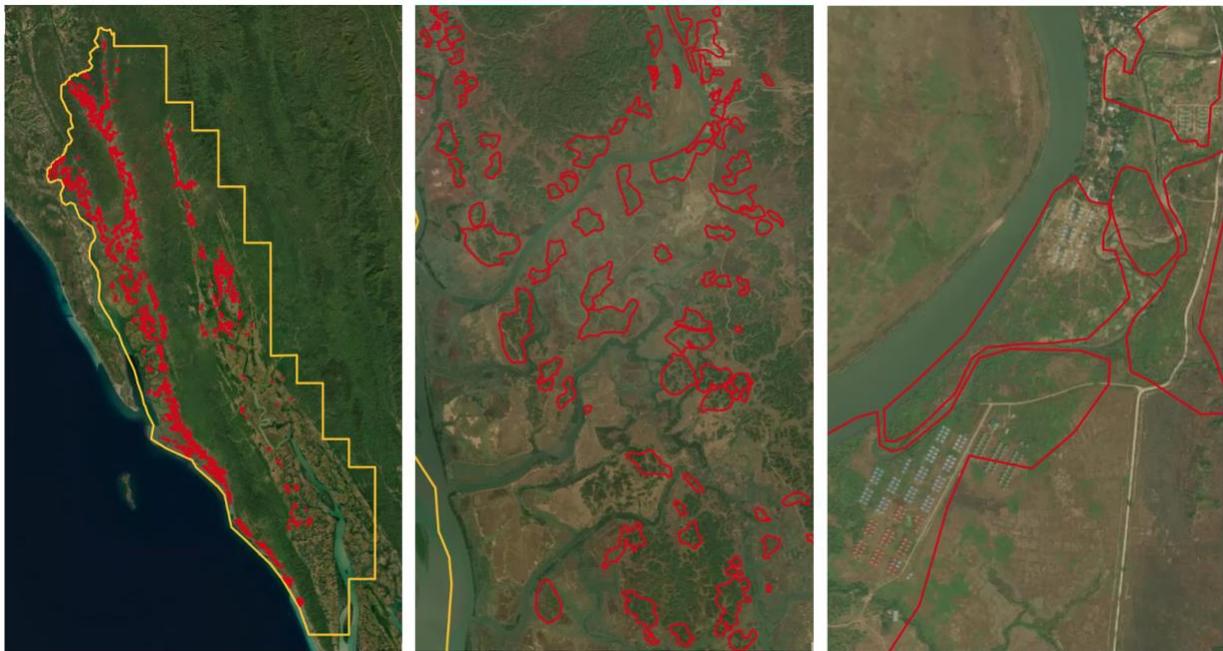


Summary news article

ONE YEAR OF MONITORING, DOCUMENTING, AND MAPPING FIRES WITHIN MYANMAR

MYANMAR WITNESS, SEPTEMBER 2022

September 2022 marks one year of Myanmar Witness' work monitoring the deliberate use of fire by actors within Myanmar. Fire was used with alarming consequences in the 'clearance operations' in Rakhine State during the Rohingya crisis which started in 2017. Villages were systematically and deliberately burned and destroyed. The continued use of arson as a military and political tactic in other areas of the country raises many concerns for human rights defenders.



