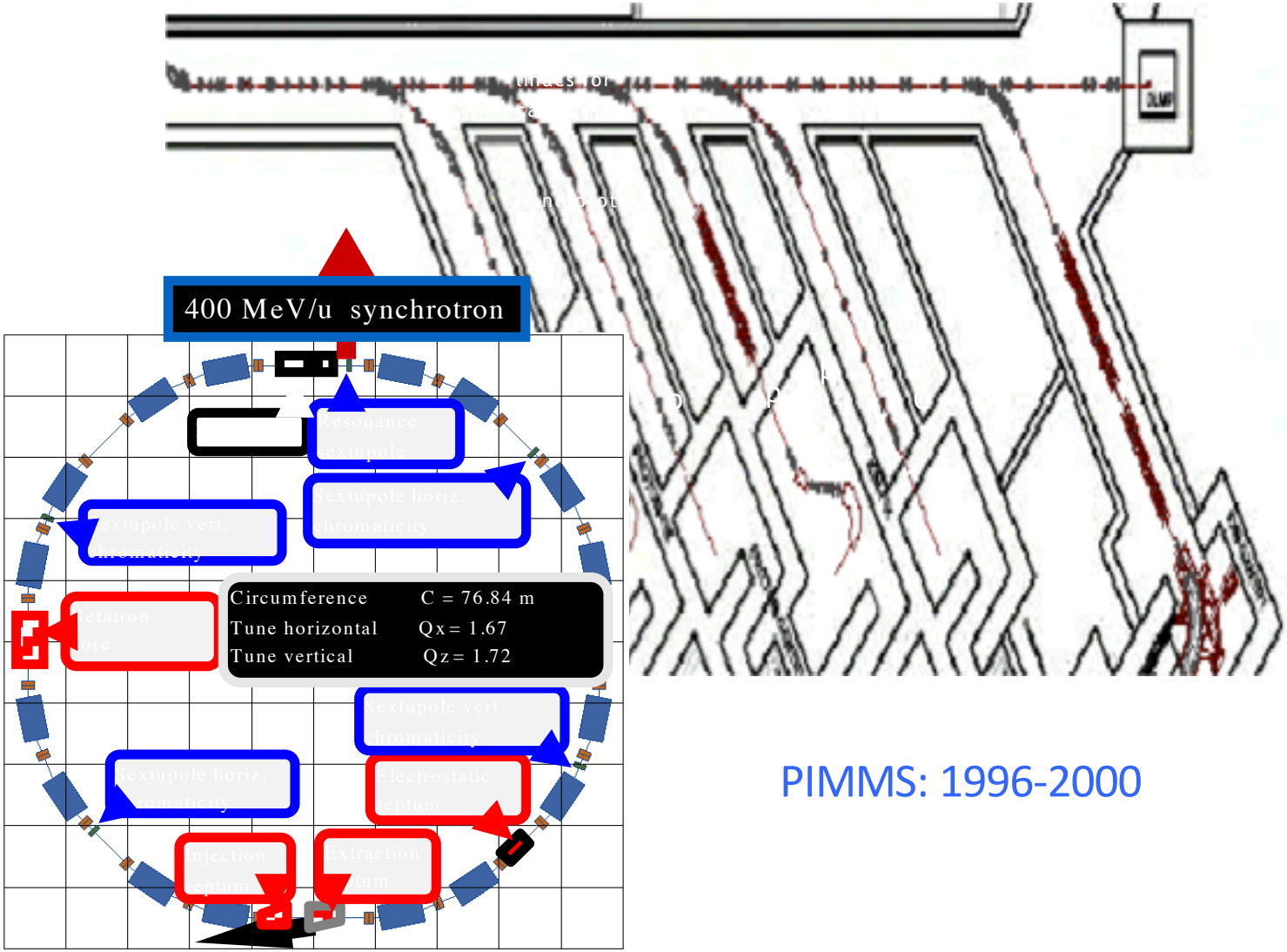
Workshop
Location Archamps, France
Venue: European Scientific Institute (ESI)
Dates: 19-21 June 2018

ENLIGHT and Hadron Therapy

Manjit Dosanjh

CERN

PIMMS Study - trigger for ENLIGHT



PIMMS: 1996-2000

ESTRO Hadron Therapy Group: 2000

- In 2000 PIMMS study was presented in Vienna. After this the ESTRO HT group was proposed for creating a **joint platform** covering the different aspects of hadron therapy for the different projects in Europe which should lead to a closer **European cooperation…**
- ESTRO HT Group met on the occasion of Med AUSTRON international advisory board meeting in 2001 and the idea was born.

Jean-Pierre Gerard (President of ESTRO) & Germaine Heeren (ESTRO) were key

2001

The beginnings of ENLIGHT

- The idea germinated in 2001 after ESTRO- Med-AUSTRON meeting
- In October 2001 the proposal for a Thematic Network was submitted to EC
- ENLIGHT was launched In February 2002 at CERN
- Funded: 1 million Euros in 2002

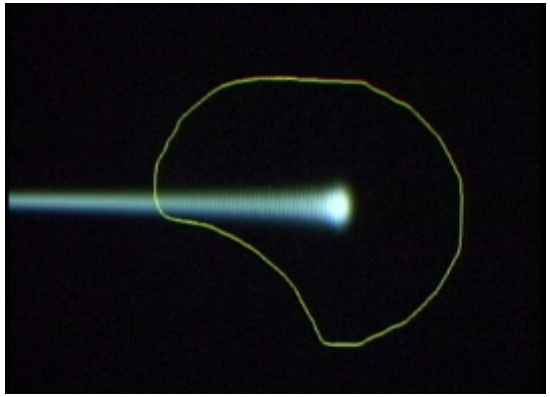
Driving Force:
Ugo Amaldi
Jean Pierre Gerard
Germane Heeren

Organisation:
Hans Hoffmann
Manjit Dosanjh

Manjit Dosanjh, 19 June 2018

European Network for Light Ion Hadron Therapy

- Create common **multidisciplinary platform**
- Cancer treatment
- Identify **challenges**
- Share **knowledge**
- Share best practices
- Harmonise data
- Provide **training**, education
- Innovate to improve
- Lobbying for funding



