



Earth Observation supporting Emergency Response

Global Changes Adaptation
Oceania Geospatial Symposium 2022

DEFENCE AND SPACE

Fabrice Triffaut - Canberra

AIRBUS

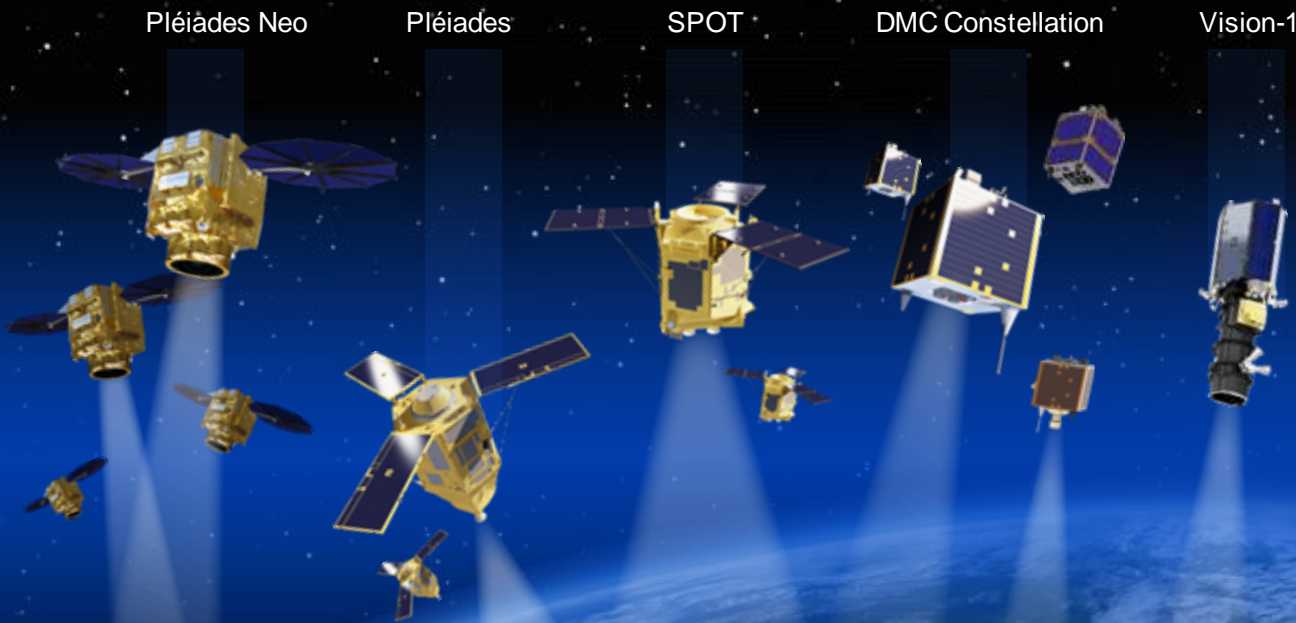
Earth Observation Constellations

Largest commercial satellite constellation with **wide range** of modes, resolutions, swathes and revisit frequencies.
Partnerships ensure **diversity**, including non-imagery data (HawkEye).

NEXT [Airbus Amber]



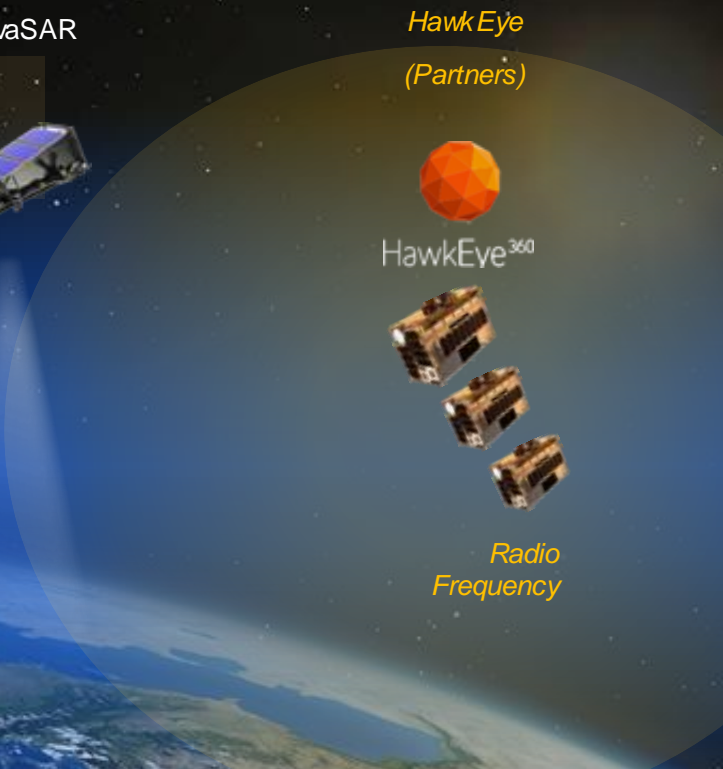
OPTICAL CONSTELLATION



RADAR CONSTELLATION



SIGNAL INTELLIGENCE





Pleiades Neo

Constellation

4 x IDENTICAL SATELLITES

2 million of km²

COLLECTED PER DAY

6 Bands

Incl. DEEP BLUE • RED EDGE

3.5m CE90

ACCURACY

EDRS

Space Data Highway

30cm

NATIVE
RESOLUTION

Earth Observation for Security



They rely on Airbus' satellite constellation to answer emergency needs:



Earth Observation Emergency response

International Charter Disaster

Copernicus Emergency

Airbus on-line interfaces (GeoStore, OneAtlas)

Use cases

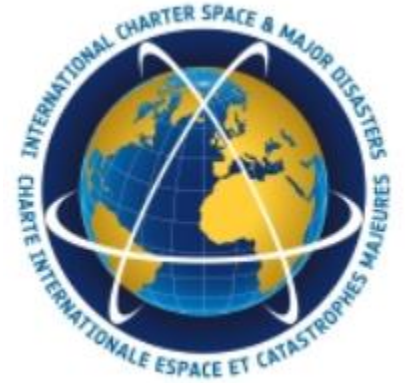
International Charter Space and Major Disasters

Satellite data to support disaster response worldwide

Support National Needs

The Charter is a worldwide collaboration, through which satellite data are made available for the benefit of disaster management. By combining Earth observation assets from different space agencies, the Charter allows resources and expertise to be coordinated for rapid response to major disaster situations; thereby helping civil protection authorities and the international humanitarian community.

This unique initiative is able to mobilise agencies around the world and benefit from their know-how and their satellites through a single access point that operates 24 hours a day, 7 days a week and at no cost to the user.





