



Satellite Sentinel Project

MAKING THE WORLD A WITNESS



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MAKING THE WORLD A WITNESS REPORT ON THE PILOT PHASE DECEMBER 2010 - JUNE 2012

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Introduction



By Dr. Charlie Clements

Executive Director of the
Carr Center for Human
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Harvard Kennedy School

When historians eventually compile the history of Sudan during 2011 & 2012, they will also have to tell the story of the Satellite Sentinel Project. This remarkable effort was led by an internationally known movie star, a former U.S. State Department official, a humanitarian initiative within a leading university, a company that owns and operates a constellation of high-resolution commercial earth-imaging satellites, and a number of NGOs. It is also the story of a couple dozen college students who sometimes worked day and night as volunteers to prevent a return to the Sudanese civil war, which over 20 years claimed more than 2 million lives.

I believe that history will present the efforts of this unlikely consortium as the beginning of a paradigm shift, when instruments of national security, heretofore the domain of military and intelligence agencies, began to be used by civilian-led institutions, humanitarians, and human rights activists to protect human security. This pivot point in the history of human rights documentation was the result of a unique partnership. For-profit entities like Digital-Globe and Google, not-for-profit entities like Enough and Not on Our Watch, the Harvard Humanitarian Initiative, individuals like George Clooney and John Prendergast, as well as many others, all worked together towards the common goal of protecting human lives.

The accompanying report tells that story not from the perspective of historians, but rather from that of the protagonists who feared that if the wrenching decision of the January 9th, 2011 referendum was for the oil-rich southern part of Sudan to secede, it could easily trigger a spasm of prolonged violence and a resumption of the civil war. The United Nations and the international community shared those fears, but it was these individuals and institutions described in this report who acted upon their concerns in an unprecedented manner.

Over a period of 18 months the Satellite Sentinel Project catalogued the antecedents of mass violence, analyzed and interpreted them as part of an understandable pattern. They then monitored an area that would become the border of Sudan and the newly emerged state of South Sudan with the intent of warning vulnerable populations and the international community, when it appeared that threats of violence were imminent.

These decisions were fraught with ethical dilemmas – would the release of intelligence not even available to the antagonists lead to escalation and perhaps preventive strikes...or could they prevent mass violence or allow civilians to flee?

Though led by professionals, the day to day work of searching for the anomalies that would lead to a pattern was usually done by dedicated graduate and undergraduate student volunteers whose efforts were characterized by thoroughness, accuracy, integrity, and a belief that their contribution if done well would make a difference. It did. It will take twenty-five or perhaps fifty years for historians to put it all into perspective – that's how long it takes history to be written – but we can say unequivocally that they changed the course of history.

We thank them and dedicate this report to them.

Charlie Clements

EXECUTIVE SUMMARY

The Satellite Sentinel Project (SSP) was launched on 29 December 2010, with a mission to deter a return to full-scale civil war between northern and southern Sudan. From January 2011 to June 2012, in 28 reports, SSP documented acts, by both the Government of Sudan and the Republic of South Sudan-aligned forces, that can constitute violations of international humanitarian law and the laws of war. In one of its earliest reports, SSP showed evidence that both Government of Sudan and Republic of South Sudan-aligned forces violated the 2005 Comprehensive Peace Agreement by deploying unauthorized forces inside the Abyei region.

SSP's achievements include the successful prediction of the Government of Sudan's May 2011 invasion of the Abyei region nearly two months before it occurred. SSP also identified multiple alleged mass grave sites in the city of Kadugli, the former capital of South Kordofan, Sudan, and collected visual evidence of alleged war crimes and crimes against humanity used by the International Criminal Court in investigative documents obtained by TIME magazine.

The Harvard Humanitarian Initiative (HHI) designed SSP's methodology for managing and analyzing satellite imagery and reports on events in Sudan. SSP operations team based at HHI produced each of SSP's 28 reports released between January 2011 and April 2012. With the end of the pilot phase of SSP on 1 June 2012, HHI concluded its participation in SSP and the operations staff transitioned into the recently launched Signal Program on Human Security and Technology at HHI.

The Enough Project, a project of the Center for American Progress to end genocide and crimes against humanity, provided valuable context for SSP products through ground reports and policy analysis, driving SSP's communications strategy. Enough and Not On Our Watch's ability to align and mobilize artists, activists and cultural leaders generated unprecedented media coverage of the deteriorating humanitarian situation in Sudan, creating a platform for near real-time policy recommendations associated with SSP's reports. As of 1 June, the Enough Project, in partnership with DigitalGlobe, assumed responsibility for day-to-day operations of SSP following HHI's departure from the initiative.

Since January 2011, DigitalGlobe has been the sole satellite imagery provider of SSP. DigitalGlobe provided SSP with in-kind contributions of over 300,000 square kilometers of priority tasked satellite imagery. Additionally, the DigitalGlobe Analysis Center provided crucial training, analytic support, and supervision of SSP's imagery analysis.

SSP's work has been cited in over 8,000 articles in leading domestic and international publications, including The New York Times, the Washington Post, the Associated Press, Reuters, Agence France-Presse, CNN, NBC, ABC, CBS, PBS, NPR, Al Jazeera, and the BBC. Reports prepared by HHI for SSP have been directly presented to the President of the United States, the Secretary of State, the US Ambassador to the United Nations, the US National Security Council, the UN Security Council, and have been cited by over 60 Members of Congress, the bipartisan leadership of the Senate Foreign Relations Committee, and the United Kingdom's House of Lords.

