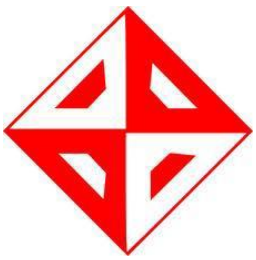

SOFTWARE TEST DOCUMENT

For Cloudy Mesh

14/04/2013

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1. OVERVIEW

1.1 Document Identifier

This document is the first version of the product.

Intended audience will be Onur Tolga Şehitoğlu, Buğra Özkan and the users of the project.

Date of issue: 14.04.2013

Authors: Umut Ağıl, Emre Avan, Gökhan Uras, Muhittin Burak Üçok.

1.2 Purpose

The purpose of this document is to explain the design of the testing process and the results of them.

By using information from IEEE 829-2008 this document will provide a direct approach to the testing of this project hence reducing feature creep and pointedly determine the quality of the design.

1.3 Scope

This document gives a detailed description of the testing phases of the Cloudy Mesh. Also includes the objective, input and outcomes of the tests. This document gives a clear understanding of how the project will be tested.

1.4. References

IEEE. IEEE Std. 829-2008 IEEE Standard for Software and System Test Documentation. IEEE Computer Society, 1998.

2. TEST CASES

2.1 Enviromental Needs

Environmental needs for all test cases are same. A PC with a browser that supports HTML5 and WebGL is enough for the test cases.

2.2 Inter-case Dependencies

The test cases will be executed as the given order.

2.3 Test Cases

2.3.1 Adding Geometries from List Test Cases

Test Case ID :	**Add Geometry – 1**
Objective :	Selecting a geometry different than the default object geometry on the scene.
Input :	Click on the "Meshes" button and select a geometry other than the one on the scene.
Outcome :	Previous geometry will disappear and new geometry will be drawn as an object on the scene.
Special Requirements :	The user should login before doing this test.
Result :	PASSED

Test Case ID :	**Add Geometry – 2**
Objective :	Selecting a geometry which is already displayed on the scene.
Input :	Click on the "Meshes" button and select the same geometry with the one on the scene.
Outcome :	Same geometry should be displayed on the scene.
Special Requirements :	The user should login before doing this test.
Result :	PASSED

Test Case ID :	**Add Geometry – 3**
Objective :	Selecting a geometry and inspecting the attributes of the object on the scene.
Input :	Click on the "Meshes" button and select any geometry.
Outcome :	Chosen geometry should be displayed on the screen, however all the attributes of the object should turn back to their initial states.
Special Requirements :	The user should login and change the attributes of the objects, such as translating, scaling or rotating the object before doing this test.
Result :	PASSED

2.3.2 Generating Mesh For Certain Object Geometries Test Cases

Test Case ID :	**Generate Mesh - 1**
Objective :	Generate mesh for the solid object on the screen with triangulation algorithms. All the computations should be done on the cloud.
Input :	Click on the “Generate Mesh” button.
Outcome :	Current mesh information which is stored as “.edf” format is converted to .str format and sent to cloud machine. Then mesh generation is done by given triangulation algorithms. After that mesh info is sent back to user side and converted to .edf format again. As a last step it is displayed on the screen.
Special Requirements :	The user should login before doing this test.
Result :	NOT IMPLEMENTED YET

2.3.3 Picking Polygons with Mouse Test Cases

Test Case ID :	**Pick polygon with mouse - 1**
Objective :	Pick a polygon on the object by clicking on the polygon with mouse.
Input :	Click on a polygon on the object with the mouse.
Outcome :	The picked polygon should be marked as chosen and the color of the polygon should be changed. New color is specified by the user.
Special Requirements :	The user should login and the color specified for the picked vertices should be different than the main color of the object before doing this test.
Result :	PASSED

Test Case ID :	**Pick polygon with mouse - 2**
Objective :	Enable/disable polygon picking
Input :	Click on the “Polygon Pick” button with the mouse.
Outcome :	Initially, user cannot pick any polygon. After clicking the “Polygon Pick” button, this feature is enabled. Then, second click disables it.
Special Requirements :	The user should login and the color specified for the picked vertices should be different than the main color of the object before doing this test.
Result :	PASSED