INTERNATIONAL CHARTER SPACE & MAJOR DISASTERS

A worldwide collaboration through which satellite data are made available for the benefit of disaster management



FOUNDED BY ESA,
CNES AND CSA ON
20 OCTOBER 2000

+20 SUPPORTED BY MORE
THAN 20 INTERNATIONAL
ORGANISATIONS



MORE THAN 80 NATIONAL USERS FROM OVER 80 COUNTRIES
CAN REQUEST DATA FROM THE CHARTER. FIND OUT HOW TO
REGISTER THROUGH UNIVERSAL ACCESS:
disasterscharter.org/web/guest/how-to-register-as-a-user

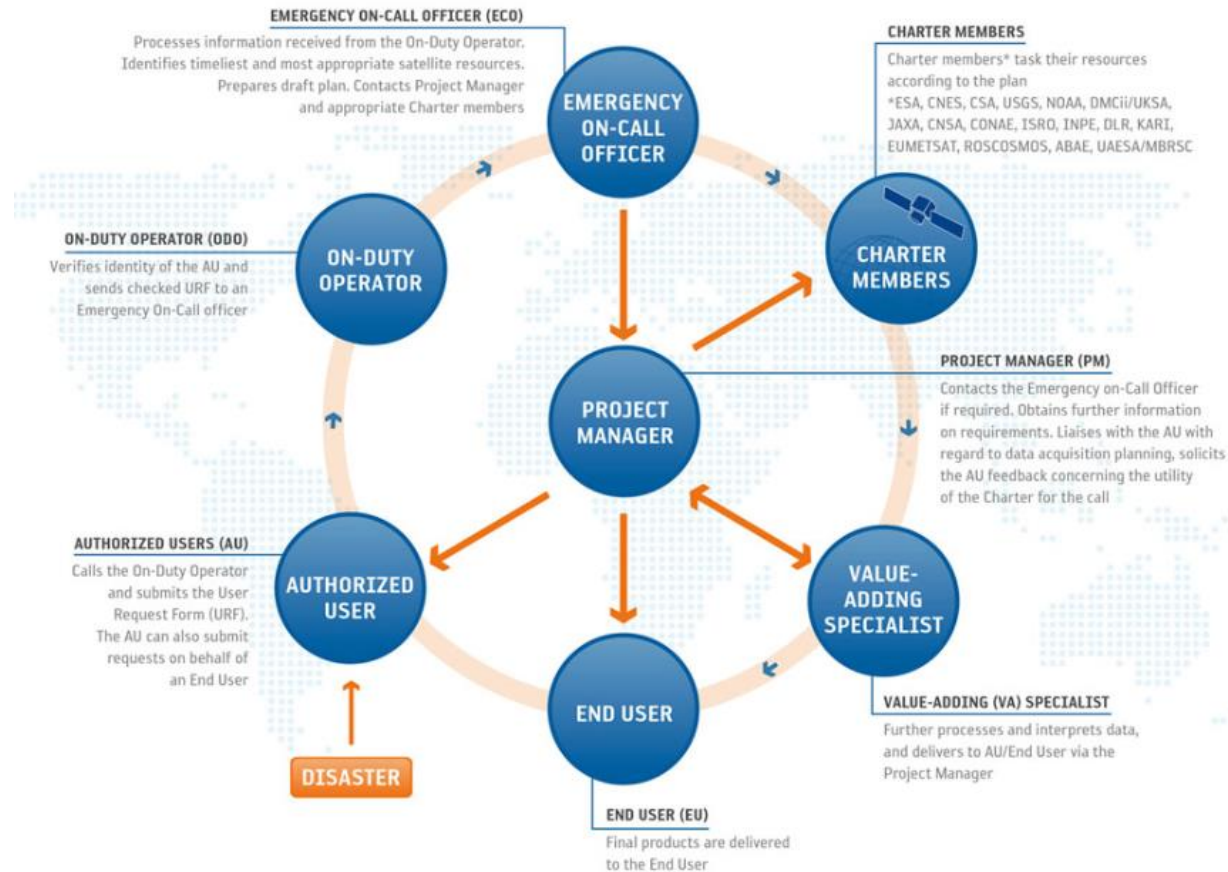


وكالة الإمارات للفضاء
UAE SPACE AGENCY



International Charter Space and Major Disasters

Activating the Charter



An activation starts with an **Authorised User (AU)** - typically a representative of a national civil protection, rescue, or security organisation - who may log in to the Charter Operational System and submit a request to mobilise the space and associated ground resources associated with the Charter members in order to obtain data and information on a major disaster. AU's are the only bodies authorised to directly request an activation of the Charter. They may also request support on behalf of another user with which they co-operate for relief purposes.

International Charter Space and Major Disasters

Activating the Charter

New users without direct access to the Charter should address emergency related enquiries to:
executivesecretariat@disasterscharter.org

General enquiries concerning the Charter operations and provisions should be addressed to:
webmaster@disasterscharter.org

<https://disasterscharter.org/web/guest/home>



Cyclones ▶



Earthquakes ▶



Fires ▶



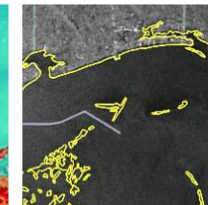
Floods ▶



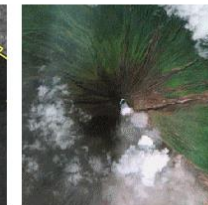
Snow and Ice ▶



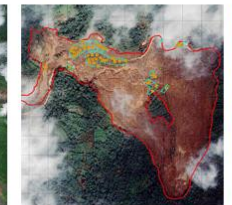
Ocean Waves ▶



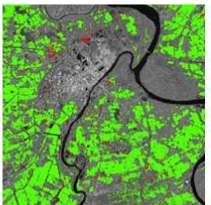
Oil spills ▶



Volcanoes ▶



Landslides ▶



Other ▶



Nuku Alofa - TONGA

Volcanic activity - Situation as of 18/01/2022

Grading - Detail map 06



Cartographic Information

1:2500 Full scale A1, 200 dpi resolution

0 0.05 0.1 0.2 km

Grid: WGS 1984 UTM Zone 15 map coordinate system
 Risk marks: WGS 84 geographical coordinate system

Legend

- Build Up Grading**
 - Destroyed
 - Probably destroyed
- Transportation Grading**
 - Road, Destroyed
 - Road, Probably destroyed
 - Secondary Road, No visible damage
 - Local Road, No visible damage
 - Canal Road, No visible damage
- General Information**
 - Area of Interest
 - Not Area of Interest
- Place names**
 - Place name

Map Information

After the eruption of the underwater volcano Hunga-Tonga-Hunga-Ha'apai located close north of Tonga, a tsunami wave triggered and affected several islands in the region. The city of Nuku Alofa was also affected. Damage following the tsunami has been reported from the island of Tonga. In order to assess the damage assessment is ongoing.

The present map shows human damage grade assessment caused by the volcanic eruption in the area of Nuku Alofa. The present map was derived from post-event satellite imagery by means of visual interpretation. The land surface features in the map were not completely covered with ash deposits as represented in the Charter map 01. The ash deposit cover has been extracted from the Charter map content in order to improve the map quality of the damaged areas. The map content is not intended to be used as a basis for any of the post-event mapping. The scale of the map is 1:2500. The maximum positional accuracy (RMSE) is 2.2 m or better, from satellite positional accuracy of the background satellite image. The maximum mapping error (RMSE) is 50 m.

The background post-event imagery is as of 15/01/2022 at 21:45 UTC.

Relevant date records (UTC)

Event	15/01/2022 00:00	Release as of	18/01/2022 21:58
Activation	15/01/2022 18:45	Map production	18/01/2022

Data sources

Pre-event image: Pleiades-A/B in Cloud (2021), distributed by Airbus DS, acquired on 15/01/2022 22:08 (UTC, 500 0.5 m, approx. 67% cloud coverage in Aug. 2021 off-nadir angle), provided under CC-BY-NC-SA license by the European Union and ESA, all rights reserved.

