

STATEMENT OF WORK AND TECHNICAL SPECIFICATIONS

Mechanical Spectrograph-Telescope Interface for the High Resolution
Spectrograph for the Galileo National telescope

DOCUMENT SARG-D024

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1 GENERAL INFORMATION

1.1 Introduction

The Italian *Consiglio delle Ricerche Astronomiche* and the Padova Observatory have constructed the Galileo National Telescope (TNG) located at Roque de los Muchachos, La Palma, Canary Islands, Spain. The TNG is a 3.5 m optical telescope. A high resolution echelle spectrograph (SARG) is planned for Nasmyth focus B of this telescope, to work in the wavelength range 370 to 900 nm. This Statement of Work and Technical Specification defines technical requirements of the contract for the mechanical telescope-spectrograph interface between Osservatorio Astronomico di Padova (SARG Project Group) and the Contractor.

1.2 Description of SARG

SARG is an echelle spectrograph located on a platform rigidly connected to the TNG fork. All units are placed on a commercial optical table; this is placed inside a thermally controlled enclosure to protect the instrument against temperature fluctuations, dust, etc.

A general layout of SARG is given in Figures 1, 2, and 3. Briefly, beam at the spectrographic Nasmyth f/11 focus is first transformed into an f/34.4 beam by a diverging (Barlow) lens (L1), and then deflected downward by a folding mirror (FM1). These optical elements are within the structure of the Low Dispersion Spectrograph (LDS). The other spectrograph components are located on an optical table, rigidly connected to the TNG fork. A second lens (L2) collimates the beam: an optical derotator is located within this collimated section of the optical path. Then a third lens (L3) focus the beam on the slit.

After the slit, a second folding mirror (FM2) redirects light toward a white pupil collimator (focal length 1100 mm), which creates a collimated beam with a diameter of 100 mm. This kind of mounting is free of aberration except field curvature. Another advantage of the mounting is that the echelle is reimaged near the camera entrance (pupil transfer) which allows to minimize the size of the camera optics. Field curvature is corrected by a weak cylindrical surface close to the detector on the rear side of the field lens which is also the cryostat window. An R4 echelle grating is located on the first pupil image created by this collimator. A choice of cross dispersing grisms may be located on the second (white) pupil image.

The parallel beam dispersed by the grism cross disperser is focused by a Camera with a focal length of 497 mm, and a clear aperture of 116 mm. In the focal plane of the camera a single large size CCD detector is placed (actually a mosaic of two 4096×2048 chips, with pixel size of $13.5 \mu\text{m}$; field size 5.5×5.5 mm).

2 STATEMENT OF WORK

2.1 General

This contract concerns the delivery of the mechanical components of the spectrograph-telescope interface for SARG described in the attached constructed drawings (Auto-