Test Case ID	**:**	**Pick polygon with mouse - 3**
Objective	**:**	Picking multiple polygons with mouse
Input	**:**	Click and drag the mouse.
Outcome	**:**	The polygons which are in the area, covered by mouse dragging, should be picked and their color should change.
Special Requirements	**:**	The user should login and the color specified for the picked vertices should be different than the main color of the object. Polygon picking should be enabled before doing this test.
Result	**:**	NOT IMPLEMENTED YET

2.3.4 Picking Vertices with Mouse Test Cases

Test Case ID	**:**	**Pick vertex with mouse - 1**
Objective	**:**	Pick a vertex on the object by clicking on the polygon with mouse.
Input	**:**	Click on a polygon on the object with the mouse.
Outcome	**:**	The picked vertex should be marked as chosen and a little 2D circle should be displayed around that vertex.
Special Requirements	**:**	The user should login and vertex picking should be enabled before doing this test.
Result	**:**	NOT IMPLEMENTED YET

Test Case ID	**:**	**Pick vertex with mouse - 2**
Objective	**:**	Enable/disable vertex picking
Input	**:**	Click on the “Vertex Pick” button with the mouse.
Outcome	**:**	Initially, user cannot pick any vertex. After clicking the “Vertex Pick” button, this feature is enabled. Then, second click disables it.
Special Requirements	**:**	The user should login before doing this test.
Result	**:**	NOT IMPLEMENTED YET

Test Case ID	**:**	**Pick vertex with mouse - 3**
Objective	**:**	Picking multiple vertices with mouse
Input	**:**	Click and drag the mouse
Outcome	**:**	Around the vertices which are in the area, covered by mouse dragging, 2D circles should be displayed.
Special Requirements	**:**	The user should login and vertex picking should be enabled before doing this test.
Result	**:**	NOT IMPLEMENTED YET

2.3.5 Picking Edges with Mouse Test Cases

Test Case ID :	**Pick edge with mouse - 1**
Objective :	Pick an edge on the object by clicking on the edge with mouse.
Input :	Click on an edge on the object with the mouse.
Outcome :	The picked edge should be marked as chosen color of the edge should be changed.
Special Requirements :	The user should login and edge picking should be enabled before doing this test.
Result :	NOT IMPLEMENTED YET

Test Case ID :	**Pick edge with mouse - 2**
Objective :	Enable/disable edge picking
Input :	Click on the “Edge Pick” button with the mouse.
Outcome :	Initially, user cannot pick any edge. After clicking the “Edge Pick” button, this feature is enabled. Then, second click disables it.
Special Requirements :	The user should login before doing this test.
Result :	NOT IMPLEMENTED YET

Test Case ID :	**Pick edge with mouse - 3**
Objective :	Picking multiple edges with mouse
Input :	Click and drag the mouse
Outcome :	The edges which are in the area, covered by mouse dragging, should be displayed with different color.
Special Requirements :	The user should login and edge picking should be enabled before doing this test.
Result :	NOT IMPLEMENTED YET

2.3.6 Saving Meshes Test Cases

Test Case ID :	**Save Mesh - 1**
Objective :	After editing an object save it to the database to use later.
Input :	Click “Save Mesh” button with mouse.
Outcome :	Object should be saved to the database with its latest state.
Special Requirements :	The user should login and the object on the screen should be edited before doing this test.
Result :	PASSED

2.3.7 Loading Meshes Test Cases

Test Case ID :	**Load Mesh - 1**
Objective :	Loading an already edited mesh.
Input :	Edit a mesh, and choose another object from “Meshes” button, after that load the previous object from “Meshes” button again.
Outcome :	Last chosen object should be displayed on the scene. Saved properties of the object should be loaded from the database, so that user can continue its editing.
Special Requirements :	The user should login. Object should be edited and saved. User should not logout while doing this test.
Result :	PASSED

Test Case ID :	**Load Mesh - 2**
Objective :	Loading an already edited mesh.
Input :	Edit a mesh and logout by clicking the “Logout” button, after that load the previous object from “Meshes” button again.
Outcome :	**C**hosen object should be displayed on the scene. Saved properties of the object should be loaded from the database, so that user can continue its editing.
Special Requirements :	First, the user should login. Object should be edited and saved. Then the user should logout and login before doing this test.
Result :	PASSED

