



*Spatially Enabling
Australia and New Zealand*

Demonstrating the benefits of QZSS in Australian agriculture

Philip Collier

Research Director

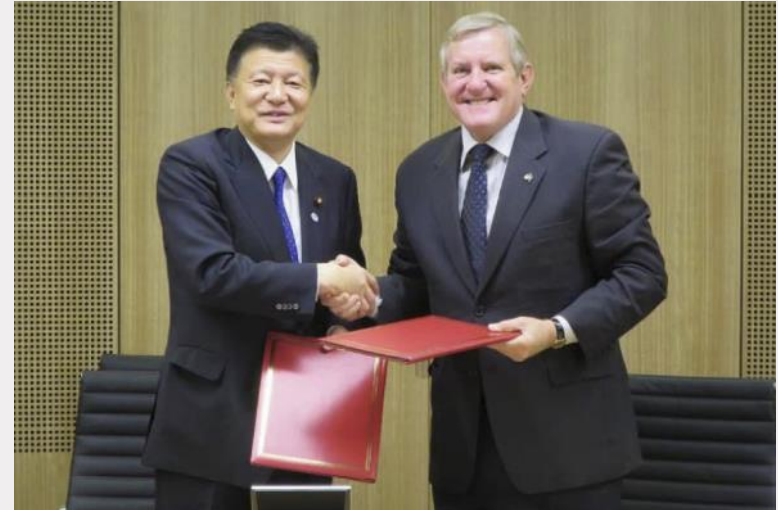
Cooperative Research Centre for Spatial Information



The seeds of collaboration...

Japan....

- Demonstrate QZSS capability
- Promote international adoption
- Encourage scientific collaboration
- Engage with industry



Australia....

- Geographical alignment
- Early adopters of technology
- Dependence on collaboration
- Reliance on precise positioning
- Unique problems to solve



JOINT STATEMENT BY THE MINISTER FOR INTERNAL AFFAIRS
AND COMMUNICATIONS OF JAPAN AND THE MINISTER FOR
INDUSTRY OF THE COMMONWEALTH OF AUSTRALIA ON
COOPERATION ON GEOSPATIAL INFORMATION

Ministry of Internal Affairs and Department of Industry of
Communications of Japan Commonwealth of Australia


SHINDO Yoshitaka


Ian MACFARLANE

Minister for Internal Affairs and Minister for Industry of the
Communications (MIC) of Japan Commonwealth of Australia

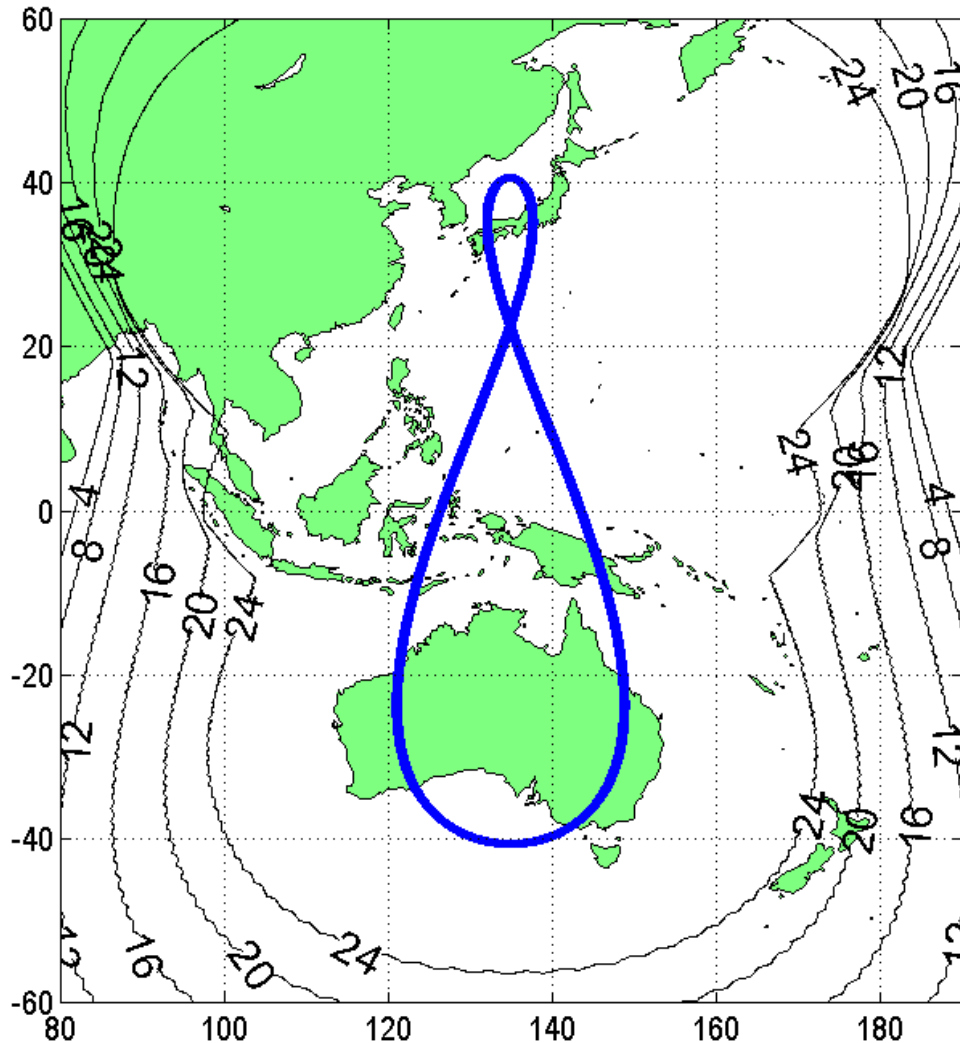
Activities to date...

