

# Maritime Response Services



## About RPS APASA

RPS APASA is a science and technology leader that provides expert modelling support to world scale events such as the Deepwater Horizon and Montara oil spills and the search for the missing Malaysian Airlines flight MH370.

Every day of the year RPS APASA systems and personnel are on standby to support the management of environmental disasters, pin-pointing locations for the recovery of assets and time-critical saving of lives at sea. Our experience and software systems are key tools used globally by oil and gas operators, response co-ordination centres, salvage companies, police agencies and government authorities.

For more than a decade, RPS APASA has been at the forefront of development and application of computer modelling and analysis tools for the assessment of impacts in marine and freshwater environments.

RPS APASA operates from East and West Coast offices in Australia and services a large client base in over 25 countries in the region, with our reach extending globally now as part of the RPS Group.

RPS APASA is recognised as a leader in the prediction of ocean currents and waves, to the assessment of discharges, sediment transport and oil and chemical spills.

The findings from these studies are used by a range of sectors including offshore oil and gas, shipping, marine ports and harbours and government agencies to minimise and manage potential risks associated with their proposed and existing operations.

RPS APASA is the leading provider of marine emergency prediction software and forecasting data for response to maritime incidents, including for oil, gas and chemical spills, and search and rescue/recovery operations. We hold long term software, data and response contracts for many organisations, including both government and private sector agencies.

Our work has been recognised at the prestigious Queensland Premier's Export Awards, winning the Environmental Solutions Award (2013), the Small Business Award (2012) and the Dermot McManus Award for Outstanding Achievement in Export Innovation (2011).

### About RPS

RPS is an international consultancy providing world-class local solutions in energy, mining, infrastructure, urban growth and natural resource management.

We employ more than 4500 people across the UK, Ireland, the Netherlands, the United States, Canada, Australia and Asia Pacific and undertake projects in many other parts of the world.

Asia-Pacific Applied Science Associates (APASA) joined the RPS Group in 2013 solidifying a long term relationship with Applied Science Associates (now RPS ASA) who joined the Group in 2011. RPS ASA has been an industry leader for more than 30 years and is recognised internationally for providing high quality scientific services, software and solutions.



# Maritime Response Services

RPS APASA has been the leading provider of oil spill trajectory modelling to the oil and gas and shipping industries throughout the Asia-Pacific region for over 15 years.

RPS APASA provides a range of maritime response modelling, analysis and data support services including the following:

- Standby 24/7 on-call support for emergency response to spills and marine accidents
- Prediction of zones of concern for hazardous vapours during blowouts and gaseous releases from offshore facilities and vessels
- Computer simulation of incident action/mitigation plans, using OILMAP technology, to test options of various spill response equipment and mitigation strategies under actual or predicted met/ocean conditions. For example, containment, booming, skimming, dispersant application
- Testing of spill combat response options to measure effectiveness and net environment benefit analysis (NEBA) from various possible spill mitigation techniques
- Backward modelling and determination of the source of the oil
- A tailored situation awareness system, which would include factors such as winds, currents, weather, AIS, model results
- Spill risk modelling for incidents involving:
  - Surface and subsurface oil and chemical spills (2D and 3D)
  - Surface releases of chemicals with variable physical properties, air/gas plumes, floaters, dispersers, sinkers and combinations of properties
  - Subsea releases of oil, for example sunken vessel, pipeline failure or subsea well blow-out (3D)
  - Release of chemicals from support vessels, sunken or floating shipping containers
  - Assessing best sites for “places of refuge” during maritime casualties
  - Ship-to-ship transfers at sea
  - Emergency incidents at sea requiring cargo discharges to sea
  - Potential releases from rigs or vessels undergoing salvage or towing
- Prediction of sea state, tide heights and timing at any point globally for the salvage and re-floating of commercial vessels or other maritime craft
- Application and analysis of field aerial surveillance and remote sensing imagery of slicks to remodel for resources at risk and future locations for on-water combat operations
- Marine surface and subsea oil spill modelling studies for risk assessments and planning.
- Provision of search and rescue and recovery software systems to government and private organisations, and operational assistance where required
- Prediction of the fate or origin of physical material at sea, including stricken vessels, personnel, equipment and other objects.

