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Development of 4D farms to improve students learning and safety

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SHAPING THE FUTURE OF TERTIARY EDUCATION

Development of 4D farms to improve students learning and safety

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D Shallcross, J Owens, S Barber

In collaboration with

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Teaching agricultural production systems

- *Assessment = students need to describe, compare and explain management systems on various enterprises over time*
- Possible issues with property visits:

10 minutes

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Field trips

- Ideal situation is regular field trips to complement classroom theory
  - Continues as "gold standard" – difficulties = $$$, time
- Requirement for support resources available to supplement this?
  1. easy to use
  2. viewable in different environments
  3. editable
  4. view change through time
  5. multimedia modules
  6. multi-access
- Early work done in Chemical Engineering

Shallcross D.C., Dalvean J., Hadgraft R., Mann K., Sola M., Cameron I., Crosthwaite C., Maynard N., Tadé M., Kavanagh J., (2011), 'Using a 4D Virtual Reality Learning Environment to Follow the Evolution of an Engineering Project', Proceedings of the First Conference of the Society of Engineering Education of South Africa Conference, Cape Town, August 2011

Why develop classroom learning tools?

- Student background/experience
- Continual, repeatable virtual access to properties
- Consistent learning/understanding
- Learn at own pace
- Recheck definitions or questions
- Increase value of “on-farm” experience
- Reduce problems due to group sizes

- <u>Not to replace “on-farm” experience</u>

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Development

- OLT grant –
  Australian Commonwealth Government
- Collaboration of 5 universities for images (and reviewed by 3 others)
  - Distribute work load
  - Gain access to properties
  - Develop tools that will be reused
  - Agreed ILOs at commencement

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Intended learning outcomes

1. Seasonal variations in pasture growth & timing of livestock management acts.
2. Major inputs, major outputs, management to maximise their productivity.
3. Factors that determine profitability, how measured and practical steps.
4. Role of genetics and nutrition - what are the similarities and differences?
5. Major management activities, timing and identify risk areas.
6. EHS (OHS) procedures on different properties – identify & reduce.
7. Factors that limit productivity and compare to other virtual farms.
8. Review environmental (rainfall, temperature and evaporation) variation for this property and impact on decision making over week/month/year/longer
9. Use of relative feed surpluses and cope with feed deficits –strategies and plan.
10. What objectives do farmers have for a property in any year.

