THE GRAVITATIONAL VOICE

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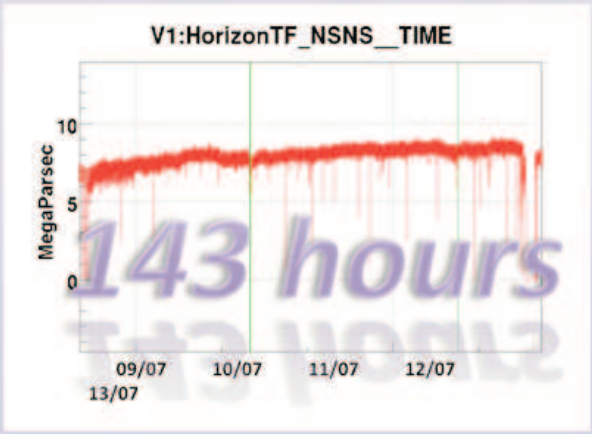
AUGUST 2009

WORLD RECORD

Longest Continuous Lock!!!



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News from EGO and VIRGO

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"h - The Gravitational Voice" is an internal publication of the European Gravitational Observatory (EGO) and the Virgo Collaboration.

The content of this newsletter does not necessarily represent the opinion of the management.

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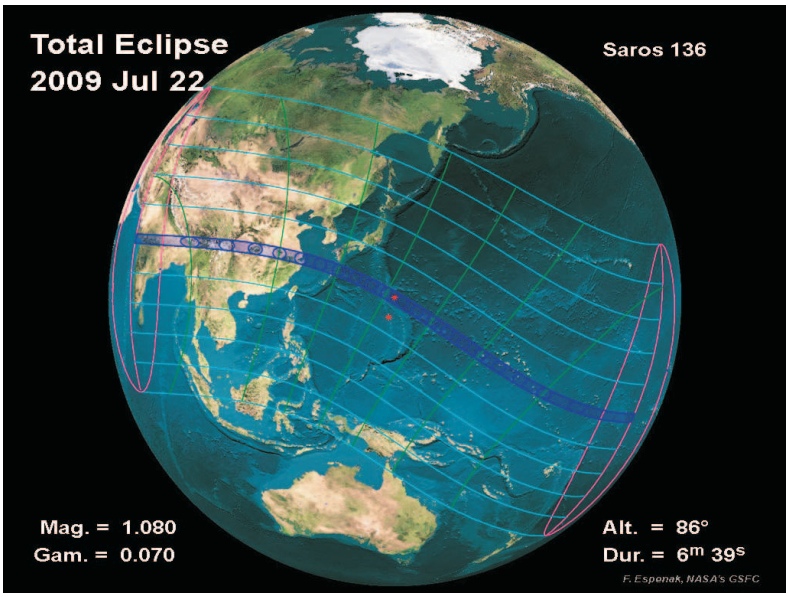
EDITORIAL

We would like to take the opportunity of the publication of h12 to remind you that this year, being the International Year of Astronomy (IYA2009) is full of events, local, national and worldwide. After the summer pause, October will be very rich.
The week from 10 to 17 October 2009 has been chosen as the "European week of Astroparticle Physics", inviting physicists, laboratories, sites of experiments to organize open days, talks for the general public and exhibitions (http://europeanweek.astroparticle.org/). This proposal comes from the two bodies in charge of coordinating the European efforts of astroparticle physics. ASPERA (http://www.aspera-eu.org/) and ApPEC (http://www.appec.org/); in both organizations the EGO Council is present with its chairman and vice-chairman. Following the unprecedented success of IYA2009's 100 Hours of Astronomy, another series of events is being planned for 23-24 October 2009. This new IYA2009 Cornerstone Project is called Galilean Nights (http://www.astronomy2009.org/news/updates/348/) and will see amateur and professional astronomers around the globe taking to the streets and pointing their telescopes to the wonders that Galileo observed 400 years ago. On October 26 there will be the opening ceremony of the Astroparticle Physics Exhibition, organized by the INFN at the Palazzo delle Esposizioni, in Roma.



EGO and Virgo are planning to participate in all these occasions and all our readers are warmly invited to suggest ideas and contribute to their realization.
Besides all these artificial events the sky always contributes with many beautiful natural events. Among these, last Virgo Week was treated to the longest solar eclipse of the 21st century. The eclipse was visible in the middle of the Pacific Ocean and partially in central China. To allow astronomers and people all around the world to witness this spectacle, the Chinese Astronomical Society, supported by the Chinese Academy of Sciences, hosted a live broadcast of the eclipse (http://eclipse.astronomy2009.org.cn/english). Late participants to the Biathlon buffet and people on nightshift between 21 and 22 of July could enjoy this vision. Nightshift workers did not report in the log-book about any visible effect in our data.

Carlo Bradaschia
Chief Editor

Alternative energies at EGO:

an experimental approach

Cost reductions have become buzzwords in many organizations. However it may be very difficult to find some room for reducing costs, especially when prices increase, as is the case of energy.

In this context, EGO is no exception and has to face higher energy costs than some years ago, also because its energy consumption needs have increased. A deeper look at the energy consumption reveals that the air conditioning system is one of the greediest systems on site in terms of energy consumption. Besides the fact that air conditioning is not a luxury in hot Italy, it is crucial for Virgo that some parts of the experiment such as the towers are kept at constant temperature. Air conditioning is therefore essential!

That was indeed the rationale of this project, called "Alternative energies" which, in its first phase, aimed at answering the question: "are there solutions available on the market which can enable the renewal of 500m^3/h of air in a terminal building and at the same time allow us to make drastic reductions in energy consumption costs? A competitive market survey was carried out and its results tend to prove that: "YES THERE ARE!".

Then a review of the existing techniques highlighted a particularly interesting technique which seemed to present many benefits and would be worth further investigation: the air cooling and heating by Earth Tube Heat Exchangers (ETHE). The benefits of such a solution are numerous: reduction of fuel consumption (for supplying the boilers), reduction of the power consumption for electric refrigeration, reduction of the maintenance costs, simplification of the equipment maintenance activities and reduction of the CO2 emissions, which is absolutely essential in a world more aware than ever of the necessity to turn to the sustainable environment concept.

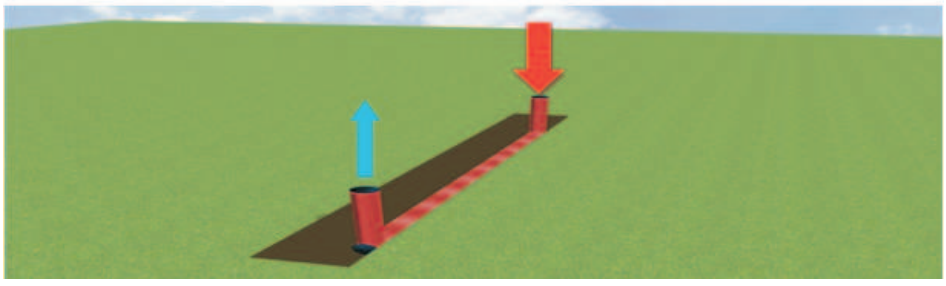
But could it be applied to the Virgo experiment?

Before being able to answer this question, let's see how Earth Tubes Heat Exchangers work. The principle is rather simple and consists of taking advantage of the nearly constant temperature of the soil some meters below the surface. The inlet ventilation air is then led through a long earth tube in which it will, depending on their relative temperatures, take up heat from, or leave heat to, the surrounding soil.

ETHE are currently being used for residential, agricultural or industrial purposes as a viable and economical alternative to the conventional heating, cooling or heat pump systems since they do not need to utilize any compressors, chemicals or burners and only blowers are required to move the air.

It seems that the origins of ETHE come from the Persian Empire. However, recent implementations of such a system in Austria, Denmark, Germany, France and India have contributed to extending it to other parts of the world.

