Start of the SEEIIST Design Phase
September 18th 2019, Budva

Benefits For Regional Industry By SEEIIST

Mark, Pleško, Engineering Academy of Slovenia,
Cosylab

Your TRUSTED Control System Partner

COSYLAB

Purpose Of The Talk

COSYLAB

- To show that all this cooperation, done in partnership with the accelerator laboratory, is beneficial for
  - the specific industrial company
  - the specific laboratory
  - the accelerator community
  - the wider society

- I cannot make an industry/lab wide analysis

- But to prove my point, it‘s enough to focus on some very specific examples in a small region.
  - if it works there, it works in all other areas


Let‘s Choose A Random Small Country - Slovenia
And The Accelerator At Its Border - Elettra
Slovenia
Zagreb
Trieste
Venice
Milan
Verona
Munich
Vienna
Salzburg
Austria
Graz
Budapest
Hungary
Cluj-Napoca
Oradea
Szeged
Timişoara
Romania
Galaţi
Ploieşti
Bucharest
Constanţa
Craiova
Belgrade
Београд
Bosnia and Herzegovina
Sarajevo
Zadar
Serbia
Croatia
Genoa
Bologna
Pisa
San Marino
Italy
Adriatic Sea
Montenegro
Kosovo
Podgorica
Подгорица
Sofia
София
Bulgaria
Varna
Burgas
Edirne
Rome
Naples
Bari
Tirana
Albania
North Macedonia
Thessaloniki
Θεσσαλονίκη
Çanakkale
Matera
Taranto
Lecce
Tyrrhenian Sea
Greece
İzmir
Aegean Sea
Patras
Πάτρα
Athens
Αθήνα
Palermo
Peggio
Google
Moldova
Chisinau
Iaşi
Košice
Zürich
Stuttgart

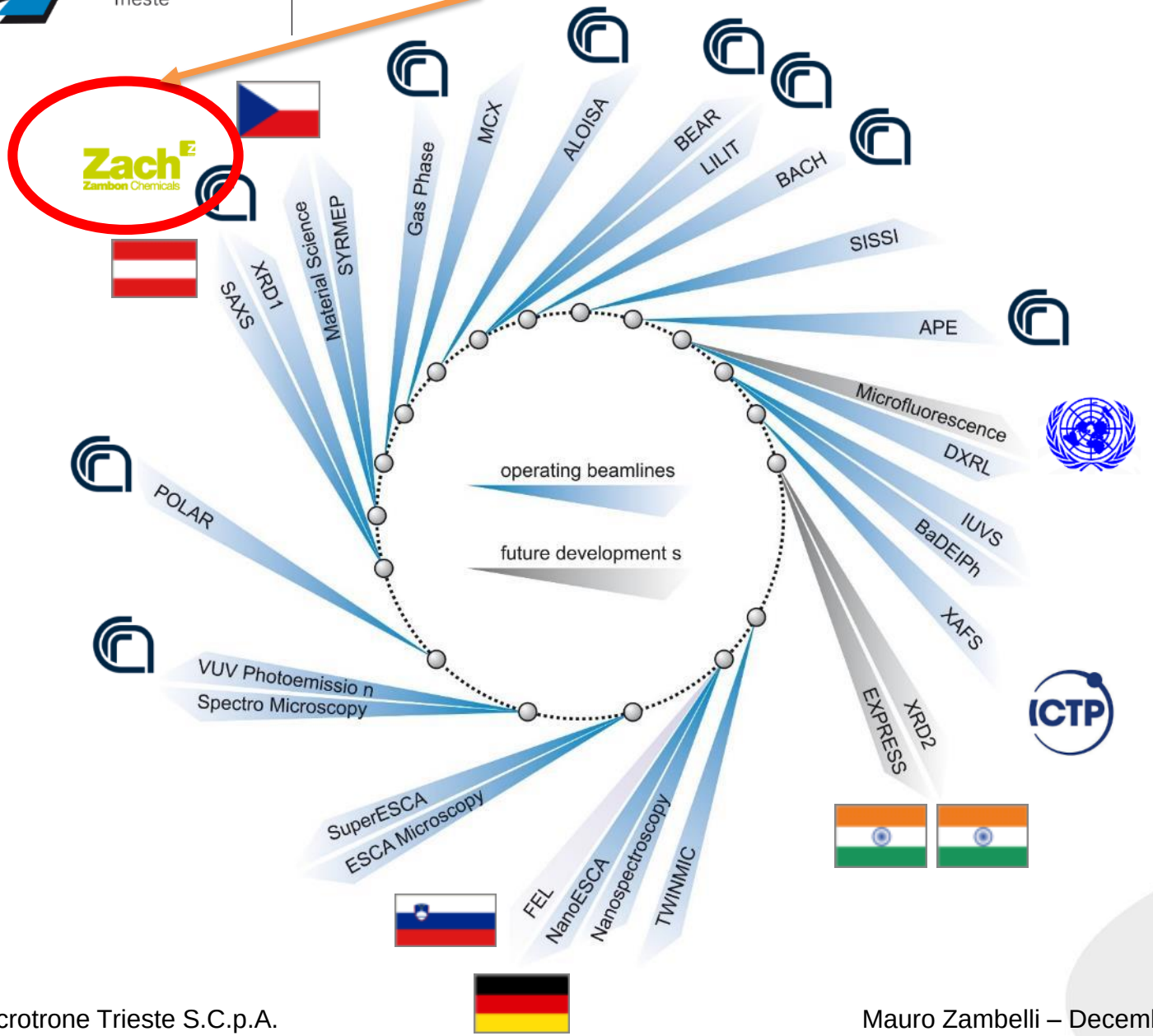
3 Ways Of Cooperation Between Industry And A Research Facility

