



The International Charter Space and Major Disasters NEWSLETTER

September 2019 | Issue 19



Activations on map



@DisastersChart



CSA takes the lead

The Canadian Space Agency (CSA) took over as the Charter's lead agency at the 41st Executive Secretariat, Board and Communications meetings in May 2019.



Planet data contribution

The first private-sector data provider to directly support the Charter, Planet released imagery of over 600,000 square km for use by the Charter in 2018.



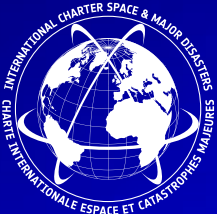
KOMPSAT-3A is now available for the Charter!

KOMPSAT-3A of the Korea Aerospace Research Institute (KARI) provides very high-resolution optical images with a ground sampling distance of 0.55 m.

Bringing together new and efficient space technologies to support disaster management

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CSA becomes lead agency of the International Charter 'Space and Major Disasters'

The 41st meetings of the Executive Secretariat, Board and Communications of the International Charter 'Space and Major Disasters' took place in late April / early May 2019 in Quebec City, Canada. The meetings were hosted by the Canadian Space Agency (CSA), which took over as the Charter's lead agency on May 3, 2019, succeeding the Centre national d'études spatiales (CNES), France's space agency. The CSA will hold the lead role until October 2019, at which time Roscosmos, Russia's space agency, will take over.

Forty-eight representatives from Europe, Asia, and North and South America participated in the meetings with the objective of further improving the Charter's ability to support worldwide disaster relief. During the week of meetings, the CSA organized presentations by Public Safety Canada, the Authorized User for Canada; and Natural Resources Canada, a Value Adder to the Charter. The presentations gave Charter members the opportunity to learn more about the work performed by front-line disaster relief workers and provided valuable feedback about Charter operations from the perspective of its end users.

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Participants of the 41st Charter meeting in Quebec City, Canada

Photo credit: CSA



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Planet data contribution to the International Charter 'Space and Major Disasters'

Planet Labs was founded in 2010 by ex-NASA scientists with the goal of using space to help life on Earth. They launched their first satellite, Dove-1, in April 2013. The company rebranded in 2016 as Planet and has operated under that moniker ever since, while maintaining their legal name, Planet Labs, Incorporated.

Since initially delving into the Earth observation arena, Planet has launched several missions including SkySats and the largest constellation of satellites ever launched on a single rocket. In 2017, they launched 88 Dove satellites aboard a polar satellite launch vehicle, which established their ability to image the entire Earth's landmass every day. Planet designs, builds and operates the world's largest constellation of Earth monitoring satellites.

In 2018, Planet became the first private-sector data provider to directly support the International Charter 'Space and Major Disasters.' As a formal data provider, Planet provides PlanetScope imagery (3 to 5 m resolution) of their Dove Satellites to the Charter's emergency response authorities throughout the world.

In their first full year of contribution to the Charter, Planet supported nine disaster events including volcanic eruptions, floods and hurricanes, as well as a typhoon and earthquake. In total, Planet released imagery of over 600,000 square kilometers for use by the Charter.

During Hurricane Michael in the US in 2018, Planet data was used by the Federal Emergency Management Agency for situational awareness and initial damage assessments that could identify areas where higher-resolution satellite imagery and/or aerial imagery should be collected. In the images below, an area of extensive damage northwest of Mexico Beach, Florida, was identified using PlanetScope data (left) and was later flown over by the Civil Air Patrol to acquire 3D aerial imagery of the affected areas.

The addition of Planet as the first private-sector data provider to the International Charter, has ushered in a new era for the provision of no-cost satellite observations for disaster response.

