Pierre Auger Project
Progress Report

August, 2000

Progress Report Summary

The building contractor continues to make good progress on both the Central Campus Assembly Building and on the Los Leones Fluorescence Detector Building. See the Photo Album for this month at (http://www.auger.org/admin/Reports/august_photo_album.html). We now see how the exposure to the elements slows the Los Leones Building. One of the photos shows a wall under construction on the Los Leones building blown over by 120 Km/winds. Thus we have another important lesson in the reality of working at the site. The damaged wall has been reconstructed.

A report of the Fluorescence Detector meeting at Bad Liebenzell may be found at http://www.physics.utah.edu/~sommers/hybrid/reports/report.y00m09d04. The configuration of the two prototype fluorescence telescopes was determined. One telescope will be a combination of aluminum mirrors from Karlsruhe and glass mirrors from Olomouc. The other telescope, from Torino, will use slumped glass mirrors. The camera and electronics will be the same for both.

A test of 100 channels of fluorescence detector electronics and camera is now underway in Rome. Reports indicate that all is going very well on this important milestone. The fluorescence detector groups have done an outstanding job in designing and building the FD electronics system and camera!

Preparations for the installation of the surface array are moving ahead with the production of the next 18 tanks to begin on September 18 at Alpina in Brazil. These tanks will arrive and be off loaded at the Central Campus in mid October, just as the Assembly Building is being completed. The contract for the water purification plant is being let with the expectation that it will be installed at the Central Campus in late October. Liners, solar power systems and other detector station equipment are either at the site or en route. A preliminary set of surface detector electronics is now under test. Electronics for ten tanks is under construction. A detailed schedule for deployment of the surface array may be found at http://Tdserver1.fnal.gov/project/Auger/Schedule/Web/2.1_SDS/sds_8_15.pdf.

As shown in one of the pictures in the August Photo Album, the base of the Campus communications tower is being built. The steel tower structure is ready to be shipped to Malargüe. The tower should be complete by the end of September. Equipment is being procured for the microwave link between the concentrator tower at Los Leones and the Central Campus.

Real progress is being made in identifying a fast internet link from the Auger Site to the rest of the world.

We may have a break through in the customs and importation problem. The Argentine Ministry of Foreign Affairs will issue in import permit to an embassy for tax free importation for Auger Equipment. Although no material has actually arrived at the site by this path, two shipments are on the way. The shipments will clear customs in San Rafael. See details in the body of the monthly report.

Fluorescence Detector

1.1.1.1 Mirror System (Institute of Physics, Czech Academy of Sciences, Prague - Jan Ridky)

We have delivered first mirrors that should be deployed as prototype together with the Karlsruhe mirrors. During September we shall finish and deliver the whole batch of 40 mirrors. The first measurements at lab have shown that the specimens have excellent spot size and the reflectivity around 86 to 88 percent. One specimen had lower reflectivity (76%), we know the reason and it was coated anew. The above listed reflectivity is for mirrors already coated with protective layer. We aim to equip 12 out of 30 telescopes with mirrors and we have already 'in principle' money to do that. Another possibility mentioned in Liebenzell was that we produce the mirrors only for 6 telescopes. This should clearly depend on the results of the tests at Los Leones. The discussed scenarios were that we produce mirrors for either two peripheral sites (6 telescopes each) or one peripheral site, Coihueco, and 6 telescopes in the Central site opposing Coihueco. The pace of building construction will also play an important factor.