Faculty Director of HHI, Dr. Michael VanRooyen, MD, MPH, said, "The Satellite Sentinel Project is a clear example of how technology transforms the way we think about and prepare for crises. In the hands of well-trained and experienced analysts guided by humanitarian principles, satellite technology provides a potent new way of ensuring that the world witnesses threats to civilians."

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HOW IT BEGAN

On October 4, 2010, George Clooney with Enough Project co-founder John Prendergast travelled to the Abyei region of Sudan three months before the January 2011 referendum which would make South Sudan the world's newest nation. Abyei was one of the three disputed regions whose status was not resolved in the 2005 Comprehensive Peace Agreement, which ended the decades-long civil war in Sudan between the Government of Sudan and the Sudan People's Liberation Movement. Clooney and Prendergast visited Abyei to raise awareness about the potential for renewed violence between the North and South in the disputed areas after South Sudan's expected secession. Clooney questioned why any person could use Google Earth to see his house in Los Angeles but could not see images of the deteriorating situation in the Sudan border region.



Previously, human rights groups -- notably, Amnesty International, the United States Holocaust Memorial Museum, and Physicians for Human Rights (PHR) -- had used the analysis of satellite imagery to document alleged war crimes in the Darfur region of Sudan, Sri Lanka and elsewhere. Never before, however, had non-classified satellite imagery analysis been harnessed in near real-time to try to predict a conflict before it began.

Clooney and Prendergast returned from Sudan to Washington, D.C., and enlisted Enough Project Director of Communications Jonathan Hutson to help them determine whether a satellite surveillance operation along the contested border in Sudan was feasible. Hutson co-authored a concept memo with David Sullivan, Director of Research at the Enough Project, and contacted his colleagues Lars Bromley, formerly the head of the remote sensing and human rights program at the American Association for the Advancement of Science (AAAS) and Nathaniel Raymond, a war crimes investigator at PHR. Hutson, Bromley and Raymond had used satellite imagery in 2009 to show the apparent destruction of an alleged mass grave site in Northern Afghanistan which was published as part of a front-page New York Times article by James Risen. Bromley, an internationally recognized expert in human rights and satellite imagery, was chosen to lead imagery analysis for what would become the Satellite Sentinel Project. Bromley had recently joined the staff of the United Nations Operational Satellite Applications Programme (UNOSAT) at the United Nations Institute for Training and Research (UNITAR) in Geneva, Switzerland.

For several years, Raymond had been working to develop data management systems to help make sense of large streams of different types of information caused by complex humanitarian disasters. Raymond was chosen to serve as SSP's first director of operations, leading the data analysis for the new initiative and responsible for developing a methodology to safely and effectively track events in Sudan. Under the overall leadership of Dr. Charlie Clements MD, Executive Director of the Carr Center for Human Rights Policy at the Harvard Kennedy School, the Harvard Humanitarian Initiative agreed to host SSP's operations staff.

George Clooney and the board of Not On Our Watch (NOOW), including Don Cheadle, Brad Pitt, Matt

Damon, Jerry Weintraub and John Prendergast, authorized the initial seed money in the amount of \$750,000 for the Satellite Sentinel Project. On 29 December 2010, less than three months after Clooney and Prendergast visited Abyei, the Satellite Sentinel Project launched.

Upon the establishment of SSP, DigitalGlobe generously agreed to provide both priority tasked satellite imagery of Sudan and analysis support to SSP. DigitalGlobe has a constellation of three high-resolution satellites orbiting the earth. Having secured access to satellite imagery, Not On Our Watch and the initial partners -- the Enough Project, the Harvard Humanitarian Initiative, UNOSAT, Google and the Internet strategy firm Trellon, LLC -- faced the challenge of capturing the right imagery and information to make sense of a quickly changing situation.

UNOSAT was responsible for leading imagery analysis for the first six months of the pilot phase. Google provided engineering support and software including Google MapMaker and Google Earth Pro. The Internet strategy firm Trellon, LLC, designed SSP's online platform, including the website, satsentinel.org.

On 1 January 2011, approximately a dozen students and volunteers, led by faculty and staff at the Harvard Humanitarian Initiative, began logging reports from the field, creating accurate maps and designing a method for making sense of thousands of square kilometers of DigitalGlobe imagery. Working around the clock in four different time-zones, the Satellite Sentinel Project produced its first report, "Evidence of SAF Deployment in South Kordofan". The report was published on 27 January, within three weeks after the 9 January referendum which would lead to the creation of South Sudan. The report showed an alarming buildup of troops and equipment belonging to Sudan Armed Forces (SAF) along the contested border. In its first report, SSP delivered proof of concept that a fusion of satellite imagery analysis along with reports from the field and effective data management could detect threats to human security in near-real time.

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Predicting the Invasion of Abyei

Between January and April 2011, SSP documented the build-up of SAF and northern-aligned forces, as well as incursions by southern-aligned forces, in and around the disputed border region of Abyei and warned the international community that a SAF invasion of Abyei was imminent. Over the course of seven reports, SSP identified the following apparent indicators of an invasion by SAF.

