

COPERNICUS MARITIME SURVEILLANCE PRODUCT CATALOGUE



© **European Maritime Safety Agency 2017**

Photo credits: Front Cover EMSA; ESAATG medialab_pages 2, 9, 67 & back cover; Rafael Ramirez Lee/shutterstock.com_back cover; jorisvo/shutterstock.com_backcover; cc_Epicstockmedia/shutterstock.com_backcover; sakchaistockphoto/shutterstock.com_page 2; andrey polivanov/shutterstock.com_page 2; Dahotski Dzmitry/shutterstock.com_pages 4 & 5; Irish Coast Guard_page 6; European Space Imaging/DigitalGlobe (2015)_page 12; Rastislav Sedlak SK/shutterstock.com_page 34; European Space Imaging/Digital Globe (2016)_page 63; WorldView3@European Space Imaging/DigitalGlobe (2016)_page 71; Josef Hanus/shutterstock.com_page 72;

COPERNICUS MARITIME

SURVEILLANCE

PRODUCT CATALOGUE

TABLE OF CONTENTS

INTRODUCTION 4

CHAPTER 1

HOW TO ACCESS THE COPERNICUS MARITIME SURVEILLANCE SERVICE 6

- Service scope 7
- Access to the CMS service 8
- Tasking CMS services 10
- Archive data access 11

CHAPTER 2

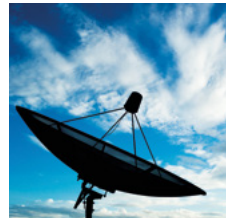
EARTH OBSERVATION PRODUCTS 12

- Overview 13
- Planning modes 14
- Resolution classes and products 15
- Band combinations 17
- EO sar image products 18
- EO optical image products 28

CHAPTER 3

EARTH OBSERVATION VALUE ADDED PRODUCTS 34

- Overview 35
- Oil spill detection 36
- Vessel detection 38
- Activity detection 40
- SAR wind and SAR wave 42
- Value added products: applications and uses 44



CHAPTER 4	
FUSION PRODUCTS	46
• Overview	47
• Correlation with vessel reporting information	48
• Oil spill alert reports	50
ANNEX I	
SATELLITE LICENCE CONDITIONS	52
• Overview	53
• Sentinel-1A and Sentinel-1B image products	54
• RADARSAT-2 image products	54
• TerraSAR-X/TanDEM-X/PAZ image products	55
• Pleiades 1A and 1B, and Spot 6 and 7 image products	57
• DEIMOS-1 and DEIMOS-2 image products	59
• WorldView 1, 2, 3 and 4, and GeoEye-1 image products	61
• Landsat	62
• Results of the exploitation of the contracts	62
ANNEX II	
IMAGE CREDITS	64
• Optical satellite data	65
• Synthetic aperture radar data	65
• EMSA derived products and value added products	66
ANNEX III	
ACRONYMS AND ABBREVIATIONS	68



INTRODUCTION

Copernicus is a European Union Programme aimed at developing European information services based on satellite Earth Observation (EO) and in-situ (non-space) data¹. The European Maritime Safety Agency (EMSA) is the Entrusted Entity responsible for implementing the Copernicus Maritime Surveillance (CMS) service under a Delegation Agreement signed with the European Commission for the period 2015-2020.

The CMS service supports monitoring of human activity at sea for a range of functions, including amongst others, maritime safety and security, fisheries control, marine pollution monitoring, and law enforcement². The CMS service can be accessed by European Union (EU) and European Free Trade Association (EFTA) national administrations with responsibilities at sea, as well as relevant EU bodies and institutions. The service provides additional EO information through existing EMSA applications, and establishes new opportunities to use such data.

The CMS service offers users an extended geographical scope and enhanced range of high quality maritime information. Coverage can be provided in areas of European interest across the globe, with a variety of different resolutions and sensor types. In addition to image products, the service provides value-added products, including detection and classification of vessels based on automatic algorithms, and activity detection.

1 For more information on the programme in general, please see www.copernicus.eu

2 The Copernicus Maritime Surveillance Service does not support border surveillance, for which a separate Copernicus service has been set up.

The catalogue is divided into four chapters:

- The first chapter of the catalogue describes how to access the CMS service by contacting EMSA, and notes that the CMS service is provided through EMSA's integrated maritime service (IMS) interface
- The second chapter of the catalogue presents the EO image products available, both from synthetic aperture radar (SAR) and optical satellites
- The third chapter of the catalogue describes the value added products. This type of information is extracted from the images using algorithms developed for that specific purpose, and is tailored to the end-users' needs. Given the very particular nature of value added products, an overview table has been provided indicating which products may be useful for a range of different use cases
- The fourth chapter provides information on the higher level fusion products available
- In annex, the catalogue concludes by providing some information on the legal context, outlining certain restrictions to the use of CMS products, as well as the obligations in terms of acknowledging ownership of original or derived products when displayed for any purpose.

The CMS Product Catalogue will be updated on a regular basis to include new products that are deployed or to remove products that are considered obsolete.

The products listed in the Product Catalogue and provided by the CMS service are only for distribution to, and for the official use of, authorised users. For other distribution restrictions related to satellite products, please see Annex 1.

CHAPTER 1

HOW TO ACCESS THE COPERNICUS MARITIME SURVEILLANCE SERVICE



1.1 SERVICE SCOPE

The CMS service provides EO products (satellite images and value adding products) to support a better understanding and improved monitoring of activities at sea. The CMS service is available through EMSA's integrated maritime services (IMS) to support a wide range of operational functions.³ The CMS service provides support to interested Member State administrations and European bodies exercising functions in the maritime domain⁴, including in the areas of:

- fisheries control
- maritime safety and security
- law enforcement
- customs
- marine environment monitoring, and
- other (e.g. defence).

Within IMS the existing access rights will continue to apply with regard to other data sources such as vessel position information. In addition to providing Copernicus information via IMS, EMSA can also deliver EO data directly to the user – specific requests will be addressed on a case by case basis.

³ These functions are defined in a service portfolio included as an annex to the Delegation Agreement signed between EMSA and the European Commission.

⁴ Please note that the CMS service does not support border surveillance functions, for which a separate Copernicus Border Surveillance service has been implemented. With the Delegation Agreement finalised on 10 November 2015, the European Commission entrusted Frontex with the border surveillance component of the Copernicus Security Service. For further information on the border surveillance service, contact: efs@frontex.europa.eu

1.2 ACCESS TO THE CMS SERVICE

Requesting access to the CMS will depend on the functions being exercised:

1. Fisheries control:

- If you are interested in CMS for the purposes of fisheries control, please contact the European Fisheries Control Agency (EFCA), which coordinates user access for this particular service component, at: copernicus@efca.europa.eu.

2. Maritime safety and security, law enforcement, customs, marine environment monitoring, and other functions:

- Please contact the EMSA Copernicus team directly at copernicus@emsa.europa.eu to discuss your specific needs in terms of earth observation information and products.
- If you are interested in using the CMS service for other functions, for example defence, or other areas not listed above, coordination with the European Commission (DG-GROW) may be necessary in order to include these functions in future implementation plans. Users are encouraged to contact EMSA to discuss how to proceed.

Users can also get in touch with DG GROW through the dedicated email address: ec.copernicus.mss@ec.europa.eu.

Please contact the EMSA Copernicus team at copernicus@emsa.europa.eu at any time with questions, comments, suggestions, or additional requirements.





1.3 TASKING CMS SERVICES

Once a user has contacted the EMSA Copernicus team to request access to CMS data, an iterative process of further defining the exact user requirements particular to that user will be initiated. While this process differs according to the user - for example depending on their level of previous experience of using EO products, the areas in which they are interested in receiving data, and their security requirements - there are some basic steps which will be taken in almost all cases, and which are outlined below in Table 1.

TABLE 1 - INITIAL ACTIONS TO TASK CMS SERVICES

CMS USER INITIAL ACTIONS	EMSA INITIAL ACTIONS
<ul style="list-style-type: none"> ■ Provide the following information: <ul style="list-style-type: none"> ● Time interval of acquisitions ● Area of interest (AOI) (in WGS84 coordinate system) ● Frequency of coverage or number of acquisitions ● Additional relevant information regarding object of interest (e.g. vessel length; structures to be identified; associated features; day/night preferences) ● Requested EO value-added products (vessel detection service, activity detection, EO images) ■ Users should note that EMSA can provide assistance in defining these parameters 	<ul style="list-style-type: none"> ■ Designate a point of contact ■ Liaise with user to complete Operational User Requirements Questionnaire (to better understand user service needs) ■ Liaise with user to complete Service Request form (to place a request for products)

1.4 ARCHIVE DATA ACCESS

There are two types of archive data which may be of interest to CMS users:

1. Archive data which EMSA has previously ordered and which is available in-house.

Authorised users have access to EMSA's archive data. This is available online directly from the IMS interface for up to six months after acquisition. Archive data that is older than six months can be retrieved manually by EMSA; interested users should contact copernicus@emsa.europa.eu.

2. Archive data which may have been acquired by the satellite missions to which EMSA service providers have access, but which was not ordered directly by EMSA at any point in time, and is not archived in EMSA.

If users are interested in historic data from a given period and related to a specific area, e.g. to confirm whether a suspected activity took place, it may be possible to acquire this data post-hoc from EMSA's contracted providers (even if it was not previously ordered by EMSA). If users are interested in historic data not available online they should contact copernicus@emsa.europa.eu and place a service request providing the information described in Table 1 (period, area, purpose). The EMSA Copernicus team will then evaluate whether there is data available from any source to fulfil the request.

CHAPTER 2

EARTH OBSERVATION PRODUCTS



The products described in Chapter 2 constitute the core of the EO data being delivered by the CMS service. This part of the catalogue will be updated as new products are developed and released. The products are categorised by the best spatial resolution available for each image, which in the case of optical images is the panchromatic band. The highest resolution presented for SAR products is the azimuth spatial resolution defined by the satellite provider.

Generically, spatial resolution, given in meters or centimeters, indicates the size of the smallest object that can be depicted in an image.

2.1 OVERVIEW

The CMS service offers image products, value added products and fusion products based on two types of earth observation data: SAR data and optical data.

SAR sensors use microwave frequencies to retrieve backscatter measurements from the detected surface below (sea or land). The images can be acquired regardless of weather conditions and cloud cover, and at any time of day or night. SAR images of the ocean greatly depend on surface roughness caused by wind stress at the sea surface. By measuring the roughness of the sea surface, resulting images display features which stand out against the background; for example, vessels and other man-made structures appear as bright spots, while oil spills or areas with very low wind appear as dark shapes.

Optical images can provide a wealth of information in different spectral bands. They provide easier image interpretation and object identification due to the combination of Red-Green-Blue (RGB) frequencies and higher contrast, albeit the very high dependency on sunlight and weather conditions. Optical radiometers cannot capture images during the night or in cloud cover conditions.

2.2 PLANNING MODES

The SAR and optical missions' products, delivered by CMS, are available through standard planning modes. The optical missions are also available through advanced planning modes, which can be used separately or in combination: cloud cover, data take opportunities (DTO), pinpointing, multi-mission and SAR-aligned.

- Cloud cover protection activation guarantees that an acquisition over an area of interest (AOI) is done only if a maximum of cloud-free area can be guaranteed. The threshold for the maximum percentage, e.g. 20%, of area covered with clouds will be specified by EMSA when placing this type of order.
- DTO planning intends to maximise the reliability of a successful delivery and minimise the impact of last minute cancellations, non-acquisitions or satellite unavailability. This can be achieved by allowing flexible dates, times of acquisition and/or different missions. Several images are tasked, yet only one is delivered.
- Pinpointing enables acceptance of last minutes changes to the footprint within the AOI before the satellite overpass. This planning mode exploits the agility of the optical satellites, which have sensors that can move swiftly back and forth, and sideways.
- The multi-mission option allows maximising successful delivery by ordering delivery of several possible acquisitions in a specific AOI, during a limited period of time, by tasking at least two different satellites.
- SAR-aligned planning is the procedure that allows the synergetic use of SAR and optical. The SAR acquisition is used to determine the optical acquisition footprint.

2.3 RESOLUTION CLASSES AND PRODUCTS

The resolution classes and products categories presented here are aligned with the European Space Agency (ESA) Data Access Portfolio⁵. All missions of the space component are classified primarily by sensor type (SAR or optical) but also by resolution classes, from very high resolution (VHR) to high resolution (HR) to medium resolution (MR). Table 2 summarises these classes for the SAR products and Table 3 summarises it for the optical products available in CMS service.

