CERN Bulletin

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LS2 REPORT: A TECHNOLOGICAL LEAP FOR SPS ACCELERATION

The SPS radiofrequency acceleration system is being enhanced with a new technology: solid-state amplifiers

The new solid-state amplifier system developed by CERN with the Thales Gérac company comprises 32 towers, in which 2560 RF modules, each containing four transistors, will be installed. (Image: Maximilien Brice/CERN)

Big changes are under way at the Super Proton Synchrotron (SPS). One of the major operations is the upgrade of the machine's acceleration system. "The beams in the High-Luminosity LHC will be twice as intense, which requires an increase in radiofrequency power," explains Erk Jensen, leader of the Radiofrequency (BE-RF) group. One aspect of the LHC Injectors Upgrade (LIU) project is therefore bringing the SPS acceleration system up to standard.

Erk Jensen shows us around the huge Building 870, just behind the CERN Control Centre on the Prévessin site, which is a hive of activity. Everywhere you look, teams are pulling out cables, unscrewing components and removing electronic modules. Dismantling is one of the main activities of this first phase of the Long Shutdown. No fewer than 400 km of cables are being removed at Points 3 and 5 of the SPS, for example.

In the large halls, we can see the huge power converter and amplifier installations that supply the radiofrequency (RF) accelerator cavities of the SPS. The amplifiers use an electronic tube technology dating back to the 1970s and 80s, as the SPS was commissioned in 1976 and transformed into a proton-antiproton collider in 1981.

(Continued on page 2)

A WORD FROM FRÉDÉRICK BORDRY

THE TIME OF THE LHC INJECTORS UPGRADE PROJECT

Anyone looking at sites around CERN would be forgiven for thinking that we're moving out, such is the scale of the undertaking we have just begun for LS2, and such is the volume of equipment that's being removed from the accelerator tunnels and buildings for replacement or refurbishment. LS2 is a shutdown that is dedicated mainly to the LHC Injector Upgrade project, LIU, through which the entire injector chain is being prepared for the task of delivering high-brightness beams in readiness for the High-Luminosity LHC, HL-LHC, scheduled to start up in 2026. The 2000 or so people working on the accelerators in LS2 have their sights firmly set on the progressive restart of physics in experimental halls around the Laboratory in early 2021.

(Continued on page 2)

In this issue

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A WORD FROM FRÉDÉRICK BORDRY

THE TIME OF THE LHC INJECTORS UPGRADE PROJECT

LIU got under way in 2015, and much has already been accomplished. From the construction of an entirely new linear accelerator, Linac 4, to the installation of a ground-breaking RF solid-state power amplifier system and new beam dump for the SPS and the delivery of a powerful 200 MVA transformer at Prévessin, new installations have been appearing across the CERN landscape, ready to be brought into play during LS2. Nothing is being left untouched. From the venerable Proton Synchrotron and its Booster to the SPS, every machine upstream of the LHC will be transformed over the next two years.

The final touches to the meticulous LIU planning process were made earlier this month at a very productive workshop in Montreux, mapping out the road to physics resuming in 2021. By the time this happened, however, LS2 work was already in full swing. At the PS Booster, work got under way to ready the machine to receive beams at 160 MeV instead of 50 MeV, and to accelerate them to 2 GeV instead of 1.4 GeV. In the PS itself, the removal of 43 of the machine's 100 bending magnets started, while at the SPS, the replacement of some 400 kilometres of cabling began and components of the acceleration system were brought to the surface for refurbishment. All these are major undertakings in their own right, and give a glimpse of the scale and complexity of the task at hand. As LS2 progresses, dedicated articles in the Bulletin will keep you up to speed - this week's article describes the ground-breaking solid-state power amplifiers that will be powering the SPS RF cavities.

Although LIU is the main focus of LS2, there's much else going on. Next year, for example, the first set of two 11-tesla dipole magnets using cable based on the niobium-tin compound, Nb_3Sn, will be installed at Point 7 of the LHC. This is a technology that has long been studied at CERN. It was considered in the early days of the LHC project, but was not sufficiently mature at the time. Now that the technology has evolved, this magnet will be the first of its kind to be installed in a particle accelerator. When the HL-LHC starts up, the final focus magnets for ATLAS and CMS will use niobium-tin cable, as will the four dipoles at Point 7. Niobium-tin technology supports higher current density, allowing higher fields to be generated, leading in turn to a sharper focus at the experiments, and to greater bending power in the four dipoles, which have to produce the same bending power over their 11-metre length as the standard LHC dipoles produce over 15 metres in order to free up space for new collimators. In LS2, the consolidation of the LHC main dipole by-pass diodes will also be achieved, and some 20 superconducting magnets will be exchanged.