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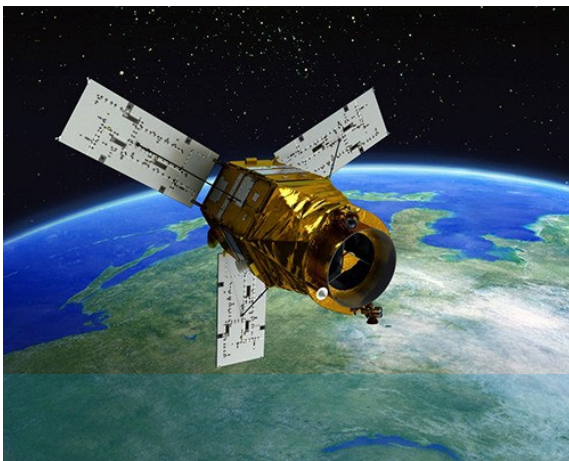


PlanetScope 3-m imagery near Mexico Beach, Florida, on October 21, 2018 (left), and WaldoAir imagery of the identified damaged area on October 24, 2018 (right).

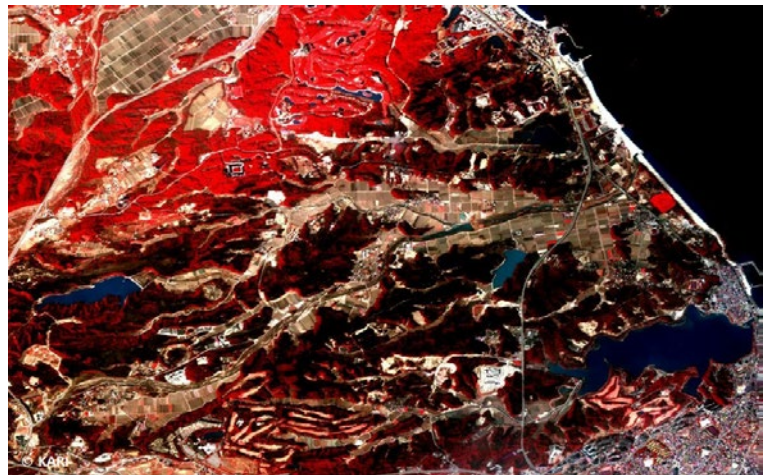
KOMPSAT-3A is now available for the Charter!

KOMPSAT-3A is the upgraded version of KOMPSAT-3 and provides very high-resolution optical images with a ground sampling distance (GSD) of 0.55 m. It opens up new possibilities in environmental monitoring, agriculture, urban planning, resource management, and disaster monitoring. For the International Charter 'Space and Major Disasters,' the Korea Aerospace Research Institute (KARI) provides panchromatic and multispectral images of a product level of 1G and product types of bundle or pan-sharpened.

The satellite image below on the right is an example of KOMPSAT-3A imagery, acquired on April 5, 2019, when an extensive wildfire occurred in Gangwon province, South Korea. This image presents a false-color composite of near-infrared (NIR), red and green bands of KOMPSAT-3A. Healthy vegetated areas are highlighted in bright red color in the false-color composite, and areas with dark red color in this image indicate unhealthy vegetation in burned areas caused by wildfire. The very high-resolution images with red, green, blue and NIR bands of KOMPSAT-3A allow detailed analysis of disasters, including wildfires, floods and more.



KOMPSAT-3A satellite. © KARI



False-color composite of KOMPSAT-3A on the damaged areas after a wildfire in Sokcho, Gangwon province, South Korea. © KARI

KOMPSAT-3A specifications

	Spectral range (nm)	Sensor GSD	Radiometric resolution (bit)	Swath Width (km)	Orbit Height (km)
MS 1	450 – 520 nm (Blue)	2.2 m	14	13	528
MS 2	520 – 600 nm (Green)				
MS 3	630 – 690 nm (Red)				
MS 4	760 – 900 nm (NIR)				
PAN	450 – 900 nm	0.55 m			

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Universal Access: A great success

Building on a decade of success in making satellite data available to designated users for disaster response, the Charter has opened its door even wider since 2012. By adopting the principle of Universal Access (UA) the Charter is further strengthening its contribution to disaster management worldwide.

The Charter can be activated by a predefined list of appointed users, known as 'Authorized Users' (AUs). Before 2012, AUs were typically disaster management authorities, from countries of Charter member agencies, able to request Charter support for emergencies in their own country, or in a country with which they cooperate for disaster relief. Charter members felt that user access to the Charter should be improved. Therefore the principle of Universal Access was accepted in 2012: any national disaster management authority will be able to submit requests to the Charter for emergency response. Proper procedures will have to be followed, but the affected country will not have to be a Charter member. A registration process is available for national authorities that express interest in becoming Authorized User of the Charter. In addition, procedures to activate the Charter in case of major disaster will be provided to the new Authorized Users, and a simulation exercise will be performed.

