



The official CERN60 ceremony on 29 September featured the European Union Youth Orchestra, directed by Maestro Vladimir Ashkenazy, with 42 musicians covering all of CERN Member, Associate Member and Observer States. (CERN-PHOTO-201409-196 – 120)

A year at CERN

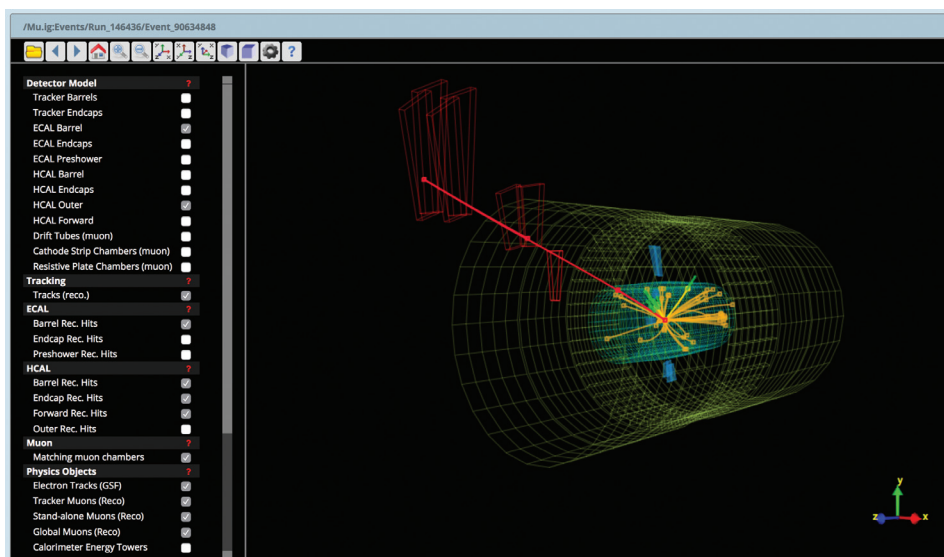
On 29 September 2014, it was exactly 60 years since the European Organization for Nuclear Research — CERN — came into being. Just a few years after the Second World War, 12 European countries joined forces and built what has become the world's largest particle-physics laboratory. To mark the anniversary, CERN celebrated 60 years of science for peace with a total of 130 events throughout the year, at the Laboratory, in the local area, in the Member States and beyond.

At the beginning of July, a joint event at the Paris headquarters of the United Nations Educational, Scientific and Cultural Organization (UNESCO) commemorated the initial signing, on 1 July 1953, of the CERN Convention, which was to establish CERN under the auspices of UNESCO a year later. On the day of the 60th anniversary itself, delegations from 35 countries came to CERN for the official CERN60 ceremony. Other celebratory events at CERN and in the surrounding area invited people to listen to talks, hear music and see science in the streets (see p. 32). Finally, at a special event at the UN headquarters in New

York on 20 October, CERN and the UN Economic and Social Council celebrated science for peace and development.

From LS1 to Run 2

During the year, the first Long Shutdown (LS1) of CERN's accelerator complex progressed towards a successful conclusion, nearly two years after it had begun early in 2013. Protons once again entered the Proton Synchrotron (PS) in June. They were soon serving experiments there and at the ISOLDE facility, the n_TOF neutron source and the Antiproton Decelerator (AD) — all of which had seen upgrades and refurbishment during the shutdown. The Super Proton Synchrotron (SPS) and the experiments there followed suit in October. Then, in November, beams came knocking at the door of the Large Hadron Collider (LHC) as they were successfully steered down transfer lines from the SPS.