TABLE 2 - RESOLUTION CLASSES FOR EO SAR IMAGE PRODUCTS

CLASS	RESOLUTION (X)	PRODUCT
VHR1	$x \leq 1\text{m}$	TerraSAR-X Staring Spotlight
VHR2	$1\text{m} < x \leq 4\text{m}$	RADARSAT-2 Wide Ultra-Fine
		TerraSAR-X StripMap
		RADARSAT-2 Ultra-Fine
HR1	$4\text{m} < x \leq 10\text{m}$	RADARSAT-2 Extra Fine
		TerraSAR-X StripMapRad
		RADARSAT-2 Multi-Look Fine
HR2	$10\text{m} < x \leq 30\text{m}$	TerraSAR-X ScanSAR
		RADARSAT-2 Wide
		RADARSAT-2 Standard
MR1	$30\text{m} < x \leq 100\text{m}$	TerraSAR-X Wide ScanSAR
		RADARSAT-2 ScanSAR Narrow
		RADARSAT-2 Ship Detection
		Sentinel-1 Interferometric Wide Swath
		RADARSAT-2 Ocean Surveillance
		RADARSAT-2 ScanSAR wide
		Sentinel-1 Extra Wide Swath

⁵ Copernicus Space Component Data Access Portfolio: Data Warehouse 2014 - 2020

TABLE 3 - RESOLUTION CLASSES FOR EO OPTICAL IMAGE PRODUCTS

TYPE	RESOLUTION (X) (PANCHROMATIC BAND)	PRODUCT
VHR1	$x \leq 1\text{m}$	WorldView-4
		WorldView-3
		WorldView-2
		WorldView-1
		GeoEye-1
		Pleiades 1A
		Pleiades 1B
		DEIMOS-2
VHR2	$1\text{m} < x \leq 4\text{m}$	Spot 6
		Spot 7
HR1	$4\text{m} < x \leq 10\text{m}$	Currently not available
HR2	$10\text{m} < x \leq 30\text{m}$	Landsat-8
		DEIMOS-1

2.4 BAND COMBINATIONS

Optical images are composed of different image bands that represent specific frequency information. Panchromatic images represent the intensity of the radiation (resulting in a greyscale image), whereas multispectral represent various bands of the spectrum (which is visualized in most cases as a real colour image). As a default, users receive the final image product with processing already completed to provide a final result. On request, users can receive different band products rather than a final processed image; it is anticipated that this possibility will only be of interest to users with considerable technical experience of using satellite images. The following options are available in terms of ordering of optical products and respective bands⁶:

- Panchromatic: a single-band image coming from the panchromatic sensor (which is the highest resolution band in a certain sensor)
- Multispectral: a multi-band image coming from the multispectral sensor. Usually three bands are used to construct the RGB image
- Pan-sharpened: three image band product, resulting from adding the information of each multispectral band to the panchromatic band (highest resolution)
- Bundle (panchromatic and multispectral bands): a multi-band image containing the panchromatic and multispectral products packaged together.

⁶ Band combination information from: <http://www.deimos-imaging.com/imagery>

2.5 EO SAR IMAGE PRODUCTS

2.5.1 VERY HIGH RESOLUTION 1 (VHR1)

PRODUCT NAME

SAR VHR1

Sub-products

TerraSAR-X Staring Spotlight (TSX ST)

OPERATIONAL DETAILS

Very high resolution SAR images, delivered in near real time, with spatial resolution $x \leq 1\text{m}$

Tasking priority	Routine	Ordering takes place several months to 72 hours before satellite acquisition. This is the standard tasking mode
	Short notice	Ordering takes place 72 to 48 hours before satellite acquisition. It requires the planning and ordering to be done with reduce time
	Emergency	Ordering can take place less than 48 hours before acquisition, depending on the different tasking capabilities

Delivery (T)

Near-real-time (T ~ 30 minutes depending on image size and distance to ground stations masks)

Service access

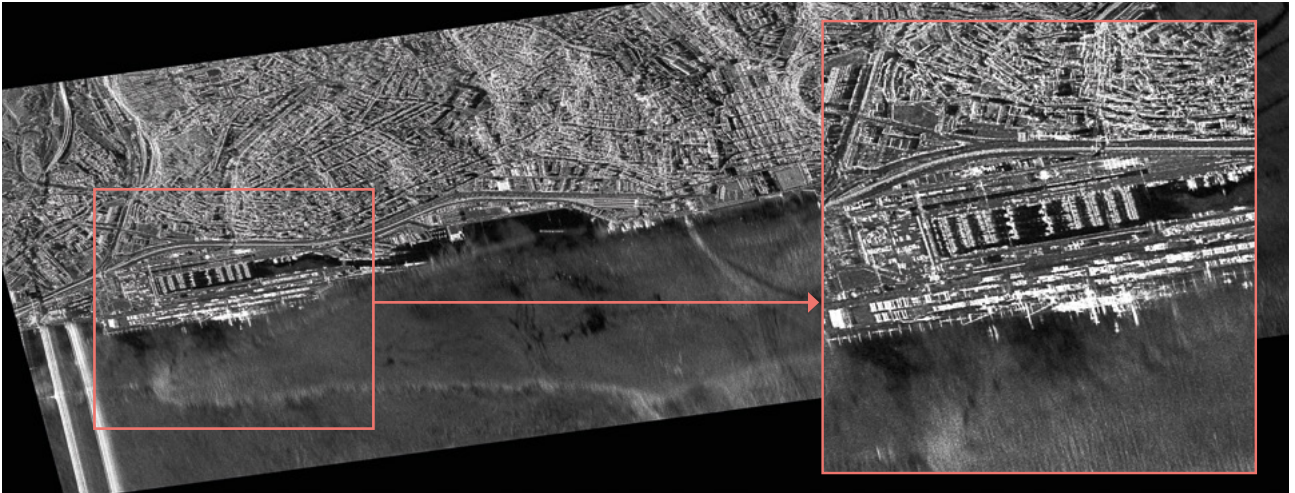
Available through IMS

TECHNICAL DETAILS

Image	Highest resolution	Standard scene size (width x length)	Polarization
TSX ST	0.25m	4 km x 3.7km or 2.5km x 7.5 km (incident angle dependency)	Single (HH or VV)

HOW TO CITE THE PRODUCT

TerraSAR-X: "© DLR e.V. [year], Distribution Airbus DS Geo GmbH"



Lisbon - TSX ST © DLR e.V. 2015, Distribution Airbus DS Geo GmbH

2.5.2 VERY HIGH RESOLUTION 2 (VHR2)

PRODUCT NAME

SAR VHR2

Sub-products

RADARSAT-2 Wide Ultra-Fine (RS2 UFW)

TerraSAR-X StripMap (TSX SM)

RADARSAT-2 Ultra-Fine (RS2 UF)

OPERATIONAL DETAILS

Very high resolution SAR images, delivered in near real time, with spatial resolution $1\text{m} < x \leq 4\text{m}$

Tasking priority	Routine	Ordering takes place several months to 72 hours before satellite acquisition. This is the standard tasking mode
	Short notice	Ordering takes place 72 to 48 hours before satellite acquisition. It requires the planning and ordering to be done with reduce time
	Emergency	Ordering can take place less than 48 hours before acquisition, depending on the different tasking capabilities
Delivery (T)	Near-real-time (T ~ 30 minutes depending on image size and distance to ground stations masks)	
Service access	Available through IMS	

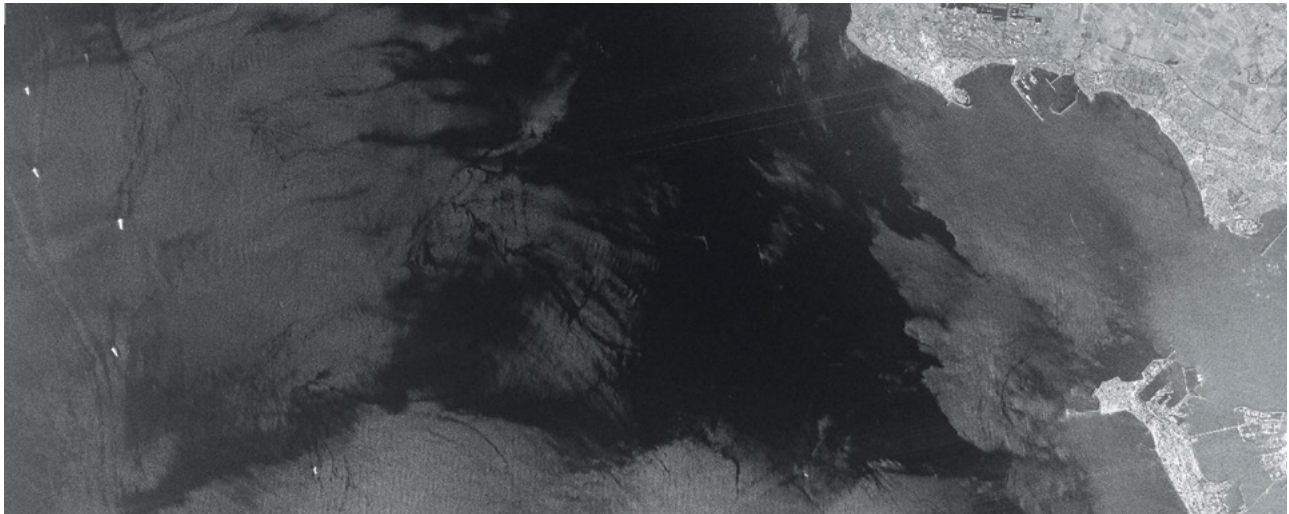
TECHNICAL DETAILS

Image	Highest resolution	Standard scene size (width x length)	Polarization
RS2 UFW	3m	50 km x 50 km	Single (HH or VV)
TSX SM	3m	30 km x 50 km	
RS2 UF	3m	20 km x 20 km	

HOW TO CITE THIS PRODUCT

TerraSAR-X: “© DLR e.V. [year], Distribution Airbus DS Geo GmbH”

RADARSAT: “RADARSAT-2 Data and Products © MacDONALD, DETTWILER AND ASSOCIATES LTD [year] – All Rights Reserved” and “RADARSAT is an official mark of the Canadian Space Agency”



Cadiz Bay, Spain - RADARSAT-2 Data and Products © MacDONALD, DETTWILER AND ASSOCIATES LTD 2016 – All Rights Reserved; RADARSAT is an official mark of the Canadian Space Agency

2.5.3 HIGH RESOLUTION 1 (HR1)

PRODUCT NAME

SAR HR1

Sub-products

RADARSAT-2 Extra Fine (RS2 XF)

TerraSAR-X StripMapRad (TSX SMR)

RADARSAT-2 Multi-Look Fine (RS2 MF)

OPERATIONAL DETAILS

High resolution SAR images, delivered in near real time, with spatial resolution $4\text{ m} < x \leq 10\text{ m}$

Tasking priority	Routine	Ordering takes place several months to 72 hours before satellite acquisition. This is the standard tasking mode
	Short notice	Ordering takes place 72 to 48 hours before satellite acquisition. It requires the planning and ordering to be done with reduce time
	Emergency	Ordering can take place less than 48 hours before acquisition, depending on the different tasking capabilities
Delivery (T)	Near-real-time (T ~ 30 minutes depending on image size and distance to ground stations masks)	
Service access	Available through IMS	

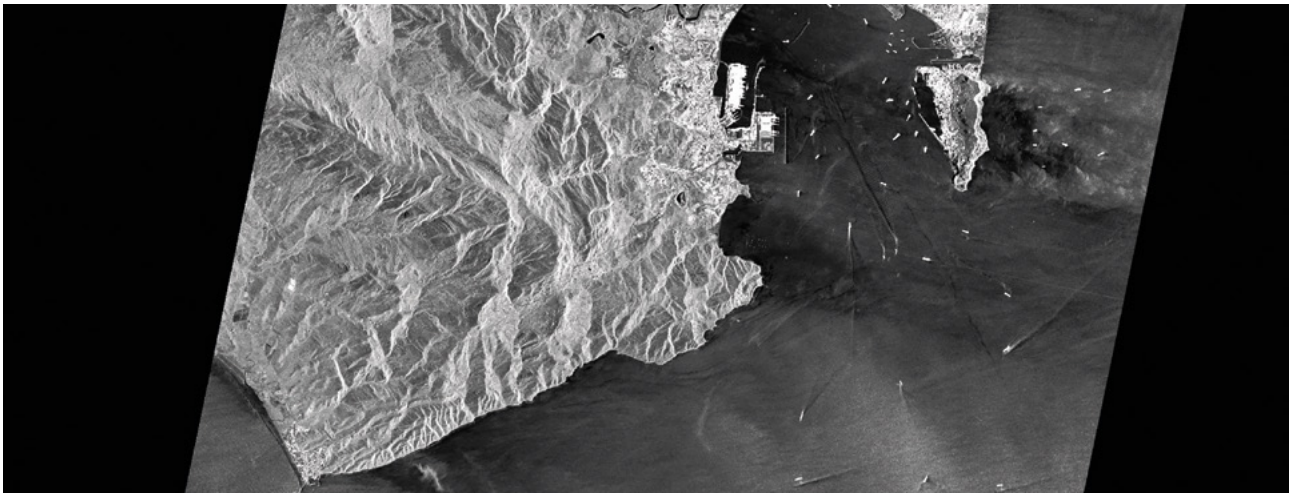
TECHNICAL DETAILS

Image	Highest resolution	Standard scene size (width x length)	Polarization
RS2 XF	6 m	125 km x 125 km	Single (HH or VV)
TSX SMR	6 m	30 km x 50 km	
RS2 MF	8 m	50 km x 50 km	