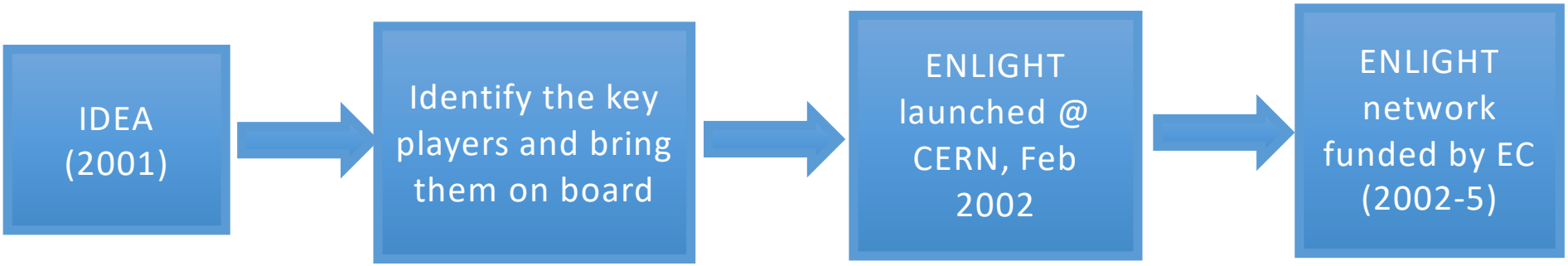
Leveraging Physics collaboration philosophy into a multidisciplinary medical environment

Challenges for the network then…

Multidisciplinary and cutting-edge technologies activity and a heterogeneous group:

- Clinical/Epidemiology Studies
- Radiobiology
- Treatment planning for Particle Therapy
- Adaptive ion therapy and moving organs
- Novel imaging PET/other detector systems
- Study for compact gantry designs
- Cheaper, compact facilities
- Many partners. How to collaborate effectively and make progress with the key objectives? Differing needs and interests of the groups
- How to balance between basic research and the clinical needs?

Build a collaborative multidisciplinary network



European Network for Light Ion Hadron Therapy

Since 2005, no more EC funds for the ENLIGHT but the collaboration continued at the request of the partners

ENLIGHT++

From **2006** it became

+More than a **network**…research

+More countries, more institutions

- The community decided to **continue without funding but**
  - Develop strategies for securing the funding for specific projects under the umbrella of ENLIGHT, along two major axes
    - **Research** in areas needed for highly effective hadron therapy
    - **Networking,** to establish and implement common standards and protocols for treating patients

COST networking proposal (lead by UA)

- We did not get our network project funded
- But COST funded a workshop @CERN in 2007
- Resulted in the Marie Curie PARTNER being prepared and submitted: the meeting finished on Friday and the proposal submitted on Monday
- Largest Marie Curie with highest score
- Lobbying and text for ENVISION and ULICE in FP7