Enhancement of Strategic Infrastructure

SSP detected the construction of elevated, all-weather roads leading from the SAF 15th Division Headquarters in Muglad, South Kordofan, towards Abyei in areas without major oil production. These roads indicated the intent to deploy armored units and other heavy vehicles south towards Abyei during the rainy season. Analysis of satellite imagery over several weeks also showed the construction of a fueling facility, increasing SAF's capability for high-tempo operations, at the 15th Division airstrip in Muglad. SSP later documented the subsequent deployment of several attack helicopters, including Mi-24 Hind helicopter gunships.



Violation of the Comprehensive Peace Agreement by Both Parties

SSP showed evidence that both Government of Sudan and Republic of South Sudan-aligned forces violated the 2005 Comprehensive Peace Agreement by deploying unauthorized forces inside the disputed Abyei region.

On 10 March 2011, SSP identified the appearance of a newly fortified camp at Bongo, 15 km/ 9 miles from the recently razed village of Maker Abior, which was consistent with reports of SAF-aligned encampments present in the area. The camp's appearance approximately two weeks before the attacks on Maker Abior, Todach and Tajalei corroborated reports that the forces who allegedly attacked those villages had established staging areas nearby. Meanwhile, SSP identified the apparent construction of additional fortifications at the burned villages of Todach and Tajalei, which indicated that Sudan People's Liberation Army (SPLA)-aligned forces were reinforcing their positions.

On 22 March 2011, SSP identified encampments consistent with reports of northern police or other SAF-aligned forces deployed inside Abyei at Goli and Bongo. Imagery also revealed evidence of recently fortified camps containing structures consistent with the presence of at least one infantry company or battalion-strength unit in the vicinity of Diffra and Bongo. Government of Sudan spokespeople denied SAF recently deployed troops to Abyei.

The commanding general of the UN Assistance Mission in Sudan publicly confirmed SSP's findings. Major General Moses Obi, the UN mission in Sudan's chief commander, stated, "We have evidence that both sides have militarized Abyei. We have seen all sorts of armed elements that ordinarily are not supposed to be there."

Rapid Escalation of Force Deployment

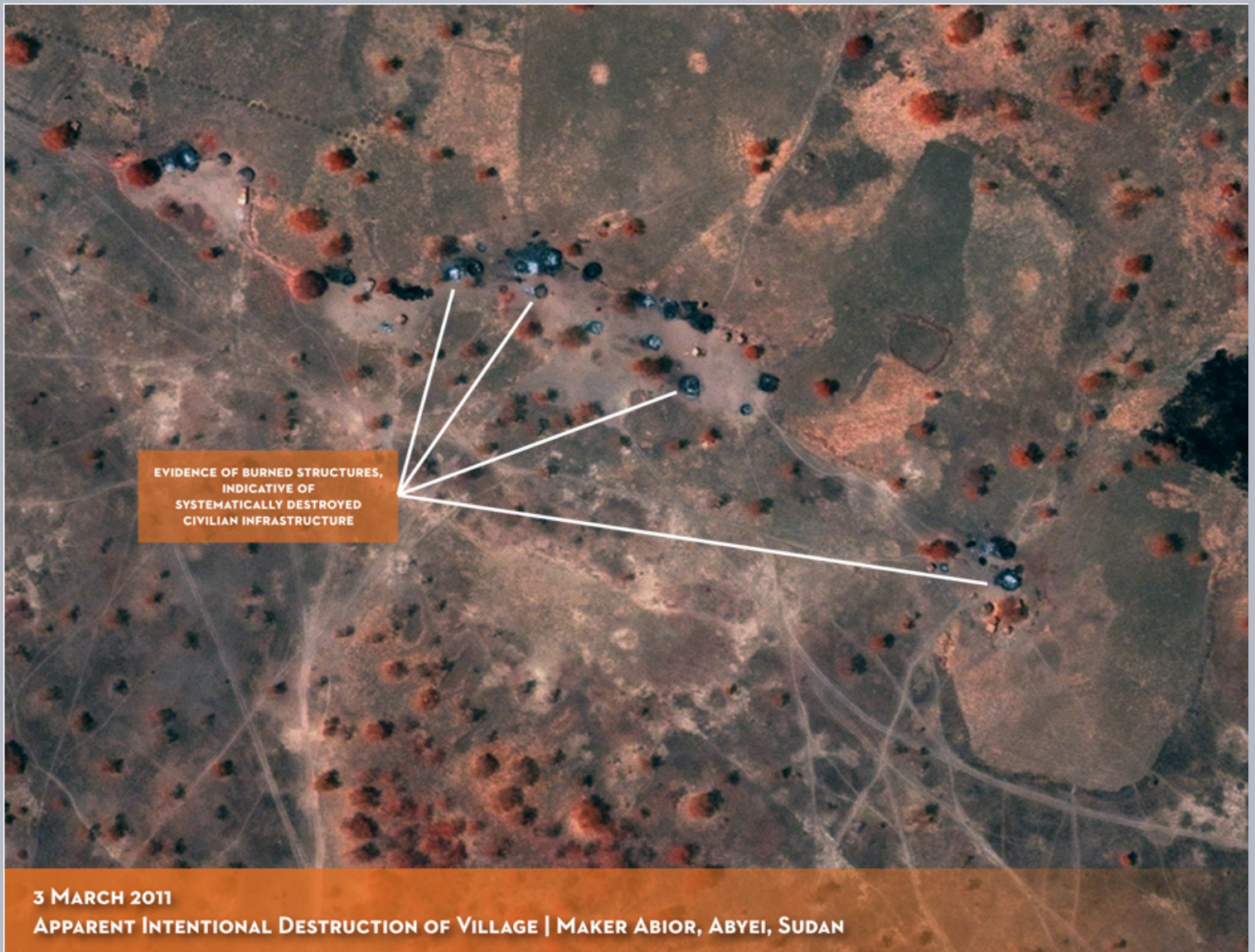
Throughout March and April 2011, SSP conducted regular surveillance of SAF and SAF-aligned bases surrounding Abyei which yielded clear evidence of a dramatic deployment of infantry, fighting vehicles, artillery, main battle tanks and aircraft within strike range of Abyei. SSP documented the amassing of SAF and SAF-aligned forces consistent with mechanized infantry and heavy armor at the following locations: Diffra (31 km/ 19 mi from Abyei), Nyama (55 km/ 34 mi), Heglig (113 km/ 70 mi), Kharassana (129 km/ 80 mi), Muglad (159 km/ 99 mi), and El Obeid (440 km/ 273 mi).





