

An aerial photograph of the CERN facility in Switzerland, showing the LHC and other accelerators. The image is overlaid with a large yellow oval and various labels for experiments and accelerators. The background features a vast landscape with green fields, a large lake, and snow-capped mountains under a clear blue sky.

CERN: from a European towards a global project

Rüdiger Voss

SEENET-MTP Meeting, Nis, Serbia, 11 June 2018



Accelerating Science and Innovation



Key facts & figures

Founded 1954:

12 European States: “Science for Peace”

Today: 22 Member States

Member States: Austria, Belgium, Bulgaria, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Israel, Italy, Netherlands, Norway, Poland, Portugal, Romania, Slovak Republic, Spain, Sweden, Switzerland, United Kingdom

Associate Members in the Pre-Stage to Membership: Cyprus, Serbia, Slovenia

Associate Member States: India, Lithuania, Pakistan, Turkey, Ukraine

Applications for Membership or Associate Membership:

Brazil, Croatia

Observers to Council: Japan, Russia, United States of America;

European Union, JINR and UNESCO

~ 2500 staff

~ 1800 other paid personnel

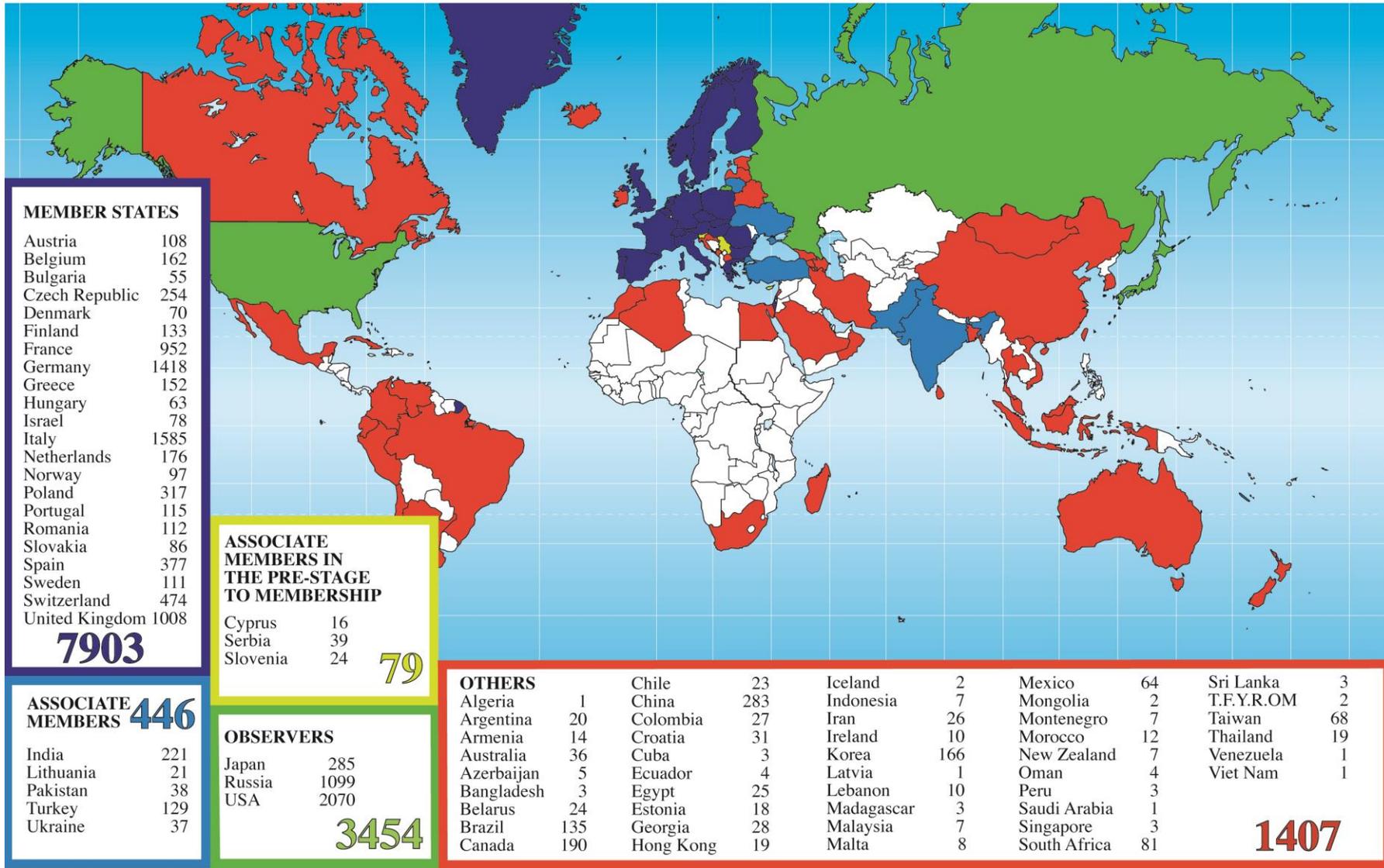
~ 13000 scientific users

Budget (2018) ~ 1100 MCHF



A paradigm of the globalization of science

Distribution of All CERN Users by Location of Institute on 24 January 2018





CERN and non-Member States

- The participation of scientists from non-Member States (NMS) has been stable at $\lesssim 40\%$ for a few years now
- Past & present CERN managements have exercised a policy of 'open doors', with no discrimination between Member States and non-Member States
- Expect this to continue...
- ...but is it sustainable?



The historical perspective

- CERN's policy of free access is rooted in the ICFA policy of *mutual* free access of physicists from different regions to laboratories in other regions
- Policy shaped at a time when
 - three regions provided nearly all globally used facilities (Europe, North America, Japan)
 - the global HEP community was strongly dominated by scientists from the same regions
 - Exchange between different regions was healthy & balanced



The landscape has changed

- The SSC has not happened
- Major facilities in the US have been shut down, or converted to applied science facilities, and have broken the symmetry of exchange between Europe, the US, and Asia
- The LHC has developed into a global endeavour
- New actors have appeared on stage:
 - Asia
 - Latin America
 - Africa



Where do we go from here?

- The LHC has convincingly demonstrated the potential of global partnership in basic science, and is widely perceived as a paradigm of successful, global co-operation on megascience projects
