Sentinel Vision
EVT-131
02 November 2017

2D Layerstack

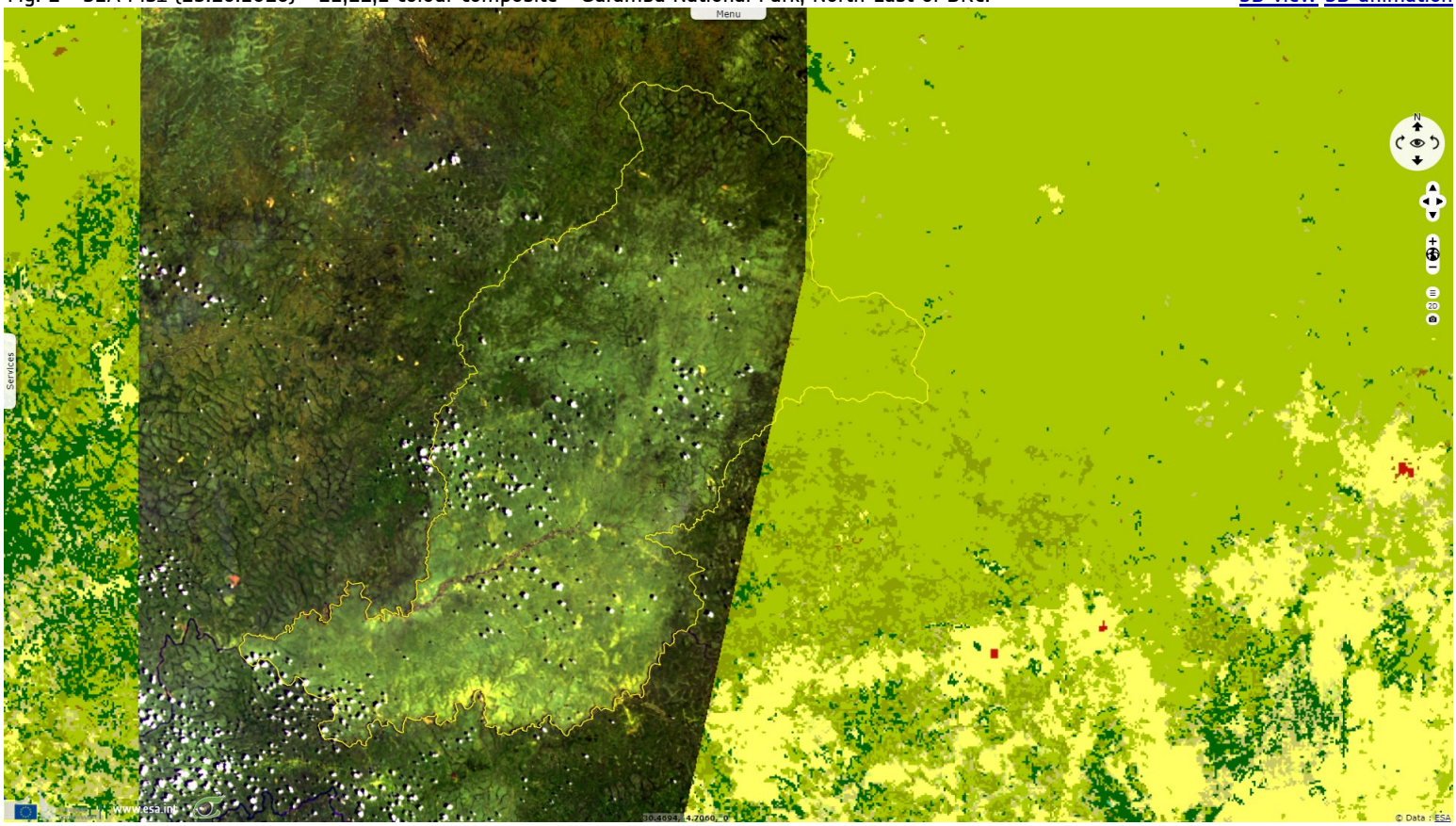
Wildfires and poaching threats in Garamba National Park

