The European Master's Degree in Radiation Protection:

An ENETRAP result

EMRP

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* presented by

instn

GRENOBLE 1 UNIVERSITE JOSEPH FOURIER SCIENCES, TECHNOLOGIE, MEDECINE

THE NORTH HIGHLAND COLLEGE

OUTLINE

- ENETRAP WP8 → EMRP consortium
- EMRP content and organisation
- EMRP and nuclear renaissance
- Difficulties to overcome
- Conclusion

EMRP: AN ENETRAP RESULT

- **ENETRAP WP8 - FP6 project**
  - *Objectives*:

  To introduce a proposal for the establishment of an Erasmus Universities Consortium

- **EMRP - EACEA: n°210377-IC-1-2005-1-FR-ERASMUS-PROGUC-2**
  - *Objectives*

  Creating an integrated second year Masters degree course in Radiation Protection, to meet the current and increasing needs for skilled personnel in sectors using ionizing radiations (industry, medicine, research).

Proposing, within this Academic course, an harmonized curriculum for **R**adiation **P**rotection **E**xpert (RPE - QE) to fulfil the requirements of the EURATOM Directive 96/29 thus favouring the mobility of experts across Europe.

EMRP: CONSORTIUM OF UNIVERSITIES

- **Université Joseph Fourier (UJF),** hosting over **17,000** students (Mathematics, Physics, Biology, Medicine, Pharmacy, Sporting, Computer Science, Earth Sciences, etc). Established in Grenoble - France.

- **Institut National des Sciences et Techniques Nucléaires (INSTN)** (**700** students and 7,700 professionals approx) a higher education institution placed within the French nuclear research organisation, CEA.

- **Czech Technical University (CTU)** in Prague, (**22,000** students) is the largest Czech technical university. Among its constitutive faculties, the Faculty of Nuclear Sciences and Physical Engineering, was founded in 1955 with the start of the Czechoslovak nuclear programme.

- **North Highland College (NHC)**, (**8,000** students approx) a partner college within the **UHI**. The College is made up of 4 main centres of which the largest is situated only 15 kilometres from Dounreay.

A CONSOLIDATED AND HARMONISED SYLLABUS

EMRP is ~~M1 (60)~~ + M2 (60) P ~~R~~

CORE CURRICULUM

		ECTS
1	Principles of nuclear and radiation Physics	3
2	Detection and measurement methods and dosimetry	4
3	Biological effect of radiation and Epidemiology	2
4	Legal and regulatory basis	2
5	Occupational radiation protection	3
6	Public and environment Radiation Protection	2

+ 6 months Internship

(30 ECTS)

SPECIFIC MODULES

		ECTS
7	Nuclear installation	3
8	General Industry	2
9	Medical applications	3
10	Decommissioning and waste management	3
11	Non Ionising Radiation	1
12	NORM	1
13	European Week	1
14	technical Visits (included)	
-	Internal Exposure: ENETRAP- EURADOS Module (elective suplementary module)	

- ENETRAP Training Scheme
- Directive 96/29 description
- ERPC syllabus
- French Masters programme
- IAEA PGEC syllabus

ORGANISATION

- The **core curriculum** is delivered by each partner in local language
- The different partners will develop and teach **specific modules** in English in their specialist areas (one location in English)
- **Common selection procedures**
- A minimum time period of **6 months** (30 ECTS) could be obtained in a foreign EU country
- **The European week** to promote exchanges (students, lecturers)
- The **EMRP started** in France in 2008 as a pilot session

EMRP IN FIGURES

- **74** professors and lecturers
- **17 +2** members in the Steering and Pedagogical Committee
- **540** hours of lectures and practical works (=30 ECTS =6m)
- **210** students educated ('95 →)
- **23%** of LLLs (EDF, CEA, Navy, CEPN...)
- **6** months of OJT period (=30 ECTS)
- **3** weeks of technical visits
- **90**% success
- **100**% employed (~32k€/y)
- **M1** (Physics, Envir., biol...), **Ing**. Diploma, **PHD**, **M**edical **D**octor
- **15** years old → former Masters degree
- French and **foreign** students (IAEA + Algeria, Cameroon, China, Colombia, El Salvador, Gabon, Italy, Lebanon, Madagascar, Morocco, Niger, Tunisia...)

