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## D1.1 DOCUMENTATION OF KICK-OFF MEETING

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This document describes the EUNISON kick-off meeting that was held in Stockholm on 11-13 March 2013. It is a compilation of items from the agenda and of notes taken by several meeting participants.

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## 1. Introduction

The EUNISON project started officially on 1<sup>st</sup> March, 2013. The kick-off meeting was held at KTH in Stockholm on 11-13 March. Accommodation, coffee breaks and some of the meals were provided by KTH, while the travel was paid by each participant.

## 2. Meeting format

### 2.1 Attendance

All five project participant sites and all WP's were represented for the duration of the meeting.

Participant	Name	Role	Comment
KTH-TMH	Ternström, Sten	PC, WP1 leader	
KTH-TMH	Engwall, Olov	WP7 leader	
KTH-TMH	Selamtzis, Andreas	WP7 PhD student	
KTH-HPCviz	Hoffman, Johan	WP2 leader	
KTH-HPCviz	Jansson, Johan	WP2 researcher	
KTH-HPCviz	Nyazi Cem Degirmenci	WP2 researcher	
KTH-CB	Örjan Ekeberg	WP7 researcher	
LaSalle	Oriol Guasch	SC, WP5 leader	
LaSalle	Francesc Alías	WP8 leader	
FAU	Stefan Becker	WP3 leader	
FAU	Stefan Kniesburges	WP3 researcher	
FAU	Stefan Müller	WP3 researcher	
CIMNE	Ramon Codina	WP4 leader	
CIMNE	Joan Baiges	WP4 researcher	
GIPSA-Lab	Xavier Pelorson	WP6 Leader	
KTH-TMH	Lingonbacke, Carina	Administrator	Opening session only
KTH Research Office	Marina Backer Skaar	KTH LEAR	
KTH Research Office	Jeanna Ayoubi	Liaison officer	
KTH Research Office	David Spangenberg	Legal Advisor	



*Oriol Guasch and Ramon Codina*



*Sten Ternström*



*Joan Baiges, Xavier Pelorson, Stefan Müller, Stefan Kniesburges, Cem Degirmenci and Örjan Ekeberg*

## 2.2 Schedule

<i>Item</i>	<i>When</i>	<i>What/where</i>	<i>Presenting</i>
10	11.30	Assemble at TMH room Fantum	All
20	12:00 – 13:00	Lunch at restaurant <i>SysterObror</i>	All
	Monday afternoon		
30	13:00 – 13:15	Welcome and overview	<i>ST, OG</i>
40	13:15 – 14:00	Management and financial issues, incl. Consortium Agreement	KTH Research Office <i>JA, DS, MBS, CL</i>
50	14:00 – 16:30	WP status reports – what we are bringing in at project start	WP leaders
60	16:30 – 17:30	Modeling with replicas – what we can/can't do, how we link to simulations	<i>XP, SB</i>
70	17:30 – 19:00	Dinner at <i>La Ciociara</i> , Valhallavägen 69	
80	Monday evening 19:00 – 20:30	Introduction to FEniCS Parallel-processing resources at KTH	<i>JH, JJ</i>
90	Tuesday morning 09:00 - 12:00	Complete models: scope, architecture, interfaces	<i>OG</i> moderator
100	12:00-13:15	Lunch at <i>Östra Station</i>	Researchers
110	Tuesday afternoon 13:15 - 17:00	WP work plans – how we intend to reach Milestone 1, forms of deliverables	WP leaders
120	Tuesday evening 18:30 – 22:00	Dinner and socials, <i>Wallquistska Huset</i> , Vil-lagatan 19.	Researchers + <i>CL</i>
130	Wed. morning 09:00 – 12:30	<ul style="list-style-type: none"> <li>• Teleconferencing: platform and routines</li> <li><i>Study groups</i></li> <li>• Data formats for sharing of models and results (geometry, computational grids)</li> <li>• Dissemination 1<sup>st</sup> year</li> <li>• Collaboration with other FET projects</li> <li>• Calendar: Fix schedule of coming meetings for year 1 (to Feb 2014)</li> <li>• Conclusion</li> </ul>	<i>ST</i>  Breakout into groups  Reconvene
140	12:30	Lunch at <i>Quantum Hyllan</i> “The Shelf”	Researchers
150	Departures		