The following criteria must be met by an entity requesting to become a new user:

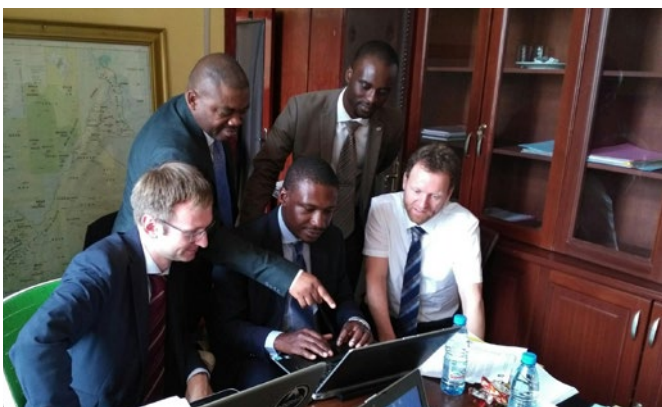
- The entity must be a national disaster management authority or its delegated agency in that country
- The entity must have the capacity to download and utilize maps
- The entity must be able to submit and pursue its activation requests in English

Australia, Malawi and Pakistan were the first countries to be granted access to the Charter via the Universal access initiative by the end of 2014. As of 2019, there are now 21 countries that have become Authorized Users through this process (highlighted in green in the map below). Seven additional countries are currently under evaluation process and/or training phase.

Thanks to the active work from UNOOSA/UN-SPIDER through Technical Advisory Missions, most of the latest UA requestors are from Africa, where still very many countries don't have direct access to the Charter. The Charter and UNOOSA/UN-SPIDER are working closely together in continuing to promote Universal Access in countries on the African continent and in Oceania, but also overall the world.

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Staff from UNOOSA/UN-SPIDER and the National Space Research and Development Agency of Nigeria (NASRDA) together with representatives of the Department of Civil Protection of Cameroon explore the Charter website and discuss how Cameroon gets direct access to the Charter through Universal Access in July 2109.

© Juan-Carlos Leon de Villagran (UN-Spider Bonn office)



Map showing the 65 countries (in dark blue and green) with direct access to the Charter as of August 2019. Countries that gained access through the Charter's Universal Access Initiative are given in green

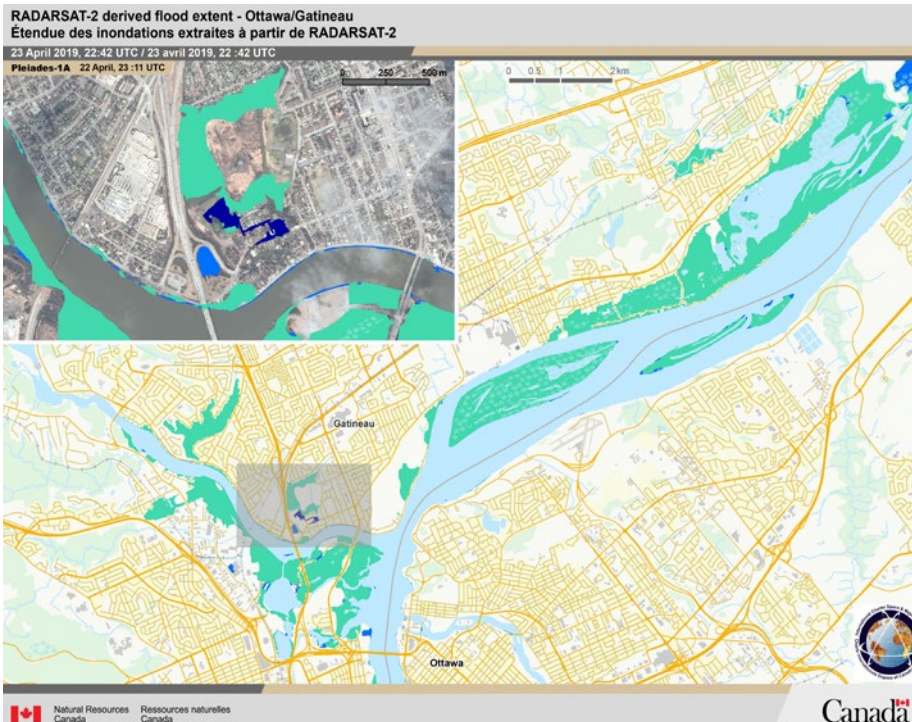
Charter supports relief efforts following floods in Canada

