Development of a Research Infrastructure Priority Plan at the University of Tasmania – A Discussion Paper

Background

World class research requires world class research infrastructure. World class research infrastructure, combining the right human capital with the right tools, attracts world class researchers and facilitates international collaboration with leading researchers and organisations elsewhere. These statements seem incontrovertible and self-evident, yet in many research organisations and tertiary institutions, purchase, maintenance and promotion of research infrastructure is often an ad-hoc rather than a strategically planned issue.

The University of Tasmania (UTAS) has examples of sector best practice in regard to research infrastructure, eg, the establishment of the Central Science Laboratory (CSL) is an example that many other Australian universities have sought to emulate. However, UTAS also has many examples of outdated research infrastructure that cannot support leading edge research or facilities that are no longer fit for purpose.

No institution can afford to fund and maintain a comprehensive suite of leading edge research infrastructure that spans all disciplines – in fact most major national research infrastructure funding schemes (NCRIS, ARC LIEF) emphasise the need for collaboration. However each institution should have that research infrastructure which is capable of both supporting basic research needs and showcasing a smaller number of high performing strengths.

Against this backdrop the DVC (Research) commissioned a UTAS Research Infrastructure Assessment Working Party with the following purpose:

To develop a sustainable research infrastructure plan for the University of Tasmania (UTAS) including current Central Science Laboratory (CSL) capacity, eResearch capacity, personal research infrastructure capacity (research data and information sources, desktop support) and examination of central vs School/Faculty support mechanisms.

The Working Party comprised Professor Brian Yates, Deputy Chair: Academic Senate (Chair); Professor Mardi Dungey, Faculty of Business; Ms Jane Long, University Librarian; Dr Evan Peacock, Director: Central Science Laboratory and Dr Mark Hochman, Senior Advisor: Research Policy and Strategy (Executive Officer). This Working Party was charged with the following terms of reference:

1. To identify the current research infrastructure base within the University;

2. To identify national and international infrastructure currently used by UTAS researchers including e.g. access to the Australian Synchrotron, ANSTO, NCI supercomputing facilities and others;

3. To assess additional opportunities for collaborative use of research infrastructure (internal and external);
4. To make recommendation as to an appropriate balance of central versus school/faculty infrastructure. This may include an examination of categories of infrastructure (eg local, mid size, flagship infrastructure) as well as identification of issues around central support versus local facilities;

5. To examine the value to the university of its research infrastructure including contribution to research outputs and to recommend how such information might be collected and measured on an ongoing basis;

6. To assess the adequacy of the University’s current research infrastructure, including limitations to research;

7. To recommend principles to guide future allocations of internal funding for research infrastructure, including for those items to be purchased outright and those to be leveraged through other schemes such as ARC LIEF, NHMRC Equipment Grants and other national infrastructure schemes. Development of these principles will take account of how best to plan for improving research infrastructure and mechanisms for prioritising, and then either maintaining existing or acquiring new research infrastructure;

8. To assess the University’s current eResearch capabilities and recommend on opportunities for further integration of eResearch into University business.

The Working Party commenced work in November, 2011 interviewing an initial selection of staff identified by Deans and Directors of Institutes with the aim of producing an initial Discussion Paper (this document) which would be used for wider consultation. The list of persons consulted thus far is contained in Appendix A. The Working Party is thus seeking feedback from the UTAS community on the principles and observations contained in this Discussion Paper, or anything pertaining to the Terms of Reference above. Written submissions should be sent to Mark.Hochman@utas.edu.au by Friday 10th August.

Meetings to provide feedback will be organised with a number of groups across the Faculties, and people who particularly wish to meet with the working party should contact Mark Hochman. Following further input the Working Party will release a paper on the recommended approach to developing a sustainable University Research Infrastructure Priority Plan.

Discussion

1. To identify the current research infrastructure base within the University.

Findings

- Research infrastructure comprises more than large machines and laboratories. Several staff commented on the value of infrastructure provided through access to databases, specialised collections and curation, desk top IT support and the Library. In Humanities and Social Sciences subscriptions to data sets and collections are an essential infrastructure. Qualified support staff also form an important part of UTAS research infrastructure. All of these aspects need to be recognised in development of a UTAS infrastructure inventory and plan.
- The Library is highly valued as a research infrastructure resource throughout the university. However, along with recognition of the Library’s value to research was a
common concern that current collections/subscriptions were not current or comprehensive and there is a suggestion that collections be prioritised to support existing and emerging areas of research strength.