- To take this co-operation to the next-higher level, and to fully exploit its potential to the benefit of all stakeholders, CERN welcomes an enhanced *institutional* participation of its partners, in the framework of its new membership policy (aka 'Geographical Enlargement')



A twofold rationale

- *Catch up*, at a political and institutional level, with the migration of the global particle physics community to the LHC
- *Anticipate* the long-term (i.e. post-LHC) future of CERN
 - LHC experiments are truly *global* projects
 - the LHC accelerator was a 90% European project (~ 10% NMS contribution, mostly in-kind), born under enormous labor pains
 - A funding & governance model that is unlikely to work for a future large facility (FCC, CLIC,)



CERN's new enlargement policy

- For > 50 years, the CERN Council has repeatedly *interpreted* the 1953 Convention as restricting membership to European states
- In response to the strong global participation in the LHC – and in anticipation of the post-LHC era – the Council in 2010 approved the most significant shift in CERN's membership policy thus far, opening CERN fully to non-European states (CERN/2918/Rev.)



Dimensions of enlargement

- Full Membership open to non-European states
 - Israel first non-European Member since 2014
- Associate Membership – membership “light” in two flavours:
 - Pre-stage to full membership: compulsory transition period on the way to full membership (2–5 years)
 - Regular (‘steady state’) Associate Membership
- “Observer” status to be phased out for states



The (wider) Eastern European Region

- Romania: most recent Member State (2016)
- Associate Members in pre-stage to Membership:
 - Cyprus (2016)
 - Serbia (2012, full Membership expected 2019)
 - Slovenia (2017)
- Associate Members:
 - Lithuania (2018)
 - Turkey (2015)
 - Ukraine (2016)
- Application for Associate Member status received from Croatia in 2014



CERN-Serbia Agreement 2012



Signature of Associate Membership Agreement, CERN, January 10, 2012



Former President Boris Tadić visiting the CMS cavern



Looking beyond Europe

- “Regular” Associate Members:
 - India (2017)
 - Pakistan (2015)
- Pending application: Brazil
- In discussion with other countries...
- Most relations with non-European countries regulated by International Cooperation Agreements



Association Agreement with India



Mumbai, 21 November 2016



International Cooperation Agreements

- Instrument of International Co-operation Agreements (ICAs) maintained
 - \approx 50 ICAs currently in force with non-Member States
- Interesting recent example: Palestine! (2015)
- New round of Agreements signed with the US in 2015:
 - New ICA in May
 - Three first-generation “Protocols” in December 2015
 - US Participation in HL-LHC upgrades
 - US Participation in ATLAS & CMS upgrades (ALICE in the pipeline)
 - **CERN participation in LBNP@Fermilab** (“CERN Neutrino Platform”)



