

3rd ILIAS N2 meeting – IAP - Paris 18/07/05

Notes and Minutes

Redactor : N. Spooner

Present people : B. Saghai (morning), G. Nollez (our host at IAP for 1h) M. Zampaolo, C. Riccio, J. Peltoniemi, T. Enqvist, N. Spooner, J. Mulholland, S. Paling, A. Ortiz, J. Morales, J.M. Carmona, E. Coccia, N. Ferrari, C. Vignoli, R. Tartaglia, G. Gerbier

Note: see the talks for more information, apologies for omissions and mistakes.

(1) Introduction (Gilles Gerbier)

The purpose of this meeting is to review the first year and make priorities for the next year. This is the first meeting to include the Finish lab - Juha Peltoniemi, Timo Enqvist

One new objective is to make an inventory of available space and of new experiments
A second important issue in view of the recent Frejus fire is safety, then communications and outreach.

Aim for next full meeting in Jan/Feb 2006

(2) Update on ILIAS (Bijan Saghai)

Another new lab has joined and we need to add this to the list. There will be a mid-term report in Oct/Nov. Each workpackage will do their own work but we need a coherent document at the end.

For publications in the 2nd year EC will only accept publications that explicitly contain reference to ILIAS.

Other lessons from the first year report - main thing is that it was non-homogeneous and also repetitious - too much copy-paste. We need to keep track of manpower in the activities - team leaders vs. coordinators. We need to interact more with the administrators. Finances - only got 14 months in first go. Supposed to spend 70% but spent less than this. For 2nd year if we don't reach 70% then again we will be in trouble, so demands for 2nd pre-finance from the coordinators must be realistic. We need to avoid another audit. The annual report was delayed by 6 weeks because of delay by one coordinator of their audit certificate. there is a 45 day delay but this might be restarted if the EC do not like the report. So could be Oct before we get the next round of money.

For the next mid-term report we need a scientific report but also the financial report. The GC will need a 3 month justification of costs now every three months.

Action: we need to send this back by 25th July - real costs only

(3) Pyhasalmi Lab (Juha Peltoniemi)

The goal of the lab is to hold small and medium experiments in existing caverns, then larger experiments in new caverns. The main office is in Oulu. The lab site location is in the middle of Finland but with access even in Winter. The mine is a metal mine, zinc copper etc. in two parts, old and new. The old part is about 1 km deep, not used for mining. The new mine has been active for 4 years and is now the deepest metal mine in Europe. There is access by car but also a lift (lift in 2 min, car in 40 min). Currently they are only using caverns in the old part (with one experiment in the new part to measure muon background). There are several possible caverns at 95m, 210m, 400m, 660m, 980m, plus an old mining hut on the surface. Some new cosmic ray studies will start at 85m deep, then expand to lower level probably.

Expansion is possible: easy to construct new labs because its hard rock; mechanics of 20m x 20m x 120 m is possible. A megaton size cavern has not been studied yet. There are no unavoidable restrictions, e.g. it would be possible to build pipelines for liquids. The typical excavation and infrastructure cost is about 200 Euro per m³ but raw caverns are much cheaper, <30 Euro/m³. Access tunnels cost more, up to 3000 Euro. Full access with lifts could be 2-20 Meuro. Could build to 2500 m but cost would be higher. Existing caverns: 20x7x7 at 980 m (2800 mwe) plus 2 others slightly smaller. the environment is dry, temperature 16C. There are data links and ventilation. The radon rate is below 100-200 Bq/m³ depending on ventilation. At 1900 mwe there is a 30x10x8 site plus smaller caverns - partially wet and 20 min by car. At 400 m there is also a small caverns and at 210 m but here it is wet and misty, also at 85m level.

Conclusion: lab under development; basic facilities but could make big and stable caverns later. Separated from biosphere, no public so reduces safety issues. Ideas include neutrino oscillations.

(4) Pyhasalmi Lab - Safety Aspects in the Lab (Tino Enqvist)

The site is located on E75 in middle of Finland. It's the deepest operational base metal mine in Europe, run by INMET mining corp. Access by car or lift to very bottom.

