

# European strategy update

Gerald Eigen, University of Bergen  
Town meeting in Bergen , August 24 2018





# Introduction

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- The first European Strategy was adapted by the CERN Council in 2006 to provide guidance on scientific activities, organizational issues and dissemination of knowledge
- Using the input from the HEP community the European Strategy Group produced a document stating their recommendations, which was ratified by the Council in July 2006
- It was agreed that after approximately every five years an update would be performed, which takes about two years for completion
- The first update was completed May 2013
- Now it is time to start next update to be completed by 2020
- The Strategy Secretariat proposes to broadly follow the steps of the previous two Strategy processes (concluded in 2006 and 2013) which leads to the following timeline considerations:



# 2013 Updated Strategy Statements

- The present strategy was adapted by the CERN Council in Brussels May 30<sup>th</sup>, 2013 and consists of **16** statements:
  - **Two** statements on **General issues**: *necessity of strategy*
  - **Four** statements on **High-priority large-scale scientific activities**
    - *LHC, accelerator R&D, ILC, Neutrino*
  - **Five** more scientific statements on **Other scientific activities essential to the particle physics program**
    - *Theory, Flavor, Detector R&D, Non-accelerator & astroparticle physics experiments, Nuclear Physics*
  - **Two** statements on **Organisational issues**
    - *CERN's role in coordinating European particle physics, Relation with EU*
  - **Three** statements on the **Wider impact of particle physics**
    - *Outreach, Technology Transfer, Education & Training*

**Full document:**



[https://council.web.cern.ch/sites/council.web.cern.ch/files/European\\_Strategy/esc-e-S-103Rev.pdf](https://council.web.cern.ch/sites/council.web.cern.ch/files/European_Strategy/esc-e-S-103Rev.pdf)



# Briefing Book 2013

## ● Energy Frontier

- Accelerators for Exploring the TeV Scale
- Energy Frontier Physics at LHC
- Physics at  $e^+e^-$  Colliders
- Energy Frontier Physics at Other Proposed Facilities

## ● Physics of Flavor & Symmetries

- Quark Flavor Physics
- Charged Lepton Flavor Physics
- Fundamental Symmetries

## ● Neutrino Physics

- Reactor & Atmospheric Neutrino Experiments
- Next Generation Long-Baseline Experiments
- Sterile Neutrinos
- Absolute Neutrino Mass

## ● Strong Interaction Physics

- Parton Densities
- Relativistic Heavy-ion Collisions

## ● Astroparticle & Non-accelerator Physics

- Astroparticle Physics in Europe
- Dark Matter
- Large Underground Detectors
- The High Energy Universe
- Transversal Activities

## ● Particle Physics Theory

- CERN theory unit, relations with EU program and with experiments
- Lattice field theory and development of software packages