In spring 2019, snowmelt and rain caused flooding in parts of the Canadian provinces of Manitoba, Ontario, Quebec and New Brunswick. According to Statistics Canada, about 17,500 homes were either hit by flooding or considered to be at risk. Approximately 460 km of roadways were washed out and over 600 square km of land were flooded, including 153 square km of agricultural land. In Quebec, around 9,500 people were evacuated from their homes, while one person died in a flood-related road accident. Over 2,000 soldiers were deployed to the affected areas to help fill and distribute sandbags and assist residents.

Public Safety Canada, the Authorized User of the Charter for Canada, activated the Charter on April 19. The activation was closed 33 days later. Two hundred and twenty-seven satellite products were provided by eight agencies. In addition, 13 value-added products were produced to support relief efforts.

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Flooding in the Ottawa/Gatineau area. The colours show the flood extent: blue shows open water flood, green shows flooded vegetation and dark blue shows urban flood.

RADARSAT-2 Data and Products © Maxar Technologies Ltd. (2019) - All Rights Reserved. RADARSAT is an official trademark of the Canadian Space Agency, Pleiades ©CNES 2019, distribution AIRBUS DS, France, all rights reserved. Map produced by Canada Centre for Mapping and Earth Observation.



Members of the Canadian Armed Forces unload sandbags used to assist residents of Constance Bay, Ontario, in barricading water.

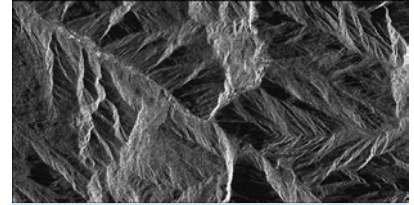
Photo: Master Corporal Donnie McDonald, 4 Canadian Division Headquarters Public Affairs LX02-2019-0025-088

Contribution of Chinese GF-3, GF-4 to the Charter

In October 2018, the China National Space Administration announced that it would be adding the GF-3 and GF-4 satellites to Charter duty. In March 2019, the GF-3 and GF-4 satellites began providing data to the Charter.

The GF-3 satellite is the Chinese next-generation SAR imaging satellite in the National High-Resolution Earth Observation System Major Project. The GF-3 satellite has many imaging modes. It can perform not only wide-range surveys, but also detailed investigations of specific areas. The satellite has the ability to monitor global ocean and land resources in all weather conditions and at all times. It can meet the needs of various customers such as those in the marine, disaster management, water conservation and meteorology sectors.

The GF-4 satellite is the first Chinese remote sensing satellite in geosynchronous orbit. It can provide fast, reliable and stable optical remote sensing data about disaster reduction, forestry, earthquake and meteorology, opening up a new field of geosynchronous orbit high-resolution Earth observation in China. Furthermore, the GF-4 satellite has great potential applications in environmental protection, marine, agriculture and water conservation.