They have a Toyota LandCruiser car for access. The lift is used mainly for Ore. In the car there is a safety box, including oxygen and fire extinguisher etc.

They use the same safety rules as the mine personnel, with all personnel involved in fire training. There are plans for an exercise in mine safety soon. Basic safety instruction also comes from the mine, e.g. protocols for security exits, fresh-air, phones. A safety/risk analysis has to be performed by every experiment, accepted by the mine and used by them (similar forms as used by the mine). Working alone underground is not allowed.

Safety Issues: speed limit is 25 km/h to limit possible car accidents. The highest threat however is fire. There are safety boxes if a fire is above you, otherwise evacuation is upwards. The safety box contains oxygen, not a self-rescuer and is kept in the car.

For visitors there needs to be two people from the lab - this is no problem with the mine. Currently there have been no foreign visitors.

The mine is profitable in copper at the moment. 12 years lifetime. The company is Canadian. There are pumps to keep it dry.

(5) Frejus Fire (Michel Zampola)

There was a fire at Frejus at 6pm on 4th June. This talk describes what happened in the lab and the problems.

Tunnel is 13 km, with lab at 6.5 km inside. Ventilation is from vent plant B at 4.2 km, fire was at 5.8 km only 600 m from the lab. Because of flow of air from France to Italy, the heat of the fire went to Italy and extended for to 6.2 km i.e. only 200 m from the lab.

Scenario: truck from France started to burn, 2nd truck from Italy caught fire when passing, then third one passed and also caught fire. Truck 1 was carrying tires, 2nd one steel, 3rd one food, a 4th truck was empty. The fire lasted from 6 pm until 12 pm. The lab system informed the staff, monitoring of oxygen, CO₂, opacity of air, nitrogen. Within a few minutes the problem was identified. The flow was stopped after 12 min because the temperature was >40 deg C. A technician was informed but could not reach the lab until 6 am.

The trend of the air opacity was recorded but data is only available from 1 hour after the event because the system does not keep the data. The first room, a store, was the worst hit, the fumes were highest here. In the main hall and other rooms the level was small. So the first room (small) amount was dissipated in the rest of the lab. So how did the smoke get in? Probably a shelter door was left open inside. Two truck drivers died in the fumes, they were unable to reach the safety shelters. The Italian side were in a bad position because of the direction of the air flow. The traffic was light so it could have been more serious.

The fresh air duct to the lab was destroyed in the fire. The fire was too strong for this to cope with the ventilation. But there is a new pipe in the fresh air side that was not destroyed. Problem was not the pipe but plastic holders of the pipe.

Main problems in lab were: flow of air, only 1000 m³/hr c.f. 6000 m³/hr normally. A new line allowed recovery in 5 weeks, so could not run the radon factory. The main door was locked by the police because it looks like the door was opened during the fire. but there was access by car allowed. Dust masks were needed in the tunnel for a while.

Conclusions:

- first minutes are decisive
- escape through the fresh air gallery was possible
- the quality of the sealing of the labs needs to be addressed
- more live vests with air pressurized bottles is needed
- training in the darkness with live vests is needed
- calibration of the safety system will be checked

- the name and number of people in lab is not know automatically but this will be changed.
- firemen will now be stationed inside the tunnel at 4 km and 8 km.

Control of people in event of accident is through the tunnel control. There are loudspeakers throughout the lab. The lab was 100% operational after 5 weeks.

There is no decision yet on second tunnel, i.e. will it be a full tunnel or a smaller access tunnel only.

IR cameras are available if there is smoke, run by the driver.

(6) Publicity (Neil Spooner)

See talk given by Neil from Susan Cartwright.

Various ideas where presented - one conclusion is to have better communications between the various projects, to exchange ideas and best practice. There needs to be specific resources provided, e.g. to produce brochures etc.

(7) Boulby (Neil Spooner)

Short update given by Neil.

Some issues and ideas: could we do the cosmic ray experiments underground for public outreach - idea to include the underground labs in some way, via web sites.

Could we have Plastino do motion monitoring in the labs, to give feedback on the potential motion of the walls.