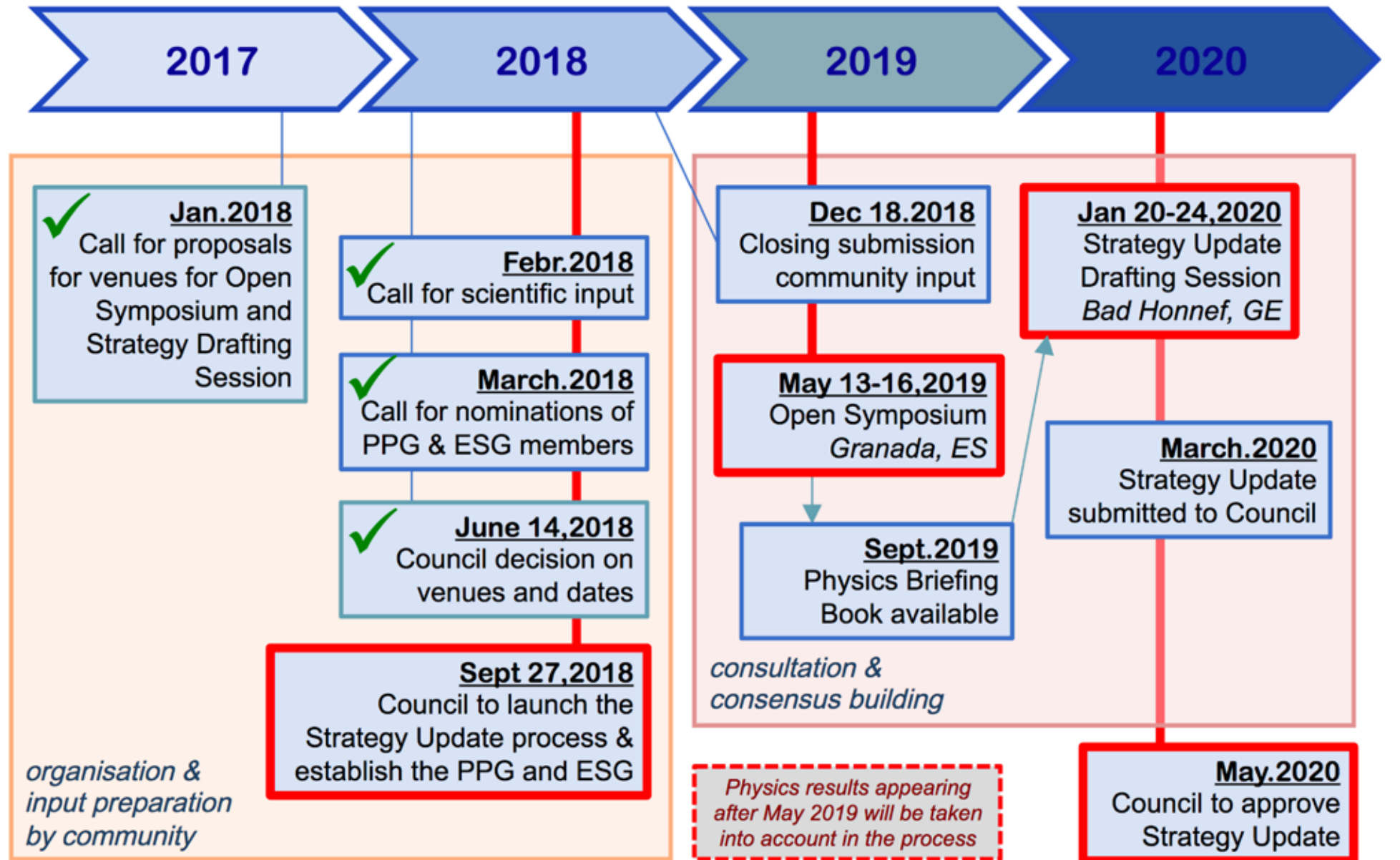
## ● Accelerator Science and Technology

- Energy Frontier Challenges
- Intensity Frontier Challenges
- Accelerator R&D for HEP in Europe

## ● Instrumentation, Computing & Infrastructure

- Detector R&D
- Construction of Large Scale Projects
- Computing for Particle Physics 2020

# Timeline for the 2018-2020 Update Process



# Composition of the European Strategy Group

- Professor H. Abramowicz (Scientific Secretary), professor K. Ellis (SPC chair), professor J. D'Hondt (ECFA chair) and professor L. Rivkin (European Lab Directors' group chair)
- One physicist from the 22 CERN member states
- The CERN DG, president of the Council and former president of the Council
- Invitees from three Associate Member States in pre-stage to membership (Cyprus, Serbia, Slovenia)
- Invitees from five Associate Member States (India, Lithuania, Pakistan, Turkey, Ukraine)
- Invitees from five Observer States (, Japan, Russian Federation, USA)
- EU representatives
- ApPEC chair
- FALC chair
- ESFRI chair
- NuPECC chair



# Composition of the Physics Preparatory Group

- The Strategy Secretary (acting as Chair): [Professor H. Abramowicz](#)
- Four members appointed by the Council on the recommendation of the SPC
- Four members appointed by the Council on the recommendation of ECFA  
[Stan Bentvelsen](#) (NIKHEF), [Paris Sphicas](#) (AThens), [Marco Zito](#) (Saclay), [Antonio Zoccoli](#) (Bologna) → responsible for organizing open meeting and deliver Physics Briefing Book to ESG
- The SPC Chair: [Professor K. Ellis](#)
- The ECFA Chair: [Professor J. D'Hondt](#)
- The Chair of the European Laboratory Directors' group: [Professor L. Rivkin](#)
- One representative appointed by CERN
- One representative from Asia appointed by the respective regional representatives in ICFA
- One representative from the Americas appointed by the respective regional representatives in ICFA.

# Agenda Items

- The agenda has 10 projects
- Maybe there are new activities I was not aware of
- If so, I apologize; this is no problem, as they can be included in the report