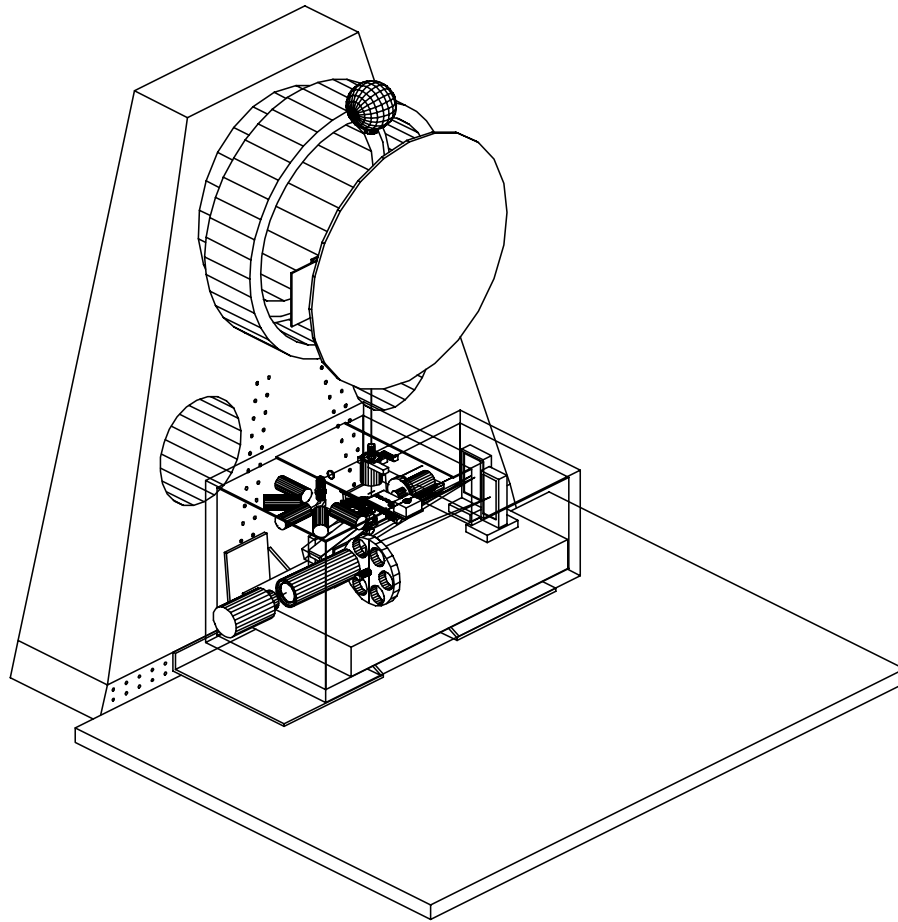


Figure 1: SARG layout in the Nasmyth room. SARG is rigidly mounted on the telescope fork. Light reaches the spectrograph from a folding mirror (in this figure hidden by the LDS structure). To enhance mechanical stability, the rotator adaptor is kept fixed when using SARG. Field derotation is achieved by means of an optical derotator. Guiding is done at the slit, using a cooled CCD

