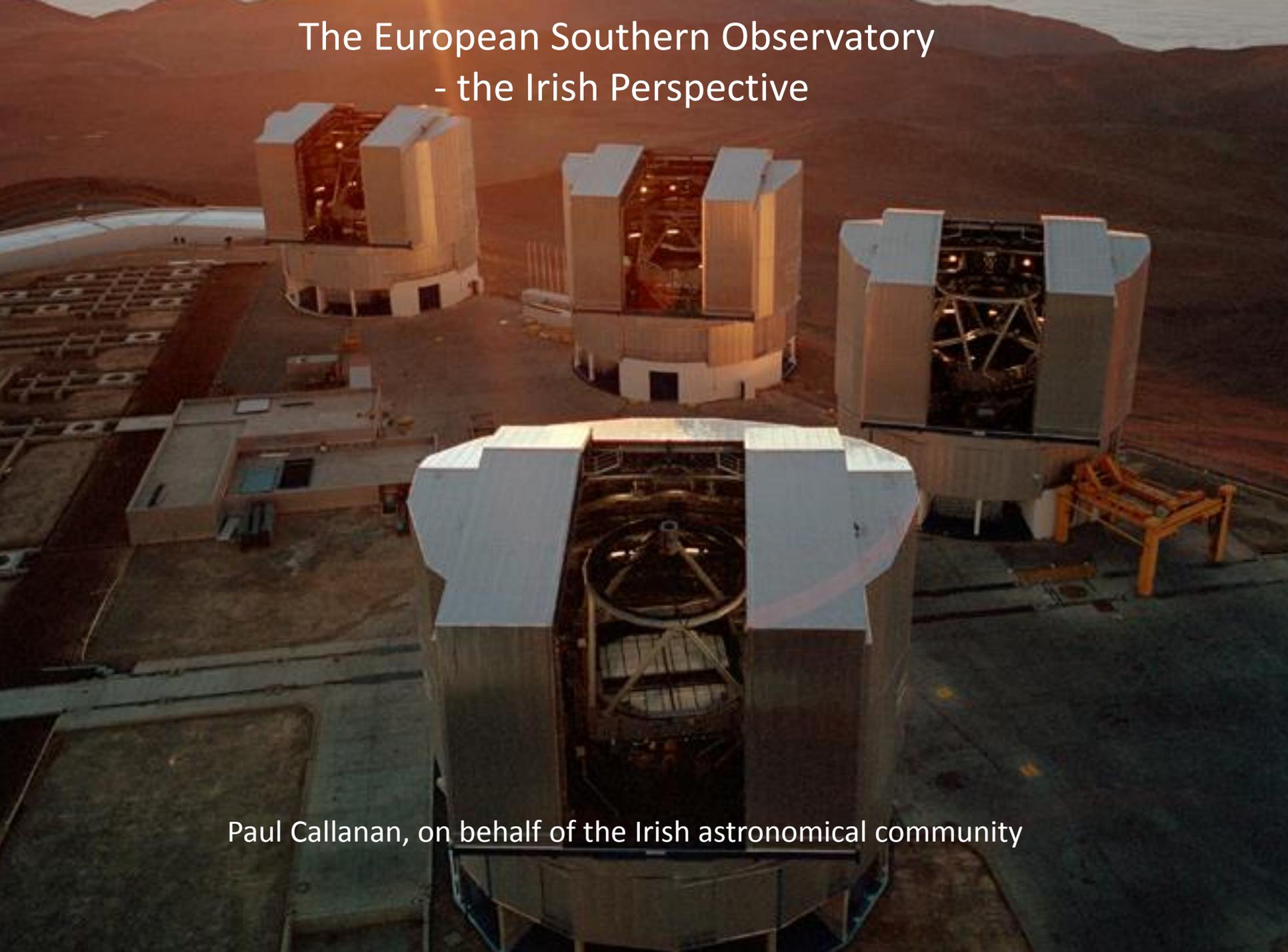


The European Southern Observatory - the Irish Perspective



Paul Callanan, on behalf of the Irish astronomical community

Overview of the Irish astronomical community -

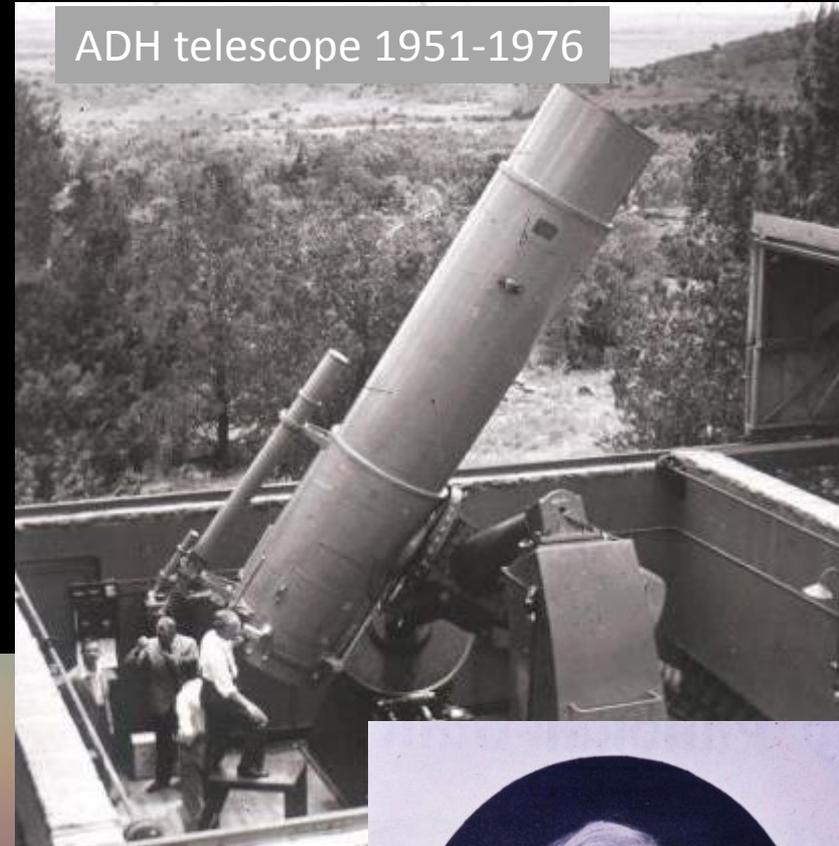
- Long tradition of Research
- Strong and diverse research portfolio
- Supports astronomy related degree programmes in all Universities
- Strong outreach
- But – blind. No direct access to observing facilities

A Tradition of Irish Astronomy

Birr Telescope 1845-1917



ADH telescope 1951-1976



La Palma 1979-2003



Howard Grubb

Research Strength and Diversity

- More than 50 professional astronomers in Ireland, at post-doctoral level and beyond. ≈ 30 tenured staff, most with dedicated research groups, in every Irish University, DIAS, and several ITs.
- Of order 65 PhD students currently carrying out astronomy related research – despite lack of national funding for Basic Research. Hence total population of research active Irish astronomers > 100 .
- Diverse research themes, including solar and stellar physics, star formation, compact objects, gamma-ray bursts, active galactic nuclei, jets, high time resolution astrophysics, high energy astrophysics.
- Groups involved in observational, theoretical, computational and hardware related programmes across range from radio to TeV. Several hardware programmes related to ESA activities.

- The community has been very active, meeting annually and biannually under the auspices of the Astronomical Science Group of Ireland, since 1974 – one of the first cross border scientific organisations in Ireland.
- Over the period 2006-2011, research income ~13 million euro, total publication rate of ~1,200 over the same period (ie 240 astronomy related publications per year nationally)

Teaching:

- Astronomy an excellent motivator for the brightest students
- Excellent source of transferrable skills (analytical, computational, problem solving).
- TCD, UCD, NUIG, NUIM, DCU, UCC all run astrophysics related degree programmes, with an average of ~10 students graduating in astronomy/astrophysics per institution per year.

Outreach/Education:

- Astronomy arguably the most potent of all the sciences for STEM outreach (e.g. Blackrock Castle Observatory, European Space Expo in TCD in 2013, March 20 2015 solar eclipse, large community of amateur astronomers).
- Astronomy now included in the junior cycle science programme.