2.3.8 Camera Movements Test Cases

Test Case ID :	**Move Camera - 1**
Objective :	Moving the camera with keyboard keys.
Input :	Press the “w” key in the keyboard.
Outcome :	The camera should move through its gaze, which means it should move forward.
Special Requirements :	The user should login before doing this test. If the user has changed the gaze direction, camera should move with respect to new gaze direction.
Result :	PASSED

Test Case ID	**:**	**Move Camera - 2**
Objective	**:**	Moving the camera with keyboard keys.
Input	**:**	Press the “s” key in the keyboard.
Outcome	**:**	The camera should move in the reverse direction of its gaze, which means it should move back.
Special Requirements	**:**	The user should login before doing this test. If the user has changed the gaze direction, camera should move with respect to new gaze direction.
Result	**:**	PASSED

Test Case ID	**:**	**Move Camera - 3**
Objective	**:**	Moving the camera with keyboard keys.
Input	**:**	Press the “a” key in the keyboard.
Outcome	**:**	The camera should move through the (90 degree) left side of its gaze direction, which means it should move to the left.
Special Requirements	**:**	The user should login before doing this test. If the user has changed the gaze direction, camera should move with respect to new gaze direction.
Result	**:**	PASSED

Test Case ID	**:**	**Move Camera – 4**
Objective	**:**	Moving the camera with keyboard keys.
Input	**:**	Press the “d” key in the keyboard.
Outcome	**:**	The camera should move through the (90 degree) right side of its gaze direction, which means it should move to the right.
Special Requirements	**:**	The user should login before doing this test. If the user has changed the gaze direction, camera should move with respect to new gaze direction.
Result	**:**	PASSED

Test Case ID	**:**	**Move Camera – 5**
Objective	**:**	Changing the gaze direction of the camera.
Input	**:**	Holding right click of the mouse and dragging it.
Outcome	**:**	The (looking) gaze direction of the camera should change with the reverse direction of the mouse curser. (If we move the mouse to the right then the camera should turn to left as we drag the

		mouse.)
Special Requirements	:	The user should login before doing this test.
Result	:	PASSED

2.3.9 Changing Color of the Object Test Cases

Test Case ID :		**Change color - 1**
Objective	:	Change color of the whole object.
Input	:	Click on the "ObjColor" input boxes and change them by giving values from keyboard. Then click on the "Color" button with mouse.
Outcome	:	Color of the displayed object should change with respect to RGB values which are written in the "ObjColor" input boxes.
Special Requirements	:	User should login and none of the polygons should be picked before doing this test.
Result	:	PASSED

Test Case ID :		**Change color - 2**
Objective	:	Change color of the picked polygons of the object.
Input	:	Click on the "PickedColor" input boxes and change them by giving values from keyboard. Then enable picking with "Polygon Pick" button and pick a polygon by clicking with mouse.
Outcome	:	Color of the picked polygons should be the RGB values which are written in "PickedColor" input boxes.
Special Requirements	:	User should login before doing this test.
Result	:	PASSED

Test Case ID :		Change color - 3
Objective	:	Change color of the non-picked polygons of the object.
Input	:	Click on the "ObjColor" input boxes and change them by giving values from keyboard. Then click on the "Color" button with mouse.
Outcome	:	Color of the non-picked polygons should be the RGB values which are written in "ObjColor" input boxes.
Special Requirements	:	User should login and at least one polygon should be picked before doing this test.
Result	:	PASSED

2.3.10 Rotating the Object

Test Case ID :	Rotating the Object-1
Objective :	Starting the rotate functionality
Input :	Click “Rotate” button with mouse
Outcome :	Object can be rotated and translating object functionality is disabled.
Special Requirements :	he user should login before doing this.
Result :	PASSED

Test Case ID :	Rotating the Object-2
Objective :	Rotating the object with mouse
Input :	Holding left click of the mouse and drag it whichever position that user wants to rotate.
Outcome :	Object will be rotated according to the initial and final position of the mouse which is direction of the rotation.
Special Requirements :	The user should login before doing this operation user need to have an object that is on the screen.
Result :	PASSED

Test Case ID :	Rotating the Object-3
Objective :	Stopping the rotate functionality
Input :	Click “Translate” button with mouse
Outcome :	Object can be translated and rotating object functionality is disabled.
Special Requirements :	The user should login before doing this.
Result :	PASSED