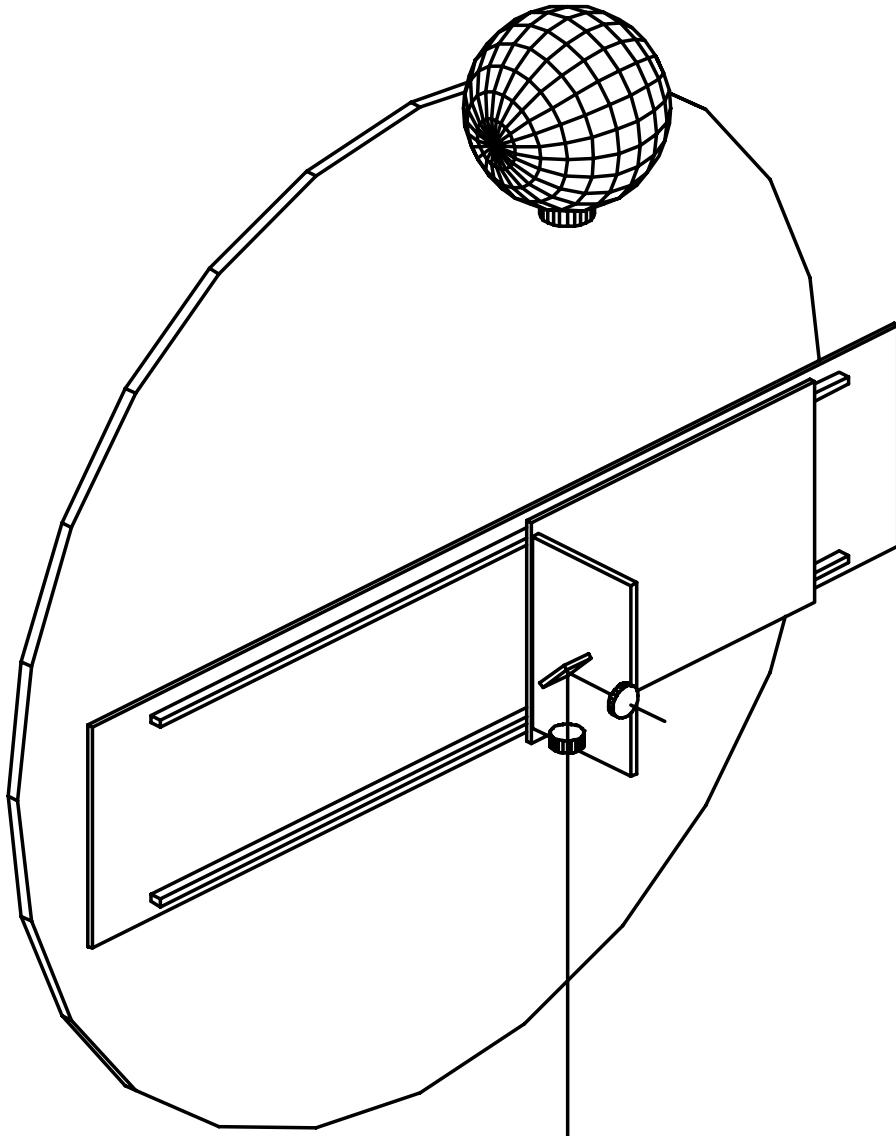


Figure 2: Layout of SARG components inside the mechanical structure of LDS

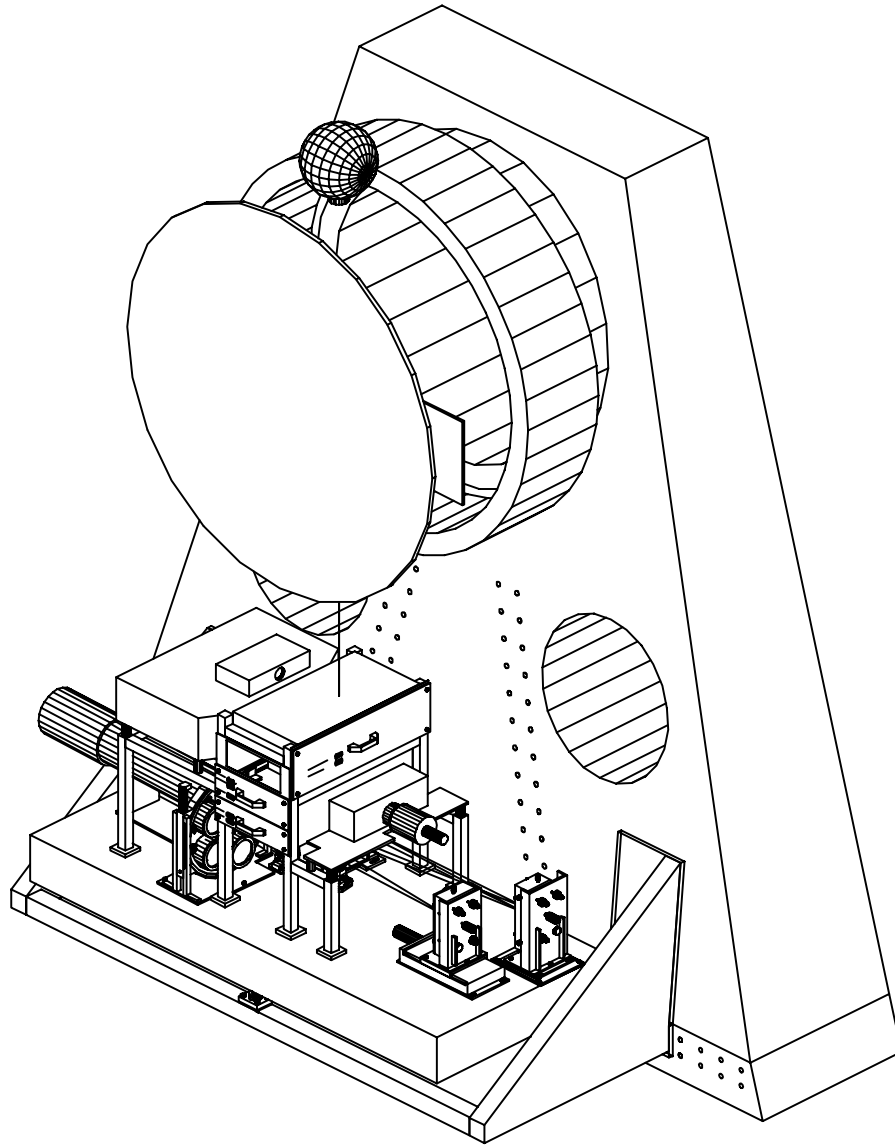


Figure 3: Spectrograph layout (components on the optical table). Light enters the spectrograph from top. Note (in order along the optical path) the calibration lamp unit, the optical derotator, the preslit slide (equipped with the absorbing cell), the slit wheel, the slit viewer, the filter wheel just after the slit, the spectrograph shutter, the white-pupil collimator, the R4 echelle, the wheel carrying the grisms used as cross dispersers, the dioptric camera and the dewar for the mosaic of two large format CCD's

CAD14 files provided on CD-ROM support).

The contract comprises the following items:

1. Procurement of material and components and preparation of the individual items
2. Assembling of subsystems
3. Acceptance tests
4. Packing and transport to Padua Observatory

2.2 Project milestones

The project milestones are as follows:

Kick-off meeting, placing of contract	T0
Provisional Acceptance	T0+3 months

(August is neutralized). Changes in milestones must be approved by the SARG project group.

2.3 Review, reports and meetings

We expect the project requires close interaction between the SARG Project Group and the Contractor, even out of the following planned meetings:

Kick-off meeting: Clarification of open points, including interfaces. Establishing of project organigrams, project planning with milestones and action list.

Problem Reports: Any major problem jeopardizing punctual delivery or technical performance and requiring SARG project group's immediate attention must be reported within 5 working days.

Provisional Acceptance: test of individual subsystems; acceptance test protocol.

