WHT-NAOMI-108

Strain Gauge Monitor

Application User Guide

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1INTRODUCTION

The purpose of this document is to outline how the NAOMI engineer or observer may use the *strain gauge monitor application*. The *strain gauge monitor application* provides to the user a graphical representation of the *deviation* from the midrange value of *each* of the three actuators associated with the 76 segments of the NAOMI deformable mirror.

At a glance the user will be able to ascertain if any of the actuators are working close to their limits via a display which is updated in realtime.

1.1Scope

The application described in this document forms part of the NAOMI adaptive optics system which is deployed at the W. H. T.

2 GENERAL DESCRIPTION

The purpose of this application is to provide to the user an indication as to whether the *actuators* or *strain gauges* associated with each of the segments of the NAOMI deformable mirror are working within their expected *limits* during NAOMI operations.

The application consists of a *single* window which contains a graphical representation of the NAOMI deformable mirror. Each one of the *76 segments* is associated with *three actuators* which collectively , can move the segment in three dimensions. Each of the *actuators* has a range of *0-8192* with the *midrange value* being 4096. As the measured value of an actuator *deviates* from the midrange value, the *colour* of the actuator on the display will change accordingly.

The default colour of an *actuator* which is currently set to the midrange value of *4096* is *black*. As the actuator measurements *deviate* from the midrange value up until the *user-defined* threshold limit, the actuator will be displayed using a progressively lighter shade of *grey* until it reaches the *user-defined* limit at which point it will be represented by the colour *white*.

At the point that the actuator measurement exceeds the *user-defined* threshold limit, the colour of the actuator will turn a *dull red* to indicate that a limit has been exceeded.

The application is designed to be left running throughout NAOMI operations, the overhead incurred by the realtime system as a result of the application running is minimal.

2.1Starting the Application

The application may be started from the **navis** command line whilst logged onto the system as user **naomi** using the following command;

   DMStrainGaugeMonitor&

Alternatively, the application may be started from the *TopGui* tools menu. After a short delay, the following window should appear on the display.
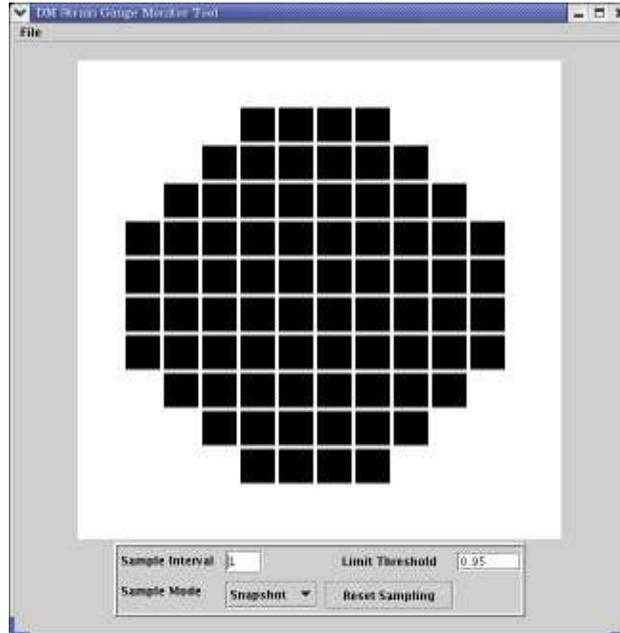
The Strain Gauge Monitor Main Display

It should be noted that in order to use this application, the remainder of the NAOMI system must be fully functioning.

2.2Setting the Threshold Limit

The user can specify as a real number between *0.0* and *1.0* in the field labelled *Limit Threshold*, a value which will represent the threshold limit *after* which the *measured value* of the actuator will be considered out of range. The *midrange* value of an actuator is considered to be *4096*. The default threshold limit is set to *0.95*

As the *measured value* of an actuator *deviates* from the midrange value, the colour of the actuator will lighten from a *black* colour towards a *white* colour as it tends towards the *user specified limit*. For instance, if the user had specified the threshold limit as *0.5*, the colour of an actuator will lighten as the actuator measurements progressively deviate from the midrange value until the measured value of an actuator reaches *6144* or *2048*. At this point the *actuator* will be displayed using *white* as the colour.

Once the measurement of the actuator *exceeds* the user specified threshold limit, the colouring of the actuator will take the form of a dull *red* colour. As the measurements of the actuator tends towards the *absolute* physical hardware limit of *8192* or *0*, the *redder* the colour of the actuator will become.

2.3 Sampling Modes

The application offers the user *three* different *sampling modes*. The following sections outline the significance of each of these sampling modes.

2.3.1 Snapshot Mode

If the user selects *snapshot mode*, the graphical representation of the deformable mirror will be based *solely* on the *last* set of actuator measurements retrieved from the adaptive optics system.

2.3.2 Tidemark Mode

If the user selects *tidemark mode,* the graphical representation of the deformable mirror will be based on the *maximal* actuator measurements sampled since either the application was started or the last time that the button labeled **Reset Sampling** was pressed.

The purpose of this mode is to allow the engineer to see an actuators *maximum deviation* from the *midrange value*.

2.3.3 FIFO Mode

If the user selects *FIFO mode,* the graphical representation of the deformable mirror will be based on an *average* of the previous 100 actuator measurements. As suggested by the title of the mode, once 100 measurements of an actuator have been collected, the next sample will result in the *oldest* measurement being discarded for the *most recent* actuator measurement.

When the user presses the **Reset Sampling** button, the FIFO measurement queue will be emptied.

2.4 Sampling Interval

By default, the application samples the strain gauge measurement data every second. The user can change the *sample frequency* by modifying the value displayed within the box labeled **Sample Interval** which is expressed in seconds.

There is little to be gained from sampling the strain gauges much faster than one hertz.

2.5 Examining Individual Actuator Measurements

The engineer can examine the *individual* actuator measurements simply by positioning the mouse pointer over an actuator of interest and pressing the righthand mouse button. The most recent *measurement* of the actuator in accordance with the *sampling mode* selected, as well as the associated *actuator* and *segment* number, will then be displayed in the lower part of the display.

2.6 Exiting the Program

The user may *exit* the application by selecting the *Exit* option from the *File* drop-down menu.

2.7 Trouble Shooting

The application relies on a *server task* which is required to run on the **navis** computer which is called **DMStrainGaugeDataServer**. The purpose of this task is to acquire *strain gauge measurements* from the realtime system and then serve them to clients such the *strain gauge monitor application*.

Normally the server task is started as part of a *NaomiRestart* procedure but in the case of the strain gauge application not functioning correctly, the engineer should ensure that this server task is running on **navis** using the **ps -Aef | grep python** command and ensure that the task is listed. If this is not the case, the application should be restarted using the following command from the **navis** command line

DMStrainGaugeDataServer&

If the above measure does not solve the problem, the engineer should check with TopGui whether or not the C40s are functioning correctly.