2.3.11 Translating the Object

Test Case ID :	Translating the Object-1
Objective :	Starting the translate functionality
Input :	Click “Translate” button with mouse
Outcome :	Object can be translated and rotating object functionality is disabled.
Special Requirements :	The user should login before doing this.
Result :	PASSED

Test Case ID :	Translating the Object-2
Objective :	Translating the object with mouse
Input :	Holding left click of the mouse and drag it whichever position that user wants to translate.
Outcome :	Object will be translated according to the initial and final position of the mouse which is direction of the translation.
Special Requirements :	The user should login before doing this operation user need to have an object that is on the screen.
Result :	PASSED

Test Case ID :	Translating the Object-3
Objective :	Stopping the translate functionality
Input :	Click “Rotate” button with mouse
Outcome :	Object can be rotated and translating object functionality is disabled.
Special Requirements :	The user should login before doing this.
Result :	PASSED

2.3.12 Scaling the Object

Test Case ID :	Scaling the Object-1
Objective :	Scaling in X direction
Input :	Click on the “Scale” input box and change X by giving values from keyboard.
Outcome :	The input will be multiplied with the size in X direction of the object.
Special Requirements :	The user should login before doing this and also there should be an object that is attached to user that must be on the screen.
Result :	PASSED

Test Case ID :	Scaling the Object-2
Objective :	Scaling in Y direction
Input :	Click on the “Scale” input box and change Y by giving values from keyboard.
Outcome :	The input will be multiplied with the size in Y direction of the object.
Special Requirements :	The user should login before doing this and also there should be an object that is attached to user that must be on the screen.
Result :	PASSED

Test Case ID	**:**	Scaling the Object-3
Objective	**:**	Scaling in Z direction
Input	**:**	Click on the “Scale” input box and change Z by giving values from keyboard.
Outcome	**:**	The input will be multiplied with the size in Z direction of the object.
Special Requirements	**:**	The user should login before doing this and also there should be an object that is attached to user that must be on the screen.
Result	**:**	PASSED

2.3.13 Grouping meshes & vertices & edges and giving specific attributes to groups

Test Case ID	**:**	**Grouping meshes & vertices & edges-1**
Objective	**:**	Grouping elements according to color
Input	**:**	Select desired elements. Press “Groups” button by mouse. After groups menu will show up, give a name to the group and press “Add” button by mouse.
Outcome	**:**	Group will be added to the database.
Special Requirements	**:**	At least one element must be selected.
Result	**:**	PASSED

Test Case ID	**:**	**Grouping meshes & vertices & edges-2**
Objective	**:**	Grouping elements according to faces.
Input	**:**	Select desired elements according to the angle between their normals, after elements are chosen. Press “Groups” button by mouse. After groups menu will show up, give a name to the group and press “Add” button by mouse.
Outcome	**:**	Group will be added to the database.
Special Requirements	**:**	At least one element must be selected.
Result	**:**	NOT IMPLEMENTED

Test Case ID	**:**	**Grouping meshes & vertices & edges-3**
Objective	**:**	Grouping elements according to material.
Input	**:**	Select desired elements. Press “Groups” button by mouse. After groups menu will show up, give a name and material to the group and press “Add” button by mouse.
Outcome	**:**	Group will be added to the database.
Special Requirements	**:**	At least one element must be selected.
Result	**:**	NOT IMPLEMENTED

2.3.14 Disintegrating the groups

Test Case ID :	Disintegrating the groups-1
Objective :	Disintegrating the color groups
Input :	Press “Groups” button by mouse. After groups menu will show up, select any desired color groups and press “Delete” button.
Outcome :	Color group will be deleted.
Special Requirements :	There should be at least one color group.
Result :	PASSED

Test Case ID :	Disintegrating the groups-2
Objective :	Disintegrating the face groups
Input :	Press “Groups” button by mouse. After groups menu will show up, select any desired face group and press “Delete” button.
Outcome :	Face group will be deleted.
Special Requirements :	There should be at least one face group.
Result :	NOT IMPLEMENTED

Test Case ID :	Disintegrating the groups-3
Objective :	Disintegrating the material groups
Input :	Press “Groups” button by mouse. After groups menu will show up, select any desired material group and press “Delete” button.
Outcome :	Material group will be deleted.
Special Requirements :	There should be at least one material group.
Result :	NOT IMPLEMENTED