EU funded projects

PARTNER

2008-2012

- Marie Curie Initial Training Network
- 12 institutions
- 29 trainees

ULICE

2009-2013

- Infrastructures for hadron therapy
- 20 institutions

ENVISION

2010-2014

- R&D on medical imaging for hadron therapy
- 16 institutions

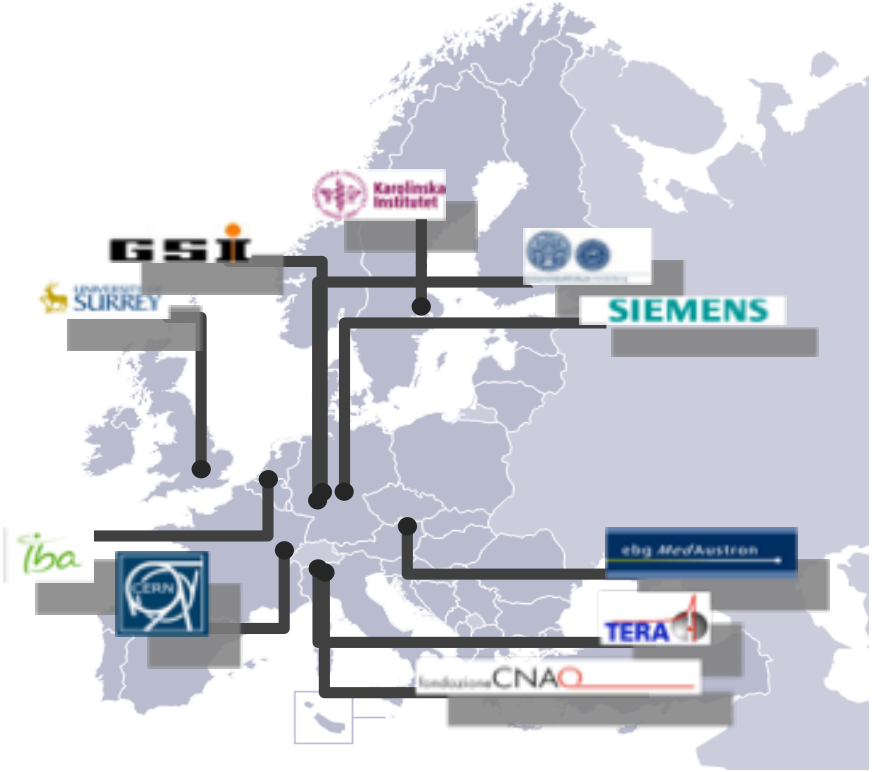
ENTERVISION

2011-2015

- Marie Curie ITN
- 12 institutions
- 16 trainees

PARTNER – a success story

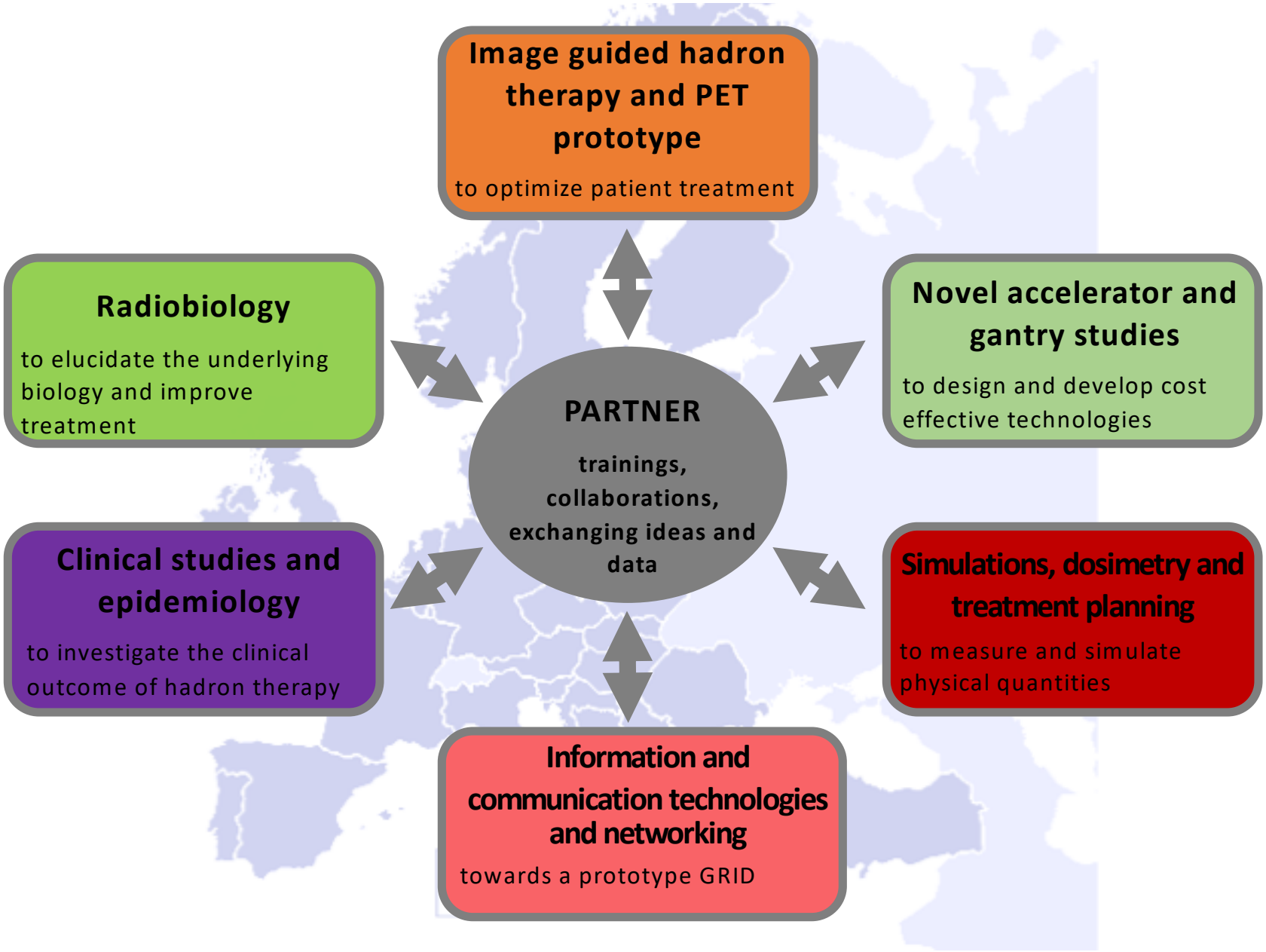
- Particle Training Network for European Hadrontherapy
- 10 academic institutes, research centres, 2 leading companies
- 29 young researchers



Outcome :

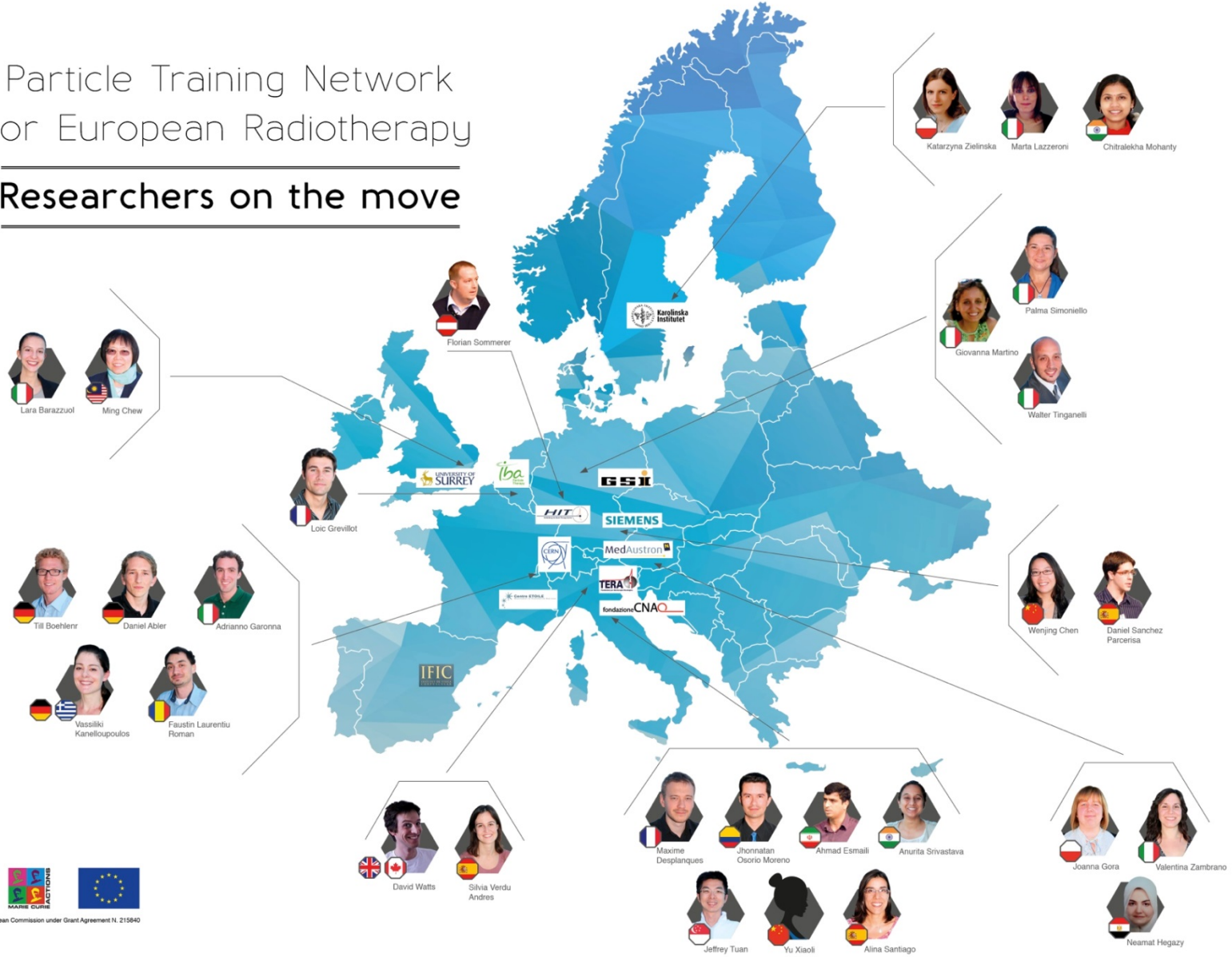
- Now working around the World
- 7 at MedAustron
- Open access PARTNER-JRR

