



WR 140 Campaign at Izana Observatory Tenerife

An announcement for a professional like observing run at a world-class observing site.

Last December I have been on Tenerife/Canary Islands for visiting my friend Johan Knapen, Professor at the astronomy department (Instituto Astrofisico de Canarias - IAC) at the local University of La Laguna. I spoke to him about our WR 140 campaign and that we collaborate with professional astronomers. He informed me about the MONS telescope at Izana Observatory in 2300m altitude on Tenerife Island. For more detailed information about WR 140 and our Campaign see <http://www.stsci.de/wr140/index.htm> .

Some details

- MONS telescope is available for amateur astronomers.
- It is a 50cm f/15 Cassegrain.
- For observing time a written application has to be proposed.
- The price per night is 30 Euros for the accommodation of maximum 4 observers.
- A kitchen is available and food can be self-organized.
- The observatory residency with cantina also offers cheap breakfast/lunch/dinner.



MONS Observatory

During a visit on the mountain I checked the instrument and its infrastructure to learn if it could be an option for a group campaign. In addition I contacted the responsables at IAC via Johan Knapen and got more information. Here is the technical baseline:

- The basic “instrument” is an eyepiece.
- Although the “user manual” says that an own instrument is no option, we can use our own spectrograph.
- The instrument is computer controlled but has no autoguider. Guiding has to be performed by hand.
- Observers get local technical support.

MONS telescope is an opportunity for us to go not only for WR 140, which is visible just during the evening/morning but also for other targets with rapid line variability, as O stars. For the latter Klaus Vollmann and me are in touch with Thierry Morel at University of Leuven / Belgium. Unfortunately, Be stars are only a minor option due to their long-term line variability. But all this is open for discussion, of course. The only fixed target is WR 140 for about three ours during the whole night..

The campaign

- Baseline is the observation of the WR 140 periastron passage from **December 1** to **March 23** resulting from the data of the Marchenko paper (see full information at <http://www.stsci.de/wr140/index.htm>).
- WR 140 can be observed for maximum three ours a night. For this reason Tony Moffat, Thierry Morel from Liège and others are defining additional target dor the run. Present suggestions are the two B supergiants HD 14134 and HD 42087, some O stars and other WR stars.
- If we split this time into 8 two-week-periods we could send 8 teams by minimum 2 and maximum 4 observers to the telescope for this run.
- We would bring one of the LHIRES spectrographs out of the group or even the best, CAOS group from ESO with the BACHES Echelle spectrograph is involved.
- Using a first-class site with average 0.7'' seeing at high altitude we could obtain a complete coverage of periastron data. The campaign is accompanied by various observers from all over the world. Tony Moffat / Montréal organizes a collaboration with astronomers in Asia and North America. Presently, a photometric collaboration with the 1.5m Mercator Telescope on La Palma is in discussion. Until now I sent a number of technical questions about the feasibility of such a run and got some first answers. These question s and answers are attached.



MONS telescope



Johan Knapen already talked to the head of the institute and the response was promising. and as follows:

1. We have to officially apply for time including scientific background, the time period we need, the observability and a description about our instrument and its adjustment.
2. The telescope is the “joker” at Izana and they often use it for presentations. This is only done in the evening and it could be that we loose some evenings because of such visits. We have to deal with it.
3. There is good reason to believe that a proposal will be successful. They like the professional-amateur collaboration.
4. To enhance our chance we could offer a collaboration with the IAC.
5. Only after a successful application we can check technical details.
6. We have to add other target stars to use the full nights.

The Challenge - Visibility of WR 140 at Izana

Although the seeing conditions are extraordinary at this high altitude site the visibility of WR 140. The following table shows that the observations take place at relatively high air masses which reduces the outcoming S/N. Especially during the most important time right after periastron passage in the end of January the observers have to do a very accurate job. However, I consider this fact as a challenge and the situation will be appreciated by the professional community. That means even more fun!

Date	Time	Height	Airmass
Dec 1	7:30 – 10:00 pm	53° - 27°	1.3 – 2.2
Jan 1	7:30 – 10:00 pm	32° - 17°	1.9 – 3.4
Feb 1	6:00 – 7:00 am	15° - 24°	3.9 – 2.5
Mar 1	5:00 – 6:30 am	23° - 38°	2.6 – 1.6

Costs

My price calculations base on my December visit and are as follows.

1. 112 nights 30 Euro each = 3360 Euro
2. Rental cars for 8 * 14 days from www.autoreisen.es = 8 * 200 Euro = 1600 Euro
3. 16 flight tickets for maximum 300 Euro each = 4800 Euro (16 observers) or 9600 (32 observers)

That is 610 Euro per person if 16 observers will participate and 455 Euro per person if we find 32 participants. I consider the 610 Euro as an absolute maximum because of the 300 Euro flight ticket. I flew for 230 Euro from Cologne to Tenerife with TuiFly and early booking can reduce this price to about 100 Euro. However, for a realistic calculation I leave the best/worst case range at **455 – 610 Euro per person for two weeks. Food goes extra!**

This is surprisingly cheap and I see this as a perfect opportunity to make such a run.

