Setting up a Large-Scale Research Facility in SEE

South East European International Institute for Sustainable Technologies (SEEIIST)

http://seeiist.eu

Dr. Sanja Damjanovic
Minister of Science of Montenegro
Chairperson of the SEEIIST Steering Committee

ENGELBERG DIALOGUES, 17 October 2018, Engelberg, Switzerland

Joint South-East European International Institute for Sustainable Technologies (SEEIIST) in the spirit of 'Science for Peace'

Initiative proposed by Prof. Herwig Schopper, former Director General of CERN at a WAAS meeting in Dubrovnik at the end of 2016

positive reception by a number of organizations and institutions

Brain drain: a special form of Migration since 1990's

- Due to the recent history in SEE all scientific activities very much slowed down
- As a consequence this region suffered ever since from a strong brain drain of the young generation, in particular the best
- SEE belongs to the regions with the lowest employment rates in the world
- All socio-economic indicators place the SEE countries at the bottom of Europe
- In contrast, the same region had in the past intensive technological developments and made significant contributions on an European scale

Why the International Institute for Sustainable Technologies is urgently needed in South East Europe

- To recover the great tradition in technological developments, to remedy the present desert of state-of-art infrastructure in the region and to decrease the presently large gap to the rest of Europe
- To revert the brain drain by enabling 'first class research' establishing a center of scientific excellence, a regional research nuclei in SEE
- To address common challenges and social cohesion

Why Science?

'Science is cooperative, it stresses the need for an open mind'

'Scientists must reverse direction, and they normally do'

'Science is a self correcting system' (L.G.Christophorou)

The main benefits of international cooperation

- Accelerating knowledge and innovation
  - Scientific excellence
  - Education and training
  - Trigger innovation and enabling technological transfer
- Enabling the improvement of the standards of living
  - 'Science for Peace' by keeping dialog between cultures, developing exchange of ideas, sharing common goals among the international partners
  - Improving the wealth of citizens, 'Science for Society'
  - Helping developing economy and creating jobs

The main objectives of the SEEIIST Project

- To promote collaboration between science, technology and industry, but also to provide platforms for the development of the education of young scientists and engineers based on knowledge and technology transfer from European laboratories like CERN and others
- To mitigate tensions between countries in the region

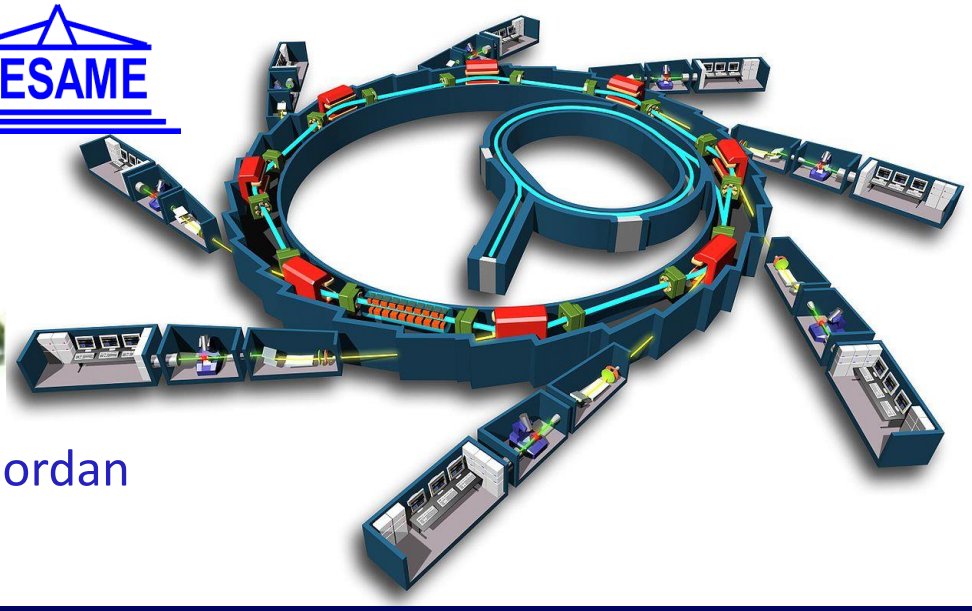
The combination of these tasks would imply another case of the 'CERN model' of 'Science for Peace'