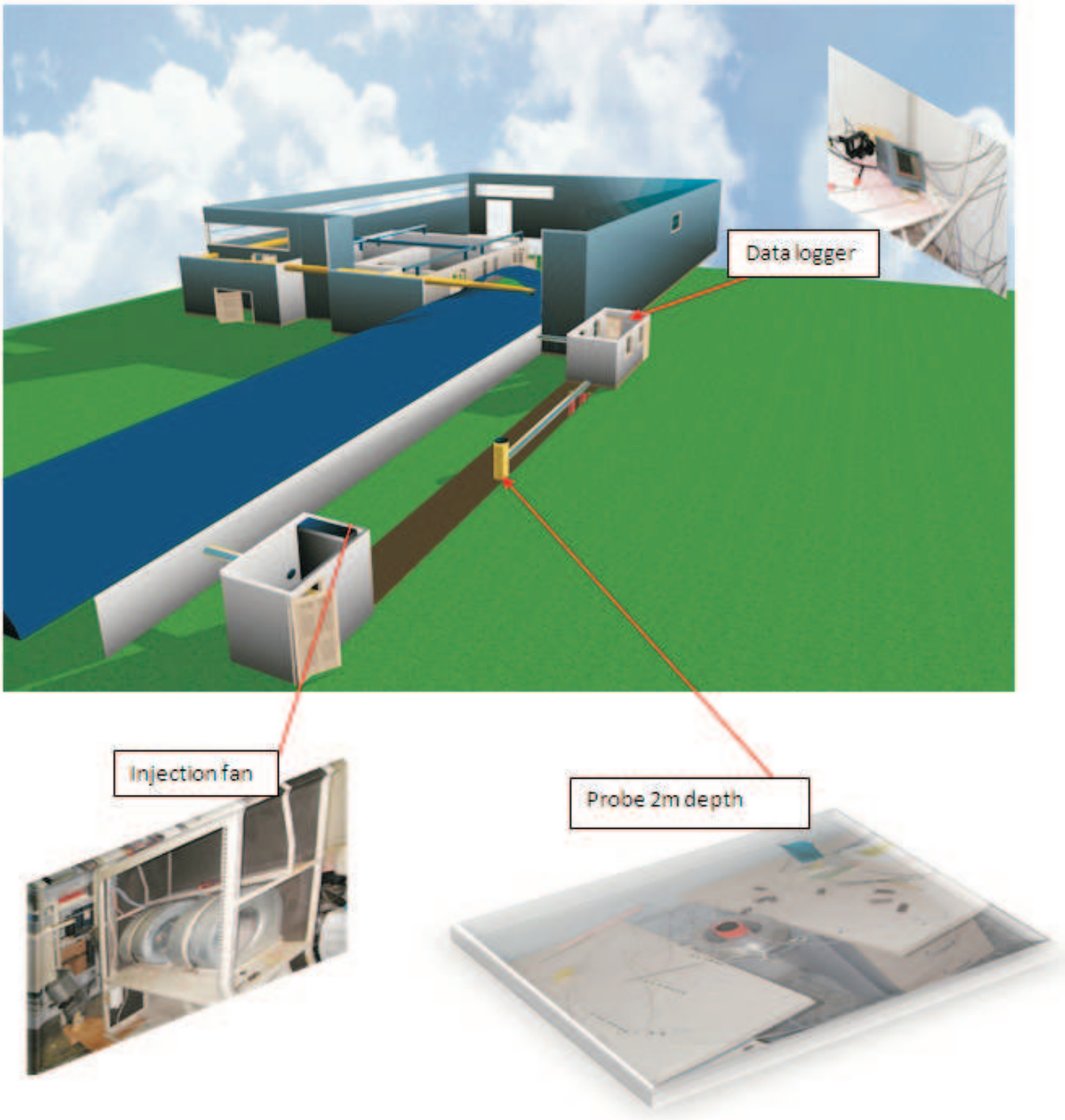
It is becoming now fairly common since the mid-1990s. ETHE are referred to in many different ways: air-to-soil heat exchanger, earth tubes, earth channels, earth canals, earth-air tunnel systems, ground tube heat exchanger, ground coupled heat exchanger, subsoil heat exchangers, underground air pipes, Canadian



wells or Puits provençal. It should not be confused with the hypocaust that was the precursor of today's central heating systems, based on fuel burning and hence polluting!

To understand whether ETHE can represent a valid alternative solution, it was decided to carry out a feasibility study to see if there could be a possible application on site, first by installing temperature sensors in the soil at a depth of 1.5 m and 2.50 m and doing 6 months of daily continuous measurements. As a result of this 6-month data acquisition, the average soil temperature was found to be between 15 and 18°C.

Second, calculations and simulations were needed to determine the optimum parameters of the ETHE according to Virgo needs, the soil and the environment, in the hypothesis of an installation in one of the terminal buildings. Hundreds of simulations were done with a specialist software. Then the construction of an ETHE prototype started with the digging of a trench into the soil. Unfortunately heavy rains and consequently the flooding of the site interrupted these works for many weeks.



Picture above: Start of the works for digging a trench into the soil and installing the heat exchanger tubes

In the meantime the first results of the 3-month data acquisition on the soil temperature have been collected and are encouraging. Considerations have been made on drainage and health. Some studies even indicate that ETHE may reduce building ventilation air pollution.
Finally, the installation of the 45 meter long heat exchanger tubes could start. The figure below shows the positioning of the measurement systems.
Although the first impressions are rather positive, it is still too early to make a conclusion on the feasibility study for implementing on site an ETHE system for the Virgo experiment. Many questions are still open. In particular a comparative study will have to be carried out on the Energy consumption costs. I suggest that you read the next editions of *h* to know more about that!

D. TROSZEZYNSKI

Running VSR2 on the shoulders of VSR1

VIRGO has finally reached and overcome the date of its second long term science run called VSR2. Data collection has started the 7th July 2009 at 23:00 local time. The end date is not yet fixed. Besides the possibility of a break for a few months in mid 2010, the end of VSR2 will be determined by start-up of the activities for the installation of AdVirgo, presumably mid 2011. According to plans two other LIGO gravitational wave detectors in the USA, at Hanford and Livingston, join Virgo with their scientific data taking called S6. The VSR2/S6 event is the confirmation of the collaboration between both LSC and VIRGO communities initiated in May 2007 with the joint VSR1/S5 run. These three interferometers will operate simultaneously as a unique detector, thus enhancing the rejection of fake events, the amplitude of the observed sky, and making also possible the triangulation of the GW sources.
As I have already had the occasion to write in these pages (http://www.ego-gw.it/public/hletter/doc/h_5_JULY2007.pdf), VSR2 will also be a good step forward along the *"muddy path of the epic history of science"*, and only the time ahead will tell if we leave traces in the mud. It is certain that intention is strong and the spirits are well forged to go Gravitational Wave hunting.

Now we are at the start of the VSR2 story and well into the organization set-up. We are sitting firmly on the shoulders of our past experience with VSR1 (18th May 2007 at 21:00 UTC - 1st October 2007 at 05:00 UTC). Finally with also a bit of pride, I can confirm that VSR1 has been a fairly good success, even if at the moment the cosmos has not blessed us with a marvellous GW detection. The collaboration responded well to the "Run Organizer" requests, and all groups have participated in the feared planned shifts with an understandable spirit of sacrifice.

