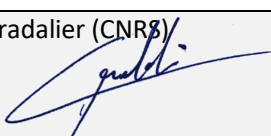




# Autonomous Robotic Inspection and Maintenance on Ship Hulls and Storage Tanks

## Deliverable report – D7.1

Context	
Deliverable title	3D Models of the Inspection Results
Lead beneficiary	RWTH
Author(s)	Sebastian Pape – RWTH – <a href="mailto:pape@vr.rwth-aachen.de">pape@vr.rwth-aachen.de</a> Simon Oehrl – RWTH – <a href="mailto:oehrl@vr.rwth-aachen.de">oehrl@vr.rwth-aachen.de</a> Torsten W. Kuhlen – RWTH – <a href="mailto:kuhlen@vr.rwth-aachen.de">kuhlen@vr.rwth-aachen.de</a>
Work Package	WP7
Deliverable due date	31 March 2023 (M39)
Document status	
Version No.	1
Type	Data collection with additional documentation
Dissemination level	<b>Public</b>
Last modified	04 April 2023
Status	RELEASED
Date approved	04 April 2023
Approved by Coordinator	Prof. Cédric Pradalier (CNR8) Signature: 
Declaration	Any work or result described therein is genuinely a result of the BUGWRIGHT2 project. Any other source will be properly referenced where and when relevant.





## TABLE OF CONTENTS

HISTORY OF CHANGES .....	1
REFERENCES DOCUMENTS .....	1
Executive summary .....	2
1. Content list of the provided folder structure .....	2
1.1. Bazancourt .....	2
1.2. JC Coulomb .....	2
1.3. Simulation Models .....	2
1.4. Mock-up Athens .....	2
1.5. Robot Models .....	2
2. Software used for the manipulation of the models .....	3

## HISTORY OF CHANGES

Date	Written by	Description of change	Approver	Version No.
-	-	-	-	-

## REFERENCES DOCUMENTS

- D7.1 3D Models of the Inspection Results

Folder stored on the file sharing site hosted by CNRS ([NextCloud](#))



# Executive summary

The Deliverable 7.1 3D Models of the Inspection Results summarises the list of all the files of this deliverable, as it is mainly a collection of 3D models. It includes the 3D visualisation models from various field visits and integration weeks and will be extended with further data once it will be collected in the project. This document will be the summarisation and description of the folder contents together with a short list of software capable of viewing/manipulating the models/data.

## 1. Content list of the provided folder structure

### 1.1. Bazancourt

- Contains 3D scans, 3D models and pictures that were collected in two field visits at a sugar factory in Bazancourt, France, where parts of a sugar storage tank was scanned.
- The subfolders “Nov21” and “Sep22” denote the dates at which the data was collected, November 2021 and September 2022 respectively.

### 1.2. JC Coulomb

- Contains collected point clouds and 3D meshes that were generated from the point clouds. The colouring of the mesh, shown in a rendering “JCCoulomb.png”, represents an artificially generated depth measurement, that can be used in testing.
- The data was collected in October 2022, in Concarneau, France.

### 1.3. Simulation Models

- Contains 3D models and textures that were used in the beginning of the project for different simulation and visualisation purposes.
- “real\_hull\_hr” contains a CAD model of the hull of a real ship.
- “SecondShip.dae” is another model of a complete ship used in visualisation early in the project.
- Based on the contained “real\_hull\_hr”-model an artificial ship was modelled for visualisation purposes, it is contained in the “Modelled Ship” subfolder. Different textures were hand-drawn for different purposes in the visualisation.

### 1.4. Mock-up Athens

- Contains collected point clouds and 3D meshes that were generated from the point clouds collected during the second integration week in Athens, in November 2022. Additionally, some photos were taken for texturing of the data.

### 1.5. Robot Models

- The robot models folder contains 3D meshes, which are either textured or coloured for visualisation purposes.
- The “Crawler” folder contains a base CAD model of the actual crawler used in the project.



- The “Drone” folder contains a drone mesh, found on the internet, which is used for visualisation purposes. It does not actually reflect the real drone geometry, but was helpful for early testing.
- The “Pioneer” folder contains a coloured 3D model of the first under-water drone in the project the “Pioneer” from Blueye. While the currently used real world robot is the follow-up model, they are rather similar so the initial model was kept for visualisation purposes.

Note: For some of the point cloud data files, some unprocessed additional meta data was kept in addition to the 3D models. It is not directly relevant to this deliverable, but might be helpful in later usage and processing steps.

## 2. Software used for the manipulation of the models

All used data formats for 3D models and images can easily be read with free and open source software:

- “.ply”, “.off” and “.dae” can be opened with MeshLab<sup>1</sup>
- “.pcd” can be opened with Blender<sup>2</sup> and the “blender-pcd-io”-plugin<sup>3</sup>
- “.obj”, “.stl” and “.fbx” can be opened with Blender<sup>2</sup>
- “.vtk” can be opened with VTK<sup>4</sup>
- All image file formats can be viewed most image software

---

<sup>1</sup> <https://www.meshlab.net/>

<sup>2</sup> <https://www.blender.org/>

<sup>3</sup> <https://github.com/MarkHedleyJones/blender-pcd-io>

<sup>4</sup> <https://vtk.org/>