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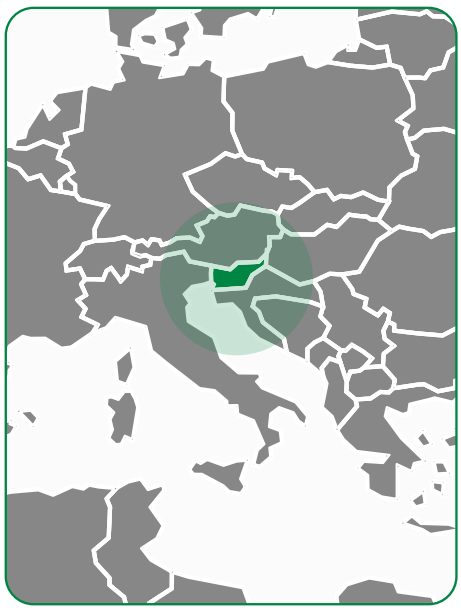
INSURANCE AND RISK MONITORING IN SLOVENIA

Copernicus Sentinel data is being used by insurance companies to conduct better risk assessments. In the wake of natural disasters, the data also allows for rapid mapping of impacted areas and helps in determining future exposure to similar events.

THE CHALLENGE

It could have easily been missed amongst the all-consuming panic of the COVID-19 pandemic, but 2020 also broke records in terms of extreme weather events and climatically driven disasters. Plumes of smoke circumnavigated the globe, emanating from wildfires which consumed vast areas in Australia, South America, Siberia and the USA's Pacific coast. Flooding in parts of South East Asia and Africa led to massive population displacement and record numbers of powerful hurricanes were experienced in the Atlantic. These types of events are terribly tragic, and also bring with them huge financial damages. In the 10 years from 2010-2019, total economic losses from natural disasters reached €2.42 trillion globally, almost a full trillion euros higher than the 2000-2009 period. 2011-2020 will also be counted as the world's warmest decade on record, with the hottest six years ever all occurring since 2015. According to the Intergovernmental Panel on Climate Change (IPCC), it is no coincidence that the most costly decade in terms of natural disasters coincided with the hottest decade in human history. The relentless and unforgiving force of mother nature is something we have dealt with for hundreds of thousands of years, but the effects of climate change are now testing us more than ever. It isn't a nice thought, but the coming years will undoubtedly bring even more natural disasters, most likely at higher frequencies and with greater intensities. As a result, the need to financially protect our properties and livelihoods from the effects of natural disasters is something that will likely become more and more compelling. Insurance providers can offer financial cover to help mitigate the effects of natural disasters, however, risk management and uncertainty modelling are tricky at the best of times, not least in the most climatically turbulent years in living memory. When it comes to natural disasters, mapping risk areas and assessing damage requires extensive and rich geographic information. This is where Copernicus Sentinel data comes into play...



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HOW SATELLITES CAN HELP

Flycom Technologies is a Slovenian company who specialises in remote sensing based preventative and predictive infrastructure maintenance services. Flycom Technologies has developed advanced proprietary GIS's for clients, which can combine geospatial information and business intelligence to produce valuable insights for insurance industry stakeholders. Using their system, information regarding risk potential and claim management can be analysed and managed both swiftly and automatically.

Although primarily offering airborne-based remote sensing services, Flycom Technologies have also started to leverage Copernicus Sentinel data to help clients assess risk potential by detecting and mapping different types of natural hazards (i.e. floods, droughts, wildfires, heavy rain) across large geographic regions.

In particular, they make use of Sentinel-1's SAR data in conjunction with Sentinel-2's multi-spectral optical imagery to derive extremely rich geographic information gathered for use in their GIS. The Sentinels can map the entire Earth's surface every 6 days, meaning recent information on natural disasters can be quickly gathered, while the historical data archive can help in both analysing the extent of damage caused by past catastrophic events as well as predicting future risk. The free and open data available from Copernicus has been instrumental in making services such as Flycom Technologies' commercially viable.