Post-event image: Pleiades-A/B in Cloud (2021), distributed by Airbus DS, acquired on 15/01/2022 22:08 (UTC, 500 0.5 m, approx. 67% cloud coverage in Aug. 2021 off-nadir angle), provided under CC-BY-NC-SA license by the European Union and ESA, all rights reserved.

Background image: Pleiades-A/B in Cloud (2021), distributed by Airbus DS, acquired on 15/01/2022 21:30 (UTC, 500 0.5 m, approx. 67% cloud coverage in Aug. 2021 off-nadir angle), provided by International Charter (art. 12.14), all rights reserved.

Map data: Airbus DS (2021), distributed by Airbus DS, acquired on 15/01/2022 21:45 (UTC, 500 0.5 m, approx. 67% cloud coverage in Aug. 2021 off-nadir angle), provided under CC-BY-NC-SA license by the European Union and ESA, all rights reserved.

Open vector layer: OpenStreetMap contributors (2021), Wikipedia.org, OpenStreetMap contributors (2021), OpenStreetMap contributors (2021), all rights reserved.

Map data: Airbus DS (2021), distributed by Airbus DS, acquired on 15/01/2022 21:45 (UTC, 500 0.5 m, approx. 67% cloud coverage in Aug. 2021 off-nadir angle), provided under CC-BY-NC-SA license by the European Union and ESA, all rights reserved.

Regulation: EU Regulation (EU) 2017/1001 European Commission, 2017

Disclaimer

Products delivered in this Charter are provided as they are. The information is not intended to be used as a basis for any of the post-event mapping. The scale of the map is 1:2500. The maximum positional accuracy (RMSE) is 2.2 m or better, from satellite positional accuracy of the background satellite image. The maximum mapping error (RMSE) is 50 m.

Delivery format: see Charter (vector: PDR, GeoJSON and vector: GeoJSON, Google Earth, GeoJSON).

Map produced by: Airbus DS, released by: Airbus DS (2022).

For the latest version of this Charter, please visit: <https://emergency.europa.eu/emergency>

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Emergency Copernicus

Copernicus is an EU programme aimed at developing European information services based on satellite Earth Observation and in situ (non space) data.

Copernicus is implemented by the European Commission (EC) with the support from the European Space Agency (ESA) for the Space component and the European Environment Agency (EEA) for the in situ component.

The objective of Copernicus is to monitor and forecast the state of the environment on land, sea and in the atmosphere, in order to support climate change mitigation and adaptation strategies, the efficient management of emergency situations and the improvement of the security of every citizen. Information provided by Copernicus improves people's safety, e.g. by providing information on natural disasters such as forest fires or floods, and thus help to prevent the loss of lives and property, and damages to the environment.

Copernicus is a user driven programme and the information services provided are available to its Users, mostly public authorities, on a **full, open and free-of-charge basis** (<https://emergency.copernicus.eu/>).

Emergency Copernicus

Who can use the service

Users are entities and organisations at regional, national, European and international level active in the field of crisis management within the EU Member States, the Participating States in the European Civil Protection Mechanism, the Commission's Directorates-General (DGs) and EU Agencies, the European External Action Service (EEAS), as well as international Humanitarian Aid organisations.

There are three distinct user categories:

Authorised Users may trigger the service, by sending a Service Request Form (**SRF**) directly to the European Response Coordination Centre (ERCC). Authorised Users include National Focal Points (NFPs) in EU Member States and in most countries participating in the European Civil Protection Mechanism as well as EC Services (DGs), the Situation Room of the EEAS and the EU delegations.

Associated Users must coordinate with and go through the Authorised Users in order to trigger the service. Associated Users include local, regional and other public entities; International Governmental Organisations (e.g. UN agencies, World Bank), and National & International Non-Governmental Organisations; the INTCEN, the EU Satellite Centre.

General Public Users are not authorised to trigger the service, but can be informed of an activation request through the web portal. Activations, for which sensitivity restrictions apply, are excluded

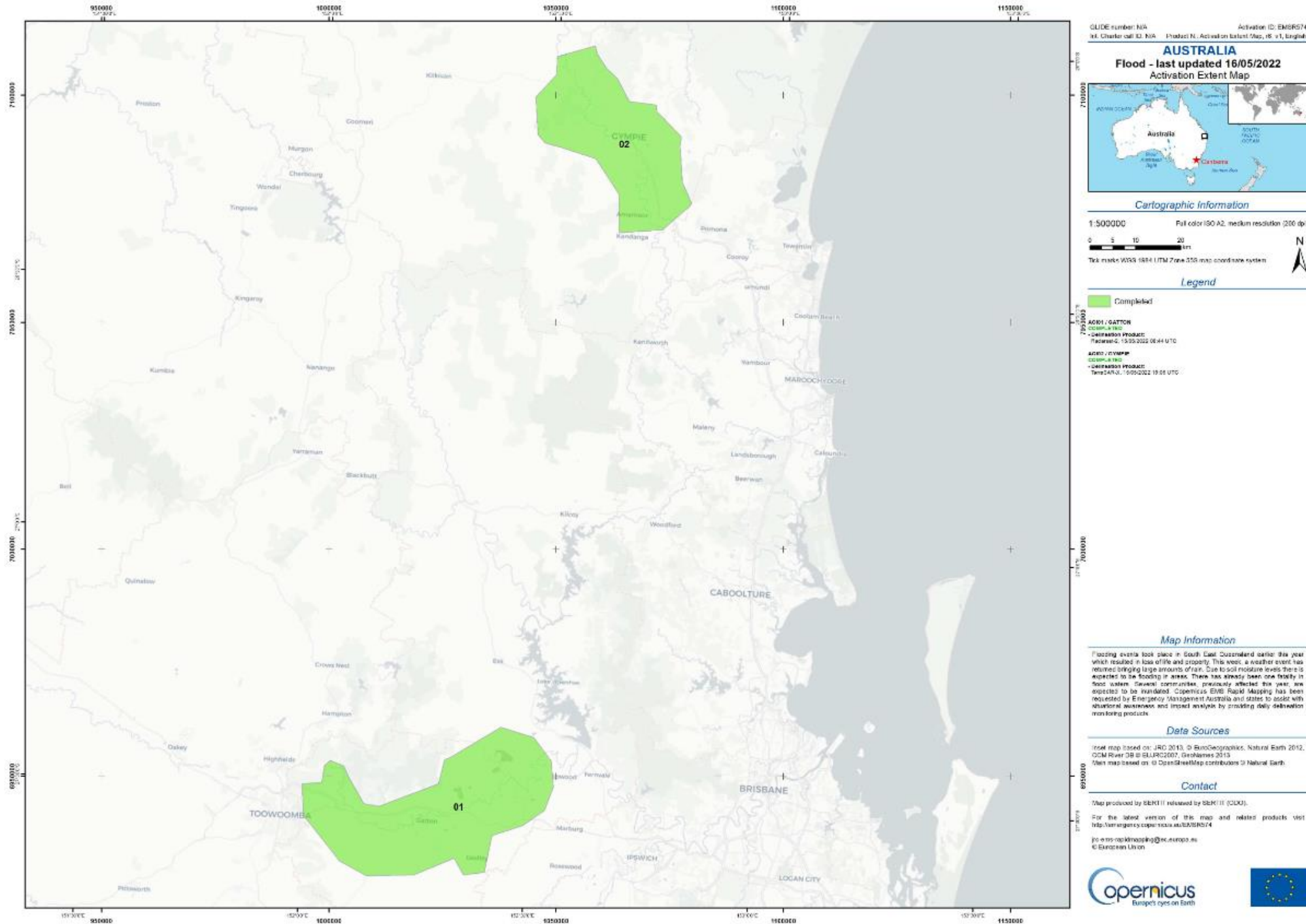
DEFENCE AND SPACE

Emergency Copernicus EMSR574:

Floods, QLD, Australia (May 2022)

Copernicus EMS Rapid Mapping has been requested by **Emergency Management Australia and states** to assist with situational awareness and impact analysis by providing daily delineation monitoring products.