The goals can only be achieved with a Large Scale Facility based on the latest technologies to enable 'first class research' and thereby strongly revert brain drain and assure high competitiveness

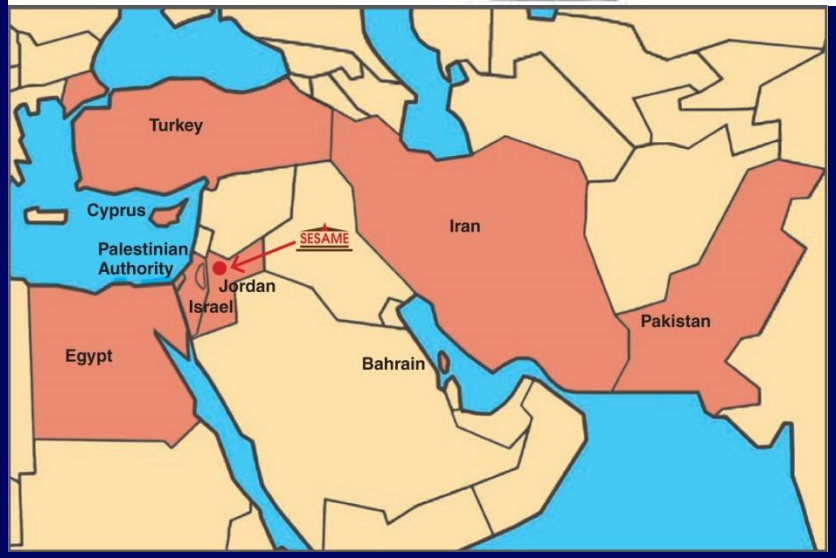
The project would be unique in the region and could contribute to

- develop the economic situation
- improve the standard of living
- reduce unemployment
- trigger complementary technologies

SESAME: 'Synchrotron Light for Experimental Science and Applications in the Middle East'



Jordan



The success of such an initiative is being demonstrated by the SESAME project:

built in Jordan, unifies 9 member states of different political systems and religions in the Middle East: Bahrain, Cyprus, Egypt, Israel, Iran, Jordan, Pakistan, Palestinian Authority, Turkey; has achieved all of them to peacefully work together

The first President of Council of SESAME: Prof. Herwig Schopper

Preparatory steps during 2017 towards the realization of the SEEIIST Project

WAAS meeting, Dubrovnik, proposal H. Schopper for a joint SEE International Institute

Official support by the Government of Montenegro

Political steps

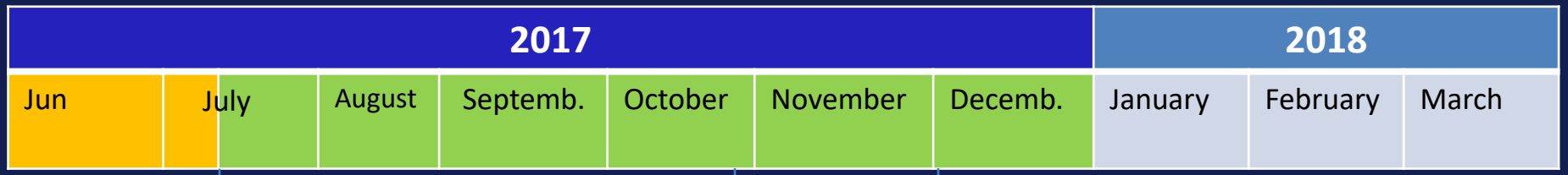
Visit of all Science/Corresp. Ministers of the region