COSYLAB

- A) Industry performs research at accelerators
  - e.g. use of synchrotron radiation or biomedical research
- B) Industry licenses technology
  - to use it in its own products in accelerator and other markets
- C) Industry develops for the large laboratory
  - and sells to other laboratories

Elettra Sincrotrone Trieste

Case A) Industrial Beamline at Elettra



Case B)

- Industry licenses technology
  - to use it in its own products in accelerator and other markets

- CAEN els, Sezana (established 2009), now at Padriče
  - Power supplies

- Kyma Tehnologije, Sezana (established 2008)
  - Undulators

First customer: Elettra

CAENels
Gear for Science

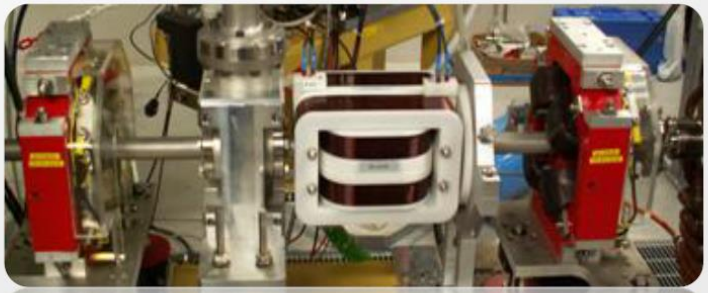
FERMI@Elettra

- Linear accelerator – FEL (400 meters length)
- about 400 magnets of **5 A** up to **750 A**
- 24 hours/day – 365 days/year
- Reliability and Efficiency

FERMI basic installations

X-FEL requirements for the power sources:

- 180 power sources of ±20A @ ±20V (A2620BS)
- 210 power sources of ±5A @ ±10V (A2605BS)
- Correction and Quadrupole Magnets



Expanding Worldwide

CAENels
Gear for Science

Tsukuba - Japan

- Custom specific **bipolar linear** power sources rated at **±5 A** and **±60 V**
- Start of design in December, delivery and installation after **4 months** in March

Prestigeous References
Also Outside ACC Market

CAENels
Gear for Science

Argonne NATIONAL LABORATORY
USA

Australian Synchrotron
Australia

BARC
India

BERKELEY LAB
USA

BOSCH
Germany

BROOKHAVEN NATIONAL LABORATORY
USA

BRUKER
Germany

BUCKLEY SYSTEMS
USA

Canadian Centre canadien Light de rayonnement Source synchrotron
Canada

CERN
Switzerland

STRUMENTI SCIENTIFICI CINEL
Italy

CNPEM
Brasil

cnrs
France

DAWONSYS
South Korea

DIGITAL BROADCAST
Italy

DESY
Germany

EEI EQUIPAGGIAMENTI ELETTRONICI INDUSTRIALI
Italy

elaphe
Slovenia

EMBL
Germany

ess EUROPEAN SPALLATION SOURCE
Sweden

Technology Transfer On Undulator Design&Assembly

Kyma Tehnologija d.o.o.

JOINT VENTURE

cosylab

Elettra Sincrotrone Trieste

WIKA Part of your business

EUROMISURE

27% 51% 22%

ITALY

Kyma Srl

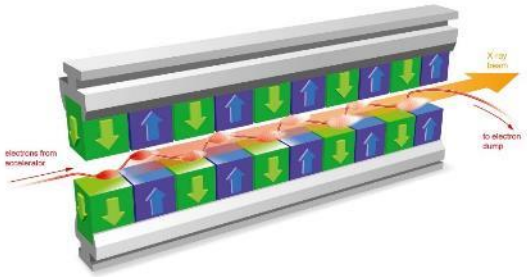
100%

SLOVENIA

Kyma Tehnologija d.o.o.

