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SUPPORT AND CONTROL SYSTEM FOR THE MEXICAN METEOR NETWORK

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This work presents the design of a platform to support and protect the ensemble of cameras, part of the Mexican Meteor Network. Also it is presented the design of a system to control temperature and dew point.

In Mexico, since 2013, a group of Mexican scientists have worked at "Citlalin Tlamina" (meteor in Nahuatl language), the Mexican Meteor Network, whose objective is to install meteor observation stations throughout the national territory to study the dynamics of asteroid and cometary material through the Earths atmosphere as well as related phenomena. Other objectives are to recover meteorites and support civil protection services as is mentioned by Cordero-Tercero et al. (2016).

Both, the platform and the control system, were worked by modules following the Isermann Mechatronic design methodology based on the vdi 2206 standard created by Rolf (2005), which allows to develop products with a synergy in the mechanical, electronic, control and computing parts.

The developed system was made up of eight modules (Fig. 1): a) control module, b) image processing, c) user interface, d) information storing, e) amendment of energy, f) energy distribution, g) support and protection. The control module measures the internal and external temperature and humidity. Based on these data, it regulates the temperature both internal and on window glasses to avoid dew formation on them. The amendment module is in charge of conditioning the power coming from the electrical network to be able to supply the necessary voltage for actuators and sensors. The system of support and protection fulfills the function of protecting and supporting cameras and components in its interior to avoid damage by extreme temperatures or external agents such as dust, rain or humidity which can also reduce the useful life of the components.

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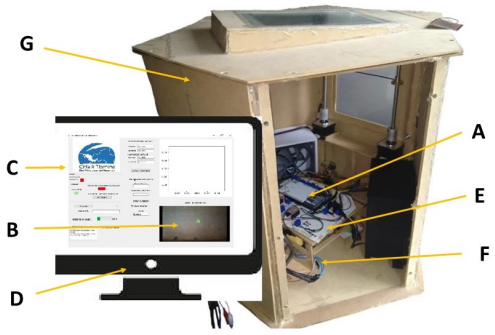

Fig. 1. Prototype built using wood at 1:1 scale to validate the designed system for the Mexican Meteor Network. The graphic interface is showed too.

A graphical interface was created to allow the interaction between users and the system. It monitors parameters such as humidity and internal and external temperatures of the system and allows to watch what cameras are recording in real time (Fig 1- B). In addition, a green alert lights up when movement has been detected. The interface processes the video in which something moving was detected and decides if it corresponds to a meteor or not when using a neuronal network trained with images of previously detected meteors.

Each module has been tested to validate its correct operation. In particular, two platforms were made of wood to assemble all modules (Fig. 1). Currently we are working on the construction of a platform made of steel that will be the final version of the system. We expect to take it to field work soon.

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