Furthermore, the performance of VSR1 by itself strongly confirms my opinion of the success. The overall duty cycle was about 81% (see fig.1 on the next page) with many long data taking periods of more than 20 hrs and a maximum *"Science Mode"* duration of 94.3 hrs (see fig.2).
Also the trend of the NS-NS inspiral range horizon during VSR1 demonstrates that the organization of the commissioning activities during this run has achieved satisfactory results increasing by more than 43% its initial value

Picture below: stop of the works due to the flooding of the site

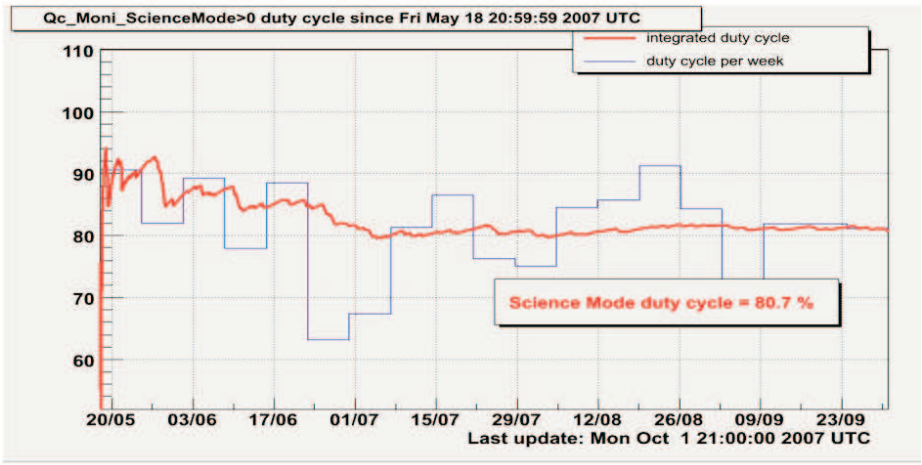


Fig. 1: VSR1 "Science Mode" duty cycle.

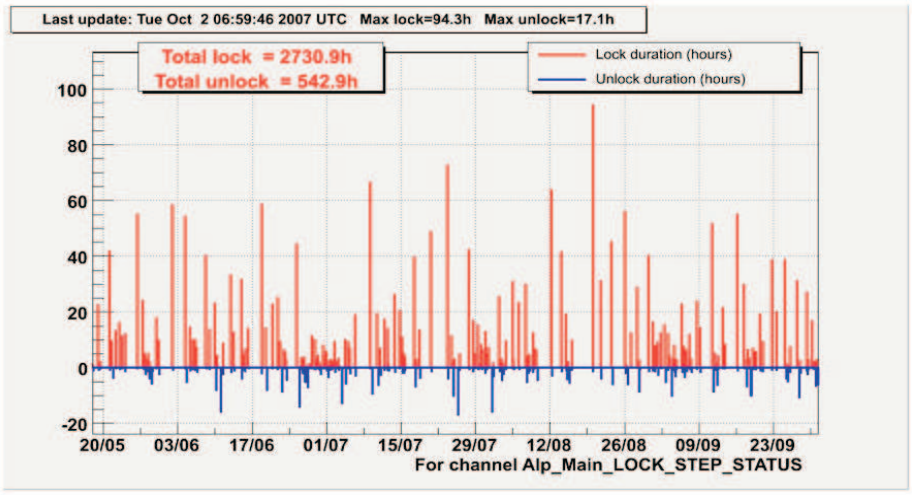


Fig. 2: Time trend of the lock/unlock durations (hours).

of about 3 Mpc up to a final value of about 4.5 Mpc (see fig. 3 right below).

As this is a good occasion for remembrance I would like to remind you that VSR1 consisted of a total of 135,3 days, equivalent to 406 shifts of 8hrs with 2 people involved each time: one operator and one scientist. At that time all the groups of the Virgo collaboration were involved (EGO, INFN-Firenze /Urbino, ESPCI/LMA, LAL, LAPP, INFN-Napoli, NIKHEF, OCA, INFN-Perugia, INFN-Pisa, INFN-Roma1, INFN-Roma2 plus the final participation of INFN Padova/Trento and INFN Geova). Approximately 7 *operators* and 110 *scientists* operated in the control room. It is worth remembering also the significant contribution of all the people *on-call* each 24 hours per day (11 ITF subsystems plus 4 EGO site services), and last but not least we should remember the *weekly run coordinators*. As always it applies in these cases I may have forgotten someone and I apologize in advance for this. However, at this point it seems to me that these numbers alone testify to the effort.

Soon after VSR1 the commissioning activity re-started with strong impetus. In May 2008 the situation was such that still today when we look at the Virgo sensitivity we reference the curve of 5th May 2008 (see fig. 4, next page).

Unfortunately the well known incident to the North End vacuum window broke the calm and all plans were changed abruptly to start the interventions for the Virgo + upgrades as soon as possible. Without being discouraged and with a great dose of self control we passed through the valley of desperation and frustration. After about a year of intense activities having crossed a sea of varied difficulties and passing the columns of Hercules we are now sailing in the calm waters of a vast ocean of new experiences.
For the sake of all the various review committees, and all the GW communities, we are now in the position to announce the event of VSR2 being almost in time with our moving average schedule. In fact, thanks to an impressive commissioning the perspective is now quite different: the actual Virgo sensitivity, as visible in figure 4, is not that far from the design

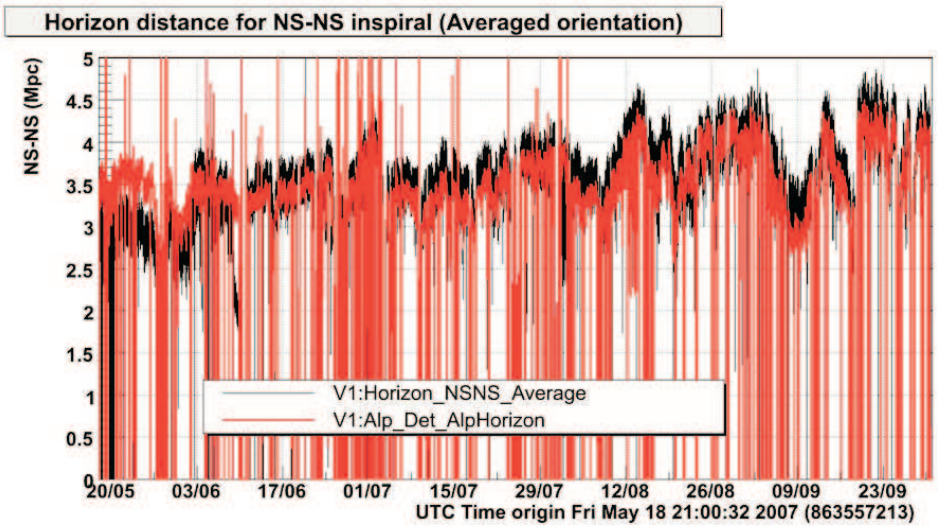


Fig.3: Time trend of the NS-NS inspiral range (Mpc) during VSR1.

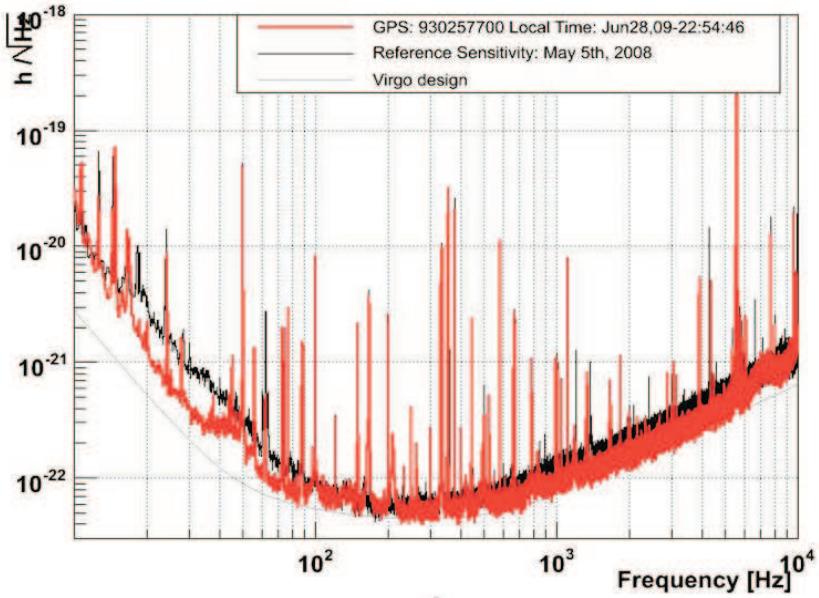


Fig. 4: Plot of the Virgo sensitivity of 28th June 2009 (red) vs. that of 5th of May 2008 (black).

goal, and the NS-NS inspiral horizon with a value of about 8 Mpc is almost doubled with respect to VSR1 (see fig.5).