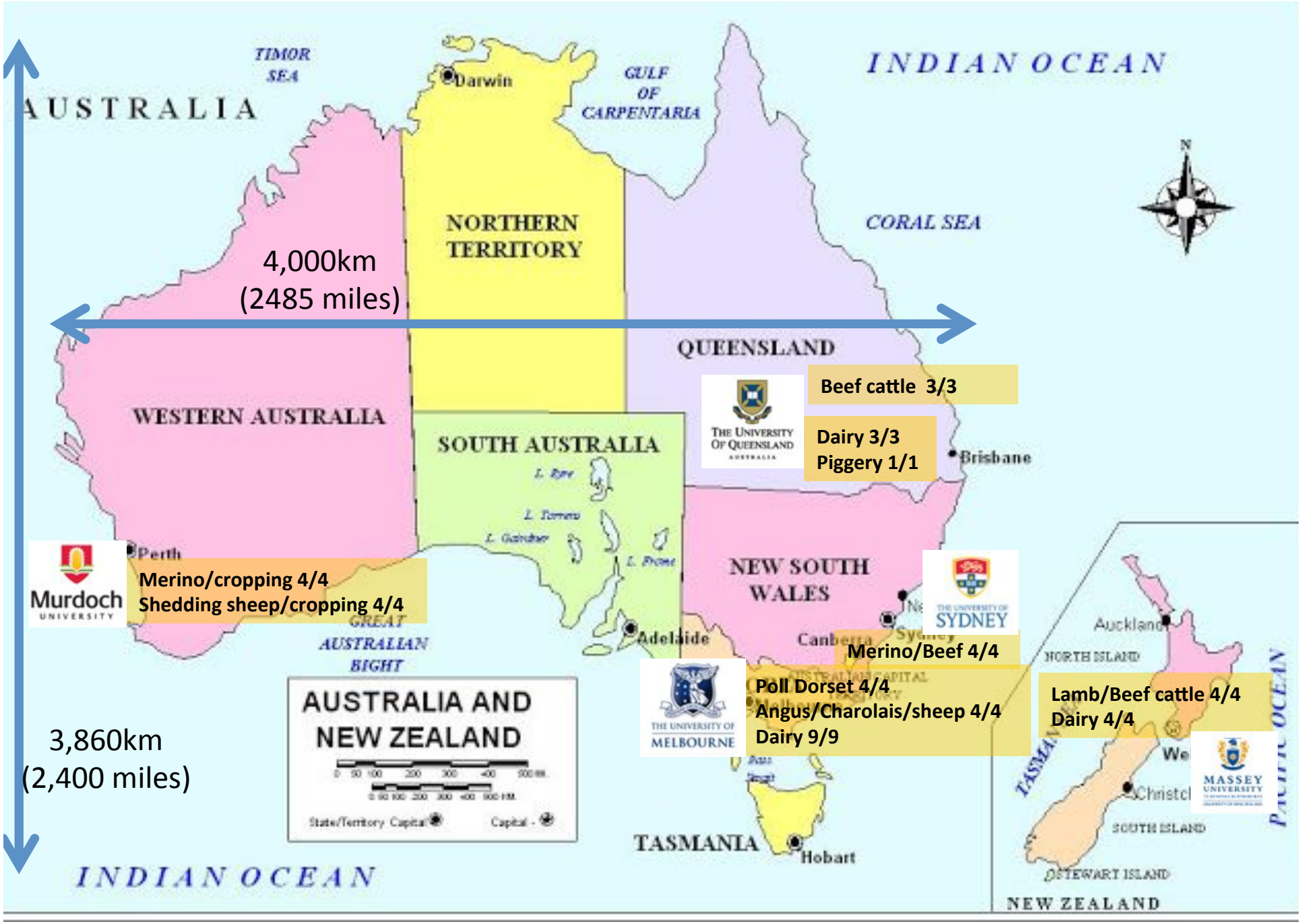

Image modified from http://geobeeprep2011.blogspot.com.au/2013_02_01_archive.html

Methods

- At ~25 locations per farm (green dots on image)
- Capture 7 images (3 exposures)
- Return 4 times to each farm (seasons)
- 7x3x25x4x10 = 21000 images
  - ~25mb/image = ½ Terabyte of photos!
- Capture additional images & video at each visit where appropriate

