



+ information:

AIDO — Technological Institute of Optics, Color and Imaging
Nicol s Cop rnic 7-13,
Parque Tecnol gico
46980 Paterna, Valencia
(SPAIN)*

Email: aido@aido.es
TEL.: +34 961318051
FAX: +34 961318007



aido hosts:

Forumtech 09

Valencia 2nd and 3rd November
www.forumtech.es

EuroI+Deas 09

Valencia 15th December
www.euroideas.info

Photonics Valencia

12th and 13th May 2010
www.photonicsvalencia.info

Leaflet printed according
to Standard ISO 12647

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Let's talk
machine vision



If your company intends to make the technological leap towards an efficient, profitable, competitive, and strong business productive system that will allow you to establish 100% quality control systems at your factory, **AIDO** is definitively the technological ally that you're looking for. Shall we talk?

AIDO makes the difference

Expertise and Know How in machine vision

There are a lot of specialists in vision systems but AIDO makes the difference for 6 simple reasons:

_AIDO's vision systems provide solutions to complex problems that the commercial systems already on the market have not resolved.

_It has the technical knowledge and the necessary innovation capacity to incorporate continuous improvements into all design stages, thus giving rise to robust systems that are 100% reliable.

_After more than 10 years of experience in the field of artificial vision applied to industry, AIDO has developed projects for over a hundred companies in Spain, the United States, and Europe.

_AIDO has designed, implemented, and integrated advanced vision systems in over twenty different industrial sectors offering turn key solutions adapted to each client need.

_It has a highly qualified team of 115 professionals including technologists, doctors and engineers that carry out their daily activities in modern installations of 5,000 m² equipped with 7 test laboratories and a pilot plant, where all the assemblies are carried out that are subsequently transferred to the client's production line.

_Because the future of vision systems start



$Y = 0.000 \text{ mm}$

$Z = 0.000 \text{ mm}$

Dist. = 748.615 mm X = 0.000 mm

Azimut = 0.006 ° Y = 0.000 mm

Elevación = 0.012 ° Z = 0.000 mm



PHILIPS

Sector
Machine-tool

Vision for excellence

Technologically advanced industrial equipment

Most machine tools currently available on the market do not incorporate systems that allow the establishing of quality controls on their end-products.

AIDO has designed semi-automatic equipment that carries out a dimensional control on screws (diameters, lengths, angles, radiuses, concentricity, indentations, points, and perpendicularity) and also on the thread of the screw (worms, screw pitch, thread angle, outer diameter, and inner diameter).

With the development of this machine AIDO introduces to the company a system that allows the integration in the system itself of a quality control mechanism that is made to measure for its needs. In this way the machine is capable of rejecting the units that do not comply with all parameters and tolerances specified by the company.

This equipment consists of a high-definition optical system and is immune to external light pollution, owing to which it carries out measurements with a precision of $\pm 10 \mu\text{m}$.

In a later development AIDO perfected the initial equipment by producing a model that currently allows the carrying out of a dimensional control on screws and studs. The system is capable of inspecting up to 700 parts/minute when in continuous operation and up to 90 parts/minute with 360° control activated for a production of 650-900 parts/hour.

Sector_ Car Industry



Vision for productivity

Detection of fissures in car manufacturing in 4 seconds

One of the main weaknesses of the car sector lies in the difficulty of establishing control mechanisms for the superficial defects that occur in panels after the pressing process, in which the future side panels of small cars to be manufactured are shaped.

During these operations cracks and fissures appear, which in the following phases of car manufacture tend to lead to breakages and hence losses estimated at some 600 per faulty part.

In Spain an average of x cars are manufactured every month, of which at least 1% have defects in the panels that mean they have to be dismantled before they can be placed on sale. This causes the sector losses of xxx per year.

In order to improve production quality in car manufacturing companies, AIDO has developed a system of artificial vision so as to control the quality of production lines, which is formed by two robotic arms including a camera and a lighting system.

These arms position themselves so as to be able to inspect the critical points in the manufacturing of vehicle side panels in real time. The system analyses the images acquired for each point, and by means of image treatment algorithms the appearance of these imperfections is detected.

This quality control is carried out on the production line itself in order to reject defective parts automatically and thus prevent them from reaching the assembly phase. The system is capable of inspecting up to 8 points of the side panel in a 4-second cycle.