HOW TO CITE THIS PRODUCT

TerraSAR-X: "© DLR e.V. [year], Distribution Airbus DS Geo GmbH"

RADARSAT: "RADARSAT-2 Data and Products © MacDONALD, DETTWILER AND ASSOCIATES LTD [year] – All Rights Reserved" and "RADARSAT is an official mark of the Canadian Space Agency"



Gibraltar - TSX SMRaD © DLR e.V. 2012, Distribution Airbus DS Geo GmbH

2.5.4 HIGH RESOLUTION 2 (HR2)

PRODUCT NAME

SAR HR2

Sub-products

TerraSAR-X ScanSAR (TSX SC)

RADARSAT-2 Wide (RS2 W)

RADARSAT-2 Standard (RS2 S)

OPERATIONAL DETAILS

High Resolution SAR images, delivered in near real time, with spatial resolution $10\text{ m} < x \leq 30\text{ m}$

Tasking priority	Routine	Ordering takes place several months to 72 hours before satellite acquisition. This is the standard tasking mode
	Short notice	Ordering takes place 72 to 48 hours before satellite acquisition. It requires the planning and ordering to be done with reduce time
	Emergency	Ordering can take place less than 48 hours before acquisition, depending on the different tasking capabilities
Delivery (T)	Near-real-time (T ~ 30 minutes depending on image size and distance to ground stations masks)	
Service access	Available through IMS	

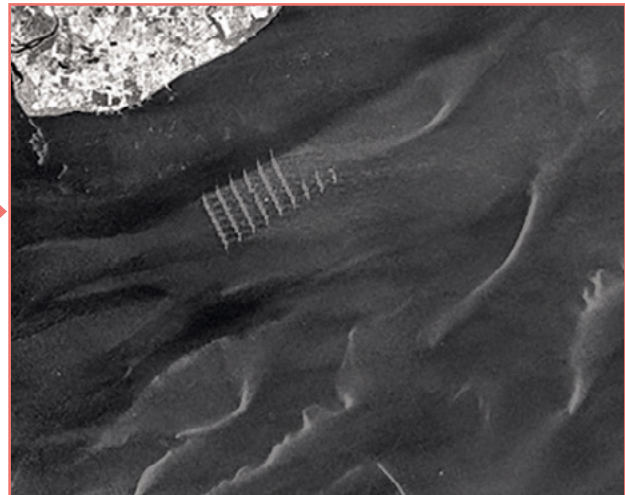
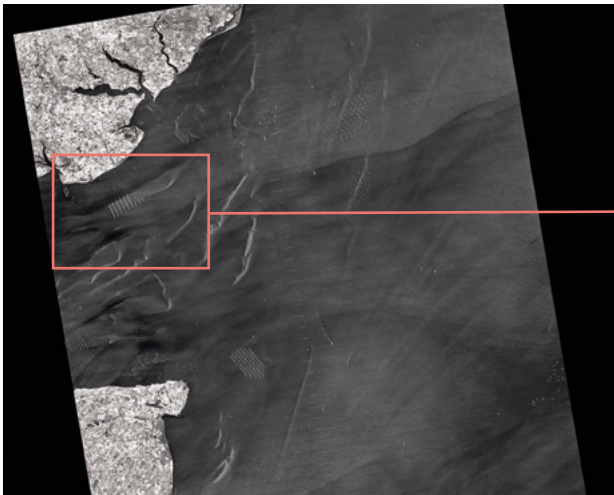
TECHNICAL DETAILS

Image	Highest resolution	Standard scene size (width x length)	Polarization
TSX SC	18.5m	100 km x 150 km	Single (HH or VV)
RS2 W	25m	150 km x 150 km	
RS2 S	25m	100 km x 100 km	

HOW TO CITE THIS PRODUCT

TerraSAR-X: “© DLR e.V. [year], Distribution Airbus DS Geo GmbH”

RADARSAT: “RADARSAT-2 Data and Products © MacDONALD, DETTWILER AND ASSOCIATES LTD [year] – All Rights Reserved”
and “RADARSAT is an official mark of the Canadian Space Agency”



English Channel - TSX SC © DLR e.V. 2011, Distribution Airbus DS Geo GmbH

2.5.5 MEDIUM RESOLUTION 1 (MR1)

PRODUCT NAME

SAR MR1

TerraSAR-X Wide ScanSAR (TSX WS)

RADARSAT-2 ScanSAR Narrow (RS2 SCN)

RADARSAT-2 Ship Detection (RS2 DVWF)

Sub-products

Sentinel 1 Interferometric Wide Swath (S1 IWS)

RADARSAT-2 Ocean Surveillance (RS2 OSVN)

RADARSAT-2 ScanSAR Wide (RS2 SCW)

Sentinel 1 Extra-Wide Swath Mode (S1 EWS)

OPERATIONAL DETAILS

Medium resolution SAR images, delivered in near real time, with spatial resolution $30 \text{ m} < x \leq 100 \text{ m}$.

Please note that two of the products are optimised for particular tasks:

- RS2 OSVN is optimized for ocean surveillance: ship detection, oil on water, ice analyses and wake detection. It can detect ships larger than 50m in length
- RS2 DVWF is optimized for ship detection. It can detect ships larger than 20m with high confidence level.

Tasking priority	Routine	Ordering takes place several months to 72 hours before satellite acquisition. This is the standard tasking mode
	Short notice	Ordering takes place 72 to 48 hours before satellite acquisition. It requires the planning and ordering to be done with reduce time
	Emergency	Ordering can take place less than 48 hours before acquisition, depending on the different tasking capabilities
Delivery (T)	Near-real-time (T ~ 30 minutes depending on image size and distance to ground stations masks)	
Service access	Available through IMS	

TECHNICAL DETAILS

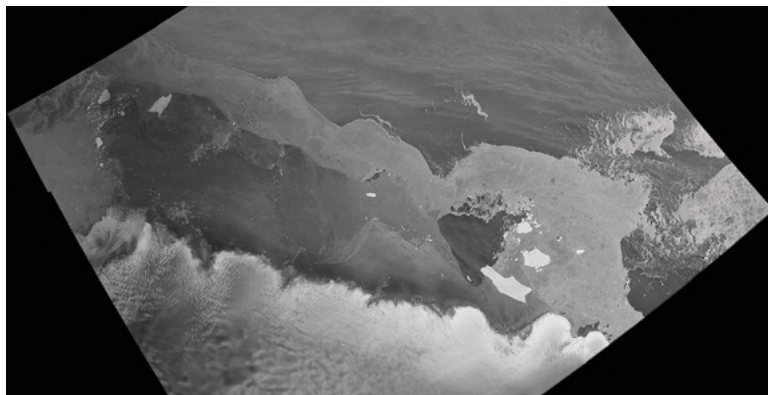
Image	Highest resolution	Standard scene size (width x length)	Polarization
TSX WS	40m	270 km x 200 km	Single (HH or VV)
R2 SCN	60m	300 km x 300 km	
RS2 DVWF	80m	450 km x 500 km	Single (HH only)
S1 IWS	90m	250 km swath width	Single (HH or VV)
RS2 OSVN	100m	500 km x 500 km	
R2 SCW	100m	500 km x 500 km	
S1 EWS	100m	400 km swath width	

HOW TO CITE THIS PRODUCT

TerraSAR-X: "© DLR e.V. [year], Distribution Airbus DS Geo GmbH"

RADARSAT: "RADARSAT-2 Data and Products © MacDONALD, DETTWILER AND ASSOCIATES LTD [year] – All Rights Reserved" and "RADARSAT is an official mark of the Canadian Space Agency"

Sentinel-1 (data obtained via Copernicus): "Copernicus Sentinel data [Year]" (or where the Copernicus Sentinel Data have been adapted or modified: "Contains modified Copernicus Sentinel data [Year]")



Adelie Coast, Antarctic - RADARSAT-2 SCW Data and Products © MacDONALD, DETTWILER AND ASSOCIATES LTD, 2016 – All Rights Reserved; RADARSAT is an official mark of the Canadian Space Agency

2.6 EO OPTICAL IMAGE PRODUCTS

2.6.1 VERY HIGH RESOLUTION 1 (VHR1)

PRODUCT NAME	
OPTICAL VHR1	
	WorldView 1, 2, 3, 4 (WV1, WV2, WV3, WV4)
Sub-products	GeoEye-1 (GE1)
	Pleiades 1A, 1B (PHR1A, PHR1B)
	Deimos 2 (DE2)
OPERATIONAL DETAILS	
Very high resolution optical images, delivered in several delivery categories with spatial resolution $x \leq 1$ m and different band combinations: Panchromatic, Multispectral, Pansharpened and Bundle	
Tasking priority	Routine Ordering takes place several months to 72 hours before satellite acquisition. This is the standard tasking mode
	Short notice Ordering takes place 72 to 48 hours before satellite acquisition. Requires the planning and ordering to be done with reduce time
Advance planning modes	Simple Cloud cover protection, DTO planning, pinpointing, multi-mission, SAR-aligned
	Combination Multi-mission and DTO planning; cloud cover and DTO planning
Delivery (T)	<ul style="list-style-type: none"> • Near-real-time (T ~ 45 minutes depending on image size and distance to ground station masks) • T < 3 hours • T < 6 hours • T < 24 hours • T ≥ 24 hours
Service access	Available through IMS



Oceanographic ship - PLEIADES © CNES 2016, Distribution Airbus DS



Detailed view of two vessel decks - WorldView 3 © European Space Imaging/DigitalGlobe 2016

TECHNICAL DETAILS

Satellites	Highest resolution	Coverage (width x length)
WV4	30cm	13.1km swath width at nadir Maximum contiguous area collected in a single pass (30° off-nadir): 66.5 km x 112 km or 13.1 km x 360 km (single strip)
WV3	30cm	13.1km swath width at nadir Maximum contiguous area collected in a single pass (30° off-nadir): 65.5 km x 112 km or 13.1 km x 360 km (single strip)
WV2	50cm	16.4 km swath width at nadir Maximum contiguous area collected in a single pass (30° off-nadir): 138 km x 112 km or 16.4 km x 360 km (single strip)
WV1	50cm	17.7 km swath width at nadir Maximum contiguous area collected in a single pass (30° off-nadir): 111 km x 112 km or 17.4 km x 360 km (single strip)
GE1	50cm	15.3 km swath width Maximum contiguous area collected in a single pass (30° off-nadir): 112 km x 44 km or 15.2 km x 360 km (single strip)
PHR1 A PHR1 B	50cm ⁷	20 km swath width strips oriented along a North-South axis Maximum theoretical contiguous area collected in a single pass (45° off-nadir): 120 km x 120 km or 20 km x 300 km (single strip)
DE2	75cm	12 km swath width at nadir and 24 km in wide area mode Maximum contiguous area collected in a single pass (30° off-nadir): 24 km x 200 km or 12 km x 1400 km (single strip)

HOW TO CITE THIS PRODUCT

WorldView: "© European Space Imaging/DigitalGlobe [year]"

GeoEye: "© European Space Imaging/DigitalGlobe [year]"

PLEIADES: "© CNES [year], Distribution Airbus DS"

DEIMOS-2: "© Deimos Imaging [year], Distribution Airbus DS"/"© Deimos Imaging [year]"

⁷ Pleiades optical sensor has a 70 cm Ground Sampling Distance at nadir for the panchromatic band. A product resolution of 50 cm is offered after post-processing resampling. For more information refer to the Pleiades User Guide.