THESIS AND FINAL DEFENCE

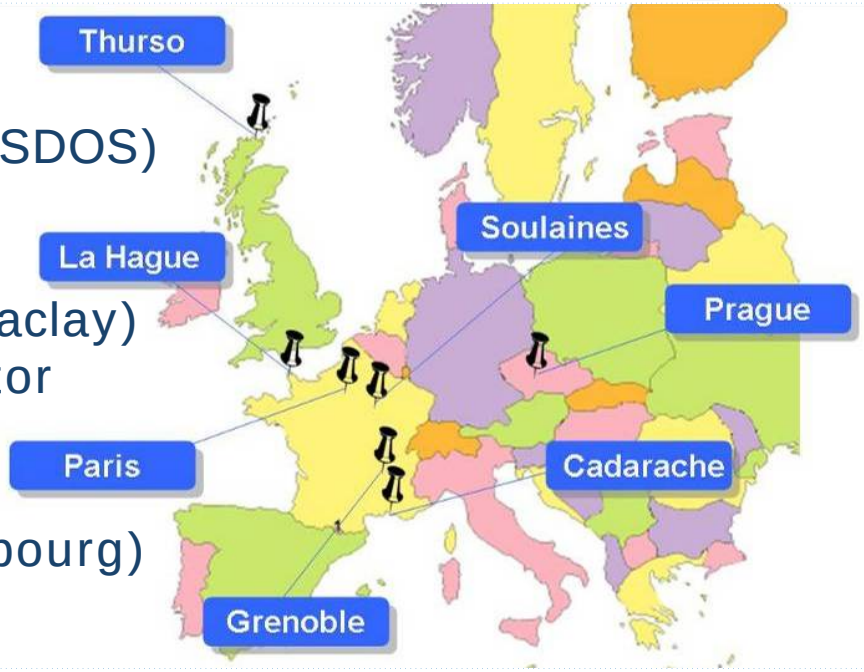
2 groups of students (current and previous Academic year)

Steering and pedagogical committee (UJF medicine and Physics, INSTN, CEA, EDF, IRSN, AREVA, authorities, medical field, Army, students representative and EMRP partner universities representative) ⇒ representative panel

