

High-Resolution Satellite Imagery and the Conflict in Sri Lanka

Summary Report

May 12, 2009

This report was produced by the Geospatial Technologies and Human Rights project as part of the Science and Human Rights Program (SHRP; <http://shr.aaas.org>) of the American Association for the Advancement of Science (AAAS). SHRP brings scientists and scientific expertise to efforts to achieve human rights around the world. As a program of AAAS - the world's largest multidisciplinary scientific membership organization - SHRP engages scientists and marshals scientific tools, techniques, and technologies to enhance the impact of human rights work, promotes the human right to benefit from scientific progress (Article 15, ICESCR), and brings human rights norms to the conduct of science.

Acknowledgment

Primary support for this project was provided by the John D. and Catherine T. MacArthur Foundation through grant number 06-88407-000-GSS.

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Introduction

The Science and Human Rights Program of the American Association for the Advancement of Science (AAAS) has acquired and analyzed commercial high-resolution satellite imagery of the Conflict Zone (CZ) in northeastern Sri Lanka. This imagery is intended to provide information regarding the status of internally displaced persons (IDPs) within the CZ, especially as they were affected by reported violence occurring May 9–10, 2009. This violence was reported by international news sources,¹ including the BBC, and was referred to by the United Nations (UN) as a “bloodbath”.² The UN called on all parties to meet international humanitarian law obligations. This analysis was initially requested by Human Rights Watch and Amnesty International USA, which have expressed repeated concern over the status and condition of civilians in the CZ.

Figure One: Image Analysis Area in Sri Lanka



In an effort to better understand the situation on the ground and to offer evidence to human rights organizations, AAAS conducted analysis of high-resolution commercial satellite imagery collected by DigitalGlobe's WorldView and QuickBird satellites. Imagery from these satellites analyzed by AAAS includes WorldView scenes collected at approximately 11AM local time on May 6 and May 10, 2009, as well as an earlier scene collected from the QuickBird satellite on May 9, 2005 (prior to the current period of conflict). An additional scene from the GeoEye satellite Ikonos, acquired on March 23, 2009, is also available³ and was used to verify pre-conflict conditions in the CZ. For all scenes, the area identified as the Conflict Zone

by the UN as of May 10, 2009 (see Figure One) was reviewed to determine possible evidence of shelling and other heavy weapons fire, as well as movements and conditions of IDPs, especially as indicated on May 10. While a full accounting of these factors will take significantly longer, AAAS is releasing a preliminary analysis in order to circulate the latest information as soon as possible.

¹ http://news.bbc.co.uk/2/hi/south_asia/8045135.stm; <http://www.cnn.com/2009/WORLD/asiapcf/05/12/sri.lanka.fighting/index.html>

² Gordon Weiss, Spokesman for the UN Humanitarian Coordinator in Sri Lanka

³ See: http://unosat.web.cern.ch/unosat/asp/prod_free.asp?id=32

Samples of observed features in the imagery are provided in this report, and all May, 2009, imagery has been made available on GoogleEarth.⁴

May 6 Imagery Analysis

Results for the May 6 image analysis correlate to reporting from news sources for the region. The May 6 image was compared to the image from May 2005, on GoogleEarth, and the March 2009 Ikonos image to denote changes possibly occurring during the period of conflict. AAAS analysts conducted a visual change inspection of the various images, identifying areas of significant change and specific modes of change.

Figure Two: Likely Craters in CZ, May 6, 2009



This image shows apparent impact craters in the CZ on May 6, 2009 (Lat: 9.32 N Long: 80.77 E).

When comparing the 2009 and 2005 images, possible evidence of shelling, in the form of likely shell impact craters and adjacent destroyed structures, are in evidence. These possible shell impact craters are found throughout the conflict zone, in close proximity to and intermingling with IDP shelters and other structures (see Figure Two). However, it is of course difficult to precisely indicate whether these are craters from shelling, or due to other natural or anthropogenic drivers. What is certain is that these circular, crater-like features were not present in significant numbers prior to the May 6, 2009 imagery. Evidence of destroyed structures is commonplace and unambiguous in the May 6 imagery. Specifically, dozens of structures have clearly been destroyed, with remains of the structure and debris visible (Figure Three). In some

⁴ See: http://www.aaas.org/international/geotech/ge/srilanka/srilanka_cz.kml

cases, interior walls of the structure are visible, though not rooftops, a likely indication that the structure was partially or completely burned (see Figure Four).

Figure Three: Damaged Structures in CZ, May 6, 2009



This image shows apparent damage to permanent structures in the CZ on May 6, 2009 (Lat: 9.32 N Long: 80.77 E).

May 10 Imagery Analysis

Analysis of the May 10 imagery sought to provide some evidence of the events of May 9-10, when reports indicated significant use of artillery or other heavy weapons on the IDP population in the CZ, as reflected in UN and other statements. The salient feature of the May 10 image, when compared to the May 6 image, is the obvious removal of thousands of likely IDP structures from the central part of the CZ (see red outlines, Figure Five). While some new areas of IDP structures did appear in the same time period (see yellow outlines, Figure Five), their quantity is not enough to compensate for the sheer number of removed IDP structures. What caused the IDP structures to be removed between May 6 and May 10 is uncertain based on the imagery, though it is certainly unlikely that the IDPs would have moved en masse, and so completely without a compelling reason. It is also notable how complete the removal of IDP structures appears, in that some debris and evidence of the structures remains, but overall the area has been swept relatively clean (see Figure Six). This is less indicative of the entire area being razed by shelling, though it could correspond with an emigration from those specific areas by the IDPs due to some outside driver, such as shelling.