- The Central Science Laboratory (CSL) is a highly valued central resource and is a model now being adopted in other larger universities. However the CSL is heavily dependent on use of external programs such as ARC LIEF to replace aging infrastructure and develop further facilities for UTAS staff. Use of the CSL within UTAS is uneven, even amongst science based disciplines, with less use from the research institutes than the faculties. The University may need to consider whether it is appropriate to have large scale scientific infrastructure outside of CSL or whether there are further efficiencies to be gained through further consolidation of such facilities into the CSL.

The broader role of CSL should also be considered within UTAS, i.e. whether it has a facilitation role to other external facilities, whether it is a source of advice on research infrastructure purchases within the University or whether it should play a larger coordinating role in considering research infrastructure purchases within UTAS.

- Throughout UTAS much of the large fixed infrastructure (e.g. glass houses) is aging. There seems to be no mechanism within School or faculty budgets to address this issue at the current moment.

- The knowledge of the UTAS broader research infrastructure base is generally not well known outside of individual academic units and hence shared use of infrastructure is limited. A starting point for any research infrastructure priority plan would be a good base knowledge of existing infrastructure.

Recommendations
The University should develop a comprehensive record of its research infrastructure. This record should be updated annually and available to the whole University community to encourage broad use of existing infrastructure

Questions
How far should this record extend? Should it apply only to infrastructure above a particular dollar value? If so, what is an appropriate dollar value?

Should priority be given by the University Library to develop research collections in specific disciplinary areas reinforcing existing and emerging areas of research strength? Is this acceptable if it leads to other areas of research and learning and teaching not being supported?

2. To identify national and international infrastructure currently used by UTAS researchers including e.g. access to the Australian Synchrotron, ANSTO, NCI supercomputing facilities and others.

Findings
- Use is made of national infrastructure, such as the synchrotron and ANSTO, but there is no coordinated record of such usage. This causes difficulties and re-collection of data from faculties whenever cases are made to invest in large external facilities.

- The University needs a greater awareness of national facilities and national initiatives (e.g. NCRIS) – see more under Term of Reference 3.
• There is no systematic method of determining the costs of accessing national infrastructure – some subscriptions are paid centrally, some at the Faculty level, and equipment use is often funded by individual project grants. A set of transparent guidelines governing contributions to external facilities and data subscription services is considered to be necessary.

• UTAS should be more outward looking in its use of research infrastructure, and this could include greater representation on national committees.

• IMOS is an example of nationally significant research infrastructure based at UTAS which is used by other institutions – infrastructure attracts researchers. See more under Term of Reference 3.

• There is other no-cost or low-cost research infrastructure that is used (e.g. the National Library) or which is accessed through collaborative ventures (e.g. general facilities within CSIRO, MNRF and AAD, and specific (often one-off) facilities that are negotiated between individual researchers). Even in these cases there may still be the cost of travel.

Recommendations
The University should develop a list of substantial national (and international) facilities that are used by researchers.

The University should develop guidelines for access to national research facilities. Such guidelines should include clear information on the benefits of accessing facilities and the costs of subscription/access.

Questions
How is a register of national (and international) infrastructure kept manageable and up-to-date? (How can we make it most useful to researchers?)

What principles should be used to determine access or subscription payments to national research facilities? What principles should govern the source of payments, i.e. central vs faculty vs individual project funds?

3. To assess additional opportunities for collaborative use of research infrastructure (internal and external).

Findings
• As noted in the first Term of Reference a register of internal research infrastructure would facilitate opportunities for collaborative use of internal infrastructure. This register should make reference to existing collections of resources such as the Library catalogue and other information discovery tools. Such a register would need to be regularly maintained (updated annually?) and easily located. An appropriate location for this register could be the CSL or elsewhere in the Office of the DVC (Research) with multiple entry points including through the Asset Management Services Unit.