Moreover we have refined our experience with the automated procedures for acquiring the ITF locking, and a great deal of work has been performed to review and build up the on-line and off-line data analysis tools. This does not mean that the entire story is behind us but just that, without stopping the walk, much progress has been made trying to make our future less uncertain. What remains is quite presumably the hardest to achieve but taking data during VSR2, with a stable detector configuration, will probably allow us to progress towards our best target, as has been demonstrated during VSR1.

The moment has finally arrived for me to say something about the VSR2 organization. After this long introduction it is quite evident that at least initially the run organization will follow the guidelines adopted for VSR1.

There will be three daily shifts of 8 hrs. Each (starting at 07:00, 15:00 and 23:00 local time) with two people involved: one *operator* and one *scientist*. The *operator* will have to run the ITF locking automated procedures and the *scientist* will have to monitor the detector status and the quality of data making use of the available on-line data-analysis tools. Both the operator and the scientist will have to make reports of any special event that could trigger the interest for an off-line analysis of experts. The short term ordinary run coordination has been assigned to *weekly run coordinators* that will operate in collaboration with the *run organizer*.

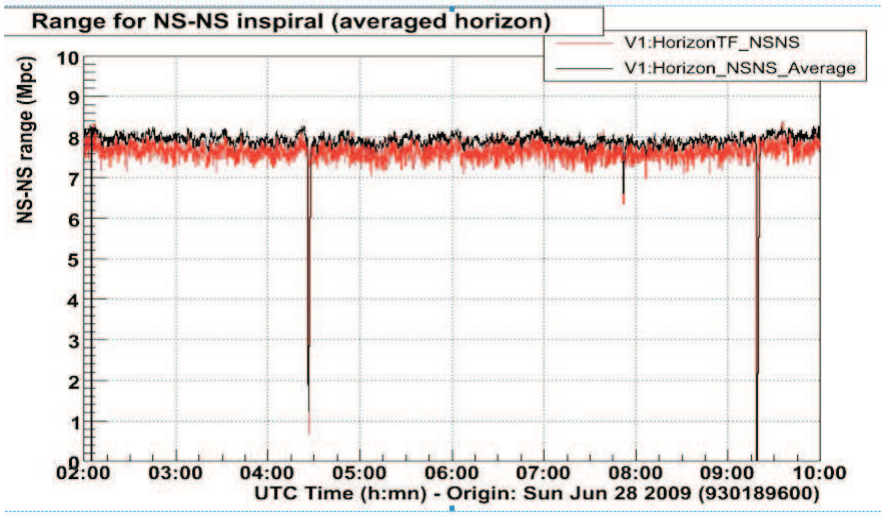


Fig. 5: Time trend of the NS-NS inspiral range (Mpc) as measured the 28/06/2008.

As a general rule the shifts have been assigned to each group of the collaboration according to the rate of their members in the Virgo author list. Also the newly arrived Hungarian group RMKI has been asked to participate in the shifts. According to the initial plans the shifts have been scheduled for a period of 87 days from the 7th July 2009 up to the 2nd October 2009. As a result 261 shifts have been assigned with the following percentage distribution (see table below). The same rule has been adopted for the assignment of the run coordination weeks.

Groups	% Distribution of Shifts
APC	1.9
ARTEMIS	6.4
EGO	12.7
INFN - Fi/Ur	6.4
INFN - Ge	1.9
INFN - Na	7.0
INFN-Pd/Tn	3.2
INFN - Pg	5.7
INFN - Pi	12.1
INFN - Rm 1	8.3
INFN - Rm 2	5.7
LAL-ESPCI	7.6
LAPP	7.0
LMA	4.5
NIKHEF	3.2
POLGRAW	4.5
RMKI	1.9

Percent distribution of the VSR2 shifts for the period 7th July 09 - 2nd October 09.

With the aim of guaranteeing the minimum recovery time from possible detector failures it has been foreseen the on-call for 11 specific

ITF subsystems (Alignment, DAQ, Detection, Electronics, Locking, Laser & Injection, MSC, On-line Computing & Network, Software, Suspension Electronics & Software, TCS) and 5 EGO Site Services (Network & Global Security System, Site Infrastructure-Conditioning, Site Infrastructure-Electricity, Vacuum, Interferometer Operation). According to preliminary plans during VSR2 there will be periods of data taking breaks for infrastructure maintenance (5hrs./week) and commissioning activities (48 hrs/month). These activities will be scheduled in coordination with the other two LIGO detectors.
Plans are being defined to achieve also signals of GW event triggers from other detectors (GRB and neutrino signals).

In conclusion I would like to say at the beginning of such an important period for our community that everything was ready, or almost, to start this new adventure that will see most of us involved for quite a long time. I really hope that satisfactions and articles will come sweetening the taste of the long hours spent in the control room.
Best wishes for a fortunate data-taking!

R. PASSAQUIETI
Run Coordinator

PS: As you may know, we have very nice big news. After a very fast shaky start-up things have progressed in fairly impressive way. After only one week of run Virgo has achieved a fantastic record with its longest locking period that is of 143 hrs. This sounds more like a world, or better galactic and perhaps cosmic, record!

Toward the realization of Advanced Virgo

The effort of the Virgo Collaboration to both create Advanced Virgo and be a main actor in opening the way to GW astronomy has been on-going for a few years. After the approval and start of Advanced LIGO in 2008 this effort has turned into a rush - to stay competitive with our American colleagues and realize the detector with a similar timeframe, and to be part of the 2nd generation network from the start.

The long path towards the approval of Advanced Virgo started on November 3rd in front of the External Review Committee (ERC), chaired by Barry Barish. Challenging panel indeed! We went in front of them the first time, having presented a preliminary design. The Committee remarked that we should have done a lot of extra work to allow them to fulfill their mandate and they established a monthly telecom to follow up Advanced Virgo activity.

In April, after an explicit request by the ERC, the EGO Council appointed a Project Leader for AdV. This certainly was a sign that funding agencies were looking favourably at the opportunity of realizing AdV.
Eventually the time for the final review session came. With respect to November, a lot more work had been done on the detector design and on the project management. This time we went in front of them having released the AdV Baseline Design, the cost and manpower plan, the WBS (with most of the responsibilities assigned to the labs), and the planning.

The final session was not easy. The members of the committee were well prepared. They had studied the documentation provided and were well aware of the "weak points" of the project. However, the final report released to the EGO Council is really supportive. In brief, it states that:
- the scientific motivation is very strong;
- It is plausible that AdV will join Advanced LIGO in early detections (but achieving this goal requires aggressive schedule, early funding availability, capable management);
- The technical solutions are sound, risks are reasonable;
- The cost estimate is reasonable;
- The management is capable.

Finally "*The ERC members unanimously believe Ad Virgo as proposed is a worthwhile investment for funding.*"

The EGO Council convened in Cascina on July 2-3 and examined the report. Though a formal approval of the project could not be decided "*The Council recognized that the Advanced Virgo project fulfills all the requisites to become its medium-term scientific programme according to the art. 14 of its Statute and decided to submit it to the Consortium Members for funding approval. The Council asked to the Virgo Collaboration to continue the advancement of the project in order to produce a technical design report before mid 2010. The Council gave the authorization to the Director to start placing orders for preparatory works by using the funds existing in the 2009 EGO budget*".

This part of the meeting minutes reads very much as a decisive step: we may expect that the project will start in early fall (an extraordinary Council meeting has been scheduled on October 6th in Rome).
So, we go on: now that the ERC review is over we must focus on the open issues. We need to go back to the design finalization effort: several points are still at conceptual level. We need to prepare the issue of the big order of the mirror substrates. We must complete the sharing of the construction responsibilities among the labs. We must define the communication and reporting procedures to ensure a plain running of the project. Plenty of work for everybody. But now we can also count on the enthusiasm generated by being really close to approval.

