UK Radio Astronomy Strategic Review

Ian Robson

- Arose from recommendations of the Balance of Programmes Review:
- ‘50 The E-ELT and SKA are acknowledged as critical developments for the future, and support for instrument development at current levels is ranked high priority by the AAP, a rung below the top. As a reflection of the diversity innate to astronomy, the same high priority is attached to the suite of smaller development projects as well as to LSST membership – a new opportunity involving all astronomy groups across the country. On the next rung down, the AAP report places the continued operations of e-MERLIN, LOFAR (both radio) and LT (optical time domain) at medium priority. This view makes sense given that the research communities using these facilities are respectively looking forward to the large SKA, and financially more modest LSST, investments in the future. In the case of radio astronomy, it can be argued that the total cost to STFC is now high relative to the overall volume of activity and UK interest in the area. ‘

- 52. In March 2018, the contract between STFC and Jodrell Bank in respect of e-MERLIN operations comes to an end, and a decision on bridging funds will be needed by then. If this is not enacted, radio interferometry within the UK is no longer supported, and continued involvement in observations of this kind in the run up to SKA may only proceed through international facilities (e.g. the VLA, the SKA pathfinders ASKAP, MeerKAT). STFC will also need to decide on the continuation of LOFAR by mid-2018.

- Recommendation 5: **We recommend an immediate review of UK involvement in all on-going, and planned, radio facilities and experiments (including UK leadership of MeerKAT and ASKAP radio surveys) to create a strategic roadmap for radio astronomy towards the SKA era. This review, in consultation with the radio community, should assess and tension the range of facilities available to UK astronomers and determine the key SKA 'pathfinders' (surveys and telescopes) in preparation for the main UK-led SKA science.**

- Ad hoc Panel set up in May 2017

Radio Astronomy Strategic Review Panel

- Membership
  - Prof Ian Robson
  - Dr Judith Croston (Open)
  - Prof Catherine Heymans (Edinburgh)
  - Dr Jonathan Pritchard (Imperial)
  - Dr Mark Sargent (Sussex)
  - Prof Ian Smail (Durham)
  - Prof Serena Viti (UCL)
  - Prof Anton Zensus (MPIfR)

Terms of Reference

1. Identify the key science goals of STFC's science roadmap that are most effectively delivered by the current and future UK radio facilities;
2. Consult with the UK astronomy community to identify and prioritise and where appropriate tension the observational capabilities and facilities that are required to deliver the key science goals.
3. Establish a roadmap and timeline showing the pathway for the development of future capabilities and facilities highlighting inter-dependencies, overlaps and key points for investment.
4. Analyse the broader European and global radio astronomy research landscape to identify current and potential future synergies. Comment on the importance of existing collaborations and how these benefit the UK radio astronomy community. [Noting the recent ASTRONET European RA review; RadioNet; H2020 etc]
5. Produce a written report that will be presented by the Chair of the Review Panel to STFC's Science Board by the end of 2017.