As with LS1 before it, LS2 has an ambitious work plan. And as with LS1, our working mantra is: "safety first, quality second, schedule third". We have a lot to do, we are well prepared, we will succeed, and we will succeed safely.

Frédérick Bordry
Director for Accelerators and Technology

LS2 REPORT: A TECHNOLOGICAL LEAP FOR SPS ACCELERATION

Two tube systems exist alongside each other, each producing 2 megawatts of power.

To supply the power needed for the High-Luminosity LHC, a team from the RF group, headed by Eric Montesinos, working with the firm Thales Gérac, has developed a new system that uses solid-state amplifiers, similar to those that were recently developed for the SOLEIL and ESRF synchrotrons. The transistors for these amplifiers are assembled in sets of four on modules that supply 2 kilowatts, much less power than was delivered by the electronic tubes (between 35 and 135 kilowatts). But a total of 2560 modules, i.e. 10 240 transistors, will be spread across 32 towers. The power from 16 towers will be combined via an RF power combiner. The whole system will be able to provide RF power of two times 1.6 megawatts to the cavities.

"This system is much more flexible, since the power is distributed across thousands of transistors," observes Eric Montesinos. "If a few transistors stop working, the RF system will not stop completely, whereas if one of the tubes failed, we had to intervene quickly." In addition, it's much easier to change a module, especially since electronic tubes in this frequency range are an endangered species, accelerators being among the last applications of the technology.

Development of the solid-state amplifier system began in 2016. A team from the RF group worked in collaboration with scientists from Thales Gérac, and many tests and adjustments had to be carried out. Power electronics are subject to significant thermomechanical effects, so the technique for fitting the transistors onto the plate of the module, to take one example, turned out to be a particularly tricky aspect to get right. After several dozen complex prototypes had been produced, the work finally came to a successful conclusion last year: the first tower housing 80 transistor modules operated for 1000 hours, passing the validation tests in August. This was a great success that allowed series production to begin while the tests continued.

The structures, i.e. the 32 towers, have already been installed in a new room, giving it the air of a science-fiction movie set. Only one of them so far is equipped with its RF power modules, offering a taste of the even more futuristic look that the room will have in a few months' time. The modules will be delivered as of May, continuing through to the end of the year; all of them will be tested on a specially designed test bench before being installed in the towers. Some painstaking work faces the teams that will install all the modules.

In parallel, the cavities have been removed from the tunnel. The SPS has four 200 MHz cavities: two formed of four sections, and two of five sections, each section measuring four metres. “To accelerate more intense beams, we need to reduce the length of the cavities in order to maintain a sufficiently strong electromagnetic field along their whole length,” explains Erk Jensen. The teams will therefore reassemble the sections in order to form a total of six cavities: two of four sections and four of three sections.

At the same time, the beam control system is being replaced. The Faraday cage, which houses the electronic racks for the beam control system, has been completely emptied, ready to be fitted with the latest electronics and new infrastructure (lighting, cooling and ventilation systems, among others). Finally, an improved system for eliminating parasitic resonances will be installed, based on HOM (higher order mode) couplers, which were tested during the last run.

The teams must stick to a tight schedule, comprising all the dismantling work, the start of installation later in 2019, and numerous tests and commissioning tasks in 2020.

See more pictures on CDS (*https://cds.cern.ch/record/2658182*)

The four 200 MHz accelerating RF cavities of the SPS are removed from their tunnel to be upgraded during the Long shutdown 2 (LS2). (Image: Maximilien Brice/CERN)

Corinne Pralavorio

DEVELOPERS REVIVE FIRST WEB BROWSER AT WEEK-LONG HACKATHON

As part of CERN's celebrations of the 30th anniversary of the Web, an international team is at CERN to recreate the WorldWideWeb browser

The team working to resurrect the first Web browser (Image: Jean-François Groff)

An old NeXT Computer from the early '90s, borrowed from a group of computer enthusiasts in Lausanne, sits in a corner, its screen showing a black-and-white command prompt on the old NeXTstep operating system. Programmers and developers from around the world gather around an oblong table with their computers, having animated conversations about “anti-aliased fonts” and “browser binaries”. Next door, a gigantic room houses the CERN Data Centre 's servers, where all of the Laboratory's computing is done, as well as where the data from the Large Hadron Collider 's experiments are stored. The same room also hosted CERN's first Internet connection in 1989 and today hosts the CERN Internet eXchange Point (CIXP). The developers are here to recreate the first Web browser, which was built at CERN in 1990 by Sir Tim Berners-Lee to browse pages on the Web, also his invention.

