



# Our **Oceans**

**AIRBUS**



# Protecting Our Oceans through **Improved Visibility** and **Insight**

The immense size of our oceans, combined with the growing numbers of movements and activity within them, means that surveillance of the maritime domain represents a notable and escalating challenge for government agencies, coastguards, border forces and environmental bodies. In regions where ocean-going traffic denotes a strong economic driver or a potential security risk, the effective monitoring of activities such as people smuggling, illegal fishing, drug trafficking and marine pollution are all major concerns.

By combining proprietary data with a plethora of complementary maritime

intelligence sources, and leveraging our team of expert imagery analysts, Airbus is uniquely positioned to cost-effectively support improved surveillance across both coastal areas and open seas.

Key to our capabilities is our unrivalled multi-sensor, multi-resolution satellite constellation, which provides the flexibility to meet almost any requirement. From very high-resolution imagery, with daily revisits of anywhere on Earth, to weather and light independent radar sensors capable of capturing valuable insights in any conditions, Airbus can be a critical partner to those engaged in this field.



Pléiades Satellite Image - Galešnjak, the Island of Love © CNES 2017, Distribution Airbus DS





### Salmon Monitoring

Using the hyperspectral signature from Airbus' satellites to identify harmful algae, or other toxic elements, helps salmon producers to effectively monitor sea conditions.

Temperature monitoring and other spectral signature analysis may provide an early warning system to salmon producers and help improve productivity.

Satellite data provides insight remotely, reducing costs and time without the need for on-site surveying.



## Protecting **Sustainable Fishing** and **Supporting Commercial Activities.**

Safeguarding a country's exclusive or shared fishing rights against illegal activity is a challenge in itself. With millions of miles of oceans to monitor, the scale of the problem is self-evident and developments in the UK's relationship with the EU will likely only add to this dilemma in the years to come.

Airbus' imagery solutions and its new OceanFinder product are able to monitor large swaths of ocean for abnormal behaviour, as well

as detect and track suspicious activity and unregistered vessels – recording the intelligence gained and alerting enforcement authorities in near real-time, so targeted action can be taken.

Of equal value is Airbus' ability to monitor our oceans for a range of unwanted elements and temperature changes. This supports legal activities and the wellbeing of marine life.

### Illegal Fishing

Through the use of satellite imagery combined with historic AIS data, suspected vessels can be monitored and tracked for illegal activity.

Once an area has been analysed, ship detection and expertise is activated to notify authorities. Vessels can then be intercepted rapidly.



# Taking Action to Combat Marine Pollution

The marine habitat is facing a serious and sustained threat from pollution – potentially impacting essential human activity, as well as human lives. With this in mind, the need to actively reduce the causes and consequences of marine pollution has never been greater. However, finding effective ways to detect and document transgressions, as well as prosecute those responsible, requires a collaborative approach and the utilisation of all available resources.

## Sea Turbidity - Water Quality During Nearshore Pipeline Construction

The construction of pipelines and offshore oil recoveries entails intense dredging activities, moving underwater sediments from one place to another and thus disturbing water quality. Solutions to monitor water quality and compliance -

The increasing employment of satellites for pollution detection, monitoring and tracking have transformed how governments and environmental agencies are able to cover large areas both rapidly and cost effectively, with different remote-sensing platforms and sensors each having their own capabilities for mapping and monitoring water pollution of different types, characteristics, and concentrations.

rely more and more on satellite imagery. Airbus provides wide coverage, fine detail, intensive monitoring, reliable and successful new collections, premium reactivity including time-critical satellite tasking and interpretation response.



UK-DMC2 Satellite Image - The Deepwater Horizon Oil Spill in the Gulf of Mexico © UK-DMC2 2010 Airbus DS

## Case Study



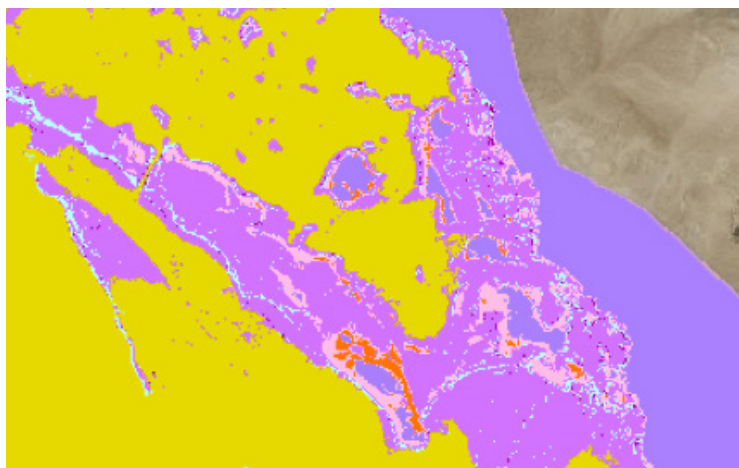
### Detection and Observation of Toxic Gulfweed in Martinique

Sargasse, a toxic gulfweed threatened the Martinique coastline, posing a potential environmental disaster and serious hazard to public health. Satellite imagery of the ocean can provide high value information on the state of the oceans and their not so natural pollution.

