Digital Preservation and Astronomy: Lessons for funders and the funded

Norman Gray, Graham Woan and Tobia Carozzi
University of Glasgow, UK
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plan

- What is ‘big science’?
- What is ‘long-term’ (and for whom?)
- What is OAIS? (and why?)
- Preserving and opening data
- What is the data preservation problem (and whose?)
- What is the data preservation solution?

big science

- big money – decades, G€ / G$
- big author lists – LIGO=0.8 kAuth; ATLAS=3 kAuth
- big data – aLIGO ~ 1PB/yr; ATLAS ~ 10 PB/yr (= '1 LHC')
- big admin – MOUs, councils, ...
- big careers – PhD to tenure

JISC study restricted to this scale of projects – unique to physical sciences

astronomy data

- Babylonian data can be used for earth slowdown studies
- Plates are used for some astrometry
- Astronomers can (roughly) read 1627 Rudolphine tables
- ...and with help, 12C Toledan tables
- So, let's say a millennium

Image © British Museum

Venus tablet of Ammisaduqa is a 7th C BCE copy of 17th C data – the rise times of Venus over a 21 year period. This is digital data.
Very long-term preservation is possible

hep data

- Major challenge to understand data
- ...so software is crucial
- ...and supercession inevitable
- So, perhaps 30 years?

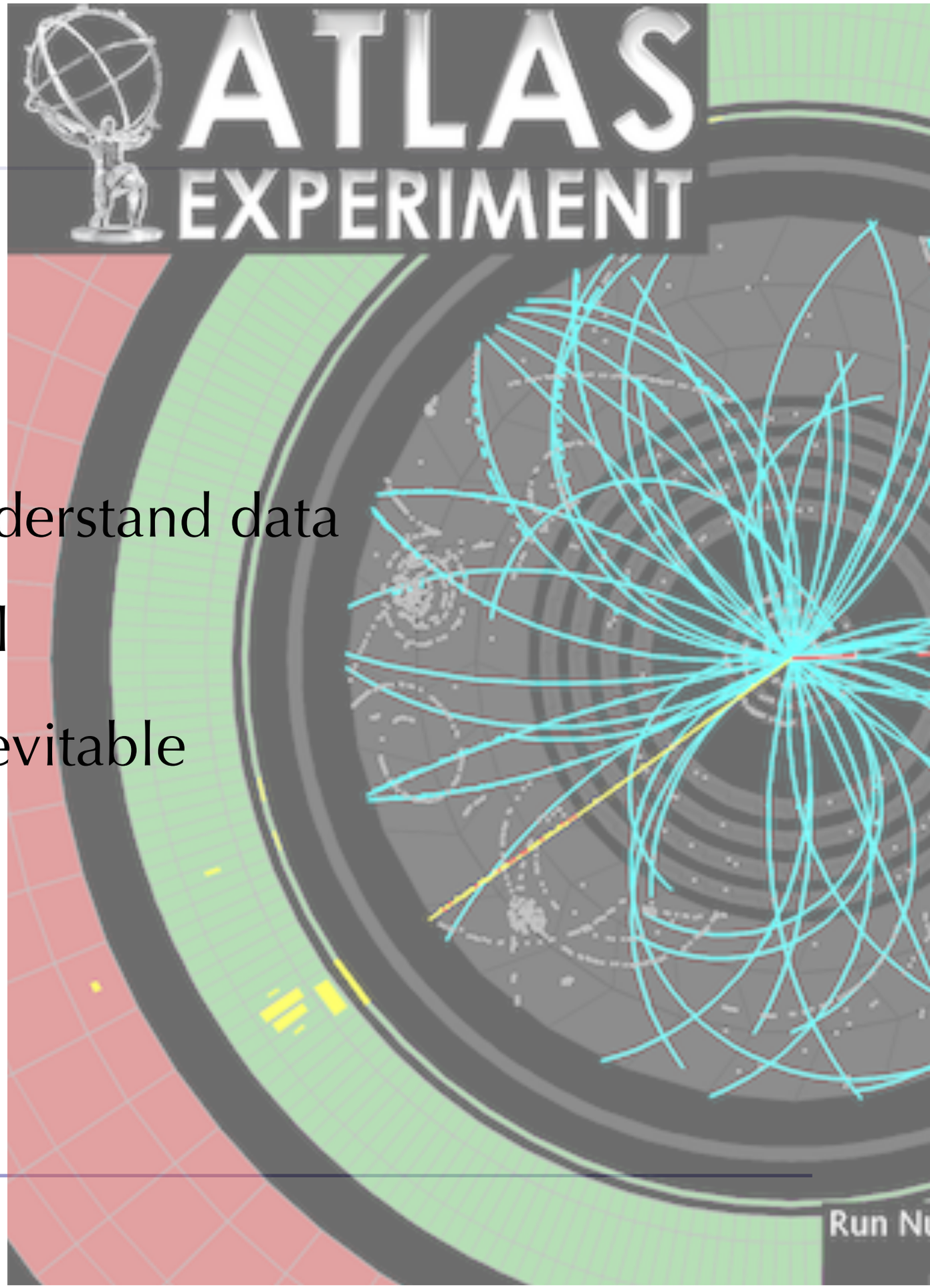

Image from atlas.ch

gravitational waves

- Features of both astronomy and HEP
- No detection announced so far, but still ~PB/yr
- Data reduction heavily dependent on software
- ...but the eventual data products will be intelligible

Data reduction ~HEP; data products ~astro

the ‘long-term’ (1)

So ‘long-term preservation’ means answering the question:

Who cares?

And are they born, yet?

And will they speak english, mandarin, or klingon?

And how many legs will they have?