Sample of GF-3 imagery. © CRESDA



Sample of GF-4 imagery. © CRESDA



Artist's concept of GF-4. © CRESDA



Artist's concept of GF-3. © CRESDA

Parameters of the GF-3 satellite payload

	Resolution/m	Breadth/km	Polarization Mode
Spotlight (SL)	1	10	Optional single polarization
Ultra-fine strip (UFS)	3	30	Optional single polarization
Fine strip I (FS I)	5	50	Optional dual polarization
Standard strip (SS)	25	130	Optional dual polarization

Parameters of the GF-4 satellite payload

	Spectrum band No.	Spectral range (μm)	Spatial resolution (m)	Breadth (km)	Revisit time
Visible light near infrared (VNIR)	1	0.45-0.90	50	400	20s
	2	0.45-0.52			
	3	0.52-0.60			
	4	0.63-0.69			
	5	0.76-0.90			
Medium wave infrared (MWIR)	6	3.5-4.1	400		

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Charter promoted on China's National Disaster Prevention and Reduction Day

May 12, 2019, was the tenth National Disaster Prevention and Reduction Day in China. In an interview with China Space News, the China National Space Administration (CNSA) introduced the Charter to Chinese readers. It discussed Chinese cooperation and interaction in disaster reduction and relief over the past 12 years.

China joined the Charter in May 2007. So far, the CNSA has contributed data from nine satellites to the Charter, and that data has been used by more than 30 countries all over the world. The Charter has helped with emergency response 26 times in China, playing a significant role in major disasters such as the Wenchuan earthquake, the Yushu earthquake, and the Zhouqu debris flow in Gansu Province. With more next-generation satellites strengthening the Charter, international users have increasing demands for Chinese satellite data.

From April to October 2020, China will take lead responsibility once again, in charge of the daily operations of the Charter. The CNSA will mobilize more Chinese satellites, including commercial ones, contributing data to international disasters.

遥望大地感知灾害的“太空之眼”

原创：中国航天报 中国航天报 5月15日

中国航天报 | China Space News

20多天内8起火灾，安排成像136次，分发景数合计 327景，这是自3月25日到4月18日间，我国陆地观测卫星应急数据日常情况汇总一览。

当前，我国遥感卫星正处在快速转型发展时期。近十年来，灾害监测遥感卫星数量、种类显著增加，在轨对地观测卫星数量达100余颗，风云、海洋、资源、环境减灾、高分等遥感卫星已具备一定的业务化服务能力，在国内外减灾救灾中取得了明显成效，发挥着越来越重要的作用。

值此我国第十一个全国防灾减灾日（5月12日）之际，请随本文一同管窥近十年来我国遥感卫星国内外应急救灾情况。

A special edition of China Space News on China's National Disaster Prevention and Reduction Day to promote the Charter. © CRESDA

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Charter booth attracts attention at ESA's Living Planet Symposium

Over 4,200 Earth observation (EO) scientists and operators from over 80 countries attended ESA's Living Planet Symposium in Milan, Italy, in May 2019. It was the world's biggest EO conference to date.

With a total of 187 scheduled scientific sessions with more than 1,000 oral presentations, as well as open assemblies, workshops, demonstrations, poster sessions and social events throughout the week, the symposium was an excellent opportunity to showcase the benefits of EO.

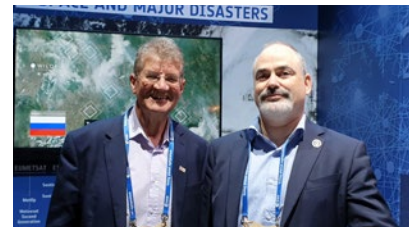
The event not only saw scientists present their latest findings on Earth's environment and climate based on satellite data, but also focused on the importance of EO in building a sustainable future and a resilient society.

The International Charter was there with a booth strategically placed at the entrance of the demo area. There was quite an interest in the Charter, its purpose and its mandate, with many people interested in offering project management (PM) services.

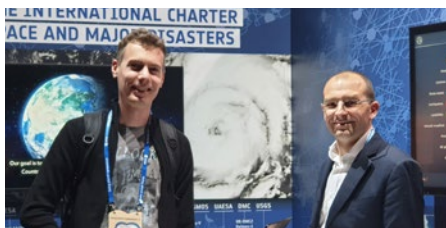
ICEYE, a Finnish company owning a constellation of small satellites carrying a SAR sensor, visited the booth, and inquired about ways to support the Charter.