Sentinel-2 MSI acquired on **13 October 2016** at 08:20:02 UTC
...
Sentinel-2 MSI acquired on **01 April 2017** at 08:20:01 UTC
Sentinel-2 MSI acquired on **08 September 2017** at 08:20:11 UTC

Author(s): Sentinel Vision team, VisioTerra, France - svp@visioterra.fr

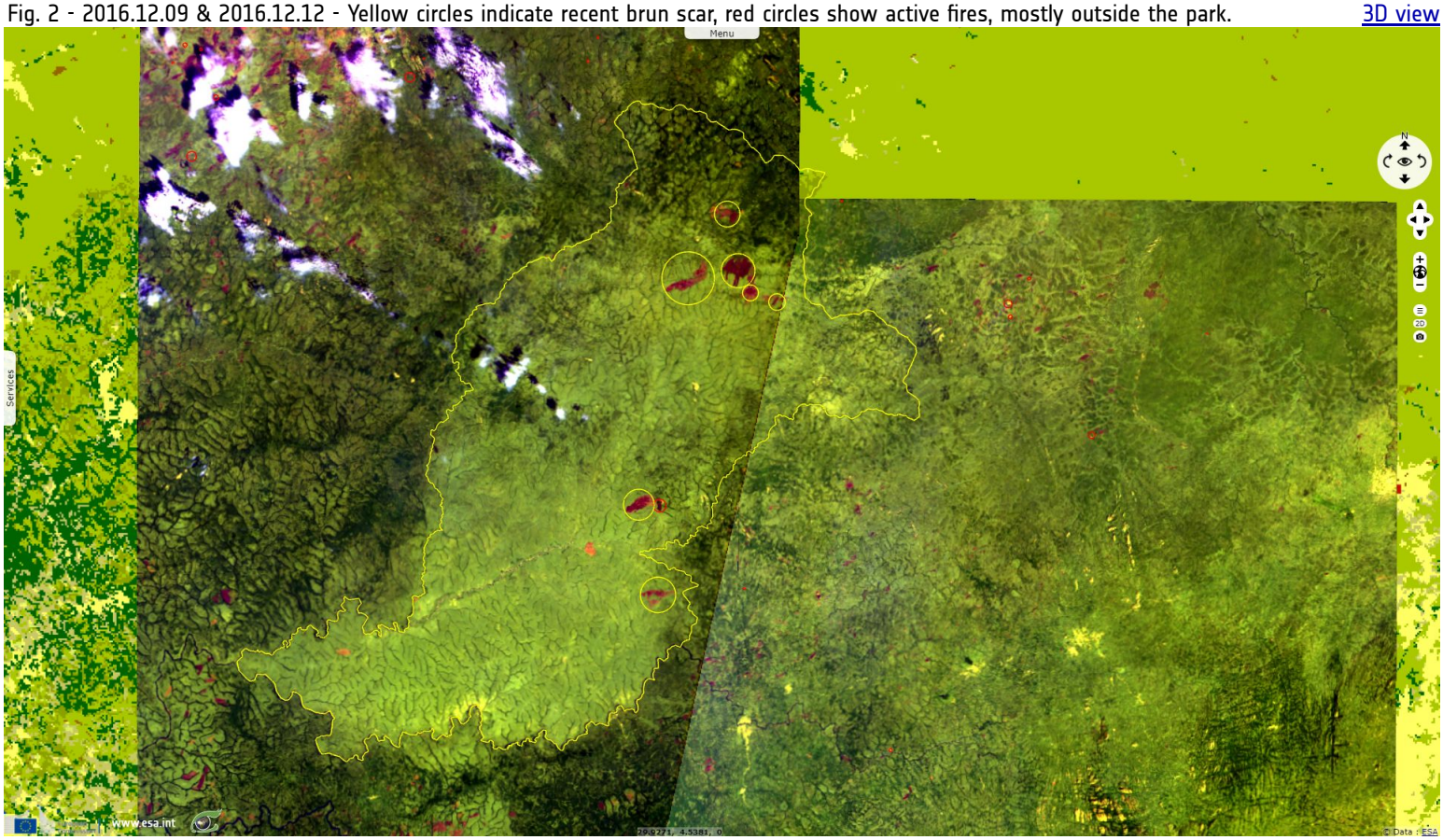
Keyword(s): Land, forestry, wildfire, bush fire, savannah, UNESCO World Heritage, national park, wildlife, poaching, DRC, Congo