Your TRUSTED Control System Partner

PURPOSE: To build Undulators developed at Elettra



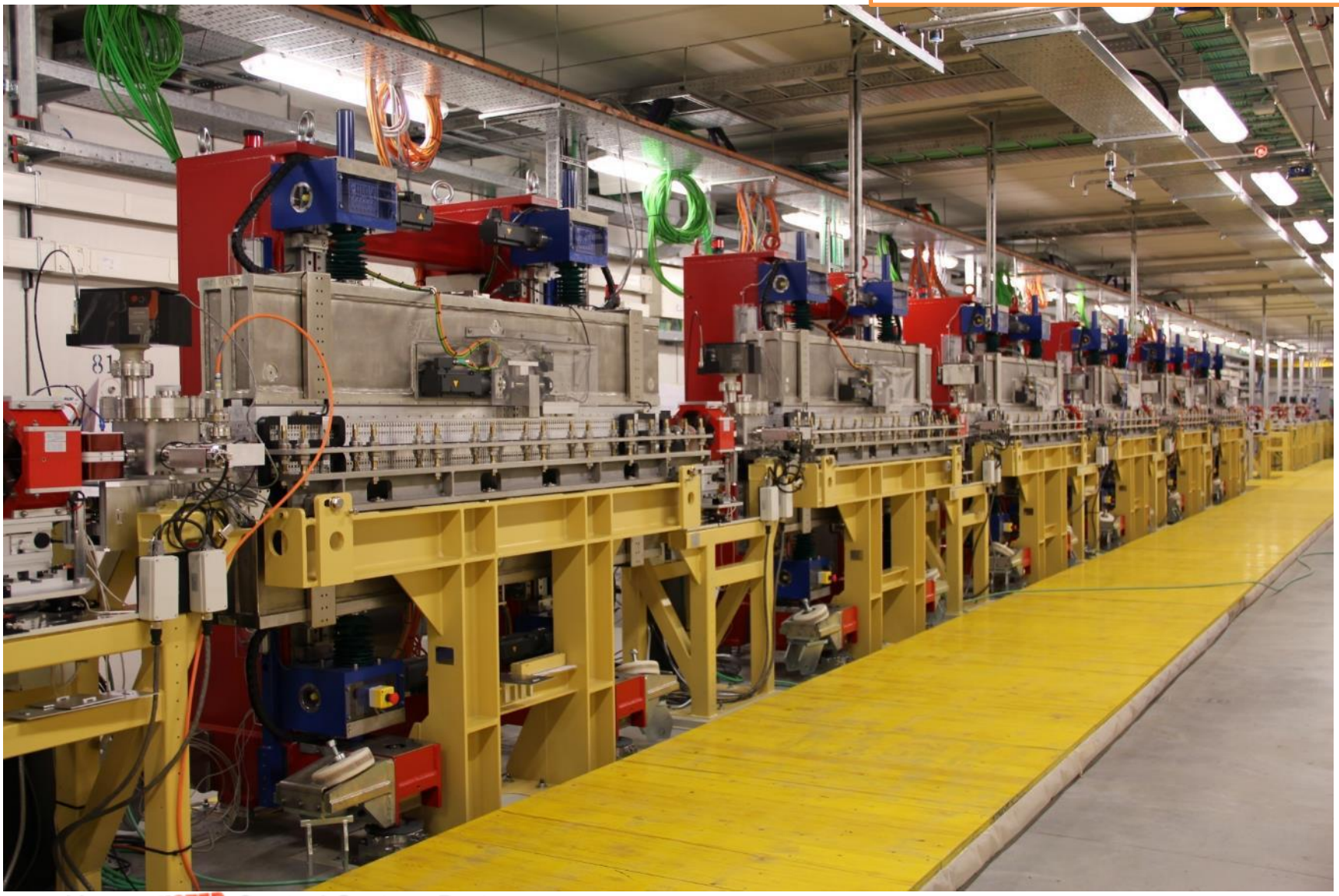
KyTe Lab Inauguration In Slovenia

Kyma Tehnologija d.o.o.

August 2008

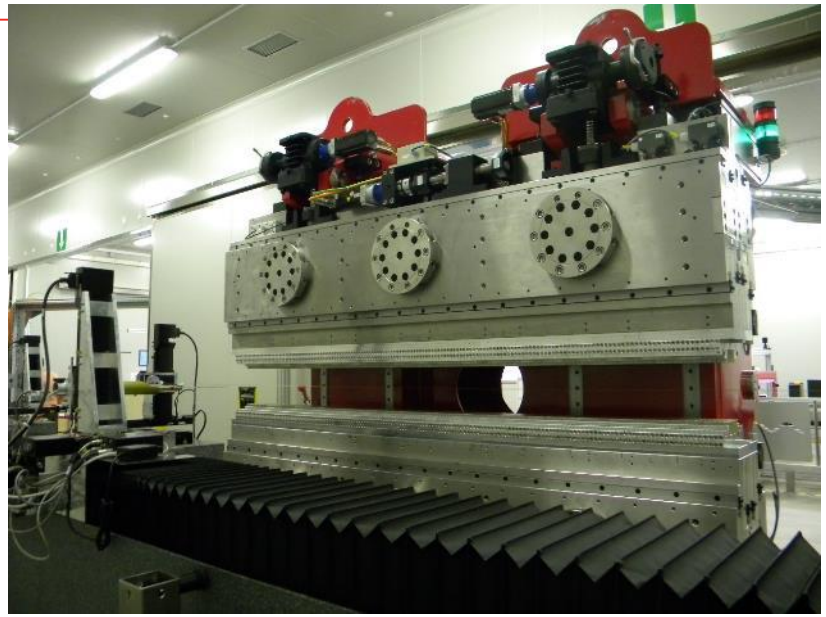
First Job: Undulators for FERMI@Elettra

Kyma Tehnologija d.o.o.