PARTNER research areas



Particle Training Network for European Radiotherapy

Researchers on the move



PARTNER

MARIE CURIE ACTIONS

PARTNER is funded by the European Commission under Grant Agreement N. 215840

Union of Light Ion Centre in Europe

ULICE

- Transnational access to beam time at HIT and CNAO successfully implemented
- Joint research activities: New gantry design being finalized
- Training courses at HIT and CNAO
  - For physicians and physicists already working in hadron therapy
  - For physicians, physicists, biologists who want beam time for their experiments

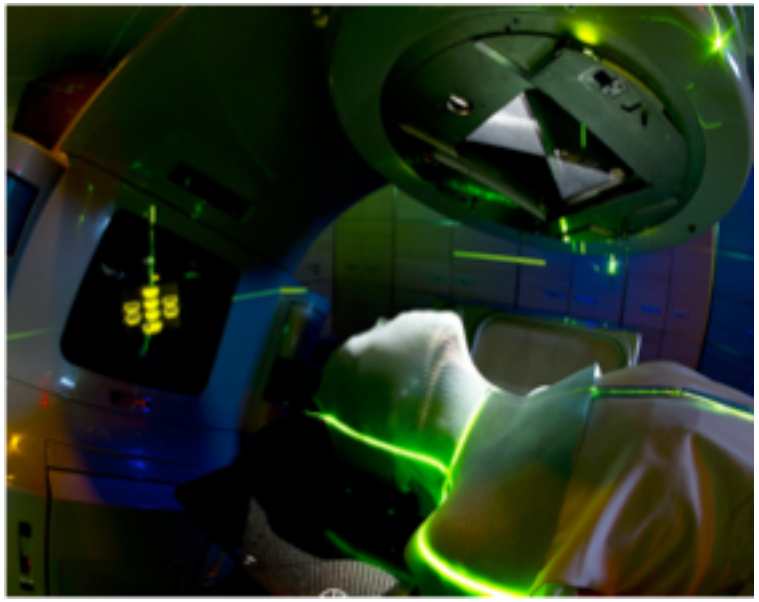
ENVISION

European Novel Imaging Systems for Ion Therapy

Accurate positioning is a crucial challenge for targeting moving organs during particle treatment

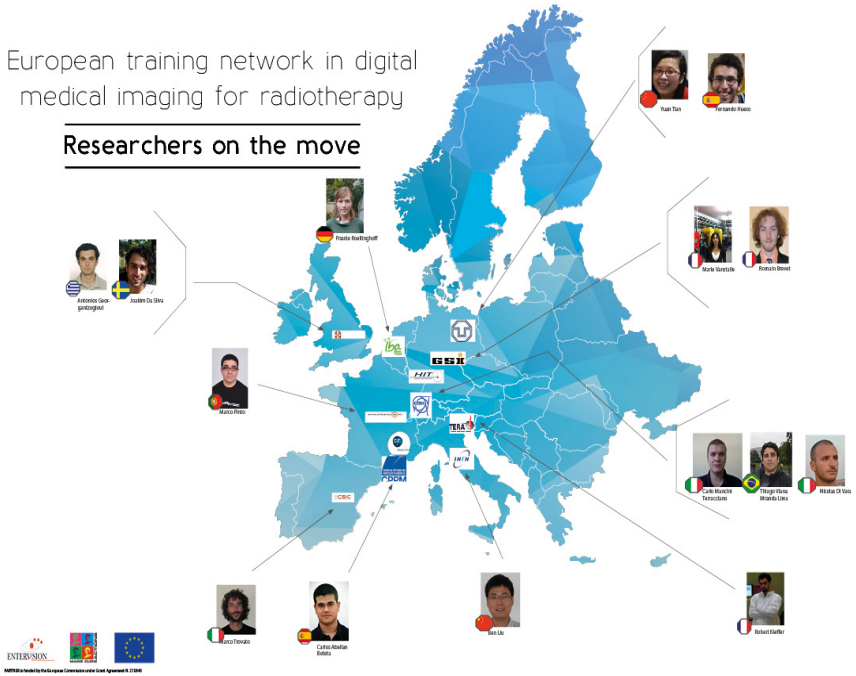
- 4-year EU funded project: Budget 6M euros
- launched in February 2010
- 16 leading European research centres and industrial partners, coordinated by CERN

- R&D in real-time medical imaging for more precise and effective particle therapy
  - 2 demonstrators for real time imaging have been constructed and are being tested
  - > 100 scientific publications and 80 conference talks/posters



ENTERVISION

- Training Network for medical imaging
- 10 academic institutes, research centres, IBA leader PT
- 12 Early Stage Researchers
- 3 Experienced Researchers



Outcome :

- 11 PhDs
- Over 30 posters, 50 oral presentations and 35 publications
- Patent for prompt gamma camera
- Frontiers in Oncology: Special Issue with 11 articles written by Entervision researchers in an open-access journal

http://journal.frontiersin.org/researchtopic/3520/charged-particles-in-oncology

Krakow Meeting 2015: was time for reflection

Much had changed since 2002: many centres, community was established, more than 600 members for over 20 countries, much had been done…

- Did we still need **ENLIGHT**?
- If yes, what sort of **ENLIGHT** did we need?