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How each image is formed…






360° Panoramas

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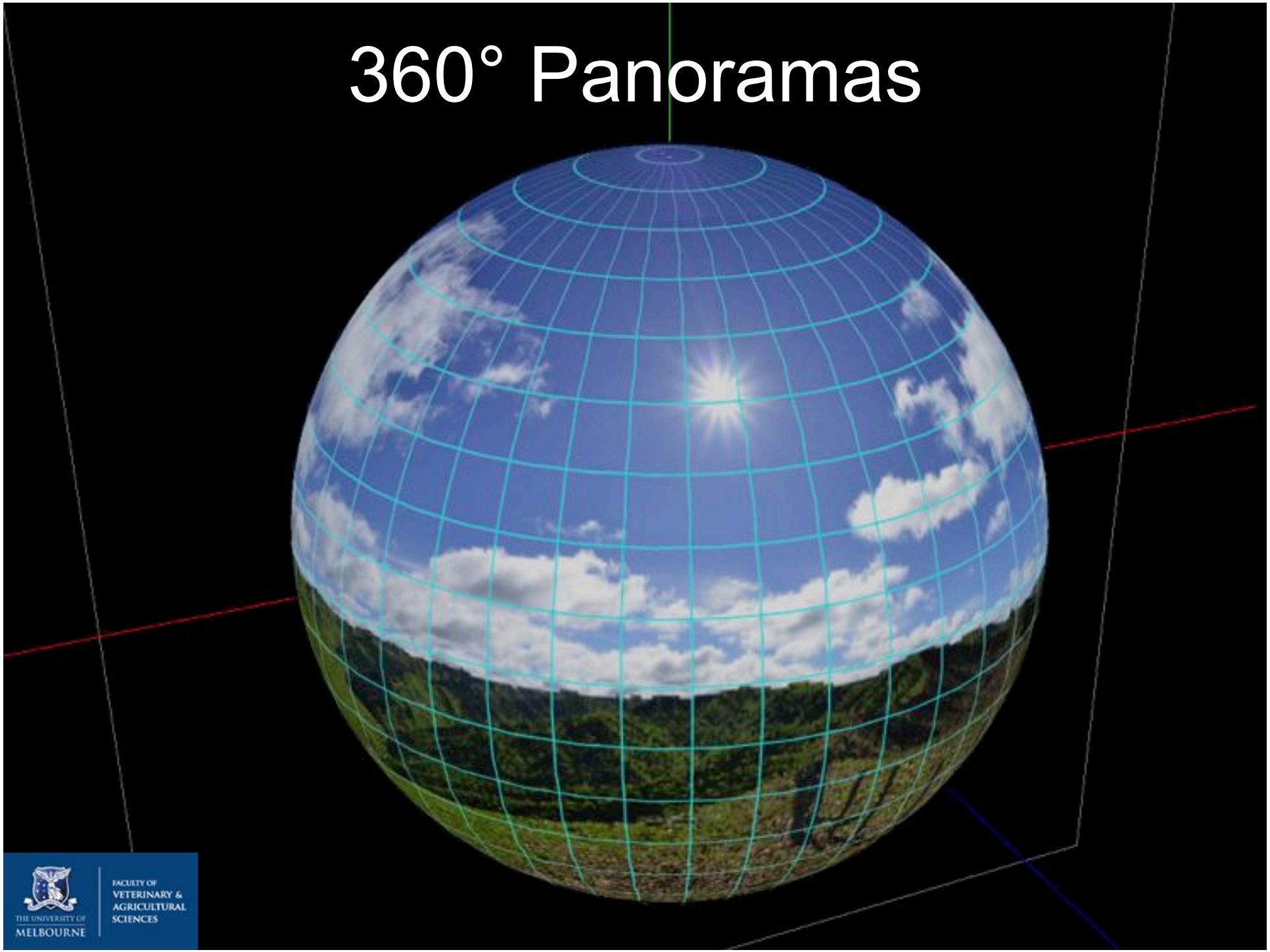
360° Panoramas



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Methods

Developed 4D interface

- Web technology based
- Flash, HTML5 (webGL)

