

# *Mapping Unmarked Graves at the Little Glory Cemetery, Port Elliot*



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University of Cambridge and Flinders University

# Who am I?

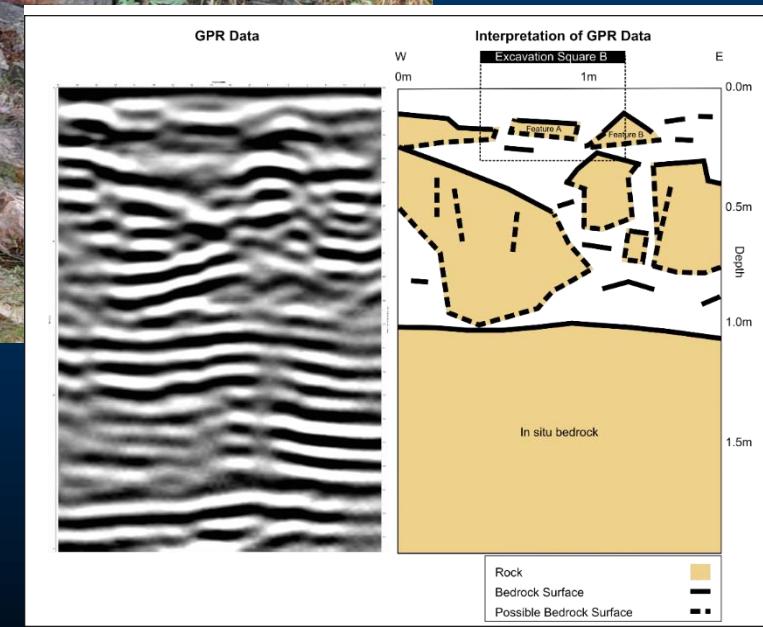
- Commonwealth Rutherford Fellow at the University of Cambridge
- ARC DECRA Research Fellow in Archaeological Science at Flinders University
- Former Postdoctoral Researcher at IMS-FORTH in Crete
- PhD from ANU in archaeological geochemistry
- BA (History and English) and BSc (Hons) (Earth Science) from UQ



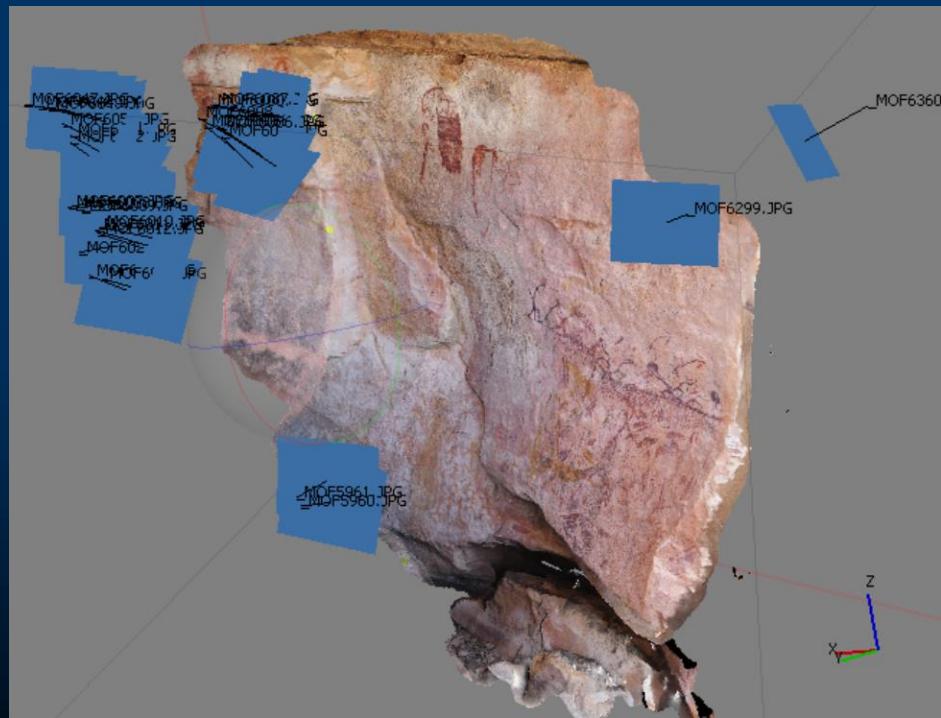
# Mapping Ancient Greek and Cambodian Cities



# Understanding Archaeological Caves



# 3D Modeling of Archaeological Sites



# Presentation Summary

- Why locate unmarked graves?
- How do we do it non-invasively?
- Little Glory results