Closer Look

ABYEI BURNING: INTENTIONAL DESTRUCTION OF THREE VILLAGES IN ABYEI



In March 2011, SSP used satellite imagery analysis to confirm the intentional burning of three villages in the Abyei region by Government of Sudan-aligned forces. SSP confirmed that structures consistent with civilian dwellings were intentionally burned in Maker Abior and Todach villages as of 4 March. SSP also confirmed the intentional burning of at least 300 buildings, two-thirds of which were consistent with civilian dwellings, in Tajalei. The systematic destruction of Maker Abior, Todach and Tajalei, primarily through the burning of civilian infrastructure, is a violation of the laws of war and represents a gross violation of human rights.

SAF Invasion Begins

On 19 May, soldiers from the Southern Sudanese police or military forces reportedly ambushed a convoy of SAF elements of Joint Integrated Units (JIUs) and their United Nations Mission in Sudan (UNMIS) escorts within the Abyei Administrative Area. In response, SAF allegedly bombed several villages in the Abyei region that were reportedly controlled by southern-aligned forces. SAF also bombed the main bridge that provided access to areas south of Abyei. On 21 May, SAF seized control of Abyei town.

Rebecca Hamilton, then a Special Correspondent for the Washington Post in Sudan and a fellow at the Pulitzer Center on Crisis Reporting, stated that, “[The Invasion of Abyei] is perhaps the most clearly forecast crisis in history. And the march towards it is certainly the most well-documented. The Satellite Sentinel Project, a joint venture of the US advocacy group Enough and the Harvard Humanitarian Initiative, has been releasing images over the past three months showing the increasing military build-up near the Abyei area.”

Documenting Alleged War Crimes in Abyei

SSP collected satellite imagery corroborating field reports of apparent war crimes and crimes against humanity in Abyei town following the May 2011 invasion by SAF and Government of Sudan-aligned militia.

SSP reporting confirmed the presence of heavy armor, artillery, light and heavy transport vehicles, and other weaponry showing SAF control of the town. In addition, the presence in operational range of Abyei town of two Nanchang Q-5 ground strike fighters, An-26 Antonov transport planes, and Hind Mi-24 helicopter gunships, corroborated reports of indiscriminate aerial attacks on civilians in the Abyei region.

Satellite imagery analysis and photos from the ground, obtained by the Enough Project, also corroborated reports of the intentional destruction of Banton Bridge, the main bridge providing access to Abyei, which prevented civilians who fled Abyei town from returning after the invasion. An assessment conducted by the imagery analysis team at HHI concluded that approximately 1/3 of civilian dwellings and municipal structures in



Abyei town had been razed. Photos obtained by the Enough Project showed SAF troops in uniform, together with northern-aligned militias, apparently engaged in the looting of Abyei town. The UN reported that UN and NGO agencies looted in Abyei, including a World Food Programme storehouse, lost 800 metric tons of food, enough to feed 50,000 people for three months.

On 26 May, SSP analysis of satellite imagery corroborated reports of looting by SAF and Misseriya militia in Abyei. The image showed vehicles traveling on the Diffra road north of Abyei carrying what appeared to be irregular payloads. Ground photographs obtained by the Enough Project and released by SSP showed both uniformed SAF forces and armed irregular forces in Abyei town.

Three former senior US State Department officials, including two former US Ambassadors-at-Large for War Crimes Issues, publicly concurred with SSP's reports showing clear evidence of alleged war crimes. David Scheffer, former US State Department Special Ambassador-at-Large for War Crimes Issues, stated, "The evidence derived from SSP satellite imagery of the assault on and destruction of much of Abyei town reveals actions that appear to violate the principles of military necessity, proportionality, and distinction – primary pillars of the laws of war."

Also, Pierre Prosper, former US State Department Special Ambassador-at-Large for War Crimes Issues, said, "The imagery provided by the Satellite Sentinel Project contains evidence of actions by Sudan Armed Forces that may well constitute war crimes and crimes against humanity. It is time for the United States and international community to put into place a serious and concerted action plan to end the abuses in Sudan once and for all."