TECHNICAL VISITS PROGRAM: AN EMRP STRENGTH

3 weeks to visit relevant nuclear installations

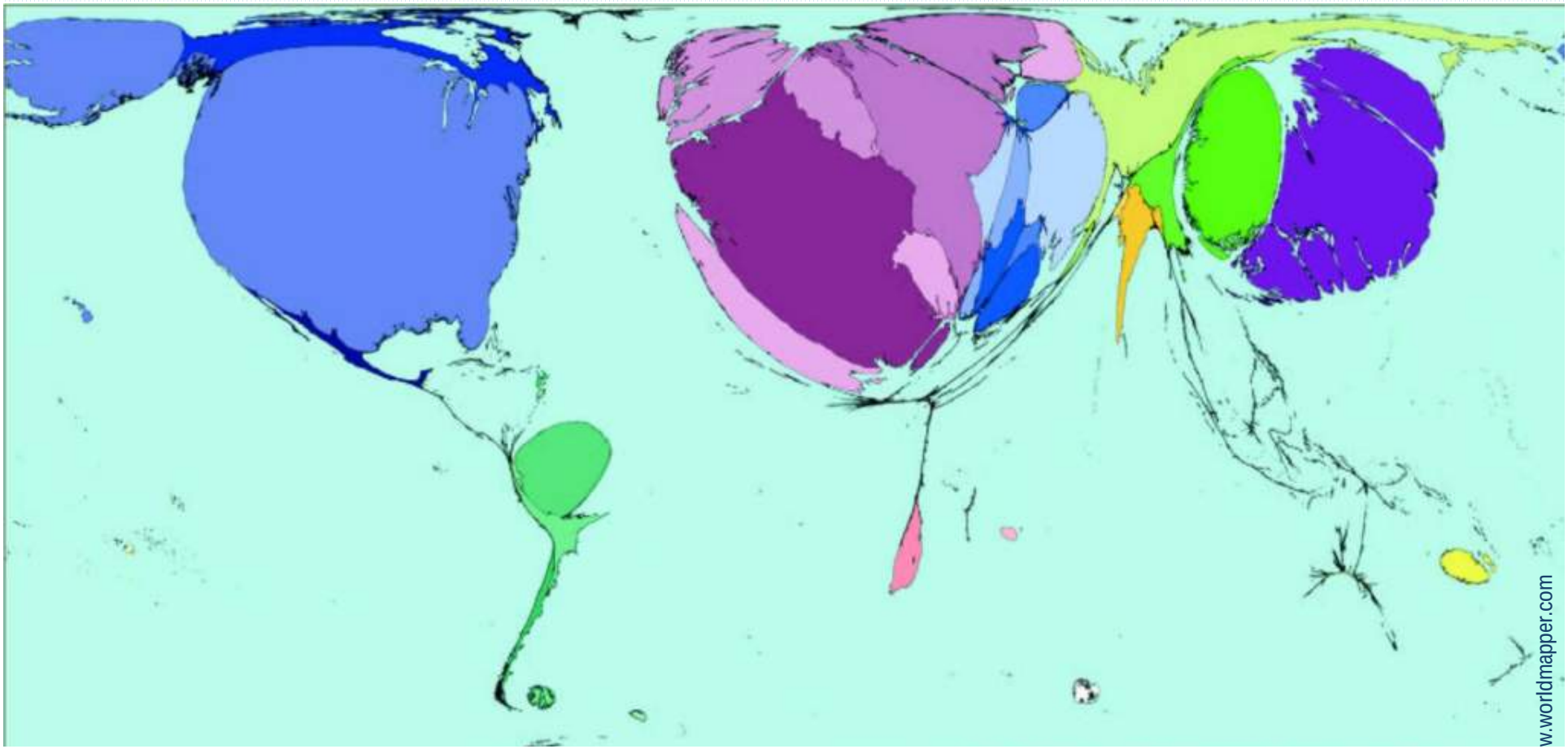
- ANDRA (CSM - CSA)
- SPRA (CTBRC Clamart)
- IRSN (Le Vésinet, SERAC, CTC, LSDOS)
- AREVA La Hague
- EDF NNP
- Installations STELLA and LECI (Saclay)
- Decommissioning of SILOE reactor
- ILL Reactor (Grenoble)
- ESRF (Grenoble)
- Life-like workshops (INSTN Cherbourg)
- NUCLEART (Grenoble)