# A Critical Research Challenge

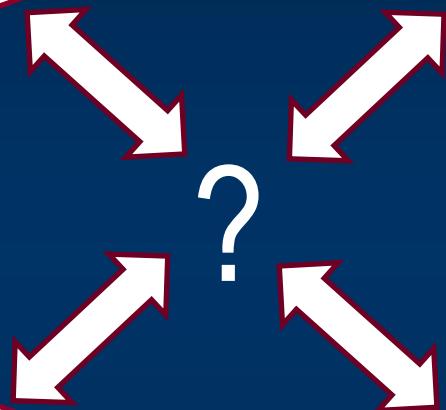
Mapping unmarked graves in cemeteries

Locating areas for repatriation

Forensic investigations

Development surveys

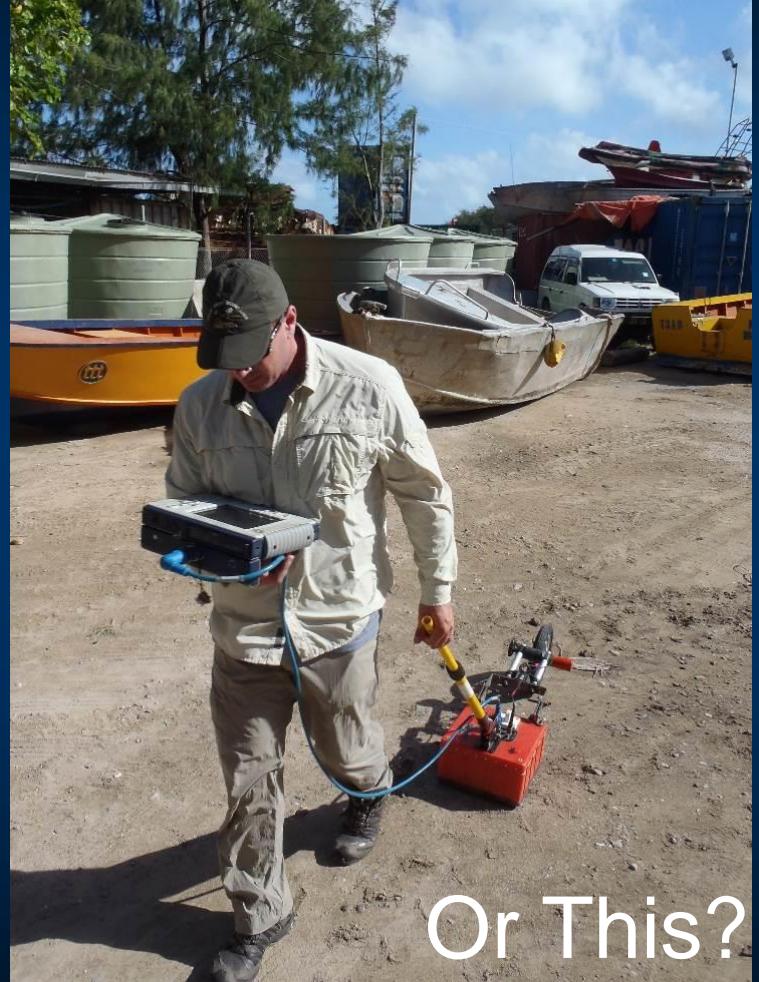
There are ~50,000 unmarked graves in West Terrace Cemetery alone....



# Why Geophysics?

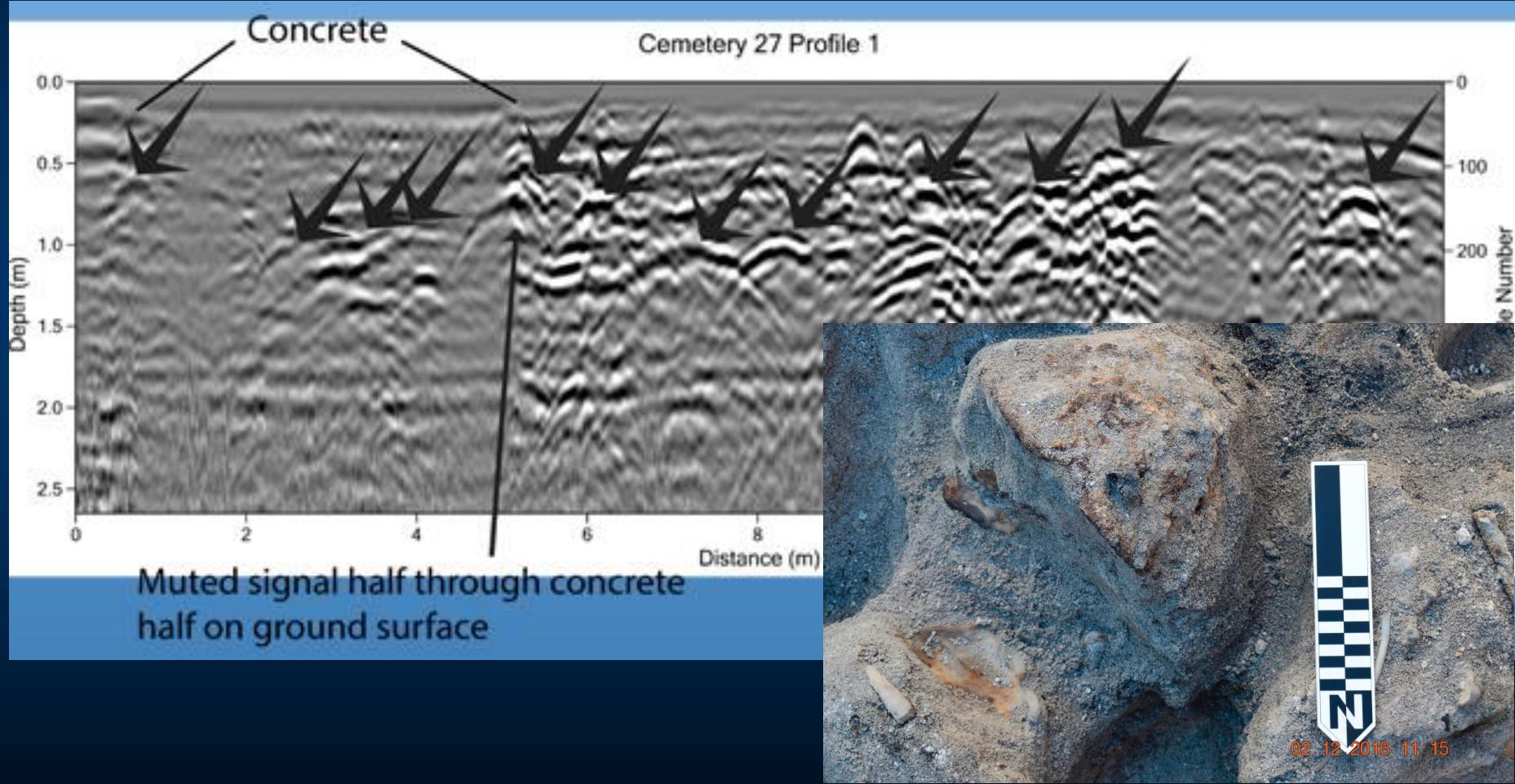


This?