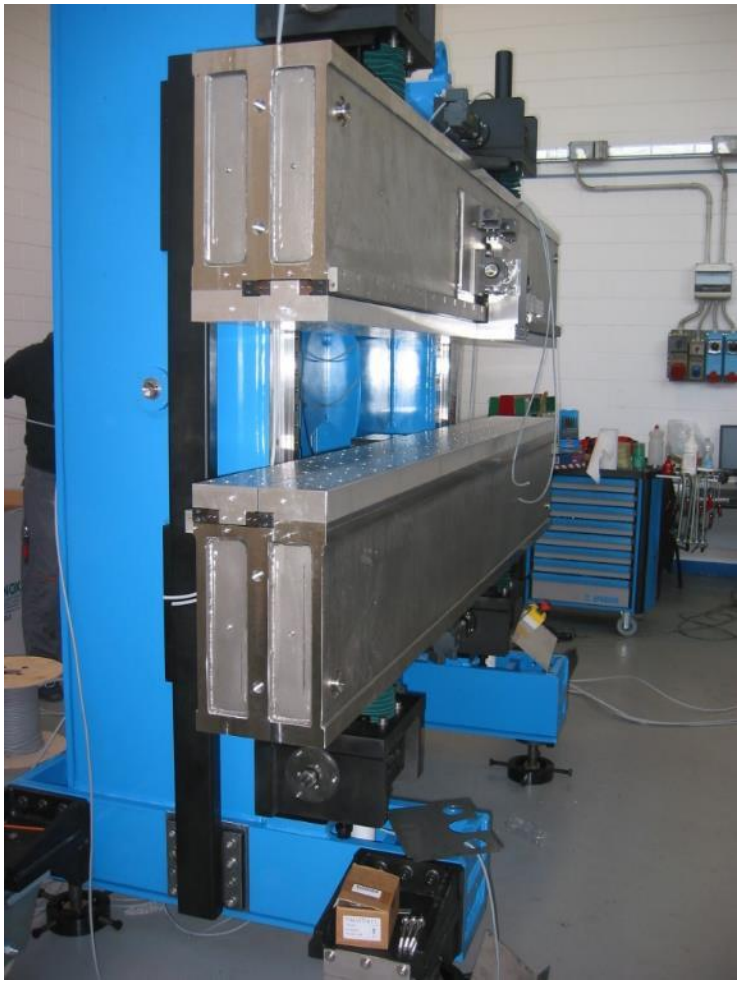


Now Customers Worldwide:

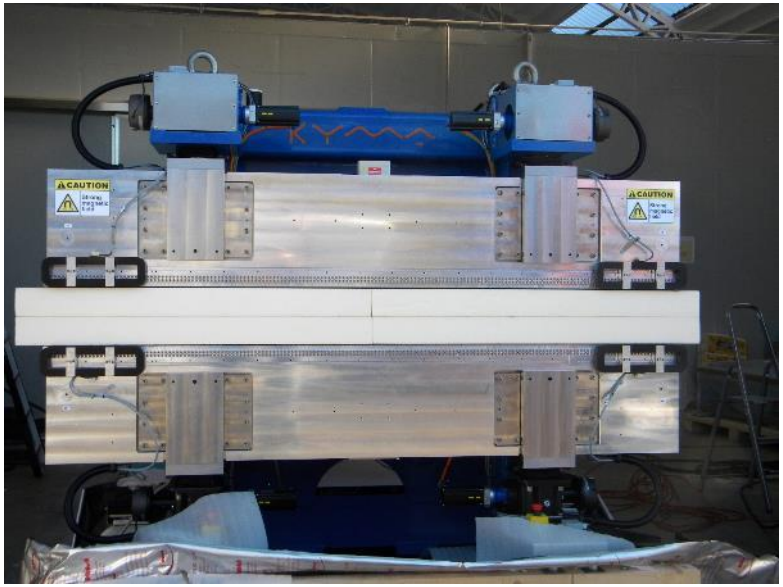
Kyma Tehnologija d.o.o.



USA



ASIA



EUROPE

Case C)

- Industry develops for the large laboratory
  - and sells to other laboratories

- Instrumentation Technologies, Solkan (Nova Gorica) (established 1998)

- Cosylab, Ljubljana (established 2001)

Instrumentation Technologies

Golden gazelle – best fast growth co.

Visit of Prime Minister

Co-Innovated Digital BPM For PSI, Then Developed New Model From Scratch

With two launch customers, Soleil of France and Diamond of the United Kingdom, Libera began its „winning march“ in 2004

Instrumentation Technologies is the provider of Libera instruments

- Established in 1998
- Located in Slovenia (EU)
-
- Thousands of units deployed and working reliably for 15+ years
- Tens of scientific publications use I-Tech instruments as *the* reference benchmark