Fig. 1 - S2A MSI (13.10.2016) - 12,11,2 colour composite - Garamba National Park, North-East of DRC. 3D view 3D animation



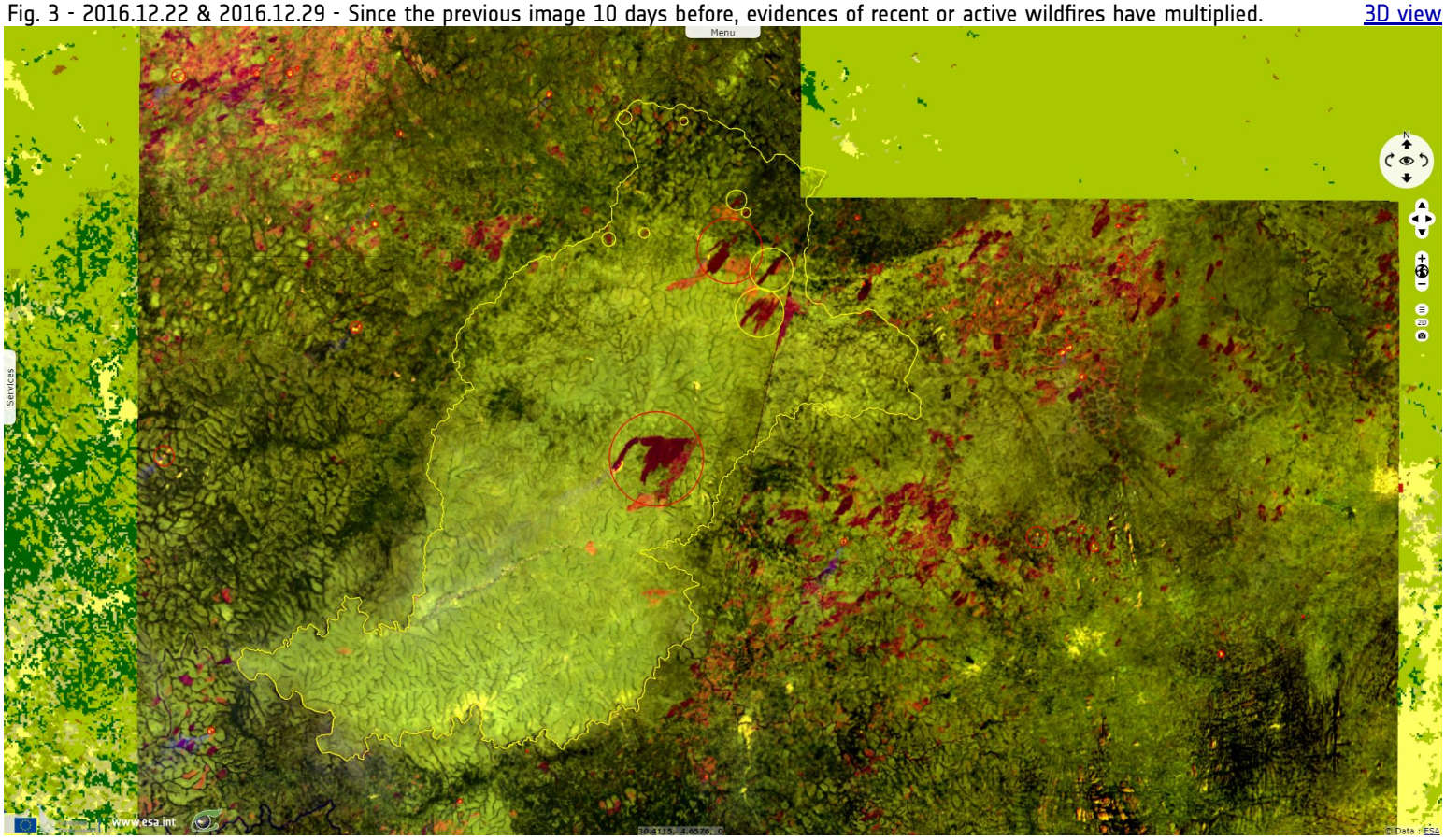
UNESCO listed Garamba National Park as a World Heritage site, it is described in the following terms: "*Covering vast grass savannas and woodlands interspersed with gallery forests and marshland depressions, Garamba National Park is located in the north-eastern part of the Democratic Republic of the Congo (DRC) in the transition zone between the dense tropical forests of the Congo Basin and the Guinea-Sudano savannas. It contains the last worldwide population of the northern white rhinoceros, endemic sub-species of Congolese giraffe and a mixed population of elephants, combining forest elephants, bush elephants and individuals demonstrating morphological characteristics common to the two elephant sub-species. It is also characterized by an exceptionally high level of biomass of great herbivores as a result of the vegetation productivity of the environment.*". National Geographic added "*Garamba is home to an estimated 2,000 to 3,000 elephants, making it one of the largest elephant populations remaining in central Africa. It is also home to many other species, including hippos, lions, and buffaloes.*".