1.1.1.2.1.2 Optical Filter and Frame (National University of Athens - Emmanuel Fokitis)

a) The optical filter tests with 4 filter prototypes (called OCJ-V1) made by OCJ Japan, optimized for angles of incidence 0-15 degrees, were continued. The results were presented at the Liebenzell meeting by Emmanuel Fokitis. A method to mount 36 filter pieces of 170mm x 170mm squares on a frame of thin metal stripes just if front of the FD camera. Thus, the cost for covering 1 square meter filter needed for 1 FD telescope is a bit less than US $ 4,000. After the evaluation of these filter pieces, and confirmation that the results were in agreement with the optical design of OCJ, and in accord with the requirement to have a cutoff at 400 nm (for 0-15 degrees angle of incidence), we requested the OCJ for a simulation that would allow optimized performace (high average transmission) below 400 nm for angles of incidence of 15-40 degrees. Since the results of this simulation were satisfactory, and based on the level of the performance of the 4 filter samples already produced, we decided to order 72 filter pieces of size 170mm x 170mm squares. In this way, 2 arrays of 36 filter pieces will be mounted and can be tested as alternative filters in front of the FD camera. The method to design the filter mount so that one can have minimum obscuration, satisfactory for the FD performance specification is still under development. The mount will at first be tested using glass plates of dimensions 170mm x 170mm squares before the filter pieces are installed.

b) The work in evaluation of a MUG-6 piece sample: The sample obtained, 50mm x 50mm has been examined at the CERN metrology lab together with a similar sample of OCJ filter. The measurements gave the thickness profile every 0.5 cm and the deviation from flatness by using a stylus sensor with an accuracy 2 microns. The MUG-6 filter was also measured for transmittance using two double-beam spectrophotometers, at CERN and University of Athens. Detailed results will be presented as soon as possible.

c) An evaluation of the optical filter candidates as far as their functionality in the diaphragm position has been started in an experimental setup which includes a Hg spectral lamp of 125 Watt equipped by transmission optical grating, pinhole and collimating lens. The selected collimated beam at 365nm is reflected by a 100mm x 100mm mirror of 1700mm focal length, kindly provided by Hans Klages. This mirror is at a distance 3.5 meters away from the lamp and then is studied by a "pinhole-pmt system" in the mirror focal plane. The pinhole is moved by x-y translator. By placing optical filters just at the exit of this lamp, it is possible to study the effect of imperfections in the optical filters which can cause diffuse scattering (reflectance or absorption). Then, the diffuse scattering component which is strongly wavelength dependent can cause some change of direction of the incident monochromatic beam as well as some loss of signal at the position of ideal image spot. By placing the optical filter sample alternative first in the diaphragm position (about 5.2 meters away from pmt) and on the image plane (in front of the pmt with a pinhole of angular dimension around 0.3 degrees) one can study the merits and disadvantages of placing the filter in different locations. This work is still under development.

d) Simulation of the energy loss experienced by electrons and positrons of EAS cascades of energies of 100 eV, using AIRES code, to determine the energy loss per unit atmospheric depth. Having such profiles for typical events, we can use them to estimate the comparative performance of optical filters. This work must be coupled by subroutines giving optical radiation transport from production position to the FD. Work is under development.

The people who have contributed to the above work are: E. Fokitis, S. Maltezos, P. Moissides, L. Papantonopoulos, R. Vlastou, K. Patrinos, E. Katsoufis, K. Razakias (from NTUA), A. Petrides, Th. Geranios, M. Vassiliou and G. Georgopoulos (from University of Athens) and M. Kokkoris from NRCPS Democritos. In Summary, we expect to have by beginning of October 2000, 72 optical filter pieces enough to equip two FD telescopes at the position of the camera. This is a cost effective solution and its merits can be evaluated after completion of a mechanical support system with minimum obscuration of incident air fluorescence signal. We hope to have such a support ready by middle of October. Another square meter optical filter surface of the same or other geometry pieces (to be dictated by experience from the filter pieces already ordered) will be ordered at beginning of 2001. In principle we can have the funds to deliver 10-12 such filter arrays to equip same number of FD telescopes, provided tests of them in Greece and in Malargüe indicate that they pass the AUGER specifications. The actual cost may be lower than 4,000 US $ per square meter per

FD telescope depending on the price agreement for large quantities which we could reach with a vendor. Since, there are at least two possible vendors, it is expected that a total cost of filters for 33 telescopes may be in the reasonable price range between 110,000 - 120,000 US$. The extra costs for hardware and man-power for optical filter mounting is expected to be also reasonably small due to the small surface, less than 1 square meter, of each filter array.