Building the Charter booth. *Credit: ESA*



C. Lee from the UK Space Agency visits the Charter booth. *Credit: ESA*



S. Plank, who serves as Charter Emergency-on-Call Officer and Charter Project Manager at DLR, visits the Charter booth. *Credit: ESA*



Previous Executive Secretariat and Board members from CNES visit the Charter booth. *Credit: ESA*



The Copernicus service manager of REACT visits the Charter booth. *Credit: ESA*



C. Winquist from ICEYE visits the Charter booth. *Credit: ESA*

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Five examples of activations

Since 2007, the Charter has been activated 40 times per year on average. Learn more about five recent activations, which received the most interest from visitors to the Charter website in the last few months.

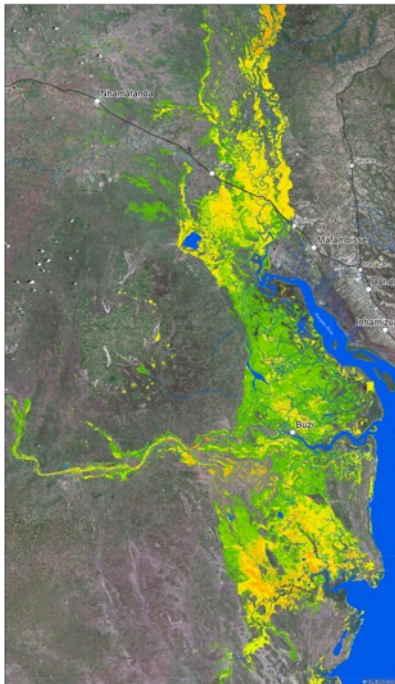
1. Flood in [Iran](#)

Heavy rainfall caused widespread floods in Iran during March. The floods affected the southwestern region of the country and damaged thousands of homes.

After the government of Iran declared a state of emergency for the disaster, UNOOSA (United Nations Office of Outer Space Affairs) requested help from the Charter on behalf of the Iranian authorities. The Charter members provided optical and radar imagery to assess the damage and extent of the flooding in Lorestan Province.

UN-SPIDER's Regional Support Office in Iran was appointed as the Project Manager for the Charter activation and value adding support to produce the maps was provided by the Iranian Space Agency.

2. Cyclone Idai in [Mozambique](#)



Total flood duration in Sofala, Mozambique between 15 and 25 March, from one day (dark green) to nine days (dark red).

Sentinel-1 and -2 © Contains modified Copernicus Sentinel data (2019). TerraSAR-X © DLR e. V. 2019, Distribution: Airbus DS Geo GmbH
Map produced by DLR/ZKI

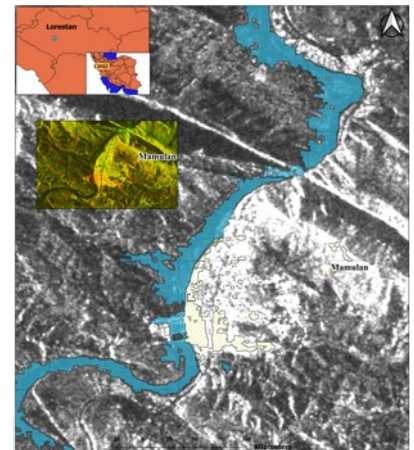
In March, Cyclone Idai struck the south-east coast of Africa, entering records as one of the worst storms the region has experienced. The disaster resulted in two activations of the Charter, following requests from three organisations.

The first activation covered Idai's impact on Mozambique, where hundreds of people were killed and almost two million were affected by the storm. The storm also destroyed large areas of cropland.

The Charter received requests for help from the Ministry of Regional Development (CENAD) in Brazil, and UNOSAT (UNITAR's Operational Satellite Applications) on behalf of IFRC (International Federation of Red Cross and Red Crescent societies). Charter members provided many images of the disaster from different satellites mapping the flood extent and impact of the storm's aftermath. Data acquired during the disaster enabled the production of flood duration maps and reports on the evolving situation.

The Ministry of National Integration in Brazil served as the Project Manager of the Charter activation, coordinating the provision of maps and reports produced by a large number of value adders: the Brazilian Department of Civil

Protection and Defense, Copernicus Emergency Management Service, the Universities of Leicester and Edinburgh, DLR's Center for Satellite Based Crisis Information (ZKI), UNITAR/ UNOSAT, and SERTIT.