Early Warning on SAF Deployment in South Kordofan Region

On 19 April 2011, satellite imagery analysis confirmed that at least 356 structures in el-Feid, South Kordofan were razed. Also, SSP confirmed that Um Barmbita, South Kordofan, was burned but could not confirm if the burning was intentional. The razing of el-Feid underscored the rising tensions prior to South Kordofan State gubernatorial elections. Abdelaziz al-Hilu, the Deputy Governor of South Kordofan State, claimed that Popular Defense Forces militias attacked the towns on 13 April, allegedly burning between 300 to 500 houses and reportedly killing more than 20 people. El-Feid is al-Hilu's hometown. Al-Hilu claimed that the forces were under the command of Ahmed Haroun, Governor of South Kordofan, whom the International Criminal Court indicted in 2007 for alleged war crimes in Darfur. Haroun and al-Hilu ran against each other for the governorship of South Kordofan in May 2011. NASA's MODIS satellite, which detects fire, confirmed SSP's report on the razing of el-Feid village in South Kordofan.

SSP identified on 26 May the amassing of SAF forces at El Obeid barracks in preparation for apparent combat deployment. The forces there included multiple infantry platoons in marching formation, towable artillery hitched to transport vehicles, which is consistent with potential imminent movement, and armor positioned to be loaded onto heavy equipment transports. SSP warned the international community about the immediate potential for additional Government of Sudan-aligned attacks on civilians. The SAF attack on Kadugli, South Kordofan, and the surrounding area, began on 5 June.

Confirmation of Civilian Displacement and SAF Control of Kadugli

Satellite imagery analysis confirmed reports of a large population of internally displaced persons seeking protection on the perimeter of the UNMIS compound in Kadugli. The several thousand civilians who had sheltered there were later reported missing and their whereabouts remain unknown. On 9 July 2011, approximately one month after fighting erupted between SAF and Sudan People's Liberation Movement-North (SPLM-N), the UNMIS mandate for its operations expired, prompting its withdrawal from Sudan. Due to the expiration of the mandate, UNOSAT was no longer able to participate in the Satellite Sentinel Project. As a result, HHI assumed overall responsibility for SSP's imagery analysis, with support and training from Digital-Globe, and Isaac Baker became SSP's lead imagery analyst.



INTERNALLY DISPLACED PERSONS AT UNMIS COMPOUND | KADUGLI, SOUTH KORDOFAN
17 JUNE 2011

Crime Scene

Visual Evidence of Alleged Mass Graves

On 14 July 2011, SSP released satellite imagery and three new eyewitness reports, obtained by the Enough Project, consistent with the systematic killing of civilians and the presence of three apparent mass graves on the outskirts of Kadugli near the Tilo School. On the same day that SSP released its findings on the Tilo School, TIME Magazine released a leaked draft version of a United Nations High Commissioner for Human Rights (UNHCR) report which confirmed SSP's findings of the alleged grave sites at Tilo.

In August 2011, SSP released satellite imagery corroborating reports of three additional mass graves in Kadugli. Two of the mass graves were identified through eyewitness reports collected by the Enough Project on behalf of SSP. Witnesses to alleged atrocities were provided with innovative grid maps of satellite imagery taken before the alleged event, of the area by SSP and independently identified where



POTENTIAL MASS GRAVES NEAR TILO SCHOOL | KADUGLI, SOUTH KORDOFAN
4 JULY 2011

they claimed to have seen the killing of individuals and/or bodies being disposed.

Visual Evidence Consistent with Covered Human Remains

Also, on 14 July, SSP identified a cluster of white, irregularly sized objects consistent with the reported collection and transport of corpses in white-colored tarps or body bags. In an interview with the Washington Post, the President's Special Envoy to Sudan, Ambassador Princeton Lyman, said that the State Department could not confirm SSP's report of mass graves in Kadugli, casting doubt on the analysis of imagery depicting objects consistent with body bags.

In a special report, SSP conclusively proved that white objects consistent with previously reported body bags were being buried over time in multiple sites throughout Kadugli. This report is the first time public satellite imagery analysis has documented the apparent burial of objects consistent with bodies in an alleged mass grave in near real-time. Eyewitness reports collected by the Enough Project for SSP also confirmed that the Sudanese Red Crescent Society (SRCS) had been burying bodies in mass graves in Kadugli since at least 8 June 2011, and that some of those bodies were allegedly wrapped in white tarps or body bags.

SSP's analysis of SRCS's public documents, statements, and a photograph of the SRCS body disposal team revealed that SRCS had prepositioned at least 2,000 plastic tarps and 400 white body bags in Kadugli prior to the fighting. This report conclusively rebutted a statement in the Washington Post by the President's Special Envoy to Sudan, Ambassador Princeton Lyman, which cast doubt on SSP's previous identification of objects consistent with body bags.