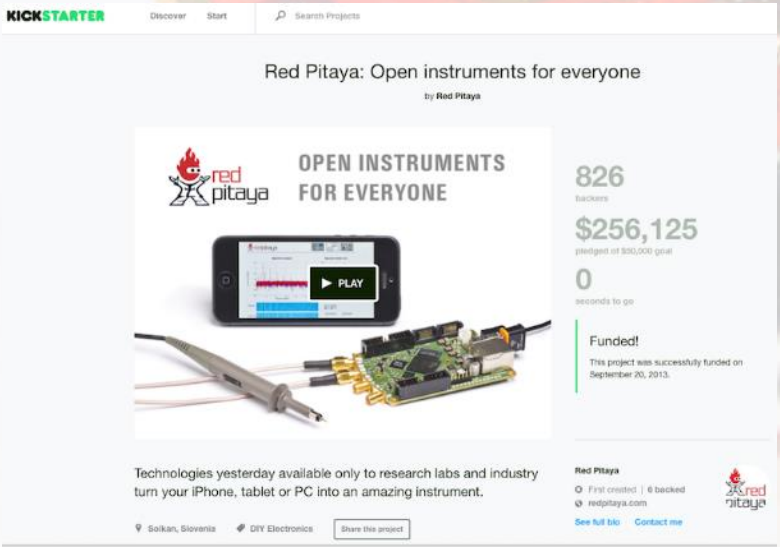
redpitaya

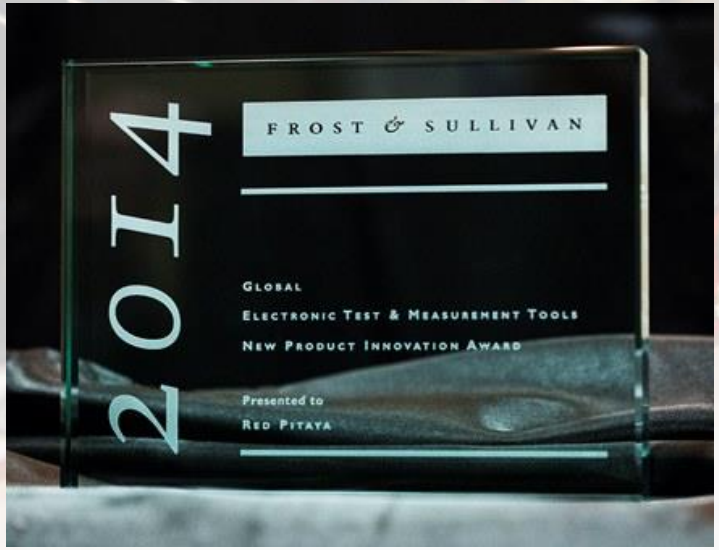
Instrumentation Technologies' spin-off

Instrumentation Technologies

"Where do you find a team that can dream up something like a Red Pitaya? Working on particle accelerators in Slovenia, of course."

Steve Leibson
Director of Strategic Marketing and Business Planning
Xilinx Inc., San Jose, USA