2.6.2 VERY HIGH RESOLUTION 2 (VHR2)

PRODUCT NAME

OPTICAL VHR2

Sub-products Spot 6 and Spot 7

OPERATIONAL DETAILS

Very high resolution optical images, delivered in several delivery categories, with spatial resolution $1\text{ m} < x \leq 4\text{ m}$ and different band combinations: Panchromatic, Multispectral, Pansharpened and Bundle

Tasking priority

Routine	Ordering takes place several months to 72 hours before satellite acquisition. This is the standard tasking mode
Short notice	Ordering takes place 72 to 48 hours before satellite acquisition. Requires the planning and ordering to be done with reduce time

Advance planning modes

Simple	Cloud cover protection, DTO planning, pinpointing, multi-mission, SAR-aligned
Combination	Multi-mission and DTO planning; cloud cover and DTO planning

Delivery (T)

- Near-real-time (T ~ 45 minutes depending on image size and distance to ground station masks)
- T < 3 hours
- T < 6 hours
- T < 24 hours
- T > 24 hours

Service access

Available through IMS

TECHICAL DETAILS

Satellites	Highest resolution	Coverage (width x length)
Spot 6 Spot 7	1.5m	60 km swath width strips oriented along North-South axis Maximum theoretical contiguous area collected in a single pass (45° off-nadir): 300 km x 300 km or 60 km x 600 km (single strip)

HOW TO CITE THIS PRODUCT

Spot: "© Airbus DS [year]"



Khark Island, Persian Gulf - Spot-6 optical image © Airbus DS 2012

2.6.3 HIGH RESOLUTION 2 (HR2)

PRODUCT NAME

OPTICAL HR2

Sub-products

LandSat 8 (LS8)

Deimos 1 (DE1)

OPERATIONAL DETAILS

High resolution optical images, delivered in several delivery categories with spatial resolution 10 m < x ≤ 30 m and different band combinations: Panchromatic, Multispectral, Pansharpened and Bundle.

Tasking priority

Routine

Ordering takes place several months to 72 hours before satellite acquisition. This is the standard tasking mode

Short notice

Ordering takes place 72 to 48 hours before satellite acquisition. Requires the planning and ordering to be done with reduce time

Advance planning modes

Simple

Cloud cover protection, DTO planning, pinpointing, multi-mission, SAR-aligned

Combination

Multi-mission and DTO planning; cloud cover and DTO planning

Delivery (T)

- Near-real-time (T ~ 45 minutes depending on image size and distance to ground station masks)
- T < 3 hours
- T < 6 hours
- T < 24 hours
- T > 24 hours

Service access

Available through IMS

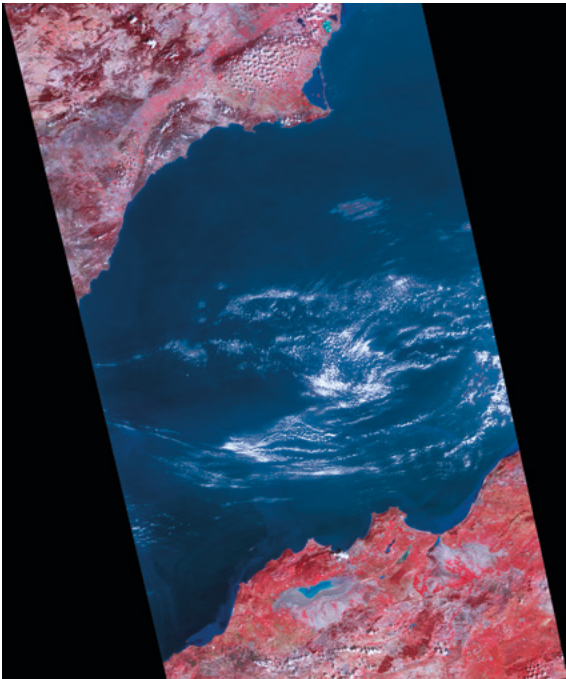
TECHNICAL DETAILS

Satellites	Highest resolution	Coverage (width x length)
LS 8	15m	185 km swath width; Standard scene size: 185 km x 180 km
DE 1	22m	650 km swath width; Maximum scene size: 650 km x 800 km

HOW TO CITE THIS PRODUCT

DEIMOS-1: "© Deimos Imaging [year], Distribution Airbus DS"

Landsat-8: "Landsat 8 data courtesy of the U.S. Geological Survey"

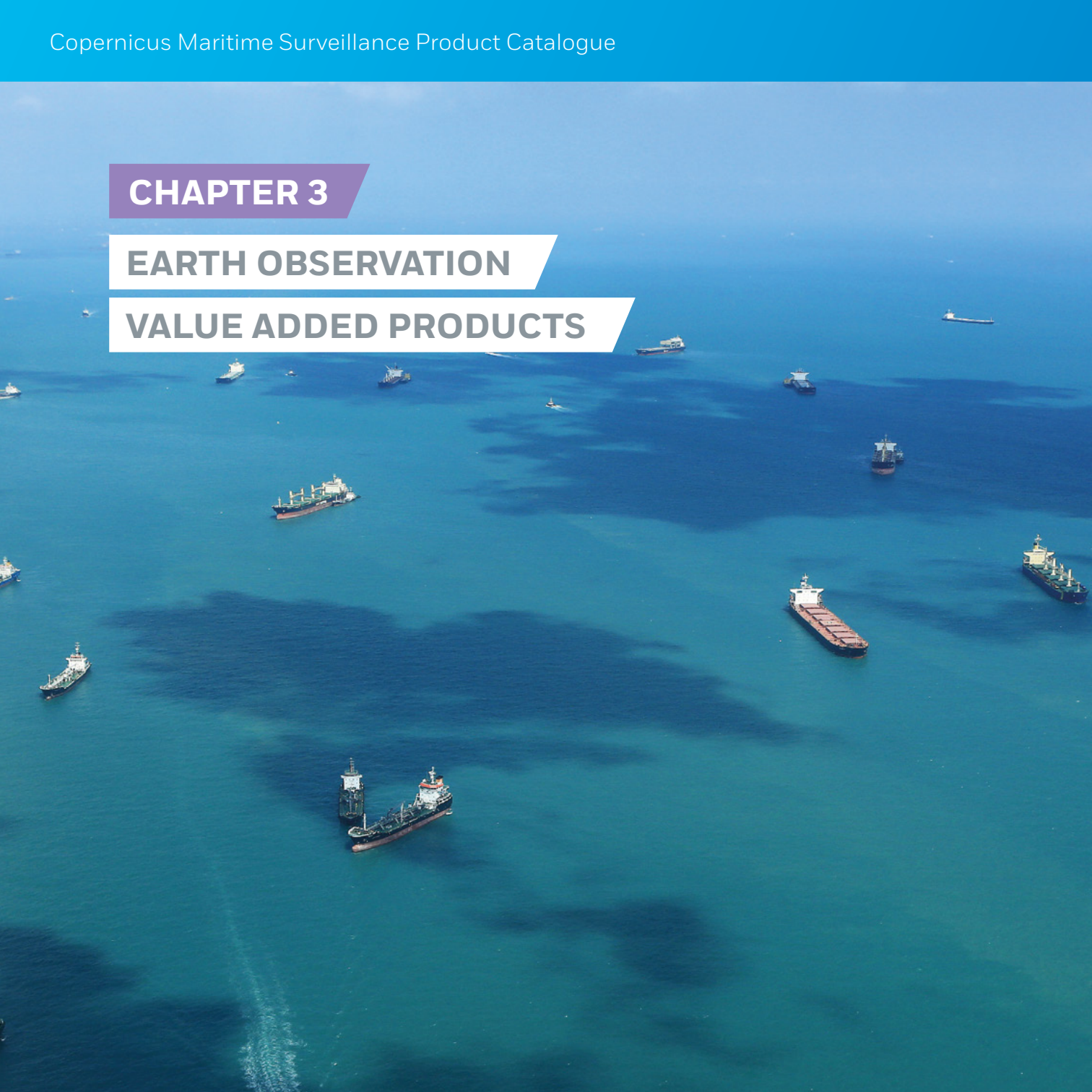


Western Mediterranean Sea - DEIMOS-1© Deimos Imaging 2016, Distribution Airbus DS

CHAPTER 3

EARTH OBSERVATION

VALUE ADDED PRODUCTS



3 OVERVIEW

The vast quantity of earth observation data potentially available to users brings enormous opportunities, but also challenges in terms of choosing and using data selectively. For maritime surveillance purposes, the benefits to be derived from EO data do not lie solely in the volume of data available, but rather in the intelligent use of data in a targeted manner. The value added products offered by the CMS service aid users by extracting particularly valuable information from the basic image products, allowing authorities to undertake higher level analysis of objects, features or activities at sea more quickly and efficiently.

The value added products can be provided either as a layer on top of the original satellite image product or as a separate layer of information, for example a vector layer. This enables users to select which individual product or particular combination of products is relevant to them. For example, a user requesting high resolution optical data to support the search for an individual vessel may want a vessel detection layer to quickly identify the location of all vessels in the area, but also the original image product layer to see the details of the vessels to narrow down the search; however, a pollution response team using SAR imagery might prefer to receive just the vector coordinates of a suspected oil spill rapidly, and not wait for a download of the full original image product, in order to send assets to the area as quickly as possible. Within the CMS service, some value added products are already available, and others are currently under development. In order to support users as fully as possible, suggestions and requirements for future added value products are always welcomed.

The factsheets in this chapter contain the descriptions of the value added products and their relevant attributes. The value added products currently being offered to users include:

- oil spill detection
- vessel detection
- activity detection
- SAR wind and SAR wave

3.1 OIL SPILL DETECTION

PRODUCT NAME

OIL SPILL DETECTION

Sub-products

Not applicable

OPERATIONAL DETAILS

This product –comprising of the oil spill notification, the vessel detection and the derived package - is currently being provided through the CleanSeaNet service in European waters. It can be provided in other areas of interest beyond European waters through the CMS service.

The relevant attributes of the oil spill product are:

- Centre - latitude/longitude coordinates
- Geometry - polygon describing oil spill boundaries
- Area - expressed in m²
- Time stamp - date/time of the observation
- Classification level - the probability/confidence that the detection is oil
- Meteo-oceanographic conditions
- Possible pollution source type/detection/vessel identification/track
- Source detection position

Tasking priority	Routine	Ordering takes place several months to 72 hours before satellite acquisition. This is the standard tasking mode
	Short notice	Ordering takes place 72 to 48 hours before satellite acquisition. Requires the planning and ordering to be done with reduced time
	Emergency	Ordering can take place less than 24 hours before acquisition, depending on the different tasking capabilities

Delivery (T)

Near-real-time (T ~ 30 min depending on image size and distance to ground stations masks)

Service access

Available through the Earth Observation Data Centre (EODC) and IMS

TECHNICAL DETAILS

Imagery used

HR2 and MRI SAR images with single polarisation (VV preferable)

Resolution

Dependent on feature size. Consult Chapter 2 for more information on resolution of images

HOW TO CITE THIS PRODUCT

© EMSA, contains modified [insert satellite mission and credit as relevant] data, [year]

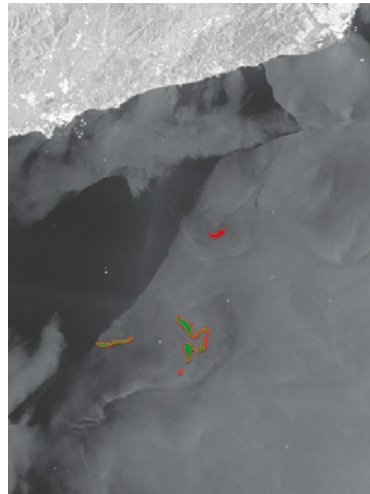
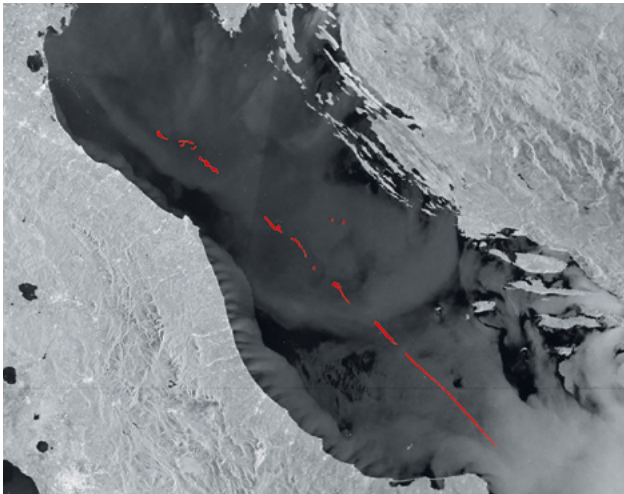
Relevant missions include:

TerraSAR-X: “© DLR e.V. [year], Distribution Airbus DS Geo GmbH”

RADARSAT: “RADARSAT-2 Data and Products © MacDONALD, DETTWILER AND ASSOCIATES LTD [year] – All Rights Reserved”

and “RADARSAT is an official mark of the Canadian Space Agency”

Sentinel-1 (data obtained via Copernicus): “Copernicus Sentinel data [Year]” (or where the Copernicus Sentinel Data have been adapted or modified: “Contains modified Copernicus Sentinel data [Year]”)



Search		EO Scenes	Oil Spills	Detected Ships	AIS
<input type="checkbox"/>	<input type="checkbox"/>		Oil Spill Identifier	Feedbacks	Class
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	OS_1701310002_1	Available	A
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	OS_1701300004_1	Available	A
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	OS_1701300002_3	Not Available	B
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	OS_1701300002_2	Not Available	B
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	OS_1701300002_1	Not Available	A
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	OS_1701290009_1	Not Available	A
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	OS_1701290008_2	Not Available	B
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	OS_1701290008_1	Not Available	A
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	OS_1701290002_2	Available	A
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	OS_1701290002_1	Available	B
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	OS_1701280011_1	Not Available	A
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	OS_1701240005_2	Not Available	B
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	OS_1701290007_2	Not Available	A

<< go to EO Scene Detail Panel		Oil Spills detected in scene 1701310002_1	
Type	Class	Type	Class
<input type="checkbox"/>	OTHER	<input type="checkbox"/>	B
<input checked="" type="checkbox"/>	OTHER	<input type="checkbox"/>	A
<input type="checkbox"/>	OTHER	<input type="checkbox"/>	B

Oil spill detection © EMSA, contains modified RADARSAT-2 data, 2015. RADARSAT-2 Data and Products © MacDONALD, DETTWILER AND ASSOCIATES LTD, 2015 – All Rights Reserved; RADARSAT is an official mark of the Canadian Space Agency

Oil spill detection © EMSA, contains modified Copernicus Sentinel-1 data, 2017

3.2 VESSEL DETECTION

PRODUCT NAME

VESSEL DETECTION

Sub-products Not applicable

OPERATIONAL DETAILS

This service entails the delivery of value added products, mainly using high and very high resolution images, focusing on vessel detection.