All parameters controlled by the system are stored on a database for subsequent consultation, with the aim of being able to optimise the inspection processes and correct the various problems arising in the matrices during the production process.



Sector_ Leather and Shoe industry

Vision for efficiency

Improving the productive processes of the footwear industry

The footwear sector in Spain is currently characterised by being an industry with a high proportion of craft processes, which require 100% manual handling of parts (sewing, punching, padding..).

This almost hand-made component of the process generates numerous human errors as a result of fatigue and tiredness, which leads to major faults that affect the quality of the end-product.

With the aim of improving the efficiency of the parts handling process in this sector, AIDO has designed a system for one of its leading international companies in the manufacture of children's footwear, which allows the automation of the process and the controlling of end-product quality on the production line itself.

The designed system combines technologies of artificial vision and robotics that allow the automatic determining of the model, size, and foot of the part to be processed in each case, together with its position, thus facilitating the handling process and improving both speed and precision.

In addition, AIDO implemented a new function of the system, which also allows the controlling at various points of the production line of the number of parts that had been produced of each model, thus favouring the early detection of those defective units.

All these vision systems have been integrated into the footwear assembly line to allow the detecting and correcting of defects during the manufacturing process. In this way the accumulation of errors is avoided as the process advances, and there is therefore a substantial saving in both raw materials and work time.



Sector Audio-visual

Vision for innovation

Immersive technologies for live 3D diffusion of events

The audio-visual sector is undergoing a constant revolution that obliges it to keep abreast of the latest technological developments with the aim of improving end-product quality.

In this sense AIDO has united the synergies of its technical knowledge in the field of audio-visual technology with that of artificial vision in order to develop an immersive 3D system to include both image and sound so as to broadcast important events live.

Can you imagine attending the final of the Champions League without having to leave your own town simply by going to the nearest cinema? Or enjoying a live concert at Sydney Opera House just as if you were there?

All this is possible with the leading-edge technology developed by AIDO, which allows the live broadcasting of an event without passing through post-production with high-definition technology.

In order to bring this technology to the cinema AIDO has developed an application that includes two high resolution video fluxes (full HD), applying to each flux the processing of images (optical centring, re-scaling, colour adjustments, automatic compensation for camera vibration, etc.) that are habitually used in 3D video post-production (and which thus allows broadcasting in real time). In this way the two video fluxes are synchronised in space and time (maximum coincidence of the pixel area and the same frame in both data fluxes).

GRAPHIC

The system allows the visualising of images for various configurations; in anaglypta format, active glasses, or passive glasses. This is a genuine technological revolution that can now be used by companies in the audio-visual sector to find new ways of reaching their audience through AIDO and artificial vision technology.

Sector ICTs

Vision for business

Automatic invoice accounting in only 30 seconds

Nowadays accounting and financial work at companies is a task that absorbs a very substantial part of their resources. Moreover, in many of them this is still done manually which results in considerable loss of productivity. In order to optimise the process of the administration and accounting of invoices, AIDO has developed a technique of optical exploration technology that allows the automation of the processes of the recognition and classification of invoices in a single software unit.

This is how Contarapid was born, a software that automatically enters in the accounts documents that have previously been scanned to generate a real documentary tool that allows you to carry out any kind of search (by amount, date, supplier, etc.) by introducing hardly any data manually.

In this way, when the company receives the first invoice from a new supplier, creditor, or client, the fields it contains (name, Tax Identity Number, date, accounting accounts) are parameterised in a process lasting no longer than 30 seconds and allowing the making of up to 5,000 automatic daily entries.

In order to create this documentary tool, AIDO has designed systems for the automatic digitalisation of documents using search indexes so that the invoices can be treated digitally, together with advanced template recognition techniques and Optical Character Recognition (OCR) Voting.

This software, which is currently being marketed by the company Incarsoft Inform tica, has revolutionised the sector of ICTs in Spain, being the first system of its kind to be sold in the country. The main advantages of the system include in particular the elimination of human error as it is totally automatic and operates 24 h a day by means of its programming module, thus allowing companies to maximise the performance of their administrative operations.

Sector_ Optics

A close-up, high-resolution photograph of a human eye, showing the iris, pupil, and eyelashes in detail. The eye is looking slightly to the left. The lighting is soft, highlighting the texture of the eye and the individual eyelashes.

Vision for health

Lenses and frames at first go

One of the major problems currently faced by the optical sector lies in its capacity to establish with precision the measuring and centring of the position of the eyes so as to design lenses and frames for its clients in a satisfactory manner.