Therefore platform independent

- Mac/Windows
- Mobile devices
- Internet Explorer, Firefox, Chrome, Safari

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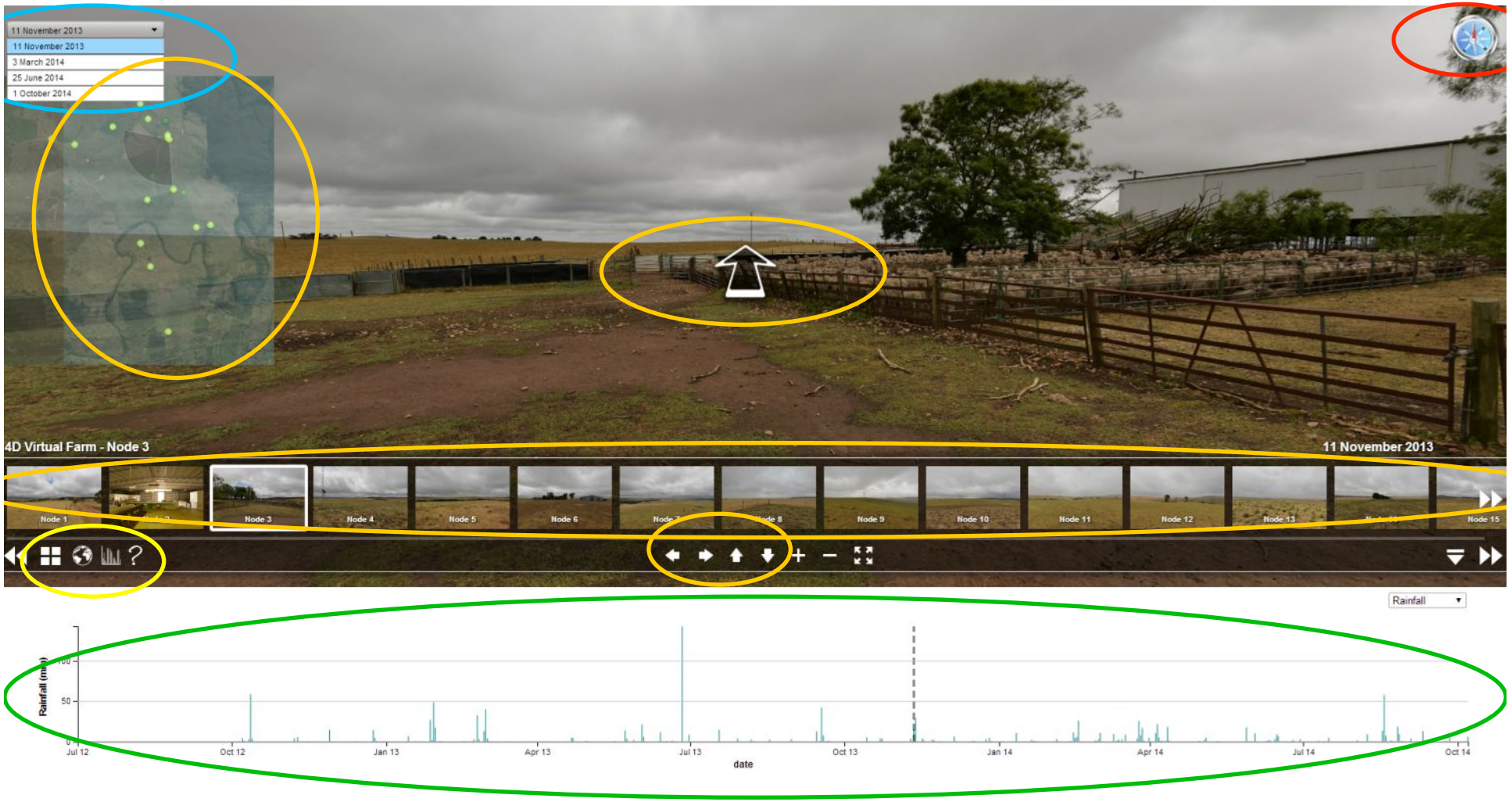
Other features

Addition of

- weather data
- video
- photos
- text
- linking to any files
- multiple choice questions