Copyright Airbus



Pleiades images over New South Wales, 07 March 2022

Average delivery time: <02h00.

Woodburn



Pleiades © CNES 2022, Distribution Airbus DS



Coraki



<https://www.copernicus.eu/en/how/how-access-data>

[Copernicus services catalogue](#)

[Access Hubs](#)

[Access Points](#)

[DIAS](#)

ESA [Copernicus Open Access Hub](#)

EUMETSAT [Copernicus Online Data Access](#)

DIAS (for "[Data and Information Access Services](#)")

Access to Data



<https://au.insight.com>

Geostore on-line portal

<https://www.geostore.com/geostore4/>

OneAtlas portal

<https://www.intelligence-airbusds.com/imagery/oneatlas/>

Access to Data

USE CASES

#1

Pléiades Neo

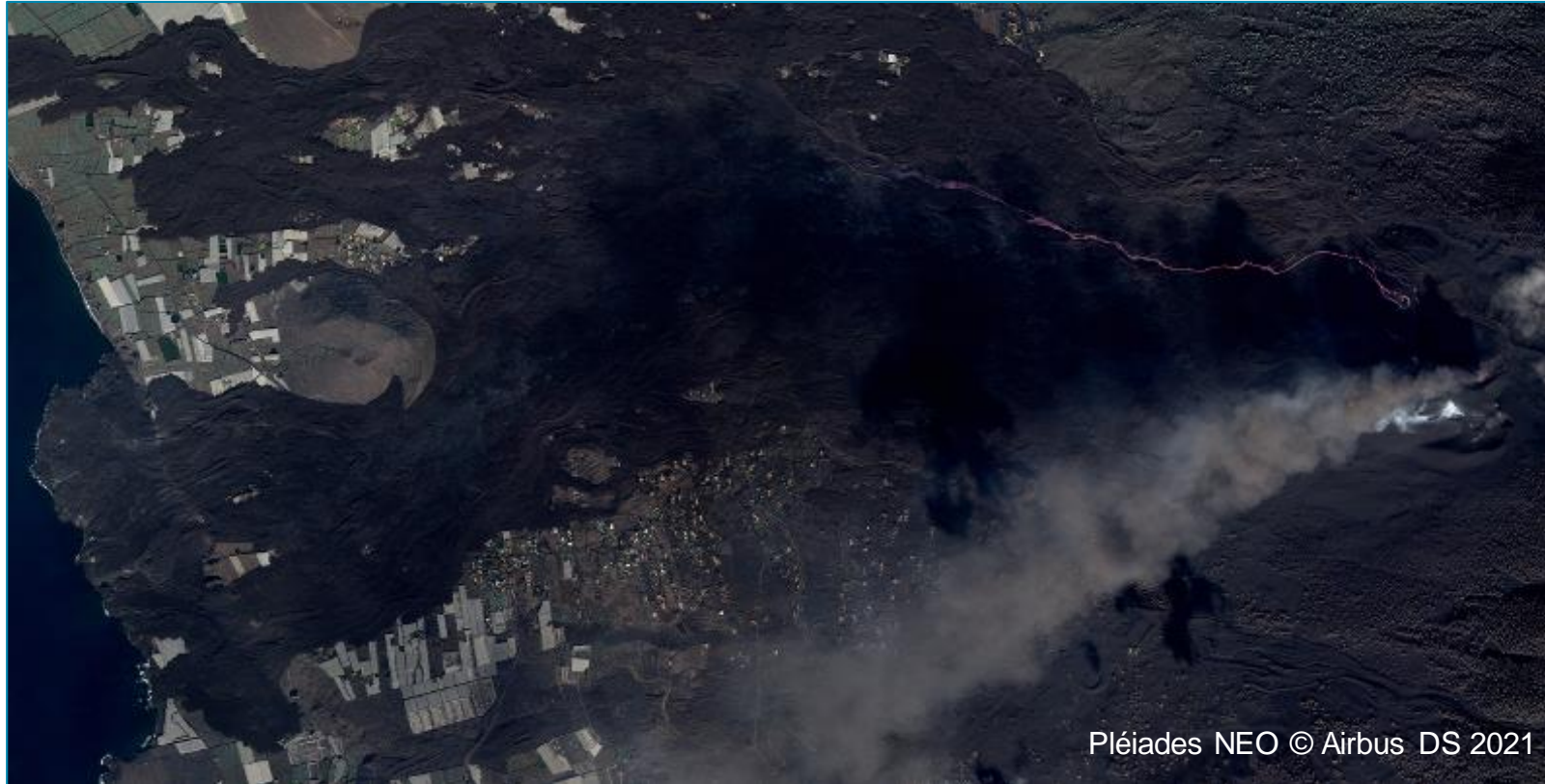
Cumbre Vieja volcano eruption at La Palma

- 85-days eruption from September 19 to December 13, 2021
- Lava stream 3.5km wide and 6.2km long
- Immense economic and societal damages. The town Todoque has been completely destroyed, La Laguna heavily damaged.