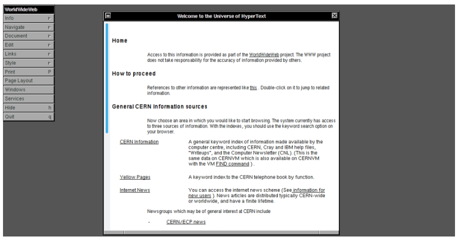
You are presumably reading this article in a browser, which shows content in HyperText Markup Language or HTML, on a mobile or desktop operating system. Sir Tim's original browser, initially called WorldWideWeb itself and later rebranded “Nexus”, could only run on the NeXT Computer on which he wrote his code. But this team of developers are now aiming to run the WorldWideWeb browser on today's operating systems by building on the capabilities of the Web itself! They are doing this by emulating the original browser within a modern browser using the popular JavaScript programming language, allowing you to indulge in the early-Web experience without needing to get your hands on an archaic NeXT Computer yourself.

The team was first assembled in 2013 to recreate the “line-mode browser”, originally written by Nicola Pellow in 1991. Now on their second stint here, with less than a month to go before the 30th anniversary of the Web, they are faced with new challenges. “We have retrieved the code of the WorldWideWeb browser,” developer Remy Sharp explained on Monday, the first day of the five-day-long sprint. “But we haven't been able to get it onto the NeXT machine so far.” Indeed, it is not trivial to interface with hardware that is many decades old.

The team needed to run the software on the machine it was designed for in order to replicate the exact look and feel on a modern system. This includes, for example, ensuring that the "blocky" fonts of the NeXTstep operating system render similarly in the emulated WorldWideWeb browser, rather than the smoother treatment they receive on screens nowadays. Eventually, fellow programmer Kimberly Blessing managed to load the WorldWideWeb browser onto the borrowed computer.

The participants of the sprint shared lunch with Web pioneer Robert Cailliau on Tuesday, where they discussed the mechanics of the early Web browsers, including the fact that the WorldWideWeb browser offered the possibility not just of reading a Web page but also of editing it in real time.

With a few hours left in their sprint, which is supported by the US Mission in Geneva through the CERN & Society Foundation, the developers are busy ensuring that their work can be publicly released. Their project notes and the resurrected WorldWideWeb browser can be found at cern.ch/worldwideweb. For more information about the project to preserve some of the digital assets associated with the birth of the Web, please visit cern.ch/first-website.



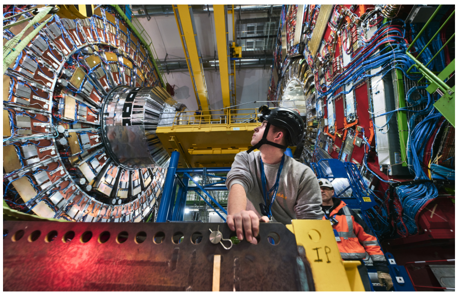
A screenshot of the emulated WorldWideWeb browser, running inside a modern Web browser

Moving towards a solution (Image: Remy Sharp)

Achintya Rao

WHAT'S IN STORE FOR THE CMS DETECTOR OVER THE NEXT TWO YEARS?

With the LHC switched off for a two-year technical stop, CMS is undergoing significant maintenance and upgrades



Removal of the CMS beam pipe (Image: Maximilien Brice/Julien Ordan/CERN)

A jewel of particle physics, the CMS experiment is a 14 000-tonne detector that aims to solve a wide range of questions about the mysteries around the Higgs boson and dark matter. Now that the Large Hadron Collider (LHC) beam has been switched off for a two-year technical stop, Long Shutdown 2 (LS2), CMS is preparing for significant maintenance work and upgrades.

All the LHC experiments at CERN want to exploit the full benefits of the accelerator's upgrade, the High-Luminosity LHC (HL-LHC), scheduled to start in 2026. The HL-LHC will produce between five and ten times more collisions than the LHC, allowing more precision measurements of rare phenomena that are predicted in the Standard Model to be taken, and maybe even detecting new particles that have never been seen before. To take advantage of this, some of CMS's components need to be replaced.