Through the agility and capacity of Airbus' SPOT 6/7 satellites, daily collection of tens of thousands sq km for a given AOI was achieved. The imagery, combined with a digital model of oceanic vegetation, was used to detect the seaweed hubs and slicks. Empowered by the satellite imagery information, the authorities were able to deploy nets offshore and trap part of the seaweed before any further drifts reach the coastline.



## Case Study



### Sea Floor Mapping

Prior to coastal development, Airbus' satellite imagery can be used to derive habitat mapping for environmental asset inventory and impact assessments. Through analysis of the imagery, you can gain a better understanding of the land form/use (i.e, mangrove, vegetation, reef, villages). This enables you to effectively manage any potential development and ensure the impact on the surrounding area is carefully managed.

# Supporting **Protected Marine Areas** and **Wildlife Conservation**

Within areas designated as marine protected zones, enforcement presents both practical and financial challenges. These areas often span hundreds or even thousands of square miles and are therefore difficult to patrol effectively, resulting in low levels of prosecution for those flouting the law. Satellite-based imagery and monitoring services can strengthen traditional enforcement practices, providing critical insights to enable informed decisions and better protect sensitive marine environments.

Through regular satellite monitoring, the nature and frequency of illegal activity can be accurately

understood, and specific culprits identified, tracked, reported and subsequently intercepted by the relevant authorities. Moreover, automatic alerts can be established against a range of parameters, such as, when vessels that exceed a specific size, or that are known to engage in prohibited activities, enter a protected area.

This highly cost-effective method of monitoring a large area of coastline or open ocean enables personnel and ocean-going assets to increase their effectiveness by focusing resources on real and current threats, backed by accurate intelligence.

SPOT 7 Satellite Image - Fiji © 2014 Airbus DS



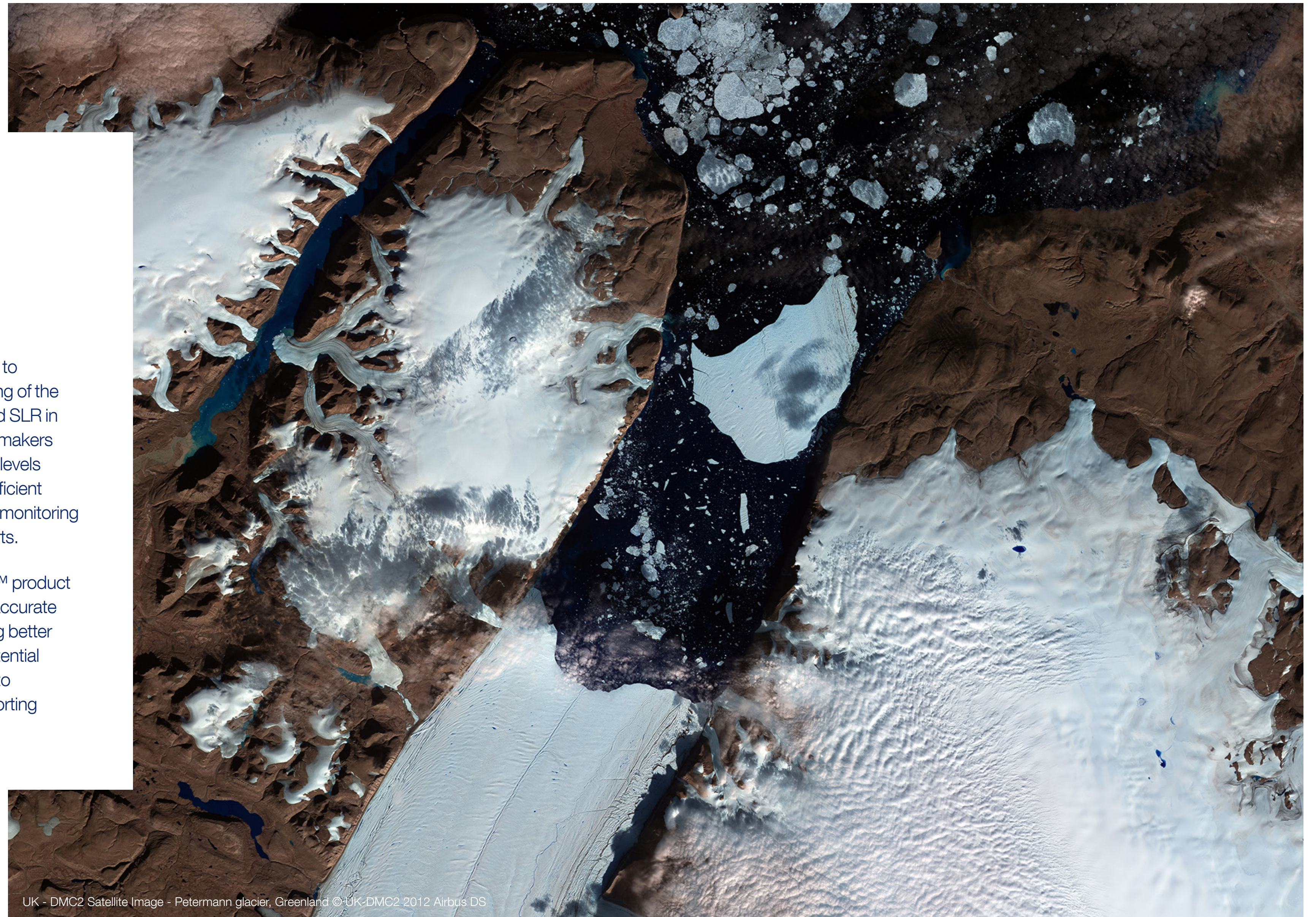
# Compelling Evidence for **Climate Change**