Initiative presented to the EC, incl. Commissioner C. Moedas

First joint discussion, Budva

Initiative presented to the IAEA, incl. DG Y. Amano

Ministerial meeting at CERN – Signature of Declaration of Intent



Two international committees of experts for each of the two project options formed

Editor committees work on Concept Studies

Editor committee meeting at CERN

Editor committee meeting in Budva

Editor committee meeting at CERN

Scientific steps

Scientific Forum ICTP, Trieste

1st Intergovernmental Steering Committee meeting, Sofia

Executive Summary of the results prepared

2nd SC meeting, Tirana

Candidate Members for the South-East European International Institute for Sustainable Technologies

Republic of Albania

Bosnia and Herzegovina

Republic of Bulgaria

Republic of Croatia

Hellenic Republic

Kosovo*

FYR of Macedonia

Montenegro

Republic of Serbia

Republic of Slovenia

Signed a Declaration of Intent

Agreed 'ad referendum'

Observer

* This designation is without prejudice to positions on status and is in line with UNSC 1244/1999 and the ICJ option on the Kosovo Declaration of Independence

Culmination of the political development so far: Declaration of Intent signed at CERN on October 25, 2017

Signed by eight parties:
Albania, Bosnian and Herzegovina, Bulgaria, Kosovo*, The FYR of Macedonia, Montenegro, Serbia and Slovenia.
Croatia agreed 'ad referendum',
Greece is presently an observer

SEE Initiative now transformed into a Project with Regional character

Further result:
Intergovernmental Steering Committee formed for the further steps

SEE Ministers of Science/Corresponding Ministers or their representatives at CERN

Selection of the Competitive Research Infrastructure

Originally two complementary options proposed, based on mapping of regional common social challenges and the need for the most advanced technologies

Option I: Facility for Tumour Therapy and Biomedical Research with protons and heavier ions

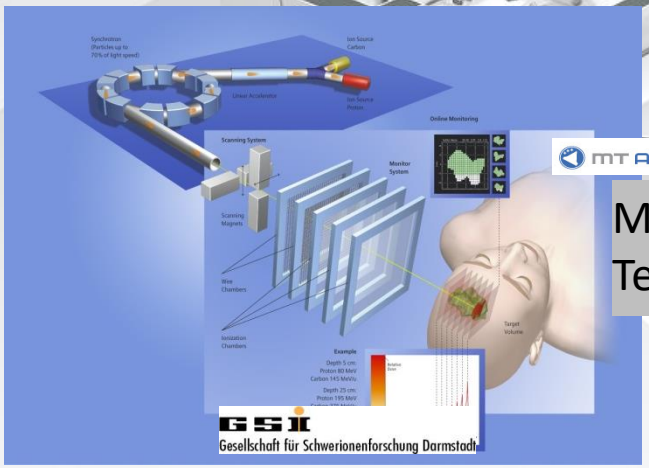
Option II: 4th Generation Synchrotron Light Source with the latest technique

Following a proposal by the EC to choose during 2018: Option I unanimously selected in the meantime

SEEIIST: Facility for Tumour Therapy and Biomedical Research with protons and heavier ions

About 500 patients per year to be treated as needed for a population of 20M. In parallel, 50% of the beam time dedicated to biomedical research. Capacity for about 1000 researchers, including a major number from outside the SEE region. Unique.