## 2.3 Activities

### 11 March, Monday afternoon:

- the Coordinator Sten Ternström welcomed all, personal introductions were made, and ST gave a condensed version of the slide show “The FET Spirit and 12 Paradoxes” as an inspiration to the project members.
- The KTH Research Office described the essentials of management and financial issues, including the Consortium Agreement.
- The seven research Work Package leaders presented, for about 20 minutes each, the current state of preliminary Eunison-related work already done at the respective sites. These presentations are summarised in section 3.
- A general discussion on the status and potential of mechanical replicas was held.

### 11 March, Monday evening

Johan Jansson and Johan Hoffman gave an introduction to unified-domain simulations in the framework FEniCS, which will be the main vehicle of the final Eunison numerical model.

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### 12 March, Tuesday morning

The three-year outlook: building a complete model of the voice: scope, architecture, interfaces

The desired final goal of the project, i.e. the state of the simulations after year 3, was discussed in some detail.

Regarding the voice simulator, it was agreed that the visual representation should be understandable to the lay public, meaning that the model should include realistic and recognizable representations of the articulators involved, rather than the control of a tube; and that the control parameters should be visually understandable.

The first step will be to start with a rudimentary model, then incrementally refine. For the VT this signifies taking the existing 3D model of the tongue, teeth, palate etc to generate the VT tube. The thus calculated VT shape will be used input to WP5. For the VF, S.T. will investigate the use of previous work, either based on standard literature references or employing an existing model (e.g. Titze et al).

Regarding the software framework and means of interaction for the unified system, a fundamental question discussed was whether the remote control should be real-time or not, and what the user should be able to synthesize: syllables or entire sentences. It was concluded that even though there are possibilities to implement model reduction, to simplify and speed up the calculations to close to real-time, two main interaction alternatives would be batch computing (i.e. that the user submits a request to synthesize a particular sequence with given settings) and a pre-generated (and growing) library of illustrative examples that could be used for e.g. education.

It was also discussed whether the batch calculations should be made with hardware available at the partner sites, or if a system needs to be implemented in which the user would purchase "cloud computing time."

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### 12 March, Tuesday afternoon

A discussion was held, for each Work Package, of how to reach the goals for Milestone 1. Minimal, nominal and exceeded target scenarios were enumerated. The major points of this discussion are summarised in Section 4.

A one-hour break-out was made for a short visit to the nearby KTH PDC Center for high performance computing, kindly hosted by Gert Svensson. The PDC facility will be instrumental to the computational work in Eunison.



*Örjan Ekeberg and Johan Hoffman  
visiting KTH PDC*



*Cray XE6 "Lindgren", Stefan Becker,  
Stefan Müller, Stefan Kniesburg*



*Olov Engwall pondering an array of  
superfluous VGA connectors*

### **13 March, Wednesday morning**

Videoconferencing: ST gave an overview of videoconferencing as hosted by KTH. Videoconferencing will be norm for scheduled Eunison meetings. Details will follow, in preparation for the first Technical Board meeting.

Logistics: alternatives for a collaborative office platform were discussed, but no conclusive decision was made.

Dissemination: The project website and the public visibility of its contents were discussed. The moderator was WP8 leader Francesc Alías. Upcoming relevant conferences in 2013 were enumerated. Partners were requested to communicate all Eunison related publications and outreach events to WP8. The principles for pre-announcing article submissions and conference attendance to the project partners for preview were established. Contact with other FET projects (mandated by the EC) was discussed. Francesc Alías had produced a selection of possible logotypes. After a brief discussion, the meeting selected one of them as the official Eunison logo. This was completed in about 15 minutes (sic).

## **3. Initial status of project**

The initial presentations are summarised below. The corresponding presentation files have been collected by the coordinator.

### **3.1 WP1**

Management resources are represented by KTH Research Office. KTH has ample experience and support for EU project administration. KTH will also provide collaboration infrastructure such as remote file-sharing and teleconferencing. A few Consortium Agreements remained to be signed and this was achieved during the meeting.