11:00	→ 11:20	<b>European Strategy Schedule and Logistics</b> Speaker: Gerald Eigen (University of Bergen (NO))	🕒 20m	📝
11:20	→ 11:30	<b>ATLAS Physics plans till 2025</b> Speaker: Farid Ould-Saada (University of Oslo (NO))	🕒 10m	📝
11:30	→ 11:40	<b>ALICE Physics plans till 2025</b> Speaker: Dieter Roehrich (University of Bergen (NO))	🕒 10m	📝
11:40	→ 11:50	<b>Accelerator Physics plans till 2025</b> Speaker: Steinar Stapnes (CERN)	🕒 10m	📝
11:50	→ 12:00	<b>Detector R&amp;D plans till 2025</b> † Speaker: Bjarne Stugu (University of Bergen (NO))	🕒 10m	📝
12:00	→ 12:10	<b>ILC plans</b> Speaker: Gerald Eigen (University of Bergen (NO))	🕒 10m	📝
12:10	→ 12:20	<b>Astroparticle physics plans till 2025</b> Speaker: Alexander Lincoln Read (University of Oslo (NO))	🕒 10m	📝
12:20	→ 12:30	<b>Theory plans till 2025</b> Speaker: Prof. Joern Kersten (University of Bergen)	🕒 10m	📝
12:30	→ 12:40	<b>Nuclear Physics plans till 2025</b> Speaker: Gry Merete Tveten (University of Oslo)	🕒 10m	📝
12:40	→ 12:50	<b>Computing plans till 2025</b> Speaker: David Cameron (University of Oslo (NO))	🕒 10m	📝
12:50	→ 13:00	<b>Electronics plans till 2025</b> Speaker: Kjetil Ullaland (University of Bergen (NO))	🕒 10m	📝
13:00	→ 14:00	<b>lunch break</b>	🕒 1h	
14:00	→ 16:00	<b>Discussion of 10 Page European Strategy Document</b>	🕒 2h	📝





# 10 Page Document

- We have to write a ~10 page report and submit it to the European Strategy Group by December 18, 2018
  - Example: German groups
    - <http://www.ketweb.de/e199632/e199635/e268373/e296589/Abschlusserklaerung.pdf>
- On the next slide, I made a possible draft that we have to discuss after lunch
- The lengths I allocated are approximate; we have to tune them but the total length should not exceed 10 pages
- I have assigned two authors for each topic except for the introduction and conclusion
- Eivind and I will serve as editors
- We will use LaTeX to write the document and Overleaf to coordinate the writing (I will set this up)
- All colleagues involved are asked to review the document
- We will spend most of the discussion period to finalize the organization of writing the 10-page document

# Proposal for the Layout of 10-Page Document

● Introduction	0.75 pages	Eivind, Alex
● ATLAS physics plans	1.25 pages	Farid, Anna
● ILC plans	0.75 pages	Gerald, Steinar
● Astroparticle physics plans	0.75 pages	Alex, Heidi
● Theory plans	0,75 pages	Jörn, Are
● ALICE physics plans	1 page	Dieter, Joachim
● Nuclear physics plans	0,75 pages	Gry, Andreas
● Accelerator physics plans	0,75 pages	Erik, Steinar
● Detector R&D plans	1.25 page	Bjarne, Gerald
● Electronics plans	0,5 pages	Kjetil, Dieter
● Computing plans	0,75 pages	David, Farid
● Outreach	0,25 pages	Farid, xx ???
● Conclusion	0.5 pages	Eivind, Gerald, Steinar



# Our Next Steps

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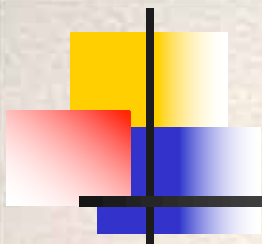
- August 24, Town meeting: organize writing of 10 page document,  
discuss layout, assign authors  
editor: Eivind & Gerald  
internal review: all involved
- October 19, First draft of report, have meeting on Vidyo to discuss draft
- November 16, Final draft of report,
- November 30, Finish internal review of report,
- December 7, Complete changes
- December 14, Final reading and submission



# Discussion Items

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- Is there any project that is missing and should be included?
- Should we have a section on outreach? I think this does not belong into this document. Outreach activities are obvious and apply to each project. Funding does not depend on that
- Discuss relevance and directions of individual projects
- Is the author assignment ok?
- Is the length allocation of each section ok?
- Is the timeline for completing the document ok?
- Can we set a date for the next Vidyo meeting?
- Any other type of business?



# Backup

# Slides



# High-Priority Large-Scale Scientific Activities

- The discovery of the Higgs boson is the start of a major program of work to measure this particle's properties with the highest possible precision for testing the validity of the Standard Model and to search for further new physics at the energy frontier. The LHC is in a unique position to pursue this program. Europe's top priority should be the exploitation of the full potential of the LHC, including the high-luminosity upgrade of the machine and detectors with a view to collecting ten times more data than in the initial design, by around 2030. This upgrade program will also provide further exciting opportunities for the study of flavor physics and the quark--gluon plasma.
- To stay at the forefront of particle physics, Europe needs to be in a position to propose an ambitious post-LHC accelerator project at CERN by the time of the next Strategy update, when physics results from the LHC running at 14 TeV will be available. CERN should undertake design studies for accelerator projects in a global context, with emphasis on proton-proton and electron-positron high-energy frontier machines. These design studies should be coupled to a vigorous accelerator R&D program, including high-field magnets and high-gradient accelerating structures, in collaboration with national institutes, laboratories and universities worldwide.

# High-Priority Large-Scale Scientific Activities

(cont.)

