Interactive Music Science Collaborative Activities

Team Teaching for STEAM Education

Deliverable 5.1
Initial 3D musical instrument interactive design kit

Date:	05/10/2017
Author(s):	Carlos Acosta (LEOPOLY)
Contributor(s):	Robert Piechaud (IRCAM)
Quality Assuror(s):	Petros Stergiopoulos (EA), Fotini Simistira (UNIFRI)
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Description:	This deliverable reports on the initial implementation of the 3D musical instrument interactive design kit.

Executive Summary

This deliverable reports on the initial implementation of the 3D musical instrument interactive design kit.

The environment can be found at:

http://devtest.leopoly.com/3d-interaction-repository-V1/leopolyDesign.html

Version Log			
Date	Version No.	Author	Change
26-09-2017	0.1	Carlos Acosta (LEOPOLY)	Initial content
29-09-2017	0.8	Carlos Acosta (LEOPOLY)	Finalized content and submit for review
04-10-2017	0.9	Carlos Acosta (LEOPOLY)	Reviewers comments incorporated
05-10-2017	1.0	Vassilis Katsouros (ATHENA)	Submitted to EU

Disclaimer

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LIST OF ABBREVIATIONS

Abbreviation	Description
3D	3 Dimension(al)
GUI	Graphical User Interface
ATHENA	ATHENA RESEARCH AND INNOVATION CENTER IN INFORMATION COMMUNICATION & KNOWLEDGE TECHNOLOGIES
UCLL	UC LIMBURG
EA	ELLINOGERMANIKI AGOGI SCHOLI PANAGEA SAVVA AE
IRCAM	INSTITUT DE RECHERCHE ET DE COORDINATION ACOUSTIQUE MUSIQUE
LEOPOLY	3D FOR ALL SZAMITASTECHNIKAI FEJLESZTO KFT
CABRI	Cabrilog SAS
WIRIS	MATHS FOR MORE SL
UNIFRI	UNIVERSITE DE FRIBOURG

1. Introduction

Design Kit includes two modules in this version: Leopoly 3D modeling tool, described in document of [Deliverable](#) [4.3-First](#) [Version](#) [of](#) [3D](#) [design](#) [environment](#) [for](#) [musical](#) [instruments](#), and Modalys sound generator described in document of [Deliverable](#) [4.4-First](#) [Version](#) [of](#) [Computational](#) [models](#) [for](#) [sound](#) [and](#) [music](#) [generation](#) [for](#) [virtual](#) [instruments](#). Full setup of musical instrument will be enabled including geometry modification and adjusting other - non-geometry parameters.
User will be able to test the instrument's sounds right in the design kit by a click of the button.

2. Leopoly 3D modeling tool

2.1. Installation and technical requirements

The *Leopoly 3D modeling tool* is accessible through the following URL:
http://devtest.leopoly.com/3d-interaction-repository-V1/leopolyDesign.html

For full functionality of the tool, Firefox Nightly or Edge Nightly versions are recommended.
No additional applications or plugins are needed to run tool.

2.2. Description of demonstrator and user manual

The user can choose through the following virtual instruments (see Figure 2-1):
- Monochord,
- Circle Membrane,
- Square Membrane,
- Xylophone

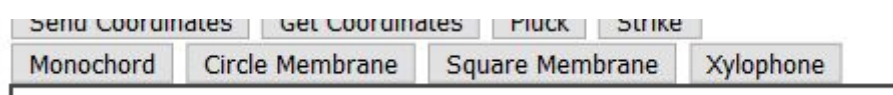This solution is only for demonstration purposes for now:

Figure 2-1: Available virtual instruments

After choosing the appropriate instrument, the corresponding instrument loads into the workbench with all design controllers. All models have the same 3D navigation options: it can be rotated intuitively by the primary button of the mouse, and it can be panned by the middle button of the mouse.