Use of the traditional method in which all measurements are taken manually gives rise to numerous inaccuracies and therefore the returning of the end-product by the client, with the point of sale having to answer for the defective product and thus incur greater expense.

In order to eliminate human error and guarantee a quality end-product, AIDO has designed a system that by the use of artificial vision and optic technologies facilitates and personalises the process of adjusting and adapting lenses, obtaining very precise 3D measurements from the client.

The system obtains two images from different viewpoints to reconstruct a scene in 3D by making the system invariable to depth changes of the patient or rotations (turning the head). The system identifies the client's eyes automatically and measures in real time the position of each of them in 3D. Once these positions are known, the calculation of the distance between the same or the height at which they lie is immediate.

In addition, it displays and prints life-size images of the client with his/her frame in order to carry out a visual quality control of the setting up process before delivery, detecting any possible defects and thus avoiding claims.

VISUAL SCAN 3D has now become a product that can be marketed by the company Tem tica Software and is currently available in twelve optical establishments in Spain.



Sector_ leisure (golf)

Vision for leisure

TECHNOLOGY FOR CLASSIFYING GOLF BALLS BY MAKE

Golf is a sport that now has over 338,000 federated players in Spain, with a growth rate over the past year of around 1.1%. A large number of golf balls are lost every day and abandoned on the greens.

In order to respond to this need, AIDO has developed an artificial vision system capable of classifying 100% of the balls recovered by the company. The selection process is initiated after introducing into the machine the models of balls to be classified. When these are recovered from the golf course they are washed and those in poor condition are removed.

Once they have been separated, the classification system will identify and group the various balls by make. Finally, the balls are packaged and put on sale at approximately 50% of standard market prices.

As well as buying golf balls at half price, enthusiasts of this sport also contribute towards the improvement of the environment when they buy some of the over 100,000 reusable balls that are put into circulation again by using technology developed by AIDO.

AIDO is studying the possibility of exporting this technology to the United States, as this system is the first world application of the classification of golf balls by make and model using artificial vision.



Sector Wood industry

Vision for sustainability

Detection on the line of defects in wood pieces

The wood sector is currently at a critical moment of technological renovation, given that the market demands shorter and shorter personalised product series. With all this, we find that according to the practice of the sector no kind of quality control is carried out except for the setting up of the machines, with which the probability that defective parts are not detected until it is time to assemble them is very high.

In order to solve this problem AIDO has developed an artificial vision system, the operation of which is based on the acquisition of one or more images of the part to be controlled and in the definition of the search regions (manually or automatically through the DXF file of the board). With the use of this technique a dimensional control can be carried out that includes distances, radiuses, parallelism, perpendicularity, angularity, position relative to a given reference axis, etc.