In the heart of CMS Hidden inside several layers of subdetectors, the pixel detector surrounding the beam pipe is the core of the experiment, as it is the closest to the particle-collision point. During LS2, the innermost layer of the present pixel detector will be replaced, using more high-luminosity-tolerant and radiation-tolerant components. The beam pipe will also be replaced in LS2, with one that will allow the extremities of the future pixel detectors to get even closer to the interaction point. This third-generation pixel detector will be installed during the third long shutdown (LS3) in 2024–2026.

Without missing a thing Beyond the core, the CMS collaboration is also planning to work on the outermost part of the detector, which detects and measures muons – particles similar to electrons, but much heavier. They are preparing to install 40 large Multi-Gas Electron Multiplier (GEM) chambers to measure muons that scatter at an angle of around 10°– one of the most challenging angles for the detector to deal with. Invented in 1997 by Fabio Sauli, GEM chambers are already used in other CERN experiments, including COMPASS, TOTEM and LHCb, but the scale of CMS is far greater than the other detectors. The GEM chambers consist of a thin, metal-clad polymer foil, chemically pierced with millions of holes, typically 50 to 100 per millimetre, submerged in a gas. As muons pass through, electrons released by the gas drift into the holes, multiply in a very strong electric field and transfer to a collection region.

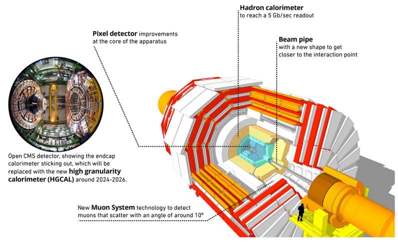
Fast-forward to the future Some of the existing detectors would not perform well enough during the HL-LHC phase, as the number of proton–proton collisions produced in the HL-LHC will be ten times higher than that originally planned for the CMS experiment. Therefore, the high-granularity calorimeter (HGCAL) will replace the existing endcap electromagnetic and hadronic calorimeters during LS3, between 2024 and 2026. The new detector will comprise over 1000 m^2 of hexagonal silicon sensors and plastic scintillator tiles, distributed over 100 layers (50 in each endcap), providing unprecedented information about electrons, photons and hadrons. Exploiting this detector is a major challenge for software and analysis, and physicists and computer science experts are already working on advanced techniques, such as machine learning.

Building, building, building CMS has also been involved with the HL-LHC civil-engineering work, which kick-started in June 2018 and is ongoing. The project includes five new buildings on the surface at Cessy, France, as well as modifications to the underground cavern and galleries.

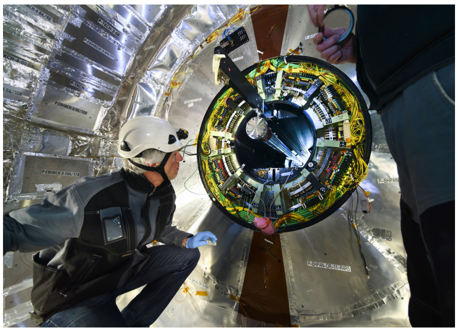
CMS's ambitious plan for the near and longer-term future is preparing the detector for more exciting undertakings. Stay tuned for more.

Read more in “CMS has high luminosity in sight” in the latest *CERN Courier*, as well as LS2 highlights from ALICE, ATLAS and LHCb.

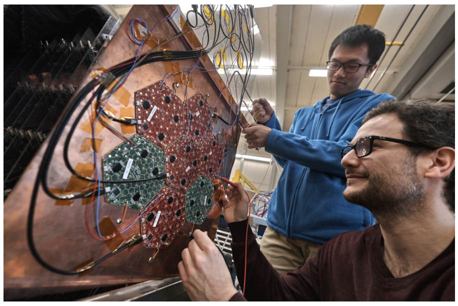
More photos from CMS are available on CDS (*https://cds.cern.ch/record/2654504*) :



This diagram of the CMS detector shows some of the maintenance and upgrades in store over the next years



CMS core removal during the Long Shutdown 2 (LS2) (Image: Maximilien Brice/Julien Ordan/CERN)



Ongoing tests on the modules of the high-granularity calorimeter (HGCAL). Intense R&D is planned for LS2 to ensure that the new detector will be ready for installation during LS3. (Image: Maximilien Brice/CERN)

Letizia Diamante

WHEELS IN MOTION: WHAT'S PLANNED FOR ATLAS IN THE NEXT TWO YEARS?