2.2.1. Monochord
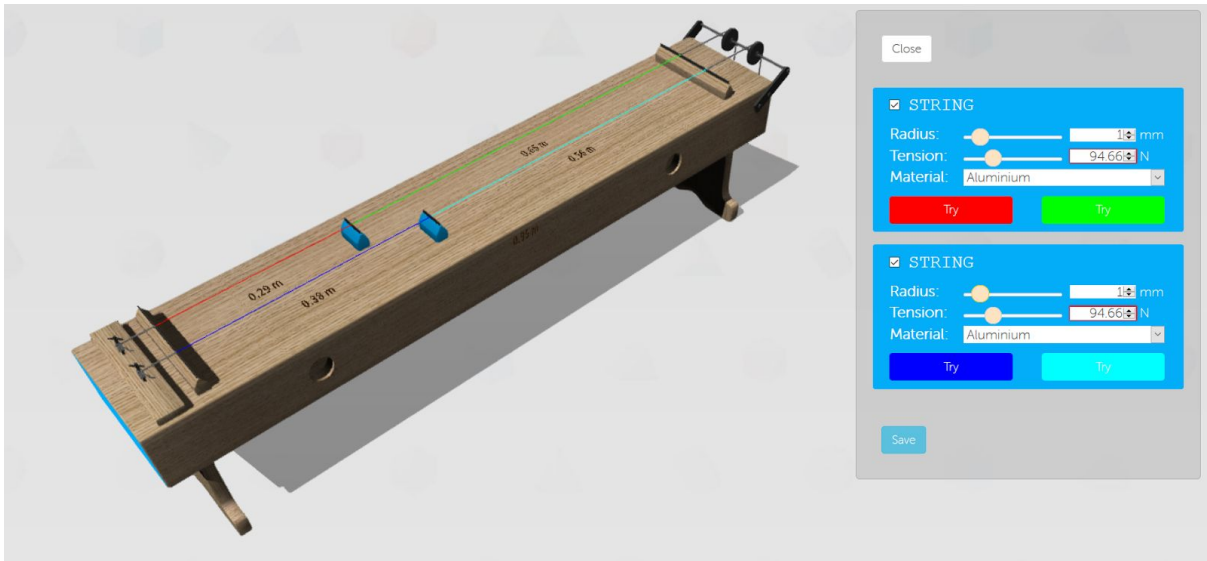
Figure 2-2 illustrates the overview of the monochord.

Figure 2-2: Overview of Monochord

When the user selects the monochord, the following options are available:

  Figure 2-3: Bridge	**Moving bridges** can be done individually by dragging them. When dragging them until the limit, the bridge is disabled.
	Shrink or expand the length of the instrument by dragging the side marked with blue.
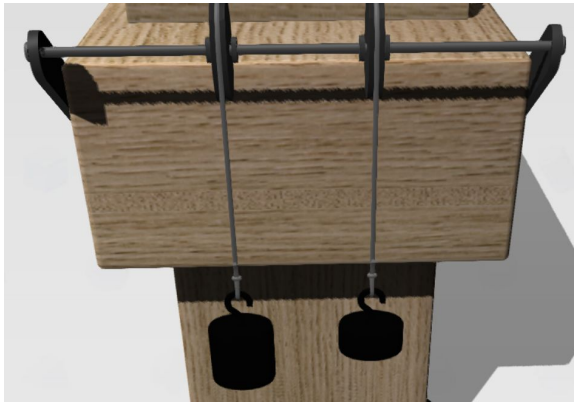
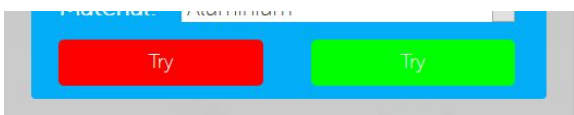|	
Figure 2-4: Shrinked monochord	
Figure 2-5: Weights straining strings Figure 2-6: Adjust tension	**Tension** can be adjusted by the corresponding slider or by entering the appropriate value to the textbox on the GUI. The weights, straining the relevant string, will grow or shrink accordingly.
Figure 2-7: One string enabled. Figure 2-8: Enable/disable string	**Turn string on/off** by selecting the corresponding checkbox (see Figure 2-8). When a string is disabled, all corresponding elements, like bridge, weight, etc. are removed also (see Figure 2-7). When a string is disabled, the corresponding controls will be unavailable also. **Radius** (see Figure 2-8) can be adjusted by the corresponding slider or by entering the desired value to the text box.
Figure 2-9: Set material	**Material** (Aluminium, Bismuth, Brass, Bronze etc) can be chosen for each string individually from the dropdown list.
Figure 2-10: Test sound	**Test sound** by testing string sections individually. Each string can have up to 2 sections if the corresponding bridge is not slided to the limit. Otherwise it has a single section (the whole string).

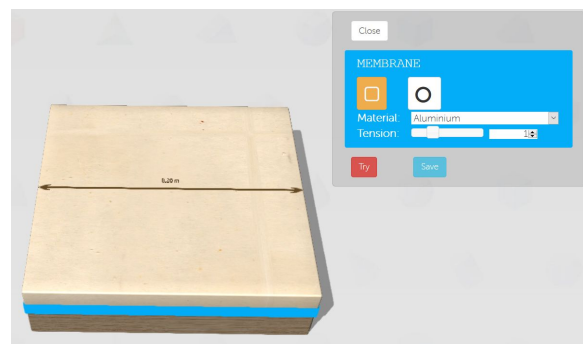### 2.2.2. Membranes
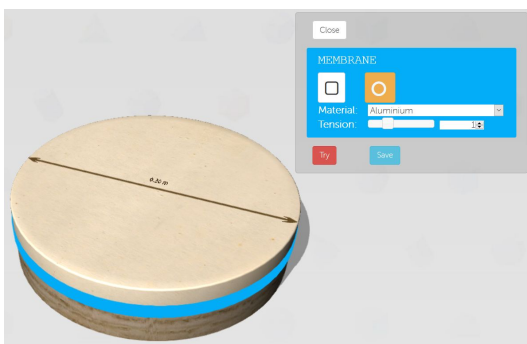
Figure 2.11: Circle membrane overview