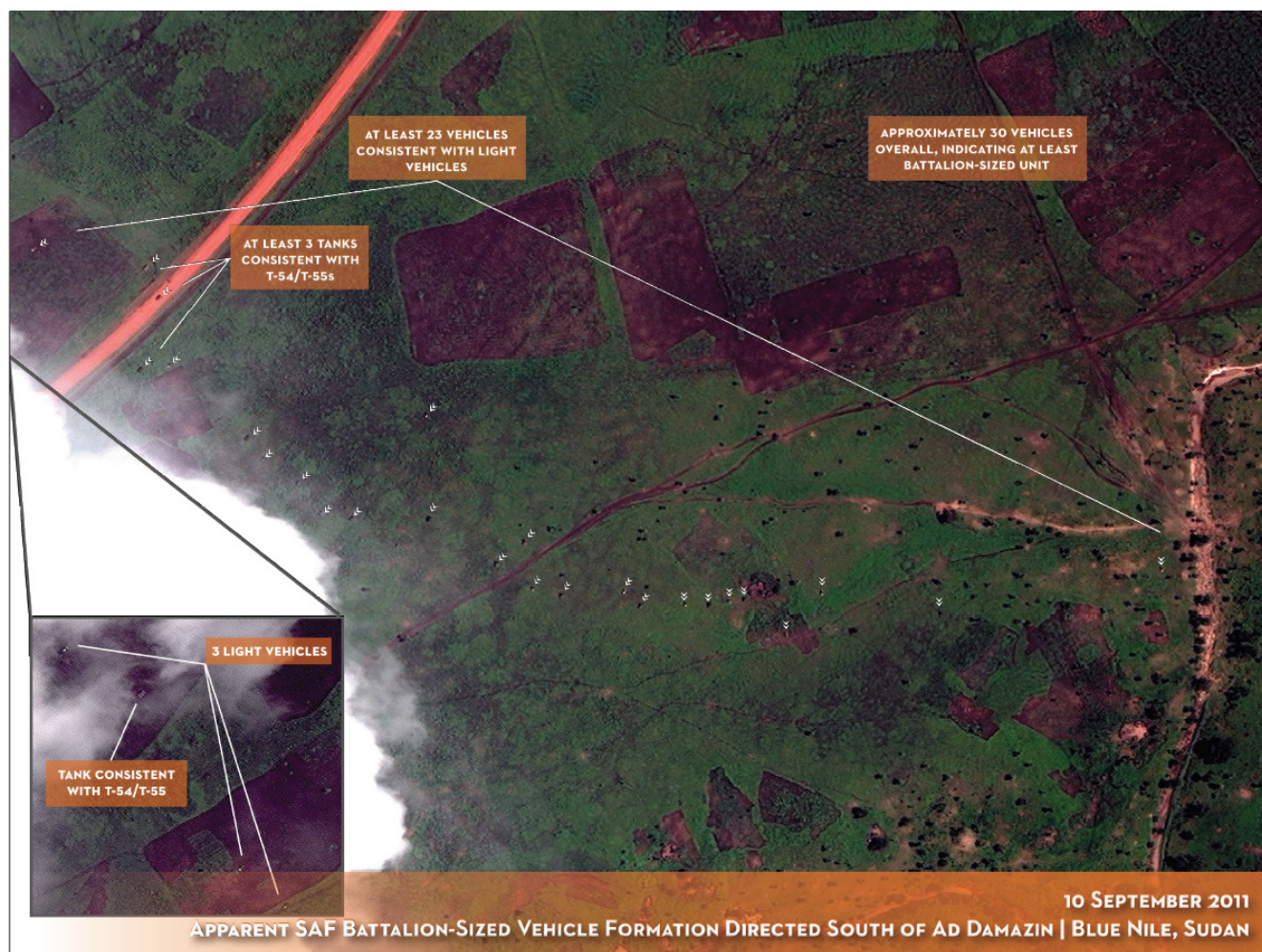
SSP also confirmed the UN's finding that all major roads leading into and out of Kadugli had been blocked with checkpoints by Government of Sudan-aligned forces. Based on new information obtained by the Enough Project in September 2011, SSP released imagery confirming the May and June 2011 build-up of a base of the Central Reserve Police (CRP), also known as Abu Tira, directly adjacent to the UNMIS compound and IDP protective perimeter. Eyewitnesses reported to the Enough Project that CRP repeatedly harassed, abused, kidnapped and killed civilians seeking shelter in the UNMIS perimeter.



Human Security Warning

On 23 September 2011, SSP issued a Human Security Warning for the rebel-held stronghold of Kurmuk,

Blue Nile state, Sudan, and the surrounding area. SSP identified an armored and mechanized infantry unit of SAF, a brigade-sized force or larger within at least 64 km/ 40 miles of the city. SSP warned of the possibility of indiscriminate bombardment of civilians and disproportionate use of force. The imagery revealed the use of camouflage by SAF in what appeared to have been an attempt to deliberately hide the number and type of its vehicles. The Office of the United Nations High Commissioner for Refugees (UNHCR) reported on 23 September that an estimated 1,500 refugees travelled through Kurmuk to Ethiopia due to increased air strikes. On 2 November 2011, SAF invaded and took control of Kurmuk.



Radius of Operations

On 11 November 2011, SSP documented SAF working rapidly to increase their air strike and air assault capacity at two air bases in Blue Nile state, Sudan. In Al Damazin, SAF expanded the airstrip by 250 meters. Also, after taking control of Kurmuk, SAF appeared to construct new helipads, build fortifications around the existing airstrip, position armor and other units nearby, and enhance the facility. The airstrip at Kurmuk became the southernmost airstrip under SAF control along the border with South Sudan. 1500 meters in length, the airstrip was long enough for landing an Antonov An-26 and other attack aircraft. Stationing attack aircraft in Kurmuk enabled SAF to strike targets in Upper Nile, Blue Nile, Sennar

state and elsewhere in southern Sudan over less distance and with greater frequency than at any other SAF airbase.