### **3.2 WP2 presentation by Johan Hoffman**

- Short introduction on FEniCS showing some examples of flow cases.
- Adaptive mesh refinement on the basis of local flow conditions in the flow field.
- Free meshing tool Salome for generation of the numeric grids.
- First results of the coupled phonation case with the vocal fold models of Erlangen with a constant Young's modulus.

### **3.3 WP3 presentation by Stefan Kniesburges**

- Introduction to the experimental setup including the devices for flow conditioning, the subglottal channel and the vocal fold models.
- Material conditions of the vocal fold models: frequency-dependent Young's modulus of the homogenous and multi-layer models.
- Introduction in the fluid flow, the structural motion and the acoustic response of both types of models.
- Experimental equipment: Measuring techniques, anechoic rooms, data acquisition. 3

### **3.4 WP4 presentation by Ramon Codina**

- Current abilities include incompressible flow solver and aeroacoustics simulations
- Simulation examples: plate, surface-mounted obstacle, telescope building, Aeolian tones from incompressible flow around a cylinder.
- Previous experience with moving domains (demos)
- Outlines for the coming work in Eunison

### **3.5 WP5 presentation by Oriol Guasch**

- Study of the influence of the head and the lip shapes on the acoustic impedance: the lips are more important.
- Clarification whether a 2D representation of the vocal tract is sufficient for the simulation of the sound propagation, due to the possible reduction of the numeric grid and simultaneously of simulation duration.
- For the moment acoustic analogies are needed for the calculation of the acoustic sources on the basis of the fluid field, because CFD tools are so far incompressible solvers.

### **3.6 WP6 presentation by Xavier Pelorson**

- Experimental setup for measuring the steady acoustic conduction of vocal tract models with a loudspeaker as source.
- Experimental setup for controlling the lips of the mouth in dynamic speech.
- Data base of the acoustic coupling of the vocal tract to the vocal folds available.

### **3.7 WP7 presentation by Olov Engwall**

- Control architecture to have three levels of abstraction
- Plenty of prior work is available on the pieces but not on the whole
- Use existing models and parameterisations to generate VT shapes and laryngeal posturing
- Programming interface must be chosen

### **3.8 WP8 presentation by Francesc Alías**

- LaSalle has Acoustics Lab, Media Lab and User Lab all with potential for project goals
- Started on project web page, operational at [www.eunison.eu](http://www.eunison.eu)
- Press releases, Publications journals / conferences (Scientific+FET) to be communicated to FA, some already suggested
- Logotype proposals, one to be selected

## 4. Meeting Outcomes

### 4.1 Outlook for Milestone 1

Milestone 1 coincides with the end of Reporting Period 1 (month 12, Feb 2014). Deliverables are due by 28 February 2014. Our first report to the EC is due by 30 April, 2014.

#### 4.1.1 D1.1 Documentation of kick-off meeting

*[This document, due month 3]*

#### 4.1.2 D2.1 FSI-model of VF replica

- There are existing results, the milestone is achievable.
- Validation, material model, mesh refinement: Given a configuration and material data, validation of numerical simulation against experiments.
- Experimental: can deliver both contact and without contact. The numerical model can provide a better approximation to the real configuration.
- Possible scientific publication about the validation of the numerical method against experimental.
- Geometry and data are required by KTH, which need to be provided by FAU. One or several validation cases.
- Validation and realistic models are two separate paths. The first milestone involves the validation.
- Test case will be based on the V shaped vocal folds.

#### 4.1.3 D3.1 Model parameters and geometry, inflow boundary conditions

Test case will be based on the V shaped vocal folds. The possibility of including perturbations on the model (additional stress, stopping movement) was discussed.

#### 4.1.4 D4.1 Finite Element Strategy, Compressible Flow

Milestone 1 seems achievable. Development of the compressible solver (theoretical and implementation). At this stage no data input is required from the other partners. If an input geometry from other partners is available, preliminary simulations will be run on it.