Interface



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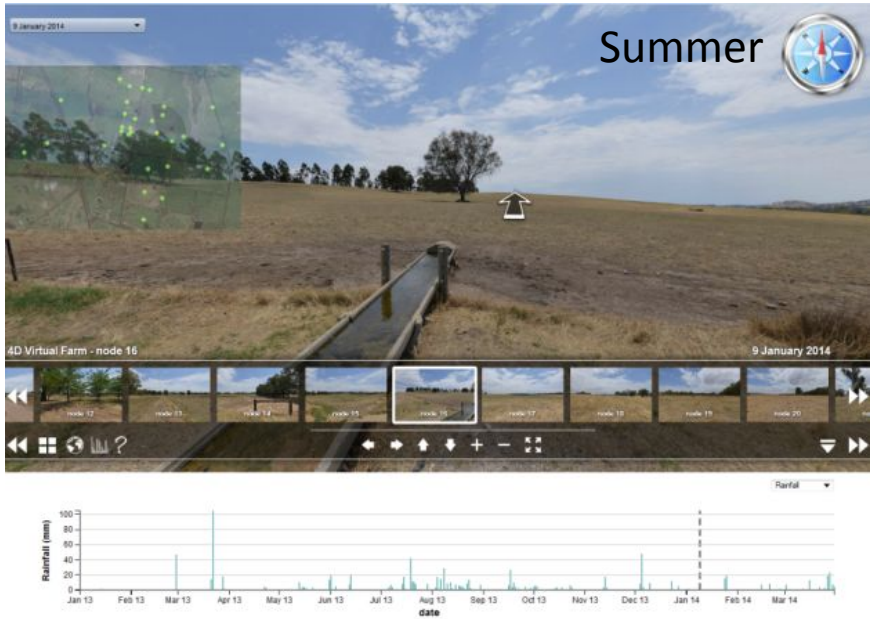
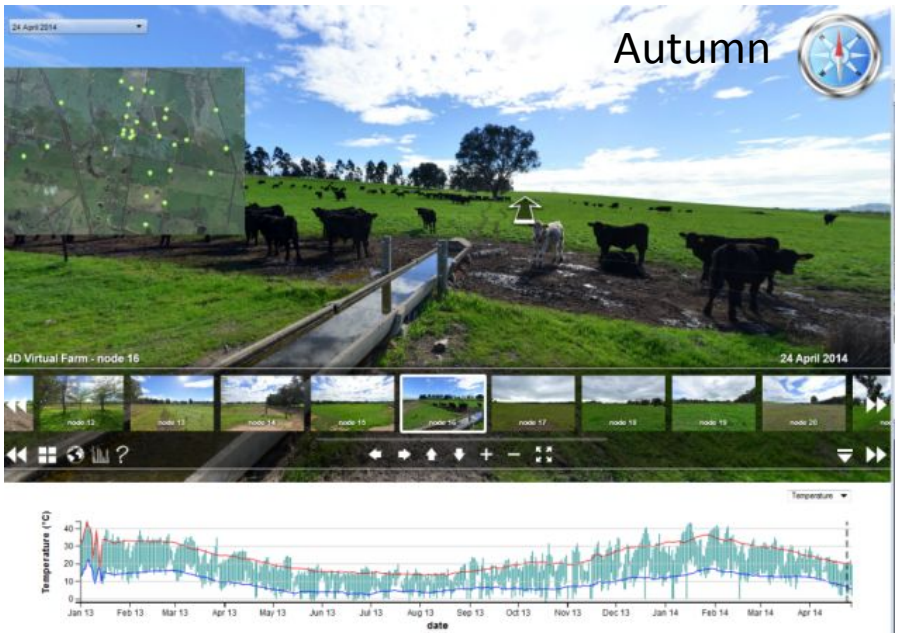
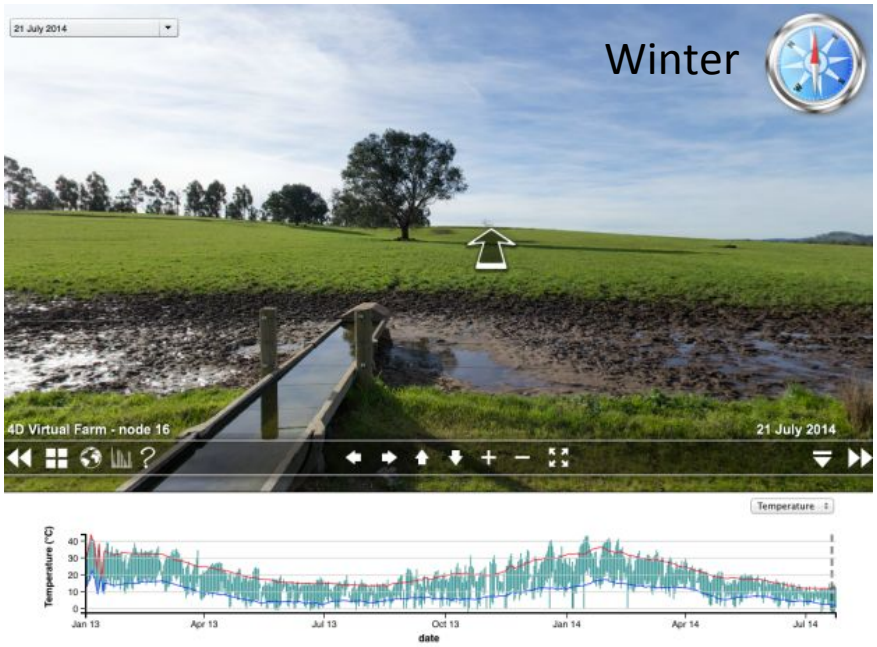
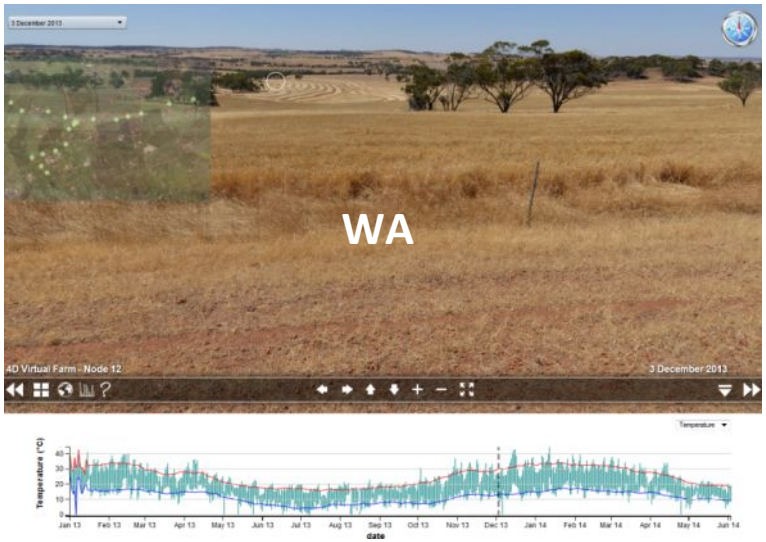
4 seasons – the 4th dimension