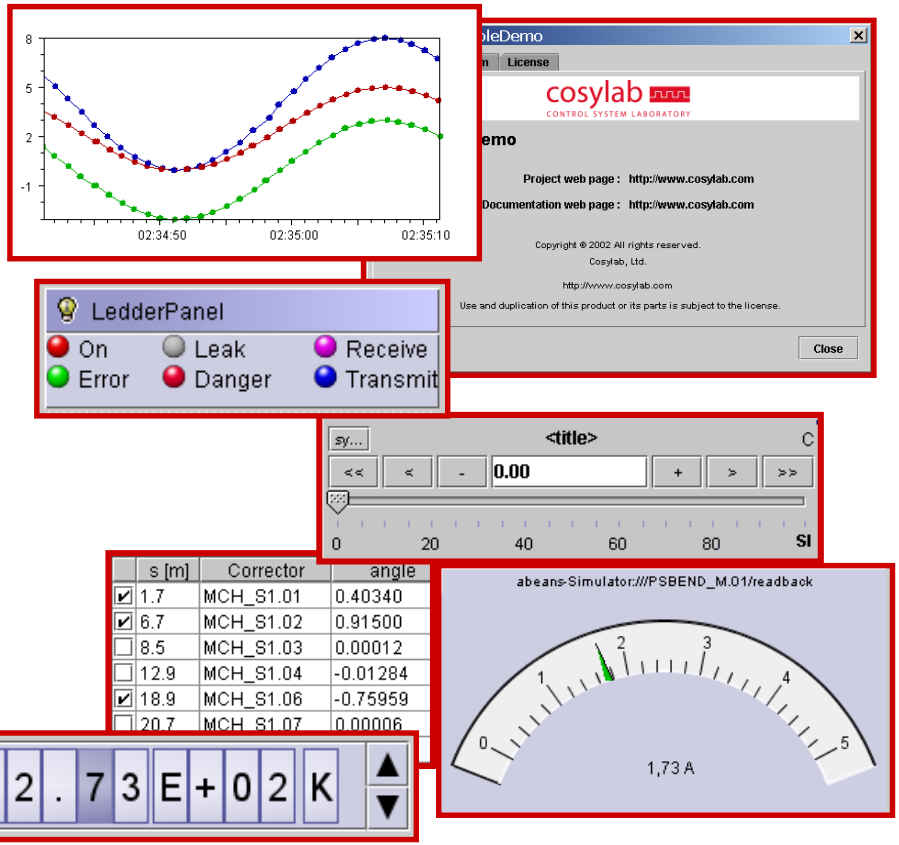


J. Stefan Institute: Students Did ANKA Control System In 1997-01

COSYLAB

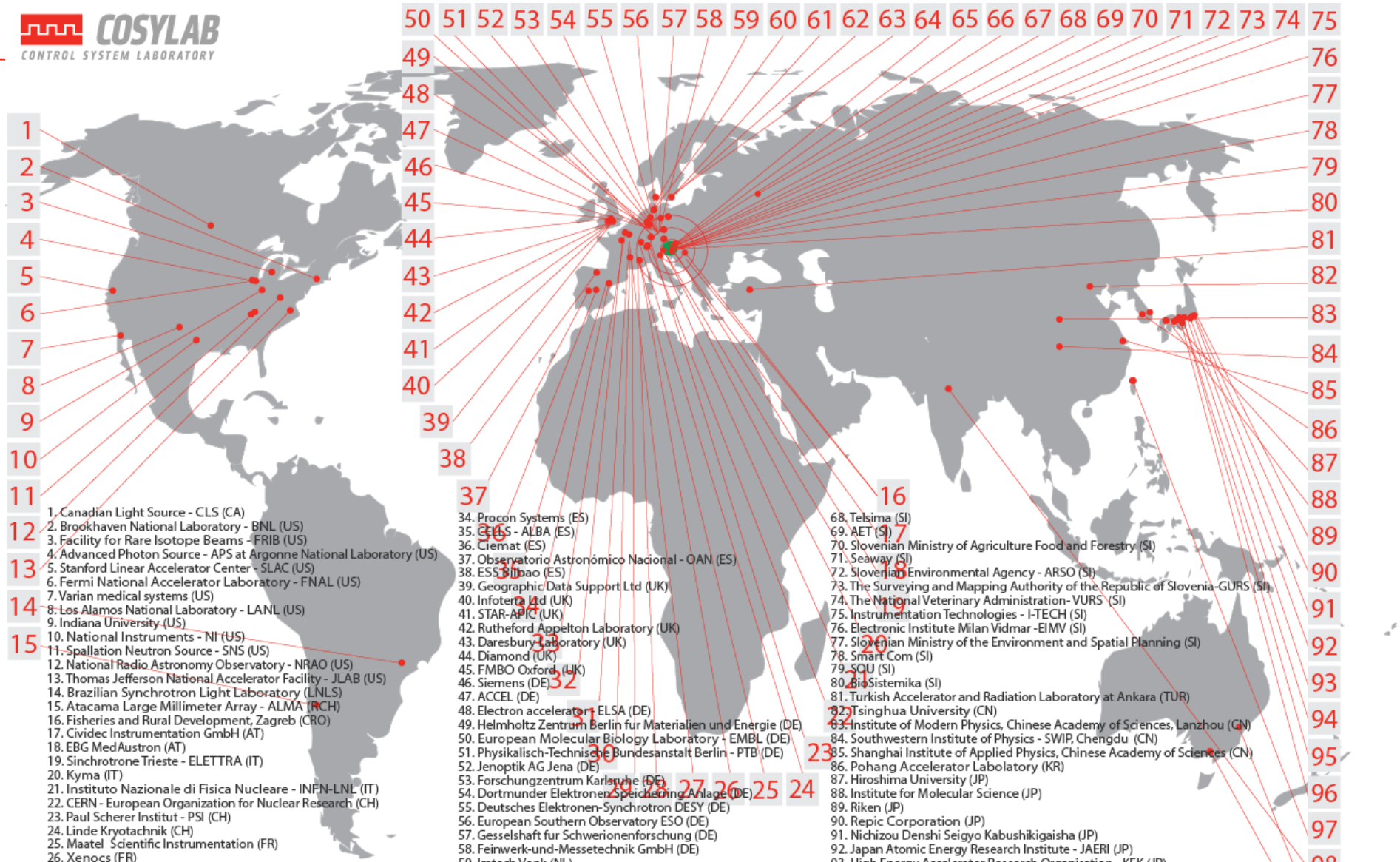
⇒ spin-off as Cosylab:

Software for Any Large Experiments Facilities



2019: >200 People: Acc, Astronomy, Fusion, Lasers, Space

COSYLAB
CONTROL SYSTEM LABORATORY



1. Canadian Light Source - CLS (CA)
2. Brookhaven National Laboratory - BNL (US)
3. Facility for Rare Isotope Beams - FRIB (US)
4. Advanced Photon Source - APS at Argonne National Laboratory (US)
5. Stanford Linear Accelerator Center - SLAC (US)
6. Fermi National Accelerator Laboratory - FNAL (US)
7. Varian medical systems (US)
8. Los Alamos National Laboratory - LANL (US)
9. Indiana University (US)
10. National Instruments - NI (US)
11. Spallation Neutron Source - SNS (US)
12. National Radio Astronomy Observatory - NRAO (US)
13. Thomas Jefferson National Accelerator Facility - JLAB (US)
14. Brazilian Synchrotron Light Laboratory (LNLS)
15. Atacama Large Millimeter Array - ALMA (RCH)
16. Fisheries and Rural Development, Zagreb (CRO)
17. Cividec Instrumentation GmbH (AT)
18. EBG MedAustron (AT)
19. Sinchrotrone Trieste - ELETTRA (IT)
20. Kyma (IT)
21. Instituto Nazionale di Fisica Nucleare - INFN-LNL (IT)
22. CERN - European Organization for Nuclear Research (CH)
23. Paul Scherer Institut - PSI (CH)
24. Linde Kryotachnik (CH)
25. Maatel Scientific Instrumentation (FR)
26. Xenocs (FR)
27. French Atomic Energy Commision (FR)
28. International Thermonuclear Experimental Reactor - ITER (FR)
29. European Synchrotron Radiation Facility - ESRF (FR)
30. bioMérieux (FR)
31. Synchrotron Soleil (FR)
32. Atos Origin (FR)
33. Ion Beam Applications - IBA (B)