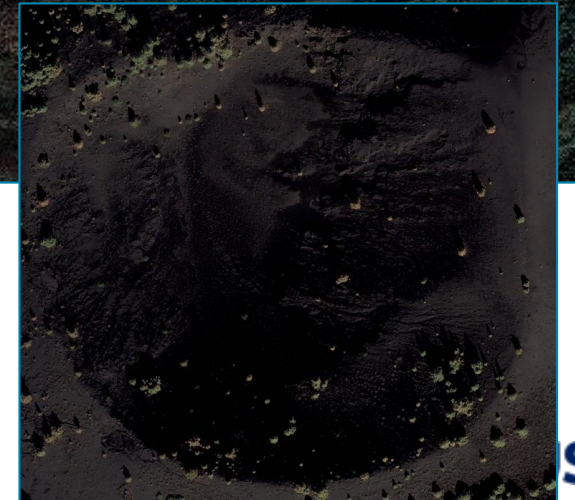
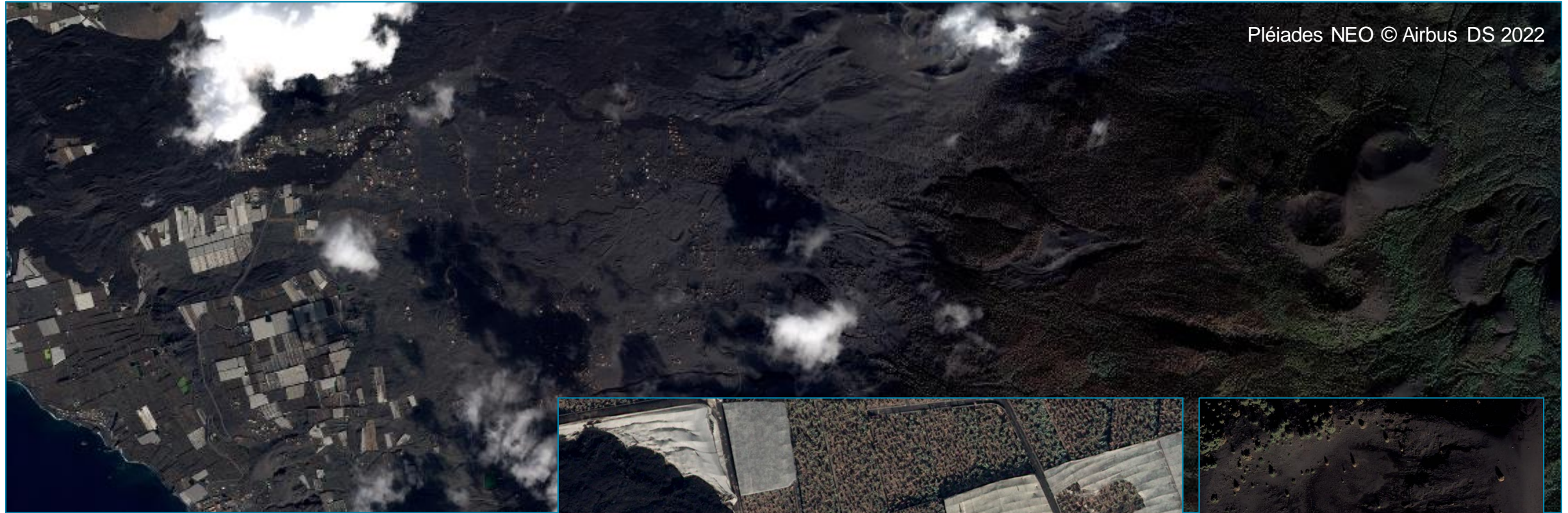