- FBFC (Romans)
- CEA Cadarache (Environment, Tore Supra, Chicade)
- Saphymo, manufacturer detection devices (Meylan)
- Research reactor CTU (Prague)
  - *Eurodif (Pierrelatte)*
  - *Dounrey nuclear site (Scotland)*



... 4,500 km !!

CONTEXT: TOWARD A RP VIEW

Which countries generate nuclear electricity?



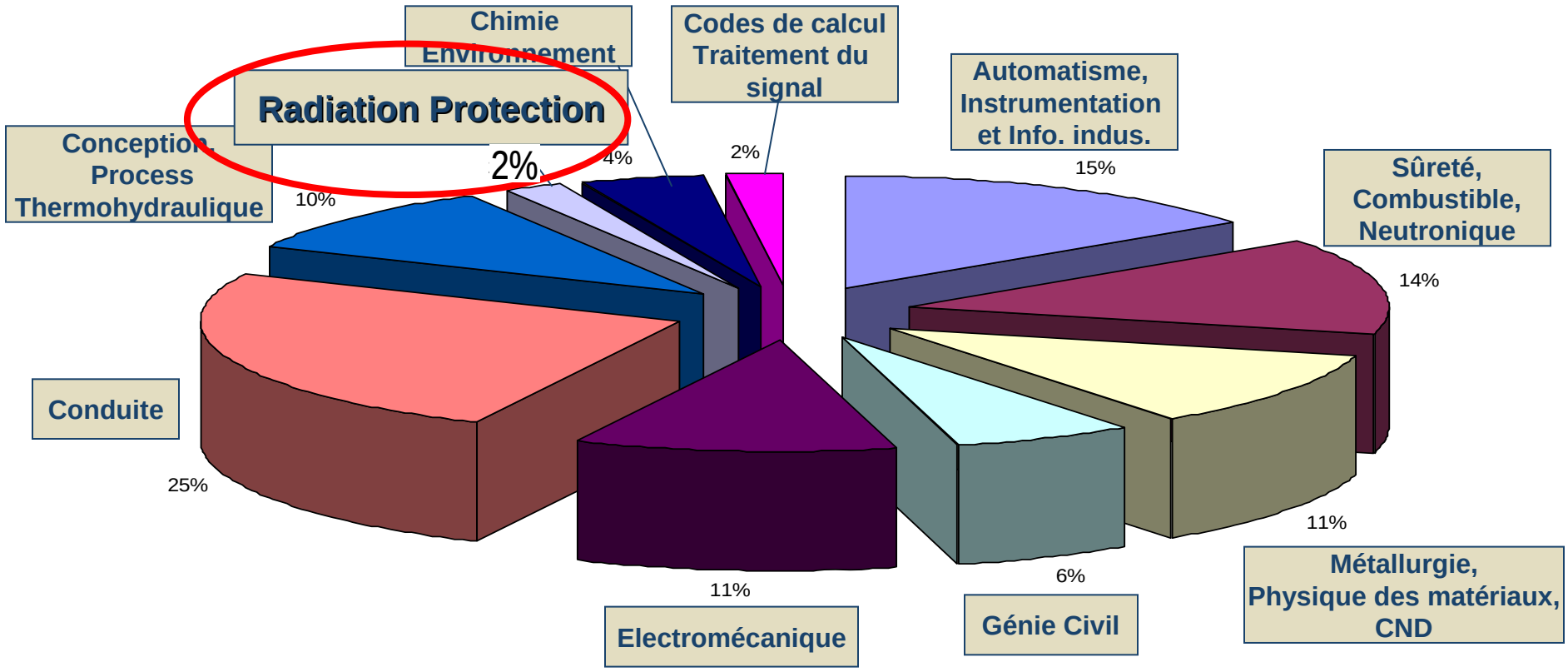
~ 45 RP / 4 units (~ 25 RP / 2 units) + 6 RP during outages **58 NPPs**

