

# Geospatial Technologies and Human Rights Project

Monitoring Change in Sri Lanka's Valikamam  
High Security Zone: 2009-2014

August 2014



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### **Contact**

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## Introduction

At the request of the Sri Lanka Campaign for Peace and Justice (SLC), the Geospatial Technologies and Human Rights Project of the American Association for the Advancement of Science (AAAS) acquired time series high-resolution satellite imagery of an area of Sri Lanka known as the Valikamam High Security Zone (HSZ) (Figure 1). The Sri Lankan government created a number of HSZs during the decades-long conflict with the Tamil Tigers, which ended in 2009. AAAS previously documented the human rights abuses that occurred at the end of the conflict, which culminated at the Civilian Safety Zone on the northeastern coast in May 2009.<sup>1</sup> The SLC requested the assistance of AAAS in undertaking an assessment of the Valikamam HSZ, to determine what changes have taken place in the military zone since the end of the conflict in 2009, as thousands of the residents of this area of the Jaffna Peninsula have not been able to resettle.

The Sri Lankan government is currently working to make the Valikamam HSZ and others permanent military cantonments.<sup>2</sup> The government has claimed that areas of the HSZ have been released for civilian use, but that an area of 6381 acres (25km<sup>2</sup>) is being retained for public use (Figure 2). What constitutes a public use has not been defined.<sup>3</sup> Human Rights groups, like SLC, are concerned about the actions of the military in these areas, as they move toward using these 'military' areas for non-military activities, such as farming and resort tourism.<sup>4</sup> Groups are increasingly concerned regarding the outcome of the situation, and petitions have been filed by many residents in an attempt to resettle.<sup>5,6</sup>

Figure 1: Study Area



<sup>1</sup> [http://www.aaas.org/geotech/sri\\_lanka\\_2009](http://www.aaas.org/geotech/sri_lanka_2009)

<sup>2</sup> <http://cl.ly/240Q2U1v392Z>

<sup>3</sup> [http://www.defence.lk/new.asp?fname=HSZ\\_dismantled\\_as\\_jaffna\\_booms\\_with\\_commercial\\_activities\\_20120607\\_01](http://www.defence.lk/new.asp?fname=HSZ_dismantled_as_jaffna_booms_with_commercial_activities_20120607_01)

