



Education and Culture DG

Lifelong Learning Programme



THE URBAN MINER

(SPAIN. ARTIFICIAL VISION)

V-spider project: SPANISH TEAM

Centro Integrado de F. P. nº 1

Santander

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ROC Leeuwenborgh

Maastricht, the Netherlands

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1. MEMORY



1.1 Aim of project:

The company UM international is the European leader in the recycling of waste materials. Their core business is recycling electronics and electrical products. These devices are dismantled accurately and the recycling process produces a constant, but mixed flow of metals and some plastic.

1.2 Justification of the project proposal

As the company's recycling international UM needs to implement a technological system of selection and removal of materials in its metals/plastics separator, this project provides a smart and inexpensive solution in order to accomplish with the requirements.

1.3 Detailed process of the project

The applicant company of the competition has delivered to each country or team, documentation which details:

- The project proposal
- The requirements that the project must meet
- The conditions laid down to each country or equipment, such as the size of parts that must select material
- The performance and work mode of the transport system.

Apart from the documentation, as a means of communication between the Member groups, a website with forum has been created The website is <http://www.vspiders.eu/>

First of all, the delivered documentation must be analysed to know all the details of the project to develop. In this documentation can be found a view in perspective (Plan nr.8) and a view on floor of the same conveyor (Plan nr.10). The necessary tasks will be divided into several phases.



1st phase:

Proceed to first contact with the project. The Spanish team met to create an approach and assess the possible solutions to the commissioned project.

Both the members of the technical team and coordinators, decided to implement a system of materials selection (plates) using machine vision technology. For the extraction process a pneumatic 2-axis system is suggested.

2nd phase:

It is divided into two parts:

- First, the design of schematics for the structure and stands of the provided solution. Used Google Sketch Up software and Solidworks. We make a manufacturing sheet of the first structure prototype, in the area of machining of the CIFP nr1. Also is sent documentation to the company of methacrylate RESOPAL for the manufacture of the final structure that will travel to the Netherlands.
- Selection of lighting required for the optimal functioning of machine vision. A study of the avenues available to get the best lighting conditions.
Please contact two suppliers, obtaining the catalogues of companies Hispanofilm and Selcansa parts. Finally opts for the use of a focus LED lighting with a power of 16Wattios and a color temperature of 3000 degrees Kelvin. The dimensions of the focus for the first bracket placement are 180mm in outer diameter and 170mm inside diameter.

3rd phase:

~~In the facilities of the Centre had an old conveyor belt, which was~~



repaired and it was decided to use for technical testing.

After a tape repair item is the mounting of the first prototype on the conveyor. Various technical tests such as measuring tape, checking the quality of lighting speed, first testing machine vision.

4th phase:

Begins to develop the algorithm to implement for the recognition of parts transported by tape and their possible expulsion.

This phase was devoted to the realization of the Vision Builder and Arduino programming. In addition the interface Opto-couplers for adaptation with Arduino security control system is designed.

The algorithm to be implemented for the recognition of parts transported by tape and their possible expulsion is created by Vision Builder.

You decide to use two webcam and the program through which we create control algorithm is Vision Builder 2012 National Instruments.

Arduino programming is carried out using the free software "Arduino version 1.0.1".

5th phase:

Once the algorithm was created in vision as Arduino will be held the same debugging, analyzing the possible existence of erratic performances and their solutions. If needed, a group meeting will be held to analyze the operation of the final prototype.

The goal of the project is agreed after several team meetings and performance studies.

6th stage:

A trip to Holland for the presentation to the solution provided by the Spanish team competition will be held from 21 to 25 May.



Individual tasks distribution

To outline the job it is decided to distribute three teams in each of the activities, depending on the specialty and skills of the team members.

- a. Lighting and design interface: José Fco. Salas, Javier Alonso and Lenin Briceño.
- b. Design structure and stands expulsion: José Fco. Salas, Javier Alonso, Lenin Briceño
- c. Machine vision software and programming Arduino: Héctor Morlote, José Fco. Rooms and Javier Alonso.

1.4 GEOGRAPHICAL LOCATION OF THE PROJECT:

1.4.1 Situation

The development of the prototype is to be performed on the premises of the integrated Centre of vocational training No. 1. Enclosed both map (Plan nr.1) as a plane's location (Plan nr.2).

1.4.2 Local description:

The project will be carried out in Cantabria in the city of Santander (Peñacastillo). The premises to carry out the project and the prototype is integrated vocational training No. 1, which accurately locates at Francisco Rivas Moreno Street no. 1

The local will be on the SDIG classroom in the area of electricity and electronics, which has an area of 45 square meters. This place is usually used for the teaching electricity and electronics.



This place is newly built and has specific conditions for the project , since the electrical installation of the building itself has several pictures and protection according to REBT circuits.

1.4.3 Local tools:

The local has a series of tools to carry out technical actions within the electronic field.

- Soldering station.
- Power supply.
- Screwdrivers set
- Game pliers
- Electric scissors
- Cables
- Punch
- Plier short wires

1.4.4 Materials:

The Centre has at first enough amount of materials, if necessary, however, the extra materials needed will be purchased and billed to the project.

The necessary supplier, will depend on the type of material that is needed, and can be from small material (hardware, etc...), going through the usual electric distributors.



1.5 Conditions imposed on the Spanish team

Engineering company “GEFISPANE” has been commissioned to develop and built a new material separator.

“GEFISPANE”, with offices in Germany, Finland, Spain and the Netherlands, is a leader in the development and construction of recycling machines.

Each country will have established conditions when it comes to selecting and ejecting parts. I.e., it has been entrusted to each country the extraction of a kind of plates with certain conditions and the rejection of the opponents pieces.

The Spanish have a condition the selection and extraction of the following items:

- Bronze material with a diameter of 40mm and a thickness of 20mm, with an orange colour according to the RAL 2010.
- Nylon, a diameter of 40mm and a thickness of 40mm, with a purple or violet color according to RAL 4006.

1.6 Dates of delivery of the project, location, and an team

Date delivery of the project on may, 24, having the delivery of documentation and implementation underway prototype on those dates.

The contest will be held in the Netherlands, in the city of Leewenborgh.

The Spanish team that will attend this event that will consist of the following students.



José Francisco Salas Rodriguez

Javier Alonso Puente

Lenin Briceño

Hector Morlote

As team coordinators will participate.

Luis Pérez del Val

Pilar de la Fuente

Eduardo Martínez

Manuel Barreneche

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