RENAISSANCE, YES !!! BUT…

- Availability of huge industrial tools (forges…)
- Quid of resources in raw materials (Uranium ore - Mox)
- Availability of qualified and skilled workers
  - English speakers for export activities
  - Massive departures to retirement
  - Weak attractiveness for scientific disciplines (ENETRAP II WP10)

JOBS FORECAST AT EDF

500 engineers/year for the next 10 years !!



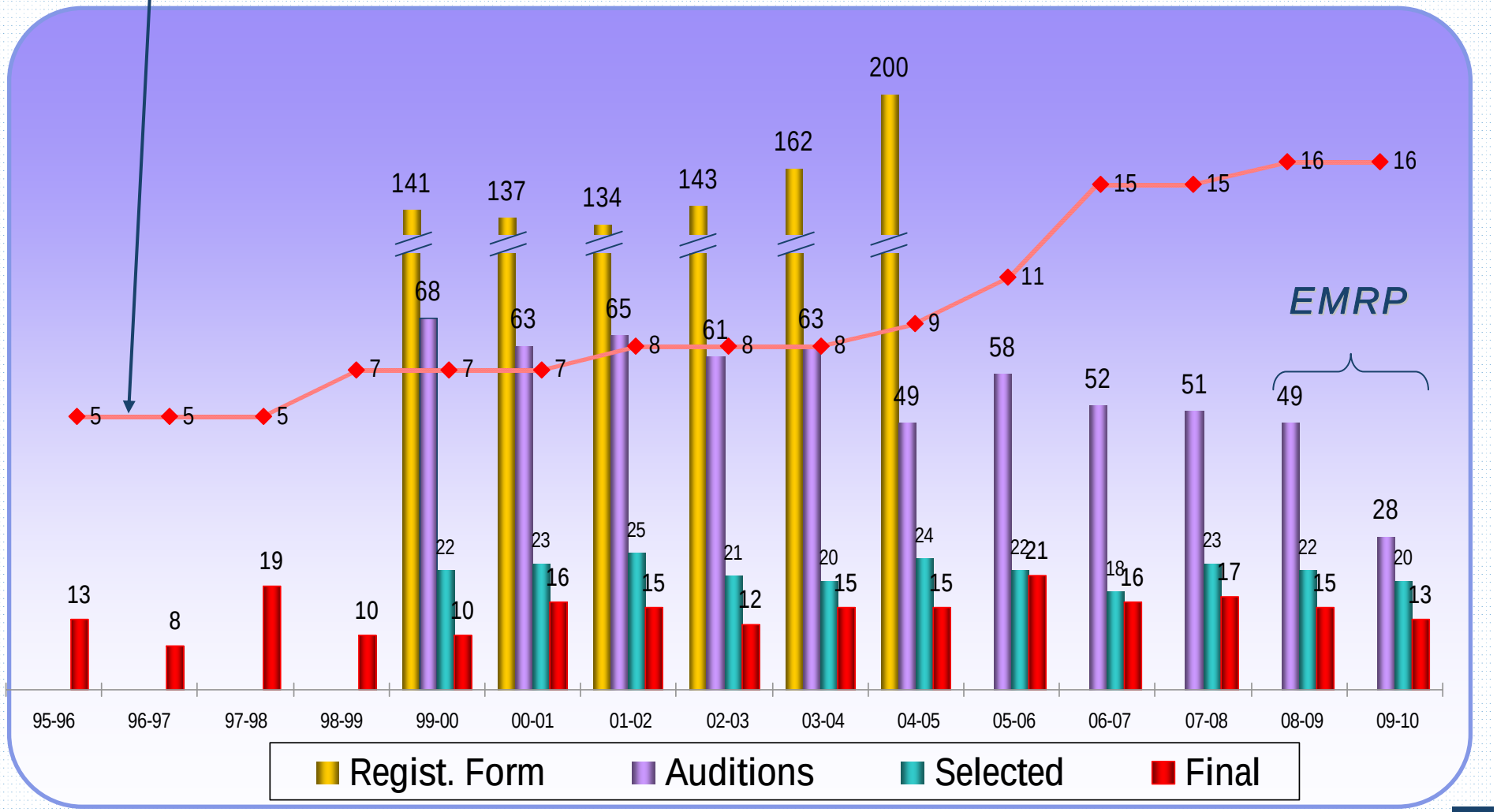
2% FOR RADIATION PROTECTION BUT…

- Ratio: 1 EDF for ~ 3 to 4 (Areva, contractors, regulatory bodies…)
- Increase of students number?
  - Initial training
  - CPD (re)training
- Impact foreseen on EMRP
  - Initial training: 15 → ~25 students (France)
  - LLLs: Increase number if still attractive (modular approach, pace, b-learning…)

however…

Number of RP students trends

~ number of Masters programs in "Nuclear" (France)



DIFFICULTIES TO OVERCOME

- To maintain an interest for RP among YG (ENETRAP II WP10) thus to maintain an appropriate number of students compared to other European Masters and national new "nuclear" Masters degree
- Large differences in tuition fees among partner institutions (from 252€ to ~3,000€)
- To find a unified definition of "joint diploma" and anticipate a greater partnership in the future
- The organisation of the required exchange period on a "one" year EMRP is difficult (M1 + M2??)
- Financial needs engendered from such a “trans national” course with exchanges and other means due to this European organisation with several partners

GOING ON ACTIONS [1/2]

- Improve attractiveness of RP careers
- Promote and disseminate information about EMRP
- Lectures in English (transition phase)
  - Courses in French with slides or pedagogical resources in English
  - English learning module (obligatory = ECTS)
  - Work shared through cases studies (multi-sites)
- Participation to RP association activities and events (SFRP, ATSR, IRPA 13...)
- Establish high framing partnership (ENEN...) and quality label (ENEN - ENETRAP II - EUTERP 2...)