2.3.15 Turning the scene back to initial state

Test Case ID :	Turning the Scene back to initial-1
Objective :	Undo every color change
Input :	Press “Original Mesh” button with mouse
Outcome :	All the color changes will be reset, and object will have initial color.
Special Requirements :	At least an object must be set to user.
Result :	PASSED

Test Case ID :	Turning the Scene back to initial-2
Objective :	Undo every picking change
Input :	Press “Original Mesh” button with mouse
Outcome :	All the picking color changes will be reset, and picked elements will be erased from the group.
Special Requirements :	At least an object must be set to user.
Result :	PASSED

Test Case ID :	Turning the Scene back to initial-3
Objective :	Undo every position change
Input :	Press “Original Mesh” button with mouse
Outcome :	Original Mesh positions will be set to object.
Special Requirements :	At least an object must be set to user.
Result :	PASSED

Test Case ID :	Turning the Scene back to initial-4
Objective :	Undo every scale change
Input :	Press “Original Mesh” button with mouse
Outcome :	Original Mesh size will be set to object.
Special Requirements :	At least an object must be set to user.
Result :	PASSED

2.3.16 Neighborhood selection

Test Case ID :	Neighborhood Selection-1
Objective :	Select neighbor edges
Input :	Press “Neighbor Selection” button.
Outcome :	Neighbor edges will be selected and color of the selected ones will be changed.
Special Requirements :	At least one edge must be picked before this feature is used.
Result :	NOT IMPLEMENTED

Test Case ID :	Neighborhood Selection-2
Objective :	Select neighbor vertices
Input :	Press “Neighbor Selection” button.
Outcome :	Neighbor vertices will be selected and color of the selected ones will be changed.
Special Requirements :	At least one vertex must be picked before this feature is used.
Result :	NOT IMPLEMENTED

Test Case ID :	Neighborhood Selection-2
Objective :	Select neighbor polygons
Input :	Press “Neighbor Selection” button.
Outcome :	Neighbor polygons will be selected and color of the selected ones will be changed.
Special Requirements :	At least one polygon must be picked before this feature is used.
Result :	NOT IMPLEMENTED

Test Case ID :	Neighborhood Selection-2
Objective :	Changing the neighbor radius
Input :	Click on the “Neighbor Radius” input box and change radius by giving values from keyboard.
Outcome :	After user select the radius, while neighbors are selected all the elements that is in the region will be selected.
Special Requirements :	None
Result :	NOT IMPLEMENTED

2.3.17 – Adding a mesh to a project

Test Case ID :	Add mesh to a project - 1
Objective :	Adding mesh to a project to enable corresponding mesh to be edited by the users work on the project.
Input :	Click project-mesh link on left menu. Select project name and mesh name on dropdown lists and click submit button.
Outcome :	Required information is added to the database table.
Special Requirements :	Panel page should be opened.
Result :	PASSED

2.3.18 – Creating a user account

Test Case ID :	**Create a user account - 1**
Objective :	Creating a user account
Input :	Fill all fields with unregistered e-mail address and click signup button.
Outcome :	Server accepts signup request and login page is opened
Special Requirements :	Signup page should be opened. All fields must be filled.
Result :	PASSED

Test Case ID :	**Create a user account - 2**
Objective :	Creating a user account
Input :	Fill all fields with registered e-mail address and click signup button
Outcome :	Server disapproves signup request and gives warning to the user
Special Requirements :	Signup page should be opened. All fields must be filled
Result :	PASSED

Test Case ID :	**Create a user account - 3**
Objective :	Creating a user account
Input :	Do not fill all fields and click signup button.
Outcome :	Server disapproves signup request and gives warning to the user.
Special Requirements :	Signup page should be opened.
Result :	PASSED

2.3.19 – Login to an account

Test Case ID :	**Login - 1**
Objective :	Login to an account
Input :	Fill email and password fields with correct information and click log in in button.
Outcome :	User logs in to an account and one of mesh editing page is opened.
Special Requirements :	Login page should be opened. All fields must be filled.
Result :	PASSED