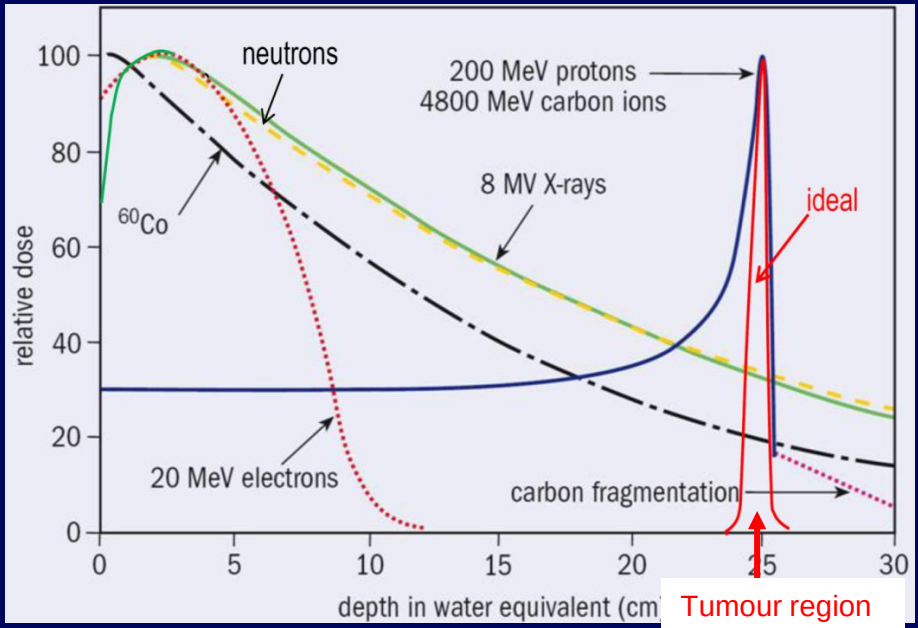
HIT Heidelberg



MT AEROSPACE

Med. Director: Prof. J. Debus
Tech. Director: Prof. T. Haberer

Hadron Cancer Radiation Therapy with protons and heavier ions - the most successful instrument for the treatment of many tumours