CERN-US Agreements 2015



Protocol signature ceremony, CERN, 18 December 2015



ICA signature ceremony, Washington DC, 7 May 2015



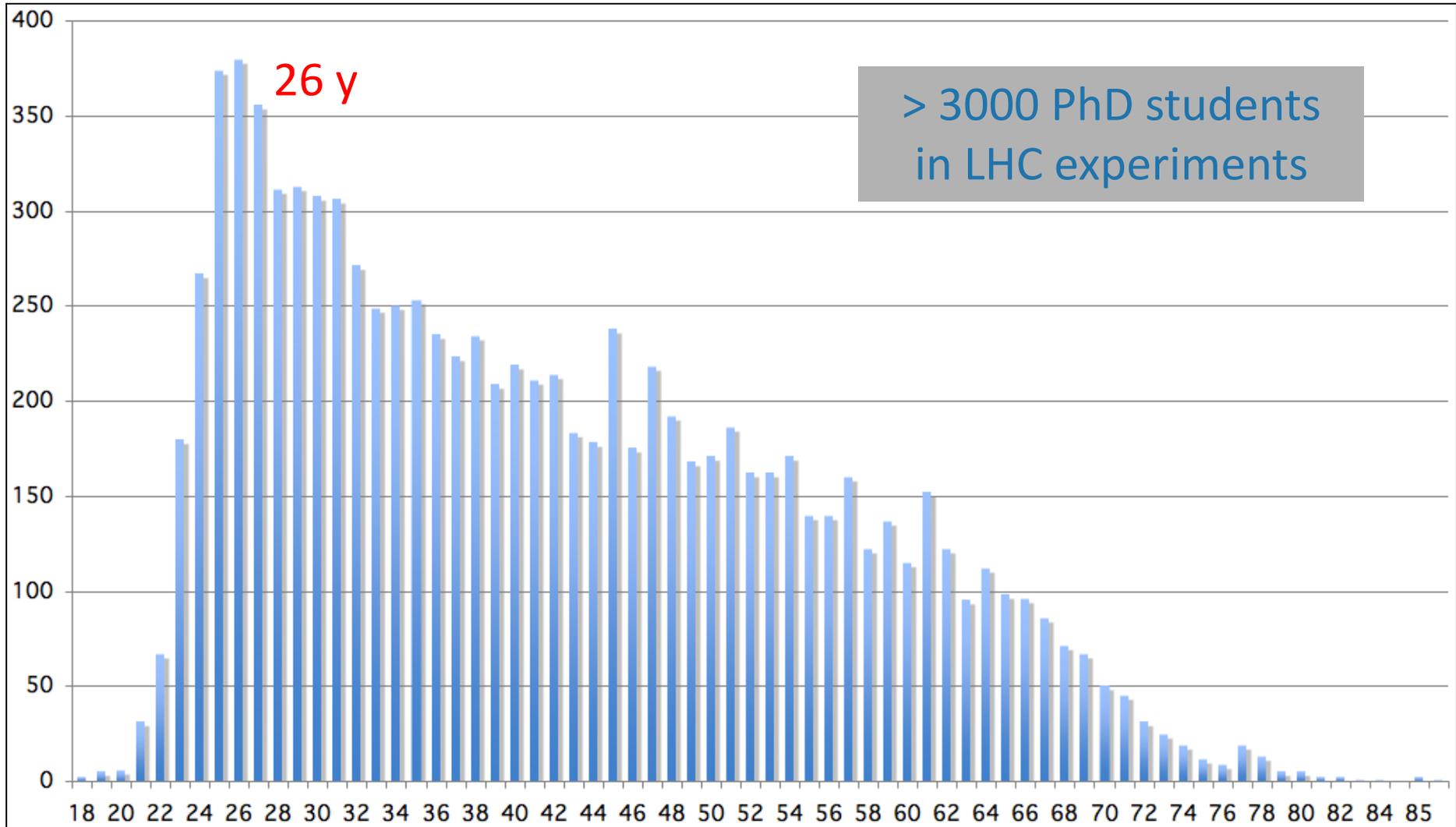
Conclusions

- The partnership between CERN, its Member States and non-Member States in building and operating the LHC has become a solid backbone of a successful scientific and technological collaboration of unprecedented, global dimensions
- CERN wants this partnership to continue, to expand and to flourish, while expanding its institutional base through participation of non-European countries

