



Telescopio Nazionale Galileo

GIARPS mode

Short Observer's Guide

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1 Introduction

1.1 Scope

This document is a short guide for simultaneous GIANO-B and HARPS-N (GIARPS mode) observations. The contents of this document will be continuously modified with the most up-to-date information.

1.2 GIANO-B and HARPS-N Web Pages

GIANO-B Web Page is available at: <http://www.tng.iac.es/instruments/giano-b/> .

HARPS-N Web Page is available at: <http://www.tng.iac.es/instruments/harps/> .

Please refer to these web pages for general information and description of the instruments. Also, additional resources as exposure time calculators, catalog file example, etc, for observation preparation are provided through the pages.

1.3 Contact information

The observers are encouraged to send a feedback on this document. Please email to Avet Harutyunyan (avet at tng.iac.es).

1.4 Reference documents

This guide assumes that the observers are familiar with the use of both GIANO-B and HARPS-N as standalone instruments. Please read the GIANO-B and HARPS-N Observer Manuals available on the corresponding web pages, since this guide refers heavily to those documents.

2 Start-up and initialization

The startup of both GIANO-B and HARPS-N has to be carried out independently and as described in the respective manuals. After that, both instruments have to be initialized. All initialization steps that are executed through the two Sequencers can be carried out independently too, except of the last “Start TEL” commands. “Start TEL” cannot be carried out simultaneously by both instrument Sequencers, first GIANO-B one has to be executed and after the HARPS-N one.

When the two instruments start-up and initialization is finished, the Telescope Operator has to set GIANO-B AG into “GIARPS” mode (following instructions in the manual).

3 Afternoon calibrations

The afternoon calibrations of both instruments can be done independently. Please follow the steps described in the instrument manuals for this. The instruments pre-slit or front-end units are sufficiently sealed, however a simultaneous execution of the two calibrations may potentially cause light contamination by the corresponding light sources. Until any such risk is ruled out through thorough tests, the afternoon calibrations of the two instruments must not be carried out simultaneously.

4 GIANO-B slit auto-calibration

GIANO-B slit auto-calibration has to be carried out in the afternoon, similarly to the GIANO-B standalone observation cases and as described in the instrument observer manual.

5 NSTS OB preparation

GIANO-B and HARPS-N observing OBs has to be prepared independently through respective NSTSs. Please refer to the instrument manuals to prepare the OBs.

For HARPS-N any type of “Obs” OBs can be used, i.e. there is no restriction on the type of the NSTS acquisition template use due to GIARPS mode observations.

In GIARPS mode, only GIANO-B in-slit A-B nodding observations can be carried out. Only “GIANO_acq_nodAB_GIARPS” acquisition template, especially designed for GIARPS mode observations has to be used. In order to execute the observations correctly, please ensure to use this template in the GIANO-B NSTS catalog file. In case regular (GIANO-B exclusive) “OB_Obs_NoddingAB” OBs are already loaded into the NSTS, “Change ACQ” command can be used to convert “GIANO_acq_nodAB” to “GIANO_acq_nodAB_GIARPS”, required in this case. Please bear in mind that this operation gives correct results only when done between the two above mentioned acquisition templates.

6 Exposure times selection

For a given target observation the total exposure times of the GIANO-B and HARPS-N OBs can be different. Technically no problem arises in case one of the instrument ends the exposure before the other, moreover, it would be practically impossible to perfectly

synchronize the two detector integrations. That said, the observing time has to be managed in the most efficient way, so some care has to be taken to choose similar exposures for the two observations. Overheads due to multiple detector read-outs for both instruments, or A-B nodding in GIANO-B case have to be considered in the total exposure times estimate.

7 Auto-guider (AG) setup

During the instrument start-up, GIANO-B AG has to be turned on and initialized, as described in the manual. Before the GIARPS mode observations start, the AG has to be set to “GIARPS” operation mode. This is done using the “GIARPS” switch button on the “GIANO guiding mode” pane of the AG GUI. Also, the biggest guiding box of 6”x6” has to be selected in the pull-down menu on the “Box controls” pane of the GUI.

8 Telescope focusing

Ideally, in GIARPS mode GIANO-B and HARPS-N share the same telescope focus. At the beginning of the night HARPS-N focusing has to be done following the steps described in the HARPS-N instrument manual.

9 GIARPS mode dichroic

When observations in GIARPS mode have to be carried out, the dichroic enabling GIARPS mode has to be inserted. This is currently done either by the TNG Staff Astronomer or Telescope Operator through a maintenance interface. Visitor observers have to ask the Telescope Operator to do this operation.

In case GIARPS mode observations are combined with GIANO-B or HARPS-N only observations during the same night, the dichroic has to be placed and removed as necessary. This can be done as many times as required during the night.

10 Observing

Once the OBs of the same target are ready for both instruments, they have to be loaded into and executed by the corresponding Sequencers. This is done by clicking “Next OB” button on the two Sequencers. The precise timing of the Next OB click is not critical. However, the suggested practice is to launch HARPS-N “Next OB” command first. After this and at any time before the HARPS-N science exposure starts, the GIANO-B OB can be launched.

Once the telescope slew ends, a HARPS-N acquisition image is obtained and the observer needs to “Repoint” to center the target star on the fiber A. At this point, the GIANO-B OB execution either still has to take its acquisition image, or has already taken one without the target star in the field (this depends on how long in advance the GIANO-B “Next OB” was clicked). In the latter case, a new acquisition image has to be taken using “Exposure” Sequencer command.

When the target star is centered on the HARPS-N fiber and at the same time is also visible on the GIANO-B acquisition image, the Sequencer “Go” command has to be executed

- first for HARPS-N
- and then for GIANO-B.

No target re-centering of any type has to be done with GIANO-B. In case of operational problems, one may delay GIANO-B “Go” command execution until the HARPS-N AG starts guiding on the target, in order to secure the different actions one by one.

It is important to take into account that when the observer issues an “Abort” command on any of the two instrument Sequencers, also the “Abort” on the other Sequencer has to be issued. After that both OBs have to be reloaded and relaunched.

For the use of “Repoint”, “Expose”, “Go” and “Abort” Sequencer commands, please refer to the instrument manuals.

11 Shut-down

The two instruments can be shut-down following the instructions in the corresponding manuals. Only “End TEL” or “End Night” commands require special care, as they cannot be executed simultaneously for both instruments.

12 GIARPS mode observations summary

For sake of clearness, a concise observer action list of typical GIARPS mode observations is reported below. For each operation in the list, more detailed instructions are available in the corresponding chapters of the guide.

☀ Afternoon

- Instruments start-up and initialization for GIANO-B and HARPS-N (simultaneously or not, see chapter 2).
- Standard calibrations, first GIANO-B then HARPS-N (or vice versa, see chapter 3).

- GIANO-B slit auto-calibration (chapter 4).
- NSTS OB preparation for both instruments (chapter 5).

☉ Nautical dusk

- Telescope focusing with HARPS-N (chapter 8).
- GIARPS mode dichroic positioning (chapter 9).
- GIARPS operation mode and 6"x6" guiding box selection on the AG (chapter 7).

☉ Night

- On-sky observations (chapter 10).

☉ Nautical dawn (or in any case immediately after the end of on-sky observations).

- GIANO-B wavelength U-Ne calibration (see GIANO-B Observer Manual).
- Instruments shut-down (chapter 11).