G. LOSURDO
AdV Coordinator

First Light in CALVA

This summer, in parallel with VSR2, laser beams will circulate and resonate for the first time in the CALVA cavity. This event will represent a major milestone in the experiment life which has not been a quiet journey up to now.

CALVA was born in August 2006, in the plane back to Los Angeles, as the conclusion of a discussion with Patrice Hello. During that summer, we spent few days in CalTech together with the 40-meter team. The studies on signal recycling were going on at that time and it obviously appears that, once again, the lock acquisition will be a difficult issue. For the "Advanced" generation, the increase of laser power, the higher Fabry-Perot finesses and the addition of a new mirror could make the lock acquisition trickier than for Virgo. In order to avoid all these problems, we converged on the use of auxiliary lasers with a different wavelength for the lock acquisition. Each cavity will be locked using the auxiliary laser and then brought to the main laser resonance in a deterministic way. First estimations on the corner of an envelope were promising and this technique was a way to bypass the main difficulties of the acquisition. Moreover, we were also convinced training scientists on a real instrument and not only using simulations was mandatory for the future. Then, the easier part of the track was behind us: it was time to shake the concept to check its validity and to design a complete experiment starting from scratch. Finally, the CALVA idea survived to possible attacks and simulations proved its correctness. On the one hand, it was impossible from manpower and financial point of view to build a full interferometer. So, the CALVA optical scheme is the minimal one involving coupled cavities as shown on Figure 1: two Fabry-Perot cavities sharing one mirror. In practice, the reflectivities of the mirrors are similar to the Advanced Virgo ones. The first cavity is a low finesse and short cavity while the second one is a high finesse and long cavity in order to mimic the behaviour of the power/signal recycling cavities versus Fabry-Perot cavities in Advanced Virgo. Moreover, as the main laser power is about 1 Watt, the mirror weights has been chosen to mimic the same radiation pressure effects as in AdV. The scale of CALVA is the typical scale of such middle-scale experiments, i.e. few tens of meters. We chose to have L1 = 5 meters and L2 = 50 meters.

On the other hand, it had no sense for LAL to pursue the CALVA adventure alone and when the project has been proposed to STAC in November 2006, four Virgo labs were involved: ESPCI, LAL, LAPP and LMA trying to take advantage of the expertise from each contributor.

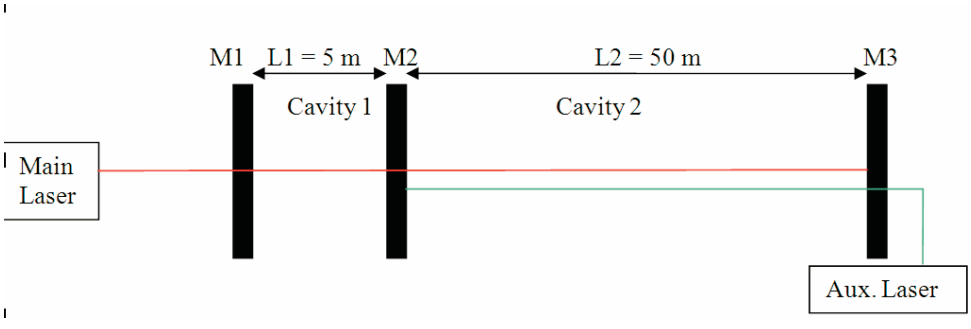


Fig.1: Optical configuration of CALVA.
For clarity, the various beams have been vertically shifted. In real conditions, they should overlap in order to see the same cavity length.

At that time, the overall cost of the experiment was evaluated to 560 k€ and about two third were requested to "2nd EGO R&D program on Gravitational Wave Detection". The other third was supplied in-kind by LAL. For scientific and financial reasons, we choose to build CALVA in two phases: first, a clean room housing the small cavity in order to test the CALVA principles and during these tests, the second room and the 50-m vacuum pipe will be installed.

The first semester of 2007 was almost idyllic as CALVA received from LAL the needed support for infrastructures and mechanics which were the largest activities at that time. Day by day, all parts, in particular the two clean rooms housing the experiment (one for the short cavity, the other one for the end mirror) and the vacuum tanks and suspension systems for the mirrors, were conceived without major problems. The first call for tender concerning the first clean room was made during the summer and on the exact day we had to choose the provider, the nightmare begun. The routine control made every three years to check the status of the hall ceiling revealed a damaged part which was full of asbestos. Such a discovery prevents any installation of a long-term experiment like CALVA. The unique solution was a complete removal of the ceiling and its asbestos components which has to be handled with great care: suddenly, the CALVA installation was postponed at least for months, or proven impossible. Several months were needed to find and implement thesolution. The positive side of this difficulty was that the hall was completely empty and there was no need to share it with another experiment as had been previously

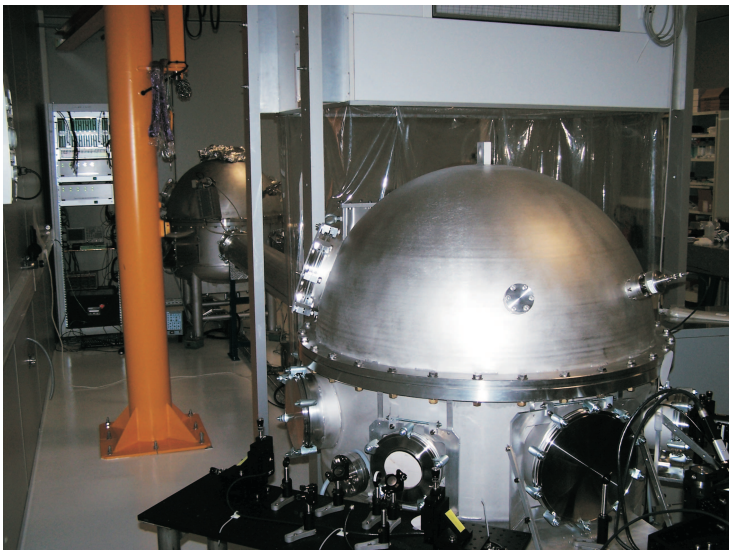


Fig.2: View of the vacuum tanks in the first clean room. In the foreground the local control system is visible.

foreseen. It allows us to design a larger clean room for the central part. Even if this event was the worst we had to face, the construction of the clean room has been punctuated by several unpleasant annoyances. The concrete floor was so smooth that the ground painting was not able to stick to it. The removal of the first painting layer and the scratching of the floor led to an incredible amount of dust: the clean room and even the hall were covered by a small layer of talcum powder. After the difficult and long cleaning, we also faced water flooding without any damage. Despite the obstacles, the clean room was finally delivered and easily matches the specifications.