1.1.2.4.1 Mercedes (Institute of Physics, Czech Academy of Sciences, Prague - Jan Ridky)

We have presented calculations showing how to optimize the 'Mercedes' shape and to adopt it to the fact that the camera will have the corrector plate.

1.1.3.1.1.2.1 Calibration Shell Studies (University of Utah - Paul Sommers & Brian Fick)

The absolute FD calibration calls for a dome or other "shell" that produces light just outside the aperture that is uniform over the area of the diaphragm and uniform over the range of angles spanned by the FD pixels. One proposal is to use something like a Tyvek bag, with light injected into the bag at the diaphragm center. Multiply-scattered photons should leak through the surface of the bag next to the diaphragm with approximate uniformity. To test the concept, we built a diffusing bag of 3-foot diameter and used a xenon flash bulb at the center of the front face. A CCD camera was used to study lateral and angular uniformity. The results were not good with isotropic emission from the bulb. By appropriately baffling the bulb's emission directions, however, we obtained uniformity to better than 10%. Many issues remain concerning the stability of that uniformity when the bag is moved, etc. Better tests of shell alternatives are being prepared in Colorado.

1.1.3.1.1.3.1 Lidar Experiment (University of Utah - Paul Sommers & Brian Fick)

The time-dependence of back-scattered light from a pulsed laser depends on the amount of attenuation of the beam to the points of scattering (and the same attenuation for the returning photons), but also on the density of scatters and the backward cross section along the beam. To measure the attenuation by itself, we assume the density and cross section are independent of (x, y) at any height z. By probing a fixed height with different zenith angles, the dependence of the return signal is a fixed function of the (known) path length with one fitted parameter that is the vertical attenuation to that height. We attempted to test this method at the physics building in Salt Lake City, using the Auger laserscope and a Celestron telescope with PMT and digital oscilloscope as a lidar system. The assumption of (x, y)-invariance is clearly invalid in this sloping terrain near the city. The results we obtained were encouraging, however, and we plan to do better tests in Millard County after incorporating a DAQ with larger dynamic range. An undergraduate student, Ryan Monson, helped with these lidar tests. We plan to prepare a technical note.

1.3.1.1.3.1 Lidar Subsystem (Ljubljana - Andrej Filipcic)

In July we performed a week of measurements in Slovenia with a mirror mounted on a new steering mechanism. We scanned at 6 different angles from a vertical to a horizontal direction. The new DAQ system with a new oscilloscope and new PC allows us to scan distances up to 65km with 2ns resolution. With horizontal scanning we are able to detect back-scattered light from 25km. In the near future we are planning to set-up a system with displaced laser source and mirror. A dedicated radio-triggering system is under construction.

1.1.3.1.1.3.2 Vertical Flasher Status (University of Utah - Paul Sommers & Brian Fick)

The vertical flasher is operational. It produces 1-microsecond collimated flashes of light. A GPS clock and control circuitry guarantee that the flashes occur on the GPS second. The flashes will be periodic. The period can be set to any value between 3 seconds and 15 minutes. The GPS system is presently a power concern. We may be able to reduce the power consumption, but we should incorporate a solar power system in any case.