• Information on major external research facilities such as NCRIS is currently ad hoc. Some individuals have extensive knowledge of large national infrastructure facilities, many have little knowledge. As a result, current access to NCRIS or other national research facilities is often limited to some individuals rather than being broadly spread across the University.

As an example, UTAS hosts the NCRIS facility Integrated Marine Observation System (IMOS) which is federally funded NCRIS facility with a nationally integrated capacity
to collect marine data, draw it together and make it accessible to researchers and other users. The facility is well known and utilised by some UTAS researchers with appropriate disciplinary expertise. However IMOS is only one of a dozen NCRIS facilities (http://ncris.innovation.gov.au/Pages/default.aspx) with advanced analysis capabilities and national datasets. Knowledge of, and hence access to, these other facilities is limited and the Research Infrastructure Working Party considers that greater effort should be made to promote national facilities throughout UTAS. The mechanism to do this is an area where feedback is sought but could potentially involve an expanded role for a body such as the CSL to act as a portal to other facilities and to proactively seek to disseminate knowledge of such national facilities.

- In addition to national facilities the Working Party is aware of unique facilities within UTAS (e.g. AMC) and the State of Tasmania and considers that the University has a role in seeking to identify strategic opportunities to promote these facilities across Australia and internationally.

**Recommendations**

The University should take proactive steps to increase awareness and use of NCRIS facilities and other national infrastructure schemes. Further promotion of NCRIS facilities and access to them should be coordinated through a central point such as the CSL.

The University should identify strategic opportunities for research infrastructure collaboration within UTAS and within Tasmania.

**Questions**

Should there be a university “portal” for promotion of and access to NCRIS and other facilities? Is CSL the appropriate portal?

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4. **To make recommendation as to an appropriate balance of central versus school/faculty infrastructure. This may include an examination of categories of infrastructure (eg local, mid size, flagship infrastructure) as well as identification of issues around central support versus local facilities.**

**Findings**

- The CSL model is supported throughout the University and could be extended.
- Proximity to facilities is still an important factor and is a reason why some Schools/Faculties choose to invest in, and maintain local research facilities rather than base them within the CSL.
- There is some overlap of equipment between CSL and Faculties but this is limited (and usually occurs where the technique is already fully oversubscribed in the CSL).
- Of more interest is potential benefit in consolidating ongoing support for large facilities.
- UTAS needs both a strong general base of research infrastructure together with more specialised facilities. In developing an inventory of current research infrastructure (Term of Reference 1) and in developing a future research infrastructure priority plan (Term of Reference 7) it would be helpful to establish categories of research infrastructure (which includes staffing and maintenance costs), e.g.:
  - Local – less than $50,000, funded by and maintained within faculties;
  - Mid-size - $50,000 - $250,000, funded collaboratively;
  - Large - $250,000 and above and requiring external funds
  - Flagship – greater than $2,000,000, requiring substantial external investment and suitable badging as a University facility.
These categories may need to be aligned with the differential needs and incomes of different faculties.

- Support for infrastructure (at the local, faculty, and central levels) is complicated by the overlap between teaching and research. Some infrastructure is used for both purposes, and some research infrastructure is funded by teaching income and vice versa.

**Recommendations**
The Working Party came to no firm few on the balance of central vs faculty research infrastructure and is keen to elicit feedback on this topic.

**Questions**
Is there further potential for consolidation of major equipment to the CSL?

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5. **To examine the value to the University of its Research Infrastructure including contribution to research outputs and to recommend how such information might be collected and measured on an ongoing basis.**

**Findings**
- Research infrastructure is essential to obtaining research results however it is difficult to quantify.
- Library resources are seen by the UTAS community as essential in producing publications and grant applications, but again, quantifying the value of Library infrastructure is difficult. The University Librarian is able to provide international reports and publications that do attempt to quantify the Library's impact on research.
- One means of capturing the contribution of the University’s research infrastructure (e.g. CSL, Library information resources) could be through the annual publication collection process where staff could indicate use of facilities and infrastructure. This would integrate with existing data collection processes and hence not impose any further burden on academic staff. Several staff interviewed were of the opinion that this information would be useful, not only for internal purposes but also for external purposes such as infrastructure applications where use of existing facilities could be demonstrated. A coordinated approach is required to ensure that the data collected is meaningful.
- Other measures discussed which could assist in determining the value of research infrastructure might include: usage data, the level of financial investment (external funds and money from research accounts used to support a facility), external leveraging, industry partners, national leadership, reputation, impact of research, breadth of impact.
- Annual reports from various facilities (e.g. CSL, IMAS, Menzies, CODES, etc.) could demonstrate use of infrastructure to obtain research outputs.