Reserve

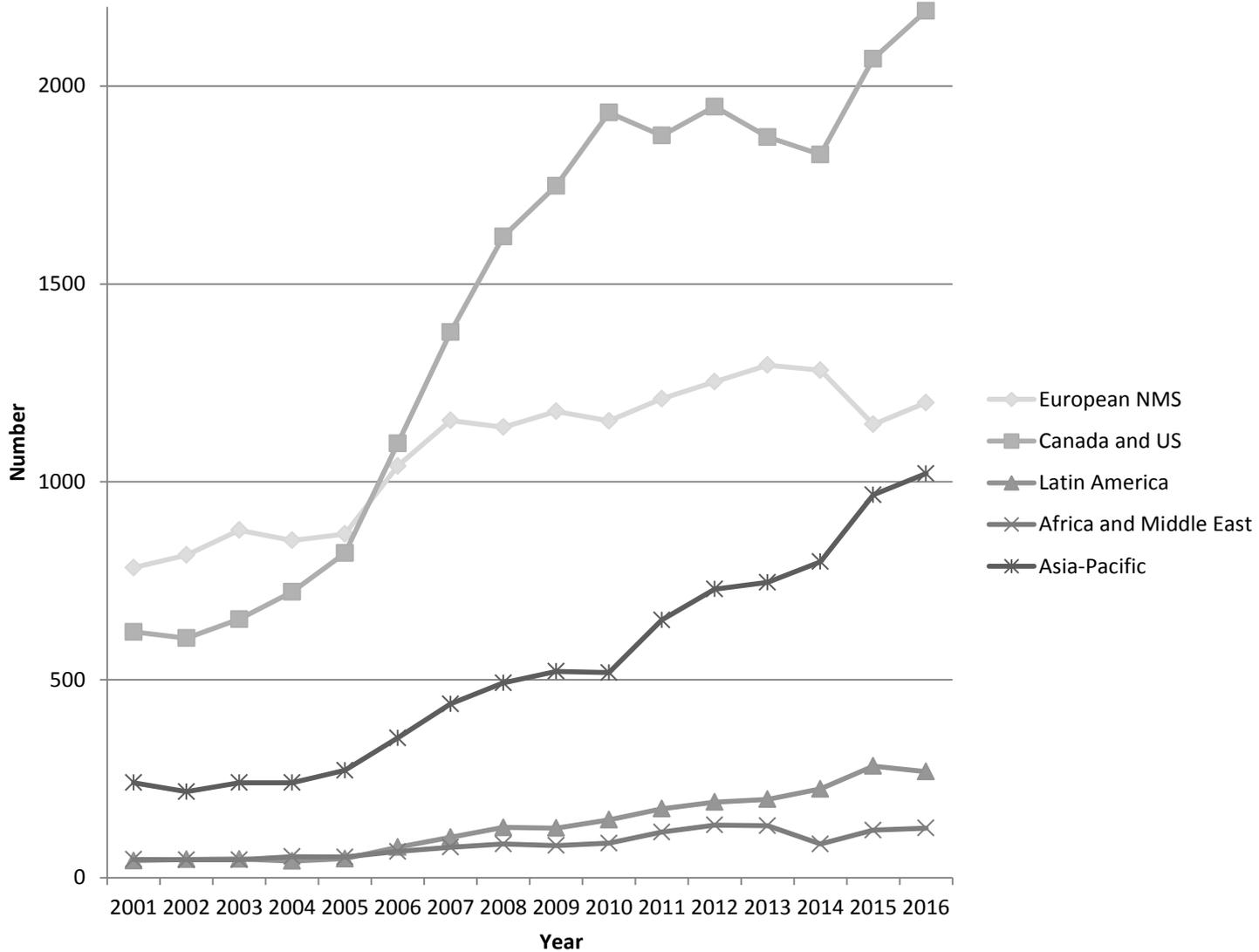


Age distribution of CERN Users



Non-Member State Users

Evolution of Non-Member State Users by region 2001-2016





Where do we stand?

- From a European perspective, the unprecedented Non-Member State participation in the LHC, spearheaded by the US, has brought about substantial scientific, technical *and* political benefits
- Helped to establish CERN firmly as world's leading center at the high energy frontier, in the perception of governments, funding agencies, and of the taxpayer



Towards a global roadmap?

- Three key regional roadmaps:
 - The proposal of the Japanese community to host the ILC
 - The 2013 update of the European Strategy for Particle Physics
 - The P5 report of 2014
- For the first time, these three regions have developed complementary and coherent roadmaps
- CERN's enlargement policy fits seamlessly into the emerging *global* strategy of particle physics



Associate Membership

A simplified view of the 'regular' Associate Membership:

- Obligations
 - Annual contribution to CERN budget corresponding to $\geq 10\%$ of 'theoretical' full Membership contribution (minimum 1 MCHF/year)
- Benefits
 - Participation in CERN governance through representation in CERN Council and subordinate bodies (no voting rights)
 - Access to employment and education programmes (excluding tenured positions)
 - Access to industrial contracts