ENLIGHT

Facilities in operation then – Europe (2002)

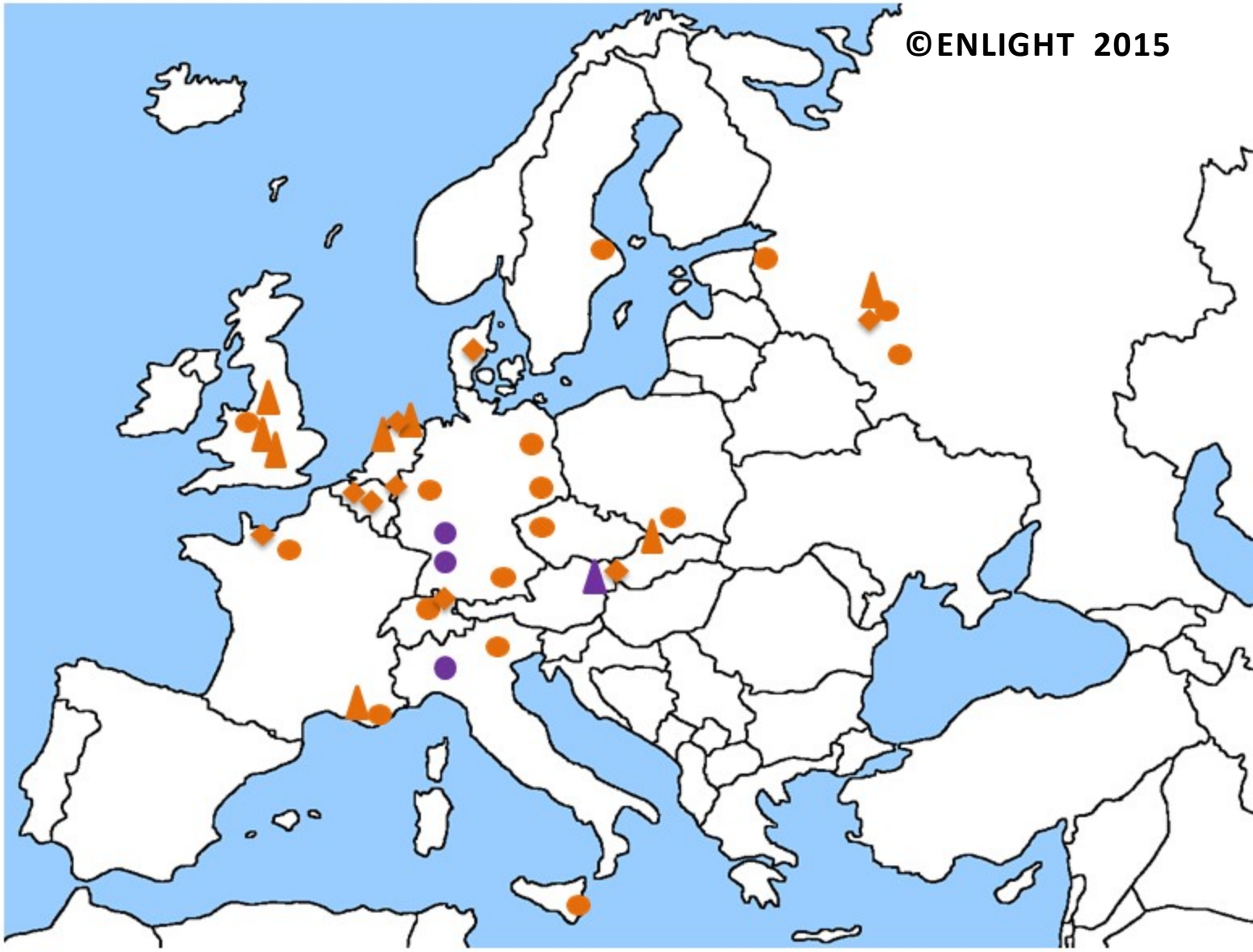
P centres

C-ion centres

Dual-ion centres

Source: PTCOG

Particle therapy centres in Europe - 2015



In operation:

- Proton
- Dual Ion

Under construction:

- Proton
- Dual Ion

Being planned:

- Proton
- Dual Ion

Source: PTCOG, October 2015 and ENLIGHT

Krakow Meeting 2015 a turning point… new challenges

- Establish the ENLIGHT network as a **non-profit network/foundation** to make it sustainable since it is considered an important instrument and needs to be maintained

- Establish an Scientific Advisory Committee

- Play a key role in the education of the **young generation** in this rapidly growing field of particle therapy

- Help to fully exploit the **advantage of hadron therapy**: more research, better tools, clinical trials, extend collaboration

- Advise **partners** who want to have access to HT

ENLIGHT Advisory Committee

CERN

CERN & Society

www.cern.ch/giving

ENLIGHT Training

Training young people and preparing skilled experts in particle therapy

Why?

Society's need for qualified, competent experts in hadron therapy - Cancer patients' need to readily access this treatment - Practitioners' need for high-level training in hadron therapy

Who?

Research students on particle physics globally - Cancer patients worldwide

How?

1-week Introductory Training at CERN, 2-day Advanced Training at ENLIGHT Annual Meeting, 3-4 weeks hands-on Internship

Impact

30 students attending the Introductory Training

80 participants taking part to the Advanced Training

3 researchers completing a hands-on Internship

15 THINGS in 15 YEARS!

700 members from all continents

25+ countries

15 annual meetings (free and open)