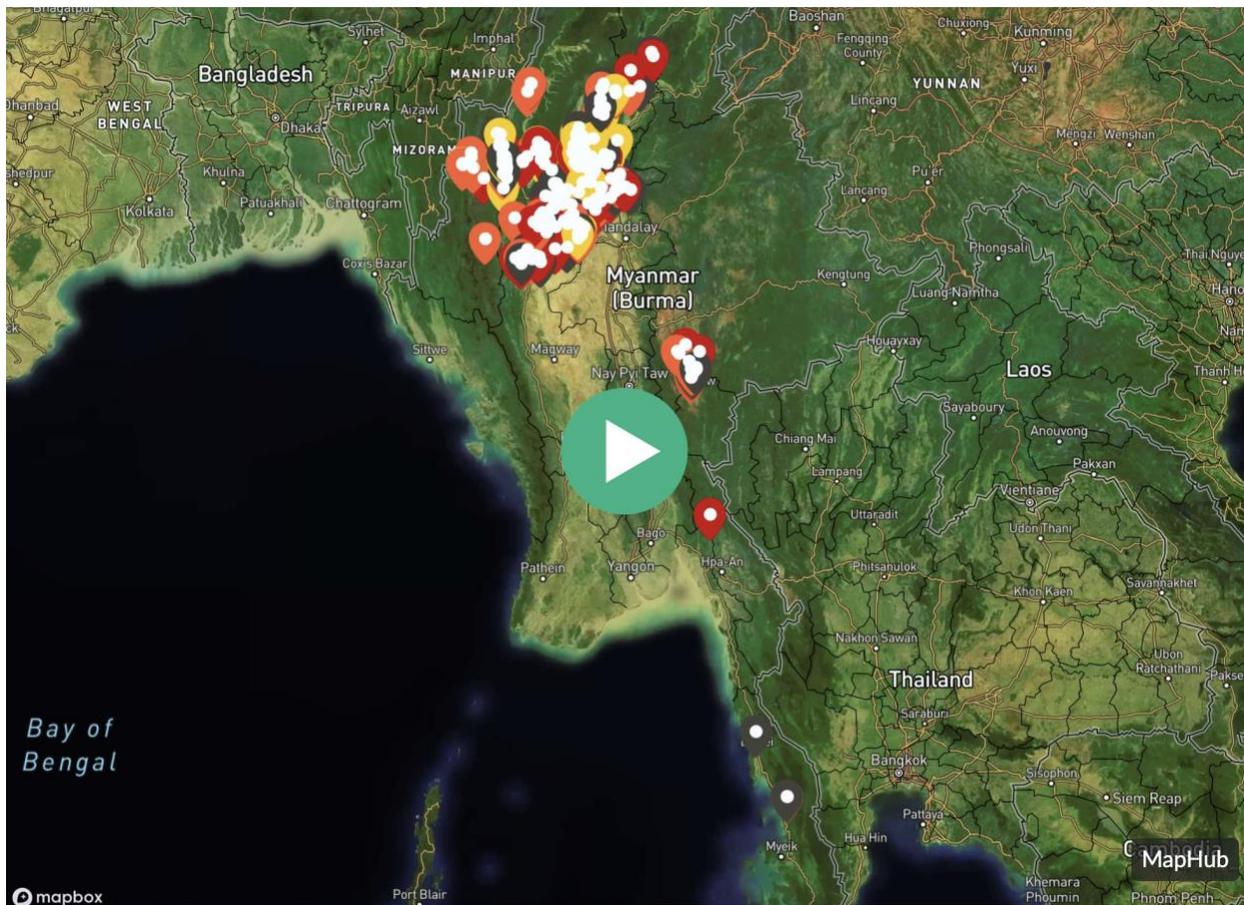
Fire detection in Rakhine State, Source: [Ocelli Project](#)

During the summer of 2021, investigators at Myanmar Witness identified a number of claims of fighting between the Security Administrative Council (SAC), its security forces and anti-SAC groups in rural areas of Myanmar, for example within Kayah State (ကယားပြည်နယ်) and the Magway Region (မကွေးတိုင်းဒေသကြီး). Yet again, arson was reported.

In June 2021, Kinma (ကင်းမ) village in Magway (မကွေးတိုင်းဒေသကြီး) was set on fire, resulting in widespread destruction. This event drew attention back to the role of arson within the political struggle seen throughout the country. Since then, special attention has been paid to ensure that the use of arson is both monitored and documented. This led to the creation of the Myanmar Witness' fire map - an interactive map which provides regularly updated information on the location of deliberately initiated fires across Myanmar, to varying degrees of certainty.