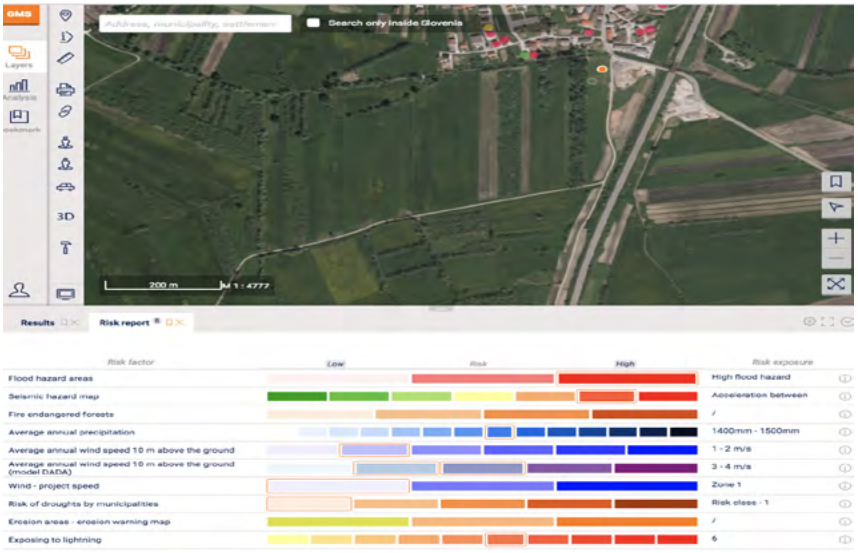


Figure 1: Snapshot of the GIS used to conduct risk assessments

The satellite data

Sentinel-1 is the Copernicus radar mission, providing an all-weather, day-and-night supply of imagery of Earth's surface. The mission consists of two satellites embarking C-band synthetic aperture radars (SARs) in continuity of the ESA's ERS-2 and Envisat missions. The mission images the entire Earth every six days for the benefit of manifold applications such as monitoring of Arctic sea ice extent, surveillance of the marine environment, monitoring land-surface for motion risks, mapping for forest, water and soil management.

Copernicus Sentinels data are available under an open and free data policy.

Sentinel-1 data can be accessed at https://scihub.copernicus.eu

More info: https://sentinels.copernicus.eu

The Service Provider

Flycom Technologies, based in Kranj, Slovenia are primarily known for providing airborne preventive and predictive maintenance services, data processing and data management solutions for infrastructure companies. Additionally, they provide a proprietary geographic information system to customers from different industry sectors, namely energy management, telecommunications, insurance, agriculture and natural resources and government. They offer a full package of services, from preventive airborne monitoring and surveying, to satellite-based remote sensing solutions, to the tailored implementation of results in GIS software.

WHO IS CONCERNED?

Zavarovalnica Triglav, the controlling company of the Triglav Group and the largest insurance company in Slovenia make use of satellite-derived products from Flycom Technologies to assess potential risks from natural disasters across large parts of Slovenia. The event which catalysed Flycom Technologies and Zavarovalnica Triglav's use of Sentinel data involved some particularly catastrophic flooding of the Krka river in 2017.

Winding its way through the Lower Carniola region and joining the Sava river close to the Croatian border, the Krka river in south-eastern Slovenia hosts along its banks some of the country's most beautiful attractions and is popular with locals for activities such as rafting, kayaking and swimming. Despite its beauty, the Krka has a dangerous side, exemplified by a particularly devasting flash flooding event in December 2017 which affected a large number of houses insured by Zavarovalnica Triglav.