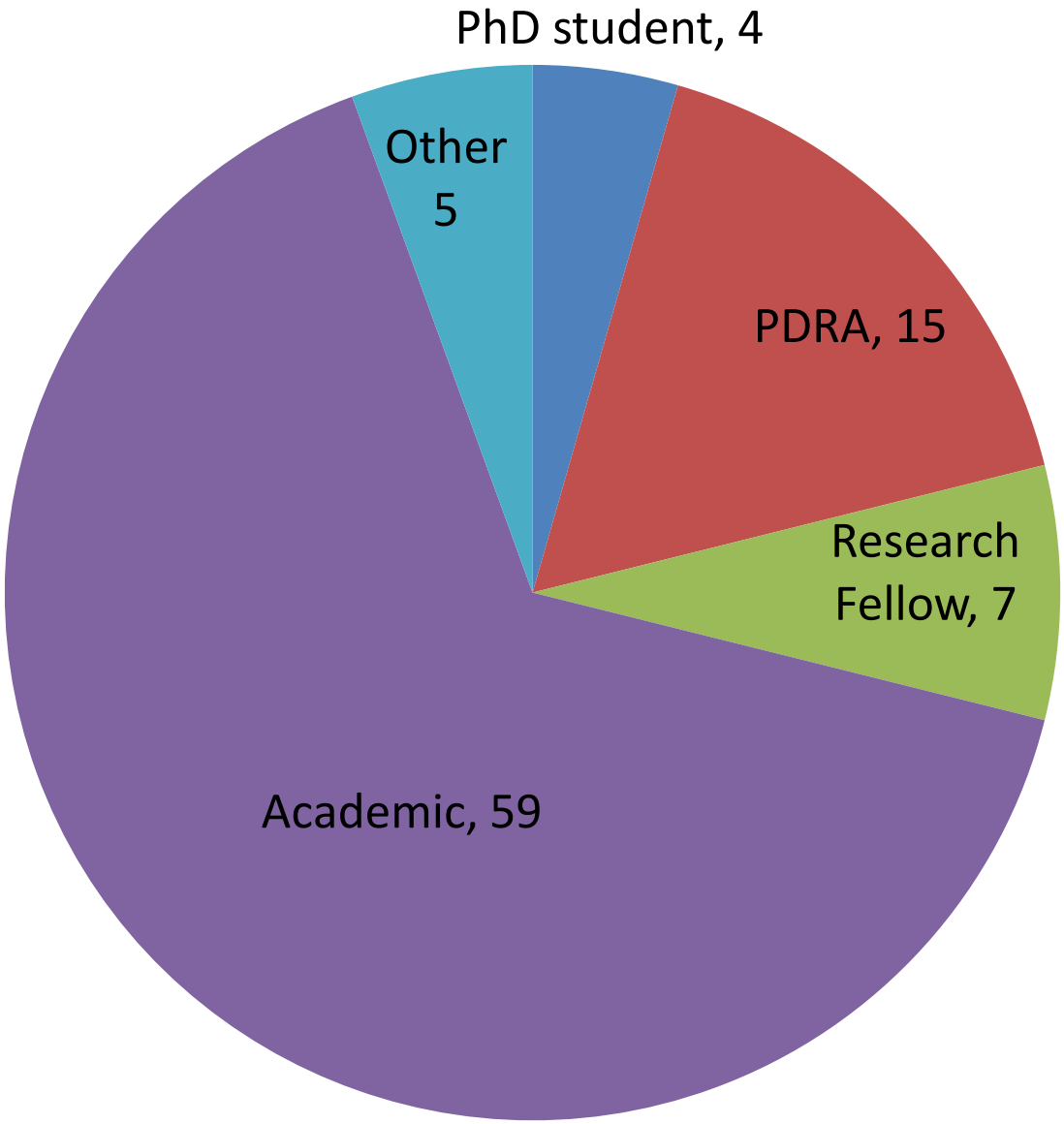
- 1st Panel meeting held on 21st June 2017
- Reviewed relevant timelines of the SKA project
- Reviewed 'scope' of radio facilities
- Overview of current grant support to radio astronomy (including use and development of SKA pre-cursers/SKA development grants)
- Agreed that previous data on SKA potential UK science areas and commitment to be used as the baseline
- Community questionnaire issued with a deadline of August 21st - 90 returns – more to come
- SKA science meeting Edinburgh Sept 7th, presentation/feedback
- 2nd Panel meeting to be held the following day
  - Presentations by e-MERLIN; LOFAR; JIVE/EVN
- Presentation/feedback to e-MERLIN/VLBI workshop Sept 11/12