Fig. 2 - 2016.12.09 & 2016.12.12 - Yellow circles indicate recent brun scar, red circles show active fires, mostly outside the park. 3D view



Tropical and subtropical savanna are naturally prone to wildfires during the dry season due to lightning that happen during storms. Plant species have adapted to the point it is a part of their life cycle and dissemination strategy.
However, the environmental pressure of traditional shifting cultivation using slash and burn is increasing as populations grow. These practices ease animal husbandry by reducing the competition between trees and grass, the latter being favored to feed livestock in transhumance livestock herding. Another use of these practices is to extend permanent cropland over forests. Intensively used, the fallow period between these burnings is reduced which implies progressive deforestation, overgrazing, soil depletion and soil erosion. As forest cover decreases, so do soil humidity and precipitations which may lead to desertification (to which the African Great Green Wall is a continent-scale answer). Slash and burn techniques are thus largely unsustainable when practiced at large scale.

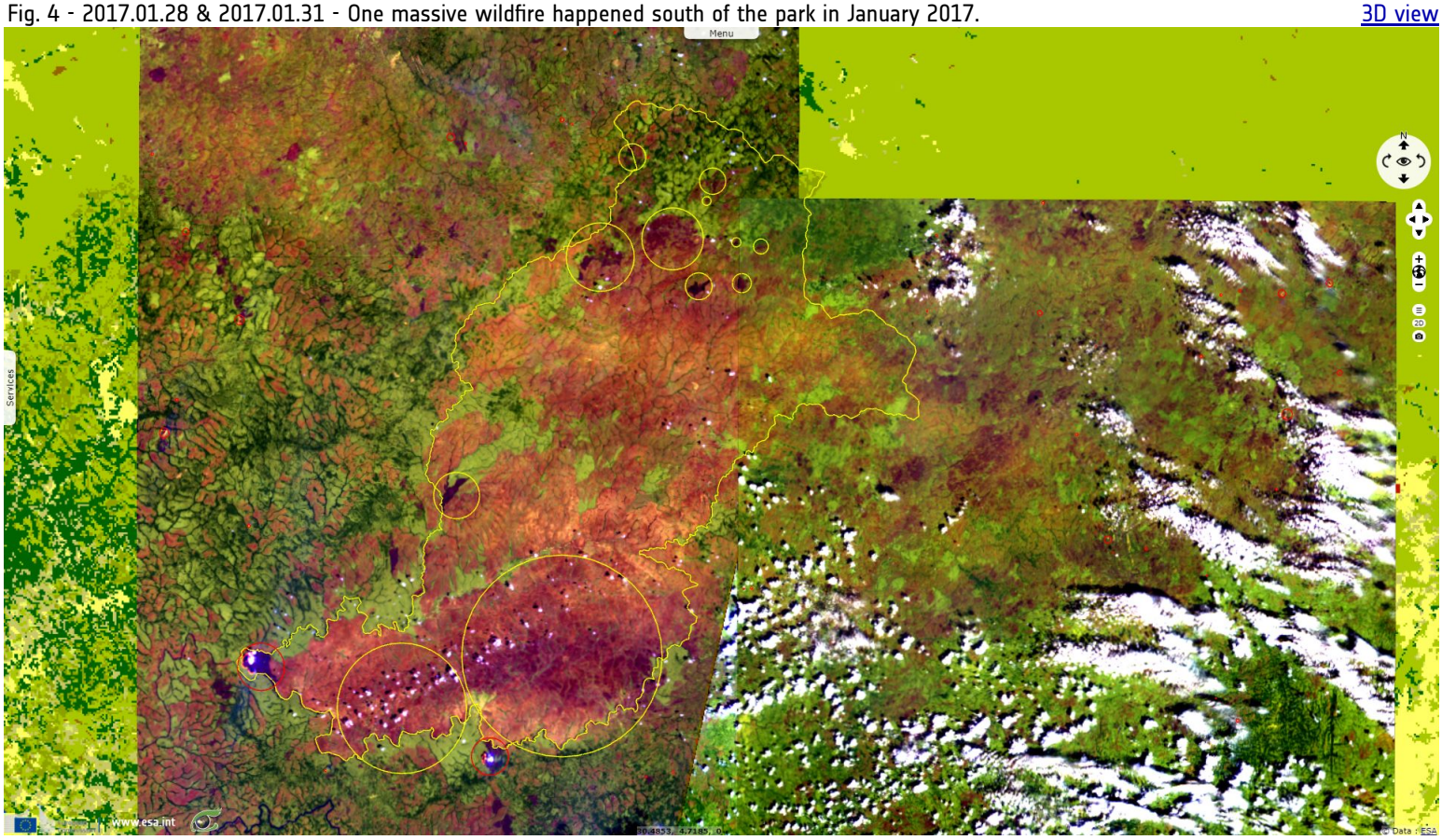
Fig. 3 - 2016.12.22 & 2016.12.29 - Since the previous image 10 days before, evidences of recent or active wildfires have multiplied. 3D view