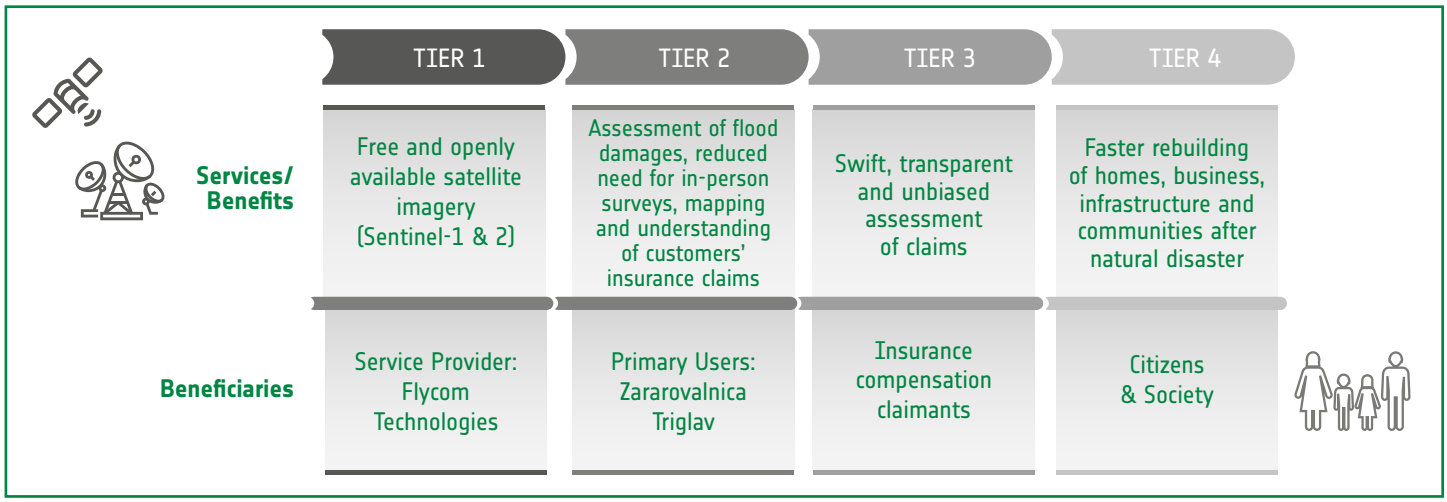
Between the 8th and 16th of December, extreme weather fronts moved across Slovenia bringing with them huge amounts of rainfall. This precipitation was followed by rising river levels and flash flooding in many regions. Nearly 6,000 households across the country lost electricity, 600 buildings were badly damaged and close to 700 roads were made impassable. The south-eastern region, and the Krka river basin in particular were hit very hard during the awful events. Many houses suffered considerable damage as a result of the extreme flooding events and many families found themselves in the unfortunate position of requiring help from their insurance provider. After the events, Zavarovalnica Triglav were faced with the task of mapping the damaged areas to understand the risks associated with such an event occurring again in the region. As the damage was so geographically extensive, Zavarovalnica Triglav required help in understanding the true impact of the unprecedented levels of damage. They called upon the services of Flycom Technologies, who utilised Sentinel-1 and Sentinel-2 data, in conjunction with their GIS to help map the widespread effects of the flooding. Through the use of Sentinel data, Flycom Technologies helped to quickly model flood maps of the affected areas. The entire region of south-eastern Slovenia could be covered quickly and remotely using the Sentinel data and served as a useful tool in determining rapid estimates of Zavarovalnica Triglav's "exposure" in the region. In insurance terms, "exposure" refers to one's susceptibility to various events in the future. All of this allowed Triglav to deeper understand the risk of catastrophic flooding in the future and better serve their customers. This particular case was the first time Flycom Technologies and Zavarovalnica Triglav used Sentinel data in such an application. Its efficacy resulted in them focussing more and more on the use of Sentinel data in their everyday operations, ultimately leading to it becoming a go-to source of rich and useful data for the companies.

The Primary Users

Zavarovalnica Triglav is a leading insurance company in Slovenia and the parent company of the Triglav Group. It is composed of a network of 12 regional units, 38 representative offices with numerous points of sale and over 660 insurance agents across Slovenia, providing a range of life and non-life insurance products and services: property and interest in property insurance, motor vehicle insurance, agricultural insurance, transport insurance, receivables insurance and spare time and travel insurance. The range of life insurance products includes all types of life, annuity, pension, accident and health insurance.

The Triglav Group is the largest insurance/financial group in the Adria region, with over 5,200 employees it currently operates in six countries and seven markets.

Figure 2: The Krka river in south-eastern Slovenia



Schematic representation of the main beneficiaries along the value chain, including the corresponding services and benefits provided

WHAT ARE THE BENEFITS?

Companies such as Flycom Technologies are able to build business models around the free and open Copernicus Sentinel data, allowing them to save on operating costs, meaning they can offer services at competitive prices, diversify their service offerings and ultimately expand their business.

