

TNG

The Instrument Plan: I, II, III
1988 - 2000

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3 basic documents:

- ♣
- *F. Fusi Pecci, G.M. Stirpe “TNG Instrument Plan I : A Progress Report”, March 1992, LIBRO ARANCIONE No. 1*
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- *F. Fusi Pecci, G.M. Stirpe “TNG Instrument Plan II: A Progress Report”, December 1994 LIBRO ARANCIONE No.2*
- ♣
- *F. Fusi Pecci, Valentina Zitelli No. 3 in “Scientific Dedication of The TNG”, CNAA, Eds. Marcello Rodonò & Giancarlo Setti, 3-5 Nov 2000, Santa Cruz de La Palma, pag. 93 -113*

**important debate and strong discussions
held in the 1990's**

We are now embedded in the VLT-era and even larger "monsters" are planned to grow up quite soon. **Why a new "small" italian telescope?**

Looking at the world's largest optical telescopes planned for the next decade and listed by Sky and Telescope, **the TNG is going to be only at position > 15-20 in the ranking**

Moreover, most of **the new mid-class telescopes are going to be highly specialized.**

1991: The Working Group on Large Optical Telescopes

- **First, “.. the TNG is based on the ESO-NTT, though with a few important modifications allowing the future implementation of additional focal stations. At first light two f/11 Nasmyth focal stations would be available for the users, only one with the rotator/adaptor fully funded”.**
- **Second, “... the main efforts must be devoted to exploit the imaging capabilities of the TNG both in the optical and in the NIR spectral regions. Major efforts must also be devoted to building a Low Resolution Spectrograph and a High Resolution Spectrograph...”.**
- **Third, “...all the baseline instruments will be permanently mounted and available and, moreover, remote control should be possible. This should guarantee a high level of efficiency and maintenance, a flexible scheduling, and a reduced impact of the operational costs.”**

- Most of **the early discussions about** instrumentation were carried out on the basis of **the assumption that the TNG could be built on Mauna Kea (Hawaii)**, where other top-quality telescopes were already operative with the best known seeing conditions, and the Keck telescope was *in fieri*.
- **Only on June 15, 1991** the Consiglio per le Ricerche Astronomiche (CRA-MURST) decided to choose as **the best possible site the Roque de los Muchachos (ORM)** on the island of La Palma.

- **In March 1992, the TNG-Instrument Working Group** (*Commissione Strumenti Galileo*), increased in the number of involved people and subdivided into various smaller groups, **prepared and presented the first official document:** "*The TNG Instrument Plan: I, A Progress Report*" (eds. F. Fusi Pecci and G. Stirpe) to the CRA and to the whole national astronomical community.
- The main purpose of this document was **to provide the CRA with the documentation needed for a critical evaluation of the global plan and for starting the procedure aimed at conclusively:**
 - defining the baseline TNG instrument set-up,
 - determining priorities compatible with the available economic and human resources, and
 - selecting for each instrument a Principal Investigator (PI) and a Construction Team.

- The baseline TNG **instrument set-up covers a very wide range of needs.**
- It consists in a sense of **four *classic* devices plus an adaptive optics module**
- They must work at the top-quality level of their 4m-telescope counterparts, **being always all mounted and ready-to-use on the telescope**

- **Optical Imager Galileo (OIG):** 2048 x 2048 pixels, field 5x5 arcmin, 0.32-1.1 wavelength range , Plans for 2 x 2 CCD mosaic , LORAL 2Kx2K, 15 μm
- **Infrared Imager and Spectrograph:** 256 x 256 array, possible provision for 512 x 512; 0.9-2.5 μm wavelength range , Narrow band imaging ($\lambda / \delta \lambda > 400$) and/or grism spectroscopy with $R \leq 700$ to $R = 5000$, scale 0.25 arcsec/px. Field 4 arcmin,
- **Low Dispersion Spectrograph** Grisms yielding $R=300-2000$ 1 or 2 (red & blue) channels, possibly with beam-splitting dichroic; 10' slit length, MOS capability on 10' field, 0.33-1.0 μm spectral coverage, polarimetric mask, removable ADC,
- **High Resolution Spectrograph :** Two-arm Echelle with dichroic splitting, Located in telescope pillar, fiber-linked to Nasmyth B focus $R = 50000$; 1".07 entrance slit 3100-8600 \AA spectral range
- **Adaptive Optics Module:** Partial correction with diffraction limited PSF with $\text{SR} > 0.3$ at 2.2 μm under 0".7 seeing Partial correction in visible of at least tip-tilt component, 35% sky coverage; 1: 1 optical relay of focal plane Minimal number of optical elements
- **Common mechanical interface for instrument flanges**
- **All these instruments will be mounted at the f/11 Nasmyth foci.**
- **At full operation: Rotator/Adaptor 1: C+D; Rotator/Adaptor 2: A+B.**

- **The bulk of the money to build the TNG instrumentation has been provided by the CRA and later by the "*Consorzio Nazionale per l'Astronomia e l'Astrofisica*" (CNAA), and many different institutions (mostly Observatories) have actually contributed people and some funds to almost any device.**
- **The global funding of the TNG instrumentation has been completed in just 3-4 years, and this has certainly represented **a big effort for the whole Italian astronomical community****

Instrument	Prev. 1992	Prev. 1996	Total cost 2000	Note
# R/A 2	1300	1300	960	+ 140 [TNG]
TOTAL A#	1300	1300	960	
TNG BASELINE				
*NAS A	120	300	310	
*CCD-WG	250	300	589	CCDs: OIG, DOLORES, ADOPT, spare
*OIG	300	300	370	With filters
*DOLORES	2000	1500	1749	With MOS, No spectropolarim.
*NICS	900	1360	1269	No spare
*ADOPT	1000 [1+2]	2000 [1+2+3]	1665 [1+2+3]	
*SARG	2000	2200	1960	
*CRTL	100	100	110	
*DIMM	60	200	250	
*METEO	70	100	205	
*ARCHIVE	100	200	248	
TOTAL B* = TNG -BASELINE	6900	8560	8725	
**GOHSS		2000	1595	
TOTAL C**		2000	1595	
GRAND TOTAL A#+B*+C**	8200	11860	11280	

- **117 people from 24 different institutions have been involved in the planning and construction of the TNG instrumentation.** To these numbers one has to add those who have worked in the various Working Groups or Committees without participating directly in any of the instrument teams. **Approximately 20 more people and 5-6 more institutions should thus be added.**
- A “complete” list of the people who were involved at different levels (WG’s, Instrument teams, Committees, etc.) can be found in
- Table: 1-23 of FFP&VZ 2000, Report No. 3
- These numbers confirm by themselves beyond any doubt that
- **the planning and construction of the TNG instrumentation has been a truly national enterprise.**

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- **Nov 2000:** Fortunately enough, **we are much stronger than before** as we now have our own national telescope.
- Together with the telescope and its instrumentation **a group of young and very active people has grown up**, securing knowledge and experience in planning, designing, building, and using top-level instrumentation.
- **They are now ready to work for and with any telescope of any size.**
- **This is not a trivial side-benefit of this big enterprise.**

- **Nov 2000:** the activity of the TNG Instrument Working Groups is now concluded as the baseline plan has been substantially fully carried out.
- **FFP is very grateful to all the dear friends who took part in this *long and great adventure*. It has been a real pleasure to work with all of them.**
- **This was also a great opportunity to learn a lot, well beyond the technical and astronomical topics.**