**Recommendations**
That the University’s publication reporting proforma be adapted to include a section on use of UTAS research infrastructure.

That an annual report be presented by the Office of Research Services to Research College Board on reported outcomes of use of infrastructure.
That annual reports from various facilities at UTAS demonstrate use of infrastructure to obtain research outputs.

Questions
What evidence based mechanisms could be used to capture the value of research infrastructure to the University’s research effort?
What is a suitable time-frame to demonstrate usefulness of particular research infrastructure?

6. To assess the adequacy of the University’s current research infrastructure, including limitations to research.

Findings
- The Working Party was unable at this stage to adequately assess this Term of Reference and seeks input to assist its deliberations. Benchmarking of UTAS research infrastructure against other universities would help to identify and validate limitations. Such benchmarking has already been undertaken by the Library and is regularly updated.
- A benchmarking exercise may include facilities and resources, but might also include the level of ongoing support of infrastructure, the level of access to national and international infrastructure and the mechanisms by which infrastructure availability is communicated to the university community.
- In addition to external benchmarking there is a need to capture information from Faculties and Schools about their perceptions of the current limitations in research infrastructure.

Recommendations
That the University should carry out a systematic benchmarking of research infrastructure for the purpose of identifying and validating areas of need.

That the University should develop a record of limitations of the current research infrastructure as identified by Faculties and Schools.

Questions
What measures should be used in the benchmarking?

What is the relationship between the record of infrastructure limitations and the Priority Plan (see next section)?

7. To recommend principles to guide future allocations of internal funding for research infrastructure, including for those items to be purchased outright and those to be leveraged through other schemes such as ARC LIEF, NHMRC Equipment Grants and other national infrastructure schemes. Development of these principles will take account of how best to plan for improving research infrastructure and mechanisms for prioritising, and then either maintaining existing or acquiring new research infrastructure.

Findings
There is no current central research infrastructure fund. Whilst most universities do not make details of their research budgets public, it is clear anecdotally and from press releases that several universities are currently investing significantly in (re)building a world class research infrastructure.

Within UTAS, currently requests for central contributions to support infrastructure bids require local input but are considered on a largely ad-hoc basis. The UTAS guidelines for applications to the external ARC Linkage Infrastructure Equipment and Facilities (LIEF) scheme specify that central funding will only be committed on a matching basis. (As a general rule, in a LIEF bid no more than 60% of the total cost should be requested from the ARC with the remainder split 20% from central UTAS funds and 20% from Faculty/School/Institute.) However, there are no guidelines to govern expected contributions or ratios from local and central areas to other external research infrastructure bids, nor is there an established budget line for research infrastructure within the central research budget.

The new UTAS budget model distributes research block grants to faculties/institutes. Part of this is used to fund central support services (e.g. the DVCR division and the Library) through operating contributions, and part is retained by the faculties and institutes. Not all faculties run an infrastructure or large equipment fund. Those that do have been decreasing the pool of funding in recent years.

There is no systematic means within UTAS of supporting infrastructure (CSL is an exception to this which is part-funded on an annual basis within the Office of the DVC (Research) and part-funded through user charges).

The University should (re-)establish a central fund to provide for new, replacement and upgraded research infrastructure. Use of such a fund should be tied to faculty research infrastructure priority plans which are refreshed regularly and prioritise the faculty’s research infrastructure requirements. UTAS should also develop transparent guidelines for use of a central research infrastructure fund. Guidelines might include: current research performance (ERA data and research outcomes), national and international priorities, cost effectiveness and collaboration (including between Faculties and Institutes), sustainability of the infrastructure (cost of ongoing support, insurance, maintenance, operation, etc.), evidence of return on investment, benchmarking data, internal and external leveraging opportunities.