The Fire Map

The fire map provides a visual display of the fire data which has been collected and verified by Myanmar Witness. The explorable map shows where each fire event occurred and provides links to relevant media where both verified and safe to do so. The key outlines the level of verification the data has received by Myanmar Witness' investigators. To interact with the fire map, head to the Myanmar Witness [website](#).



Key

-  HIGHEST CONFIDENCE
Fire claims with geolocated and chronolocated open source footage using satellite imagery or FIRMS
-  MEDIUM-LOW CONFIDENCE
Fire claims verified using FIRMS
-  HIGH-MEDIUM CONFIDENCE
Fire claims with geolocated open source footage only
-  UNCONFIRMED CLAIMS
Yet to be verified.

Fire tracking and verification within investigations

A number of Myanmar Witness’ investigations into human rights incidents have relied upon fire detection and verification. For example, the [‘Burning Myanmar’](#) report outlined the growing use of arson against civilian communities. Between September 2021 and May 2022 Myanmar Witness verified almost 200 fires that reportedly occurred as part of arson attacks on civilian communities, affecting homes, buildings and livelihoods.



Images of fire damage from the Burning Myanmar report.

In the [‘Moso Village Christmas Eve Killings’](#) report, fire analysis helped the investigators to understand the events which took place near Moso (မိုဆိုရွာ) village in Hpruso township (ဖရူဆိုမြို့နယ်), Kayah State (ကယားပြည်နယ်). More than 35 bodies were found, many of which had been burned beyond recognition.



Image taken from the Moso report of burned vehicles.

In the ['Verification of Burned Bodies in Sagaing'](#) report, Myanmar Witness verified footage relating to the alleged burning of six villagers by the Burmese military in Thit Sein Gyi village (သစ်ဆိမ့်ကြီး) in Myanmar's Sagaing region between 29 January and 3 February 2022.



Images of fire damage in Sagaing, with a Pagoda seen in the background.

In the forthcoming regional investigation, 'Civilian harm: an investigation into the impact of two military operations in North-West Myanmar', Myanmar Witness documented interconnected trends related to the military's alleged use of fires against communities in Myanmar: first, military

convoys passed through villages as part of military operations, leaving burnt buildings in their wake; and second, the military deliberately entered and set fire to communities in retribution for the perceived anti-SAC stance of their inhabitants.



Verified image of a large Military convoy moving through Dokthek (ဒေါထက်) village in Falam Township (ဖလမ်းမြို့နယ်), Chin (ချင်းပြည်နယ်) at 22.804994, 93.565967, while structures are on fire.

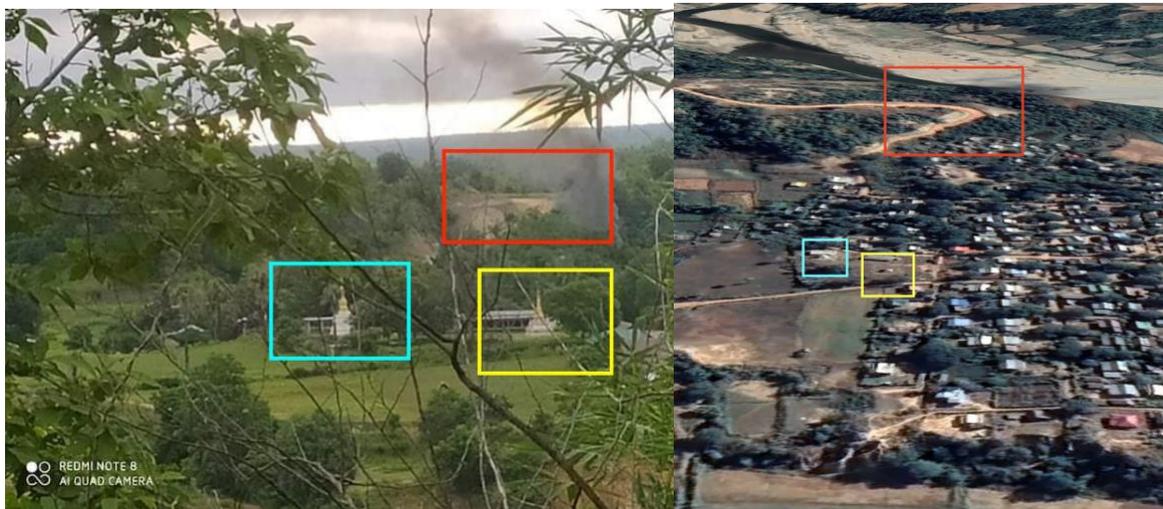
How Myanmar Witness identifies, verifies, and reports on fires

