLE project then intends to run a Pre-Commercial Procurement (PCP) action between forensic institutes across Europe to mitigate these technical and financial barriers and jointly carry out the procurement of the necessary Research and Development (R&D) activities to develop a machine+toolkit that will integrate different tape analysis tools to automate the routine part of the work of trace evidence examiners and, eventually, strengthen further judicial and police cooperation.

Some elements of it may be uploaded on the public website. Notably, the addition of the following functionalities is currently under consideration:

- Questions & Answers (Q&A) section
- Request for Information (RFI)
- Event registration

13.4 Content management

The upkeep of the SHUTTLE project website will be performed by the Project Management Office (ARTTIC) as part of WP9.

Besides the evolutions of the public website mentioned above, minor updates will be done in agreement with either the Coordinator and, when required, the General Assembly and the Executive Board.

Major updates or the publication of scientific results will be subjected to a vote of the SHUTTLE General Assembly.

14 Conclusion

The public website is available since 12 November 2018. It is fully operational and provides general information about SHUTTLE. This is an important means to achieve the overall project dissemination objectives. The specific objective of the public website is to increase awareness of the project benefits among target audiences.

This deliverable provides an overview of the current content of the public website. The website will be regularly updated to ensure relevant content and a dynamic user experience. To publicise the public website, it is recommended that partners highlight the URL (https://www.shuttle-pcp.eu/) in project dissemination materials. To further increase diffusion of information, the partners are encouraged to link to it as much as possible and metadata for search engine indexation will be updated as more content is added.

Updates will become more and more frequent as the project progresses so it should be consulted regularly to get access to new contents.