(8) LNGS (Nicola Ferrari)

Another open day this year was very successful with more done than last time. But still no web cam link.

Booklet: this was produced by Quark. This was to allow a wider distribution for outreach than would be possible just as hand-outs. It took from Nov 2004 to publication on 1st June 2005 - best time for schools. Cost was 40k€ (1/2 funded by ILIAS).

There is an offer from the editors to translate this to English and reprint for ILIAS. The cost would be for 15,000 copies 9kE.

N2 plans: Brochure about all labs; web pages about labs for the public, info about physics and visits; data base with pictures in high resolution.

For more information see the talk by Nicola

(9) LSM film

LSM presented a good little self-made film of the site (see LSM web site) .

(10) Canfranc

The new lab is well under construction with the crane now mounted in the main experimental hall. see www.unizar.es/lsc - new web-sit.

There is call for proposals already up with a template to apply for space.

Safety: a waste spillage room is already built and sensors are being placed. A self protection plan will be designed in the next few weeks. There has already been two incidents in the tunnel but not serious.

Public communication: there will be an LSC film - production to start after summer, to promote the laboratory. For TAUP 2005, visits to the new LSC lab will be organized with publicity in local media.

First experiments expected after Sept/Oct.

(11) LNGS safety (Roberto Tartaglia)

There is a general problem at LNGS of separating the lab and tunnels from the water table in the Gran Sasso. A special commission treated the recent scintillator spillage problem as an emergency allowing over rule of some administrative issues and a rapid solution. There was also a fire in May 2004 that revealed ventilation issues for the lab. At end of 2004 there was a safety audit. By Feb 2005 use of water was authorised. Also incident in March of gas smell, turned out to be a faulty car but there where big pressures on LNGS.

New programme of works is now underway including new drinkable water, drainage, collection pools and monitoring. Also upgrade of the technical infrastructure. Floor leak- proofing etc. Objectives are to restart experimental programme, improve safety and infrastructure.

Currently a road closure means diversions are needed. In the future will need to stop all the motorway traffic and use the first tunnel dedicated to the LNGS for around 4 months, using the old access road. Job include:, leak proofing, drinking water, power, monitoring and security. New cooling plant to allow water cooling (currently have to use air cooling). The system will be a closed system.

Progress has been made on the new floor and bund system in the labs and collection pits.

For infrastructure the ventilation system has not yet started but design nearly finished. Experiments awaiting this. Meanwhile:

New laws mean the LNGS is under even stricter control.

Training courses are not mandatory for users. Access badge is recorded.

Dealing with press is very difficult and is under control

Safety audit is very useful.

cost 50M Euro for the new features.

Probably open new lab in May 2006, with ministers

(12) Frejus extensions - Gilles

Two extension scenarios are envisaged at Frejus, one smaller one of $15 \times 15 \times 70 = 15,000\text{m}^3$ based on keeping to around 7% of the total new roadway. Discussions are underway with excavation people to look at feasibility and total costs. 7-8 M euros completely equipped, about 1/3 of LNGS. Designed for middle sized project requiring a deep site. e.g. third generation double beta or DM or small size neutrino detectors, e.g. SuperNEMO, Eureka SOI, liquid xenon, i.e. detectors that will benefit from deep site. Could be built with 1 m of water on surface to stop neutrons.

The other possibility is the 1 megaton experiment. A pre-study is underway. A tunnel shape is disfavoured, better is shaft size of 75m by 80m for lq Ar/Xenon, or 60m by 100m high. Results will be available by the end of the month, probably ready for TAUP conference. No decision.

Working Ground Discussions

The N2 meeting now divided into the three different working groups: WP 1, 2,3 , for detailed discussions. It was agreed to visit Canfranc on the 10th Sept pm.

Science coordination working group

There was a discussion about the proposal by NJCS to give a talk at the up coming SNOLAB meeting (below is a summary of discussions on future space availability at the sites). We agreed to complete tables for the Pyhasalmi lab. We discussed ideas for closer scientific committee interactions across the labs. Each lab gave a summary of expansion ideas.