Enhancing ATLAS's detection capabilities in preparation for the LHC restart

One of the existing small wheels was brought to the surface (Image: Jacques Herve Fichet/Maximilien Brice/CERN)

How is the ATLAS detector preparing for the future? When the CERN accelerator complex switched off in December 2018, ATLAS scientists and technicians promptly got to work opening the shaft leading from ground level to the underground ATLAS cavern, as well as opening up the detector itself. They will be maintaining and upgrading the detector over the next two years, the time CERN has allocated for a technical break called Long Shutdown 2 (LS2). Some of the improvements are part of the upgrade of the Large Hadron Collider (LHC), the High-Luminosity LHC (HL-LHC), set to run from 2026. The upgrade will greatly increase the rate of particle collisions, bring higher readout rates and create more opportunities for physics discoveries.

ATLAS is the largest LHC experiment. Installed between 2003 and 2008, it aims, like CMS, to understand the properties of the Higgs boson and search for new physics.

New not-so-small wheels A major improvement to the experiment will be the installation of two new wheel-shaped detectors to track particles called muons. Muons can be thought of as heavier cousins of electrons and pass through the inner parts of the detector with little disturbance. If you imagine the detector as an onion, the muon spectrometer is the outer skin. Muons that speed away at angles smaller than 40 degrees from the beam direction are measured by a series of three layers of sub-detectors, the innermost of which is known as the small wheel – because it is “only” 9.3 metres in diameter.

The new wheels will improve ATLAS's triggering capabilities and will be able to cope with the higher muon rates expected from the HL-LHC. Each wheel consists of 16 wedges, or sectors, covered with layers of detector chambers known as micromegas (MM) and small-strip thin-gap chambers (sTGC). Both MMs and sTGCs have excellent precision tracking capabilities, at the level of 100 micrometres, and the very good response time needed to uniquely identify the collision time.

Assembly is currently taking place on the surface and the wheels will then be transported to ATLAS and lowered through the shaft to the detector. One of the existing small wheels was brought to the surface last week and the first new wheel is scheduled to enter the ATLAS cavern in spring 2020.

Remodelling ATLAS inside and out
Linked to the upgrades of the muon detection system is the addition of 16 new stations to improve ATLAS's capability to detect muons in the region between the barrel and the endcaps. The stations contain gas-filled small monitored drift tubes (sMDT) and resistive plate chambers (RPCs). Physicists can track muons using the trail of electrically charged particles caused by the muons passing through the gas. The reconstruction of the muons' paths will be improved thanks to sMDTs with a smaller diameter and new-generation RPCs with reduced electrode thickness.

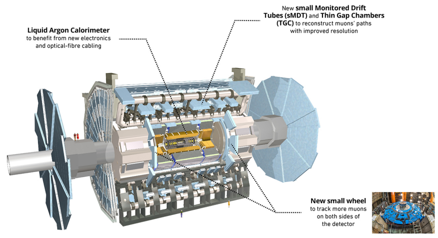
Another major task happening during LS2 is the replacement of some components of the Liquid Argon Calorimeter's (LAr) front-end electronics. This will improve ATLAS's ability to preserve important signals coming from electrons and photons. On top of that, the upgrade of the trigger and data-acquisition systems will prepare the experiment for the HL-LHC.

In parallel to work on the detector, construction work is also continuing apace around ATLAS on the surface and underground, in preparation for the HL-LHC. A 62-metre-deep shaft has just been completed and civil engineers are now busy digging a service cavern and galleries for new equipment.

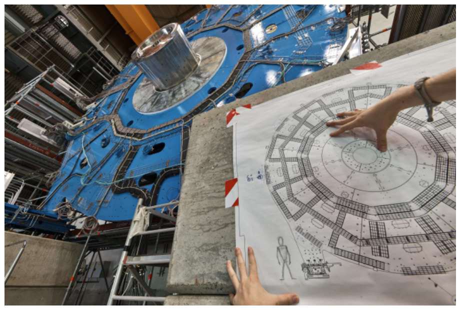
While many of ATLAS's upgrades and installations will take place during Long Shutdown 3 (LS3), which is scheduled to begin in 2024, the activities taking place over the next two years will make it a better performing detector, ready to take data when the LHC restarts in 2021.

Read more in "*ATLAS upgrades in LS2*" in the latest *CERN Courier*, ATLAS's news summary, and LS2 highlights from ALICE, CMS and LHCb.

More photos from ATLAS are available on CDS (*https://cds.cern.ch/record/2658165*)



This diagram of the ATLAS detector shows some of the maintenance and upgrade work in store in the coming two years.



