WHAT PROGRESS IS NEEDED IN TRAINING AND RECRUITMENT?

J.-G. CUBY
Email from Johannes Andersen, May 16:

As you may recall, the Roadmap exercise included not only the big hardware projects, but also the "HR" aspects of long-term planning for the future of European astronomy. Therefore, we have included a discussion of "What progress is needed in training and recruitment?".

(...) My concern is recruiting the next generation of staffs of instrumentation centres like the UKATC, ESO, Grenoble, LAM, NOVA/ASTRON (or ESTEC) etc., and the bright young astronomers (...) (I remember Guy Monnet saying at some point that "The E-ELT will be IQ starved!").

(...) I am writing to ask if you would be willing to give a short, thought-provoking introduction to this subject.
Focus of my talk

Several recommendations in the 2008 roadmap Panel E report dealt with Education and Public Outreach and were directed towards ministries. National organizations are very diverse and complex, coordination difficult. Progress is hard to monitor.

Focus on coordinating actions with the program agencies, ESO and ESA in particular, and the EC for the support programs

- Access through the advisory and decision making bodies
- Lobbying easier

Two possible lines of actions:

1. Improving the community – agencies relations for decision making in mission/instrument selection and procurement (ESO and ESA, with EC support)

2. Supporting the science exploitation (ESO, ESA, EC)
Do we have a (IQ) pb ? (I)

Hopefully not ! The community is large and competent enough, to make the E-ELT, ESA CV programmes etc. major successes (unless the economic crisis keeps cutting our jobs)

- ALMA is a major success. The VLT is the world leading OIR observatory, and an undisputed European success.
- And so are Planck, Herschel and more generally the ESA astronomy programme

Is there a change of scale ?

- Not really. These are larger projects, possibly more complex, but there are fewer of them (e.g. E-ELT vs. VLT).
- A consequence, and long-term trend is that collaborations are and will be larger (e.g. 1000+ Euclid consortium members today, probably twice as much at launch time).

Do we have the expertise ?

- Space: the space instruments are traditionally developed in space laboratories across ESA member states (despite an attempt at going to industry, ESA is back to labs in the community)
- Ground : the VLT instrumentation programme (20+ instruments) had a tremendous impact on the community. The expertise (hw, sw, project management) is now well spread across labs in the ESO community.
Do we have a (IQ) pb ? (II)

Is the vision right ?
Yes !(E-ELT, ESA CV, etc.)

But its implementation is much less so
• The E-ELT does not have a scientific vision attached to it, at least not for what it will do in the first 5-10 yrs of operation. There has been no follow-up after the E-ELT instrument phase A studies
• Political interferences in ESA decisions
  • detrimental effects on the community of the competition between scientifically different missions for the first ESA-CV missions, particularly at phase B
  • why on earth did we need US in Euclid?

As is the support to the scientific exploitation of the missions
• No science support from ESO and ESA to the scientific exploitations of their missions (unlike the well-known example of NASA support to its flagship missions)

Areas deserving improvements
• Community – agencies relations
• Scientific exploitation often has to rely on other sources of funding (e.g. ERC) with completely different peer-review processes, schedules, etc.
Agencies – community relations

There is no concept at ESO and ESA of organizing their communities
• Decisions making process sometimes has negative effects on the community (e.g. ESA CV first missions, E-ELT instrument phase A studies)
• Relations between agencies and community suffer
• Lack of trust in both directions
• (because of the process, things usually work much better at the technical level)

A possible line of thought: centers of expertise
• There could be centers of expertise, with well known technical and scientific expertise (similar to ‘space labs’, but more formal)
• ESA/ESO could recognize these centers and work with them (appropriation process)
• These centers would be ensured of being involved in a way or another when the right missions come, instead of chasing potential projects, losing focus on the way
• Support from healthy technology development programs during lower activity periods, maintaining long term competitiveness
• Networking could be supported by the EC (planned in H2020)
• Natural centers for training programs (EC-led). Cross-training with ESO/ESA
• Recruitment priorities would become clear and hopefully easier to manage at national levels

• Not a top-down thing. Build on existing situations and national preferences
• (Healthy) Competition could still apply (think at Thales and Astrium)
• This does not preclude innovation and excellence to blossom in other places
Supporting science exploitation

2008 recommendation

**Action.** Large-scale, potentially high impact astronomical research in Europe generally has to go through a “two-hoop” process for the allocation of facility time and the support of analysis and publication. We propose that a way is found of using the high quality peer review process already operated by the facilities to provide “fast track” funding for suitable projects, so enabling them to be internationally competitive and of high value for training.