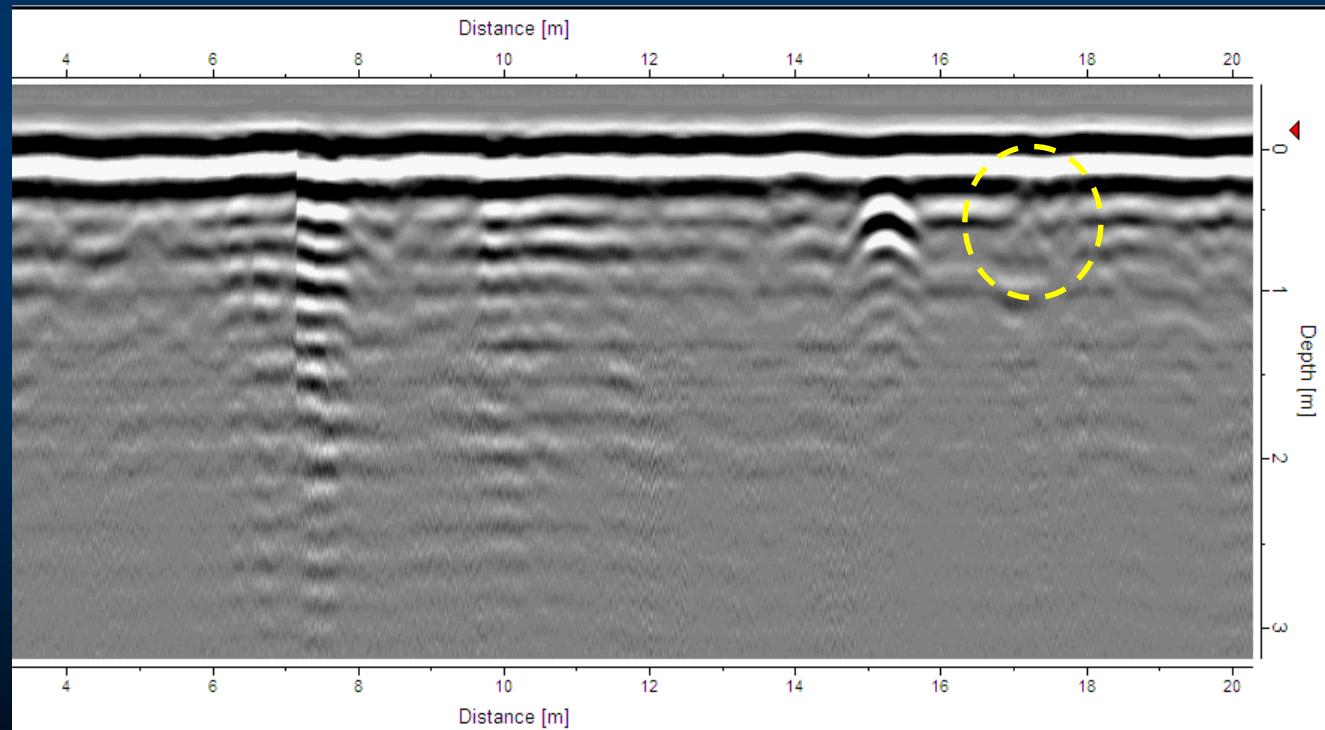
Or This?

# Can you find me a bone detector?



# Geophysics for Burial Detection

- Most geophysical methods detect soil disturbance or material culture items associated with burials



# This Means...

- Lots of high density geophysical data
- Detailed site recording
- High quality positioning



