ICD for NAOMI to Science Instrument (INGRID)

1. Summary

This is a preliminary ICD for the software interface between NAOMI and the Science Instrument (assumed to be INGRID). This interface is not yet properly defined, therefore this ICD summarises the NAOMI requirements in this area as well as stating what is currently known about the interface to the Science Instrument.

2. The Science Instrument

The Science Instrument is assumed to be a near-infrared camera. It is also assumed that the Science Instrument needs to know nothing about NAOMI.

The Science Instrument will have its main data storage route through UltraDAS, a preliminary User Requirements Document for which is at http://lpss1.ing.iac.es/~docs/ins/das/ins-das-16.html. UltraDAS collects the data and allows for operations such as windowed data frames, and writes the data to disk in FITS format.

3. NAOMI Operation

The NAOMI system monitors a guide star in the visible. From this information it has to adjust its deformable mirror to improve the image of a science object as recorded by the infrared camera. To do this it needs some way of calibrating the relationship between the image it detects and the science image. The procedure involves adjusting the control of the shape of the deformable mirror while monitoring the infrared camera's image of a point source. This leads to the following NAOMI requirement:

"The interface to the IR science instrument shall, as a minimum, permit the AO system to initiate a windowed or non-windowed exposure, to confirm the completion of the exposure and to obtain the data. This entire sequence should complete in no longer than 0.1 seconds for a 128x128 pixel window."

NAOMI ought to need to know nothing about the internal arrangement of the Science Instrument, thereby enabling it to work with different Science Instruments.

4. Suggested Command Interface

The NAOMI software should be able to send a DRAMA command to the "Science Instrument", which probably really means the data acquisition system (UltraDAS) with the meaning "take a windowed exposure with this exposure time of this windowed area and return the result as a simple 2-D image".

For convenience, here is a statement of the command in conventional syntax:

Obeyw das grab integration_time xmin xmax ymin ymax

It is assumed that all the items in this command are variables - that is, NAOMI does not have coded into it the name of the das or the actual action name corresponding to grab.

On completion of the action corresponding to "grab", the DRAMA task corresponding to "das" returns a 2-D array in the DRAMA completion message. This array has had geometrical features peculiar to the Science Instrument (eg the number and arrangement of read-out channels) already removed from it, so that NAOMI can handle it straightforwardly as a 2-D image.The question whether the image needs to be flat-fielded, and if so, which software subsystem is responsible for doing this has yet to be determined.