One of ATLAS's new small wheels, measuring almost 10 metres in diameter. (Image: Julien Marius Ordan/CERN)

Letizia Diamante

CERN CELEBRATES THE INTERNATIONAL DAY OF WOMEN AND GIRLS IN SCIENCE

CERN has been organising visits of women scientists and engineers to local schools on the occasion of the International Day of Women and Girls in Science

Marta Felcini describes a particles detector in École Bellavista (Image: CERN)

For three years now, CERN has been organising visits of women scientists and engineers to local schools on the occasion of the International Day of Women and Girls in Science celebrated annually on 11 February. This year, new partnerships with the Science Outreach Department of the Swiss Federal Institute of Technology in Lausanne (EPFL) and the University of Geneva (UNIGE) Scienscope, gave a new scope to the project.

From 11 to 15 February, 57 very enthusiastic volunteers from CERN, UNIGE and EPFL gave 150 talks, reaching over 3100 pupils!

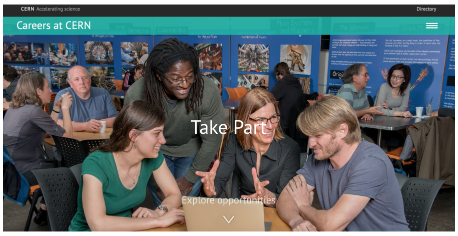
They spoke about their background, revealed some mysteries of science and conducted small demonstrations in front of very curious school pupils. The idea behind the project is to have them act as female role models to change the perception towards scientific and engineering professions. They contributed in changing sexist stereotypes, enabling young girls to imagine themselves as researchers, explorers, innovators, engineers or inventors.

Marie Bouvier

If you are interested in participating get in contact with Local engagement.

CERN HUMAN RESOURCES RECEIVE AWARD FROM THE EUROPEAN COMMISSION

The HR Excellence in Research Award was presented to CERN after several months of work, in recognition of the Organization's special efforts to implement the European Charter for Researchers and Code of Conduct for the Recruitment of Researchers



Screenshot of the "Careers at CERN" homepage (Image: CERN)

In 2005, the European Commission adopted a European Charter for Researchers and Code of Conduct for the Recruitment of Researchers. To date, 111 9 organisations have endorsed the Charter and Code (C&C) principles and a further 455 are "acknowledged institution", a list to which CERN's name was added in December 2018. This date was also when CERN won the "HR Excellence in Research" Award in the framework of the Human Resources Strategy for Researchers (HR4SR). The award followed several months of work to complete the extensive application process, involving multiple actors and stakeholders throughout the Organization. This began with a survey to evaluate to what extent CERN implements each of the 40 principles of the Charter and Code, further to which the CERN C&C Focus Group carried out a comprehensive gap analysis covering some key HR themes. Key points that CERN committed to follow up were collated in a clear action plan, submitted as part of the application, on the basis of which the Organization will be regularly audited and monitored to ensure compliance with the Code.

For James Purvis, head of CERN's Human Resources department, this is an important step forward for the Organization: "We are extremely proud to have obtained this award. It is a key milestone – not only in the recognition of CERN's HR practices, but it may also become critical in the future in CERN's ability to succeed in future EC project submissions."

CERN is deeply committed to the principles and ethos of the European Charter for Researchers and Code of Conduct for the Recruitment of Researchers, whose natural integration in CERN's Human Resources and management processes are already contributing greatly towards promoting CERN as an attractive employer in Europe.

Find out more about the content of CERN's application for the HR Excellence in Research award and what this means for the Organization at: https://hr-dep.web.cern.ch/content/cern-and-eu-charter-and-code

COMPUTER SECURITY: FATAL DEPENDENCIES

Are you a hacker? Programmer? Software developer? Coder? Many of us are. And, as intelligent humans, we tend to concentrate on the new and not try to reinvent the wheel

Are you a hacker? Programmer? Software developer? Coder? Many of us are. And, as intelligent humans, we tend to concentrate on the new and not try to reinvent the wheel, instead benefitting from what has been already created elsewhere. So we have more time to produce something new, something adapted to our needs, and leave the basics to software packages already produced somewhere else. Standing on the shoulders of other hackers, programmers, developers and coders worldwide, Gitlab at CERN, Github around the world and Stack Overflow, to name just three, provide a vast variety of libraries and code snippets for already existing functionalities. All you need to do is download or copy-paste them. But what if those hackers, programmers, developers and coders turn rogue?