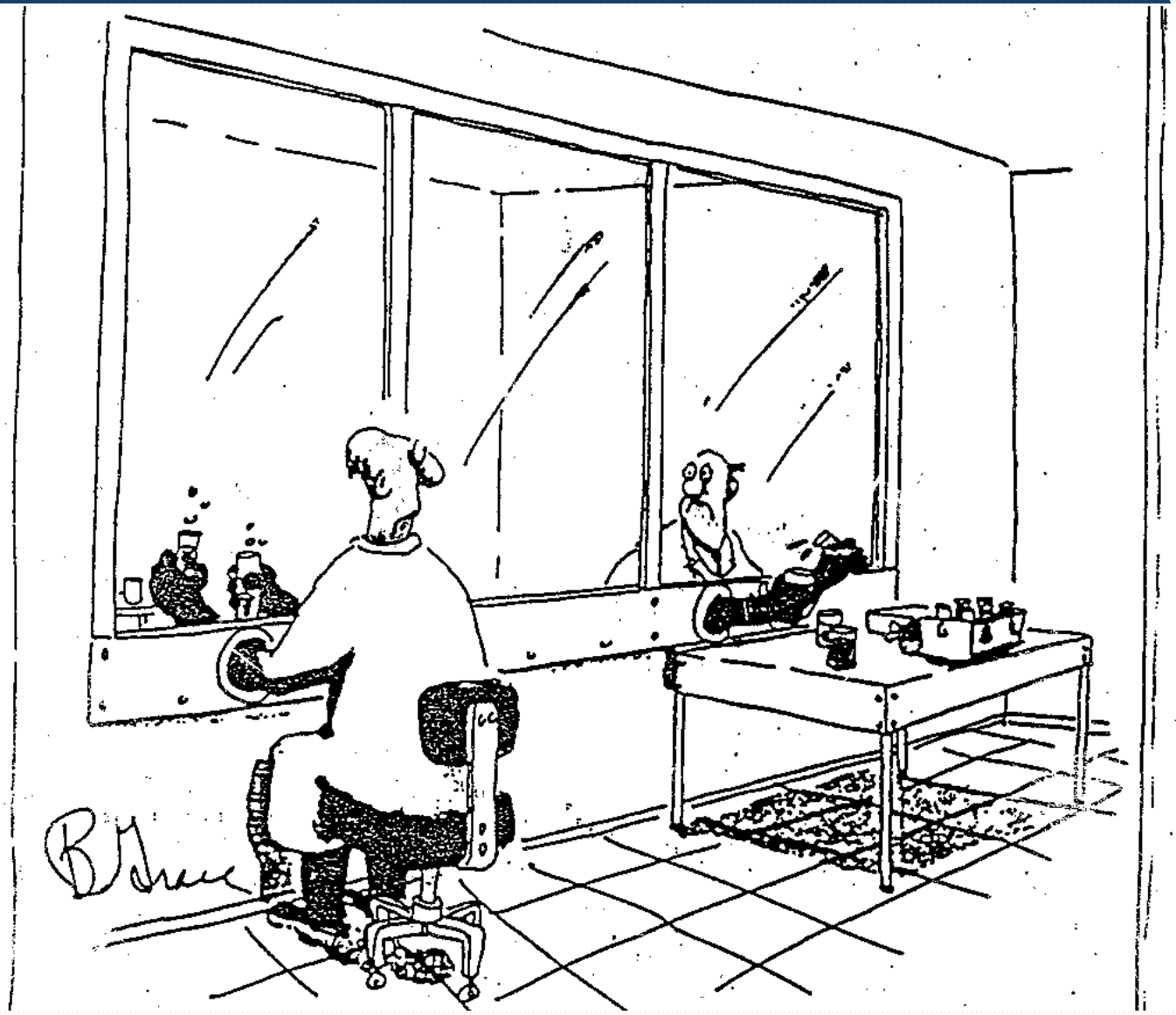
GOING ON ACTIONS [2/2]

- Consolidate EMRP recognition by nuclear actors
- Link between EMRP and a future European Masters degree in Nuclear Disciplines
- Increase number of partners in EMRP Universities consortium
- Extend possibilities for the internship period (mobility)
- Enlarge and enhance EMRP contains to
  - RP and radioecology (Norway programme)
  - RP and modelisation (specific calculation codes: MCNP, Tripoli, Geant4…)
  - RP and Nuclear security (IAEA)
- Restore an appropriate funding to maintain and improve the EMRP

CONCLUSION

- Important steps achieved by all partners
- Success of the pilot session
- Success of the European Week
- Schedule integration in ENETRAP 2 WP8 outcomes
- Difficulties and solutions identified (communication, promotion…)
- Need to continue…
- … enlarge the consortium to other Universities
- **Obtain sustainable funding**

3 +1 : Time – distance – shielding
BEHAVIOUR !!



Thank You for your attention!