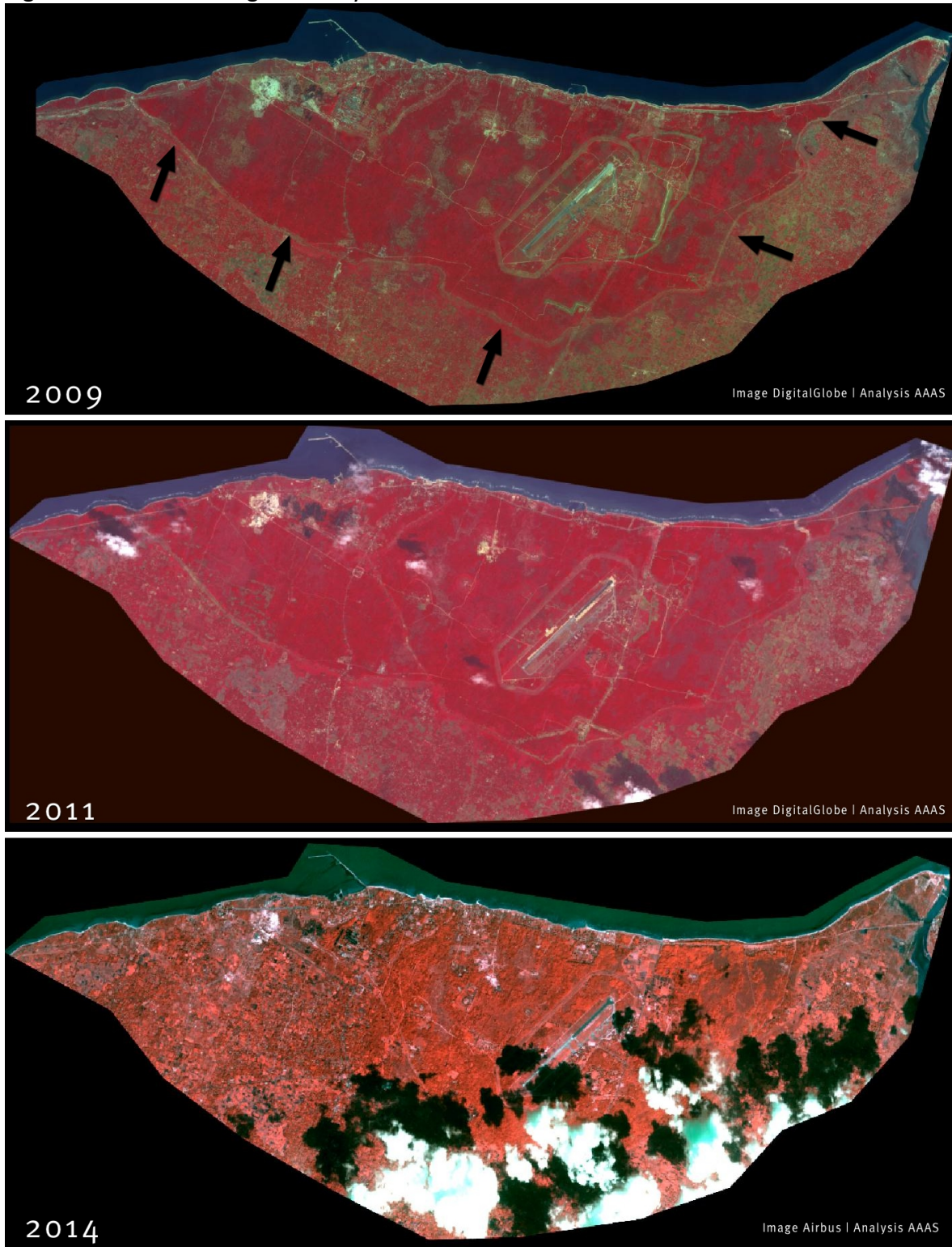
<sup>4</sup> [http://www.slate.com/articles/news\\_and\\_politics/roads/2013/08/sri\\_lankan\\_army\\_goes\\_into\\_tourism\\_business\\_after\\_crushing\\_the\\_tamil\\_tigers.html](http://www.slate.com/articles/news_and_politics/roads/2013/08/sri_lankan_army_goes_into_tourism_business_after_crushing_the_tamil_tigers.html)

<sup>5</sup> [http://www.bbc.co.uk/sinhala/news/story/2011/12/111228\\_jaffna\\_hsz.shtml](http://www.bbc.co.uk/sinhala/news/story/2011/12/111228_jaffna_hsz.shtml)

<sup>6</sup> <http://dbsjeyaraj.com/dbsj/archives/22367>



Figure 2: Valikamam High Security Zone



*The border of the HSZ being retained by the Sri Lankan government is clearly seen in the first and second images (2009 and 2011) as a line (black arrows) separating the more heavily vegetated and less developed military zone from the areas surrounding it. By 2014, however, development has clearly occurred within the military zone.*



The HSZ was occupied by civilians until a military campaign by the Liberation Tigers of Tamil Eelam (LTTE) in 1995 forced civilians to leave the area. According to the SLC, these people attempted to return to the Jaffna Peninsula, but the military had declared northernmost portion of the region a “high security zone.” In 2013, four years after the conflict ended, the government of Sri Lanka announced the intention of making this area a military cantonment, which would prevent the former residents of the area from ever returning to their former lands. SLC reports that civilians do not have access to the area.

## Data and Methods

Due to lack of access to the area, AAAS undertook an assessment of the HSZ using high-resolution satellite images from three years spanning from the end of the 2009 conflict to the present: 2009, 2011, and 2014 (Table 1).