Canfranc report: Canfranc has opened calls for SOIs on the web with contact details. There will be a scientific committee with Eugene Coccia is a member. They will meet again in Sept. The proposed clean room will come later. Safety issues are being sorted out. There will be a scientific opening. There is 600 m² of space in hall A - 2450 mwe.

Frejus: the lab is full, but there are project to increase the size by 2009/10 with a mid-size 20,000 m³ lab (current one is 3,500).

LNGS: some space available in Hall A due to GNO removal - part is for Cuore, allocation of the rest of the space depends on ICARUS in hall B. If it's to be 3000 tons then there is no further space, but this looks dead. In 6 months there will be several important events: the safety and ventilation issues will be sorted out; the future of ICARUS will be defined, so will then know how much space is available. For Hall C there is no space. The side tunnels can also be used, e.g. for XENON,

Phsyam: space is available for moderate requirements up to 1000 m³ up to 1000 mwe. the safe rock and power.

Future experiments summary

Below is an incomplete list as discussed, divide into continuing, on going and future projects

Eureca,	NA
SuerNEMO,	NA
ArDM (Ander Rubbia),	NA
Neutrino detection	NA

CERN neutrinos:
LE neutrinos
HE neutrinos
MEMPHYS - megaton project (UNO, HyperK)
LENA long baseline

DAMA/LIBRA 1 ton -	NA
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others:

WARP - LNGS	NA
LENA	NA

Neutrino - NOSTOS baby network in DUlabs	NA
CUORE - LNGS almost funded	A, 1/2
Rosebud - Canfranc funded	A,F
ANAIS (100 kg) - Canfranc hall B funded	A, F
GEDEON - 1 detector - Canfranc	A, F
EDW (phase 100) LSM - approved but 100 detector phase to 30 kg will be requested in 2006	NA but not new, continuation
CRESST II	
LB materials	

We agreed that a goal is to get a more comprehensive list of projects together.

Action: aim at TAUP to produce info for a preliminary report on future experiments and needs for space.

Science Coordination

We discussed participation of members in the different scientific panels. (we noted R. Cashmore from UK is on LNGS panel)

Action: get a list of people on each committee of the 5 labs.

Action: we agreed to have a report from each of the science committees of the labs to look at common science policy.

Summary of sub group meetings

WG1:

- decision made on what to say at SNOLAB, short summary of potential for underground space and potential for new experiment sand space.
- will arrive at a review of underground space and experiments
- will try to coordinate science across the labs, look at the lists of people in the committees. Canfranc will have first call for experiments at End of Oct.
- we will exchange the public minutes of the science meetings

WG2:

-safety, look at comparison table and distil understanding of the characteristics - to be reviewed at the Taup meeting. One area is access procedures, identification of these procedures, for instance a pass system and how to identify who and where people are in the lab; a look at what regulations to write down for users. Then training procedures try to look at main features of these items. Common procedures for the labs , e.g. number of people, need for company for people to attend with scientists, try to point out important commonality.

High energy physics safety network joined by CERN, DESY LNGS etc, meeting every 2 years, last one at SLAC. Try to have a connection to profit from their experience in this area. They are expert on areas of safety.

WG3:

The group will aim to have another meeting at TAUP on communications, including a visit to Canfranc, no.2 after Modane. The leaflet on U/G labs was discussed - 2 aspects: A booklet for each site; publication of a popular review. This has already been done in Italy with Quark. In the next month we will see if this can be done for each country. Best option would be to do something like the Radionet brochures plus a brochure for each underground lab. *Action:* Sean Paling will propose a table on contents for this. For Film no precise ideas - need to contact Mosca to update this. May decide not to go on, but not much manpower at CNRS. *Action:* For the Sept. meeting LNGS will have a restricted access web site repository for all available information. To check also the possibility of web cam access available to all - there are problems with this however. For LMS perhaps it can be done when there is nobody in the lab - there is a problem of filming people working. Will be open day near Modane later in the year with stands from industry etc, open to general public, schools and scholars 15-16th Oct.

End of meeting

NJCS July 2005