Access to observing facilities for Irish astronomers – astronomical “blindness”

- For 25 years, Ireland had access to facilities on La Palma (via an agreement with PPARC, DIAS, NBST, from 1979 – 2003). Offered the option of guaranteed access to 1-m telescope, or access to all telescopes purely on competitive basis (=> possible allocation 0 !). Opted for latter, resulting in very successful record in bidding for time on international basis for all telescopes on La Palma - to 2003.
- Agreement formally based on 1-m telescope however, and when this closed agreement was terminated. Ireland now has no formal access to any (ground based) astronomical facility, uniquely in Europe.

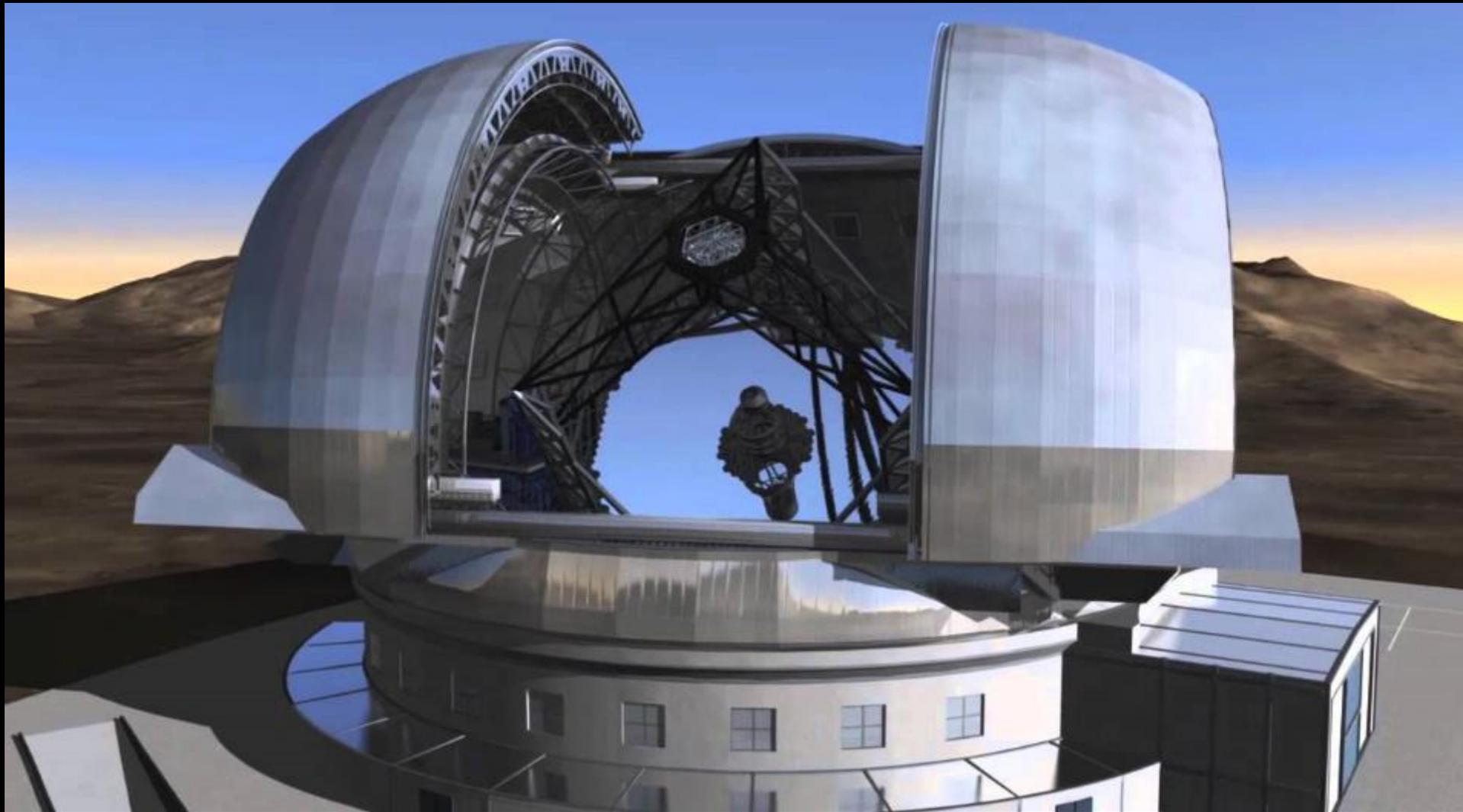
Ireland and ESO

- For the last ~10 years, it has remained the strong belief of the Irish community that, in the context of joining an International Research Organisation, its main priority is to join ESO.
- The ESO facilities clearly provide the best match to the wide portfolio of astronomical research in Ireland. Based on its current optical and IR facilities, the ALMA mm array and the future European Extremely Large Telescope (E-ELT) project, ESO membership would revolutionise astronomy in Ireland, and restore the international competitiveness of Irish astronomy.