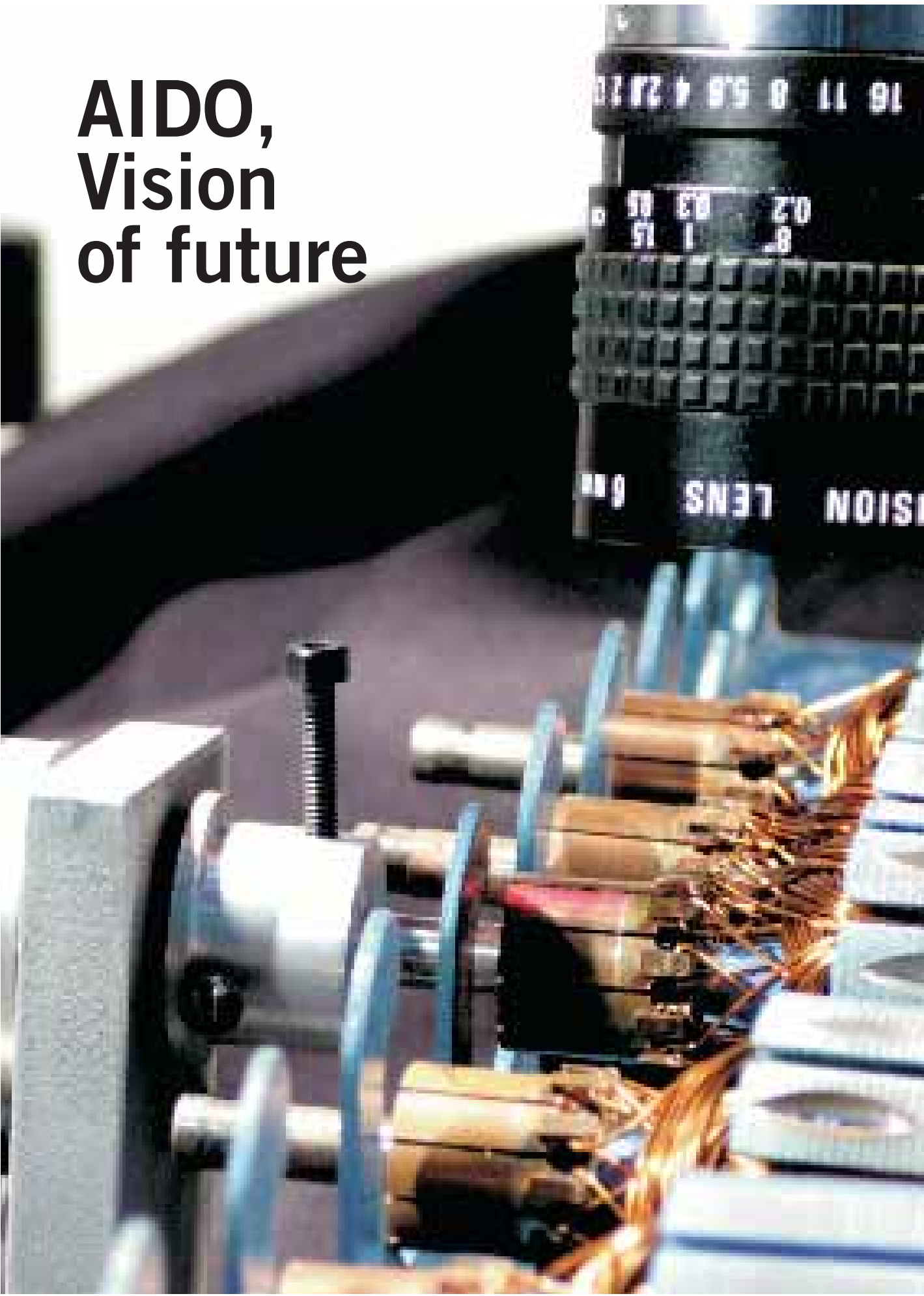
The system designed allows:

- The bidimensional measuring of the pieces.
- Determining by comparison whether the dimensions of the pieces are correct or not, with tolerance margins of up to 0.5 mm.
- Determining the position and dimensions of drills and other tooling, with tolerance margins of up to 0.5 mm.
- Separating pieces of a quality that does not comply with established specifications.
- Analysing the information by means of management software that makes it easier for the user to handle the data obtained and to improve the quality of the processes.
- Integrating the quality system in the productive cycle.

In order to make it easier for this system to be used by the factory worker, AIDO has introduced an interface that allows the administration of the system in a simple way and the exploitation of the data according to needs.

With the incorporation of this technology, companies of the furniture sector can now establish efficient process controls based on automatically registered statistical techniques that lead to a considerable improvement in end-product quality.

AIDO, Vision of future



A hyperspectral image to improve the efficiency of quality controls

In the quality control of industrial processes and product inspection, non invasive and automatable procedures are becoming more and more important. The most frequently used techniques include artificial vision and spectrometry. While artificial vision provides information on the spatial layout of objects and substances by means of the capturing of images, spectrometry is used for the chemical identification of the substances being analysed.

The combination of both techniques (artificial vision and spectrometry) creates powerful inspection systems capable of extracting a large amount of information on the physical and chemical properties of substances and objects of interest.

On allowing non invasive inspection and given their capacity for being programmed (i.e. controlled by a PC), the said systems can be used to carry out chemical analyses, for biological and medical research, for the development of the monitoring of ecosystems, etc. However, the handling and the adaptation of image spectrometers in areas of research and R +D still need advanced technical knowledge.

AIDO is currently working on the IECON project, in which it is researching companies in the agro-food, timber, and solid waste treatment sectors in order to assess the incorporation of this technology.

The technological development in which AIDO is currently involved is concentrating on the optical adaptation between lighting and digital sensors in the optimisation of the lighting model and the development of processing algorithms that are optimised for certain industrial applications, which allow direct, versatile, and intensive use of the prototypes constructed.