# Technique Review

## Geospatial

- KAP

## Geophysical

- GPR
- Other Methods

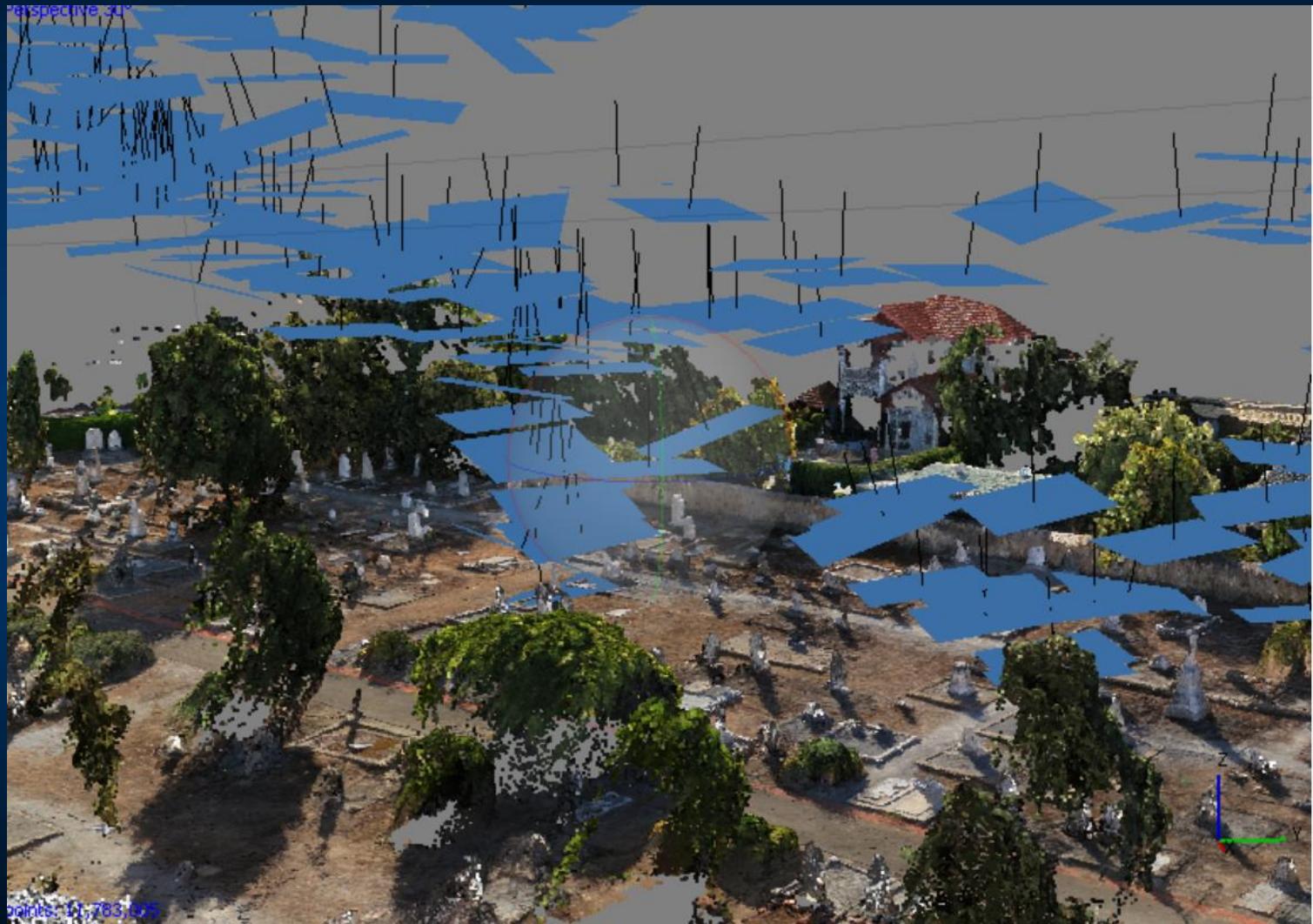


# KAP

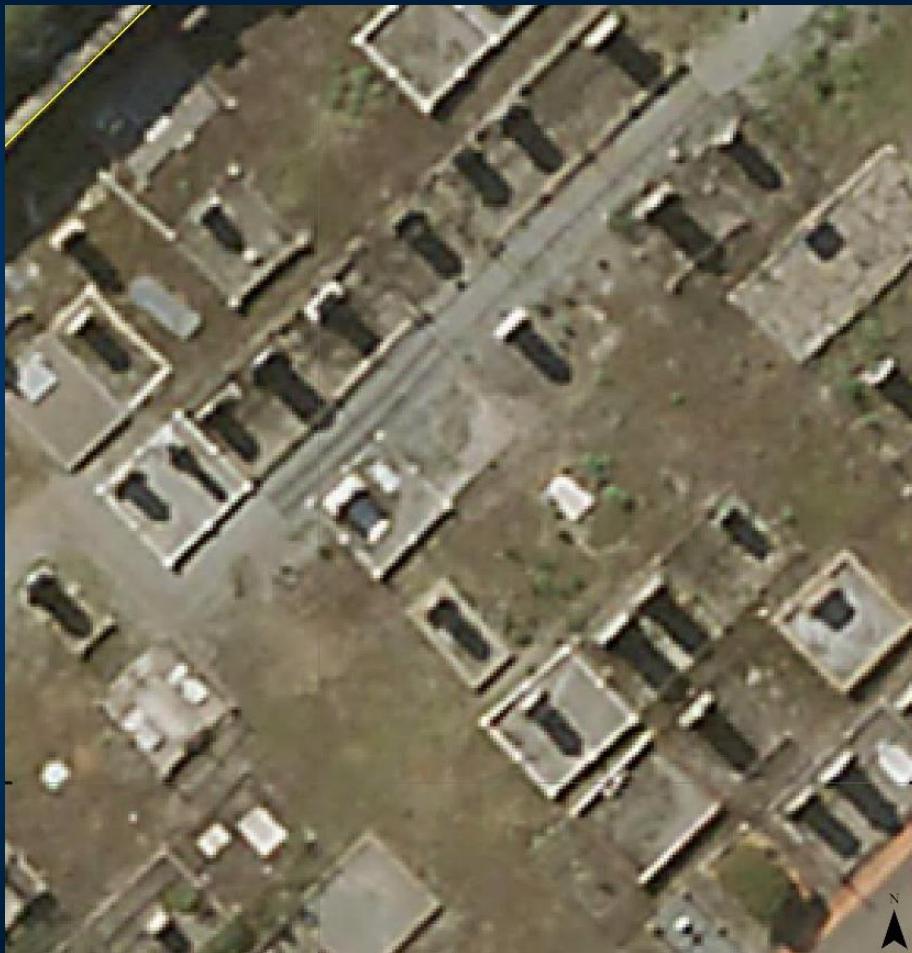
- Provides high resolution aerial photos and digital elevation models through photogrammetry
- Inexpensive and can be deployed in many places
- Provides spatially accurate products when combined with survey grade GPS
- Essential first step to any projects