*Table 1: Satellite imagery acquired*

<i>Date</i>	<i>Sensor</i>	<i>Image ID</i>
12 May 2009	QuickBird-2	1010010009986D00
23 January 2011	GeoEye-1	1050410002CCFD00
19 February 2014	Pleiades	DS_PHR1B_201402140519379 _FR1_PX_E080N09_0120_00484

Unfortunately, the 2014 image is extremely cloudy in the southern regions, obscuring much of the civilian lands adjacent to the HSZ. However, this image represented the most recent image available of the region at the time of the analysis.

## Analysis

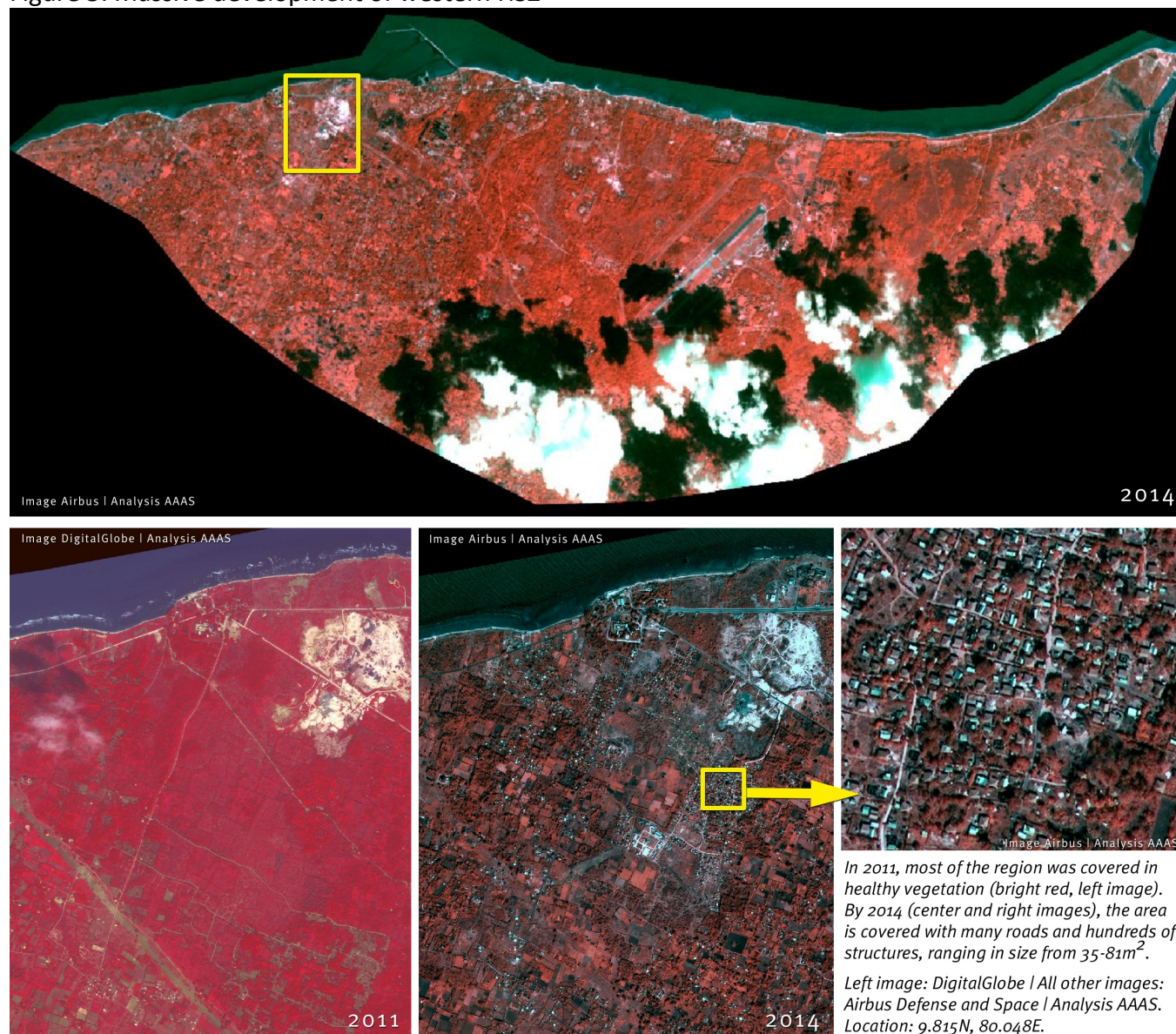
For each image date acquired, all structures within the HSZ were counted (Table 2). Structure counts were nearly constant between 2009 and 2011. However, there was a significant increase in structures between 2011 and 2014, with the total structure count rising by nearly 1,500 structures. The structure count includes all types of structures, including guard posts, military buildings, and individual, housing-sized structures. Not all structures present in 2009 were stable throughout the following two time periods, as some buildings were dismantled or overgrown by the surrounding tropical vegetation. This assessment counts all visible structures in each image independently from the other time periods.