- Membership of ESO would allow for more scientific collaborations to address the most fundamental astrophysical issues - led by Irish PIs. It would permit Irish involvement in state-of-the-art hardware development programmes (across the range of the electromagnetic spectrum).
- Membership would allow Irish companies bid for industrial contracts, in the same way as they currently do for ESA (increasing Ireland's technological capabilities with subsequent knock-on effects for the economy).
- Particularly timely in the context of the E-ELT "go ahead"
- Unlike ESA, ESO does not operate a juste-retour policy...

Artist's Impression of 39m diameter E-ELT



ESO and Ireland

There are (at least) three fundamental questions to be addressed in evaluating the case for Ireland to join an IRO such as ESO

- 1) Does Ireland have a community in place, of the required critical mass and technological expertise, to leverage the scientific benefits of ESO membership ?
- 2) Does Ireland have the industrial capability to bid successfully for the contracts that would be available, if it were to join ESO ?
What impact would this have on the long term competitiveness of these companies ?
- 3) Can Ireland afford it ?

1) The Community:

In the 2001 Forfás “Georgia Tech” report, astronomy in Ireland was described as “a particular national strength. Publication rate is above average, and the impact is strong “

This remains the case, despite the extremely adverse nature of the current funding situation in Ireland. To some extent, this is due to the proliferation of astronomy related degree programmes: many of these students proceed to postgraduate studies via IRCSET awards. This demonstrates the close interplay between undergraduate teaching and post-graduate research, and the positive effects that ESO membership would have even at undergraduate level.

There can be no doubt, however, that to truly maximise the scientific return of ESO, the Irish SSTI must broaden to include support for fundamental research.

2) Irish Industrial Capability

Would Irish industry be successful in bidding for ESO contracts ?

The purpose of this meeting !

But consider Ireland's performance as an ESA member state: as a result of the 17.3 M euro Irish ESA annual membership fee, by "the end of 2014 more than 45 Irish companies will be actively engaged on ESA contracts with turnover in these companies growing from €17 million in 2008 to a projected €70 million by 2015. Total employment in ESA participating companies is set to grow from 1,300 in 2008 to a projected 2,000 in 2015."

(Government SSTI Consultation document)

However, the current ESA “geo-return” for Ireland has reached unity: Ireland has attained its “juste-retour” limit.

But note in the context of ESO -

- ESO does not implement such a limit.
- The technological demands of the E-ELT are extremely challenging – including design, engineering, optics, detector development, data management and software development. Ireland is already highly competitive in several of these key areas, and, based on its successes within ESA, should be able to bid very strongly for ESO contracts.

3. Can Ireland afford to join ESO ?

- *Entrance fee – 12.7 million euro*
- *Facilities contribution 1.9 million (once off)*
- *Annual contribution – 1.8 million.*

Figures are for this year, based on Net National Income (and hence are likely to increase with time). Part of entrance fee may be offset against industrial contracts, subject to negotiation.

Note:

- Ireland would become a full member of ESO, enabling companies to immediately bid for contracts.
- Success of bidding process depends also on vigorous liaison between Government agencies, Irish companies and ESO.
- The annual contribution is $\approx 10\%$ of the current ESA contribution, but opens a new “market” for industrial activity.

- The ESO target is to have at least an industrial return coefficient of 0.7 for each Member State

Finally, an important aspect of the economic return to Ireland is the larger scale economic effect of spending on industrial contracts, such as those for ESO contracts. For ESA, estimates (e.g from OECD) indicate a multiplier effect of ≈ 6 , and we expect a similar multiplier is appropriate for ESO contracts as the technological requirements are similar.

So, perhaps the question to conclude with is

– can Ireland afford NOT to join ESO ?

Thank you !