1.1.3.1.1.3.3 Horizontal Attenuation Monitor (University of Utah - Paul Sommers & Brian Fick)

We have completed the prototype for HAM #1 receiver and light source. In a "one of" test in June the basic technique was evaluated in Millard County. It was demonstrated that the basic design is sound. The sensitivity of the receiver matched the light flux from the lamp at the wavelengths of interest and reasonable values for the horizontal attenuation length were obtained. The test was not intended to evaluate the routine, remote, automated operation of the system, however. Independent field tests of the receiver, designed to target automated operation revealed a number of basic design flaws. In particular it was found that the receiver was difficult to point and focus in the field (during operation and calibration) and there were concerns about possibility of long-term image drift due to flexure in the telescope mount. These concerns have been addressed in two ways: 1) the internal pointing mechanism has been removed and the telescope and ccd have been firmly attached to the housing 2) we have begun to develop an independent mobile receiver unit which will be dedicated to doing the calibration. The base receiver will be fixed at Los Leones while the mobile receiver will be moved to within 2 km of the light and subsequently to the Los Leones site during the calibration procedure. We are investigating a new type of lamp which will warm up more quickly and use less power than the baseline mercury vapor lamp design A prototype has been built and is undergoing multiwavelength stability tests in the lab.

1.1.3.1.1.3.4 Star Photometry Atmospheric Monitor (Michigan Technological University - David Nitz)

All of the camera components except for the CCD have arrived. Apogee instruments indicates that delivery of the CCD will occur by 9/29/00 (as of 9/15/00). Fabrication

of the enclosure will await arrival and checkout of the CCD.

Coding has begun on routines for the all sky photometry.

Three sets of extinction stars have been obtained and entered into digital format. Specifically these are 1) Southern First-Order Extinction Stars (73 stars), 2) Northern First-Order Extinction Stars (98 stars), and 3) Southern UBV Standard Field Stars (102 stars). Data fields are as follows (a few sample stars). The star catalogs are now complete.

1.1.3.1.1.3.5 Super-local Phase Function Measurement (University of Utah - Paul Sommers & Brian Fick)

The differential angular cross-section for atmospheric scattering of UV photons is important to know in order to correct accurately for the non-fluorescence part of the FD signal that comes from scattered Cherenkov light. This phase function will be monitored during FD operations by having the detector observe a nearby beam of pulsed UV light. We did a small-scale version of this measurement using a CCD camera to measure the intensity of a pulsed UV laser beam when viewed from different angles (10deg to 170deg in 10deg steps). We measured the phase function at two different locations in Millard County on a single night (up on the Cricket Mountain site and down near the IPP power plant). The measurements were good enough to demonstrate that the phase functions were indeed different, and both differed from a third phase function measured previously in Salt Lake City with the same method. Mike Roberts participated in this. Results will be reported in a technical note.

1.1.3.1.1.3.9 Laserscope Status (University of Utah - Paul Sommers & Brian Fick)

The laserscope is the primary tool for producing artificial tracks to be recorded by the FD. These artificial showers will be used to analyze the FD sensitivity and resolution. The laserscope is now functional for pointing and shooting the 5mJ YAG laser, and we have used it in the above lidar tests. An aligned finderscope allows the laser to be pointed at a star or other visible point with fine accuracy. Optical encoders will allow us to point it by coordinates. The laser is mounted on an optical plate to which we can mount an energy probe, depolarizer, neutral density filters, beam diverger, etc. A system for emitting the light pulse on the GPS second is being built. Software for recording (transmitting?) the pulse information is yet to be developed. For each laserscope shot, we need to include (with the FD data) the laserscope pulse energy, its point of origin, the time, and the pointing direction.

Surface Detector

2.1.1.1.1 Tank Engineering and Specification; Parts Fabrication

(Fermilab - Richard Andrews)

The resin to make the first batch of 18 tanks at Alpina in Brazil has been made, shipped, and delivered to Brazil. The resin cleared Customs on September 6th, is being delivered to Alpina, and tank production is scheduled to begin on September 18th. The second large batch of resin for Alpina, has been ordered by Brazil, and is awaiting shipment The first design for the support of the solar panels has been completed, and the bracket material cut to length for the first 10 solar panels. This material has being delivered to Malargüe at this time. Hatch covers for 24 tanks have been manufactured at Fermilab, and are also being delivered to Malargüe.