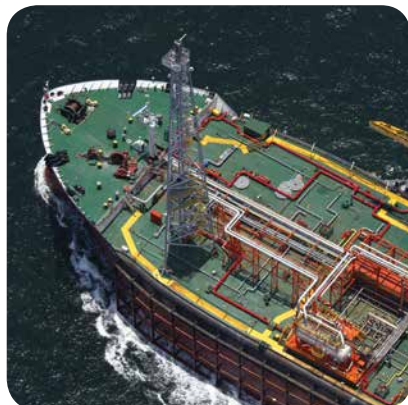
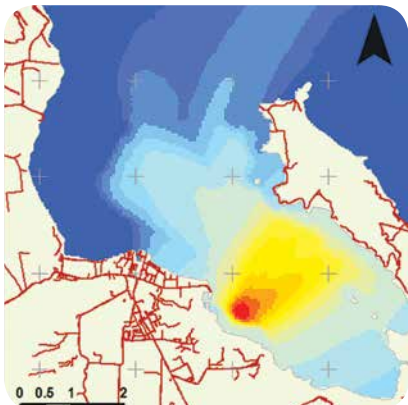


## Maritime Incidents

RPS APASA personnel have provided rapid and ongoing response modelling services, professional environmental, chemical or technical advice for a large number of incidents since 1995.

Incidents have included vessel collisions, groundings or leaks, accidental waste and chemical discharges, long term well blowouts, pipe leaks and search and rescue operations. Selected incidents are highlighted below.

- **Iron Baron (1995)** – Vessel grounding and oil spill, TAS
- **Port Stanvac (1999)** – Mobil refinery crude oil spill, SA
- **Laura D’Amato (1999)** – Sydney Harbour oil spill tanker, NSW
- **Sylvan Arrow (1999)** – Illegal discharge, Wilsons Promontory VIC
- **Pacific Quest (2002)** – Illegal discharge, Great Barrier Reef QLD
- **MT Eurydice (2004)** – Leaking crude tanker, NSW
- **Global Peace (2006)** – Gladstone QLD
- **Ghost Ship Derelict Tanker (2006)** – Weipa QLD
- **Pasha Bulker (2007)** – Grounding, NSW
- **Atlantic Eagle (2008)** – Albany WA
- **MT Breakthrough (2008)** – Grounding, Cocos Island
- **MSC Lugano (2008)** – Engine fire, Esperance WA
- **Mermaid Eagle (2009)** – Dampier WA
- **Pacific Adventurer (2009)** – Off Moreton Island QLD
- **Golden Georgia (2009)** – Nitric acid leak, NSW
- **Montara Oil Well Blowout (2009)** – (Over 100 days operation), Timor Sea
- **Shen Neng (2010)** – Grounding /oil spill, Great Barrier Reef QLD
- **Apollo S (2010)** – Sunken vessel/ collision, Port Lincoln SA
- **MV Island Trader (2011)** – Lord Howe Island, NSW
- **Vega Fyren (2011)** – Reef off PNG
- **MV Rena (2011)** – Dangerous Goods & HNS, Tauranga NZ
- **Bonga FPSO (2011)** – Nigeria
- **MV Eline Enterprise (2012)** – HNS incident, Darwin NT
- **Lady Cheryl (2012)** – Port Phillip Bay VIC
- **GL Lan Xiu (2012)** – Brisbane River QLD
- **MV Tycoon (2012)** – Oil spill, Christmas Island
- **Asian Lily (2013)** – PNG
- **Maritime Maisie (2014)** – Chemical tanker, Korea
- **Malaysian Airlines MH370 search (2014)** – Australia
- A number of oil and gas industry spills, near misses and incidents undertaken confidentially (2012 & 2013)
- Multiple investigations for government agencies for prosecutions of spillers for nuisance spills (1999 – 2014)



# Weather Reports for Incidents

RPS APASA also provides weather and metocean condition reports for shipping salvage incidents. A selection of prior incidents we have responded to include:

- **Zhi Qiang** – RPS APASA provided documentation outlining the weather and sea conditions at Long Reef (PNG) following the grounding of the Zhi Qiang
- **Pasha Bulker** – Following the grounding of the bulk carrier Pasha Bulker at Nobbys Beach (Newcastle, NSW), we were tasked with providing a report outlining weather and sea conditions from the time of grounding until 1-week following the re-floating.
- **MSC Lugano** – Following an engine fire and subsequent disablement of the MSC Lugano off Esperance WA, information was provided on the wind and current conditions in the region to facilitate more efficient towing of the vessel.
- **Atlantic Eagle** – RPS APASA delivered a report on the weather and sea conditions (including tides, winds, waves and ocean currents) from the time the Atlantic Eagle made contact with Maude Reef (south of Albany in the Southern Ocean).
- **American Legacy** – We provided a report outlining the weather and sea conditions, including tides, winds and waves at Roncador Reef (North of the Solomon Islands in the Coral Sea) following the grounding of the American Legacy.
- **Apia Samoa** – RPS APASA provided weather and tidal forecasts for Apia in Samoa, including tidal elevations, winds, and rainfall during August and September.

RPS provides a range of real-time and on-demand metocean forecasting services that include:

- spot location reports
- regional scale visualisation
- weather windows
- input to a range of operational response models
- web-based, mobile device, email or FTP delivery methods

Data can be provided for winds, waves, currents, tides and other parameters typically available from local to global scale forecast models. RPS both warehouses and serves a range of third party regional and global data sets and runs operational models of particular regions. As leaders in web-based delivery via Environmental Data Server technology we offer an integrated and flexible solution.