34. Procon Systems (ES)
35. CELLS - ALBA (ES)
36. Ciemat (ES)
37. Observatorio Astronómico Nacional - OAN (ES)
38. ESS Bilbao (ES)
39. Geographic Data Support Ltd (UK)
40. Infoterra Ltd (UK)
41. STAR-APIC (UK)
42. Rutheford Appelton Laboratory (UK)
43. Daresbury Laboratory (UK)
44. Diamond (UK)
45. FMBO Oxford (UK)
46. Siemens (DE)
47. ACCEL (DE)
48. Electron accelerator - ELSA (DE)
49. Helmholtz Zentrum Berlin fur Materialien und Energie (DE)
50. European Molecular Biology Laboratory - EMBL (DE)
51. Physikalisch-Technische Bundesanstalt Berlin - PTB (DE)
52. Jenoptik AG Jena (DE)
53. Forschungzentrum Karlsruhe (DE)
54. Dortmunder Elektronen-Speicherring-Anlage (DE)
55. Deutsches Elektronen-Synchrotron DESY (DE)
56. European Southern Observatory ESO (DE)
57. Gesselshaft fur Schwerionenforschung (DE)
58. Feinwerk-und-Messetechnik GmbH (DE)
59. Imtech Vonk (NL)
60. Kernfysisch Versneller Instituut - KVI (NL)
61. Danfysik (DK)
62. European Spallation Source (SE)
63. MAX-lab, Lund University (SE)
64. J. Stefan Institute (SI)
65. Hidria (SI)
66. ISKRATEL (SI)
67. National Research Centre "Kurchatov Institute" (RU)

68. Telsima (SI)
69. AET (SI)
70. Slovenian Ministry of Agriculture Food and Forestry (SI)
71. Seaway (SI)
72. Slovenian Environmental Agency - ARSO (SI)
73. The Surveying and Mapping Authority of the Republic of Slovenia-GURS (SI)
74. The National Veterinary Administration- VURS (SI)
75. Instrumentation Technologies - I-TECH (SI)
76. Electronic Institute Milan Vidmar -EIMV (SI)
77. Slovenian Ministry of the Environment and Spatial Planning (SI)
78. Smart Com (SI)
79. SOU (SI)
80. BioSistemika (SI)
81. Turkish Accelerator and Radiation Laboratory at Ankara (TUR)
82. Tsinghua University (CN)
83. Institute of Modern Physics, Chinese Academy of Sciences, Lanzhou (CN)
84. Southwestern Institute of Physics - SWIP, Chengdu (CN)
85. Shanghai Institute of Applied Physics, Chinese Academy of Sciences (CN)
86. Pohang Accelerator Labolatory (KR)
87. Hiroshima University (JP)
88. Institute for Molecular Science (JP)
89. Riken (JP)
90. Repic Corporation (JP)
91. Nichizou Denshi Seigyo Kabushikigaisha (JP)
92. Japan Atomic Energy Research Institute - JAERI (JP)
93. High Energy Accelerator Research Organisation - KEK (JP)
94. The University of Tokyo (JP)
95. Hitachi Zosen (JP)
96. Japan Synchrotron Radiation Research Institute - JASRI (JP)
97. NSRRC -National Synchrotron Radiation Research Center (TW)
98. Raja Ramanna Centre of Advanced Technology - RRCAT (IN)
99. Australian national nuclear research and development organisation - ANSTO (AU)
100. Australian Synchrotron - AS (AU)