On 15 November 2011, SSP identified the presence of two Antonov AN-26 transport planes at the El Obeid airbase, North Kordofan, Sudan. These planes are consistent with aircraft which allegedly bombed two refugee camps on 8 and 10 November 2011 in South Sudan.

Siege and Encirclement: Kauda Valley

On 25 January 2012, SSP released imagery showing evidence of both recent and ongoing roadwork by Government of Sudan-aligned personnel, encircling the SPLM-N-controlled areas of the Kauda Valley in the Nuba Mountains of South Kordofan, Sudan. The elevation of existing roads and construction of new roads appeared to be heading towards the Kauda Valley from SAF controlled locations. The evidence in this report indicated a pattern almost identical to the activity and disposition of the SAF reported by SSP before their invasion of Abyei in May of 2011.

SSP analyzed satellite imagery on 27 January 2012 which confirmed a battalion-sized unit of SAF in Toroge that appeared to control the main route civilians reportedly used to flee South Kordofan for Yida refugee camp in South Sudan. The SAF entrenchment, which contained 80 to 90 tent-like structures, infantry fighting vehicles (IFVs), artillery, and heavy armor vehicles, was established sometime after 23 November 2011. Yida refugee camp in Unity State, South Sudan, approximately 45 km/ 28 miles south of Toroge, Sudan, reportedly housed at least 24,000 refugees from South Kordofan, according to the UN Office for the Coordination of Humanitarian Affairs (OCHA), when SSP released its findings. Sudan People's Liberation Army-North (SPLA-N) reportedly regained control of Toroge on 27 February.

Destruction of Infrastructure and Looting in Heglig

SSP analysis of imagery on 22 April 2012 revealed evidence of the destruction of key oil pipeline infrastructure in Heglig. SSP also identified cratering consistent with bombardment in close proximity to nearby oil pipeline and oil production facilities. Both Sudan and South Sudan claim sovereignty over Heglig, which resulted in clashes until South Sudan reportedly took control of the area on 10 April 2012. On 15 April, South Sudan's information minister accused SAF of bombing the central processing



facility in Heglig, causing serious damage.

SSP could not determine, based on the evidence available, the exact cause or timeline of destruction of the object, which was consistent with an oil collection manifold. SSP also could not conclude whether the destruction was the result of aerial bombardment or ground action.



SSP revealed evidence consistent with reports of looting by the SPLA, indicated by scattered debris present at a SAF military installation in Heglig. Alan Boswell, reporting from Heglig for TIME Magazine, stated that the SPLA captured and looted a SAF military base in northern Heglig. The destruction or seizure of enemy property may violate international law governing the conduct of land warfare. Razed structures, also visible in Heglig, may constitute evidence of a violation of international law governing the protection of civilian property.

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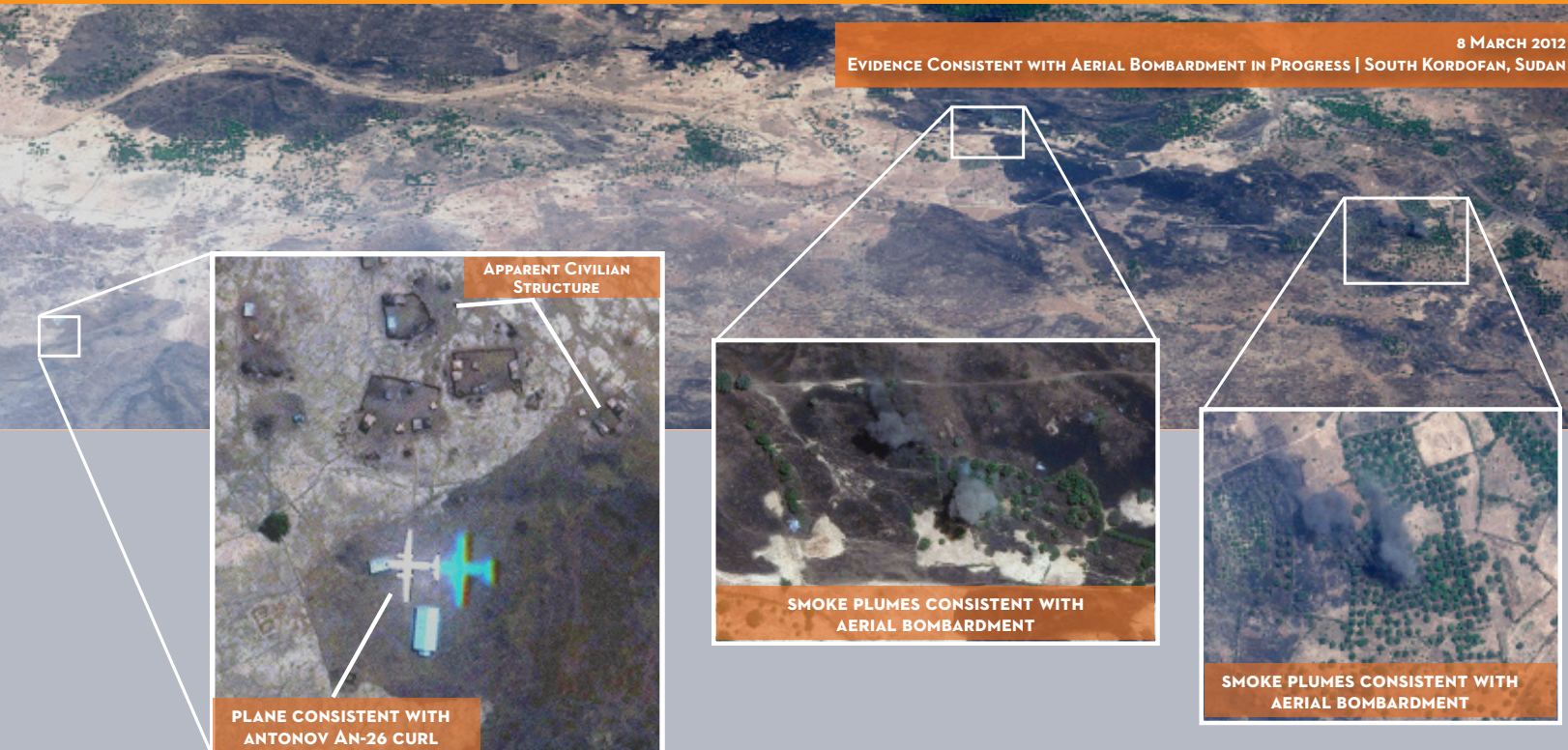