*Table 2: Structures within the High Security Zone*

<i>Year</i>	<i>Structures Observed</i>
2009	3215
2011	3244
2014	4731

Between 2011 and 2014, the landscape in the western half of the military zone changed dramatically. As can be seen in the enumeration of results reported in Table 2, extreme growth in the number of structures was observed in the time period of 2011-2014 within the HSZ (Figure 3). Hundreds of new structures of various sizes were constructed during this time period.

Figure 3: Massive development of western HSZ



The observed development occurred between 2011 and 2014 within the entire western portion of the HSZ and covered approximately 6.5km<sup>2</sup>. Structures have been constructed all the way to the former edge of the zone and the border road is no longer obvious by 2014 (Figure 4).



Between 2011 and 2014, the number of structures in the area increased from approximately 550 to over 2,700.

Figure 4: Development along HSZ boundary



*In 2009 (top image), the HSZ border is clearly visible (red arrows). By 2014 (bottom image), the boundary has been obscured by the development of dozens of small structures and multiple new roads. Top image: DigitalGlobe | Bottom Image: Airbus Defense and Space | Analysis AAAS. Location: 9.815N, 80.048756E.*

In addition to the construction of hundreds of individual structures, several areas along the coast were developed, including several reported luxury resorts.<sup>7</sup> While one of the resort developments along the coast could not be delineated from other large-scale developments, such as was seen in Figures 7 and 8, the Thalsevana Holiday Resort at Kaankeasan-thu'rai was identified. The Thalsevana Holiday Resort been highly touted by the Sri Lankan Military (Figures

<sup>7</sup> Reports of two new resorts from 14 January 2013 <http://www.tamilnet.com/art.html?catid=13&artid=35938>



5 and 6).<sup>8</sup> As noted on the resort’s website, “THALSEWANA HOLIDAY RESORT functioning under the Security Forces Headquarters – Jaffna provides you an ideal venue to make your holiday perfect and memorable.” The resort’s website even contains a Google Earth map marking its location.<sup>9</sup>

Figure 5: Thalsevana Holiday Resort



Source: [http://www.defence.lk/new.asp?fname=20101003\\_02](http://www.defence.lk/new.asp?fname=20101003_02)

Figure 6: Thalsevana Holiday Resort development



<sup>8</sup> <http://www.thalsevanaresort.com/>

<sup>9</sup> Website for google earth layer <http://www.thalsevanaresort.com/index.php>



*In 2009, the main building of the Thalsevana Resort is already constructed (pink arrow), while additional buildings are under construction (blue arrow), and numerous shipping containers are seen adjacent to the site (yellow arrows). By 2011, the buildings previously under construction have been completed, and an area along the beach is being built out into the ocean (red arrow). Finally, by 2014, one additional large building has been added to the site (purple arrow) along with several smaller buildings, and the expansion into the ocean has continued (green arrow). Top and middle images: DigitalGlobe| Bottom Image: Airbus Defense and Space | Analysis AAAS. Location: 9.815N, 80.048756E.*

At another location, less than 3km from Thalsevana, another large complex of buildings was constructed between 2011 and 2014 (Figure 7). In the first image, from 2009, only two large buildings are visible in the area, the larger measuring approximately 440m<sup>2</sup> and the smaller approximately 165m<sup>2</sup>. In 2011, in the eastern portion of the image, a large building is seen



under construction. Finally, by 2014, numerous large structures have been built, ranging from 440m<sup>2</sup> to 1,600m<sup>2</sup>.