Myanmar Witness uses an array of methods and tools to identify, verify and report on fires. From gathering user generated content from social media, to carrying out geolocations, comparing satellite imagery (Sentinel or Google Earth) and accessing NASA's fire information for resource management systems (FIRMS) tool. The use of multiple methods allows the team to compare different data sources in order to assess the level of verification. By doing so, the team works to document and investigate where buildings and villages have been destroyed by fire in possible human rights incidents.

Geolocation

Among the first events analysed was a fire in Wun Chone (ဝန်ချိုင်း) village in Magway in September 2021. Images of a fire in a village alleged to be Wun Chone (ဝန်ချိုင်း) appeared on social media. Myanmar Witness investigators were able to geolocate these images to the village.

An investigator conducts a geolocation to verify the location of an alleged event; however, the analysis of footage and user-generated content doesn't always allow for conclusions to be drawn on the time and date an alleged event took place. In order to verify these particulars, a combination of tools including FIRMS and satellite imagery (as will be discussed below) can be used.



Fire in Wun Chone (ဝန်ချိုင်း) village [21.326427, 94.375825].

Satellite Imagery

High Resolution Satellite Imagery

On 11 November 2021 there was a fire in Shauk Khar (ရှောက်ခါး) village, Ayadaw township, Sagaing region. At the time Myanmar Witness verified the claims using [FIRMS data](#).

The following two high resolution satellite images provide a comparison of the village - the first image was taken before the fire, in November 2019, and the second in January 2022, after the

fire. While the imagery is not useful for confirming the precise timing of the fire, it is useful for showing its precise location.



Figure 1. High resolution satellite images of Shauk Khar (ရှော့ကံခါး) [22.42778015, 95.49833679] via Google

Low resolution satellite imagery

As the name suggests, low resolution satellite imagery doesn't provide the same level of detail as high resolution. Nevertheless, it is still possible to use low resolution imagery to detect the destruction within a village.

An additional advantage of sources such as these is their relatively short update period. For example, Copernicus Sentinel-2 has a five-day update period, helping to considerably narrow down the time window within which an event occurred. The following images from Sentinel-2 of Hnaw Yoe (နောရိုး) village show the 6 March (left) and the 11 March (right). Although it might be hard to detect at first sight, it is possible to notice a brighter patch in the image on the right, corresponding to the destroyed area.



Satellite images of Hnaw Yoe (နောရိုး) village [21.94441032, 94.69950867] on [6 March 2022](#) (left) and [11 March 2022](#) (right). Source: Copernicus Sentinel-2.

Another advantage of using low resolution satellite imagery is the possibility of using multispectral data. In the case mentioned above, the destruction of Hnaw Yoe (နောရိုး) village becomes clearer if one applies an infrared filter. Infrared satellite imagery is useful for indicating heat in a way that other satellite imagery cannot - highlighting areas which may have been recently affected - or continue to be affected - by fire.