Cumbre Vieja volcano at La Palma island – December 2, 2021

Canary Islands



Cumbre Vieja volcano at La Palma island – December 18, 2021



Cumbre Vieja volcano at La Palma island – December 31, 2021

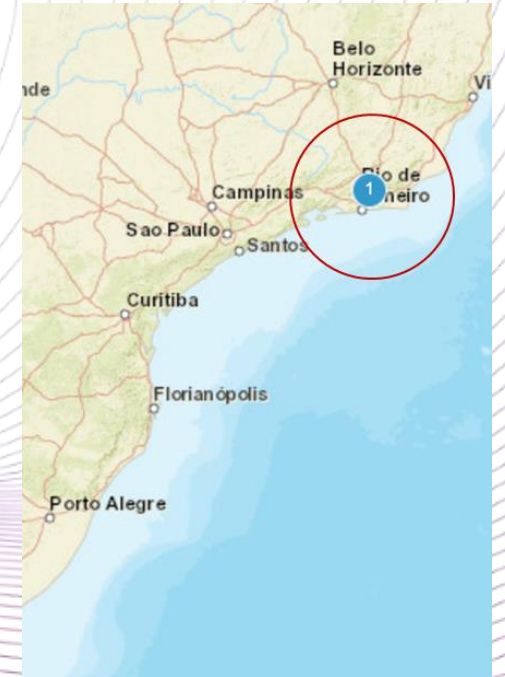


USE CASE

#2

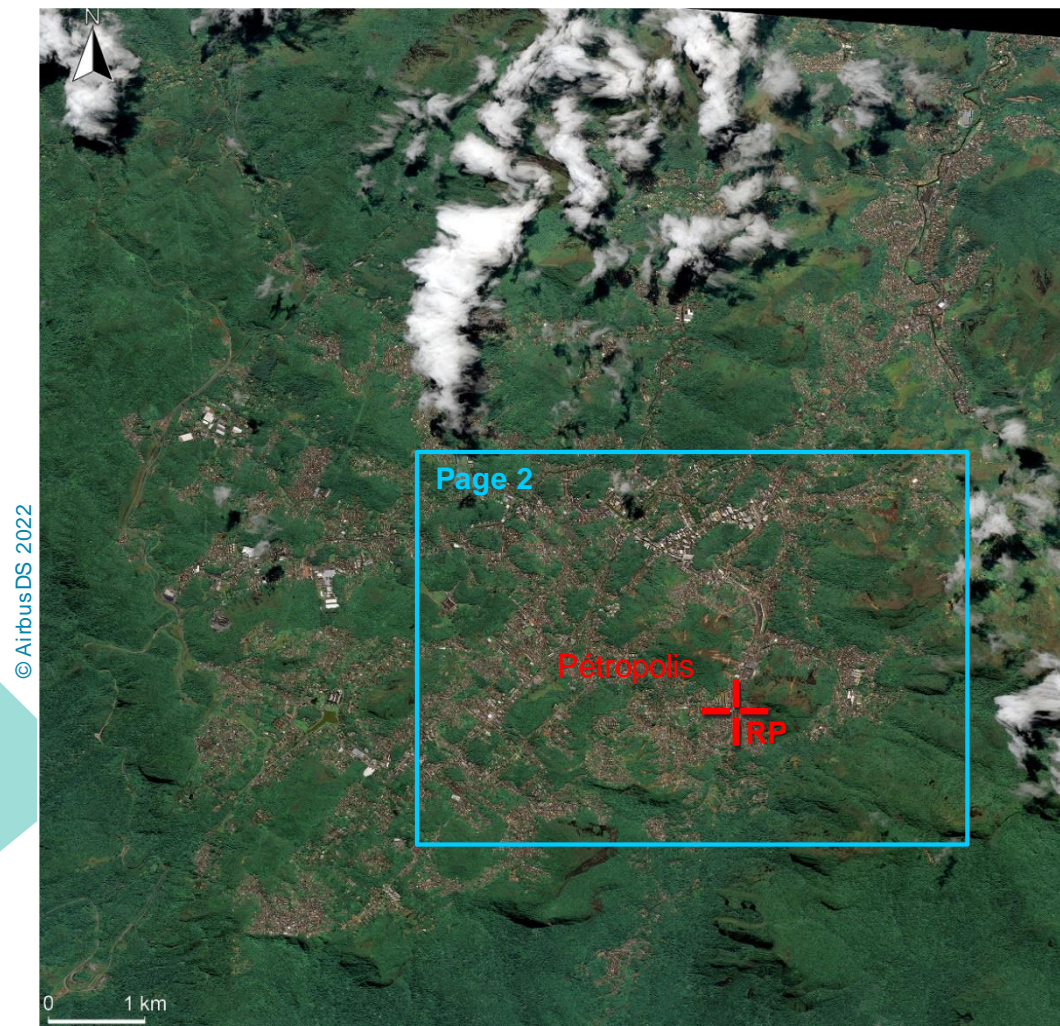
Pléiades Neo

Petropolis - Brazil



Petropolis - Brazil

Pléiades Neo



Timestamp: 2022 02 23 12h50 UTC

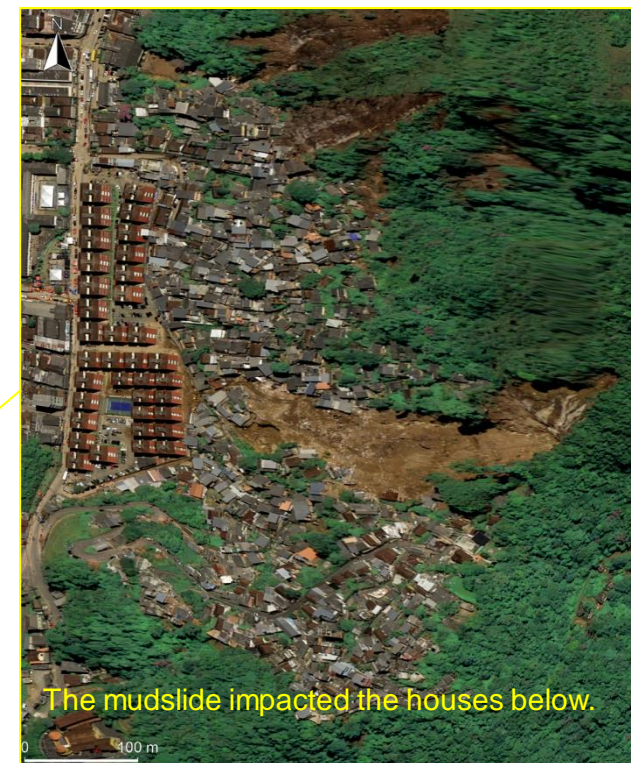
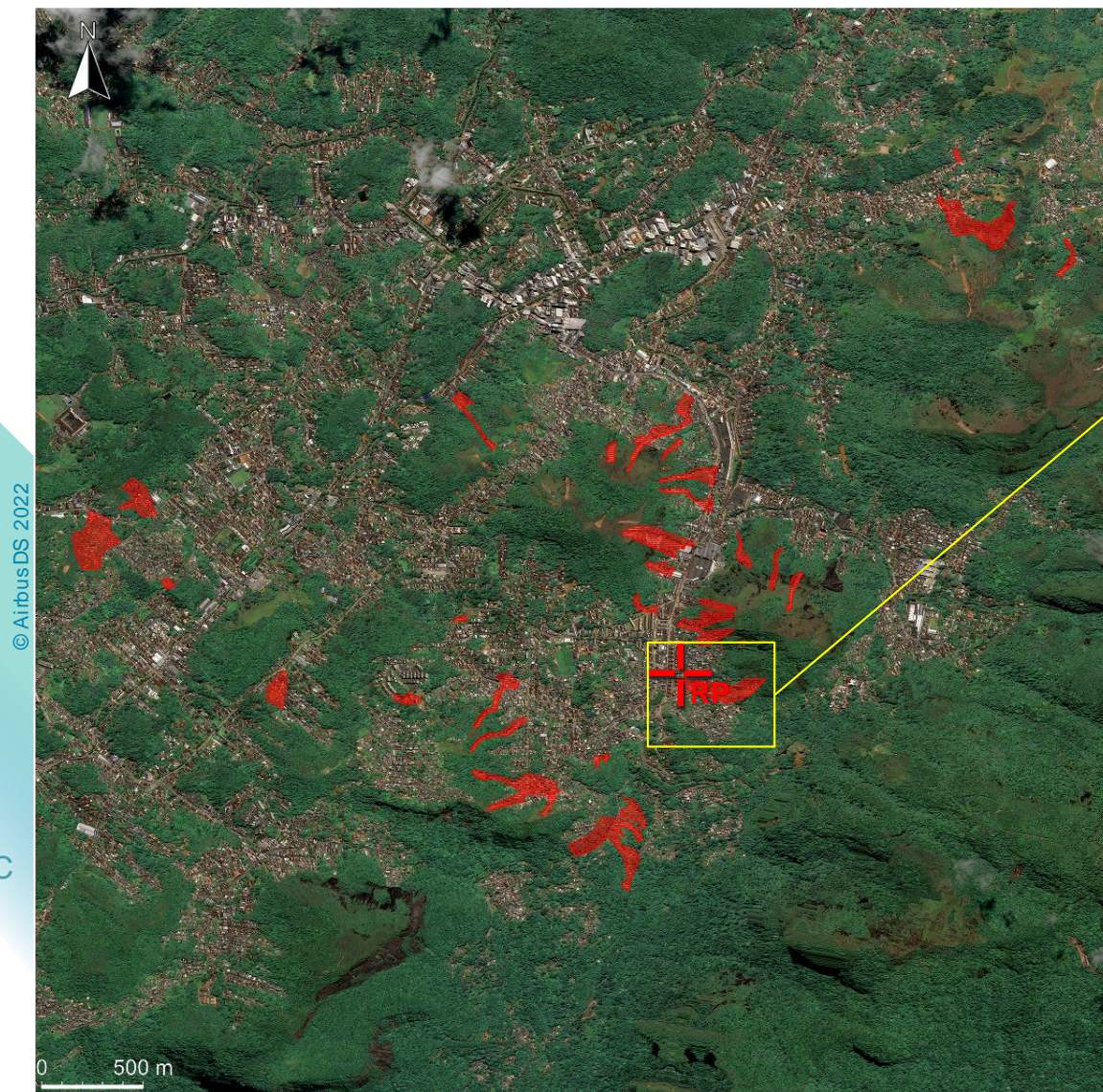
Sensor: Pléiades Neo