Figure 7: Large complex constructed between 2011-2014

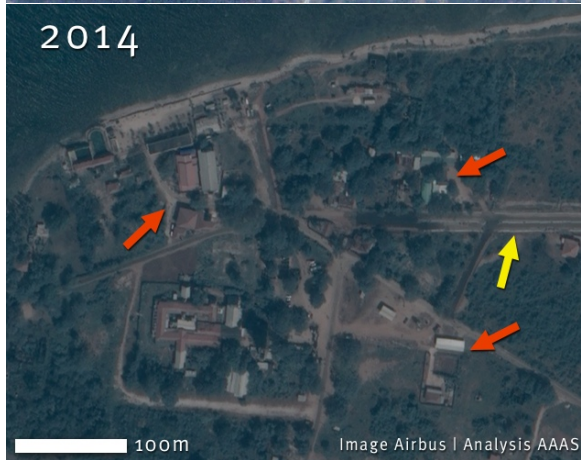






*At a site near Thalsevana Holiday Resort, only two buildings are visible in 2009 (red arrows, top image). In 2011, an additional building is under constructions (purple arrow, middle image). Finally, between 2011 and 2014, this site changed dramatically (bottom image). The road running east-west below the complex has been expanded substantially (blue arrow), and numerous buildings have been added to the site, including one building under construction that has a footprint of 1,600m<sup>2</sup> (yellow arrow). Top and middle images: DigitalGlobe| Bottom Image: Airbus Defense and Space | Analysis AAAS. Location: 9.815N, 80.021E.*