2.1.5.1.1 Liner Engineering, specification, and QA (Fermilab - Richard Andrews)

The second batch of 10 liners from China has cleared Customs in Mendoza, and is being deliver to Malargüe at this time. The third batch of liners (consisting of 5 hard dome and 5 floppy dome liners) is being manufactured in China at this time. In addition, the 2000 pound of laminate ordered from Savoy Packaging in July is now scheduled for delivery September 25th. Blue Ridge Films has completed the engineering and development of the process for 10-220 liter bags and 10 full prototype bags, and delivery is scheduled for late Nov/early Dec, depending upon material deliveries (like the welding equipment.)

2.1.6.1 PMT Assemblies (Colorado State University - Dave Warner)

PMT windows for liners 21-30 were shipped to IHEP on August 3 (on schedule). These kits are half hard dome and half floppy dome kits. These kits are all designed to be used with Photonis 9" PMTs. Components for kits for the final 10 EA liners, as well as a large number of spares, have been ordered. We hope to have delivery of these kits for final assembly and testing at the end of September. Tests with the new optical coupling compound, GE 6136 RTV look very promising. The material is easy to work with and transmits light well into the ultraviolet. Tests with the RTV coupling compound show ~100% of the light collection efficiency seen with the PMT face directly in the water, while similar tests with the polyethylene film domes gave >90% of the PMT face in water. This lower transmission for film domes was expected, and is due to adsorption of the film itself. A side benefit of the RTV coupling compound is that it fixes the position of the PMT in the window, and may remove the necessity of weight/alignment rings we had been planning for. Work on a heat-sealable fill port is continuing, but we will not have prototypes of these fill ports to use for the last 10 EA liners. We hope to have prototypes on hand this fall.

2.1.7.1.1 Solar Panels and Regulators (Fermilab - Richard Andrews)

Solar panels (20) for the next 10 tanks and their regulators are in transit to Malargüe via the embassy route.

2.2.1.1 Phototubes (EA) (UCLA - Arun Tripathi)

The UCLA group has done a detailed study of the three

candidate PMT's (EMI 9353 KB, Hamamatsu R5912, and Photonis XP1802/FLB) for the ground array detectors for the Auger Project. We received two PMT's of each kind from the Penn State group. We have measured the gain, dark current, dark pulse rate, quantum efficiency, single photoelectron spectra, and the linearity for all six PMT's. Linearity was measured for different operating gains. A detailed description of all the measurements and results will be available as a GAP note by next week.

We have also received 4 MACRO PMT's from the CalTech MACRO group. Three of these are EMI and one Hamamatsu. We are currently in the process of measuring all the above mentioned characteristics for these PMT's.

The UCLA group also particpated on site from September 2nd through September 9th. Chris Jillings (UCLA) worked with Jim Beatty (PSU) and Ingo Allekotte (CNEA) on the test tank at the Galpon. The tanks were found to have wintered-over well. The tanks were set up for data taking. During the set up we noticed a large noise component on the ground lines. This problem was solved by supplying an "earth ground" (the system was floating before) which was the ground on the electrical box inside the door of the Galpon. We were able to get three days of data taking. Data were taken at three different PMT gains with different trigger configurations. Details of the work and the data will be made available shortly.

2.3.1.1.3 Trigger ASIC (Michigan Technological University - David Nitz)

We received the second revision PLD adapter board, and stuffed one of the boards. This board uses one of the new APEX series Altera PLDs, type EP20K200RC240, in a surface mount package. We have successfully loaded the configuration file which implements equivalent functionality to the phase 1 trigger ASIC. We are now stuffing a second copy of this board. Zbigniew will be taking the boards to Louisiana State University the last week of September to test them in the LSU test rig.

We have received 25 samples of the test chip we submitted for fabrication in the June MOSIS run. In addition a test board for the chips has been designed and fabricated. Evaluation of the test chips has begun. We will be comparing results of the measurements with our simulations to validate both the Verilog (digital simulations) and the more detailed "extracted view" analog simulations of our circuits. We are happy to report that the first function of the first test chip we measured seems to be working as predicted. More detailed studies are continuing.