www.emrp.info

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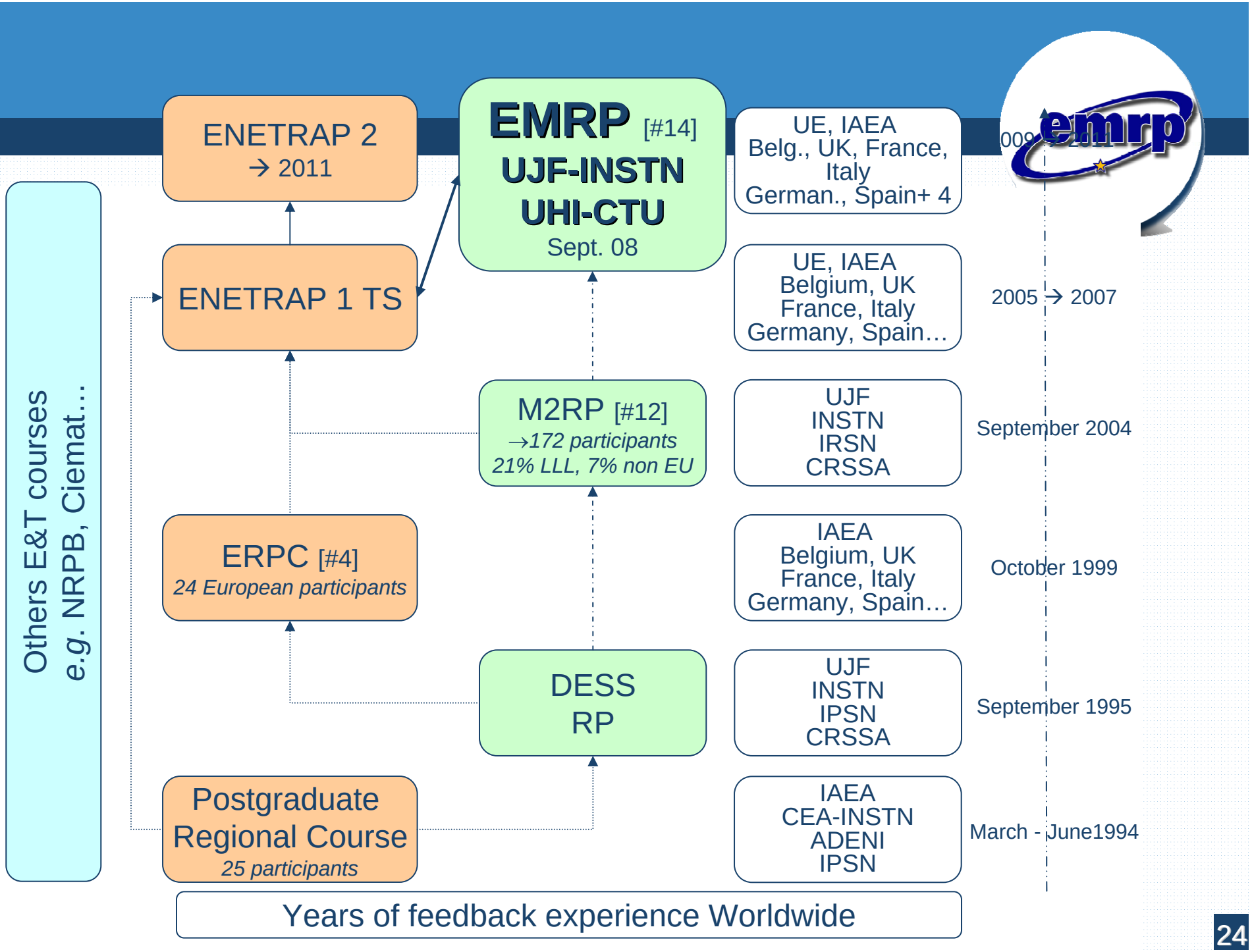
Our today students will be our colleagues in few months !


emrp

~ RP STAFF (nuclear domain)

- **EDF NPPs ~ 700**
- **CEA ~475:** Cadarache (135) + Saclay (110) + Grenoble (34) + BIII (46) + Ripault (4)+ Cesta (20) + FAR (50) + Marcoule (80)
- **AREVA La Hague ~220**
- **Contractors, ASN, support ~~500**

⇒ **~~~2000 RP Staff**


ENETRAP 2
→ 2011
EMRP [#14]
UJF-INSTN
UHI-CTU
Sept. 08
UE, IAEA
Belg., UK, France,
Italy
German., Spain+ 4
ENETRAP 1 TS
UE, IAEA
Belgium, UK
France, Italy
Germany, Spain…
2005 → 2007
M2RP [#12]
→172 participants
21% LLL, 7% non EU
UJF
INSTN
IRSN
CRSSA
September 2004
ERPC [#4]
24 European participants
IAEA
Belgium, UK
France, Italy
Germany, Spain…
October 1999
DESS
RP
UJF
INSTN
IPSN
CRSSA
September 1995
Postgraduate
Regional Course
25 participants
IAEA
CEA-INSTN
ADENI
IPSN
March - June1994
Others E&T courses
e.g. NRPB, Ciemat…
Years of feedback experience Worldwide