R.P.: 22°31'46"S / 043°10'17"W

© Copyright Airbus DS 2022

Petropolis - Brazil

Pléiades Neo



Timestamp: 2022 02 23 12h50 UTC

Sensor: Pléiades Neo

R.P.: 22°31'46"S / 043°10'17"W

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 Mud area

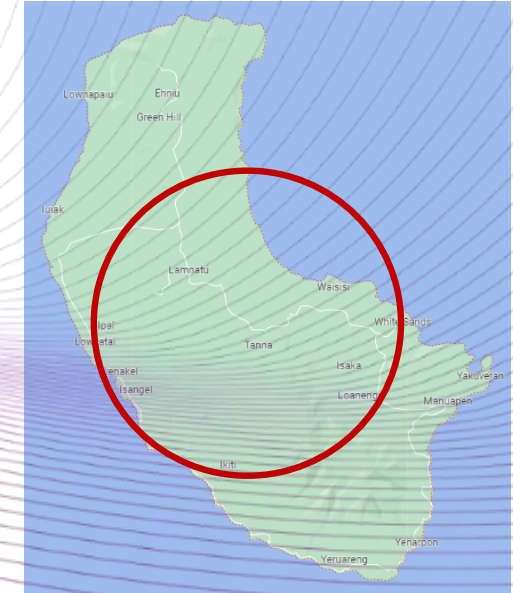
 **AIRBUS**

USE CASE

#3

Pléiades for Change Detection

Tanna - Vanuatu



Tanna, Vanuatu, Near real time delivery

2013-09-30



2015-03-15



© CNES, AirbusDS 2013

Automatic Change Detection

 **AIRBUS**

Tanna, Vanuatu, Near real time delivery

3-09-30



2015-03-15



Automatic Change Detection

AIRBUS

USE CASE

#4

Pléiades Neo for Environment

Mananjary - Madagascar



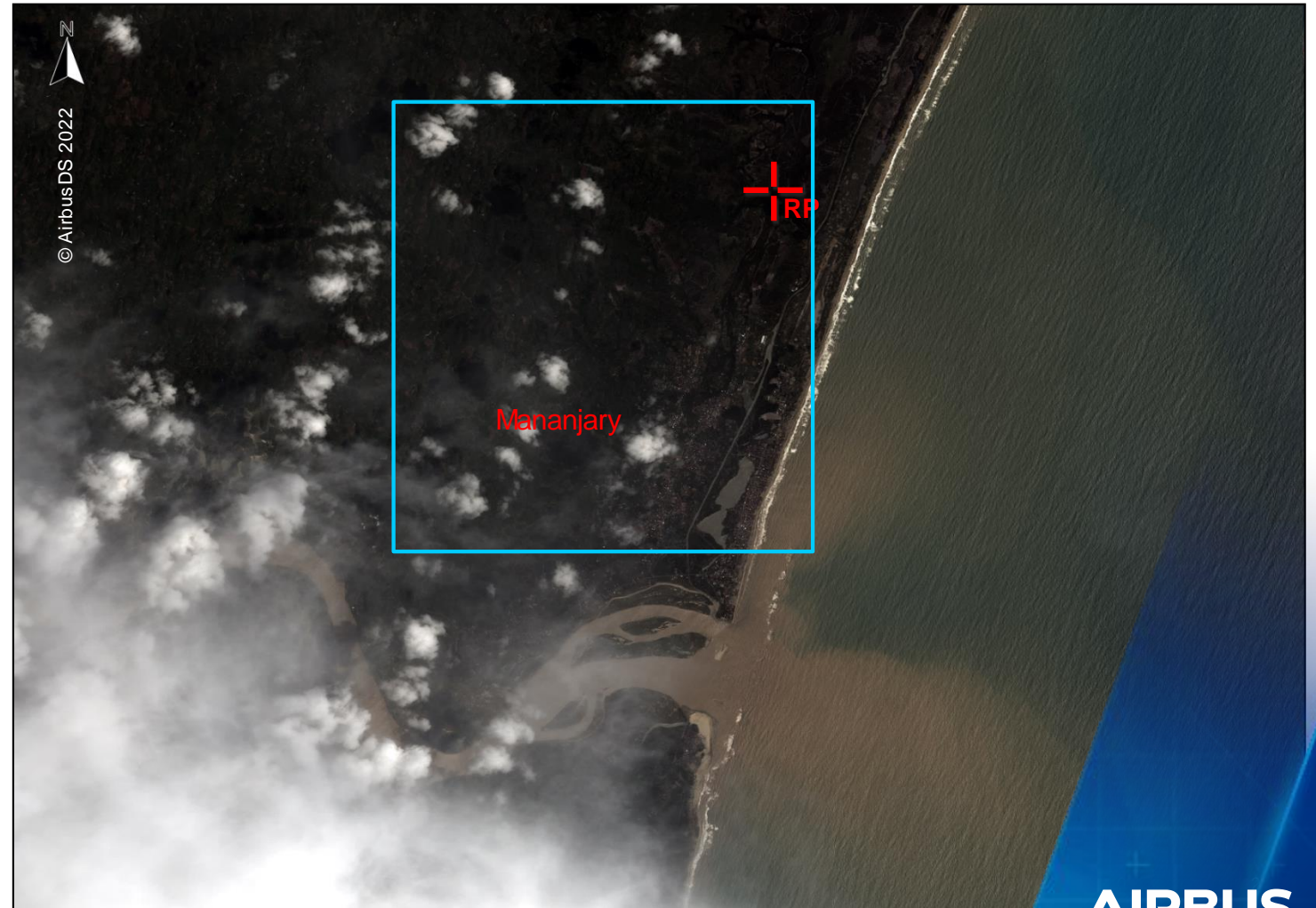
Mananjary- Madagascar

Feb 08, 2022 07:21:18 GMT

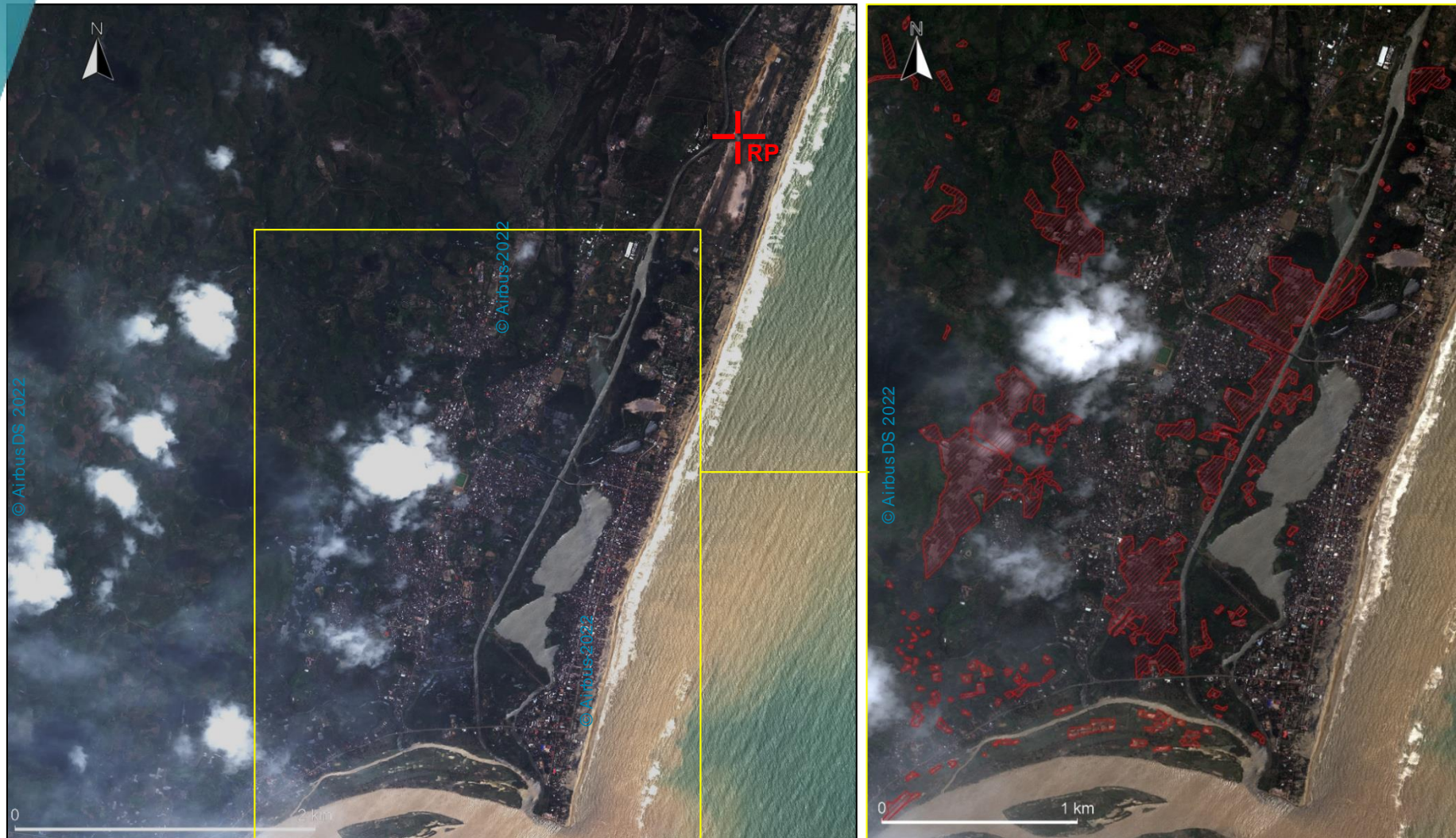
RP : 21°12'05"S / 048°21'29'E

The analysis of this Pléiades Neo image acquired on February 08th, 2022 highlights the damage that occurred after the passage on February 05th, 2022 of cyclone Batsarai in the city of Mananjary on the east coast of Madagascar.

