Archimedes’ core service is the processing and interpretation of magnetic and gravity data using its unique techniques for the petroleum exploration and development industry.

Archimedes began in Australia and initially performed work in Australia and New Zealand for clients such as Woodside Energy, Santos, Oil Company of Australia, Apache Energy and Origin Energy, covering over twelve basins throughout the region.

Archimedes has expanded considerably into the international arena, working for clients such as Shell (in several locations), BP (in several locations), Amerada Hess and many others in basins around the United Kingdom, Western Siberia, Mongolia, North & South America, Gulf of Mexico, Gulf of Suez, Nile Delta, Red Sea, Libya and West Africa.

Archimedes’ head office is in Adelaide, Australia and it has set up satellite offices in Dubai and Cairo, Egypt.

Archimedes has over 20 Permanent Staff and 20+ part time and consulting staff to deliver its products and services to the petroleum industry. It has doubled in size over the past few years to cope with this rapidly expanding business. The staff includes processing and interpreting geoscientists, computer development scientists and senior industry advisors.

The traditional mindset has considered magnetics and gravity suitable only for regional studies and then primarily in the minerals industry. However, Archimedes’ unique processing and interpretation techniques, with resolution and detail far superior to traditional approaches, are now routinely being applied in the petroleum industry to more focussed areas where seismic is not of good quality or simply not available.

Common situations where seismic has difficulties are:
- Imaging basement structure including basement faults and fractures
- Imaging basement and deeper horizons, sub-salt and sub-volcanics
- Imaging base of salt (evaporites) and base of volcanics
- Imaging horizons where seismic multiples are problematic
- When seismic data is degraded by near-surface effects (dunes, swamps, hard surface)

Common situations where seismic is sparse are:
- In areas that are difficult to acquire good seismic, such as mountainous regions, swamps, transition zones and inaccessible areas
- New exploration areas

In the case of new exploration areas, the application of Archimedes’ techniques provides a more cost effective approach to reconnaissance of the area and to filling in the gaps between sparse 2D surveys. They can aid in the design of new surveys and act as a first pass look at a new area, providing detailed basin architecture, and regional and local structural trends.

The key differentiating techniques that Archimedes has developed to the next level are:
- Energy Spectral Analysis (ESA) for Horizon Interpretation
- Automatic Curve Matching (ACM) for Fault Interpretation

Archimedes, with its technology coupled with its experienced and focussed team, is becoming recognised globally as the leader in its field of advanced processing and interpretation of high resolution magnetic and gravity data. Archimedes has provided new insights to clients in many areas where the traditional approaches have been applied, through the re-processing and re-interpretation of data. Whether it is existing data in an old area where other processing has failed to deliver results or an area where new data is required, Archimedes has the capability to provide cost effective solutions to sub-surface imaging problems.
The key factors that differentiate Archimedes from the traditional approaches are:

- The high resolution achieved in mapping various horizons. The ESA technique can be applied to each and every point on a grid as opposed to profile modelling and the application of interpolation techniques. Figure 1 shows on the left a medium resolution interpretation and on the right a high resolution interpretation of the same area. Highlighted on the left image is a high showing no structural closure. On the high resolution image that same feature is potentially closed and of further interest.

- The ability, using ESA, to interpret multiple horizons. Figure 2 shows a high resolution interpretation of two surfaces, the lower surface is basement, the upper surface is an unconformity.

- The mapping, using ACM, of high resolution magnetic lineaments which may be interpreted as faults, fracture patterns or other geological features (e.g. stress regimes) both in basement and within the sedimentary section.

- Outlining the extent of volcanics using multiple techniques. These techniques include Advanced Filtering, Modified Horizontal Gradient, Susceptibility from ACM and Spectral Shape.