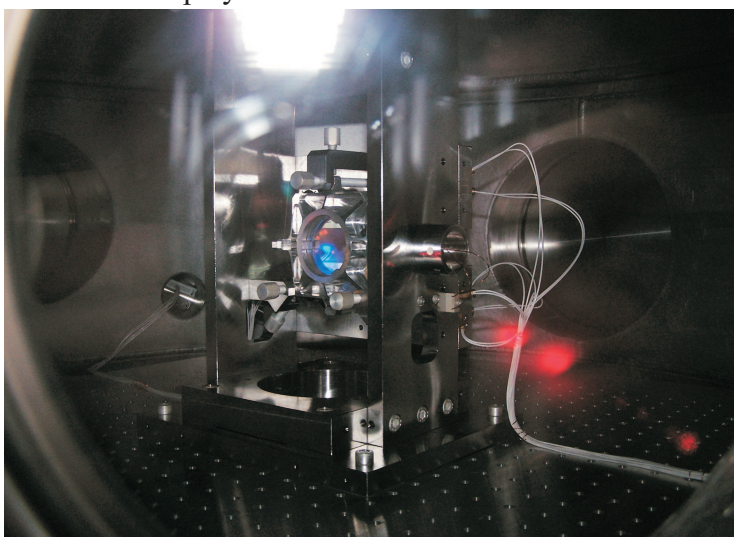
It was time to unpack the vacuum tanks we received three months before and bring in the protection package to avoid dust or shocks. After the previous difficulties, we were not ready to take any risk for the next installation step. Leak tests had been performed after fabrication by the manufacturer but we planed to do them again on site. At the first opening, it clearly appeared that grease had been used for gasket installation while it has been stated that these tanks were foreseen to house mirrors and that no pollution was allowed. Moreover, passing a white cloth on the tank internal parts revealed a magnificent pink substance, probably the product used to test welding. So, it was clear the obstacles were not behind us and our hopes for an easy installation were cooled down. It was not dramatic and has been solved by a complete cleaning of the tanks but the accumulation of all these stones in our shoes was going to become painful. Each time a milestone seemed on hand, it was thrown a few weeks or months ahead. Also removing smaller gravels, we finally qualified the tanks and linked them with the vacuum pipe as it is shown on the picture 2. Using an ion pump, we were able to reach 10^{-6} mbar on both tanks. But, as Virgo did with the North End tower, our viewports (bought before the Virgo incident) presented some defects after the first venting. New gravels but our motivation will not decrease and we will go on till the end.

The installation of the other major components: optics, electronics and suspensions was quite relaxing compared to the infra-structure setup. The acquisition system which mirrors exactly the Virgo+ one runs perfectly well and the DataDisplay presents the first ADC channels. As shown on Figure 3, the mirrors have been installed with their suspensions in their vacuum tanks. Moreover, we have been able to move them using the magnet-coil system driven by the control system. The local controls in charge of the orientation of the mirror are in place around the vacuum tank and are under test and calibration. Once this step will be done, we will inject the laser beam in the vacuum tanks and see the first resonances of the small cavity. Anyway, some unusual failures or errors occurred and we are almost convinced that a curse has been put on CALVA or the hall is built on an old Gaullic cemetery. More seriously, building a full experiment from scratch in an empty hall is a real challenge which looks like roller-coasters: it is exciting; you never know what will happen after the next looping and when it finally stops, you are sagging at the knees. But, it is so pleasant that you immediately go back for another run.

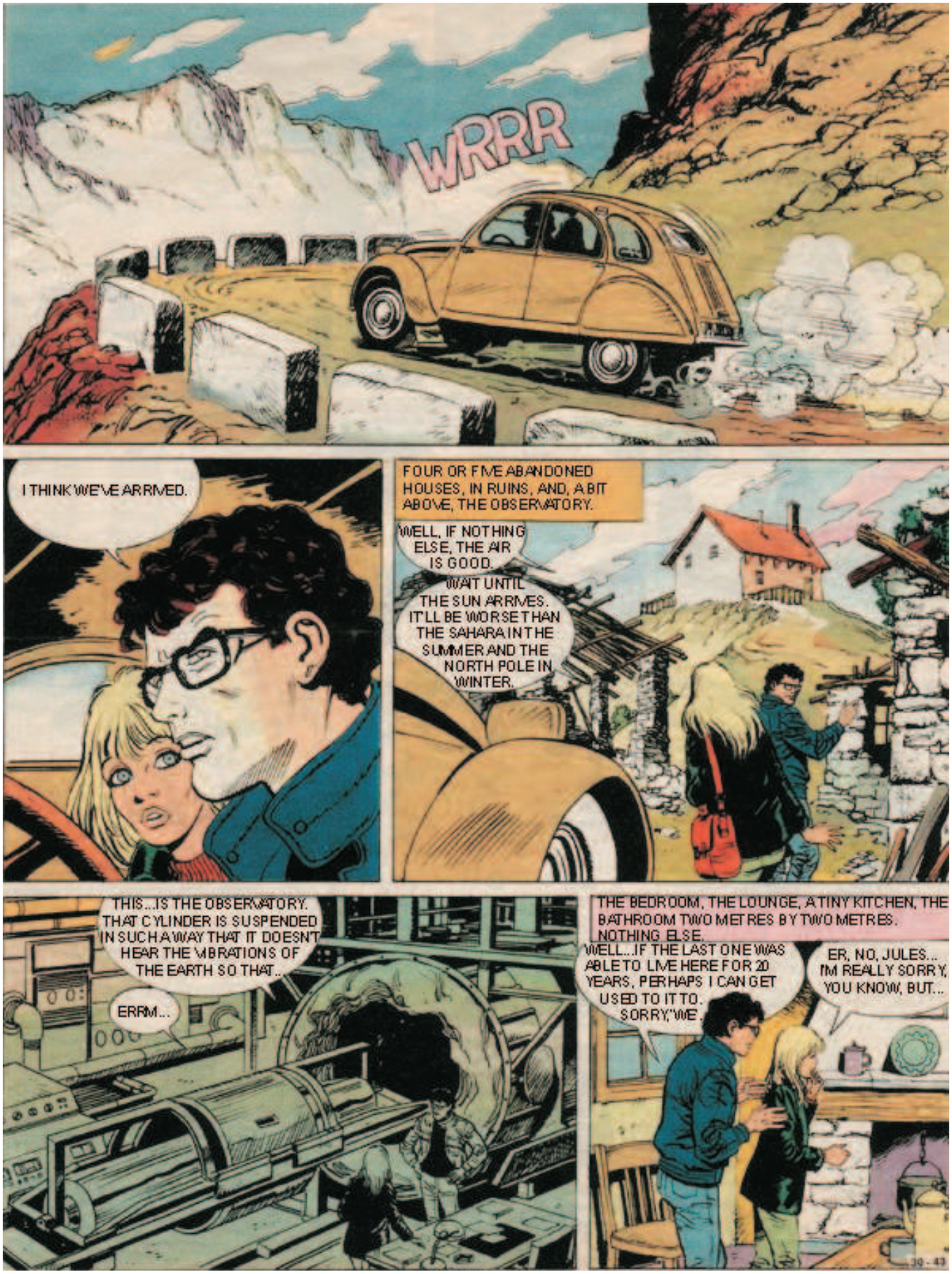
Do not worry, the following episode will be published in "*h*" and you won't miss the end of the story. We all hope that it will be a happy end like in a Hollywood production. By the way, you probably wonder what CALVA means. This is an acronym for "Cavités pour l'Acquisition du Lock de Virgo Avancé" (Cavities for Lock Acquisition of Advanced Virgo). But CALVA is also a well-known French alcohol made in Normandy using apples.

F. CAVALIER

Fig.3: View of the mirror and its suspension inside its vacuum tank. The red spots are due to the laser from local controls.

