

# **NEW CONTROL SYSTEM FOR SPACE INSTRUMENTS. APPLICATION FOR MEDUSA EXPERIMENT**

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## **ABSTRACT**

Control is a key question when we talk about space instruments. Usually, the instrument has to perform a sequence of actions and changes on this sequence are very expensive in terms of communication and time. We are developing a new technique to control space instruments, based in programmable finite state machines. This allows controlling systems and at the same time it gives flexibility to change the sequence of actions to execute. However, hardware implementation of the basic control makes the instrument more reliable than the software one. The programmable finite state machine is stored in RAM and it can be changed from Earth at every moment. The condition to execute one or other action can be selected dynamically by the user. One of the advantages of this technique is that the control can be implemented using non reprogrammable devices, because the sequence is stored in an external memory. The main disadvantage of this technique for using it in space is that it requires a large amount of memory. This means large size chips, which makes the hardware harder to route and increases the size and weight. However with the new method presented here, the necessary memory is dramatically reduced. The actions to be performed by the system are grouped into “states”. The external RAM stores the condition to change the state, and the new state.

We are testing our control system in MEDUSA instrument, from Exomars mission. A prototype board has been designed and this will allow us to finish the test to evaluate the goodness of our system.