- Position – latitude/longitude coordinates
- Time Stamp – date/time of acquisition
- Speed – over ground expressed in metres per second
- Heading – route direction
- Length and width - expressed in meters
- Vessel classification – category of the vessel e.g. fishing vessel, sailing vessel, merchant vessel
- Vessel identification – ID data
- Confidence level: three different confidence levels for vessel classification, detection and identification from 0 to 100%

Tasking priority	Routine	Ordering takes place several months to 72 hours before satellite acquisition. This is the standard tasking mode
	Short notice	Ordering takes place 72 to 48 hours before satellite acquisition. Requires the planning and ordering to be done with reduced time
	Emergency (SAR only)	Ordering can take place less than 48 hours before acquisition, depending on the different tasking capabilities
Advanced planning modes	Simple	Cloud cover protection, DTO planning, pinpointing, multi-mission, SAR-aligned
	Combination	Multi-mission and DTO planning, cloud cover and DTO planning

Delivery (T)	SAR	Optical
	<ul style="list-style-type: none"> Near-real-time (T ~ 30 minutes depending on image size and distance to ground stations masks) 	<ul style="list-style-type: none"> Near-real-time (T ~ 45 minutes depending on image size) T < 3 hours T < 6 hours T < 24 hours T ≥ 24 hours

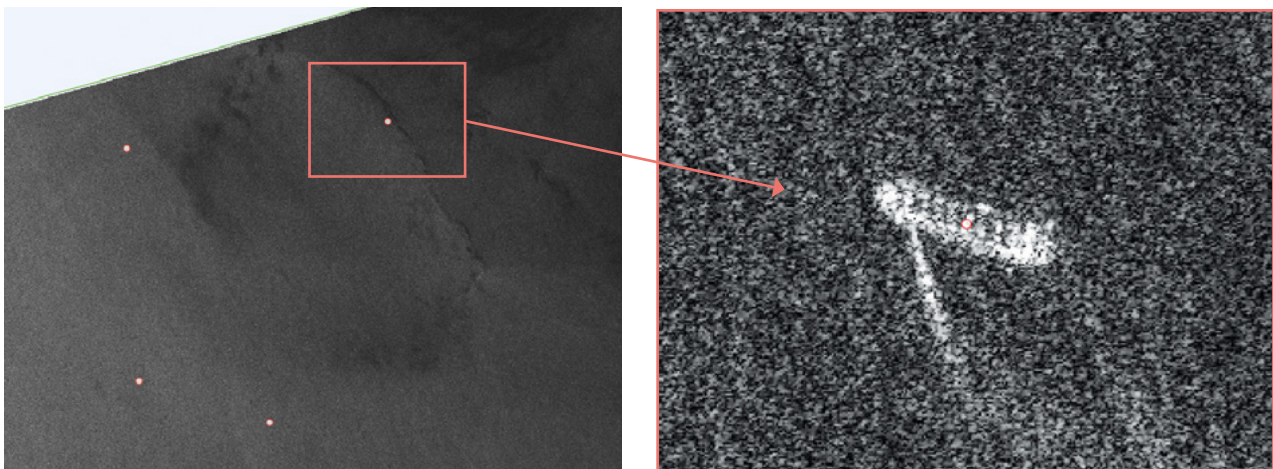
Service access Available through IMS

TECHNICAL DETAILS

Imagery used	VHR and HR SAR images
	VHR and HR optical images
Resolution	SAR: starting at 3m dependent on acquisition conditions Optical: starting at 1m dependent on acquisition conditions

HOW TO CITE THIS PRODUCT

© EMSA, contains modified [insert satellite mission and credit as relevant] data, [year]



Vessel detection © EMSA, contains modified RADARSAT-2 data, 2017

3.3 ACTIVITY DETECTION

PRODUCT NAME

ACTIVITY DETECTION

Sub-products Not applicable

OPERATIONAL DETAILS

This service is used to report information about specific activities, over a defined area at a given time, detected during analysis of EO images, mainly using high and very high resolution data.

The following attributes are included in the product:

- Type - activity detected on a EO scene, e.g. vessels towing cages, rendezvous at sea, skiffs on the beach, object on the water, large spill on the shore, structures on the beach (buildings, barracks)
- Area - latitude/longitude coordinates
- Time Stamp - date/time of acquisition
- Confidence level - expressed in high/medium/low levels
- Associated vessels - attributes: described in the vessel detection factsheet
- Other associated features attributes:
 - Description - e.g. fish farms, fish cages, oil and gas installations, icebergs
 - Position - latitude/longitude coordinates
 - Time Stamp - date/time of acquisition
 - Size - expressed in m or m²
 - Reference to other feature - previously reported feature

Tasking priority	Routine	Ordering takes place several months to 72 hours before satellite acquisition. This is the standard tasking mode
	Short notice	Ordering takes place 72 to 48 hours before satellite acquisition. Requires the planning and ordering to be done with reduced time
Advanced planning modes	Simple	Cloud cover protection, DTO planning, pinpointing, multi-mission, SAR-aligned
	Combination	Multi-mission and DTO planning; cloud cover and DTO planning

Delivery (T)

- Near-real-time (T ~ 45 minutes depending on image size)
- T < 3 hours
- T < 6 hours
- T < 24 hours
- T ≥ 24 hours

Service access

Available through IMS

TECHNICAL DETAILS

Imagery used

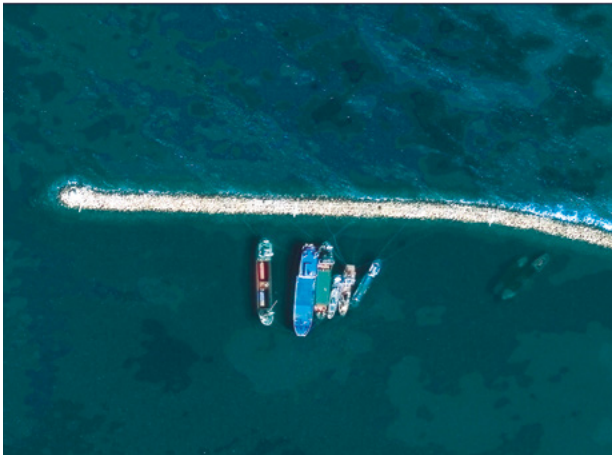
VHR and HR optical images

Resolution

Dependent on feature size. Consult Chapter 2 for more information on resolution of images

HOW TO CITE THIS PRODUCT

© EMSA, contains modified [insert satellite mission and credit as relevant] data, [year]



Port monitoring © CNES 2016, Distribution Airbus DS



Fish cages monitoring © European Space Imaging/
DigitalGlobe, 2013

3.4 SAR WIND AND SAR WAVE

PRODUCT NAME

DER - DERIVED PACKAGE FROM SAR IMAGE

Sub-products

SAR Wind

SAR Wave

OPERATIONAL DETAILS

This service entails the delivery of a package containing ocean surface wind and wave (swell) derived from SAR imagery. The attributes of these products are:

- Wind speed – expressed in m/s
- Wind direction – wind from direction
- Wave height – sea surface swell wave significant height, expressed in m
- Wave direction – sea surface swell wave to direction

Tasking priority	Routine	Ordering takes place several months to 72 hours before satellite acquisition. This is the standard tasking mode
	Short notice	Ordering takes place 72 to 48 hours before satellite acquisition. Requires the planning and ordering to be done with reduced time
	Emergency	Ordering can take place less than 48 hours before acquisition, depending on the different tasking capabilities

Delivery (T) Near-real-time (T ~ 30 minutes depending on image size and distance to ground stations masks)

Service access Available through the Earth Observation Data Centre (EODC)

TECHNICAL DETAILS

Imagery used

VHR, HR and MR SAR images

Resolution

Consult Chapter 2 for more information on resolution of images

HOW TO CITE THIS PRODUCT

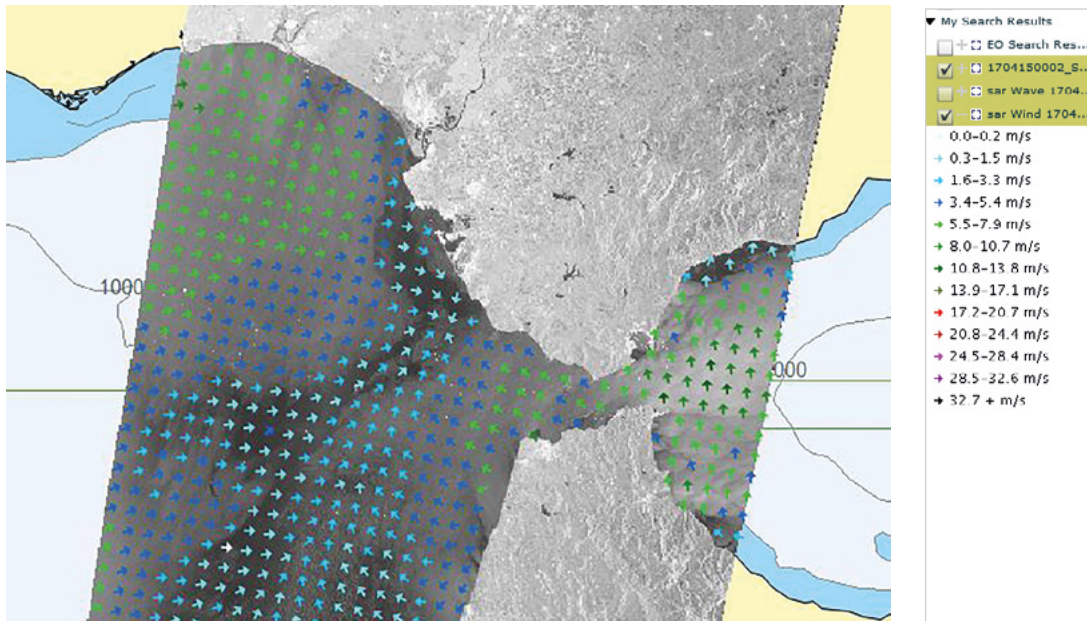
© EMSA, contains modified [insert satellite mission and credit as relevant] data, [year]

Relevant missions include:

TerraSAR-X: “© DLR e.V. [year], Distribution Airbus DS Geo GmbH”

RADARSAT: “RADARSAT-2 Data and Products © MacDONALD, DETTWILER AND ASSOCIATES LTD [year] – All Rights Reserved” and “RADARSAT is an official mark of the Canadian Space Agency”

Sentinel-1 (data obtained via Copernicus): “Copernicus Sentinel data [year]” (or where the Copernicus Sentinel Data have been adapted or modified: “Contains modified Copernicus Sentinel data [year]”)