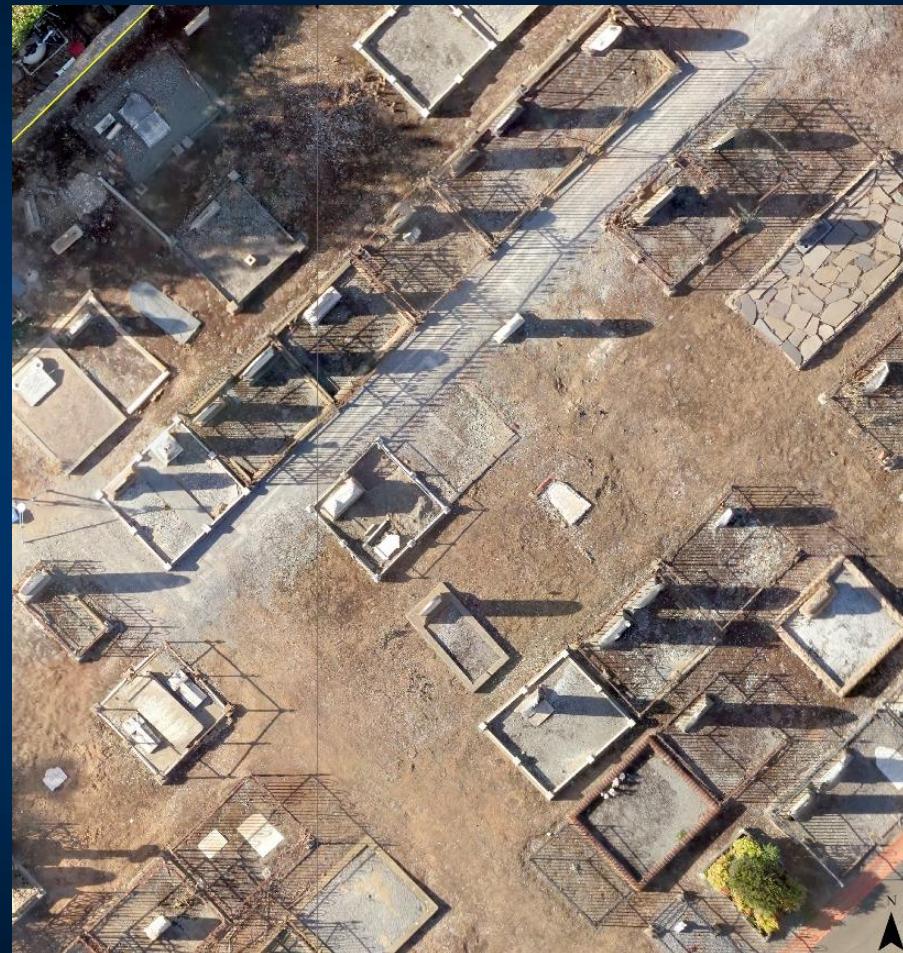
# SFM Photogrammetry



# How Good is the Data?

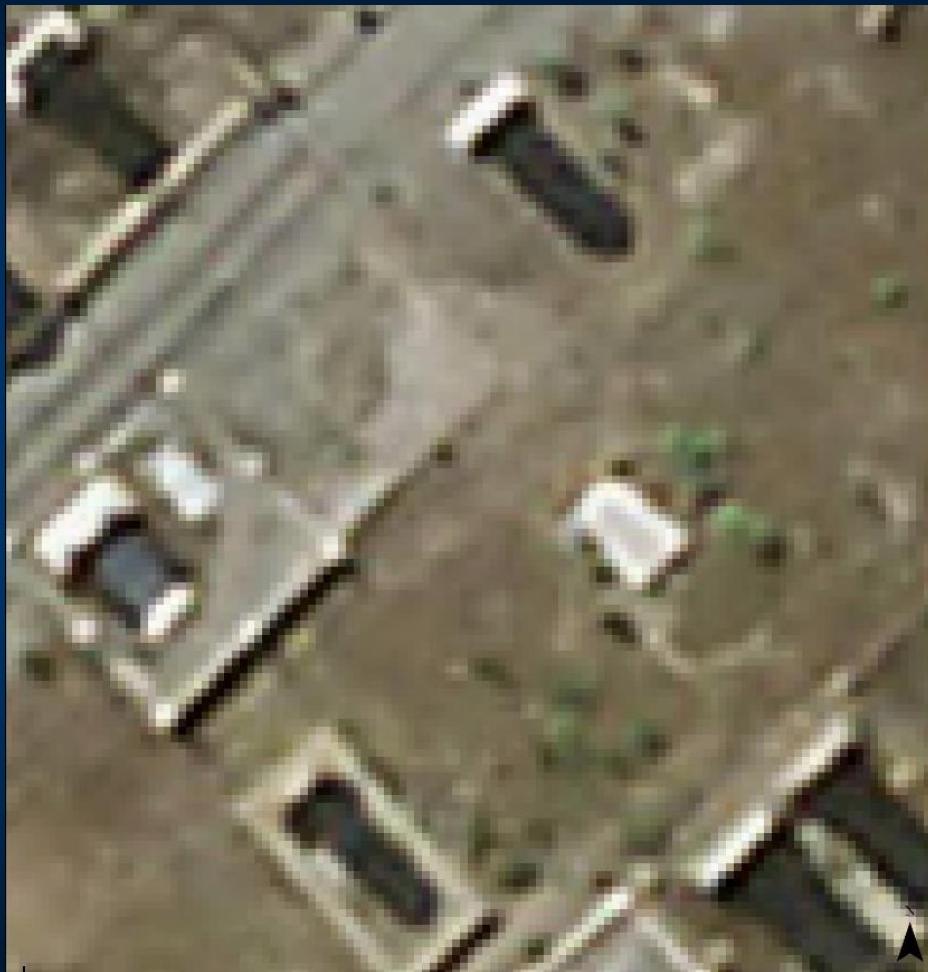


Satellite

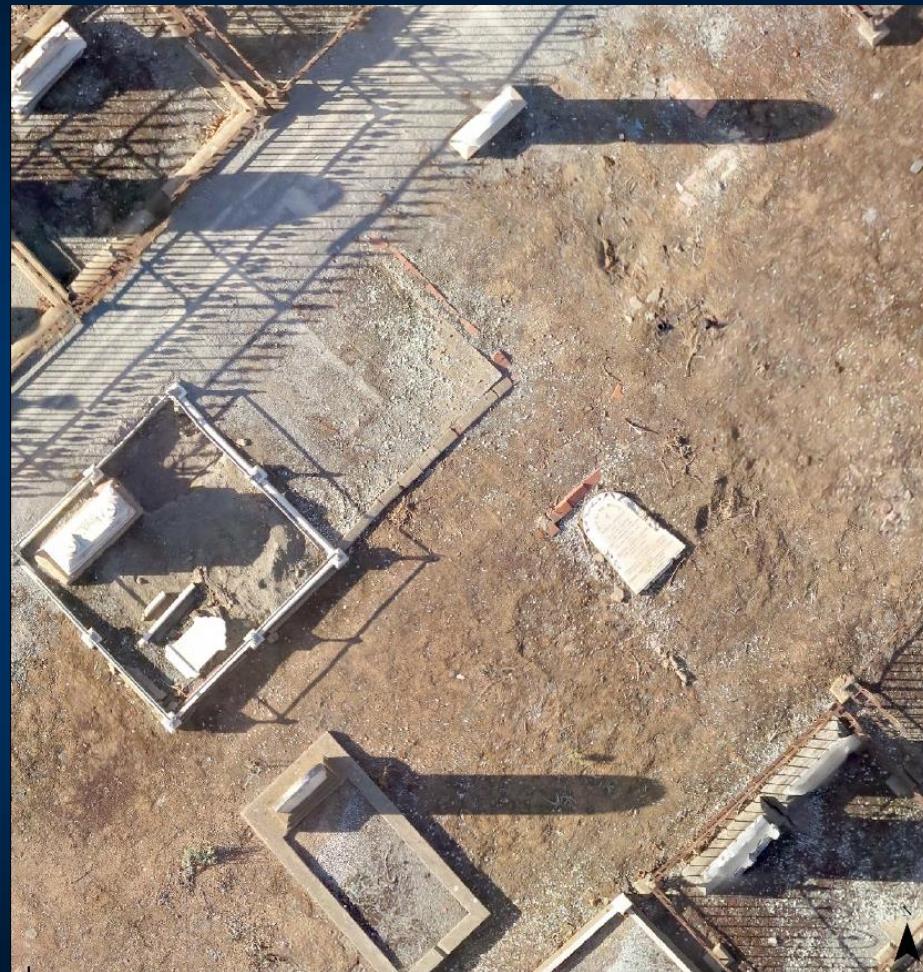


Kite

# How Good is the Data?

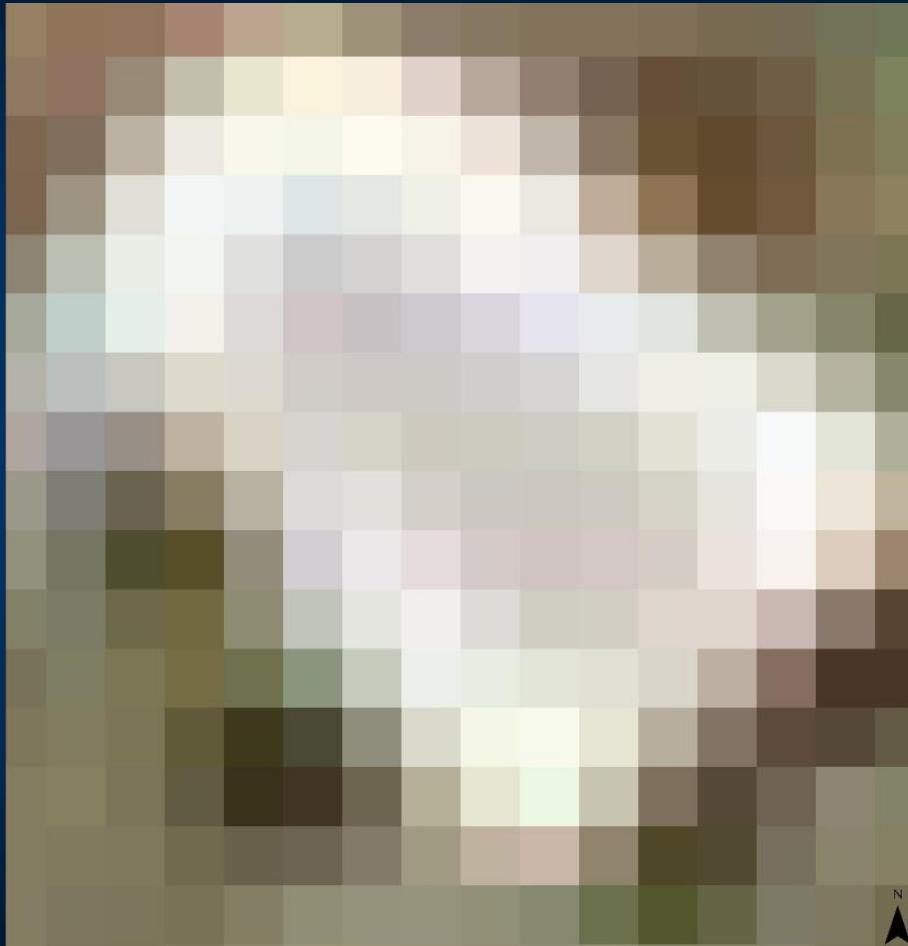


Satellite



Kite

# Just for fun.....



Satellite



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# Geophysics

- Locates and maps geological and forensic features in the sub-surface
- Different techniques detect different physical properties
- Rapid Acquisition
- Non-destructive
- Quantitative