Open source code is great, but does not come without risks. As anyone can write and share code, it is an inherent fact that some code comes with blatant security vulnerabilities. These are not necessarily introduced with malicious intent but the openness of the source code allows anyone to verify the integrity of the code and correct it if needed. However, sometimes even the open source community fails to identify major vulnerabilities like "Heartbleed". So reusing public libraries comes with a risk. And this risk becomes more severe if malicious third parties intentionally tamper with software libraries and just wait for software developers "driving by", downloading those malicious libraries and running that code in their software. Code executed and... boom! It would not be the first time that companies have been compromised through malicious libraries or modifications thereof. For example, a backdoor was discovered in the Python module named "ssh-decorator" distributed through "PyPi", a repository of software for the Python programming language. Any SSH connection credentials were forwarded to a malicious party. Similarly, some malicious libraries have been named to resemble the name of a real, widely used library like, e.g. "crossenv". But the fake one ("cross-env") was extorting local environment variables and, potentially, also credentials. Thirty-nine more typo-squatted libraries were identified and deleted from "NCM", a popular package manager for the JavaScript programming language. And then there are legacy libraries, not maintained by anyone any more, but still in use. In this example, the ownership was naively passed over to a malicious evil-doer who then introduced some malicious code in the otherwise clean library...

So automatic integration of external software libraries e.g. from PyPi or through NCM comes with a risk! Like with surfing the web, STOP – THINK – DON'T CLICK (or rather, don't import). Only install software libraries from trusted sources. And even then, inspect the code either manually (cumbersome as it is) or run at least a static code analysis tool on top of that. The CERN Computer Security Team provides a variety of static code checkers for that purpose. Also consider using a centralised software repository manager like Sonatype Nexus or Apache Maven. The former is provided by CERN IT department and used for accelerator control system development and in the ATLAS and CMS experiments.

Do you want to learn more about computer security incidents and issues at CERN? Follow our Monthly Report. For further information, questions or help, check our website or contact us at Computer.Security@cern.ch.

The Computer Security Team

Official communications

COMPOSITION OF THE JOINT ADVISORY APPEALS BOARD (JAAB / CPCR)

2019 Exercise

	Appointed by the Director-General	Appointed by the Staff Association
Members	Nicole POLIVKA / FAP	Rosario PRINCIPE / TE
1st deputies	Raymond VENESS / BE	Nicolas SALOMON / PF
2nd deputies	Ramon FOLCH / EN	Almudena SOLERO / FAP

Ms Polivka and Mr Principe have drawn up the following list of staff members from among whom the Chairperson of the Board may be chosen when required:

- François BRIARD / IR
- François BUTIN / EN
- Etienne CARLIER / TE
- Joel CLOSIER / EP
- Dorothée DURET / FAP
- Alexandra HAHNEL-BORGEAUD / IPT
- Arash KHODABANDEH / IT
- Isabelle LAUGIER / BE
- Pedro MARTEL / BE
- Jens VIGEN / RCS

Mediators [see Administrative Circular N°6 (Rev. 1) entitled "Review procedure"] will also be selected from this list of ten staff members.

HR Department

COMPOSITION OF THE JOINT ADVISORY DISCIPLINARY BOARD (JADB / CPCD)

2019 Exercise

	Appointed by the Director-General	Appointed by the Staff Association
Members	John PYM / DG	Sigrid KNOOPS / TE
1st deputies	Gianluigi ARDUINI / BE	Lynda MEICHTRY/ DGU
2nd deputies	Dante GREGORIO / FAP	Nick ZIOGAS / IPT

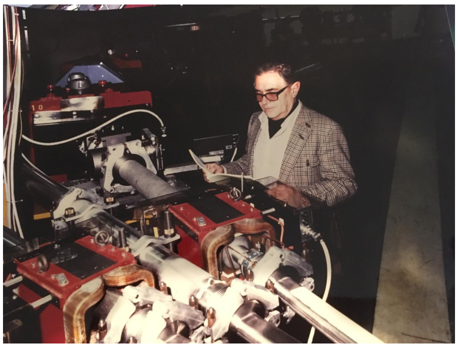
Mr Pym and Ms Knoops have drawn up the following list of staff members from among whom the Chairperson of the Board may be chosen when required:

- Ronny BILLEN / BE
- Johan BREMER / TE
- Laure ESTEVENY / IR
- Katy FORAZ / EN
- Malika MEDDAHI / TE
- Kandy MITCHELL / PF
- Alberto PACE / IT
- Stephan PETIT / EN
- Laurent TAVIAN / ATS
- Gabriele THIEDE / FAP

HR Department

Obituaries

BRUNO NICOLAI 1930–2018



(Image: CERN)

Bruno Nicolai, former coordinator of the installations at LIL (LEP Injector Linacs) and EPA (Electron Positron Accumulator) passed away on 11 November 2018. Just a few hours later, his wife, Annamaria Vecchiatti, also passed away. Bruno and Annina (this is the affectionate nickname Bruno used to call his wife) got married in 1954. Their entire life is a love story, right through to their last day together.