## 24/7 Response Modelling

RPS APASA offers a 24 hours a day, 7 days a week subscription-based modelling service to support response to marine oil and chemical spills.

This service provides critical situation awareness related to the future movement and direction of spills, where and when impact to shoreline is likely to occur and what response strategy would be optimal.

To support this service, RPS APASA applies cutting edge technology, combining modelling software that has been proven over years of practical application to real emergency events, including OILMAP (for oil spills), CHEMMAP (chemical spills) and SARMAP (search and rescue or recovery), with the COASTMAP Environmental Data Server system that ensures that multiple reliable metocean forecasts are always available for trajectory prediction.

This service covers a wide range of emergency scenarios from spills of oil or chemicals onto the water surface through to complex subsea blowouts in deep water.

All fate assessments consider the weathering and transformation based on the specific physical and chemical properties of the pollutant of concern, with our response supported by our database of oil and chemical data properties.

Outcomes are modelled using multiple sources of the best available metocean forecast data sets, with the degree of consensus providing important guidance on the safety factors that should be applied.

Critical to any response, our service is available around the clock and we provide rapid turn-around on forecasts and advice.

### Case Study Montara Well Blowout

In August 2009, the Montara wellhead platform in the Timor Sea suffered a blowout. Oil leaked continuously at the seabed for the next three months with approximately 300 to 400 barrels of oil released each day. Australia's national oil spill response plan was activated immediately, triggering the mobilisation of the Australian Maritime Safety Authority (AMSA).

RPS APASA supported AMSA's response by providing metocean data analysis, integration of remotely-sensed oil observations and oil spill trajectory forecasts on a daily basis. Together, the AMSA and RPS APASA team was able to apply new techniques and technologies to assist in effectively managing the spill response.

*(Information provided courtesy of AMSA)*



# Data Delivery and Situation Awareness

RPS APASA provides a variety of delivery solutions for spatial metocean data, critical for situation awareness and to enhance operational planning and avoid costly down-time.

Through the world leading Environmental Data Server™ (EDS) technology, subscribers have seamless access to a wide variety of global, local and point-based data sets including wind, water level, current and wave data. This is the same data that drives our world leading OILMAP, CHEMMAP and SARMAP emergency response modelling systems. This technology can serve any time-varying data sources that can be linked to web-services, including measured data (tide gauges, wave and current meters, temperature or salinity measurements, satellite information etc) feed from position tracking systems and outputs of forecasting models.

For localised applications, RPS APASA prepare high resolution hydrodynamic and wave models that are run operationally, feeding into the EDS one or more times each day and forecasting up to one week ahead. For dredging or discharge projects, forecasts of suspended sediment, water temperature or pollutant concentration can also be integrated and rendered by the system.

The data sets can be presented and accessed in a number of forms:

- Displayed and interrogated through a web browser via our Coastmap and Environmental Common Operational Picture (ECOP) portals
- Built into custom web-based applications for specific needs
- Access via WMS services for integration into other GIS frameworks or web solutions
- Integration with ESRI products including ArcGIS Online.

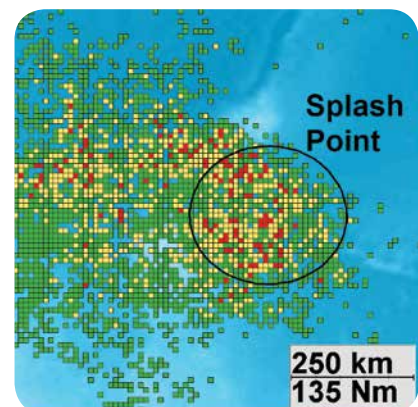
The use of web-based technology extends to mobile applications, with our aim to put consistent data into the hands of as many authorised end users as possible. This allows common access across multiple locations and throughout different groups who may be involved in the same operation. An important feature of the data available in the EDS is that it is primarily forecast based, and therefore a great tool for operational planning.

## Operational Support for Missing MH370 Search

Malaysian Airlines flight MH370 disappeared from civilian radar screens around an hour into the flight from Kuala Lumpur to Beijing on 8 March, 2014.

RPS APASA provided day-to-day drift modelling to assist the search for the plane in the southern Indian Ocean. The support provided included:

- Full time presence in the Canberra Crisis Centre
- Integration of the data from drifters being deployed by aircraft in the Indian Ocean. These drifters provide an understanding of the movement of the currents and the accuracy of model predictions.
- Integration of three global ocean models to provide multiple forecasts of surface currents
- Drift modelling of various objects from different locations to help create the daily search areas for the vessels and aircraft using a consensus modelling approach.





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