In developing a central research infrastructure fund we should not forget the need to provide funding for scholarly information resources through the Library.

**Recommendations**

That a set of guidelines for prioritising needed research infrastructure be developed.

That UTAS develop a Three year Research Infrastructure Priority Plan with input from academic units and which is updated annually. The Plan should contain aspirational infrastructure (flagship) as well as prioritised mid-size and local infrastructure. The Plan should be used to determine allocation of central funds in bids to leverage external sources of research infrastructure funds.

That a central research infrastructure fund under the control of the DVC (Research) should be established to support leveraged bids for external funds. Transparent guidelines should be developed for the use of this fund.

**Questions**

What factors should be included in the guidelines to determine research infrastructure priorities?
What amount should be set aside for a central research infrastructure fund? Should this be correlated with the total amount of the research infrastructure block grant received by UTAS?

In addition to the faculty infrastructure priorities what other criteria should govern this fund’s operation?

What level (dollar value) of research infrastructure should be funded from School/Faculty/Central budgets?

8. To assess the University’s current eResearch capabilities and recommend on opportunities for further integration of eResearch into University business.

Findings

- There is a wealth of eResearch resources (e.g. Library information resources, research databases, data management and data supply) and facilities (hardware and software for simulation) at UTAS.
- There is not enough shared knowledge of these capabilities.
- eResearch capabilities should be coordinated across UTAS and across Tasmania. It was noted that some Universities have established a position specifically to coordinate and develop eResearch within their institutions and more broadly across State/Sector boundaries, e.g. a Director of eResearch – such positions are usually located within the Office of the DVC (Research) rather than within an IT unit.
- We need an organised approach to eResearch which is outward, as well as inward, looking. Federal government initiatives are important in this area. UTAS should be an active player in the newly-formed ‘Tasmania eResearch Steering Committee’.
- Research data needs to be systematically better managed, more discoverable and more available for re-use in order to increase research impact.

Recommendations

That the University develop a record of capabilities, activities and likely initiatives in eResearch, that is updated annually and available to the whole University.

That UTAS establish an eResearch director (in the DVC Research division) whose job would be to coordinate eResearch in UTAS, to facilitate eResearch across Tasmania, and to be proactive in anticipating new developments in eResearch and assisting UTAS to make the most of government initiatives in this area.

That a strategy be developed to more systematically manage research data in order to increase its usefulness to researchers and to increase research impact.

Questions

How best can we market the resources we do have, and coordinate opportunities in eResearch across the State and nationally?

What areas of electronic resources or eResearch are we deficient in?

Is a Director of eResearch needed at UTAS? If so, is the DVC Research division the best place to locate the Director of eResearch?
How could eResearch be integrated more broadly into the way we carry out our research?

How can we better manage our research data to make it more discoverable and increase the impact of our research?

Submissions

The Working Party is seeking feedback from the UTAS community on the principles, questions and recommendations contained in this Discussion Paper, or anything pertaining to the Terms of Reference above. **Written submissions should be sent to Mark.Hochman@utas.edu.au by Friday 10th August.**

Brian Yates, Mark Hochman, Jane Long, Evan Peacock, Mardi Dungey
Appendix A – Initial list of people interviewed
This list was intended to be selective rather than comprehensive, in order to develop some initial thoughts. The subsequent consultation process is an opportunity to gather views from the broad community of researchers, support staff, and academic leaders at UTAS.

Jane Long – University Librarian
Evan Peacock – Director of CSL
Keith Jacobs – A/Dean of Research, Faculty of Arts
Mardi Dungey – Faculty of Business
Alison Venn – Acting Director of Menzies
Janelle Allison – PVC Regional Development
Neil Bose – Acting Principal, Australian Maritime College
Mike Coffin – Director of IMAS
Craig Johnson – Centre Director (IMAS), Marine and Antarctic Futures
John Parry – Director of ITR
Nigel Williams – High Performance Computing support at UTAS
Nathan Bindoff – Director of TPAC
Anthony Koutoulis – A/Dean of Research, FSET