Test Case ID :	Login - 2
Objective :	Login to an account
Input :	Fill email and password fields with incorrect information and click log in in button.
Outcome :	Email and password does not match. Server disapproves login request and gives warning to the user.
Special Requirements :	Login page should be opened. All fields must be filled.
Result :	PASSED

Test Case ID :	Login - 3
Objective :	Login to an account
Input :	Do not fills all fields and click login button.
Outcome :	Server disapproves login request and gives warning to the user.
Special Requirements :	Login page should be opened.
Result :	PASSED

2.3.20 – Logout from an account

Test Case ID :	Log out -1
Objective :	Logout from an account.
Input :	Click logout button
Outcome :	User logs out from an account.
Special Requirements :	User should be logged in.
Result :	PASSED

2.3.21 – Adding company

Test Case ID :	Add Company - 1
Objective :	Adding Company information to the server.
Input :	Fill all fields and click submit button.
Outcome :	Company information is added to the database table.
Special Requirements :	Panel page should be opened. All fields must be filled.
Result :	PASSED

Test Case ID	**:**	**Add Company - 2**
Objective	**:**	Adding Company information to the server
Input	**:**	Do not fills all fields and click login button.
Outcome	**:**	Server disapproves request and gives warning to the user.
Special Requirements	**:**	Panel page should be opened.
Result	**:**	PASSED

2.3.22 – Adding department to a company

Test Case ID	**:**	**Add department - 1**
Objective	**:**	Adding department information to the server. The department will belong to the corresponding company.
Input	**:**	Click Department link on left menu. Select company name and fill department name field and click submit button.
Outcome	**:**	Department information is added to the database table.
Special Requirements	**:**	Panel page should be opened.
Result	**:**	PASSED

Test Case ID	**:**	**Add department - 2**
Objective	**:**	Adding Company information to the server. The department will belong to the corresponding company.
Input	**:**	Click Department link on left menu. Do not fill department name field and click submit button.
Outcome	**:**	Server disapproves request and gives warning to the user.
Special Requirements	**:**	Panel page should be opened.
Result	**:**	PASSED

2.3.23 – Adding project to a department

Test Case ID	**:**	**Add project - 1**
Objective	**:**	Adding project information to the server. The project will be appointed to the selected department.
Input	**:**	Click project link on left menu. Select company and department name. Fill project name field and click submit button
Outcome	**:**	Project information is added to the database tables.
Special Requirements	**:**	Panel page should be opened.
Result	**:**	PASSED

Test Case ID	**:**	**Add project - 2**
Objective	:	Adding project information to the server. The project will be appointed to the selected department.
Input	:	Click project link on left menu. Do not fill project name field and click submit button.
Outcome	:	Server disapproves request and gives warning to the user.
Special Requirements	:	Panel page should be opened.
Result	:	PASSED

2.3.24 – Appointing user to a department

Test Case ID	**:**	**Add user-department - 1**
Objective	:	Appoint user to the selected department.
Input	:	Click user-department link on left menu. Select company and department name and users email address and click submit button.
Outcome	:	Required information is added to the database table.
Special Requirements	:	Panel page should be opened.
Result	:	PASSED

Test Case ID	**:**	**Add user-department - 2**
Objective	:	Appoint user to the selected department.
Input	:	Click user-department link on left menu. Do not select any dropdown field.
Outcome	:	Server disapproves request and gives warning to the user.
Special Requirements	:	Panel page should be opened.
Result	:	PASSED

2.3.25 – Appointing user to a project

Test Case ID	**:**	**Add user-project - 1**
Objective	:	Appoint user to the selected project.
Input	:	Click user-project link on left menu. Select project name and users email address and click submit button.
Outcome	:	If department of the project and department of user matches required information is added to the database table, if not server disapproves request and gives warning to the user.
Special Requirements	:	Panel page should be opened.
Result	:	PASSED

3. Glossary

Name	Description
GUI:	Graphical User Interface
Cloudy Mesh	Mesh editing tool which will work on browsers using a cloud computing system
Edge	Line segments that joining of two vertices.
Vertex	Point, corner point of a polygon.
Mesh	Collection of vertices, edges and faces that defines the shape of object.
CAD	Computer Aided Design
Cloud Computing	Use of computing resources (hardware and software) that are delivered as a service over a network (typically the internet).
CAE	Computer aided design, computer software to aid in engineering tasks.
CFD	Computational Fluid Dynamics