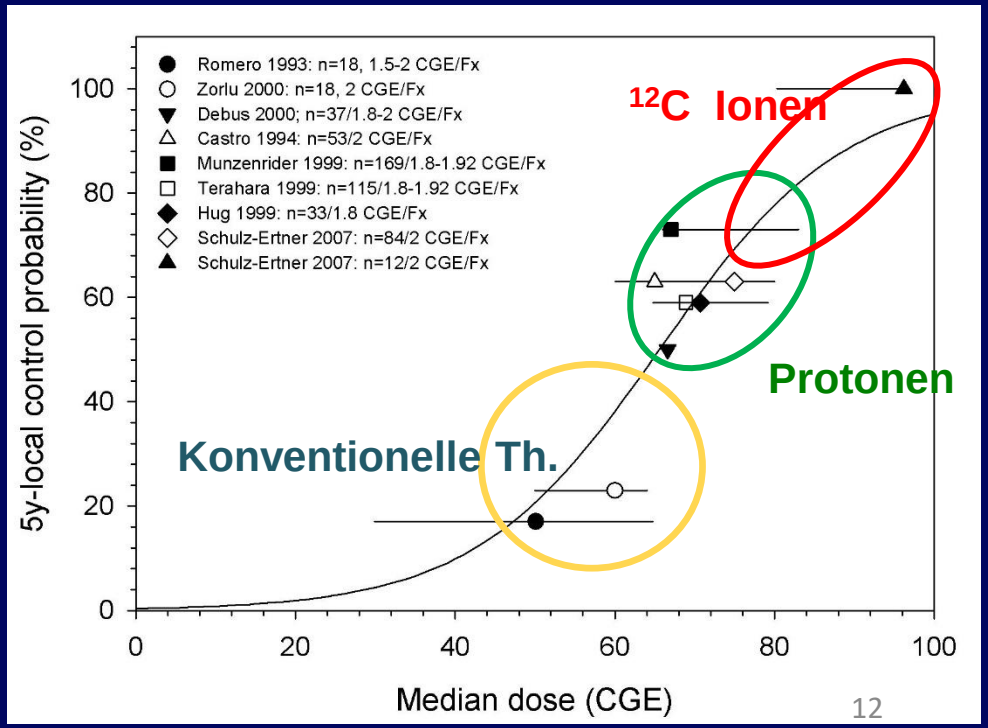


Deposited dose along the tissue depth

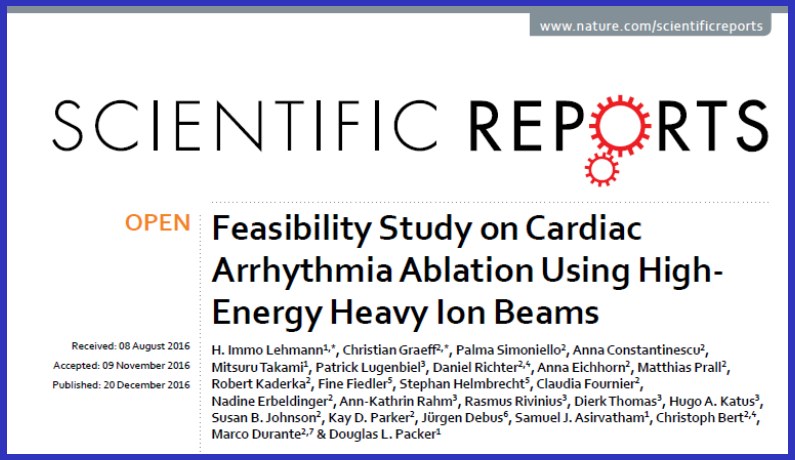
Results of therapy:

Chordomas of the Skull Base

Survival probability 5 years after treatment



Other use of ion beams: treatments of Heart Arrhythmia



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SCIENTIFIC REPORTS

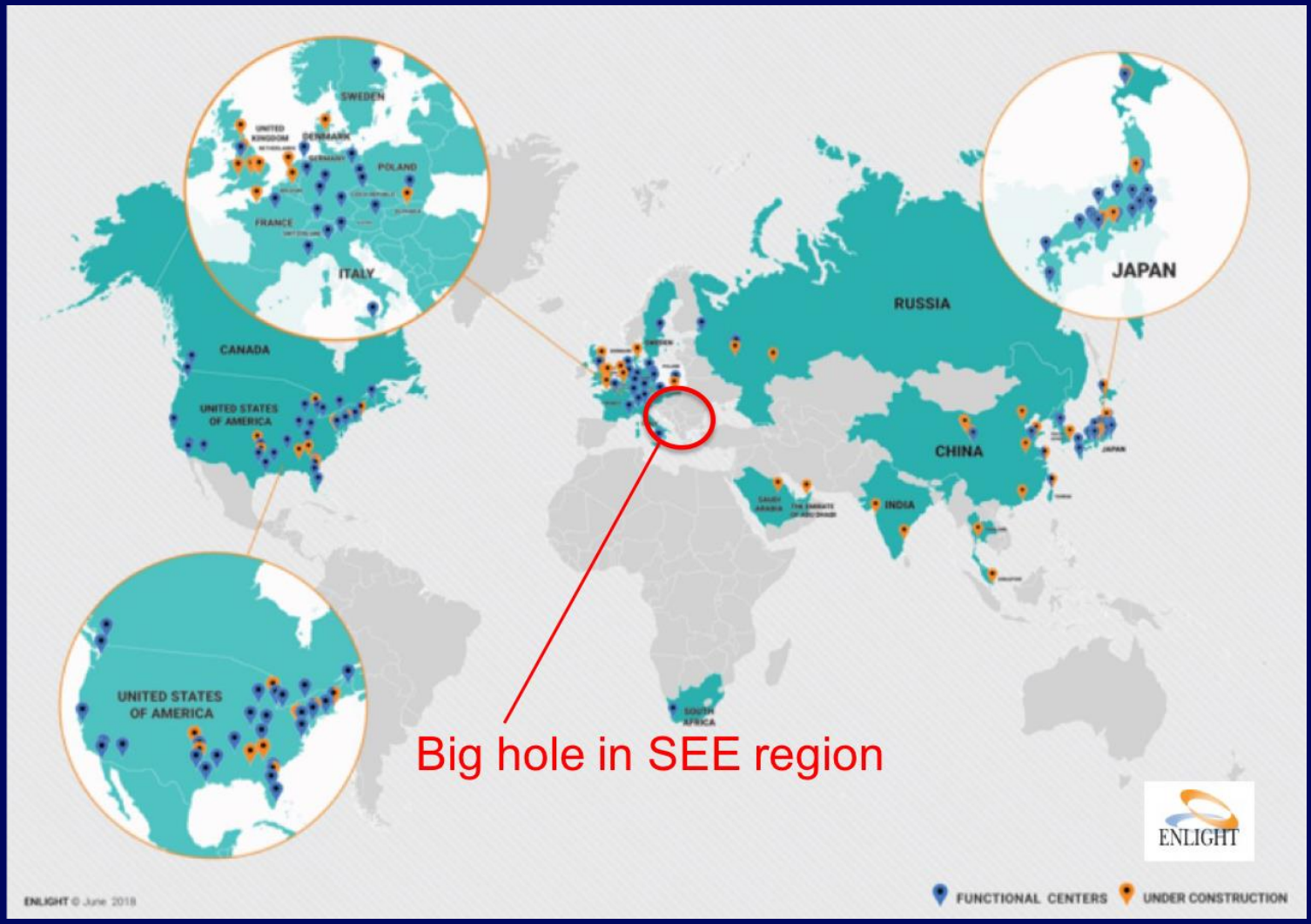
OPEN

Feasibility Study on Cardiac Arrhythmia Ablation Using High-Energy Heavy Ion Beams

Received: 08 August 2016
Accepted: 09 November 2016
Published: 20 December 2016

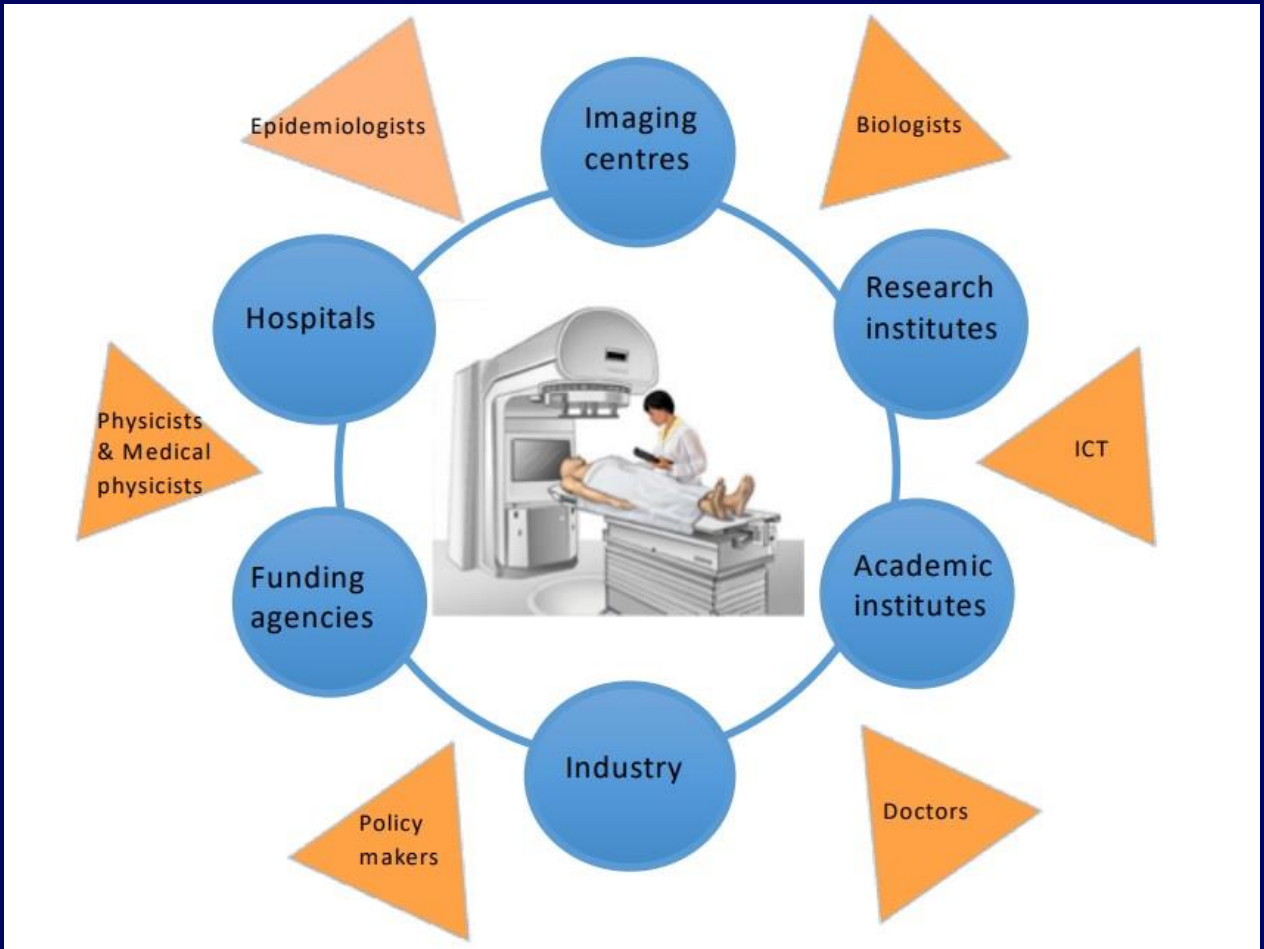
H. Immo Lehmann[1,*], Christian Graeff[2,*], Palma Simoniello[2], Anna Constantinescu[2], Mitsuru Takami[3], Patrick Lugenbiel[3], Daniel Richter[2,4], Anna Eichhorn[2], Matthias Prall[2], Robert Kaderka[2], Fine Fiedler[5], Stephan Helmbrecht[5], Claudia Fournier[2], Nadine Erbeldinger[2], Ann-Kathrin Rahm[3], Rasmus Rivinius[3], Dierk Thomas[3], Hugo A. Katus[3], Susan B. Johnson[2], Kay D. Parker[2], Jürgen Debus[6], Samuel J. Asirvatham[1], Christoph Bert[2,4], Marco Durante[2,7] & Douglas L. Packer[1]