SAR wind © EMSA, contains modified Copernicus Sentinel data, 2017

3.5 VALUE ADDED PRODUCTS: APPLICATIONS AND USES

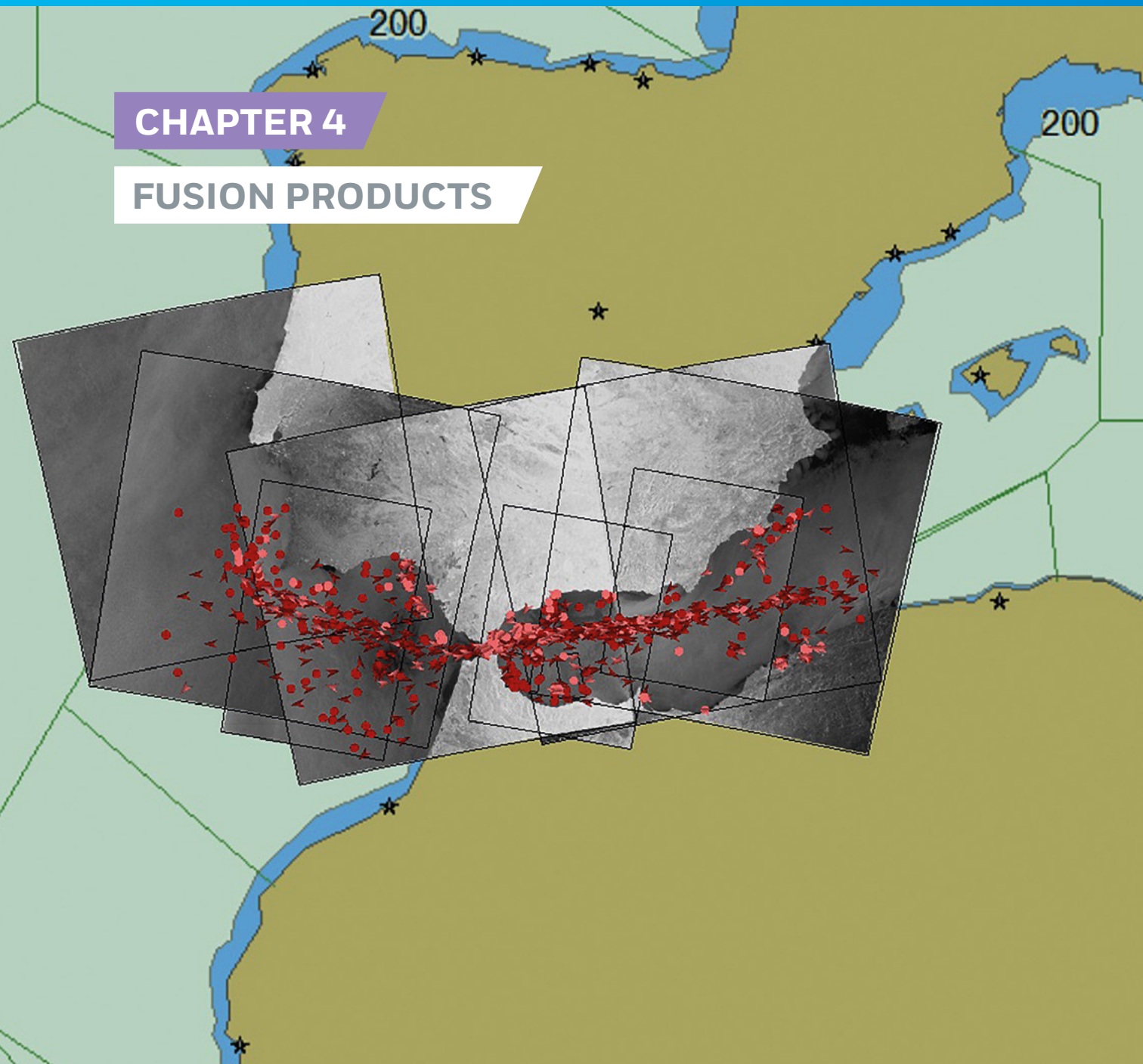
The table below provides an overview of the value-added products available through the Copernicus Maritime Surveillance service, along with some potential use cases, and an indication of which user communities may be interested in the use cases presented.

VALUE-ADDED PRODUCTS	Use cases
Vessel detection	Detection and tracking of vessels of interest
	Detection of missing vessels
	Detection of vessels in distress
	Detection of non-reporting vessels
	Detection of small vessels (<10 m)
	Detection of medium size vessels (10 m-50 m)
	Detection of large vessels (>50 m)
	Vessel type classification, e.g. fishing vessel, reefer, sailing vessel, etc.
Activity detection	Monitoring of vessel movements inside restricted areas
	Pollution detection and polluter identification
	Rendezvous at sea and transshipment operations
	Vessels towing cages
	Fishing activity pattern
	Port monitoring
	Detection of illegal discards
	Fishing grounds monitoring
	At-sea refuelling
	Skiffs on beach
	Fish cages and fish traps
	Fish farms
	Oil and gas installations
	Ice monitoring and iceberg detection
Detection of lost containers	
Detection of aircraft debris	
Wind and wave information	SAR Wind
	SAR Wave

User community					
Fisheries control	Law enforcement	Maritime safety and security	Customs	Marine environment	Other (e.g. Defence)
X	X	X	X	X	X
		X			
		X			
X	X	X	X		X
	X	X	X		X
X	X	X	X	X	X
X	X	X	X	X	X
X		X	X		X
		X		X	
X	X	X	X		X
X		X			
X		X	X		X
X					
		X		X	
		X			X
X					
X					
		X		X	
		X			
		X			
		X			
X	X	X	X	X	X
X	X	X	X	X	X

CHAPTER 4

FUSION PRODUCTS



OVERVIEW

Copernicus Earth Observation images can be integrated with other data both from EMSA's maritime information applications and from external data sources. This additional data may include information such as vessel location, identification and tracking data (for example Automatic Identification System [AIS], Long Range Identification and Tracking [LRIT], and Vessel Monitoring System [VMS]), intelligence data provided by users, and external meteorological data. Combining data makes the overall information provided to Member States more valuable operationally. Vessel position and track information, for example, overlaid on satellite images with a vessel detection layer, provides a very powerful tool for checking on vessel activity at sea – including verifying those vessels that are reporting, and locating vessels that are not reporting their whereabouts. EMSA provides these fusion products to Copernicus Maritime Surveillance service users according to their needs and to their access rights to the data.

4.1 CORRELATION WITH VESSEL REPORTING INFORMATION

PRODUCT NAME

VESSEL CORRELATION

Types of products

Vector layer: VDS correlated with other vessel reporting information

Vector layer: VDS not correlated with other vessel reporting information

OPERATIONAL DETAILS

Vessel detections derived from synthetic aperture radar and optical images are correlated against vessel data, such as: Automatic Identification System (AIS) reported positions from terrestrial and satellite AIS system data; Long Range Identification and Tracking (LRIT) reported positions; and Vessel Monitoring System (VMS) data. This can provide an overview of which vessels are reporting in a given area, and which are not.

It should be noted that a user will only receive correlations of vessel reporting information for which that user has been granted the relevant access rights.

The correlation can be provided through the Integrated Maritime Services interface, or system-to-system.

Tasking priority

Not applicable

Delivery

Simultaneous with earth observation service

Service access

Available through IMS

TECHNICAL DETAILS

Imagery used

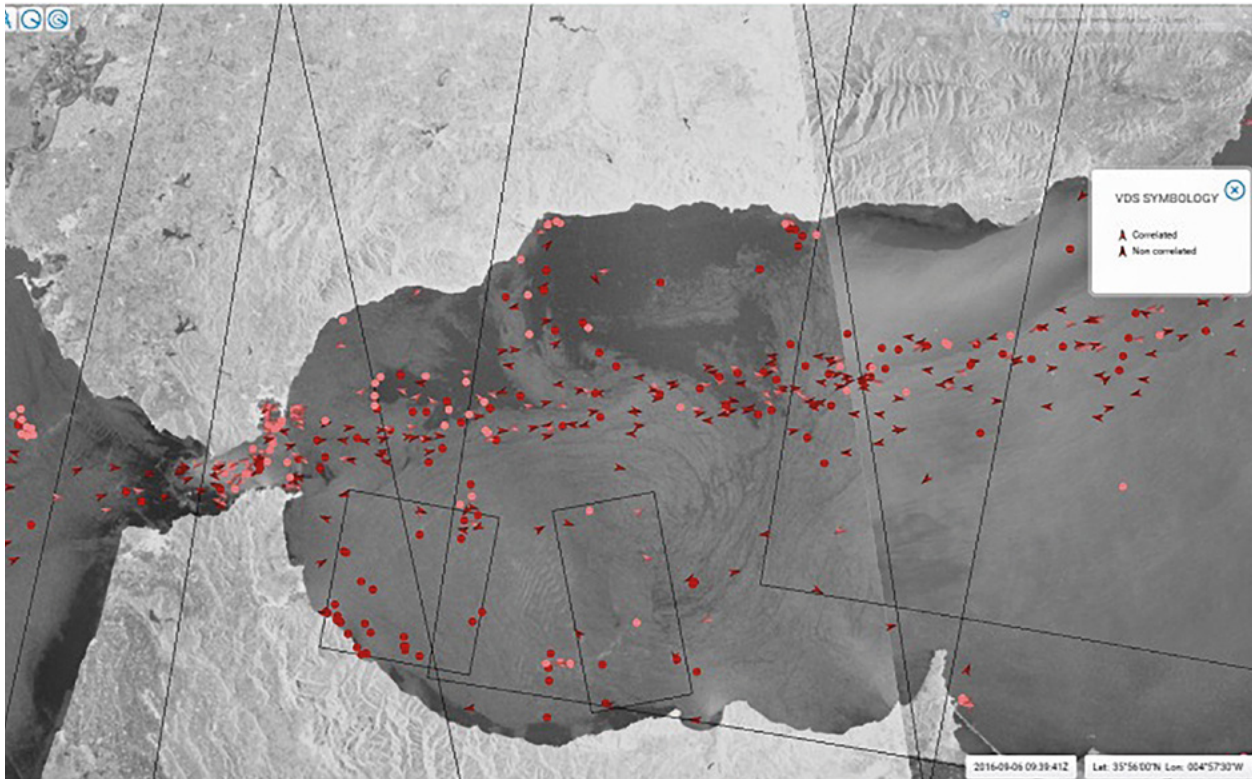
SAR images

Resolution

Consult Chapter 2 for more information on resolution of images

HOW TO CITE THIS PRODUCT

© EMSA, [year]



© EMSA, 2016

4.2 OIL SPILL ALERT REPORTS

PRODUCT NAME

OIL SPILL ALERT REPORT

Types of products

Oil spill warning notification

Oil spill alert report

OPERATIONAL DETAILS

These products are based on the near real-time analysis of satellite images in order to detect possible oil spills on the sea surface. When a possible spill is detected within the alert area of a participating coastal state, an alert is immediately sent to the relevant authorities.

There are two types of alert report:

1. An 'Oil spill warning notification' report is sent immediately, without waiting for the end of image analysis, if there is the possibility of catching a polluter in the act.
2. If there is no ongoing spill, a full 'Oil spill alert report', providing a more complete analysis and details of all spills detected in the area, is sent.

Tasking priority

Not applicable

Delivery

During analysis/following analysis; near real time delivery approximately 30 minutes depending on image size

Service access

Available through the Earth Observation Data Centre (EODC) , and emailed PDF alert report

TECHNICAL DETAILS

Imagery used

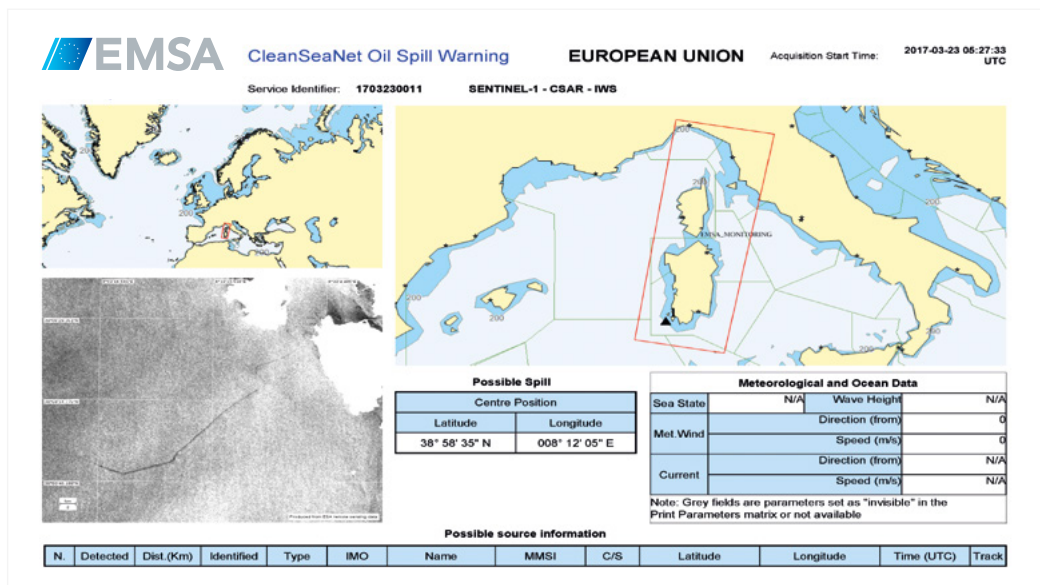
SAR images

Resolution

Consult Chapter 2 for more information

HOW TO CITE THIS PRODUCT

© EMSA, [year]



© 2017 EMSA

ANNEX I

SATELLITE LICENCE CONDITIONS

OVERVIEW

States are responsible under international law for regulating their space activities and ensuring that national activities, even if conducted by non-State actors such as corporations, respect international law. Authorisation is given by the State in the form of a licence to parties conducting space-related activities.