Organization

We invite everybody to participate in this campaign. This includes scholars, students, beginners and especially experienced observers.

There is no reason to fear knowledge deficits, neither in physics nor in observation experiences. We can organize that the technical setup at the beginning will be done by an experienced team. Two consecutive runs should overlap so that an instrument and procedure introduction is granted. In case of doubt about own capabilities the group could mix teams out of experienced and non-experienced observers.

Our goal should be a professional publication and the whole group finally decides what to do with the data. I consider myself as a kind of campaign manager but not as the prime investigator (PI) who decides what to do in detail. This in fact comes from the professional side. Every participant has the same data rights.

Schedule

- **January 29:** First campaign announcement.
- **February 1:** Begin of registration for participation with time preferences (when can I go) and if necessary, team preferences (do I have a preferred team). Attention: Do not neglect Christmas time!
- **February 5:** Official observation request at Instituto Astrofísico de Canarias (IAC) La Laguna.
- **April 1:** End of registration and announcement of the teams and respective observing calendar.
- **April 5:** Calendar confirmation for the whole team.
- **April 15:** End of calendar confirmation. => Final observation calendar.
- **April 20:** Deadline for application confirmation by the IAC (No! => Stop of all activities, YES! => Continue)
- **May 1:** Search for cheapest flights and establishment of a flight schedule.
- **May 10:** Announcement of preliminary flight table, ticket prize and a preliminary overall prize as calculated above. Request for money transaction of the complete amount (a price variation has to be accepted due to low cost carrier procedures).
- **May 30:** End of money transfer and buy of tickets. **Tickets will be bought only after complete money transaction by every participant!**
- **May 3-4:** Section conference Heidelberg.
- **April 15:** Ticket forwarding to all participants.
- **December 1:** Begin of campaign
- **March 23, 2009:** End of campaign
- **General: Continuous information exchange via Email or a dedicated protected Forum. An observer workshop before the observing run is an option.**



MONS control room



Typical sleeping room

Final remarks

1. Please keep in mind that it is essential for a successful run that travel organization has to be complete. We can not afford to loose a complete team after fixing everything.
2. An accurate and honest money handling including all receipts is granted. Individual ticket orders are open for discussion but a central management is preferable, in any case.
3. I consider the above costs, organization and schedule suggestions only as a baseline for discussion. No terms are fixed and everybody is invited for contribution.

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www.stsci.de



MONS seminar room



Appendix

1.) Cantina prices (Dec 2007)

Dinner

Starter + Main course + Dessert + Drink - 8.60 Euro

Starter + Dessert + Drink – 4.65 Euro

Main course + Dessert + Drink – 5.76 Euro

Salad + Dessert + Drink - 4.42 Euro

2.) First questions and some answers

MONS Telescope – Questions To Whom It May Concern

A spectroscopy dedicated group of German Amateur Astronomers is preparing a coordinated observational campaign on the Wolf-Rayet + O star binary WR 140 in the Cygnus constellation. The system is considered as the archetype of colliding-wind binary systems and has a 7.9-year period where the stellar separation varies between ~ 2 AU at periastron to ~ 30 AU at apastron. The binary is frequently considered a textbook example of the colliding-wind phenomenon. The group supports professional observations (some group members are even professional astronomers) all over the world and is in permanent contact with some key players (e.g. Anthony Moffat – Université de Montréal, Sergey Marchenko – University of Western Kentucky, Anatoly Miroshnischenko – University of Greensboro). Information about the group and the WR 140 campaign can be found at http://spektroskopie.fg-vds.de/index_e.htm and <http://www.stsci.de/wr140/index.htm>.

The group has their own grating spectrographs (Echelle and standard) which are generally connected to the telescope focuser. With respective telescopes of about 35 cm aperture we are able to obtain a proven signal-to-noise ratio (S/N) of about 200 within 30 minutes of this 7 mag object. However, the major penalty is the position of WR 140 in the sky during the winter for German latitudes and the German weather with about 70 clear nights a year and a seeing of about 4 arc sec, in average, which is a serious problem for detecting wind-wind interaction over the whole periastron passage of about three months.

Now we learned that the MONS telescope could easily be used for this 3 months campaign. During a visit of Tenerife we have been invited by Prof. Johan Knapen of IAC in La Laguna to examine MONS for this opportunity and realized some open question, before proposing this campaign officially.