As shown in these images, while a large fraction of the ground burns each year, the recovery of the grassland requires a few months. Tens of fires happens simultaneously on these images. While forested areas are usually less prone to wildfires that bushland, the vast majority of these fires happen in the more densely forested areas outside the protected savanna located inside Garamba National Park. Another aspect though is that most wildfires outside the park seem more limited in extent than those inside the park. One may interpret this as a consequence of a higher humidity in

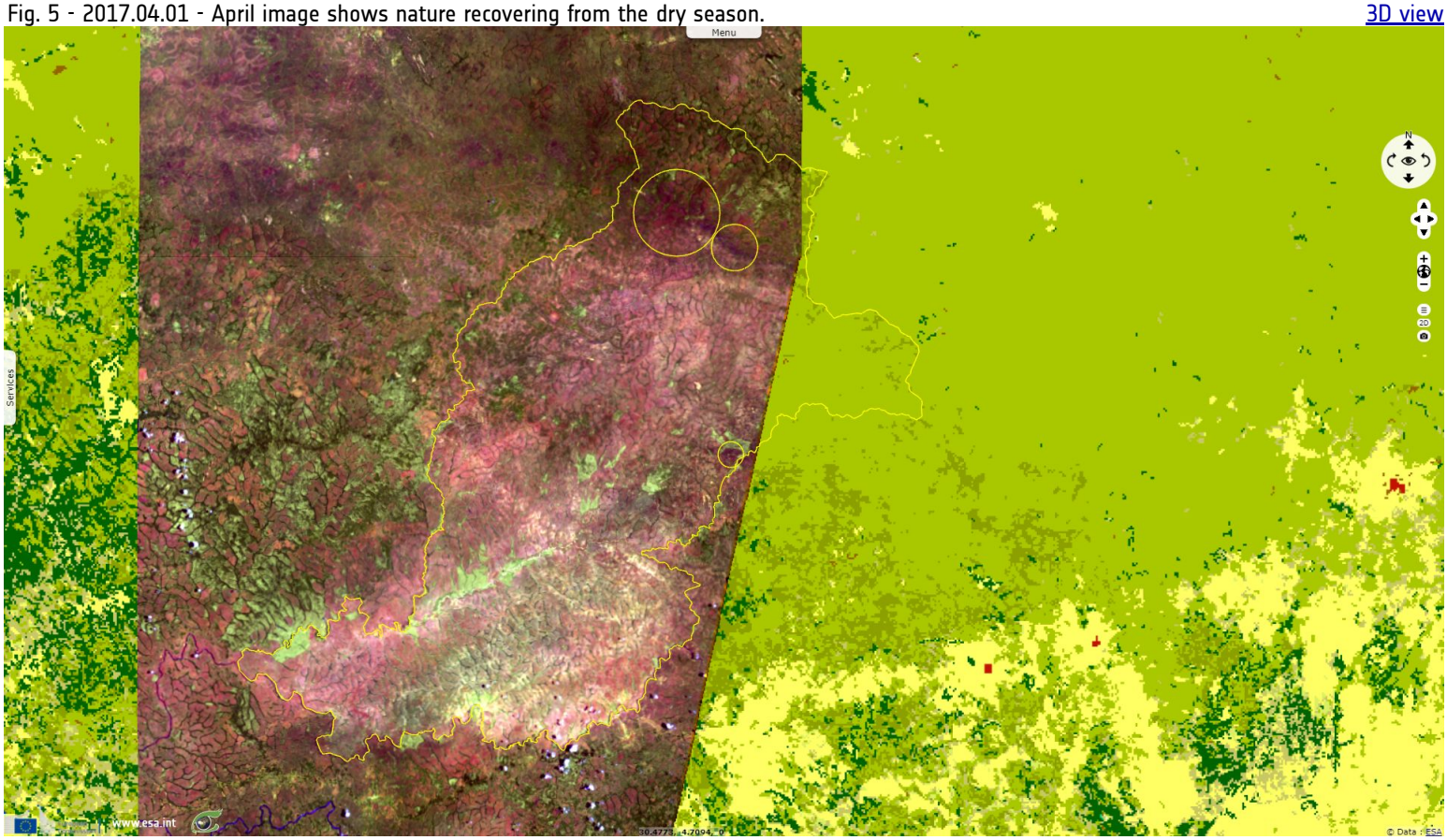
more densely forested areas outside Garamba. Another may explain this by the faster reaction of herders to fires they may have started compared to rangers. Finally, one may point the potential role of poachers who may use wildfires to drive animals to a killing zone.

Fig. 4 - 2017.01.28 & 2017.01.31 - One massive wildfire happened south of the park in January 2017. 3D view



While Garamba National Park was the last reserve of wild population of Northern white rhinoceros, poaching killed all but three of them, moved to a safer captivity.
Regarding elephants, The Guardian reports "*The park is now estimated to have fewer than 2,000 elephants, down from 20,000 in the 1960s.*" According to National Geographic, "*Ugandan military helicopters*" have been used for some of these attacks. Lords' Resistance Army, Sudanese poaching gangs and local Congolese poachers has been involved in the current "extremely heightened level of poaching". Finally, The Guardian reminds rangers are also victims of the ivory trade, such as ranger Joël Meriko Ari and Sgt Gerome Bolimola Afokao killed in May 2017 according to the article.