Bruno was born in Ficarolo (Rovigo, Italy) in 1930. Besides his wife and his two daughters, Bruno actually had another big love: CERN. A mechanical engineer, Bruno arrived at CERN in 1958 and became a staff member in 1959. He obtained an indefinite contract in 1963.

When Bruno arrived at CERN, the Laboratory was in the process of giving birth to big human adventures and Bruno was passionate about interacting with the physicists, creating new experiments, and finding unexplored technical solutions to solve issues and allow scientists to carry out their experiments. At the end of 1958, Bruno took part in the g-2 experiment, which aimed at measuring the muon anomalous magnetic moment.

After the g-2 experiment, Bruno continued to develop his career: first in the SC (Synchro Cyclotron) division, and then in the MPS (Machine Proton Synchrotron) division, becoming a real expert in magnets and, in particular, in injection and ejection systems. During this period, he was able to use his wide range of knowledge, working equally successfully with high voltage equipment, hydraulics, high vacuum, controls and civil engineering. He joined the PS ejection team in 1967 and was responsible for the "Straight Flush" kicker system. In 1974, he became KM (Kicker Maintenance) section leader in the Acceleration and Ejection group under D. Bloess in the PS Division. In the 1980s, he joined the LPI (LEP Pre Injectors) group and became responsible for the coordination of all installations going into the LIL (LEP Injector Linacs) and EPA (Electron Positron Accumulator) buildings.

In the same years, he was also an active member of the "Joint Advisory Rehabilitation and Disability Board". Bruno handled this delicate task with his usual professionalism and passion.

Bruno retired in 1990 but his passion for CERN didn't stop and actually found another way to manifest itself: through his activity as a CERN official guide. While his health was becoming ever more precarious, letters of appreciation from schools and groups were piling up in his personal book of memories.

Bruno had a wonderful career at CERN, largely because Annina always supported him through all the difficulties, the long nights spent at CERN, the frequent trips and, towards the end of Bruno's life, through a series of serious illnesses that never left him until he passed away.

Bruno left a mark of love in all of us, his friends, colleagues and people who had the chance to meet him. In spite of all the tough challenges life presented him with, he never lost his smile, not a fake one but a real, heartful smile. He used to make jokes about his age, swapping the figures around when it would make him younger (e.g. 75 would become 57) and he was indeed still very young when he passed away at the age of 88 (no convenient swap available, he used to laugh about it). Annina and Bruno will be sorely missed and always remembered together. A perfect circle of love and passion that makes life seem worth living.

His colleagues and friends

Ombud’s corner

COLLECTIVE INTELLIGENCE

In an oriental fable, six blind men decide to meet an elephant in order to broaden their horizons. The first rubs up against its side and says: “*This elephant is like an unmovable wall!*” His neighbour feels a tusk and exclaims: “*It's so smooth and pointy; this animal is surely an impressive weapon!*” One by one, the four other blind men discover the other parts of the animal: the ear, the trunk... and each experiences a different reality: a fan, a snake... The six friends then get caught up in a never-ending argument, incapable of agreeing on the type of animal they have before them. Just then, a wise man passes by: *“You're all correct; you all possess part of the truth. But rather than arguing, why don't you listen to one another and try to find out what connects your individual truths?”*

Have you ever been at a meeting where the participants try to put their arguments forward at all costs, without listening to anyone else? Each person defends his or her fragment of truth while remaining oblivious of the bigger picture.

Debbie and Peter* attend a coordination meeting about the extension of their workshop. As the DSO, Debbie firmly insists that the Safety Rules must be observed. Peter, the project leader, is interested only in the strict budgetary and operational constraints that he is bound by. The other participants observe this duet of monologues until Eric*, the DPO, reminds them of their common goal and manages to get everyone on the same page.*

As soon as each participant shares his or her “reality” and accepts that there are other equally valid realities, the discussion becomes productive and may result in common solutions that satisfy everyone concerned. The truth is rarely the preserve of a single person; it usually emerges after collective reflection.

**Names have been changed*

Pierre Gildemyn

If you'd like to comment on any of my articles or suggest a topic that I could write about, please don't hesitate to e-mail me at Ombuds@cern.ch.