**Institution.** This would generally need to be pan-European, presumably the EU or one of its delegated bodies.

**Timescale.** Two years.

**Additional comment:**
This relates to the evolution toward large(r) collaborations. Experience shows that people formed in these collaborations (PhDs, postdocs) have trouble to get positions (personal work less visible). A *partial* paradigm shift (a la particle physics) is required in hiring young scientists trained in these large collaborations. Planck has shown the way, Euclid will follow suit (1000+ members)
More from the 2008 roadmap

**Recommendation on economic impact**

**Action.** Create an international network of experts in technology transfer which organises an annual audit of technology transfer activities in order to increase the visibility of the industrial relevance of astronomy.

**Institution.** Agencies

**Timescale.** Two to three years

**Extremely important recommendation that should definitely be re-activated.**
A important measure in these difficult economic times: show that the return on investment in astronomy is large.
A high-tech, yet simple, training project

Nanosatellites
- Tens of them in preparation or already launched in the world
- Mostly university student projects
- Typically 5-yr projects

The LAM/AMU nanosatellite
- 34 students the first yr
- Supported by CNES
- No immediate return
- Payload not necessarily astronomy oriented
- Cost:
  - 1 FTE (engineer in charge of the project)
  - 1 big room (the ‘student space center’)
  - A few k€

The payback will come later
Conclusions

The next generation of facilities will be a step further into global astronomy.

The European astronomical community is certainly well prepared and has the required expertise to develop and operate them successfully.

Excellent training programs and opportunities exist in Europe (universities, national levels, EC-funded, ESA, ESO). Needs be maintained and expanded.

Areas of improvements (among others) are desirable that could optimize the HR in the community:

- Overall organization of the community and its relation with the agencies
- Science exploitation of the missions
Recommendations from the 2008 Roadmap

Create new and support existing training courses for the career and professional development of teachers

- National Ministries of Education and pan-European organisations
- One to two years to build up
- Active observation of the sky is basic to the understanding of astronomy

Encourage schools to use their playgrounds as open-air astronomical observatories equipped with simple devices.

- Ministries of Education
- One to two years

Encourage European stakeholders involved in developing educational programmes and curriculum delivery to realise the inspirational quality of learning using astronomy-related exercises and experiences

- National Ministries of Education
- One to two years to build up
Recommendations from the 2008 Roadmap

Implement a centralised, web-based distribution system for educational material in a range of languages
- Implemented by a pan-European organisation
- Two to three years.

Active steps should be taken to forge links between science museums/planetaria and the European Agencies (ESA/ESO), the principal providers of high quality media and related resources in astronomy.
- European agency (ESA/ESO) or other stakeholders
- Two to three years.

Adequate strategic long-term support must be provided for public communication and education in Europe. Firstly, observatories, laboratories and all facility funding authorities should allocate sufficient resources for public communication and education.
- Agencies.
- One to two years
Recommendations from the 2008 Roadmap

Ensure clear career-relevant recognition for scientists who become involved in public communication. Provide, and encourage scientists to utilise, media training courses.

- Employers of research scientists.
- One to two years.

Support the creation of a standardised European science communication portal for media, educators, interested laypeople and others.

- Agencies
- Two to three years.

Create an international network of experts in technology transfer which organises an annual audit of technology transfer activities in order to increase the visibility of the industrial relevance of astronomy.

- Agencies
- Two to three years

high quality peer review process already operated by the facilities to provide “fasttrack” funding for suitable projects, so enabling them to be internationally competitive and of high value for training.

- pan-European, presumably the EU or one of its delegated bodies