Figure 8: Additional large development along HSZ coast

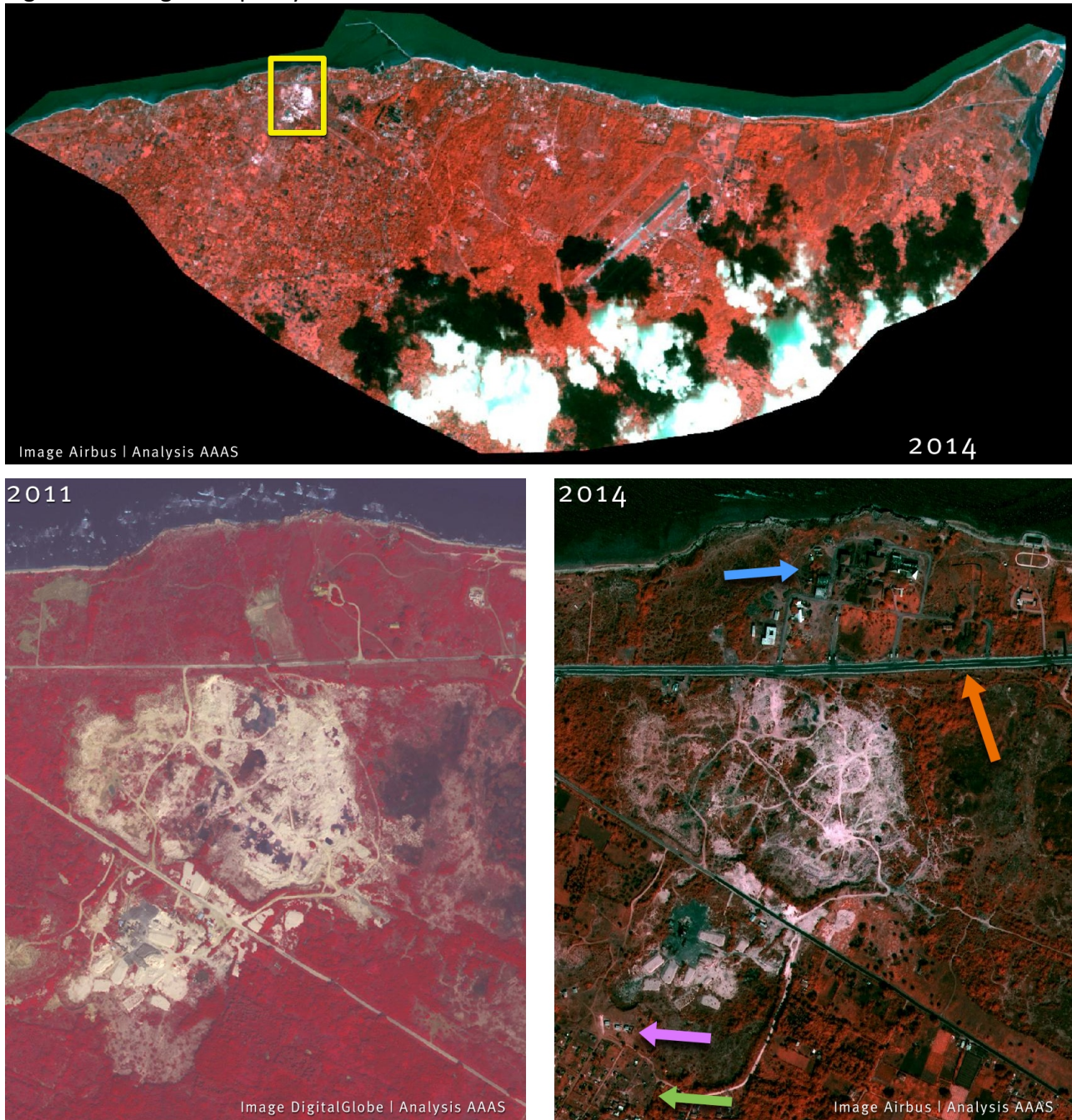


Another complex, located 1km west of the development in Figure 7 and 4km from the Thalsevana Holiday Resort (Figure 6) shows additional construction (green arrow) and a road (blue arrow). By 2014, several large structures have been added (red arrows) and the main road leading to the complex has been widened and paved (yellow arrow). Top and middle images: DigitalGlobe | Bottom Image: Airbus Defense and Space | Analysis AAAS. Location: 9.815N, 80.011E.

Some changes were observed adjacent to a quarry within the HSZ between 2011-2014 (Figure 9), located just south of the large complex detailed in Figure 7. Several buildings were constructed within the site itself, and along the road running just north of the site.



Figure 9: Changes to quarry



Changes were observed in roads and structures at the quarry area near the northern coast between 2011 and 2014. These images highlight one area, marked by the yellow box in the topmost image. By 2014, additional buildings have been added within the site itself (e.g., purple arrow), as well as several large buildings directly on the coast (blue arrow, also shown in Figure 7), and numerous small buildings to the south of the area. An expansion of the major road running east-west just to the north of the mining area was also observed (orange arrow). Top and right images: Airbus Defense and Space | Left Image: DigitalGlobe | Analysis AAAS. Location: 9.812N, 80.019E.



Little change was seen immediately outside the bounds of the HSZ, with one exception. Between 2009 and 2011 an existing network of roads was developed into a small housing area, with approximately 77 large structures, the majority of which measure between 30-40m<sup>2</sup>.