50 trainin[illegible]es

5 EU projects

45 Marie Curi[illegible]ers

2 dedicated issues in open-a[illegible]urnals

200+ journal publications

500+ posters and [illegible]nces

4 Physics for Health conferences

10+ vid[illegible] animations

10 ENLIGHT Highlights

2 [illegible]opean Researchers' Nights

50 outreach articles/news

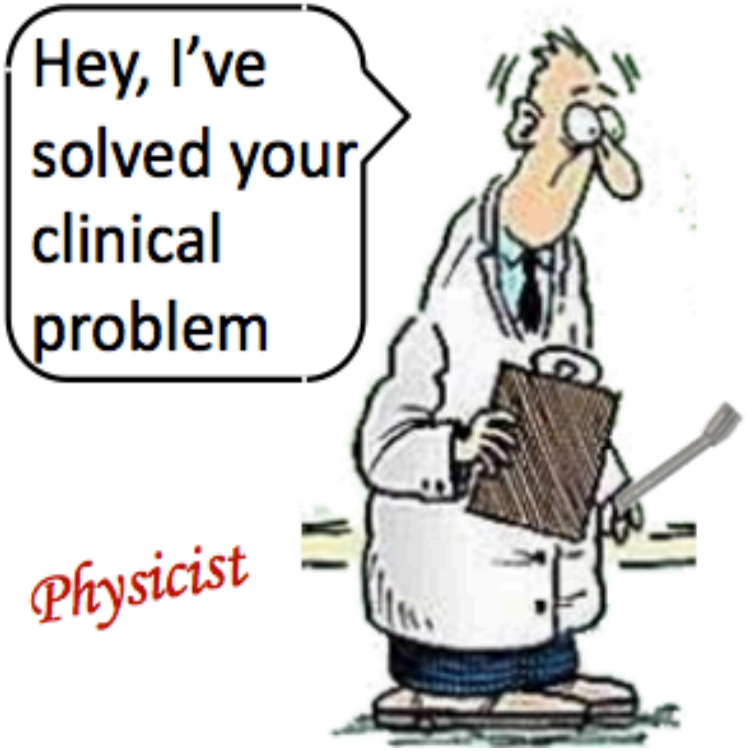
One global multidisciplinary network

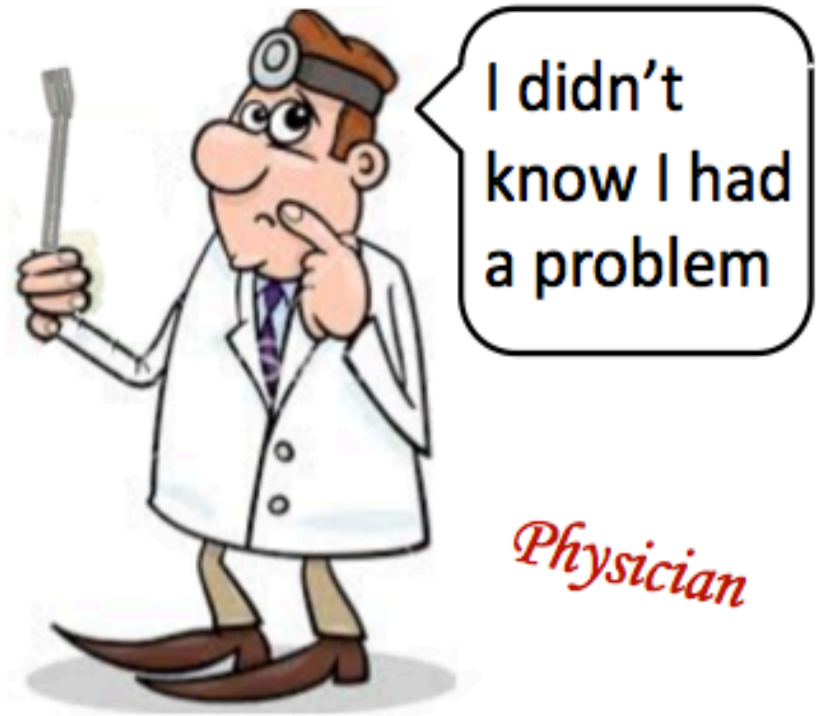
ENLIGHT

- Annual meeting, open, free
- Latest developments in the field
- Oral presentation for winning posters
- Networking
- Collaboration
- Sharing and building bridges
- Raising awareness at international level
- Special session dedicated to training
- Biannual Magazine – Highlights