- There is a strong scientific case for an electron-positron collider, complementary to the LHC, that can study the properties of the Higgs boson and other particles with unprecedented precision and whose energy can be upgraded. The Technical Design Report of the International Linear Collider (ILC) has been completed, with large European participation. The initiative from the Japanese particle physics community to host the ILC in Japan is most welcome, and European groups are eager to participate. Europe looks forward to a proposal from Japan to discuss a possible participation.
- Rapid progress in neutrino oscillation physics, with significant European involvement, has established a strong scientific case for a long-baseline neutrino program exploring CP violation and the mass hierarchy in the neutrino sector. CERN should develop a neutrino program to pave the way for a substantial European role in future long-baseline experiments. Europe should explore the possibility of major participation in leading long-baseline neutrino projects in the US and Japan.



# PREPARATORY GROUP (ESG-PG) in 2012

- The PPG had 16 members in 2011-2013 update process

<b>MEMBERS</b>	
<i>Strategy Secretariat Members</i>	
Scientific Secretary (Chair)	Prof. T. Nakada
Scientific Secretary Assistant	Dr E. Tsesmelis
SPC Chair	Prof. F. Zwirner
ECFA Chair	Prof. M. Krammer
EU Lab. Directors' Representative	Dr Ph. Chomaz
<b>SPC</b>	
Prof. R. Aleksan (FR)	
Prof. P. Braun-Munzinger (DE)	
Prof. M. Diemoz (IT)	
Prof. D. Wark (UK)	
<b>ECFA</b>	
Prof. C. De Clercq (BE)	
Prof. K. Desch (DE)	
Prof. K. Huitu (FIN)	
Prof. A.F. Zarnecki (PL)	
<b>CERN</b>	
Dr P. Jenni	
<b>ASIA/Americas</b>	
Prof. Yoshitaka Kuno (Asia)	
Prof. Patricia McBride (Americas)	



# EUROPEAN STRATEGY GROUP in 2012

- ESG had 51 members for the 2011-2013 update process

MEMBERS	NAME
<b>Member States</b>	
Austria	Prof. A. H. Hoang
Belgium	Prof. W. Van Doninck
Bulgaria	Prof. L. Litov
Czech Republic	Prof. J. Chyla
Denmark	Prof. J.J. Gaardhøje
Finland	Prof. P. Eerola
France	Prof. E. Augé (until 11.2012) Prof. J. Martino (from 12.2012)
Germany	Prof. S. Bethke
Greece	Prof. P. Rapidis
Hungary	Prof. P. Levai
Italy	Prof. F. Ferroni
Netherlands	Prof. S. De Jong
Norway	Prof. A. Read
Poland	Prof. A. Zalewska (until 12.2012) Prof. J. Krolikowski (from 1.2013)
Portugal	Prof. G. Barreira
Slovakia	Dr L. Sandor
Spain	Prof. F. del Aguila
Sweden	Prof. B. Asman
Switzerland	Prof. K. Kirch
UK	Prof. J. Butterworth
<b>DG CERN</b>	Prof. R. Heuer
<b>Invited:</b>	
Former President of Council	Prof. M. Spiro
President of Council	Prof. A. Zalewska

<b>Major European Nat. Labs</b>	
CIEMAT	Dr M. Cerrada
DESY	Prof. J. Mnich
IRFU	Dr Ph. Chomaz
LAL	Dr A. Stocchi
NIKHEF	Prof. F. Linde
LNF	Dr U. Dosselli
LNGS	Prof. S. Ragazzi
PSI	Prof. L. Rivkin
STFC-RAL	Dr J. Womersley
<b>Strategy Secretariat Members</b>	
Scientific Secretary (Chair)	Prof. T. Nakada
SPC Chair	Prof. F. Zwirner
ECFA Chair	Prof. M. Krammer
EU Lab. Directors' Representative	Dr Ph. Chomaz
Scientific Secretary Assistant	Dr E. Tsismelis

INVITEES	NAME
<b>Candidate for Accession</b>	
Romania	Dr S. Dita
<b>Associate Member State</b>	
Israel	Prof. E. Rabinovici
Serbia	H.E. Amb. U.Zvekie
<b>Observer States</b>	
India	Prof. T. Aziz
Japan	Prof. Sh. Asai
Russian Federation	Prof. A. Bondar
Turkey	Prof. Dr M. Zeyrek
United States	Prof. M. Shochet
<b>Other Invitees</b>	
EU	Dr R. Lečbychová
ApPEC	Dr S. Katsanevas
Chairman FALC	Prof. Y. Okada
Chairman ESFRI	Dr B. Vierkorn-Rudolph
Chairman NuPECC	Prof. A. Bracco
JINR, Dubna	Prof. V. Matveev

# European HEP Structure since 2006