Figure Four: Likely Burned Structures in CZ, May 6, 2009



This image shows interior walls, likely evidence of burning, of destroyed permanent structures in the CZ on May 6, 2009 (Lat: 9.31 N Long: 80.77 E).

In addition, some new possible shell craters do appear in the CZ on the May 10 image which were not present on the May 6 image. An initial analysis found at least 19, primarily in the immediate area of the removed IDP structures. These are shown in Figure Seven. Note that, as stated, crater analysis is problematic, and an additional factor is the reported use of airburst munitions, which would of course not leave pronounced craters on the ground.

Figure Five: Removed and New IDP Structures in CZ, May 10, 2009



This image indicates areas of significant IDP displacement (outlined in red), and additions (outlined in yellow), on the May 10 image when compared with the May 6 image.

Figure Six: Close Up of Removed IDP Structure Area

May 6, 2009

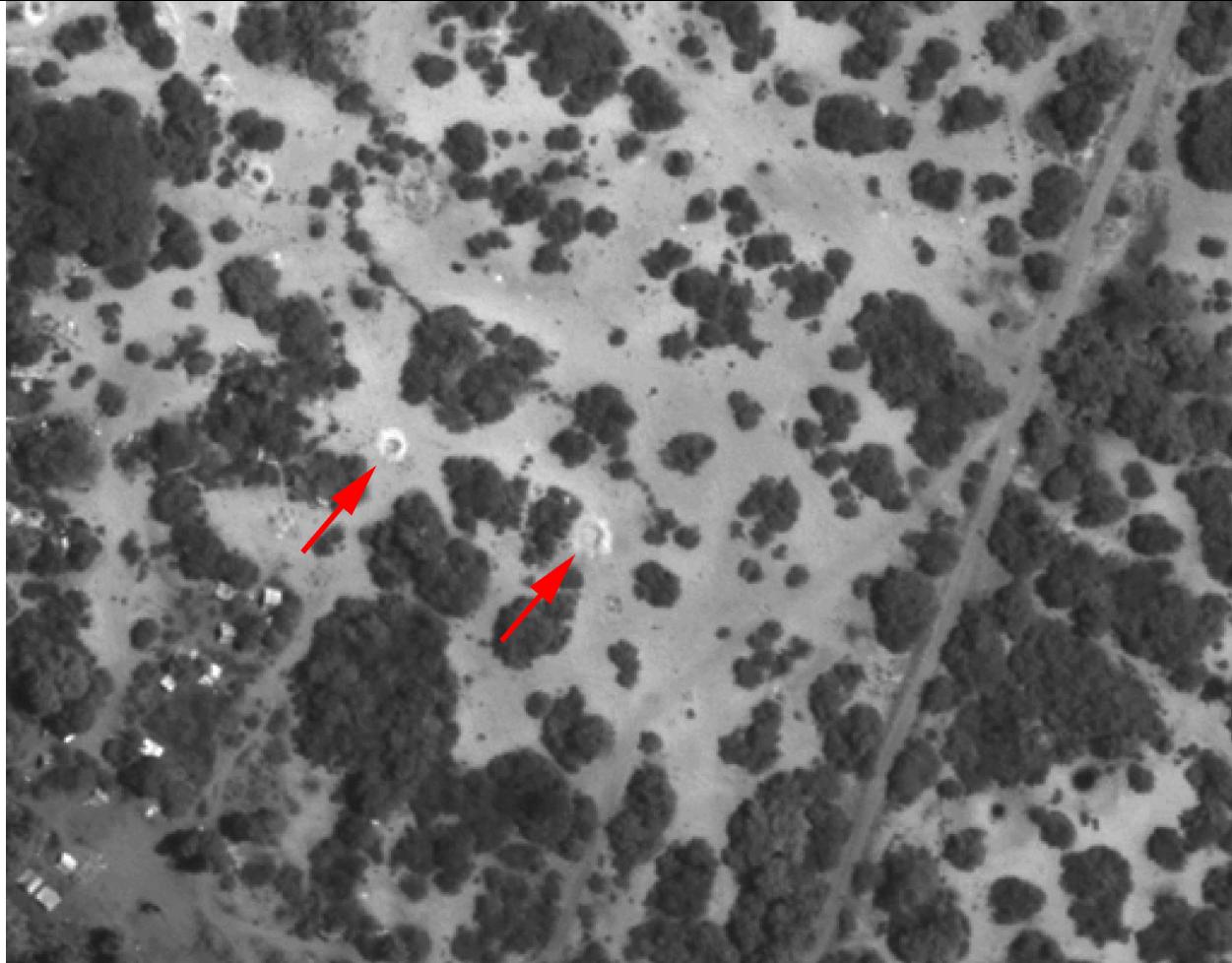


May 10, 2009



This image pair shows an area of significant IDP structure removal when the May 6 image (top) is compared with the May 10 image (bottom) (Lat: 9.31 N Long: 80.78 E).

Figure Seven: Likely New Craters in CZ, May 10, 2009



This image shows apparent impact craters in the CZ on May 10, 2009, which were not present in the May 6 image (Lat: 9.30 N Long: 80.78 E).