Insurance companies such as Zavarovalnica Triglav benefit from having more precise, wide-ranging and timely information after a catastrophic event. **The ability to assess the impact of catastrophic events over huge areas, both quickly and remotely allows insurance companies to swiftly provide support as well as understand exposure in near real-time.** Insurance companies can also save on costs through the use of satellite data as the need for in-person surveys can be greatly reduced. In the case of natural disasters such as the flooding witnessed in Slovenia, it can also sometimes be dangerous, or even impossible for surveyors to visit affected regions. The remotely sensed data can therefore help ensure risk assessments and exposure surveys can continue safely. **Through the use of Sentinel data, insurance companies can also proactively assess clients' situational nuances when providing premiums, meaning risk and uncertainty are better understood. This allows companies to more efficiently design their pricing models and improve their business operations.**

Insurance customers and claimants benefit in these cases thanks to the swift response of the companies utilising satellite technology. Their claims can be quickly assessed and processed through the use of GIS applications. Moreover, the transparent and unbiased nature of the satellite data ensures all claims are fairly dealt with. **When purchasing premiums, customers can also have their individual situational risk assessed in a more complete manner thanks to the rich Sentinel data.** This can help in providing tailored insurance cover for each claimant and where applicable, help them to reduce their premiums. **Citizens and society benefit through the fair and efficient insurance services protecting customers in the wake of natural disasters as it helps in the rebuilding of affected areas.** Communities are often torn apart in the event of any natural disaster. The quicker families, businesses and local amenities receive the financial support they need, the quicker they can get back on their feet.

The key benefits are:

Economic Insurance companies such as Triglav can better assess damage and future risk over large areas remotely, reducing the need for costly and sometimes dangerous in-person assessments (Tier 2).

Innovation & Entrepreneurship Companies such as Flycom Technologies can diversify their service offerings and dynamically enter new markets without major cost implications thanks to the free and open Copernicus data (Tier 1).

Societal Insurance beneficiaries and communities can rebuild faster after being devasted by natural disasters thanks to the efficiently managed insurance services. Thanks to the transparent and unbiased nature of the satellite data, insurance claims, premium calculations and future risk can all be dealt with in a much fairer and objective manner (Tiers 3 & 4).