#### 4.1.5 D5.1 VT with static geometries

Use realistic vocal tract shapes for vowels. Use of an existing source model for simulations. Partners have agreed on data to be provided for the simulations (JH will provide acoustic velocities). Data will be interpolated between meshes. If possible, geometry for nasals will be provided for the simulations.

#### 4.1.6 D6.1 Vocal tract replicas and acoustic measurements

- Selection and construction of static vocal tract replicas. For this deliverable: static vowels.
- It would be interesting to do several models ranging from realistic to very simplified.
- Data will be provided for the simulations. Models for fricatives in future deliverables.

#### 4.1.7 D7.1 Definition of control parameters (static)

- Input of new geometry for generating vocal tract models.
- At this point an existing model will be used. Movement already taken into account.
- Surface mesh or cross-section will be provided to the 'numerical' partners.
- Movement of shapes and surfaces will be parameterized so that movement can be described with few parameters.



- If possible, build a preliminary user interface, geometric control only. Feasible to some degree for the first milestone.

#### 4.1.8 D8.1 Eunison's web site

- To include introductory videos and animations. Involves collaboration of all partners. Small videos of each work package to explain the main ideas. Preliminary results will be published in the website.
- Videos should be general and descriptive of the global problem, not WP focused.

## 4.2 Calendar of meetings in Year 1

Project meetings are usually on a Monday at 10.00-12.00, with exceptions.

Meeting	When	Who	What	How/where
Kick-off,	2013-03-11...13 (all day)	All participants	Discussions on work plan, project organisation, and information transfer. Promote creativity and co-operation.	Face-to-face, at KTH, Stockholm
Technical board	2013-05-13 10.00-12.00	SC, WP leaders		Teleconference Host: LaSalle
Technical board	2013-07-25 14.00-16.00	SC, WP leaders		Teleconference Host: FAU
Technical board	2013-09-09 09.00-10.30	SC, WP leaders		Teleconference Host: CNRS
Executive board	2013-09-09 10.30-12.00	MgtGrp, ExBoard members		Teleconference Host: KTH
Technical board	2013-11-04 10.00-12.00	SC, WP leaders		Teleconference Host: CIMNE
Technical board	2014-01-20 10.00-12.00	SC, WP leaders		Teleconference Host: KTH
Executive Board	2014-02-28 14.00-16.00	MgtGrp, ExBoard members		Teleconference Host: KTH
General assembly, technical board	2014-03-03...05 (all day)	All participants		Face-to-face LaSalle, Barcelona

Participants are encouraged to schedule their research exchange travel so as to coincide with the teleconference meetings. This will reduce the number of sites that need to be connected.

## 5. Follow-ups as of month 3

WP1: a sufficiently **secure file-sharing scheme** for the project has been adopted and is proving very useful. The cloud service is contracted by Swedish universities from Box.com. It tracks file changes and comments, and automatically generates daily summaries of activity to the participants, which gives a good insight into what is going on. Routines for **videoconferencing** have been established. The first Technical Board meeting was held by videoconference as scheduled on 13 May 2013.

WP7: A supplementary grant proposal, concerning the construction of a more detailed numerical model for the non-acoustic biomechanics in Eunison, has been submitted to the Swedish Research Council (VR) by ST and OE. The outcome will be known in November 2013. Contact has been made with the National Center for Voice and Speech (Drs. Hunter and Titze) for potential collaboration around their National Repository for Laryngeal Data (NRLD).

WP8: the **public website** is operational at [www.eunison.eu](http://www.eunison.eu). The Eunison project has been presented to a general audience at the Royal Swedish Academy of Sciences on the World Voice Day, 16 April. KTH and LaSalle have made press releases. A set of project document templates and a set of logotype files for different graphical contexts have been uploaded to the shared area.

### Planned exchanges

Oriol Guasch and Marc Arnela from La Salle will make a visit to Gipsa-Lab in Grenoble, 23-24 May 2013, invited by Xavier Pelorson. This is intended for a better coordination of the experiments and numerical simulations involved in the first year activities of WP5 and WP6.

Marc Arnela from La Salle will perform a 6 months stage at KTH starting on November 2013 and finishing on May 2014.



**Figure 1.** EUNISON logo.