The CMS collaboration published 2010 event data on the CERN Open Data Portal in a comprehensive manner, accompanied by detailed documentation, tutorials and visualization tools with event displays like this. (OPEN-PHO-EXP-2015-005 – 1)

In May cooling of the LHC began, and by the end of the year the whole machine was near its operating temperature of 1.9 K. In addition, the magnets of one full sector (an eighth of the LHC) had been powered up to the level needed for beams to reach 6.5 TeV, the operating energy for the LHC's Run 2. Moreover, LS1 provided the opportunity for the LHC experiment collaborations to work on refurbishment and upgrades of the detectors in preparation for the higher energy and collisions rates of Run 2. There was also a significant amount of work to optimize the performance of the Worldwide LHC Computing Grid once the huge flow of data begins again.

Preparing for the future

Given the complexity of modern accelerator projects, CERN must plan well in advance for the future, not only at the energy frontier, but also for the facilities serving other areas of particle physics. The High-Luminosity LHC project to increase the collider's luminosity by up to 10 times the original design value is already underway, with funding allocated in the Medium-Term Plan for 2014–2019. For the antiproton community, a new building has been completed for the Extra Low ENergy Antiproton (ELENA) project that will allow up to four experiments to operate in parallel with antiprotons from the AD. Elsewhere, work continued on the upgrade to ISOLDE — HIE-ISOLDE — and a new experimental area came into operation at n_TOF.

Research and development continued on both accelerator and detector concepts within the Linear Collider Collaboration and the CERN Linear Collider study. Looking further into the future, following a kick-off meeting in February, the first collaboration board for the international Future Circular Collider study was established during a meeting at CERN in September. Work also began at CERN to establish a platform to enable detector development and provide support for future participation in international experiments.

Open for all

CERN's efforts to foster international collaboration extend beyond the accelerators and experiments to the data and the final results. The beginning of the year saw the start of the Sponsoring Consortium for Open Access Publishing in Particle Physics (SCOAP³). Led by CERN, SCOAP³ involves an international collaboration of more than 1000 libraries, library consortia and research organizations. With the support of partners in 24 countries, a vast fraction of scientific articles in the field of high-energy physics will become Open Access at no cost for any author.

In November, CERN launched its Open Data Portal where data from real collision events are for the first time made openly available to all. This was created through a joint venture between the IT and GS Departments, and was developed together with the



At the inauguration of the Proton Synchrotron in 1960:
François de Rose, left, and John Adams. (CERN-HI-6002058)

François de Rose 1910–2014

François de Rose, French Ambassador, President of CERN Council 1957–1960, and subsequently a CERN Council Delegate, passed away on 23 March at the age of 103. The last of CERN's founding fathers, he was a loyal supporter of CERN. After World War II, he rallied to CERN's cause after meeting the great figures of physics, who were convinced that Europe's reconstruction should be driven by the development of its fundamental research tools. From then on, he was a staunch supporter of the Organization he considered to be one of his finest achievements. His passion for CERN's research endured, and he regularly sent messages of congratulation. During a visit in 2010, he promised that he would return to CERN when the so-called Higgs boson was discovered — a promise he kept in 2013.

LHC experiment collaborations. Publishing data openly means that detailed knowledge is shared about the research process and its products, allowing everyone to reuse and reinterpret the data — from citizen scientists to partner projects around the globe. The ALICE, ATLAS, CMS and LHCb collaborations all released data to the public on the portal, predominantly for outreach and training purposes.

Society at large

CERN's commitment to ensuring that the benefits of basic scientific research can reach as wide a part of society as possible finds expression not only in the activities in knowledge and technology transfer but also in the CERN & Society programme, which continued to take shape during 2014. This programme, which is now supported by the CERN & Society Foundation,

serves as a focal point for a range of activities that require third-party funding. These initiatives range from student projects, such as the Beamline for Schools competition (see p. 33) to the ambitious OpenMed concept to develop the Low-Energy Ion Ring as a biomedical research facility. This latter project now comes under the remit of the CERN Medical Applications office (see p. 34), set up at the beginning of 2014 to bring all of the diverse medical-physics activities at CERN together under a single roof. Its budget line is small, but the aim is that it can be the seed for further developments and to establish collaborations with other institutes and centres.