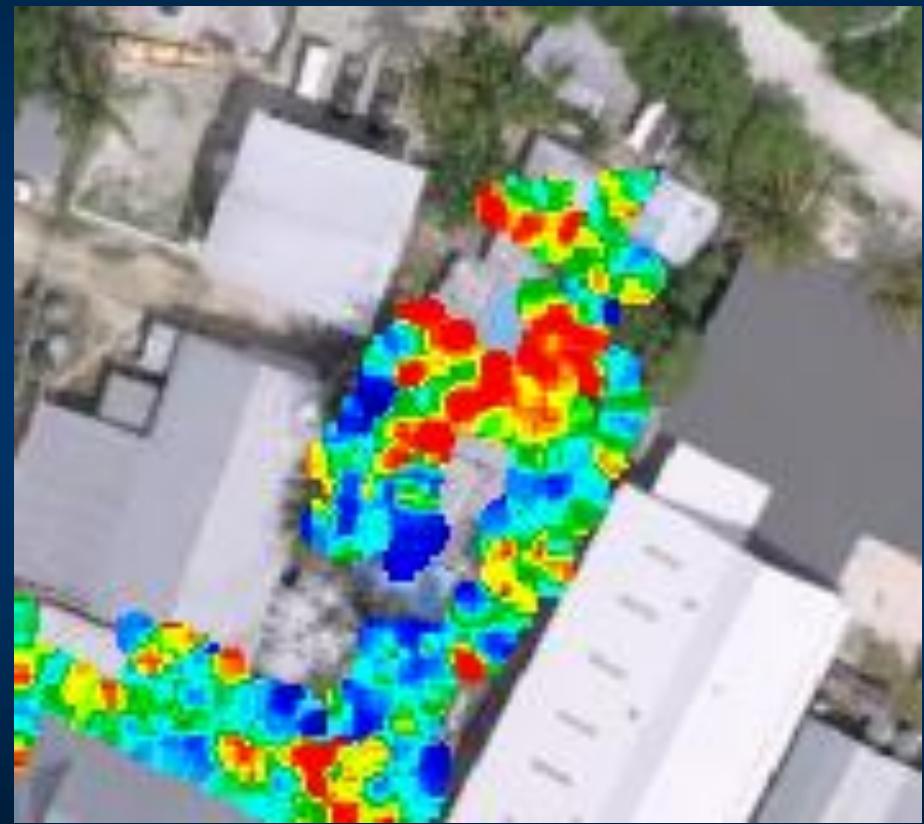
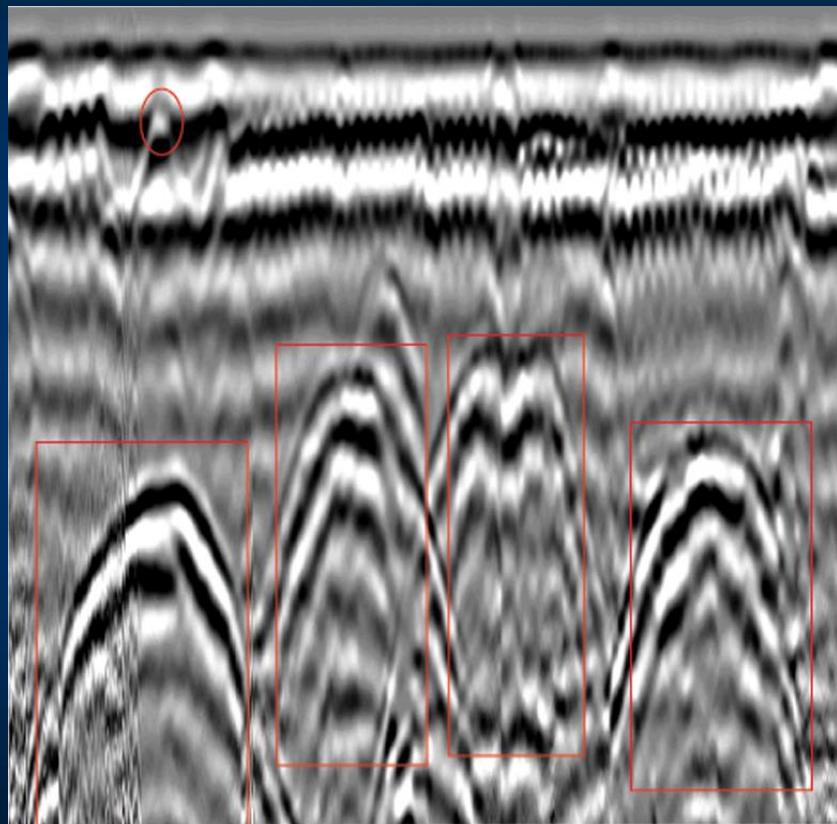


# Ground Penetrating Radar (GPR)

- Measures dielectric permittivity (effectively conductivity) of the subsurface
- Detects most forensic and geological features
- Produces 2D or 3D data
- Processing intensive but produces high value data



# 2D and 3D GPR

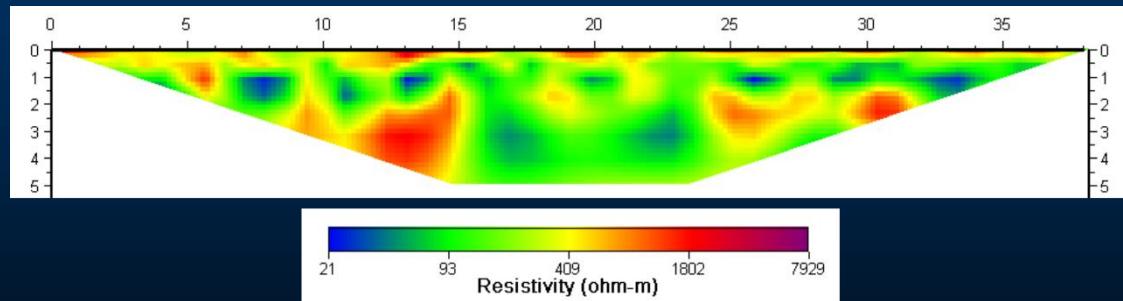


# GPR Grave Mapping

- It is essential to see soil disturbance across multiple lines
- This defines the size and shape of the feature
- This information lets you interpret a feature as a grave
- Can provide a confidence level also



# Other Geophysical Techniques



# Little Glory Cemetery, Port Elliot

- Chapel on site from 1857
- 2 marked graves



# Little Glory Cemetery: Data Collection

- 166 GPR Lines collected
- Lines surveyed in with cm accuracy with Total Station
- KAP data for site recording