Iran flood damage grade assessment of Mamulan City

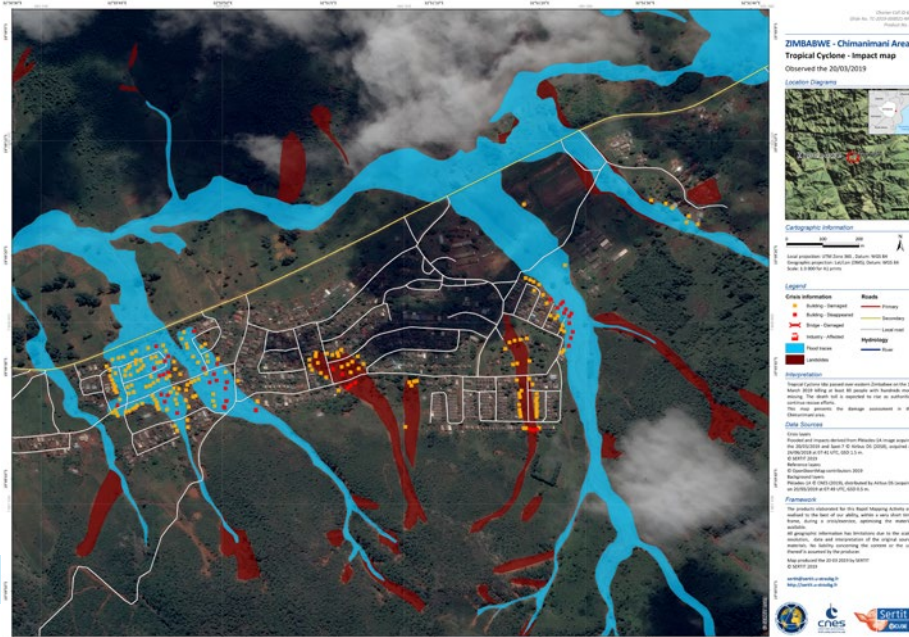
ALOS-2 © JAXA (2019) All rights reserved
- Map produced by Earth Observation Centre, Iranian Space Agency

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3. Cyclone Idai in [Zimbabwe](#)

The second Charter activation for Cyclone Idai covered the storm's impact on Zimbabwe. Sharing a border with Mozambique, both countries experienced heavy rain, which caused floods in eastern Zimbabwe. Hundreds of people were killed and over 250,000 people were affected.



Impact map of Chimanimani showing damaged (in yellow) and disappeared (in red) buildings. Pleiades © CNES (2019) - Distribution: Airbus Defence and Space, all rights reserved. SPOT-7 © Airbus DS (2019) Map produced by SERTIT

UNOOSA requested help from the Charter on behalf of UNDP (United Nations Development Programme). Many optical images from the Pleiades and SPOT-7 satellites were provided by the Charter members, which were used to map the impact of the storm on Zimbabwe.

SERTIT's Rapid Mapping Service provided Project Management duties and value adding services for the activation, producing many maps of the disaster.

4. Cyclone Fani in [India](#)

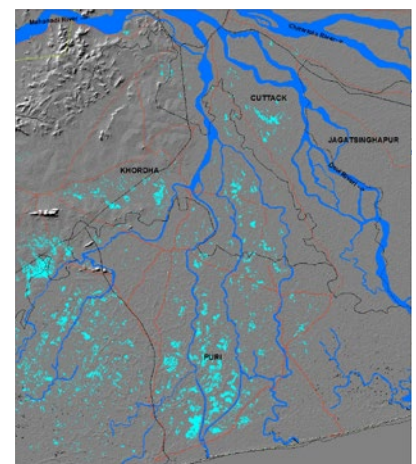
Cyclone Fani made landfall in India in May. With advance warning of the storm's approach, a million people were evacuated before Fani arrived. 72 people were reported killed and the storm damaged infrastructure.

Charter member ISRO (Indian Space Research Organisation) requested an activation of the Charter, and ISRO – along with other members of the Charter – provided imagery from many satellites. The optical and radar data was used to map the affected areas and estimate the damage.