Activity	Date
Sydney workshop	July 2014
First demonstrator (Jerilderie, NSW)	November 2014 – January 2015
Sydney workshop (Jerilderie report)	February 2015
Agriculture market research	January – June 2016
Townsville workshop (sugar industry)	March 2016
Second demonstrator (Mackay, Qld)	November – December 2016
Townsville workshop (Mackay report)	February 2017



What is QZSS?

Satellite visibility (4 satellites)....

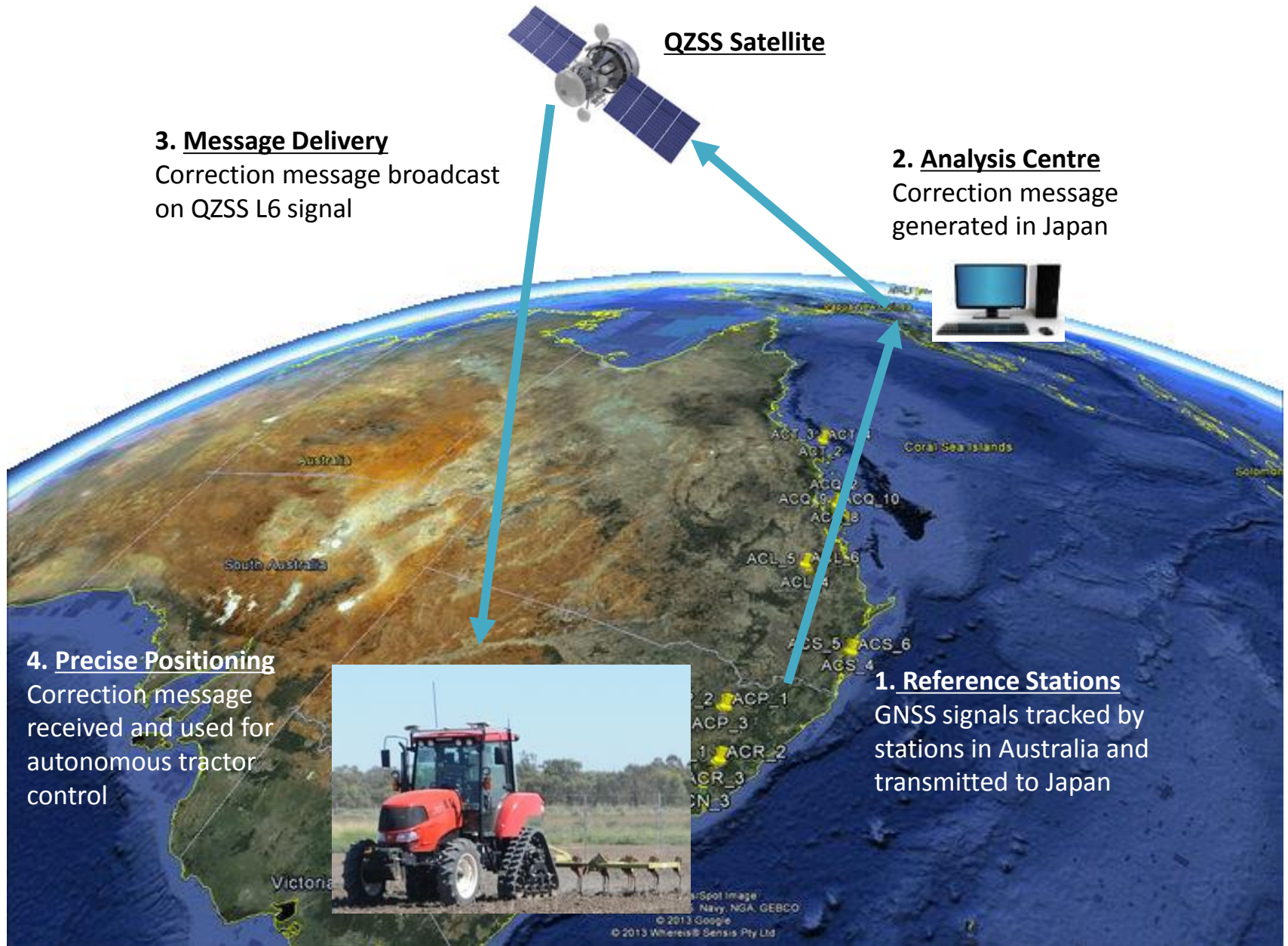


Anticipated launch schedule....

- 2010 – 1 satellite (“Michibiki”)
- 2018 – 4 satellites
- 2023 – 7 satellites



Data flow to the tractor



QZSS Satellite

3. Message Delivery

Correction message broadcast on QZSS L6 signal

2. Analysis Centre

Correction message generated in Japan



4. Precise Positioning

Correction message received and used for autonomous tractor control



1. Reference Stations

GNSS signals tracked by stations in Australia and transmitted to Japan

Demonstration sites...



Results – Jerilderie (Rice farming)



Static 2D accuracy....

- ± 5 cm horizontal

Dynamic 2D accuracy....

- ± 5 cm horizontal

Convergence time....

- Typically 30-60 minutes



Results – Mackay (Sugarcane farming)

	PPP		PPP + Iono		MADOCA	
	Horiz	Vert	Horiz	Vert	Horiz	Vert
Convergence* (min)	40	40	1	10	30-40	–
Std Dev (cm)	±3	±6	±2	±6	±2-12	±4-25

* When solution accuracy first reaches ±10 cm horizontally and ± 20 cm vertically



The team – Jerilderie



The team – Mackay



Jerilderie field day...



Mackay field day...





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