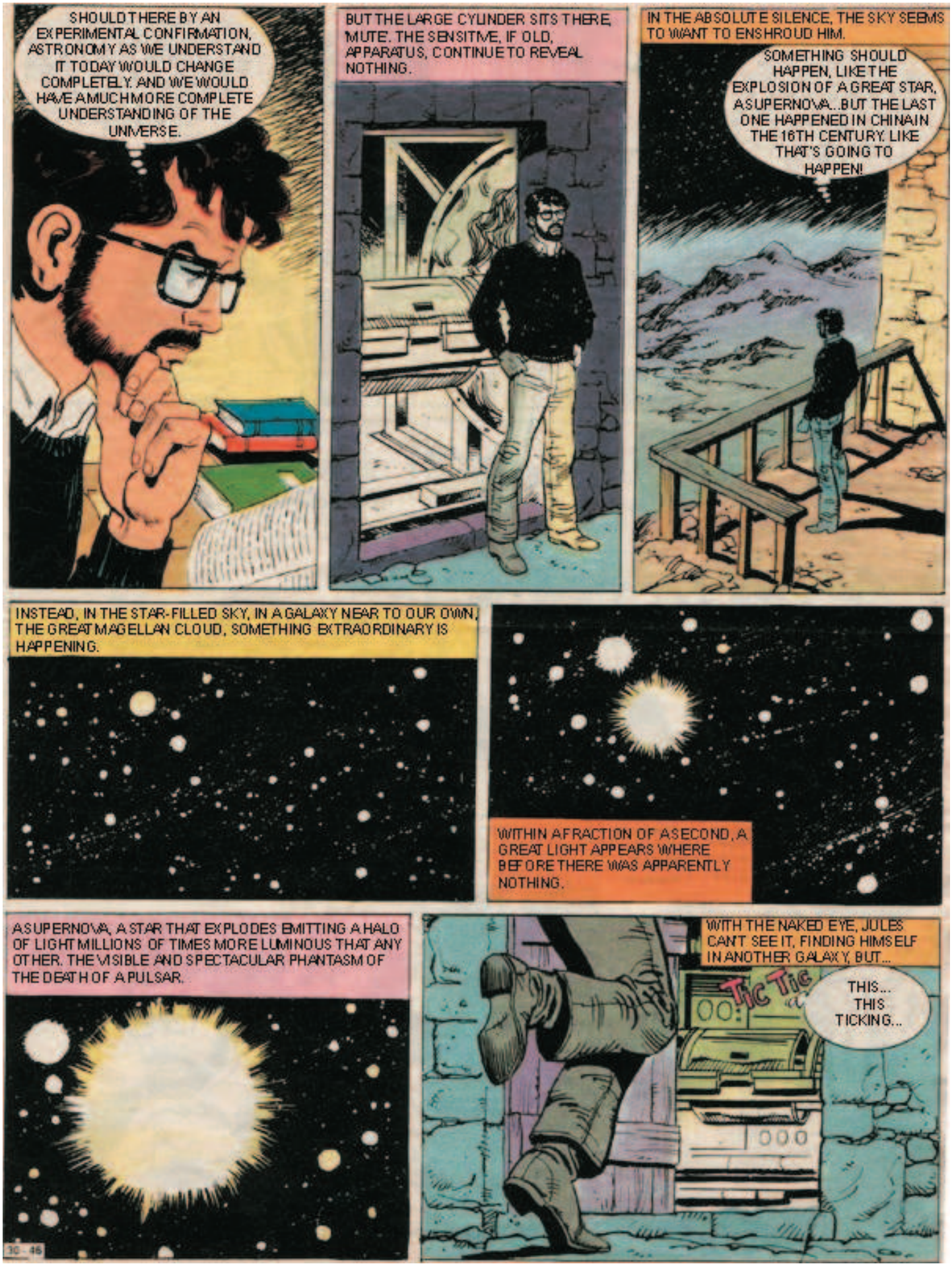


The Guardian of Nothing - Part 2




SEND LEBRUN TO HELL, RESIGN, YOU CAN LOOK FOR ANOTHER JOB...I'M NOT COMING TO LIVE HERE. THAT'S FOR SURE.
IT'S LATE THIS EVENING. LET'S SLEEP ON IT, AFTER WE'VE EATEN SOMETHING.
ALCINE HAS FALLEN ASLEEP. IT'S A MILD EVENING. THE SILENCE IS ALMOST UNREAL, ABSOLUTE.
I'VE NEVER 'HEARD' SO MUCH SILENCE.
AND I'VE NEVER SEEN A SKY SO FULL OF STARS.
ALL OF A SUDDEN HE FEELS OVERCOME BY A FEELING OF PEACE
YEARS AND YEARS HERE... WAITING FOR A LITTLE VIBRATION FORESEEN BY EINSTEIN THAT'LL PROBABLY NEVER ARRIVE. THAT SHOULD BE SIGNALLED BY A PRACTICALLY OBSOLETE INSTRUMENT.
WELL, IF NOTHING ELSE, YOU SLEEP WELL HERE. NOW LET'S TAKE THE CAR AND...
ALCINE. I'M STAYING HERE.
WHAT?! HAVE YOU GONE MAD?
NO, ALCINE. LOOK, I AM STILL A SCIENTIST. IT COULD BE THAT THAT THING NEVER SIGNALS ANYTHING, BUT...
BUT IF BY CHANCE INSTEAD SOMETHING ARRIVES, I... I THOUGHT ABOUT IT A LOT LAST NIGHT...I WOULD NEVER FORGIVE MYSELF. IT WOULD BE AN EXTRAORDINARY, HISTORICAL EVENT
IN WHICH NO ONE BELIEVES, STARTING WITH LEBRUN.


IT'S ONLY A THEORY, EVEN A BIT PECULIAR. AND, THAT THING MIGHT EVEN VIBRATE ON THE PENULTIMATE DAY BEFORE YOU RETIRE 25 YEARS HERE, WAITING FOR NOTHING! IN THIS DESOLATE LANDSCAPE...DO YOU REALISE?
JULES, THINK ABOUT IT PROPERLY.
I'VE DECIDED, ALCINE.
OK...OK GOODBYE, JULES I CAN'T SAY ANYTHING ELSE.
SHOULD YOU CHANGE YOUR MIND...
FORGET IT. I'VE NEVER WANTED TO BE A HERMIT. THE NEAREST PLACE IS TWO HOURS DRIVE AWAY, AND IT'S A LITTLE VILLAGE. GOODBYE.
I GUESS I CAN'T REALLY BLAME HER.
BUT I...I 'FEEL' THAT I MUST STAY HERE. GUARDING THIS MOULDY OLD CYLINDER.
MONTHS PASS. JULES, AS LEBRUN HAD SAID, HAD ALL THE TIME IN THE WORLD TO STUDY, TO THINK, TO RESEARCH.
AND FOR THE FIRST TIME IN HIS LIFE HE APPLIED HIMSELF SERIOUSLY TO EINSTEIN'S THEORY OF GRAVITATIONAL WAVES, FORESEEN IN HIS GENERAL RELATIVITY.
IT'S SIMPLY FASCINATING...
30 - 45


SHOULD THERE BY AN EXPERIMENTAL CONFIRMATION, ASTRONOMY AS WE UNDERSTAND IT TODAY WOULD CHANGE COMPLETELY. AND WE WOULD HAVE A MUCH MORE COMPLETE UNDERSTANDING OF THE UNIVERSE.
BUT THE LARGE CYLINDER SITS THERE, MUTE. THE SENSITIVE, IF OLD, APPARATUS, CONTINUE TO REVEAL NOTHING.
IN THE ABSOLUTE SILENCE, THE SKY SEEMS TO WANT TO ENSHROUD HIM.
SOMETHING SHOULD HAPPEN, LIKE THE EXPLOSION OF A GREAT STAR, A SUPERNOVA...BUT THE LAST ONE HAPPENED IN CHINA IN THE 16TH CENTURY. LIKE THAT'S GOING TO HAPPEN!
INSTEAD, IN THE STAR-FILLED SKY, IN A GALAXY NEAR TO OUR OWN, THE GREAT MAGELLAN CLOUD, SOMETHING EXTRAORDINARY IS HAPPENING.
WITHIN A FRACTION OF A SECOND, A GREAT LIGHT APPEARS WHERE BEFORE THERE WAS APPARENTLY NOTHING.
A SUPERNOVA, A STAR THAT EXPLODES EMITTING A HALO OF LIGHT MILLIONS OF TIMES MORE LUMINOUS THAT ANY OTHER. THE VISIBLE AND SPECTACULAR PHANTASM OF THE DEATH OF A PULSAR.
WITH THE NAKED EYE, JULES CAN'T SEE IT, FINDING HIMSELF IN ANOTHER GALAXY, BUT...
TIC TIC
THIS... THIS TICKING...

Viva CalcioNE!

Over the past few weeks football has once again been played taking place at the 'Gelsomino' as part of CalcioNE (Football at the NE). Many rooky players have joined the fray this year to pit their skills against the seasoned group of core professionals continuing to exhibit their ability on the beautiful playing surface, tenderly maintained by Fabrizio Rossi.