Distribution of hadron therapy facilities worldwide



Hadron Therapy by now developed significantly, currently used in around 70 facilities worldwide

Multidisciplinary Research



Multidisciplinary research for the benefit of several target groups – net of different hubs distributed in different parts of the region -

Preparatory steps during 2017 towards the realization of a SEE Project

2016	2017							
November	March	April	May	June	July	August	September	October

WAAS meeting, Dubrovnik, proposal H. Schopper for a joint SEE International Institute

Official support by the Government of Montenegro

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Initiative presented to the EC, incl. Commissioner C. Moedas

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Political steps

2017							2018		
Jun	July	August	Septemb.	October	November	Decemb.	January	February	March

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2nd SC meeting, Tirana

Executive Summary of the results prepared

Scientific steps

Members of the Editor Committee for Option I – Facility for Tumour Therapy and Biomedical Research with *p* and heavier ions

Dr Sandro Rossi, Director of CNAO in Pavia, Italy

Chairman

Prof. Ugo Amaldi, President of TERA, Novara, Italy

Prof. Manjit Dosanjh, Staff at CERN

Prof. Philippe Lambin, Head of Radiation Oncology, University of Maastricht, Maastricht, Netherlands

Dr. Michael Scholz, Scientific Head of Biophysics Departm. GSI, Darmstadt, D

Prof. Brita Singers Sorensen, Depar. of Clinical Medicine, Denmark

Prof. Dr. Jacques Balosso, CHU Grenoble Alpes, FR

Central goal of the Forum: Concept Studies for the two options of the Institute created by the Editor Committees and presented for the first time to the public