Figure 10: Changes outside the HSZ

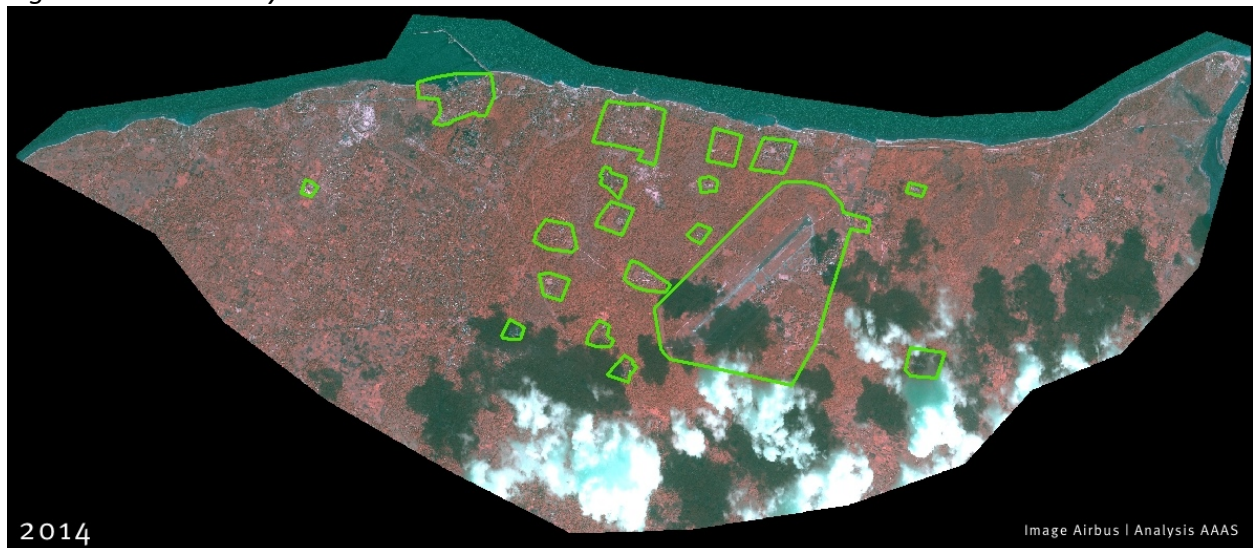


*In the area just outside the HSZ, few changes were apparent, with the exception of the housing development shown above, which was largely constructed between 2009 and 2011. A total of 77 dwelling-sized structures are visible by 2011- only 3 of which were present in 2009. In addition, dozens of smaller structures, possibly sheds, are visible surrounding the structures. Images DigitalGlobe | Analysis AAAS. Location: 9.773N, 80.085E.*

The notice published by the Land Acquisition Officer authorizing the acquisition of the HSZ under the Land Acquisition Act of 1964 asserts that the land is required for a public purpose.<sup>10</sup> AAAS attempted to determine if the land acquired as part of the HSZ was being put to a public purpose by identifying areas potentially being used by public institutions and monitoring their growth throughout the study period. This was done under the assumption that an institutional use, e.g., a military base or a hospital, is more likely to be considered a public purpose than other uses such as residential or smallholder agriculture. However, as what constitutes a public purpose was not explicitly defined in the notice, it is possible that, under some definitions, a non-institutional use could be considered a public purpose.

Although it is difficult to determine the purpose of structures based solely on satellite imagery, the presence of certain features can indicate institutional uses. These features include: fences and guard posts; large structures with similar building materials and dimensions; structures arranged in an orderly or planned fashion; a barrier (e.g. a road, forest, or field) separating the group of structures from other areas. However, it should be noted that the presence of these features does not necessarily indicate a public institution as businesses, factories, or other uses can be constructed in a similar fashion. Analyzing the 2014 image, 18 areas, containing 7.77 km<sup>2</sup> of land and primarily situated in the eastern two-thirds of the study area, were identified as potentially institutional (Figure 11).

*Figure 11: Potentially Institutional Areas*



The number of structures in these areas was then compared to the study area's total structure count to determine the extent to which the growth in the total number of structures in the study area occurred within potentially institutional areas (Table 3).

<sup>10</sup> A copy of the Land Acquisition Act notice, dated 18 April 2013, was provided to AAAS by SLC.



Table 3: Growth in potentially institutional areas

Image Date	Institutional Area New Structures	Institutional Area Removed Structures	Institutional Area Total Structures	Study Area Total Structures	Percent of Total Structures in Institutional Areas
2009	NA	NA	1126	3215	35.0%
2011	81	120	1087	3244	33.5%
2014	374	310	1137*	4731	24.0%

\*14 structures that were present in 2011 in potentially institutional areas were obscured by clouds in the 2014 image.