The layout of the phase one trigger ASIC is now nearly complete. During September and the first week of October we will be performing analog simulations of the chip (which we will validate using the test chip above). If this phase goes well we expect to be ready to submit the design for fabrication in the October MOSIS run.

We are completing layout of a 3rd revision adapter board for the trigger logic. This board conforms to the mechanical footprint for the "fast-track" electronics, and will house a combination of ASICs and/or PLD plus external memory. We expect to submit this board for fabrication before the end of September. We plan to make 15 of these boards in the first run, and to deliver a set loaded with PLD electronics for use with the 2nd batch of 10 tanks.

Communications

3.0 Communications (University of Leeds - Paul Clark)

The Leeds group is pleased to announce the appointment of Mr. Andrew Dye to the Auger project team. Andrew has an extensive industrial background in the testing and quality assurance of electronic sub-systems. He has been appointed as a Senior Technician with 100 percent of his time on Auger and he will be responsible for the testing and shipping of all our WLAN radios to the site, as well as controlling the liaison with our sub-contracted radio manufacturers. His appointment now completes the Leeds Auger team at the Electronic Engineering Department.

Campus Tower progress

Thanks to Norberto's efforts on the comms task's behalf, progress on the Campus communications tower has been steady and we expect the structure to be complete by the end of September.

Equipment Procurement

Alain Castera is busy procuring the first microwave link and the shelter-to-building fiber optic data link equipment. We are hopeful that this equipment will reach the site in early November ready for installation by the Alain and colleagues, assisted by the Leeds team.

CDAS

4.0 Central Data Acquisition System - CDA (LPNHE Université Paris 6 France - Sylvie Dagoret-Campagne)

The Hardware

A number of components have already been bought and installed in our lab and some are about to be delivered. These components have been assembled in two independent networks.

One network reproduces exactly the Malargüe CDAS system (WBS 4.2) and is designated to send to Malargüe in October 2000 and used for tests in November 2000. Its components are the following.

4 PC (9GB of disk, 256 MB RAM, Intel Pentium III Biprocessors, 450 MHz) , including one CD recorder,

1 Cisco switch (24 channels) for building the LAN,

1 RAID disk (360 GB) for all the software and the data storage,

1 Trinitec cartridge reader DAT DD4 (with 6 cartridges amounting to 240 GB) as a backup system,

2 routers,

1 GPS antenna and receiver to set on the CDAS clock,

1 network laser printer,

1 UPS power supply.

In addition to these acquisition components, LPNHE people have 2 laptops for CDAS maintenance (for use in the lab and in Malargüe).

A second network is assembled in our lab to reproduce the Malargüe system for home software tests. Its components are the followings:

3 PC (9GB of disk, 256 MB RAM, Intel Pentium III Biprocessors, 450 MHz),

1 switch (1 hub, 8 channels) for building LAN,

1 external hard disk simulating the RAID system,

1 network laser printer.

The Software

The members of the CDAS team are:

> **Antoine Letessier-Selvon, Xavier Bertou, Alain Castera, Sylvie Dagoret-Campagne, Eileen Berman, Geraldo Cernicchiarro, François Meyer, Christian Arnault, Oleg Lodygensky, René Billot and Jean-Michel Brunet, and soon Cyril Lachaud, Edgar Linares (post-doc) and Olivier Deligny (Ph.D. student).**

The CDAS Software Overview and Status

The CDAS software comprises the following components: the CDAS supervisor "Su" (WBS 4.1.1.3.1), the CDAS servers "Pm" (WBS 4.1.1.1.1), "Fd," "Mo," the CDAS applications "Rc" (WBS 4.1.1.2.3), "Ct" (WBS 4.1.1.2.1), "Eb," the CDAS clients like

"MoR" and "MoC," the Lal tools like "Ik" (WBS 4.1.1.1.2), "Db" (WBS 4.1.1.1.5), the local station simulator "Simul."

The description and the status of the software components are given below.

The LAL Tools (X.B., C.A. and O.L.)