1. The MONS telescope use conditions at <http://www.reservaweb.com/admot4/cli/plan/privacidad.html> say that “UNDER NO CIRCUMSTANCES MAY YOUR OWN EQUIPMENT BE USED.” Does this exclude the use of a spectrograph?
2. Is it possible to connect a spectrograph to the back plate (cell) of the main mirror?
3. What inner diameter has the focuser?
4. The present eye piece is fixed by a plate with four screws (see image1 and image2). Is it possible to use an extra plate for a spectrograph?
5. If yes, what is the 3-dimensional size (in mm) of this plate?
6. This plate seems to be fixed on an x-y-table (see image3). Is this correct?
7. If yes, is this table still working?
8. Between this x-y-table and the mirror cell there is a ring which seems to be rotatable (see image4). Is this correct?
9. If yes, is this ring still working?
10. What is his back focus distance of the Cassegrain optics or what is the defined focus position?
11. The Cassegrain optics is de-adjusted (see image5). Will this be improved by observatory personnel or should this be done by the observer?
12. Generally, it seems that the telescope has an electrical pointing (see image6). Is this correct?
13. If yes, is the pointing working properly?
14. Is auto-guiding possible?
15. If yes, how does it work and what is the guiding port?
16. If no, should we bring our own equipment (Laptop, CCD, Software, cable, etc.)?
17. We want to keep the stellar image on a spectrograph slit of about 50 microns. How accurate is the telescope mounting adjusted to the north? How long can a star be kept on the slit without guiding at all?

18. Is the focusing unit via secondary adjustment properly working?
19. There is a control room with two computers (see image7). Can they be used by the observers?
20. Is there an internet connection?
- 21. Can we obtain a complete users manual for the telescope?**

We would highly appreciate to get as much information as possible about the instrument. After that we can decide if the setup is useable for our spectrographs and we can officially apply for time at MONS telescope.

Please send information to our contact person Thomas Eversberg

Hi Thomas and Klaus,

I spoke to Alex Oscoz yesterday who is the scientist in charge of the Teide night-time telescopes (but not of Mons, but he still knows something about it!). I still need to speak to the boss of Mons who is the site director as well, Miquel Serra, to confirm that the thing is available at the time you want it.

Alex did answer some of your questions though, and gave the name of Emilio Cadavid, ecadavid@iac.es or phone 922 605308 who is the technician in charge. At some stage you should contact him with your detailed technical questions, but not yet. I'll let you know. You can write to him in English because if he doesn't get it one of his staff is English.

Anyway your list (the ones that are missing below were 'don't know'):

1. not applicable you can use your own instruments (as long as you tell Emilio in advance)
4. why not
6. yes
11. Emilio and/or his crew
- 12-17 yes tracking is electrical but not very good, and there is not autoguiding. Tracking is normally OK for about a minute, but Emilio will need to confirm your 50 micron slit stuff
- 20-21 yes you can use the two computers with internet, there is also an internet point in the dome if you want to connect a laptop there.
- 22 yes there is a manual (just, a few days!) but for the moment only in Spanish. Attached.

Alex also confirmed that it will be impossible to get that much time on the IAC-80. Even if you only want it for a few hours a night because there are many of those programmes, and they couldn't guarantee that you would get data every night.

Cheers! Johan

MONS TELESCOPE USE CONDITIONS

(from <http://www.reserva-web.com/admot4/cli/plan/privacidad.html>)

- To book time at the telescope you must provide all of the required information:

- at least 30 days in advance if a change of instrument is required.
- at least 7 days in advance if no change of instrument is required.

The default instrument at the MONS telescope are ocular.

-IAC personnel and students of the University of La Laguna should specify the IAC project on the booking form. All other booking requests should be marked PRIVATE.

-Once the request has been received and the guarantor's identity has been confirmed the OT Administration Service will confirm the booking by email as soon as possible.

-When you arrive at the OT you will find that the telescope has been checked by the relevant night operator or Department of Astrophysics Assistant and fitted with the instruments requested. **UNDER NO CIRCUMSTANCES MAY YOUR OWN EQUIPMENT BE USED.**

-The user **MUST** be proficient in the use of the telescope and instruments. The shift operator and the DA Assistant will only attend in emergencies. Where the telescope is being used for **practical experience by University students** the DA Assistant will explain the telescope **on the first night** and will help users to check that they are using the telescope properly.

-Care must be taken at all times to ensure that light from inside the building is not visible outside.

-Users must have approval, or certification of their ability to use the telescope, from one of the people listed below (the name and email address of the guarantor must be included with the booking request). The person providing authorisation will be held responsible for any damage resulting from misuse of the equipment.

Persons authorised to act as guarantors for damage:

- **INDIVIDUAL BOOKINGS**

IAC Personnel: Line Manager at the IAC

Graduates and 3rd and 4th year students of subjects set by the DA: DA Teacher responsible for practical experience in Astronomy and Astrophysics.

Members of Astronomy Groups: The President of the Group must send a signed letter to Sr. Director del Instituto de Astrofísica de Canarias confirming his or her endorsement.

- **ASTRONOMY GROUPS** - The President of the Group must send a signed letter to Sr. Director del Instituto de Astrofísica de Canarias confirming his or her endorsement.
- **PRACTICAL EXPERIENCE FOR UNIVERSITY STUDENTS** - Students must be accompanied by their teachers, who should be present throughout observations.
- **PRACTICAL EXPERIENCE FOR STUDENTS OF THE D.A.** - Students must be accompanied by their teachers, who should be present throughout observations.