NRSC (National Remote Sensing Centre) of India was appointed as Project Manager of the activation and also provided value adding services. NRSC produced many maps of the affected areas.

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Inundated areas in Odisha State

TerraSAR-X © DLR e. V. 2019, Distribution: Airbus DS Geo GmbH. RADARSAT-2 Data and Products © Maxar Technologies Ltd. (2019) - All Rights Reserved. RADARSAT is an official trademark of the Canadian Space Agency. Map produced by NRSC



5. Flood in Iraq

Widespread flooding occurred in Iraq during April after torrential rain. Thousands of people were forced to evacuate their homes and the inundation damaged cropland.

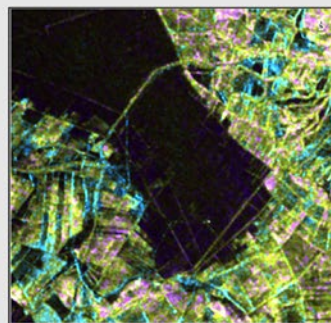
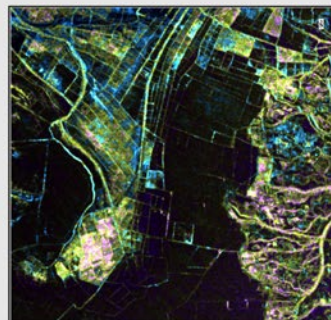
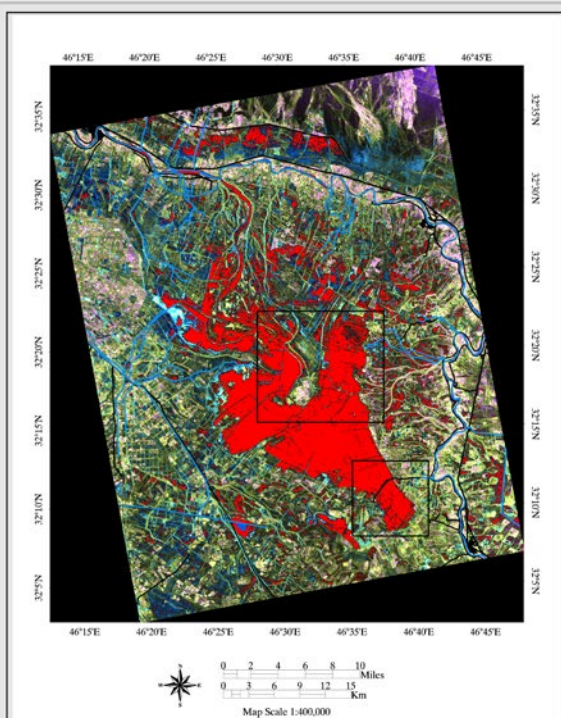
MOST (Ministry of Science and Technology) in Iraq requested help from the Charter and many optical and radar images were provided. The data was used to estimate the flooded areas, using water detection methods and comparison of imagery before and after the rainfall.

The SERTIT Rapid Mapping service provided Project Management duties and value adding services were provided by UE Geoinformation Systems of Belarus.

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FLOODING IN THE REPUBLIC OF IRAQ



Production date: 24.04.2019

Activation number: 603

Location map



Legend

SENTINEL-1A satellite detected water as of 23 April 2019
Contains modified Copernicus Sentinel data © ESA 2019
Vector Data: © OpenStreetMap

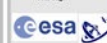
Source:

Satellite: SENTINEL-1A
Sensor: SAR
Resolution: 20 m
Coordinate System: UTM, Zone 38 N, WGS-84

Specification:

As a result of the recent heavy rain in Iraq and floods. The damage to some cities, areas, villages and farms, where a crisis cell was created and declared a state of emergency. The affected areas are between the city of Amara and Basra.

Map produced by UE «Geoinformation Systems» during activation of the International Charter Space and Major Disasters by the Ministry of Science and Technology (MOST) of the Republic of IRAQ.



Flooding in Iraq

Contains modified Copernicus Sentinel data (2019). Map produced by UE Geoinformation Systems