60-70% World Market in Particle Therapy Control Systems

COSYLAB

varian

PROTOM proton therapy technologies

ProNova

MEVION medical systems

ADVANCED ONCOTHERAPY

MedAustron

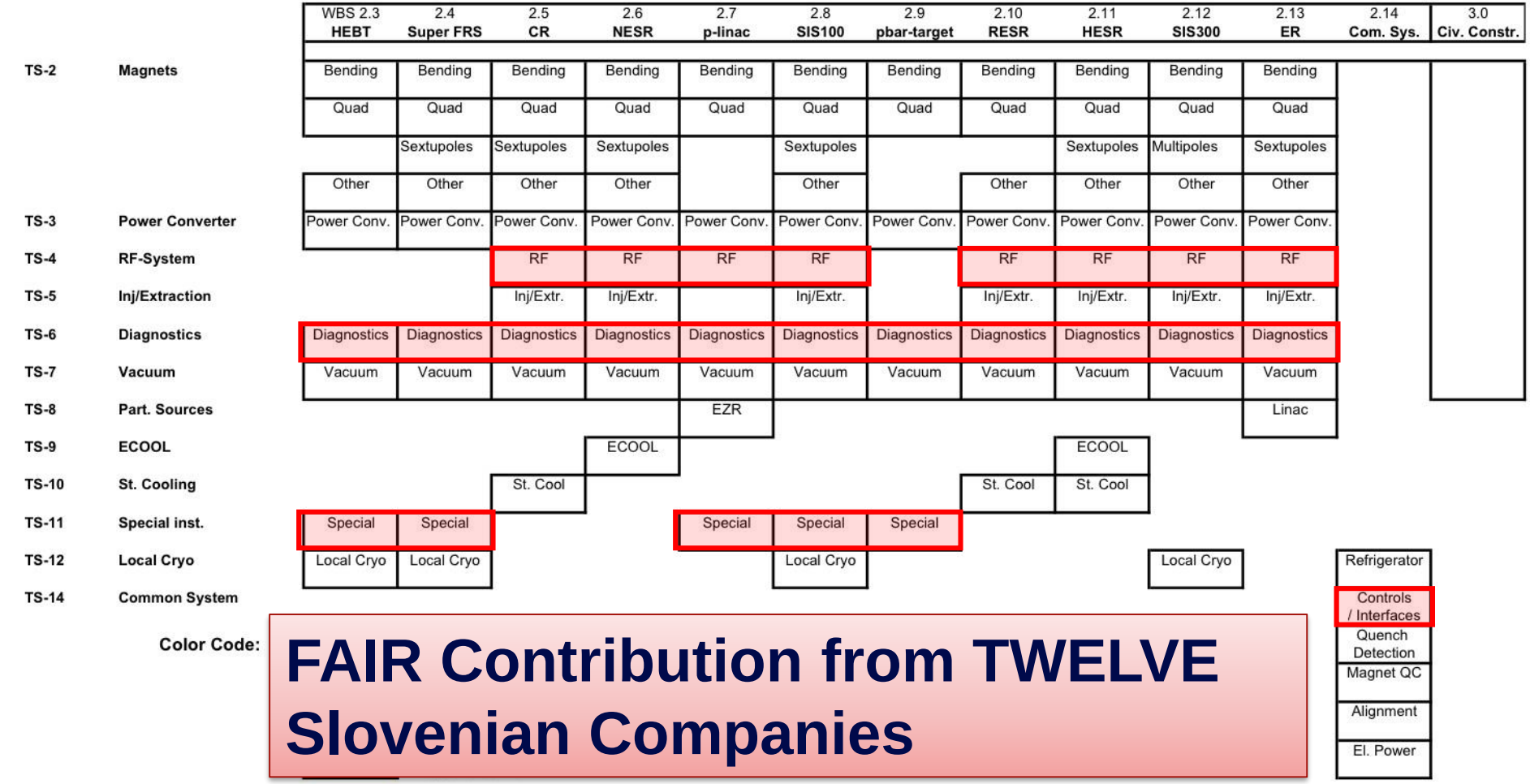
iba

CIM 中科离子

- Other partnerships and customers
  - **EU**: CNAO, PSI, SPAG, medPhoton
  - **China**: HIMM, GHMT, APTRON
  - **Japan**: iBNCT

In-Kind Contribution Driven by FAIR Requirements: New Products

COSYLAB

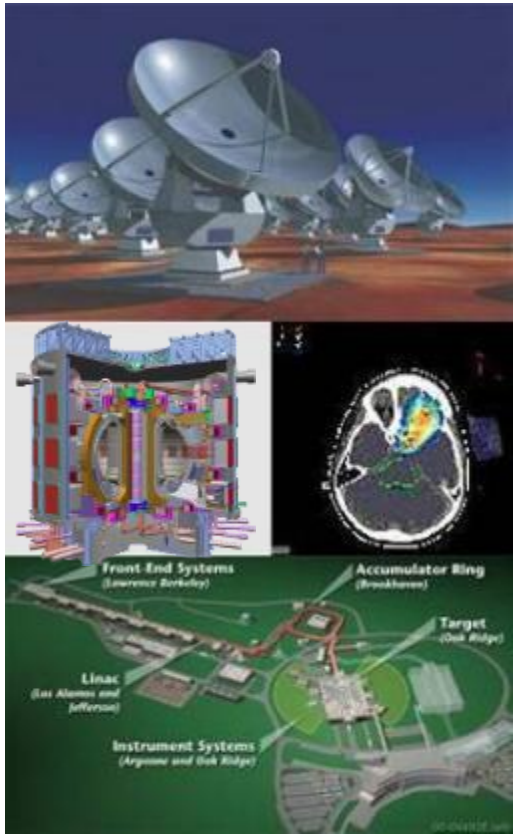


FAIR Contribution from TWELVE Slovenian Companies

CONCLUSIONS

COSYLAB

- **It works even in Slovenia**
  - All companies started (and continue) cooperation with accelerator labs
- **Benefits for all:**
  - **Companies**: kickstarting expansion worldwide and into other high tech markets
  - **Labs**: get industrial quality, highly reliable products
  - **Society**: jobs, stop brain-drain, curing cancer,..



- With help from the international community, from SEEIIST and from the Slovenian experience,
  a similar regional potential can be tapped in the SEEIIST countries

THANK YOU!

COSYLAB

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Your TRUSTED Control System Partner

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