National regulations, which differ between States, supplement this international framework. At a national level, States have the prerogative – within the constraints set by International Law – to regulate, authorise, license and supervise space activity. States exercise this power with two main objectives: 1) to protect national security and safeguard national interest; and 2) to gain priority access for government purposes to use of space capabilities.

There are two main types of restrictions imposed on satellite owners and operators: on data collection, and/or on data dissemination. This means that, depending on the licence conditions imposed and on national security legislation in the data provider's country, there may be restrictions applied to end-users from certain countries and/or restrictions regarding the area over which an image is taken depending on the resolution of the image. For end-users of the Copernicus Maritime Surveillance service, who comprise European Union bodies and institutions and EU Member State national authorities, few such restrictions apply. End-users or potential end-users are encouraged to contact EMSA to discuss whether restrictions will apply to their requests.

The licence conditions also detail the authorised or permitted use of products⁸. Users are encouraged to contact EMSA if they require more information.

⁸ Only clauses which may interest external stakeholders have been listed, not clauses related to internal EMSA use; the permitted uses are more extensive than listed here.

SENTINEL-1A AND SENTINEL-1B IMAGE PRODUCTS

DISTRIBUTION RESTRICTIONS AND AUTHORISED OR PERMITTED USE OF PRODUCTS

Copernicus Sentinel-1 data is, in principle, provided to users on a free, full and open access basis to users with regards to Copernicus Sentinel Data and Service Information. The 'Legal notice on the use of Copernicus Sentinel Data and Service Information' (see https://sentinels.copernicus.eu/documents/247904/690755/Sentinel_Data_Legal_Notice) does however state that 'EU law allows for specific limitations of access and use in the rare cases of security concerns, protection of third party rights or risk of service disruption'. Furthermore, it is worth noting that EMSA provides Copernicus Sentinel data to registered users of the Copernicus Maritime Surveillance service with a shorter time delay than that with which it is available through other services or to users accessing data via the Sentinel Data Hub. Sentinel 1 data is provided to users through the CMS service following near real time acquisition and additional processing undertaken by service providers.

RADARSAT-2 IMAGE PRODUCTS

DISTRIBUTION RESTRICTIONS

MacDonald, Dettwiler and Associates Ltd (MDA) is the license provider for RADARSAT-2 products. MDA defines authorised end users according to an extensive Customer Access Profile, which determines what can be provided to any particular user type, and under what conditions. These range from full access with no latency for certain categories of users, to no access. For example, EU Member State and EFTA Government Users and EU Institution Government Users have full access to all products with no latency; whereas Government Users from other countries may be eligible to receive only certain categories of products, only after a latency period (e.g. 24 or 72 hours), or only over the territory – including the exclusive economic zone (EEZ) – under the jurisdiction of the national government of that country. Furthermore, the delivery of RADARSAT-2 products to end-users is also subject to other mandatory conditions defined in the License Distribution.

AUTHORISED OR PERMITTED USE OF PRODUCTS

For RADARSAT-2, MDA lists the following permitted uses, amongst others:

- *excluding SLC Data⁹ - to release hardcopy prints of the Product, publish the Product in research reports, journals, trade papers or similar publications, and post the Product or DIP, to Internet web sites provided that such Product is in a secure format that allows only printing and viewing and prohibits manipulating the Product's pixel or metadata; all providing that such release, publishing or posting is solely for non-commercial uses and that the Copyright notice is conspicuously displayed alongside the Product; and*
- *subject to provisions - to develop, reproduce and distribute any Value Added Product generated from the Product by the LICENSEE.*

TERRASAR-X/TANDEM-X/PAZ IMAGE PRODUCTS

DISTRIBUTION RESTRICTIONS

Airbus DS Geo GmbH (Germany) has exclusive distribution rights for the provision of licenses for TerraSAR-X/TanDEM-X/PAZ products. The following restrictions apply:

- Distribution of TerraSAR-X and TanDEM-X data has to comply with the regulations of the German Satellite Data Security Law (SatDSiG). Data may be subject to restrictions because of the area over which the image is taken and/or the resolution of the image; the restricted countries are listed in the contract conditions. Data downlinked to Direct Receiving Stations (DRS) are subject to more stringent conditions. The Federal Office of Economics and Export Control (BAFA) has added EMSA to a 'Recipients Positive List', which means that EMSA's requests are considered non-sensitive (i.e. are not forwarded to BAFA for approval) as long as the acquisition is not over one of the countries in the restricted list
- With regard to PAZ, national Spanish legislation is still being drafted.

⁹ Single Look Complex (SLC) data is data which has been processed in a specific way

AUTHORISED OR PERMITTED USE OF PRODUCTS

Under the contract with Airbus DS GEO GmbH, EMSA has, for TerraSAR-X, TanDEM-X and PAZ, the following limited, non-transferable and non-exclusive rights under the condition that the “Products” are for non-commercial use, and the proper copyright is conspicuously marked:

- *To reformat the “Products” into different formats or media from those in which it is delivered. EMSA shall not or allow anyone to reverse engineer, disassemble or decompile the Product;*
- *To use the “Products” for further analysis and/or processing and/or to create ‘Further Processed Data’;*
- *To modify/process the “Products” through manipulation/processing techniques and/or the addition of other data, provided that the value-added products generated from data or “Products” do not retain the pixel structure of the original data or “Products” and include a significant addition of external information*
- *To provide to all authorised end users of the EMSA service the “Products” in full resolution and derived information;*
- *EMSA may*
 - *post “Products” to Internet websites provided that the “Products” are in a secure format that allows only printing and viewing and prohibits, at current technical standard, manipulating the “Product’s” pixel or metadata; and*
 - *make public presentation or display or display the data; and*
 - *communicate them through press information services*

The proper copyright has always to be marked conspicuously.

- *To distribute hard-copies “Products” on a non-commercial basis to all authorised end users. These hard-copy “Products” can also be distributed, on a non-commercial basis to International Organisations, which are involved in oil spill monitoring and maritime surveillance provided that the proper copyright is conspicuously marked.*

- *To use the “Products” for internal or external demonstration purposes, including as evidence or for other purposes in legal or administrative proceedings, on a non-commercial basis provided that such “Products” is not distributed, sold, leased, rent, sub-licensed, copied, transferred, reproduced or given in whole or in part.*

PLEIADES 1A AND 1B, AND SPOT 6 AND 7 IMAGE PRODUCTS

Under the contract with Airbus DS GEO SA (France) for licenses and services, EMSA can use and distribute products (meaning satellite images and derived products containing imagery data) from PLEIADES and Spot to authorised users. These include European Union institutions, agencies and bodies, and Member States’ institutions, other than those to which restrictions apply, as listed below.

DISTRIBUTION RESTRICTIONS

The data in the products remains the property of the satellite owner/operator, and so different end user licenses are applicable, as follows:

- Centre National D’Etudes Spatiales for Pleiades satellite imagery data
The end-users may not be established, incorporated or located in the following restricted territories: Canada and Japan
- Airbus DS for Spot 6 and 7 satellite imagery data
The end-users may not be established, incorporated or located in the following restricted territories: Canada, Azerbaijan, Georgia, Iran, Kyrgyzstan, Moldavia, Tajikistan, Turkmenistan, Uzbekistan and Japan

AUTHORISED OR PERMITTED USE OF PRODUCTS

For Pleiades and Spot products, Airbus DS GEO SA lists the following permitted uses, amongst others:

- *to alter or modify the product to produce VAP [value added products] and/or derivative works*

- *to post one extract¹⁰ on an Internet site, in an Internet-compatible image format (without associated metadata), with the credit... conspicuously displayed. The posting of such extract shall be used for end-user's promotion purposes only, and may in no event allow downloading of the extract posted or allow a third party to access the product or VAP as a stand-alone file, nor be used to distribute, sell, assign, dispose of, lease, sublicense or transfer such extract*
- *to print one extract, and to distribute such print for promotion purposes only. Such print shall include the credit... conspicuously displayed;*
- *to freely use and distribute derivative works; and*
- *to share the product and/or any VAP with affiliated end-users in the framework of a Joint Project, subject to the following cumulative conditions: the end-user shall have detailed in the order form accepted by AIRBUS DS:*
 - *the name, legal structure, site address of each affiliated end-user;*
 - *the details of the Joint Project in which the end-user and the affiliated end-users are cooperating and for which the product is ordered; the end-user shall sign with each affiliated end-user an agreement under which;*
 - *each affiliated end-user may be granted the rights provided under [the paragraphs] above;*
 - *the terms and conditions of such agreement shall in no event be less protective to AIRBUS DS and its licensor's respective rights than the provisions of this EULA; and the end-user shall guarantee that each affiliated end-user complies with the provisions and restrictions provided in the present EULA, and shall indemnify and hold AIRBUS DS harmless in connection thereto.*

¹⁰ "EXTRACT": means an extract of a PRODUCT or VAP which may consist of: (v) an extract of 1024 x 1024 pixels maximum; or (vi) if supplied with the PRODUCT (preview file) by Deimos IMAGING, the sub-sample (ratio 32 toward original PAN (8 toward original XS)) of the original image of the PRODUCT

DEIMOS-1 AND DEIMOS-2 IMAGE PRODUCTS

DEIMOS-1 and DEIMOS-2 are owned and operated by Deimos Imaging (an Urthecast company). Deimos satellite imagery data is made available to EMSA through contracts with Airbus DS GEO SA and European Space Imaging GmbH.

DISTRIBUTION RESTRICTIONS

There are no distribution restrictions; however for countries involved in conflicts or subject to embargo or commercial sanction by the international community, this must be evaluated on a case by case basis by Deimos Imaging.

AUTHORISED OR PERMITTED USE OF PRODUCTS

For Deimos products, Airbus DS GEO SA lists the following permitted uses, amongst others:

- *to alter or modify the product to produce VAP [value added products] and/or derivative works*
- *to post one extract¹¹ on an Internet site, in an Internet-compatible image format (without associated metadata), with the credit... conspicuously displayed. The posting of such extract shall be used for end-user's promotion purposes only, and may in no event allow downloading of the extract posted or allow a third party to access the product or VAP as a stand-alone file, nor be used to distribute, sell, assign, dispose of, lease, sublicense or transfer such extract*
- *to print one extract, and to distribute such print for promotion purposes only. Such print shall include the credit... conspicuously displayed*
- *to freely use and distribute derivative works, and*

¹¹ "EXTRACT": means an extract of a PRODUCT or VAP which may consist of: (v) an extract of 1024 x 1024 pixels maximum; or (vi) if supplied with the PRODUCT (preview file) by Deimos IMAGING, the sub-sample (ratio 32 toward original PAN (8 toward original XS)) of the original image of the PRODUCT

- *to share the product and/or any VAP with affiliated end-users in the framework of a Joint Project, subject to the following cumulative conditions, the end-user shall have detailed in the order form accepted by Deimos IMAGING:*
 - *the name, legal structure, site address of each affiliated end-user*
 - *the details of the Joint Project in which the end-user and the affiliated end-users are cooperating and for which the product is ordered; the end-user shall sign with each affiliated end-user an agreement under which*
 - *each affiliated end-user may be granted the rights provided under [the paragraphs] above*
 - *the terms and conditions of such agreement shall in no event be less protective to Deimos IMAGING and its licensor's respective rights than the provisions of this EULA; and the end-user shall guarantee that each affiliated end-user complies with the provisions and restrictions provided in the present EULA, and shall indemnify and hold Deimos IMAGING harmless in connection thereto.*

When DEIMOS-2 products are supplied via European Space Imaging, the standard Deimos Unlimited/Broadcast User License applies. Under Permitted Uses, the Licensee may:

LICENSEE may:

- *make an unlimited number of soft and hard copies of the Product*
- *alter or modify the Product to produce Value Added Products and/or Derivative Works*
- *freely use the Product and Value Added Products for any purpose (including commercial purposes), which for greater certainty includes any internal purpose and the right to publicly post, publish and broadcast the Product and Value Added Products in any manner, provided that the Product and Value Added Products are in a secure format that prohibits manipulating the Product's and Value Added Products' pixel or metadata, and*
- *freely use and distribute Derivative Works.*

WORLDVIEW 1, 2, 3 AND 4, AND GEOEYE-1 IMAGE PRODUCTS

European Space Imaging GmbH owns European distribution rights for DigitalGlobe satellites. These include: WorldView 1, 2, 3 and 4; GeoEye-1.