Description

The LAL Tools are some standard packages developed by C.A. for the Virgo collaboration. A subset of these tools is selected for Auger CDAS purposes (A.L.S and X.B.). The package "Ik" is used for the exchange of messages between processes. The package "Db" is used to store CDAS configuration parameters.

Status

All tools are working properly almost in their final version namely "Ik" available since May 2000 (O.L.).

The CDAS supervisor "Su" (X.B. and F.M.)

Description

"Su" must be first launched automatically on any machine. At launch, "Su" invokes a series of shell scripts: to configure CDAS parameters (like shell variable environment), to launch underlying LAL servers like "Cm", "Ik," "Db," to launch the CDAS servers like "Pm," "Fd," "Mo." "Su" provides pre-defined IP numbers and port numbers to the CDAS server allowing any client to access the servers ignoring the machine IP address on which they run. "Su" is associated with the daemons "Meta-Su" running on each PC (at launched at boot time) for controlling the status of the servers (alive or dead) and re-launching them if necessary

Status

This system is able to detect process crash and re-launches it. "Su" doesn't exist but a temporary package named "RunTool" (X.B. and A.C) provides scripts for server launch with a proper service IP number allocation since June 2000.

The CDAS data server "Pm" (A.C.)

Description

"Pm" is an interface between the CDAS and the local stations (namely the base station units) allowing the inward dataflow (2nd level triggers, events, status, calibration and monitoring data) and outward dataflow (CDAS commands, 3rd level triggers). The exchange of CDAS commands and local station status between "Pm" and "Rc" is done via "Ik". All other dataflows are done via TCP/IP protocol.

Status

The start of the run protocol has been implemented conjunctively with "Rc" in April 2000 (A.C and G.C) using an old version of Ik (X.B.) based on Unix pipes. The "start of run" protocol and the exchange of monitoring data and local triggers with "Simul" have been done in June 2000 (J.M.B., A.C, S.D.C, G.C).

The CDAS data server "Fd"

Description

"Fd" is the equivalent server as "Pm" but for the Fluorescence stations.

Status

Nothing has been done up to now.

The CDAS data server "Mo" (E.B.)

Description:

"Mo" collects monitoring data from "Pm," unpacks them, calibrates them properly (accessing to "Db") and forwards them to monitoring clients having requested for them.

Status

The reception of monitoring data first build in "Simul" (G.C), then forwarded from "Pm" to "Mo" (A.C. and E.B.) has been tested in June 2000. "Mo" was able to forward them to a dedicated client "MoR" (S.D.C).

The Run Control CDAS application "Rc" (G.C.)

Description

"Rc" is the run controller that allows the steering of the local and central acquisition process. It controls the experiment via "Ik". (The use of finite state machine like "FSM" is not clear).

Status

It is able to handle the "start of run" protocol with the local stations using the old "Ik" version. Namely it maintains in "Db" a list of all Surface Array stations with their parameters (like the location and status) and a sub-list of valid stations for the current run. But nothing is done during a run (G.C.).

The Central Trigger CDAS application "Ct" (S.D.C)

Description

"Ct" is the Central trigger. It associates in time and space the local triggers from SD and the fluorescence triggers. It publishes a positive decision with space and time information to "Ik."

Status

The association in time and space of the local triggers from SD is done. The configuration of the Surface Array is read either from Db or from a file at initialization. Preliminary tests to receive local triggers from "Pm" were done (S.D.C).

The Event Builder CDAS application "Eb"

Description

"Eb" is the Event Builder in charge of the collection of "Ct" triggers with local stations and fluorescence stations event data then of the storage for each acquired event. It could also perform a crude event reconstruction.

Status

This is an open task. Only preliminary tests to store data in Root data structures based on STL collections were done (S.D.C).

CDAS client "MoR" (S.D.C)

Description

"MoR" is an official monitoring client that stores in Root files, the calibrated monitoring data provided by "Mo" in Root data structures (particularly Root trees). It handles the name of Root files according the production date to enable Root monitoring analysis program to retrieve easily the required data.