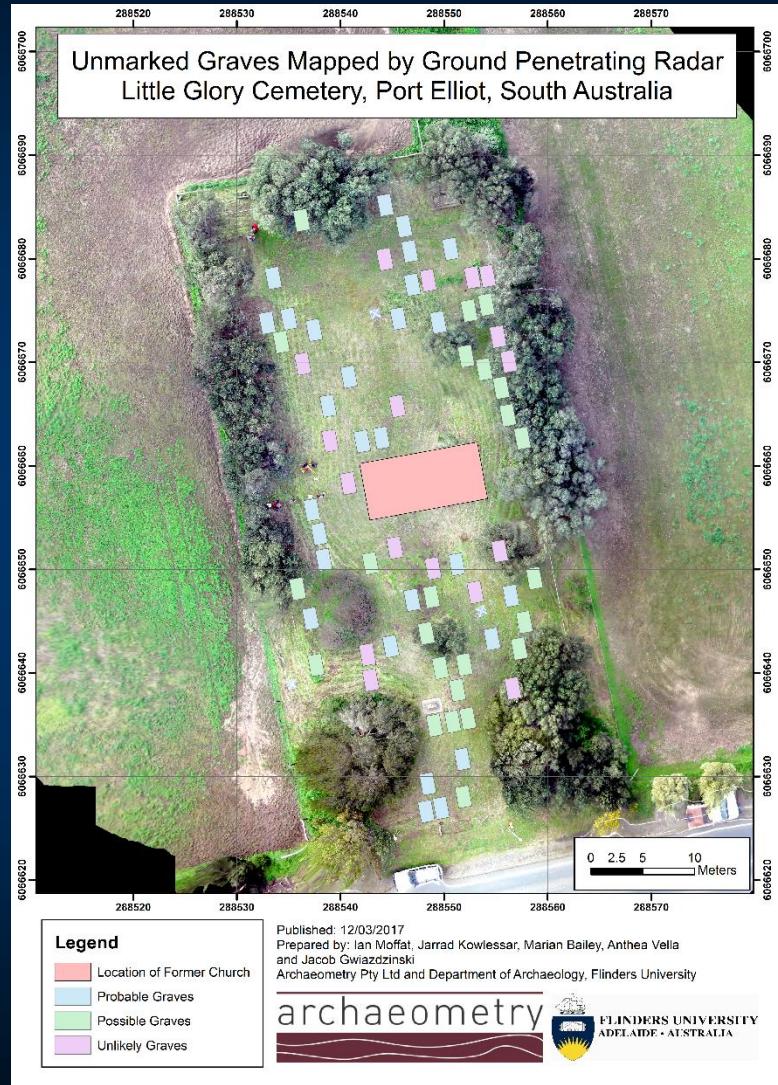


# Little Glory Cemetery: 3D Modelling

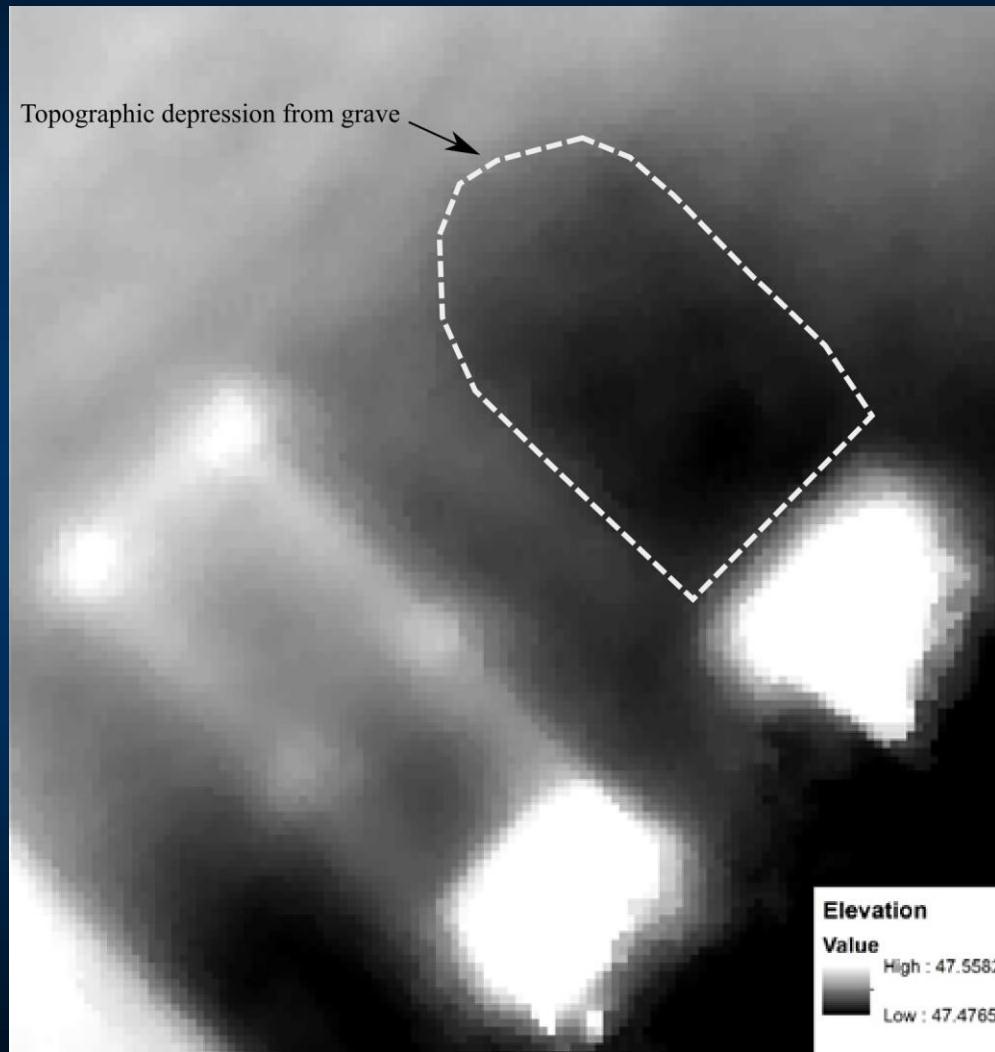


# Little Glory Cemetery: Results

- 28 Probable Unmarked Graves
- 24 Possible Unmarked Graves
- 17 Areas with Multiple Graves



# What's next.....



# Summary of Presentation

- GPR and other geophysical techniques provide a rapid, non-invasive and relatively inexpensive means of mapping unmarked graves
- Geomatic techniques are essential for mapping the site and pulling all the data together
- Try them out for yourselves this afternoon!

