CORONAGRAPH DESIGN FOR METEOR MONITORING STATION

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The present work is part of the development of the Mexican Meteor Network (Cordero-Tercero et al. 2016), which has the objective of create a net of monitoring stations that record the trace of meteors, for further study, analysis and possible recovery of meteorites.

The study of meteors within the national territory is carried out by monitoring stations (García-Fajardo. 2017) equipped with 4 WAT-902H2 ULTIMATE cameras that, combining their viewing angles, cover the entire sky. Currently, the monitoring stations around the world tend to work only at night because the constant exposure to sunlight can damage the CCD sensors of the cameras, therefore, for the Mexican Meteor Network it is necessary to design a device that be able to block the sunlight from the field of view of the cameras and allows to monitoring stations to operate during daylight.

For the creation of this device, called coronagraph, currently the Mexican Meteor Network works on the integration of mechanical, computer and electronic components. For the mechanical part, CAD software is used for structural and movement modeling. (Figure 1). Regarding the instrumentation, the Arduino IDE is being used for the integration of sensors. Finally, the software is being programmed in MATLAB and C++. For design improvement and validation, several tests are performed, seeking to satisfy the design specifications.

The shape and size of the object that will block the sunlight from the field of view of the cameras has already been defined, the solar trajectories (Duffie et al. 2013) have been calculated according to the date, orientation and spatial coordinates where the monitoring stations will be placed, and the necessary actuators to achieve the tracking of these trajectories have been determined.

Once the device be complete, we will obtain an integrated system capable to move an object in the field of view of the cameras according to the posi-
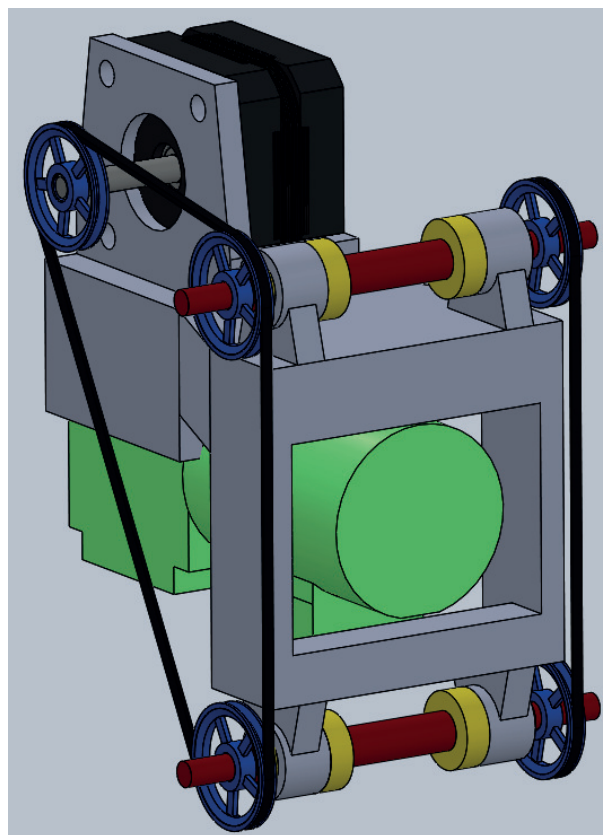

Fig. 1. Preliminary design of a coronagraph for the Mexican Meteor Network.

tion of the Sun. On the other hand, it will be implemented a feedback system that adjusts the trajectories in case of some variation in the orientation of monitoring stations caused by external factors.

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