More information on **www.earsc.org/sebs**

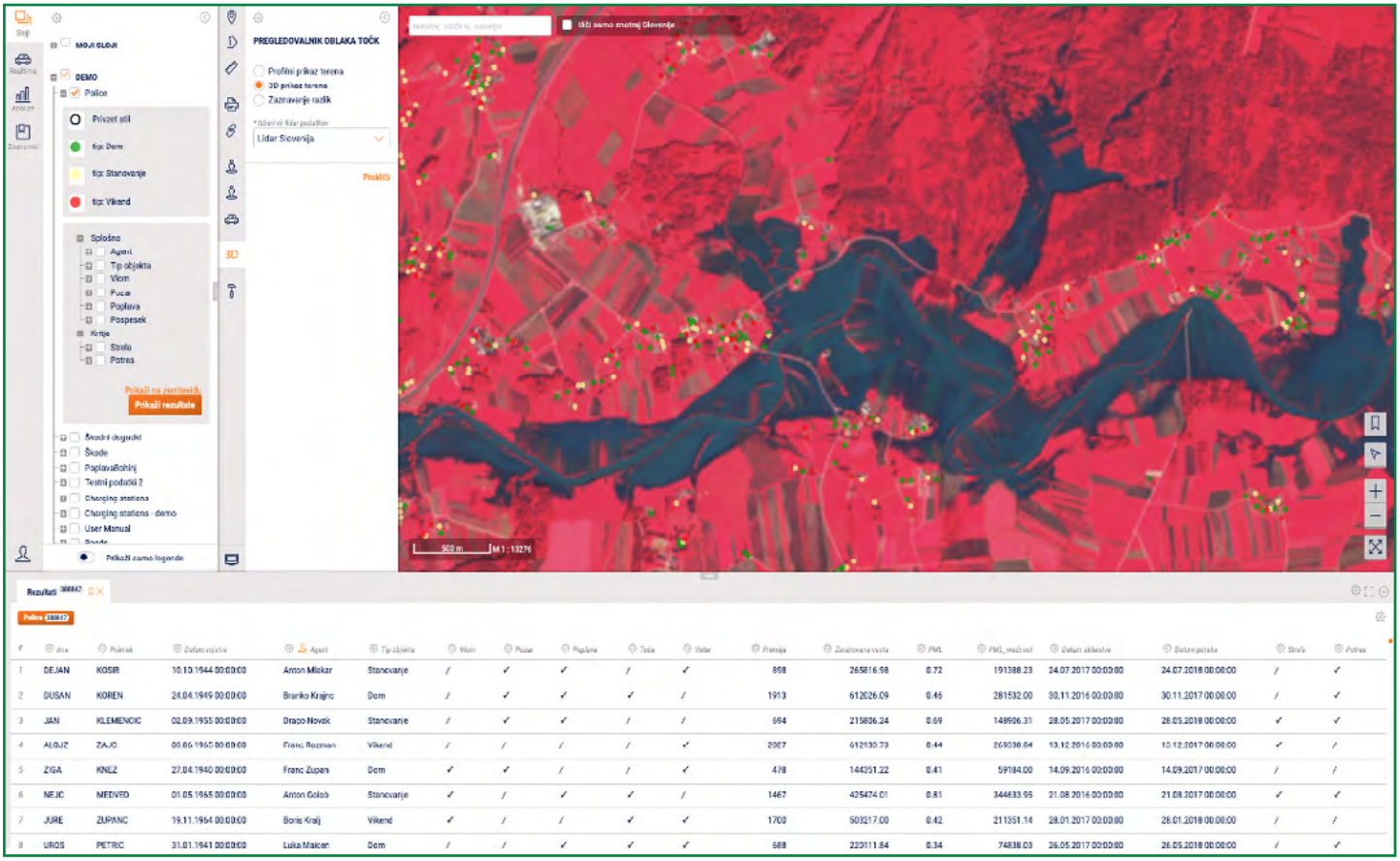


Figure 3: Mapping of exposure along the Krka river

EXTENDED IMPACT

Thanks to Flycom Technologies' effective use of Sentinel data in assessing the Slovenian flooding in 2017, they have gone on to continue developing their skills in working with Sentinel data and in 2020 joined the Copernicus Incubation programme. As part of the programme they will receive funding to develop a **Natural Hazard Module** which can be used as an extension to their GIS or as a standalone application customised for the insurance industry. With the use of Artificial Intelligence and Machine Learning algorithms the proposed solution shall enable quicker, automated responses to natural disasters by constantly importing and analysing widespread geospatial data, saving time and money for their clients.

Due to the fact that floods know no boundaries and unfortunately occur all around the world every day, the geographic extension of this application of Sentinel data is clear. The Sentinels can cover the entire surface of the earth every 6 days, meaning the expansion of insurance and risk monitoring applications to much wider geographic regions using Sentinel data is something that can easily be achieved.

Sentinel data is also clearly not limited to insurance against extreme weather events and natural disasters. It also has a plethora of other applications in agricultural insurance, where protecting against crop failure is a major concern. Not only can variables such as vegetation indices and soil moisture all be inferred from Sentinel data, but through the use of the Sentinels' historic data archive, the types of issues faced in the past as well as the likelihood of future crop failures can all be better understood. Thanks to the global coverage of Sentinel data, affordable and fair agricultural insurance can also be made available to farmers in poorer parts of the world where it couldn't before.

ABOUT THE PROJECT

The Sentinel Benefits Study (SeBS) is conducted by EARSC (European Association of Remote Sensing Companies) with partners The Greenland, IIASA (International Institute for Applied Systems Analysis) and Evenflow on behalf of the European Space Agency (ESA). It has the goal to study 20+ full cases by analysing the impact of the use of Sentinel data along a value-chain. This short-case has been prepared where there has been an interesting use made of Sentinel data, but it has not (yet) been possible to conduct a full case. It tells the story of the use of Sentinel data without going deeply into the economic or environmental benefits.

"We used Copernicus Sentinel satellites for flood modeling. Satellites were especially useful after the flood when we used them to detect the damaged areas.".

Uroš Metličar, Head of Property Department at Zavarovalnica Triglav

We acknowledge that the understanding of the case was supported by discussions with Luka Rojs from Flycom Technologies and Uroš Metličar from Zavarovalnica Triglav. We thank them for their valuable insights and availability.

Do you know an interesting case demonstrating the benefits derived from the use of Sentinels data?

Email info@earsc.org

More Information on Sentinels Benefits Studies:

www.earsc.org/sebs

The Sentinels Benefits Study is funded by the EU and ESA.
The views expressed in this study cannot be taken to reflect the official position of the EU or of ESA.