A comparison with a Pléiades image from June 29th, 2021 highlighted flooded areas as well as destruction of buildings and vegetation.



Mananjary- Madagascar



About 2 km² of flooded land have been listed on the outskirts and in the town of Mananjary.

 Flooded area

Mananjary- Madagascar

Pléiades from 06/29/2021



Pléiades Neo from 02/08/2022



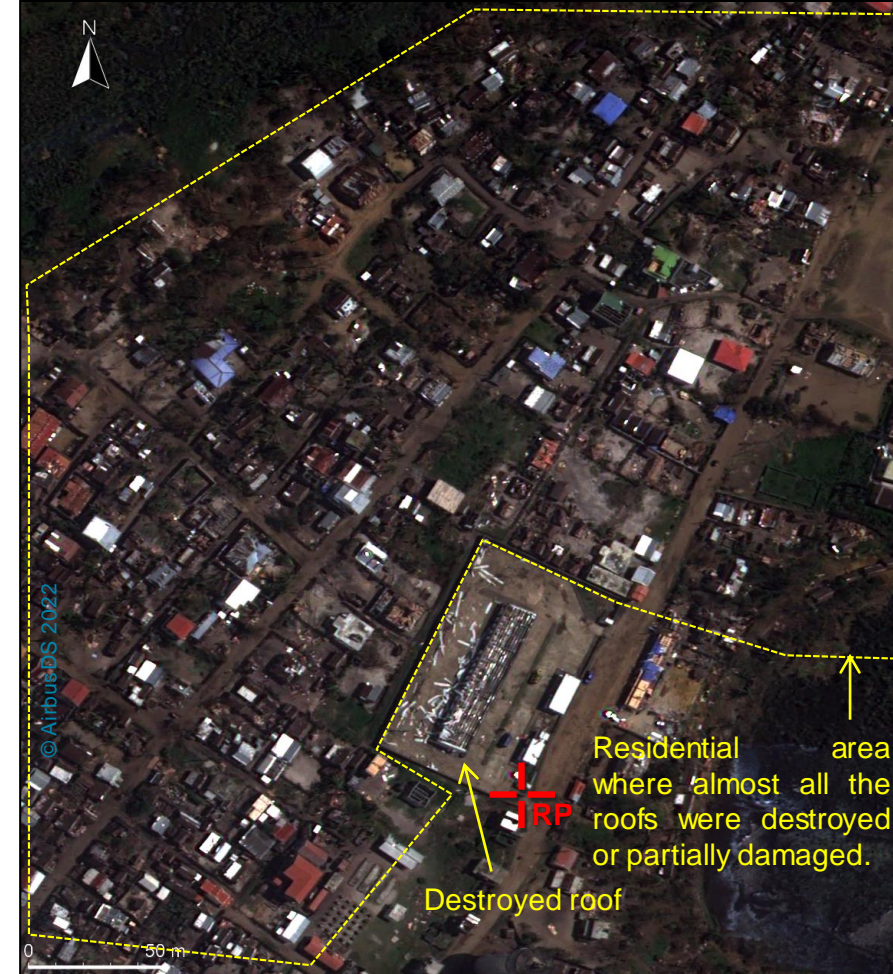
Example of damaged buildings.

Mananjary- Madagascar

Pléiades from 06/29/2021



Pléiades Neo from 02/08/2022



Example of damaged buildings and residential areas.

Mananjary- Madagascar

Pléiades from 06/29/2021



Pléiades Neo from 02/08/2022



Example of damaged buildings.

Mananjary- Madagascar

Pléiades from 06/29/2021



Pléiades Neo from 02/08/2022



Example of damaged vegetation, buildings and living areas.

Mananjary- Madagascar

Pléiades from 06/29/2021



Pléiades Neo from 02/08/2022



Example of damaged vegetation, buildings and living areas.

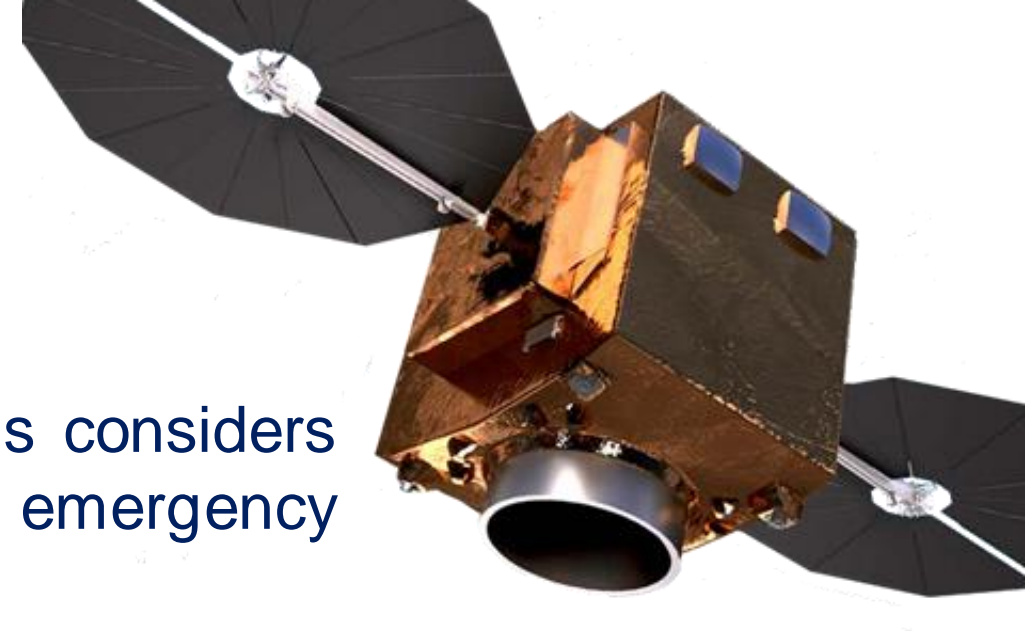
Earth Observation supporting Emergency Response

Commercial constellations are a key asset, Airbus considers itself as a strong partner to Copernicus and global emergency operations.

Airbus is providing very operational and reactive emergency and disaster management for many years, capabilities and performance are evolving.

International cooperation including data exchange is appreciated, allowing to harmonise needs and for industry to address them more efficiently.

Be prepared !



Time for questions and discussion !



Rue du General Gallieni
Nouméa 98800 Nouvelle Calédonie
+687 35 29 71
geo-contact@insight.nc
insight.nc

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Fabrice.Triffaut@airbus.com
2 Brindabella Circuit
Canberra Airport ACT 2609
Australia
fabrice.triffaut@airbus.com
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