The impact of rising sea levels and the broader effects of climate change on the maritime domain are now fully understood, with action increasing across the globe and demand for visibility growing in parallel. Satellite imagery and intelligence can provide indisputable evidence of the changes taking place and provide governments and related scientific bodies with the data they need to respond to these complicated issues.

Currently sea levels rise around 3mm per year on a global scale and the rate is expected to intensify

in the future. It is important to attain a good understanding of the complex processes behind SLR in order to support decision-makers on global, regional or local levels in the implementation of efficient countermeasures and the monitoring of the impact of these efforts.

Airbus and its WorldDEM™ product offers highly detailed and accurate height information enabling better analysis of changes to potential hazard zones and impact to infrastructure, whilst supporting effective.



UK - DMC2 Satellite Image - Petermann glacier, Greenland © UK-DMC2 2012 Airbus DS





## Fast, Cost-Effective and **Environmentally Responsible**

Another, more direct, consideration relating to maritime surveillance and climate change is identifying how growing requirements can be met most effectively, simultaneously increasing visibility and reducing the environmental impact of patrol vessels and aircraft that have been used in this capacity historically.

The increased employment of satellite technology for maritime

surveillance and intelligence gathering can support the reduction of carbon emissions by reducing the requirement for border force and coastguard vessels to patrol open oceans without a specific target. Instead, responders can be more targeted; driven by accurate, timely intelligence that provides the location and description of a vessel deemed worthy of further investigation.



# Supporting Effective **Emergency** and **Disaster Response**

Airbus provides reliable data management solutions and leverages its Optical and SAR satellite constellations, to effectively support emergency response efforts when natural or human activity disasters occur. The provision of historic and near real-time imagery provides improved situational awareness and enables officials and first responders to react faster, plan and disseminate critical mapping information to all teams involved.

Airbus is part of The International Charter - European Space Agency (ESA) and the French Space Agency (CNES), which aims to provide unified access to satellite data to assist when responding to natural or man-made disasters. Each member agency commits resources to support the provisions of the Charter, collectively helping to mitigate the effects of disasters on human life and property. This service is available 24/7 for immediate response.



Pléiades Satellite Image - Earthquake and Tsunami in Palu Indonesia © CNES 2018, Distribution Airbus DS



# Applications for Ensuring **Security** and **Safety** at Sea

Airbus has extensive experience in the collection and dissemination of critical maritime intelligence. Covering trafficking, piracy and terrorism, and other defence and security related applications, represent key areas where Airbus' maritime capabilities are able to deliver immeasurable value – providing an accurate understanding of any scenario associated with the global maritime domain that could

impact the security, safety or economy of a nation.

From locating and tracking a specific vessel or automatically identifying boats displaying abnormal behaviour, to monitoring a larger area over an extended period to better understand trafficking movements, Airbus can play an important role in improving safety and security at sea.

## Case Study: Hijacked ARIS Oil Tanker Rapidly Located

Combining the Automatic Identification System (SAT-AIS), Airbus' satellites rapid acquisition capacity and analysis expertise enabled the ARIS 13 oil tanker to be located in just a few days. The quick delivery of the ship's detection report

supported intervention, maximising resources and increasing efficiency. Our solutions support decision-making with actionable intelligence and understanding of the situation remotely.



## Case Study



### Maritime Surveillance: Helping to Tackle Speeding Traffickers

Often described as 'Go-Fast Boats' or 'Cigarette Boats', these vessels are frequently used to transport illegal drugs and other illicit goods. To support local customs authorities for an observation campaign in the Caribbean Sea, Airbus utilised its unique portfolio of satellites and imaging services, including SAT-AIS data, to identify 35 potentially relevant vessels over a 5 day period within the area of interest. Through analysis of each vessel and its navigation behaviour, it was determined that five craft met the criteria of 'Go-Fast' boats.

This provided insight into the frequency of journeys and routes potential traffickers are likely to take. In turn, this intelligence reinforces custom authorities' capability to maintain effective oversight and be in a position to more effectively track and intercept criminals on the water.



# Trust in **Airbus**



## **Global Resource**

No geographical limitation, can acquire images both onshore and offshore, both in the national territory and beyond.



## **Cost-Effective Solutions**

Compared to usual means, satellite cost is fixed whatever the distance to target.



## **Reactivity**

Can accommodate short-notice requests to support emergency operations (OneTasking).



## **Complementary Sensors**

Our constellation of radar and optical satellites offers the ideal combination between coverage and resolution.