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Depending on how long-term your long term is, there’s a variety of entertaining questions and answers
But not necessarily how to make progress

the ‘long-term’ (2)

Alternatively, and more pragmatically:

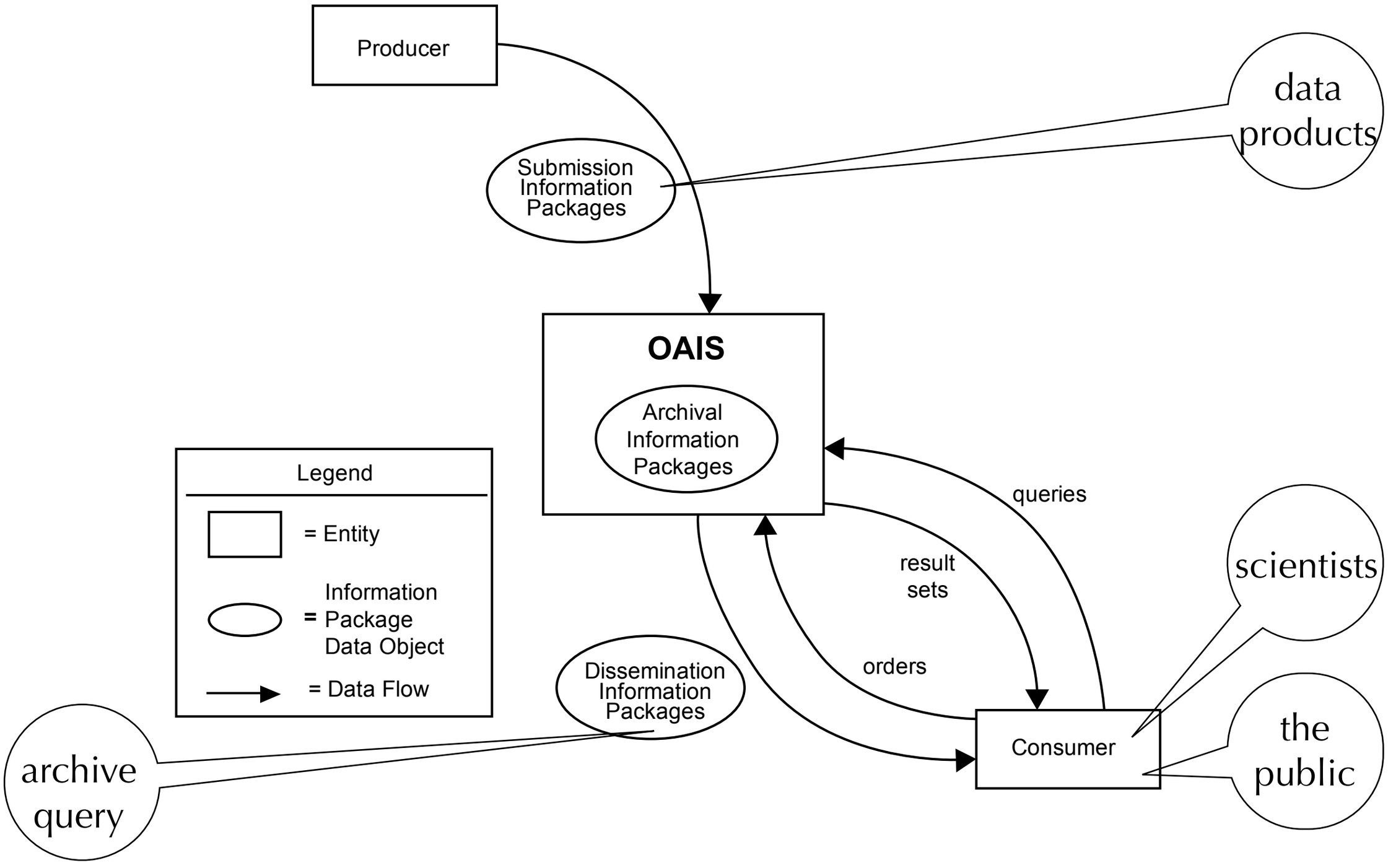
The ‘long term’ means having to change media at least once

(a rather boring answer, admittedly, but
rather more amenable to analysis)

OAIS

- Open Archival Information System
- CCSDS 650.0 = ISO 14721:2003
- A high-level model for archives
- = ‘a set of terms to think with’

If you’re an archivist, you probably know about this already; if you’re not, it’s a term you should probably at least have heard of



Broadly intelligible (naturally, since it came from space-data); maps to astro data naturally
The ‘desginated communities’ are easy to identify

data preservation planning

sharing data

- We preserve data, so we can make it available later
- Data should be available/open!
- Because it's usually publicly paid for
- ...and that's how science works
- But: precedence, proprietary periods, misunderstandings, audience, documentation, money, time, ...

I'm not pretending it's easy, but it does have to get done
Physical sciences score well without really trying (yes, the rest of science is _much_ worse)

- JISC-funded study of Gravitational Wave community, as proxy for STFC-funded big science
- See: `http://purl.org/nxg/projects/mrd-gw`
- Short version: they're doing the right thing

Not yet much to see at that URL

so what is ‘the right thing’?

- Formal & costed data management planning
- Identification of ‘designated communities’
- Identification of data products (AIPs in OAIS-speak)
- Timescales and criteria for data release
- Framed with OAIS conceptual model
- ...so coupled with the OAIS validation industry

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All of this counts as pretty radical stuff, outside the physical sciences, but is easy within. Which is good

so our recommendations will be...

- Big-science funders should say: “read and profile OAIS”
- ...and develop or support the expertise in criticising the result
- ...and use that profile as a framework for validation
- ...and pay for it.

Comments? Yes please! `http://purl.org/nxg/projects/mrd-gw` and `norman@astro.gla.ac.uk`