DISTRIBUTION RESTRICTIONS

Use of data from these satellites must comply with the NOAA License (which is in accordance with U.S. laws and national security interests). More specifically, DigitalGlobe and EUSI imagery may not be supplied to any persons listed at <http://www.bis.doc.gov/dpl/default.shtm> and <http://www.treas.gov/offices/enforcement/ofac/sdn/> or any individual or entity in the following embargoed countries: <http://www.treas.gov/offices/enforcement/ofac/programs/>, or to any of the entities on the denied persons lists published by the Bureau of Industry and Security of the United States.

AUTHORISED OR PERMITTED USE OF PRODUCTS

The Group License from European Space Imaging (the certified reseller of DigitalGlobe) allows authorised users to, amongst other uses¹²:

■ *to use and develop Derivatives of the Products as permitted in Section 2 below solely for Customer's Internal Use; and to store, access, reproduce and display the Products and permitted Derivatives solely for Customer's Internal Use. In addition, Customer may display an extract of the Product or a permitted Imagery Derivative on a public website in a non-extractable and non-downloadable manner as follows:*

- *on one domain name*
- *2048 x 2048 pixels*
- *at a resolution no better than resolution of imagery in the Product*
- *png, .tif, .tiff, .gif, .jpg, .jpeg, .jpe, .jfif, .bmp, .pdf; or any format without geo-referencing information*

¹² See full terms here: <https://www.digitalglobe.com/legal/group-license>

- *only collection date/time, vehicle, and band combination metadata can be published with the extract, and*
- *properly attribute the imagery to DigitalGlobe as required... [[Product] © [YEAR] DigitalGlobe, Inc.]*

■ **USE AND DEVELOPMENT RIGHTS.** *The license granted... above includes the following use and development rights:*

- *VIEW. Customer may view the Products and create new imagery from the Products via formatting, editing, digitization, and/or data combination (each, an “Imagery Derivative”), and*
- *ANALYSIS. Customer may extract geographic features, human-made features, persons or animals and related data from the Products via identification, measurement, and/or analysis (each, a “Feature Derivative”).*

LANDSAT

Landsat data is in the public domain, and is free and open to the public.

RESULTS OF THE EXPLOITATION OF THE CONTRACTS

EMSA acquires ownership of the results of the exploitation of the contracts, where ‘results’ means any intended outcome of the performance of the contract which is delivered and finally accepted by EMSA. EMSA does not acquire ownership of the pre-existing rights. Without prejudice to the restrictions imposed by the contractors, EMSA may make these results available to Union institutions, agencies and bodies, and Member States’ institutions, and may distribute them to the public in any form and by any method.



ANNEX II

IMAGE CREDITS

OPTICAL SATELLITE DATA

EMSA has a contract with Airbus DS GEO SA for licenses and services for PLEIADES 1A/1B, Spot 6/7, and DEIMOS-1 and DEIMOS-2 missions. When acquired via Airbus DS GEO SA, the Product, when displayed, distributed, made available and/or printed shall include the following credit conspicuously displayed:

- PLEIADES 1A and 1B: “© CNES (year of acquisition), Distribution Airbus DS”
- Spot 6 and 7: “© Airbus DS (year of acquisition)”
- DEIMOS-1 and DEIMOS-2: “© Deimos Imaging (year of acquisition), Distribution Airbus DS”

EMSA has a contract with European Space Imaging GmbH for licenses and services for WorldView 1-4, GeoEye-1, Landsat, and DEIMOS-2 missions. When acquired via European Space Imaging GmbH, the following credits should be applied when the product is displayed:

- WorldView: “© European Space Imaging/DigitalGlobe (year of acquisition)”
- GeoEye: “© European Space Imaging/DigitalGlobe (year of acquisition)”
- Landsat 8: “Landsat 8 data courtesy of the U.S. Geological Survey”
- DEIMOS-1 and DEIMOS-2: “© Deimos Imaging (year of acquisition)”

SYNTHETIC APERTURE RADAR DATA

For the SAR missions available through the Copernicus Maritime Surveillance service, the copyright notices/credits are determined by the satellite owner/operator and license provider:

- For Copernicus Sentinel data: “Copernicus Sentinel data (year of acquisition)”

- For RADARSAT-2 data: “RADARSAT-2 Data and Products © MacDONALD, DETTWILER AND ASSOCIATES LTD (year of acquisition) – All Rights Reserved” and “RADARSAT is an official mark of the Canadian Space Agency”
- For TerraSAR-X data: “© DLR e.V. (year of acquisition), Distribution Airbus DS Geo GmbH”

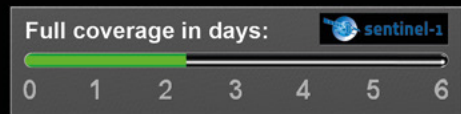
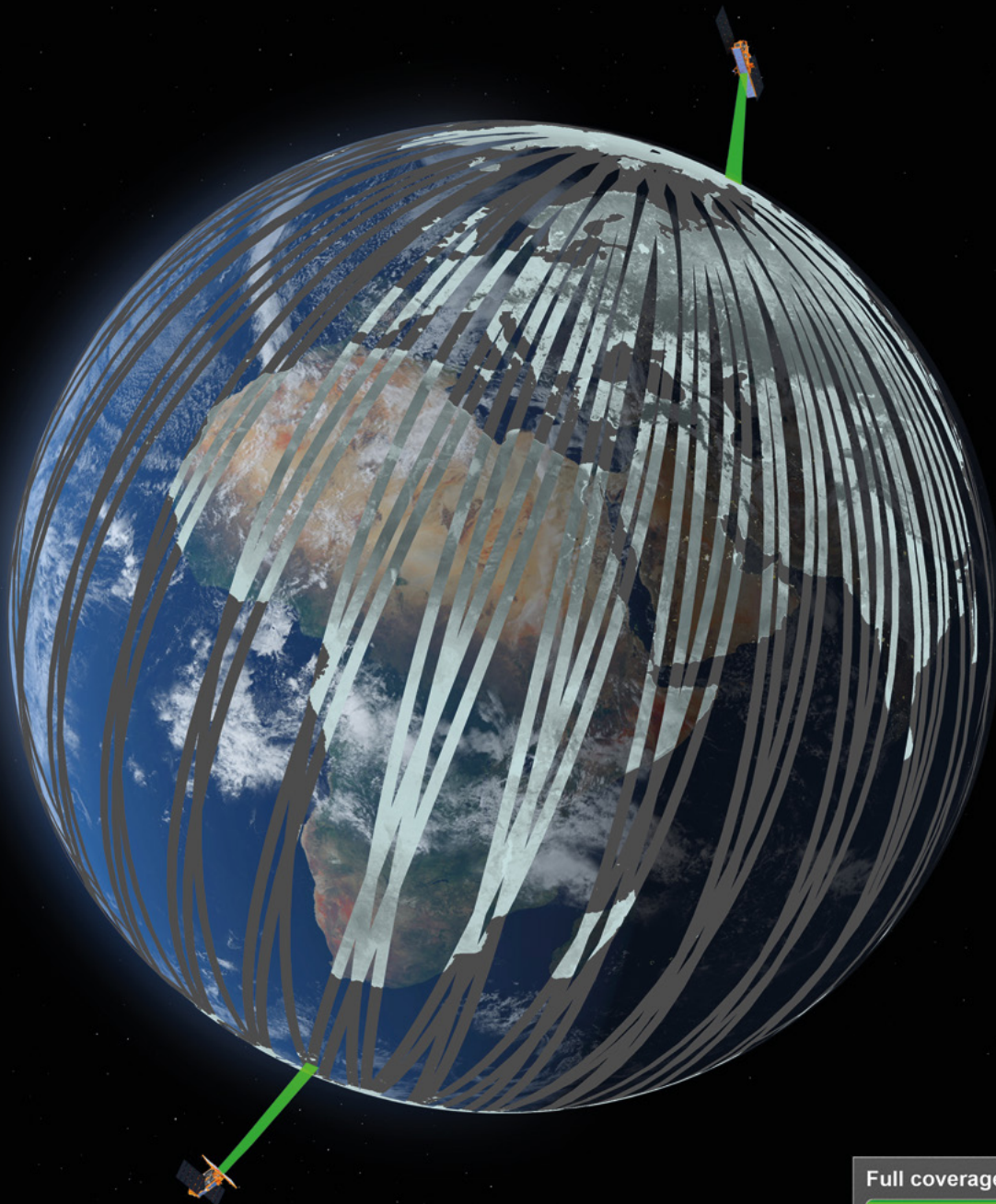
EMSA DERIVED PRODUCTS AND VALUE ADDED PRODUCTS

If an end-user wishes to display an EO image product which has subsequently been overlaid with other information (e.g. value-adding products) or is provided through the means of a fusion product, or is conspicuously displayed in the context of the EMSA web interface, EMSA should be credited as follows:

- Image credit: © EMSA, [year], contains modified [insert satellite mission and credit as relevant] data. All rights reserved. Certain parts are licensed under conditions to EMSA.

If an end-user wishes to display only the value added product or fusion product and/or if the EO image product has been further processed to such an extent that the original image product cannot be specifically identified, EMSA should be credited as follows:

- Image credit: © EMSA, [year]. All rights reserved. Certain parts are licensed under conditions to EMSA.



ANNEX III

ACRONYMS AND ABBREVIATIONS

ACRONYMS AND ABBREVIATIONS	
AIS	Automatic Identification System
AOI	Area of Interest
CMS	Copernicus Maritime Surveillance
DE	Deimos
DTO	Data Take Opportunities
EEZ	Exclusive Economic Zone
EFCA	European Fisheries Control Agency
EFTA	European Free Trade Association
EMSA	European Maritime Safety Agency
EO	Earth Observation
EODC	Earth Observation Data Centre
ESA	European Space Agency
EU	European Union
GE	GeoEye-1
GUI	Graphical User Interface
HH	Horizontally transmitting and horizontally receiving
HR	High Resolution
IMS	Integrated Maritime Services
LRIT	Long Range Identification and Tracking
MAOC (N)	Maritime Analysis and Operations Centre – Narcotics
MR	Medium Resolution
NRT	Near Real Time
PHR	PLEIADES
RGB	Red-Green-Blue

ACRONYMS AND ABBREVIATIONS - CONT.

RS2	RADARSAT-2
RS2 DVWF	RADARSAT-2 Ship Detection
RS2 MF	RADARSAT-2 Multi-Look Fine
RS2 OSVN	RADARSAT-2 Ocean Surveillance
RS2 S	RADARSAT-2 Standard
RS2 SCN	RADARSAT-2 ScanSAR Narrow
RS2 SCW	RADARSAT-2 ScanSAR Wide
RS2 UF	RADARSAT-2 Ultra-Fine
RS2 UFW	RADARSAT-2 Wide Ultra-Fine
RS2 W	RADARSAT-2 Wide
RS2 XF	RADARSAT-2 Extra Fine
S1 EWS	Sentinel 1 Extra-Wide Swath Mode
S1 IWS	Sentinel 1 Interferometric Wide Swath
SAR	Synthetic Aperture Radar (satellite sensor)
SEG	SafeSeaNet Ecosystem GUI
TXS	TerraSAR-X and TanDEM-X
TSX SC	TerraSAR-X ScanSAR
TSX SM	TerraSAR-X Stripmap
TSX SMR	TerraSAR-X StripmapRad
TSX ST	TerraSAR-X Staring Spotlight
TSX WS	TerraSAR-X Wide ScanSAR
VHR	Very High Resolution
VMS	Vessel Monitoring System
VV	Vertically transmitting and vertically receiving
WV	WorldView







ABOUT THE EUROPEAN MARITIME SAFETY AGENCY

The European Maritime Safety Agency is one of the European Union's decentralised agencies. Based in Lisbon, the Agency's mission is to ensure a high level of maritime safety, maritime security, prevention of and response to pollution from ships, as well as response to marine pollution from oil and gas installations. The overall purpose is to promote a safe, clean and economically viable maritime sector in the EU.

ABOUT COPERNICUS

Copernicus is a European Union Programme aimed at developing European information services based on satellite Earth Observation and in-situ (non-space) data analyses. The Programme is coordinated and managed by the European Commission. It is implemented in partnership with the Member States, the European Space Agency (ESA), the European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT), the European Centre for medium-range Weather Forecasts (ECMWF), EU Agencies and Mercator Océan.

Get in touch for more information

Copernicus

copernicus.eu / Twitter [CopernicusEU](#) / Facebook [Copernicus EU](#)

European Maritime Safety Agency

Praça Europa 4

1249-206 Lisboa Portugal

Tel +351 21 1209 200 / Fax +351 21 1209 210

emsa.europa.eu / Twitter [EMSA_Lisbon](#)