Closer Look

IMPACT: EVIDENCE CONSISTENT WITH SAF AERIAL BOMBARDMENT IN PROGRESS

8 MARCH 2012

EVIDENCE CONSISTENT WITH AERIAL BOMBARDMENT IN PROGRESS | SOUTH KORDOFAN, SUDAN



On 15 March 2012, SSP released evidence of apparent indiscriminate aerial bombardment in progress by SAF in South Kordofan. Plumes of grey smoke were documented rising from the ground at two separate locations, one 600 meters north of Angarto and the other 1.6 km/ 1 mile north of Angarto, South Kordofan. In a second image captured six minutes later, fire is visible at one of the apparent impact sites. An aircraft consistent with an Antonov An-26 transport plane was seen flying over Tira Mande, which is 6.5 km/ 4 mi north of Angarto. The apparent Antonov An-26 was traveling at approximately 320 miles per hour, striking the second site approximately 11 seconds after striking the first. No military infrastructure or military units appeared visible at or near the locations of the smoke plumes based on satellite imagery analysis. The indiscriminate targeting of civilian populations and infrastructure can constitute a war crime under international law.

SSP concluded that the plumes were consistent with aerial bombardment because of the similar color of the smoke and the appearance of a pair of plumes of differing heights but similar shapes at approximately the same time at the two separate locations, consistent with the explosion at the more southern location having occurred first. The pair of plumes appeared less than two kilometers away from each other in a relatively straight line, in the likely northbound flight path of the apparent Antonov An-26.

The report containing this image was presented to the President of the United States by George Clooney and John Prendergast and presented as part of the Senate Foreign Relations committee hearing on Sudan. These images were taken while George Clooney was inside South Kordofan.

Conclusion of the Pilot Phase

On 1 June 2012, the pilot phase of SSP came to a close. The Enough Project assumed responsibility for daily management of SSP and began a direct partnership with DigitalGlobe. HHI transitioned out of SSP at that time, launching the Signal Program on Human Security and Technology with the aim of establishing the first codified technical standards and professional ethics for crisis mapping, including the use of remote sensing and data management technologies pioneered by SSP.

SSP began with a seemingly impossible task never before attempted: Employing satellites to warn the international community of threats to some of the world's most vulnerable people in near real-time. After producing 28 reports in 18 months, SSP has shown that it is possible to harness a technology, once solely the domain of militaries and intelligence services, for the protection of civilian populations, the collection of evidence of alleged war crimes, and the delivery of timely and accurate early warning to populations in danger.

SSP was not the first human rights and humanitarian project to use satellite imagery. However, SSP stands as the first example of how targeted taskings of satellites, rather than the purchase of archival imagery alone, when combined with a system and a science for managing information from the ground, can impact the manner in which human security emergencies unfold. The pilot phase was funded by approximately two million dollars in contributions from George Clooney and Not On Our Watch. Without the generosity and vision of George Clooney and the board of Not On Our Watch, the revolution of civilian protection which SSP represents would not have happened.

The key to the success of SSP has been transformative collaboration. A constellation of unique partnerships between academic, non-governmental groups, artists, industry, and inter-governmental organizations made SSP possible. More than simply using satellite imagery, maps, and ground sourced data in new ways, SSP demonstrated that the answer to complex questions like mass atrocities and human rights violations must be untangled and understood collaboratively across communities and organizations each contributing unique assets. SSP has shown that the future of human rights work is now, and that future is both digitized and collaborative.

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Report List

Date	Title
27 Jan 2011	Evidence of SAF Deployment in South Kordofan
04 Mar 2011	Flashpoint: Abyei
08 Mar 2011	Emergency Report: Confirmation of Intentional Burning of Tajalei
10 Mar 2011	Frontline Abyei: Evidence of Military Escalation in Abyei Region
22 Mar 2011	Abyei Incursion: Evidence of Northern-Aligned Forces Deployed to Abyei Region
07 Apr 2011	Range of Attack: Deployment of SAF Attack Helicopters, Tanks Near Abyei
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