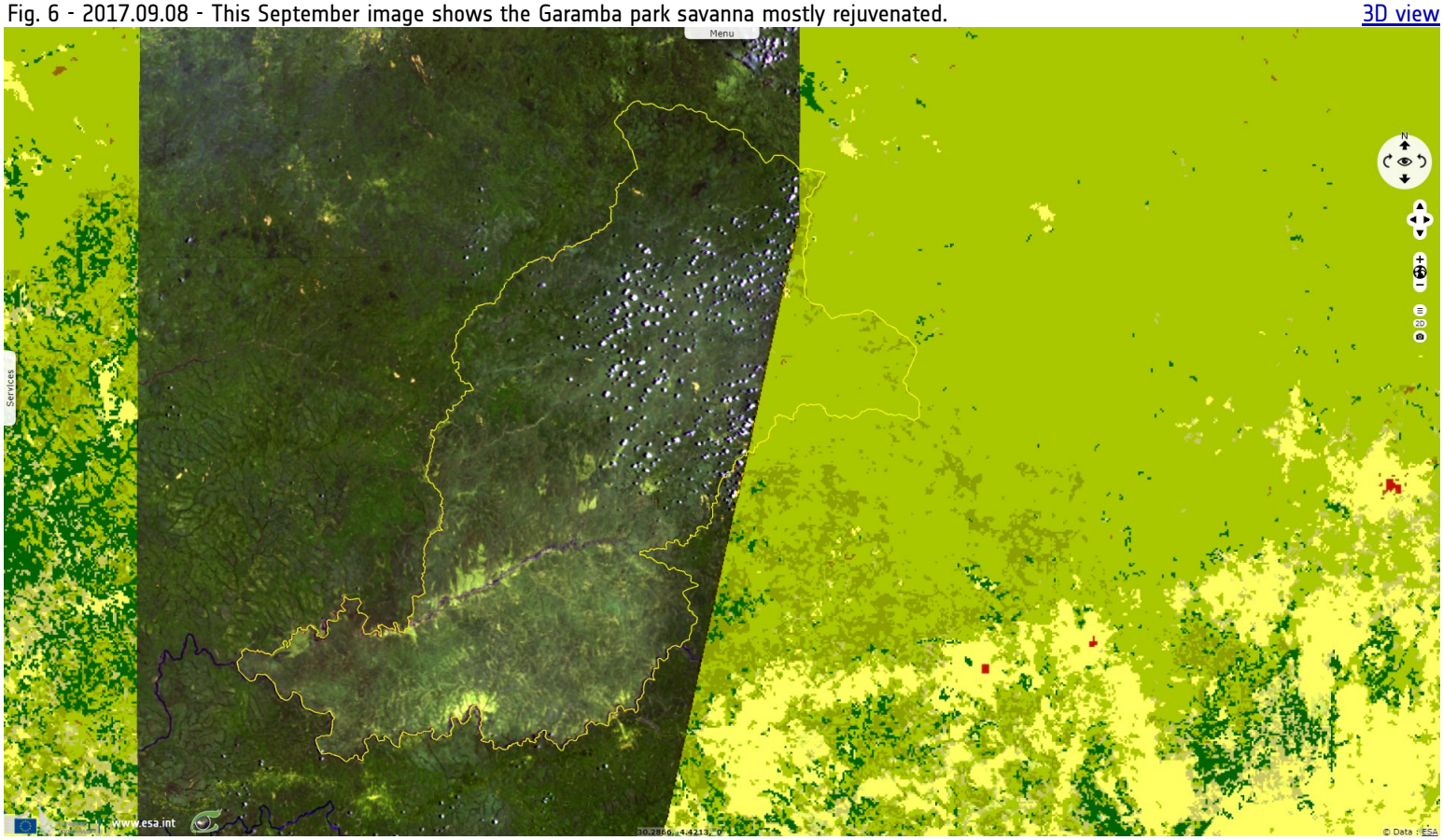
Fig. 5 - 2017.04.01 - April image shows nature recovering from the dry season. 3D view



Daniel Cressey wrote in Nature: "*researchers estimate that tens of thousands of African elephants are now being killed by poachers each year, from a total wild population of around 400,000.*" The only hope of these species might be that scientists try to map DNA samples of ivory seized as well

as imported ivory "antiquities" to identify its source. This might allow NGO to track down poachers but also convince governments or opinion to ban ivory trade if shown it originates largely from poaching.

Fig. 6 - 2017.09.08 - This September image shows the Garamba park savanna mostly rejuvenated. 3D view



The views expressed herein can in no way be taken to reflect the official opinion of the European Space Agency or the European Union.

More on European Commission space:							
More on ESA:			S-1 website	S-2 website	S-3 website		
More on Copernicus program:			Scihub portal	Cophub portal	Inthub portal	Colhub portal	
More on VisioTerra:			Sentinel Vision Portal	Envisat+ERS portal	Swarm+GOCE portal	CryoSat portal	Proba-V portal

Funded by the EU and ESA EVT-131-SentinelVision powered by VisioTerra