Among events of note this season have been the all-action performances of Romain Bonnand, Julien Marque's non-stop running in a three-a-side match – yes, non-stop - Eric Genin's perseverance in front of goal in spite of Fabrizio's goalkeeping exploits, Federico Nenci in his Pisa shirt and, most astonishingly of all, Richard Day's complete avoidance of injury.

Romain looks on as Francesco and Eric tussle for the ball!

BIATHLON 2009

In spite of an effort to organize the fifth EGO/Virgo Biathlon during the cooler spring season, this year it had to be in July. The initial proposal to run in May had been ruled out by an official letter from the whole Commissioning Team requesting a later date when the struggle to prepare the best possible interferometer for VSR2 would be over.

So the run (the athletic one!) took place on July 21, followed by the traditional buffet party by courtesy of the Director who kindly invited all EGO and Virgo members and their families.
Participation was reserved to teams composed of 4 athletes of any sex: 3 foot runners and 1 bike runner (Biathlon). In this 2009 edition 7 teams were aligned on the starting line. They were: Locking (favorites), Yes-We-Can (composed of collaborators from APC and LMA laboratories), Naples (back after a one-year break), Dream Team, Losers, Optics and XY2 (the only team with 2 female and 2 male members).

The run path along the whole interferometer service road, back and forth (12 km), consisted of the following 4 stretches:

1. North arm, 0-1000 m, 1 km, on foot
2. North arm, 1000-2950 m, 2 km, on foot
3. North arm, 2950-0 m + West arm, 0-2950 m, 6 km, on bicycle
4. West arm, 2950-0 m, 3 km, on foot.

The organizing committee rejected, after careful consideration, a few requests to have shorter segments. The preferred philosophy was that at least some part of the run should require real physical effort. In the same spirit the previous two 3 km bike stretches were unified two years ago into a single harder (!) one of 6 km long.
As in 2007, the U-turn points were 50 m before the arm ends in order to minimize seismic noise (Virgo being in Science Mode).

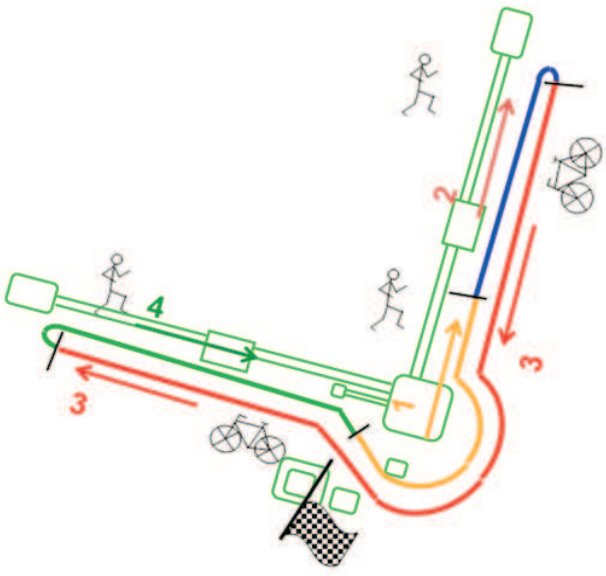
And here are the results of the Biathlon 2009:

Although Naples fought hard, the Locking team was successful in finishing again in first place. Spectators were particularly impressed by P. Ruggi's bike performance which allowed him to overtake many of his competitors, thus demonstrating one may spend much time in the control room and still be a great athlete.

The Optics team also stood on the podium by taking third place: their final runner crossed the finish line only a few meters ahead of the XY2 team who, despite a modest start, made it back from last to fourth place in the last two stretches. The Losers who indeed were losers only in name, stole fifth place from the Yes-We-Can team (6th) and the Dream team (7th).

This year we saw highly motivated athletes and very good performers! Apparently, teams have already formed for the 2010 edition of the Biathlon!

C. BRADASCHIA



The Spring Excursion 2009

It was a nice day, Sunday May 17. It started with a small panic when, arriving at the harbor of La Spezia, we discovered that most of the parking places has been taken that day due to a bike race. The problem had a happy outcome as every driver was able to find a parking spot not too far away.

The enjoyable boat trip, with sun and fresh wind brought us to the Palmaria island at the southern extremity of the gulf of La Spezia. The group was large (29, a record!) and mixed, including six children, three of them fully autonomous and three who were transported by the happy parents, fully equipped with backpacks and sunscreen.

As soon as we landed at Palmaria a dissident non-hiking family quit the company to remain on a nearby beach.

The rest of the group reached with a modest physical effort the Pozzale beach, where the base camp was

setup for swimming and eating. All this has been done satisfactorily and included coffee at a nearby bar.

In the early afternoon we attacked the most challenging part of our journey, climbing about 190 m of a slope in about one hour. Immediately after the steep rise, we went down on an even steeper slope that was advertized as “sentiero difficile”. In spite of some moderate difficulty,

both stretches, uphill and downhill exposed us to the most beautiful views of the small Tino island looking south and of the picturesque Portovenere village and the renowned Cinque Terre coast looking north.

Back at sea level we re-established contact with the dissident colleague who, had been visiting Portovenere. Our locations enabled us to take pictures of each other across the sea. Having completed the tour of the Island we indulged in more swimming and sunbathing while waiting for the return boat to La Spezia.

Eco-remarks:
During our excursion we had the opportunity to bemoan the existence of the skeleton of an unwanted building which had been improperly

built close to the sea 30 years ago. One week later we heard the news that the Palmaria Eco-Monster had been finally pulled down.

Another environment friendly remark is possible about our excursion: besides the healthiness of walking in nature which pollutes little, it was calculated that every one of us climbing 190 m in about one hour used power of less than 40 W and released to the atmosphere only 10 g of CO_2 (greenhouse gas) in addition to the few 100 g per hour, that we release breathing even in absence of any activity.

C. BRADASCHIA

PS: Thank you to our colleagues F. Paoletti and R.Maillet for the beautiful photos taken during the excursion!

Changes in *h* editorial staff

h warmly thanks Flavio Nocera for his sharp comments and contributions to the editorial team since the creation of the newsletter.

Flavio decided to quit the editorial team to focus exclusively on his responsibilities as leader of the EGO electronics group. He has been substituted by Dominique Huet who we warmly welcome.

h also launches a call to the Virgo Collaboration to actively contribute to the team. Email to carlo.bradaschia@pi.infn.it, if you are interested or wish more information.

Season's events

The arrival of the summer time brought its bunch of happy events in the EGO community. Thus, two EGO colleagues married and three others became parents.
Our congratulations go this time to:

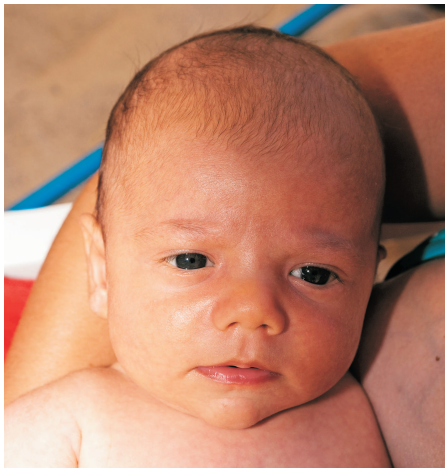
Elena Catalano who married Giuseppe on May 9, 2009

Benjamin Canuel who sealed his fate to Valentina on May 30, 2009

And welcome to this world to: **Arianna** born on April 27, who makes her parents, *Lara Coltelli* and Pietro, so happy! Unfortunately we could not make it to have a photo!

Julia Maeve born on April 29, first baby of *Martin Mohan* and his companion, Niamh.

Paolo, born on April 29 who joins the family of *Massimo D'Andrea.*



PERSONNEL MOVEMENTS STAFF

Arrivals

Romain Bonnand
Trainee in the commissioning group since March 3.

Antoine Neveu
Trainee in the optics group since June 3.

Gaëlle Parguez
Vacuum Engineer since July 1st in the Vacuum Team.

Marta Budroni
Joined the Administration department on July 13th as Receptionnist.