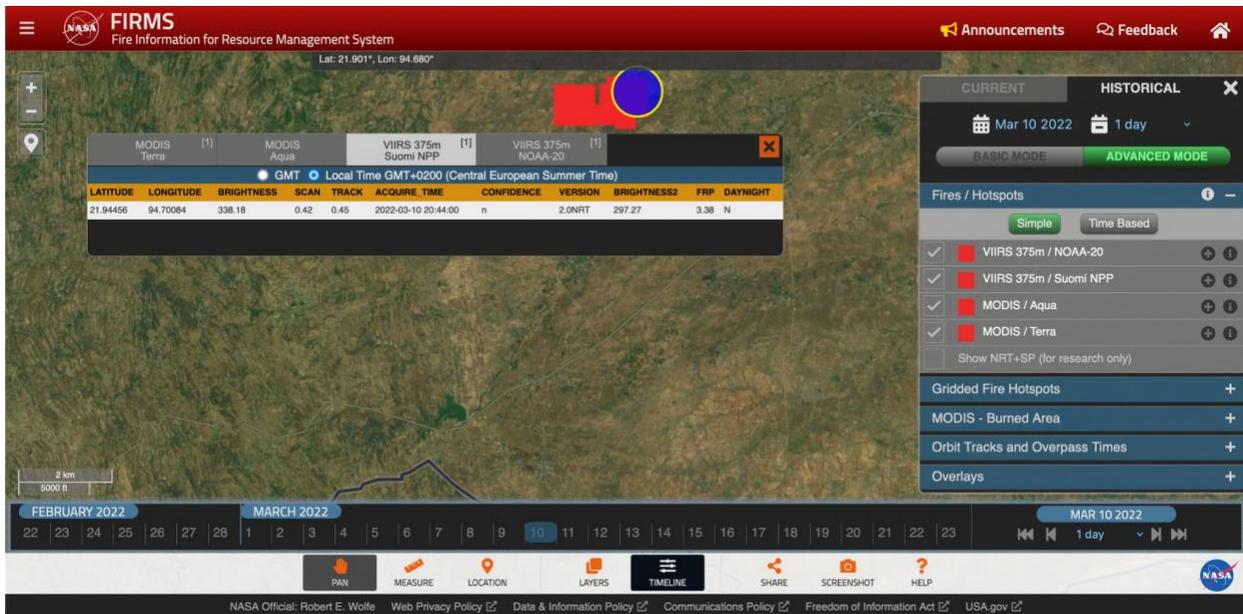


Copernicus Sentinel-2 infrared satellite images of Hnaw Yoe (၆၄၁၅) village [21.94441032, 94.69950867] on [6 March 2022](#) (left) and [11 March 2022](#) (right).

NASA Fire Information for Resource Management System (FIRMS)

NASA FIRMS is an online tool that provides near-real-time locations of fires across the globe. It works by measuring the strong emission of mid-infrared radiation from fires via satellites and reporting them back to the FIRMS website within just a few hours. FIRMS uses satellite constellations to detect temperature anomalies, including Moderate Resolution Imaging Spectroradiometer ([MODIS](#)) and the Visible Infrared Imaging Radiometer Suite ([VIIRS](#)).

The image below shows a [FIRMS data point](#) from 10 March 2022, at the location: 21.943110, 94.689740, at 1541 GMT. This was obtained by clicking one the multiple FIRMS points indicating heat signals from the area on that day.



FIRMS data point, 10 March 2022 [21.94311, 94.68974] at 1541 GMT.

FIRMS accuracy can be impacted by a number of factors, including that it can return false positives from active industry and other locations/events which output an infrared heat signature. Additionally, environmental factors such as strong cloud coverage can interfere with the accuracy of its reporting.

Continual Monitoring

Myanmar Witness will continue to monitor, document and map fires within Myanmar. To keep up to date with fire analysis, keep an eye out for the fire trend analysis posts on our [social media](#) pages, verification of fires within our [upcoming reports](#), and updates to the [fire map](#) on [our website](#).