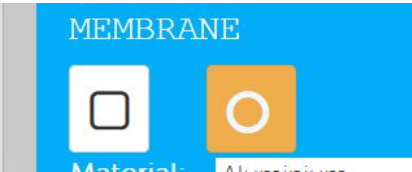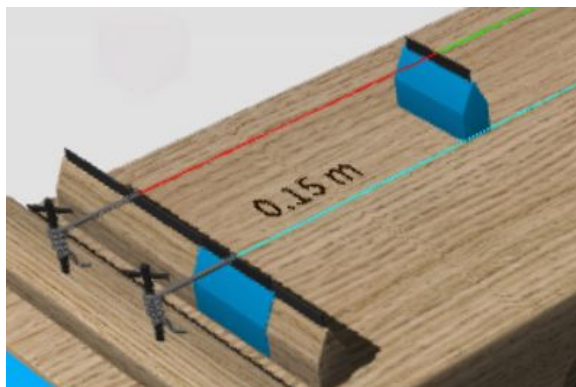Figure 2.12: Square membrane overview

Options:

Figure 2-13: Bridge

Moving bridges can be done individually by dragging them. When dragging them until the limit, the bridge is disabled.

Figure 2-14: Change size	**Change the size** keeping circle and square shapes by dragging the blue part of the instrument

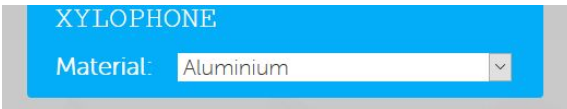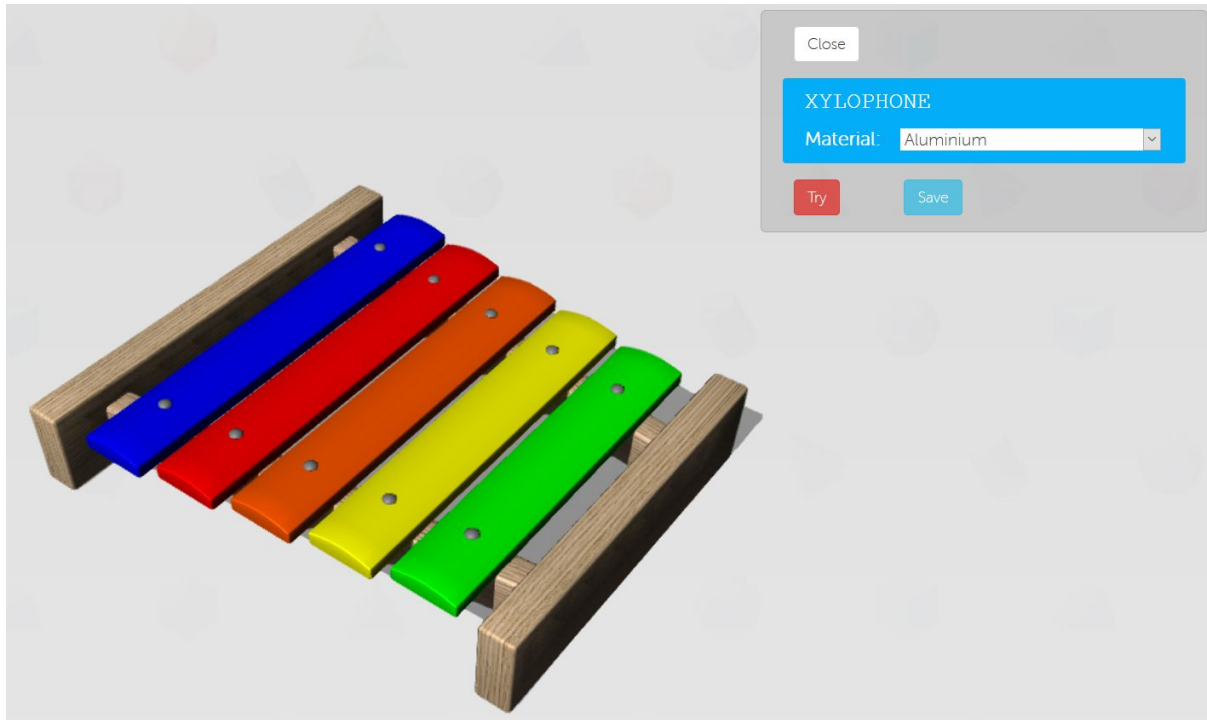|	
Figure 2-15: Change membrane type	**Change** between square and circle membranes
Figure 2-16: Set material	**Material can be chosen** for the membrane. Choose material from the dropdown list.
Figure 2-17: Test sound	**Test Membrane** sound by clicking the "Try" button.

2.2.3. Xylophone

Figure 2-18: Xylophone

Options:

 Figure 2-19: Set material	**Material can be chosen** for the membrane. Choose material from the dropdown list.
 Figure 2-20: Test sound	**Test Membrane** sound by clicking the "Try" button.

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