Status

It has been tested (S.D.C) with "Mo" in June 2000. A set of Root macros are being developed to chain Root Trees from a list of Root monitoring files according a date range request specified by the user. The user also specifies the type of monitoring data he wants to plot.

CDAS client "MoC"

Description

"MoC" is an official monitoring client that detects out of range monitoring parameters and warns "Rc" using "Ik." The allowed parameter range is stored in "Db."

Status

This is an open task.

Task list

Up to now software tests has been done on one single machine, the development PC. Tests on the distributed CDAS architecture can be undertaken from now, as the IP number service policy is implemented.

"Rc:" the adaptation with the new "Ik" version must be done (and tested with "Pm"). The policy of the action to take in case of warnings or alarms during runs must be defined.

"Ct:" The Local trigger input from Pm must be pursued. The programming of the recognition for already defined trigger patterns must be done. The T3 output via "Ik" must be done. The monitoring of trigger rates on local station must be done. The Fluorescence triggers from "Fd" must be accepted. This task constitutes a 2 full months work.

"Eb:" must be implemented. This task constitutes a 2-3 full months work.

"MoR:" Additional monitoring blocks other than those from the Local station can be added easily as new Root Trees, as soon as their data format are defined. User-friendlier Root macros can be developed for monitoring visualization. In a second version it is proposed to use the Root client/server facility in order to receive directly Root tree objects from Mo (this imply the raw data decoding is done once in "Mo").

"MoC:" must be implemented.

A CDAS user interface: a friendly user interface will launch at demand the CDAS applications and start or stop runs.

Schedule for the Engineering Array

For November 2000 tests in Malargüe, it is foreseen to have a tested bench with "Pm," "Mo" and "MoR" running on the distributed architecture. This bench allows saving monitoring information from local stations only.

For spring 2001 tests in Malargüe, it is expected to have a bench with "Pm," ("Fd" prototype?), "Mo," "MoR," "MoC," "Rc," "Ct" and a preliminary "Eb" (providing event storage, without on-line event reconstruction) working with "Ik" and "Db."

Project Management

7.0 Project Management (Fermilab - Paul Mantsch)

The agenda for the November collaboration meeting is being prepared. The Collaboration Board Meeting will be broken in to two pieces, one at the beginning to introduce issues and one at the end to try to resolve them. The problem of the balance between parallel sessions and plenary sessions is more contentious than ever.

For the past year we have tried to obtain a waiver for importation. This is still somewhere in the system. We have also tried to donate equipment to Argentina. This turns out to require a large amount of paper work and it takes three months once the paper work is ready.

Recently we have obtained the approval of the Argentine Foreign Ministry to import Auger equipment either by way of UNESCO or the embassies. We do not yet have the approval of UNESCO to use this route. The embassy route seems like it will work. The procedure seems to be as follows. A list of equipment in the proposed shipment is sent to the embassy. Someone in the embassy sends the list to a person in the Argentine Foreign Ministry who then issues an import permit. The person at the Foreign Ministry who issues the permits is:

Ministro Rogelio E. Tristany
Area Franquicias Varias
Direccion Nacional de Ceremonial
tel: 4819 700 (exts: 7136 and 7137)

Once the permit is issued it is sent by the embassy to our agent who will clear the equipment at customs. Alberto Etechegoyen has arranged to have Hector Ponte of CNEA in San Rafael act as our agent. The equipment is to be addressed as follows:

PROYECTO PIERRE AUGER
COMISION NACIONAL DE ENERGIA ATOMICA
COMPLEJO FABRIL MINERO SAN RAFAEL
ATENCION INGENIERO H.R. PONTE
(5600) SAN RAFAEL - MENDOZA
ARGENTINA

The telephone numbers for Hector Ponte are: work: +54 2627 430087/430833 - home: +54 2627 428491

NOTE: We have not actually been successful in using this importation method so this could all change.