www.cern.ch/enlight

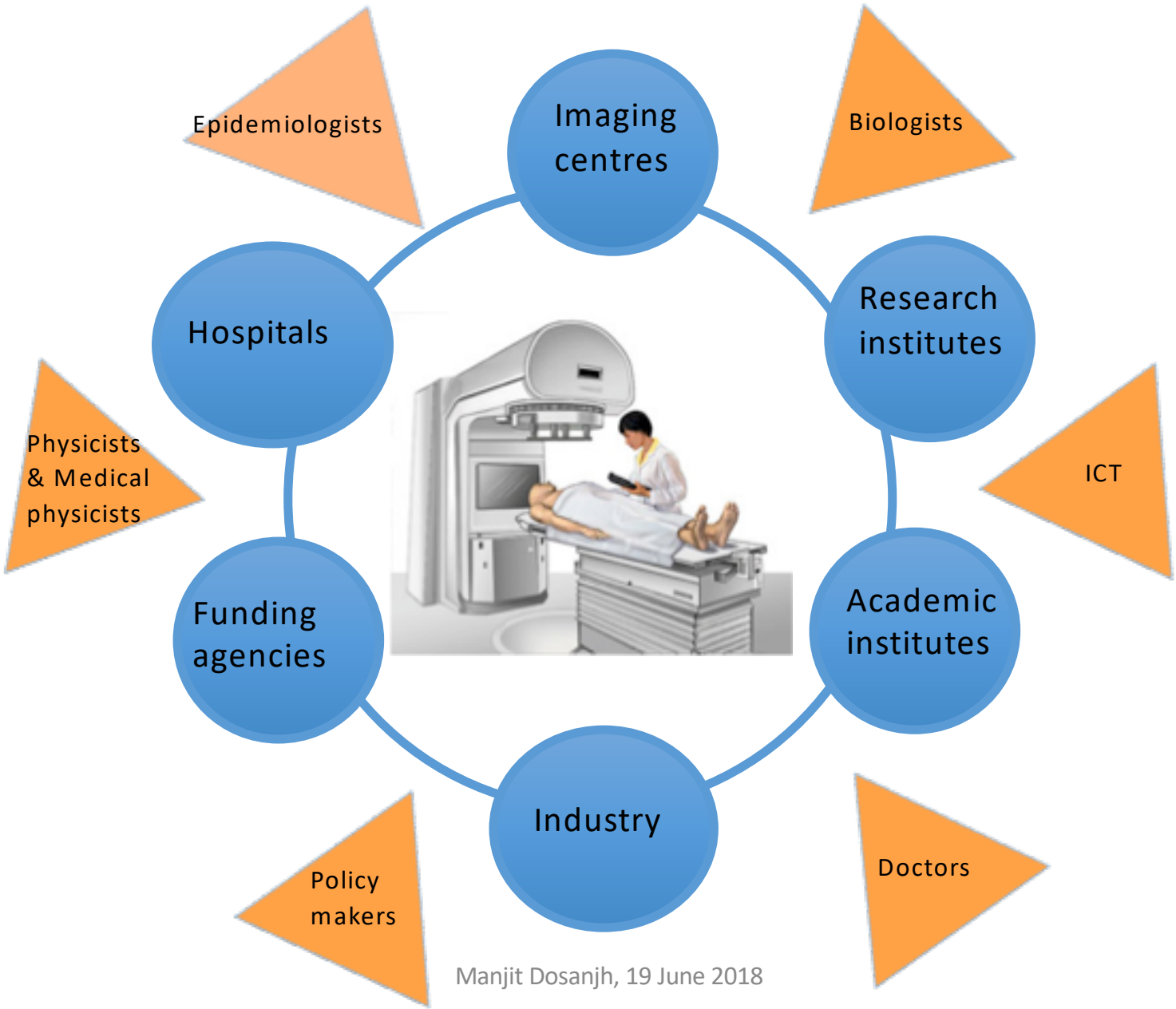
collaboration and dialogue…

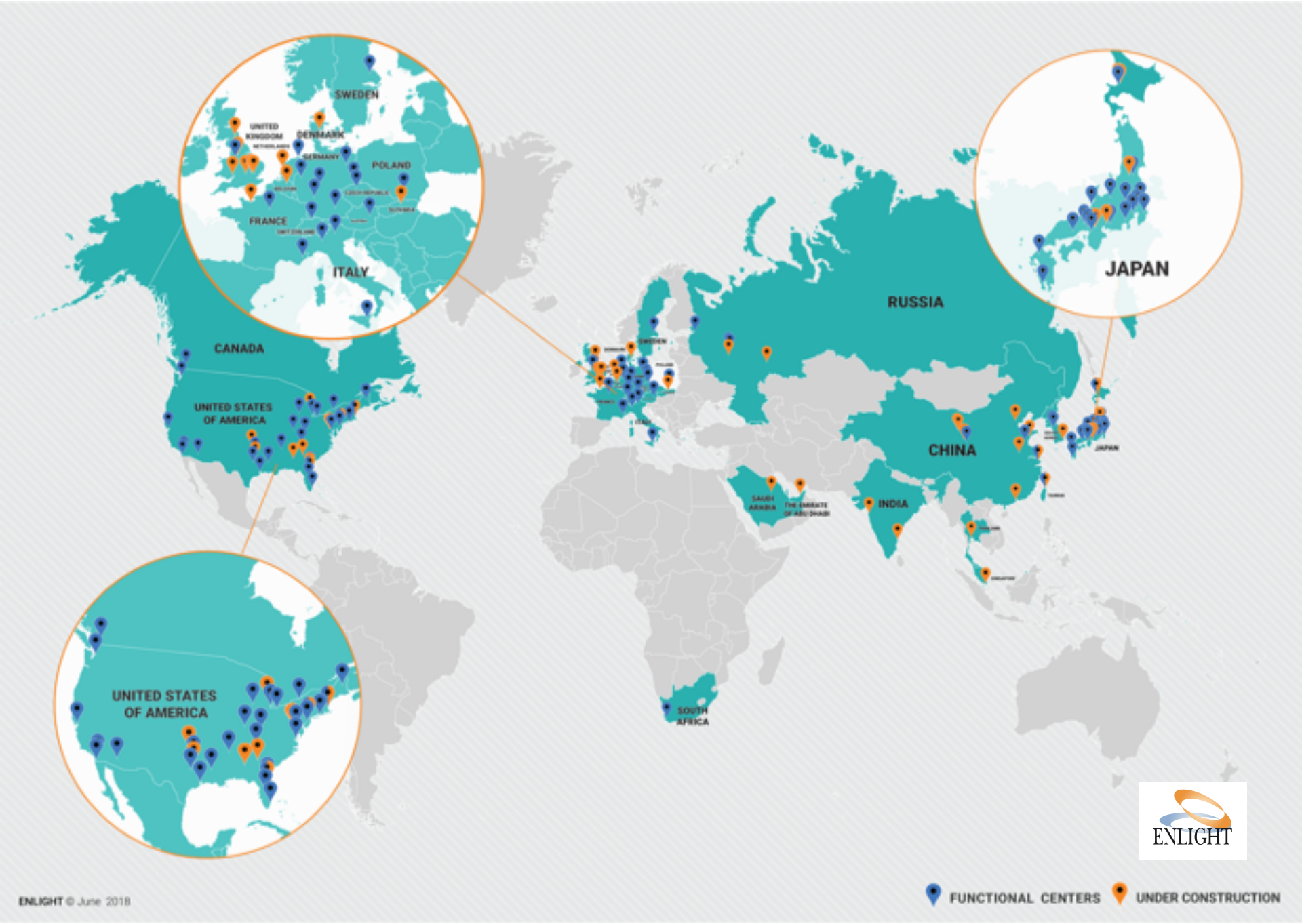




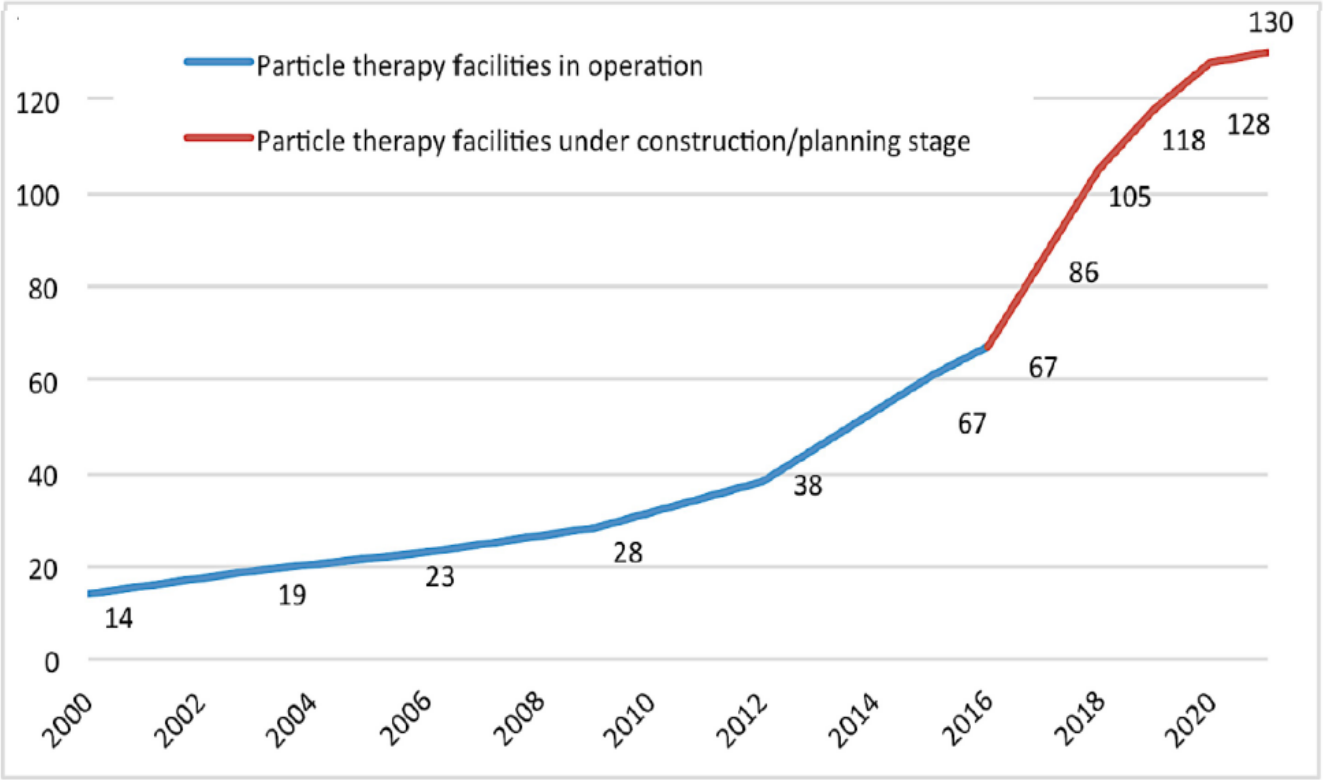
Courtesy D. Townsend

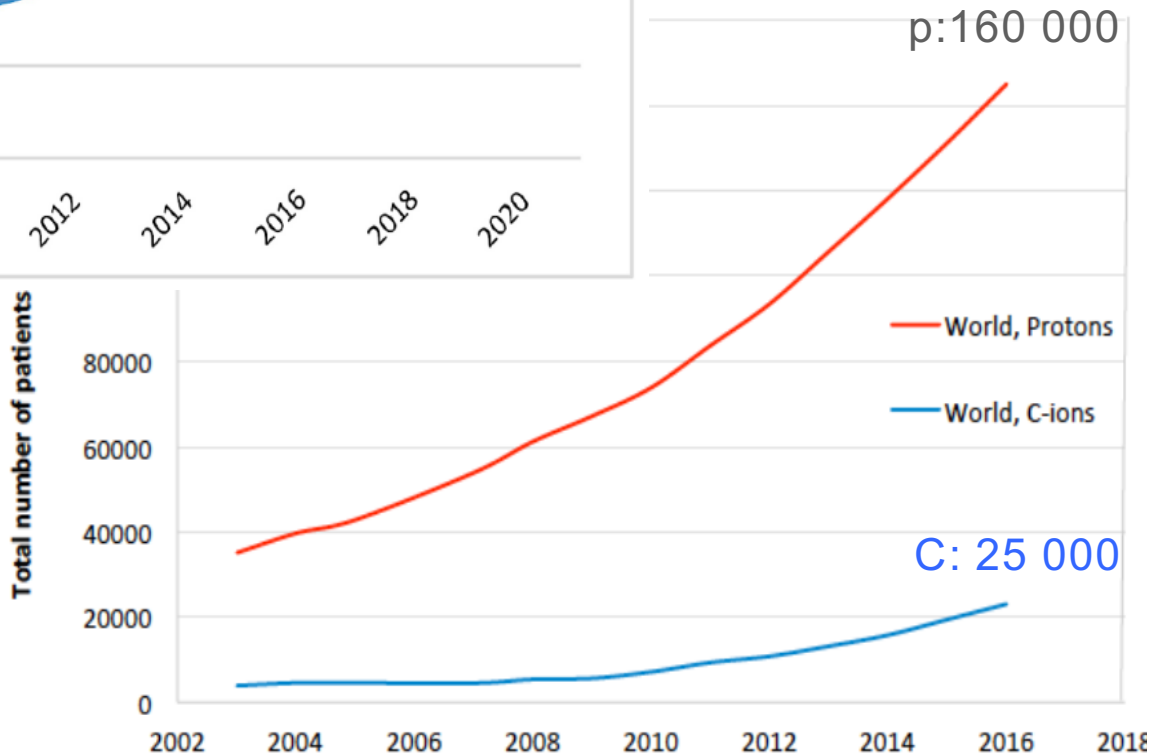
ENLIGHT is a open collaborative network





Momentum: Centres and patients worldwide





Challenges for future…

Still multidisciplinary and cutting-edge technologies + new challenges

- Clinical **trials**
- Optimisation of the present facilities to **increase patient output**
- **Cheaper/compact facilities** easier to run, cheaper treatment
- **Help** countries interested in HT: e.g. Balkan project, COST lead by Balkans but in close collaboration with ENLIGHT
- **Collaboration** outside of Europe: USA, Australia, India etc.
- **Heterogeneous** network: differing needs and interests
- How to balance between basic **research a**nd the clinical **needs?**
- Many partners. How to collaborate effectively and make progress with the key objectives?

Thank you to the ENLIGHT Community

ENLIGHT Training Day at Aarhus, 2017

ENLIGHT