



EUROPEAN  
COMMISSION

Community Research



**Collaborative project**

***Deliverable 8.4:  
Final dissemination workshop***

**Project acronym:** AIRobots  
**Project full title:** Innovative Aerial Service Robots for Remote Inspections by Contact  
**Grant agreement no:** ICT-248669  
**Project web site:** [www.airobots.eu](http://www.airobots.eu)



<b>Due date: 31 January 2013</b>	<b>Submission date: 12 March 2013</b>
<b>Start date of project: 1 February 2010</b>	<b>Duration: 36 months</b>
<b>Lead beneficiary: UNINA</b>	<b>Revision: 1</b>

<b>Nature: R</b>	<b>Dissemination level: PU</b>
R = Report P = Prototype D = Demonstrator O = Other	PU = Public PP = Restricted to other programme participants (including the Commission Services) RE = Restricted to a group specified by the consortium (including the Commission Services) CO = Confidential, only for members of the consortium (including the Commission Services)

## Executive Summary

The final dissemination workshop was held on Tuesday the 5<sup>th</sup> of March in Zürich. Goal and scope of this workshop was to demonstrate the capabilities developed in the AIRobots project to ALSTOM boiler service and inspection business and to define how the results can be industrialized and disseminated into the process plant inspection business.

ALSTOM service department participated with all stakeholder needed to decide about the planned industrialization and dissemination.

Beside the AIRobots project team a supplier of a commercial available flying platform was invited to demonstrate the capabilities of standard platform offered. The motivation behind is to integrate the AIRobots results onto such a kind of platform to speed up industrialization and dissemination.

Based on the demonstrations given followed by a brainstorming on how to leverage the project results a R&D project in ALSTOM service R&D was defined. Goal is to industrialize and to disseminate the project results within the next 2 years.



## Table of Contents

Executive Summary .....	2
1 Overview of the Dissemination Workshop .....	4
1.1 Goal .....	4
1.2 Participants .....	4
1.3 Agenda .....	4
1.4 Pictures of the day .....	5
2 ALSTOM Exploitation Plan of AIRobots .....	6
2.1 Goals .....	6
2.2 Scope of the steps .....	6
2.3 Schedule .....	7
2.4 Costs .....	7

# 1 Overview of the Dissemination Workshop

## 1.1 Goal

Goal of the Workshop was to

- Disseminate the AIRobots results within ALSTOM in order to promote exploitations of the developed technology.
- Identify how the technology researched and developed within the AIRobots project can support the inspection and service of boilers.
- Select the most business relevant functionalities and features developed in the AIRobots project.
- Define and to agree on the industrialization of the AIRobots project results.

## 1.2 Participants

About 20 persons attended the workshop with the following presences:

- ALSTOM Thermal Service
  - Chief Engineer Service Technologies
  - Head of R&D Service Technology
  - Head of Strategy Thermal Service
  - Product Manager Boiler Service Business
  - Field Service Personnel Boiler Service
- Representatives of the AIRobots Team
- ASCENDING Technologies (off-the-shelf supplier of flying systems)

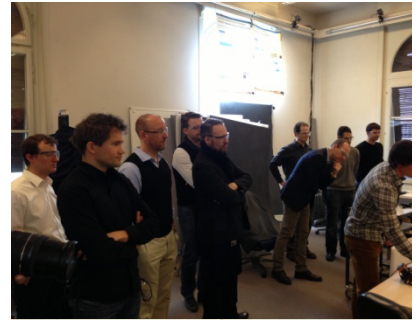
ALSTOM Thermal Service is the division of ALSTOM dealing with the servicing of thermal power plants. ALSTOM Thermal Service has about 15'000 people operation in 70 countries, the annual turnover is about 5 billion Euros.

ASCENDING Technologies is one of the world leaders in the field of remote operated flying systems.

## 1.3 Agenda

9:00	Welcome reception	Ch. Hürzeler (ETHZ)
9:10	AIRobots Project Presentation - overview, - goal & scope, - main achievements and results	L. Marconi (UNIBO)
	System demonstration in the boiler mockup	AIRobots Team
	Discussion of the results and short- / mid- / longterm relevance for ALSTOM (Boiler) business	All
10:30	Demonstration "Off the shelf Flying System	D. Gurdan, AscTech
11:00	Brainstorming / Discussion "how to apply the technology in ALSTOM (Boiler) business and how to industrialize" (supported by small experiments & demonstrations)	All
12:30	Summary and next steps	E. Zwicker (AIR)

### 1.4 Pictures of the day



## 2 ALSTOM Exploitation Plan of AIRobots

Based on the Brainstorming / Discussion Session it was decided to industrialize the AIRobots results into a flying inspection system within the next 2 years. Goal is to develop a generic flying inspection system that can be applied in larger scaled process plants.

The industrialization will be executed stepwise. A commercially available flying platform will be used onto which the navigation technologies and possibilities to contact structures will be integrated.

Servicing and inspection of boilers will be the first target application and serve as an industrial reference for further applications in process industry.

### 2.1 Goals

The exploitation phase will target the following goals:

- Stepwise industrialization of the flying inspection capabilities developed within the EU-Project “AIRobots” based on a commercially available “off-the-shelf” flying system.
- An increasing level of complexity in the degree of autonomy and capabilities of interacting with the environment was identified. The following scenarios at increasing complexity will be targeted:
  - Application: (1) Visual Inspection, (2) contact free NDT, (3) NDT by contact;
  - Navigation: (1) manual, (2) semiautonomous, (3) full autonomous;

### 2.2 Scope of the steps

Each steps brings an added value to ALSTOM FS by itself and serves as the basis for the next step. In the following the goal of the different steps is better specified:

- 1st step “manual visual inspection” -> “semi autonomous visual inspection”
  - off-the-shelf manual visual inspection
    - Application of the available flying system for operator guided (piloted) visual inspection (for high resolution pictures and cam) using the closed system “falcon 8”
    - Test missions to gain experience and to show the potential
  - Industrialization of the AIRobots navigation capabilities
    - Industrialization of the AIRobots navigation capabilities and integration into the commercially available open flying platform “Firefly”
    - Optimization in operator guided tests and pilot missions in plants (visual inspection)
    - Option: integration of the industrialized navigation capabilities into falcon 8
- 2nd step: -> “autonomous contact free NDT inspection”
  - Integration of contact free NDT / reverse engineering applications onto the system
  - Further improve navigation to allow a fully autonomous visual inspection
- 3<sup>rd</sup> step: -> “autonomous NDT inspection by contact”



- Feasibility of making a flying machine docking onto a vertical surface (either as a transporter or a analytical entity)
- Industrialization and integration of contact based NDT (Ultrasonic, deep penetrating EC)

### **2.3 Schedule**

Project start is planned for April 2013. Step 1 and 2 shall be completed in by Sept 2014. Step 3 shall be realized by April 2015.

### **2.4 Costs**

The costs for the industrialization have been roughly estimated and are considered in the financial planning for the fiscal year 2013/14 and 2014/15.