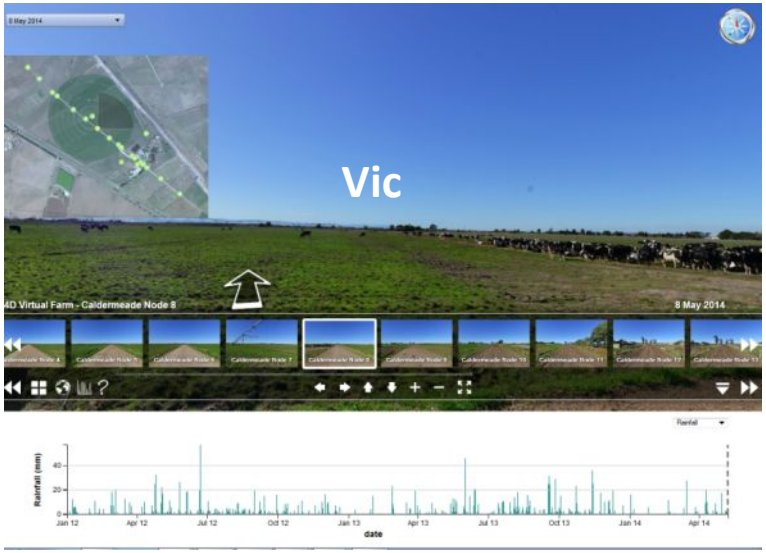


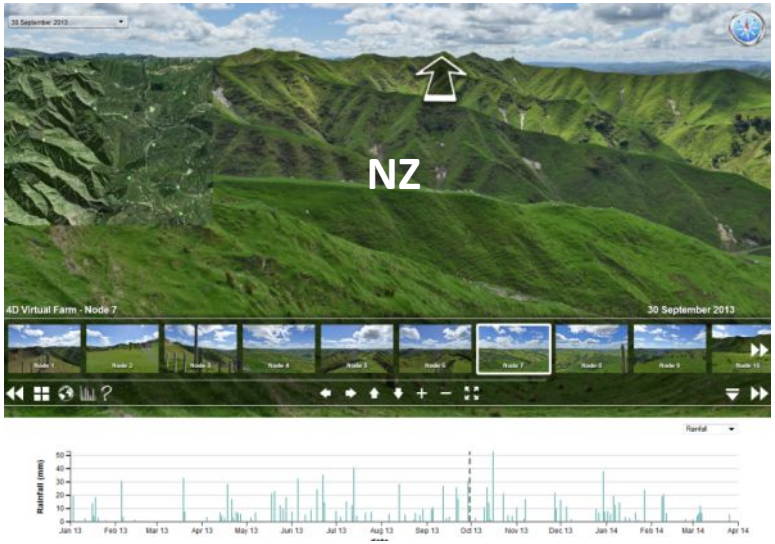




Comparison of different enterprise, geography and climate

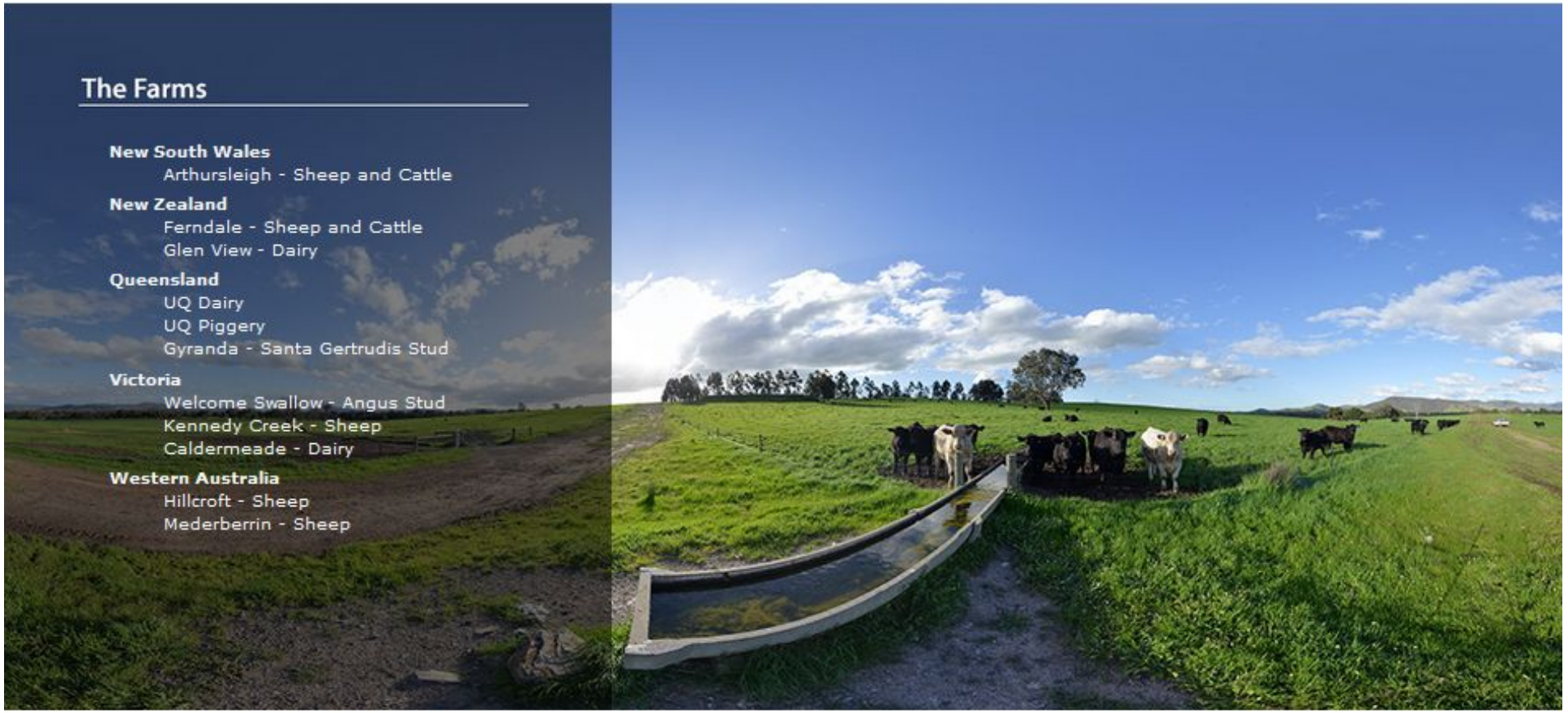






Welcome to the
4D Virtual Farms

Lets take it for a test drive…



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360 & Oculus Rift & Google cardboard etc.

- Totally immersive
- Sight/sound

Mark Zuckerberg
March 25, 2014 · Palo Alto, CA, United States ·
I'm excited to announce that we've agreed to acquire Oculus VR, the leader in virtual reality technology.

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Assessment

- Diverse, authentic options for assessment
- Can add scenarios on same farm or different farms
- Material for game based learning

Conclusions

- Very positive feedback from staff and reviewers
- To be used with students this year
- Easy to use (tested on 5-10 year olds)
- Developing teacher/student resources for use across Australasia
- Provides a unique way for students to gain confidence and understanding prior, during and after property visits
- Huge range of diverse, exciting and fun applications with some great learning and assessment benefits

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Acknowledgments

- Funding from the OLT
- Co-authors, property owners, managers and workers who assisted in gaining access to properties and management plans for the project
- Colleagues within each university for suggestions on improvement during the development phase
- Program reviewers –
  Dr Chi Baik & Prof Colin Wilks

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Questions

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Session Feedback Survey

With thanks from your hosts

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Recording available
http://transformingassessment.com

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