Meetings will as a rule take place at the contractor's work.

3 DELIVERABLE ITEMS

At Provisional Acceptance, the following item shall be supplied:

Pos. No.	Item	Quantity
1	Spectrograph-Telescope Interface	1

The above mentioned items shall be provided assembled.

It is contractor responsibility to ascertain that the items are correctly mounted in the subsystems and that there is not any loose element in the subsystems at delivery (this will be verified at Provisional Acceptance).

4 CONSTRUCTION RULES

As a rule, the items provided by the contractor shall be realized strictly following the construction design provided by Osservatorio Astronomico di Padova. This should be checked in particular for what concerns quantities, dimensions, tolerances, beveling, materials, surface finishing and treatment (anodization, painting) and cleanliness. Any change must be approved by the SARG project group.

The list of constructive drawings is as follows:

- D1.AP.00.00
- D1.AS.C01.00
- D1.AS.C01.01
- D1.AS.C01.02
- D1.AS.01.03
- D1.AS.01.04
- D1.AS.01.05
- D1.AS.01.06
- D1.AS.01.07
- D1.AS.01.08
- D1.AS.01.09
- A0.AC.01.00
- A0.AC.01.01
- A0.AC.01.02
- A0.AC.01.03
- A0.AC.01.04
- A0.AC.01.05
- A0.AC.01.06
- A0.AC.01.07

5 ACCEPTANCE

This section lists the requirements to be checked, usually by Contractor at Provisional Acceptance. Unless otherwise stated, the tests are executed at room temperature. Results shall be recorded in a report or test protocol. SARG project group representatives may be present.

- visual inspection of all items for materials and surface treatment

- mechanical measurements of dimensions
- functionality of all moving parts
- absence of any loose parts

6 DEADLINE

Deadline for presentation of the offers is August 30th, 1999.