Executive Summary of the Concept Studies prepared for the Forum


Basic concepts for a

SOUTH-EAST EUROPE INTERNATIONAL INSTITUTE FOR SUSTAINABLE TECHNOLOGIES (SEEIIST)

January 15, 2018

Main elements of a Business Plan:

- technical parameters of the facilities
- time schedule
- investment costs
- operation costs

Culmination of the large effort invested over the year 2017

Forum on New International Research Facilities for South East Europe, held at the ICTP/Trieste on January 25-26, 2018

More than 100 participants, among them representatives from the EC (DG for Research and Innovation at that time - Robert Jan Smits), Chair of the ESFRI (Giorgio Rossi), representatives of the IAEA, Secretary General of the EPS, RCC, ... representatives of the SEE Steering Committee, but also high-level representatives from the scientific community: the Medical and Technical Directors of HIT Heidelberg, the Director of CNAO, Administrative Director of SESAME. From the major European laboratories five representatives from CERN including the Director of Accelerator and Technology, and the deputy Director of DESY and the Research Director of GSI-FAIR.

Thanks to the financial help of the IAEA and some help from the EPS, more than 40 Users from the Region could participate in the Forum.

Forum on New International Research Facilities in South East Europe, ICTP, Trieste 25-26 January 2018

SEEIIST Consequences of the Forum in Trieste (I) :

Formation of a Steering Committee for the SEEIIST Project

1st Meeting held on 30 January 2018 in Sofia
Rules of Procedure, Election of Chairperson: S. Damjanovic

2nd Meeting held on 30 March 2018 in Tirana
Unanimous decision: Tumour Therapy and Biomedical Research with Protons and Heavier Ions as the core of the SEEIIST Project

3rd Meeting held on 13 July 2018 in Skopje
Distribution of tasks for the next Preparatory Phase of the Project

4th Meeting to be held on 27 November 2018 at the IAEA, Vienna
Appointment of the coordinator, Setting-up a Preparatory group

SEEIIST Consequences of the Forum in Trieste (II):

Capacity Building

- Support from the IAEA for Capacity Building – first 0.5 MEUR offered during the Forum to start the Training Program

- Dedicated COST project proposal 'Advanced Cancer Therapy NETwork' (ACT-NET) prepared by ENLIGHT partners and partners from our Region; 0.3 MEUR – result of the evaluation end of October 2018

- Dedicated Multibeneficiary IPA 2019 project 'Western Balkan Regional Network for Radiotherapy and Oncology' – 2.0 MEUR –
(The JRC hosted European Network of Cancer Registers, so we asked the JRC for advice on how to realize the same in the SEE region)

- Ongoing preparation for Marie Curie ITN project within EU Framework Program H2020 – cca 4.5 MEUR - collaboration of ENLIGHT and SEEIIST

SEEIIST Consequences of the Forum in Trieste (III) :

Prepare the ground for the next 'Preparatory phase'

- Form an International Association as a legal entity
- CERN is willing to be the headquarters for the preparatory phase of the SEEIIST until the site for the Project is selected
- First financial support of the EC – Research and Innovation – bridge money to start the preparatory phase already at the beginning of January 2019
- Prepare application for Design-Study-Call INFRADEV-01-2019-2020 (work on Technical Design Report, Business plan, Conditions for the site, future network communities)
- Two Networks to be set-up: Clinical network (to connect Hospitals and Oncological Institutes), Scientific network (to connect Universities, Research Institutes, Hospitals)

Europe needs to further advance in ion therapy
'A multiple-ion tumour therapy and research facility'
based on innovative accelerator technologies

Politically widely accepted that the SEE region needs economic help and further stabilization

Multiple-ion tumour therapy with a large fraction of beam time dedicated to biomedical research in South East Europe will be a benefit for all EUROPE

Up to 200 MEUR required guaranteeing competitivity in Europe (EU structural and cohesion funds, contributions from member-states, other funds)