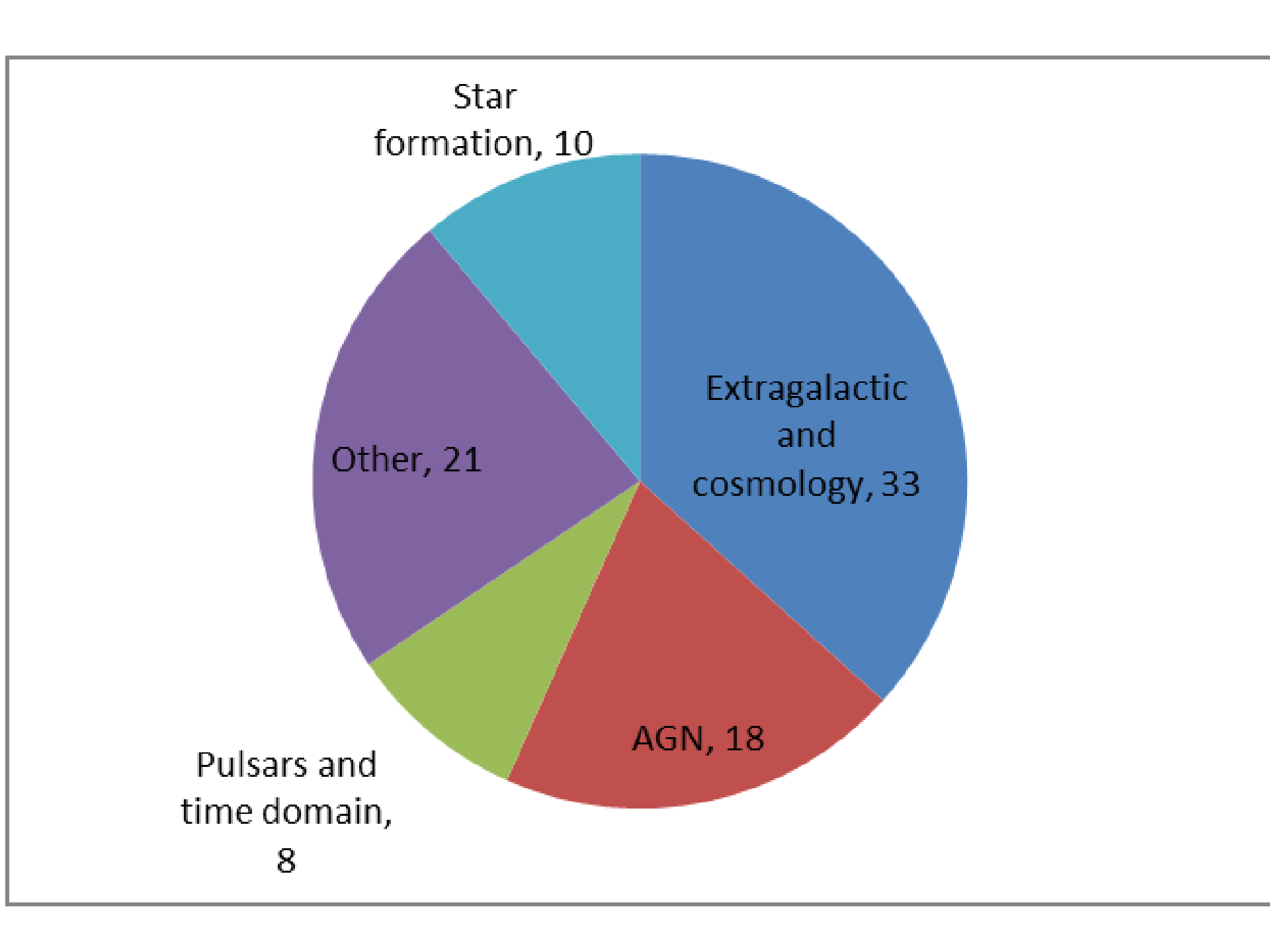
Questionnaire

Please tell us how STFC could best support your research and development in preparation for early SKA science. Where relevant, please discuss which precursor/pathfinder facilities you currently use and/or intend to use.

Institution	Total Number of responses	Status:
University of Manchester	28	16 x Academic staff; 5 x PDRAs; 3 x Research Fellows; 2 x Other Emeritus Profs; 1 x Other - Scientific support staff; 1 x PhD student
University of Oxford	7	4 x Academic staff; 1 PDRA; 1 x Research Fellow; 1 x Other - Visiting Prof
JIVE	6	4 x Academic staff; 2 x PDRAs
University College London (UCL)	4	3 x Academic staff; 1 x PhD student
University of Leeds	4	3 x Academic staff; 1 x PDRA
University of Hertfordshire	3	2 x Academic staff; 1 x PDRA
University of Southampton	3	1 x Academic staff; 1 x PDRA; 1 x PhD student
Cardiff University	2	2 x Academic staff
Durham University	2	1 x Academic staff; 1 x PDRA
Imperial College London	2	1 x Academic staff; 1 x Research Fellow
Newcastle University	2	1 x Academic staff; 1 x Research Fellow
Open University	2	1 x Academic staff; 1 x PDRA
University of Edinburgh	2	1 x Academic staff; 1 x PDRA

Total of 90 responses; 11 from international organisations


PhD student, 4
PDRA, 15
Research Fellow, 7
Academic, 59
Other 5


Star formation, 10
Extragalactic and cosmology, 33
Other, 21
AGN, 18
Pulsars and time domain, 8

Two Strategic Questions

- How do we best prepare for the SKA?

- What is the situation for radio astronomy when the SKA1 is fully operational – say a decade from now?

SWG Membership	UK Number	Chair/co-Chair
Cosmology	26	
Cradle of Life	7	
EoR	6	Chair
Exgal continuum	15	
Exgal spectral line	10	co-Chair
HI Galaxy	5	
Magnetism	6	
Our Galaxy	9	co-Chair
Pulsars	9	
Solar helio and iono	21	co-Chair
Transients	10	

Best Strategy for UK Science maximisation from the SKA?

- Leadership/membership of KSPs
- Adequate postdocs for data analysis
- Skills in specific data analysis – precursors
- Expertise in proposing science programmes
- Familiarity with observing techniques from existing facilities

- Who will drive the science programmes ?
- How do the current facilities fit in with this?
- How does VLBI fit?
- Don’t forget the need to retain technical capability
- Don’t forget Regional Data Centre requirements