The count determined that, though new structures were constructed in institutional areas, these were largely offset by older structures being removed, and thus constituted a small percentage of the total number of new structures. As a result, the total number of structures in potential institutional areas did not change drastically during the study period. In addition, the potential institutional areas experienced more change between 2011 and 2014 than between 2009 and 2011.

The pattern of structure additions and removals varied between areas. In some areas, the type of structures removed differed from the new structures, as the removed structures were often small and similar in layout to residential structures, while the new structures were larger, warehouse type structures (Figure 12).

Figure 12: Small residential structures replaced by larger structures



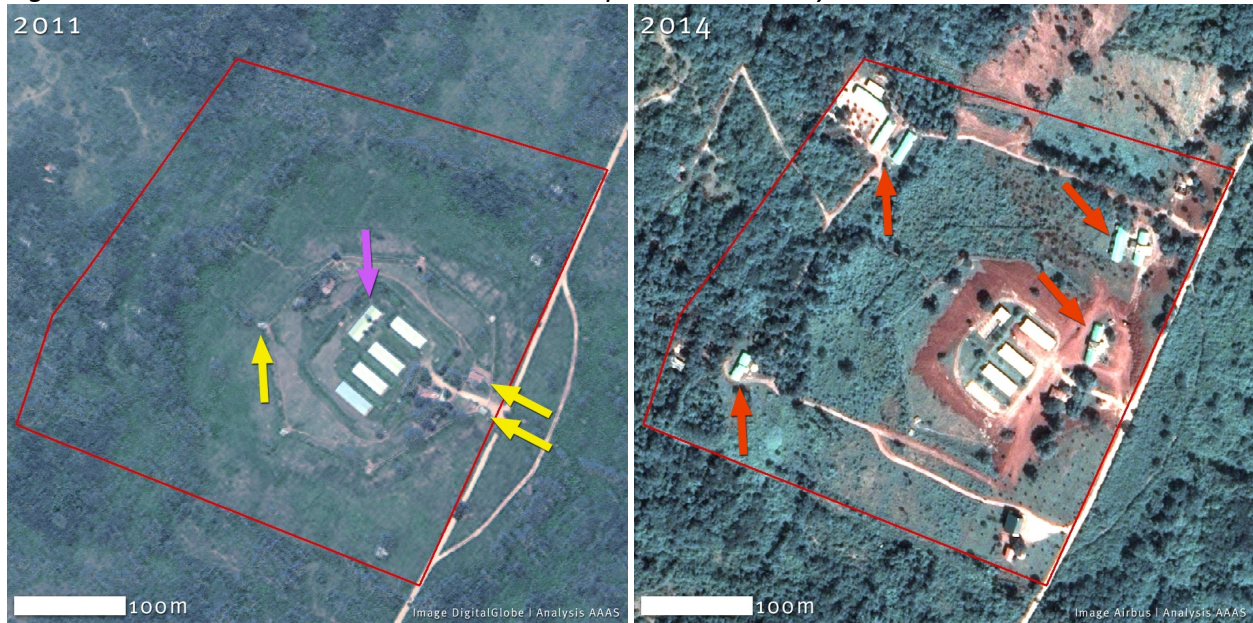
Between 2011 and 2012, several residential structures (yellow arrows) were removed from the area while multiple larger structures (red arrows) were constructed. Left Image: DigitalGlobe | Right image: Airbus Defense and Space | Analysis AAAS. Location: 9.8078N, 80.0726E.

In other areas, the type and layout of the structures indicated that the area was a military installation in 2011. In these areas, the removal of guard posts was observed between 2011 and



2014, as was the deterioration of existing structures. However, new, larger structures were constructed during the same time period (Figure 13). At a different area, marked as a hospital on the open source mapping platform wikimapia, a number of large structures are present in 2011.<sup>11</sup> By 2014, a complex of several additional structures was added (Figure 14).

*Figure 13: Structures removed and added to a potential military installation*

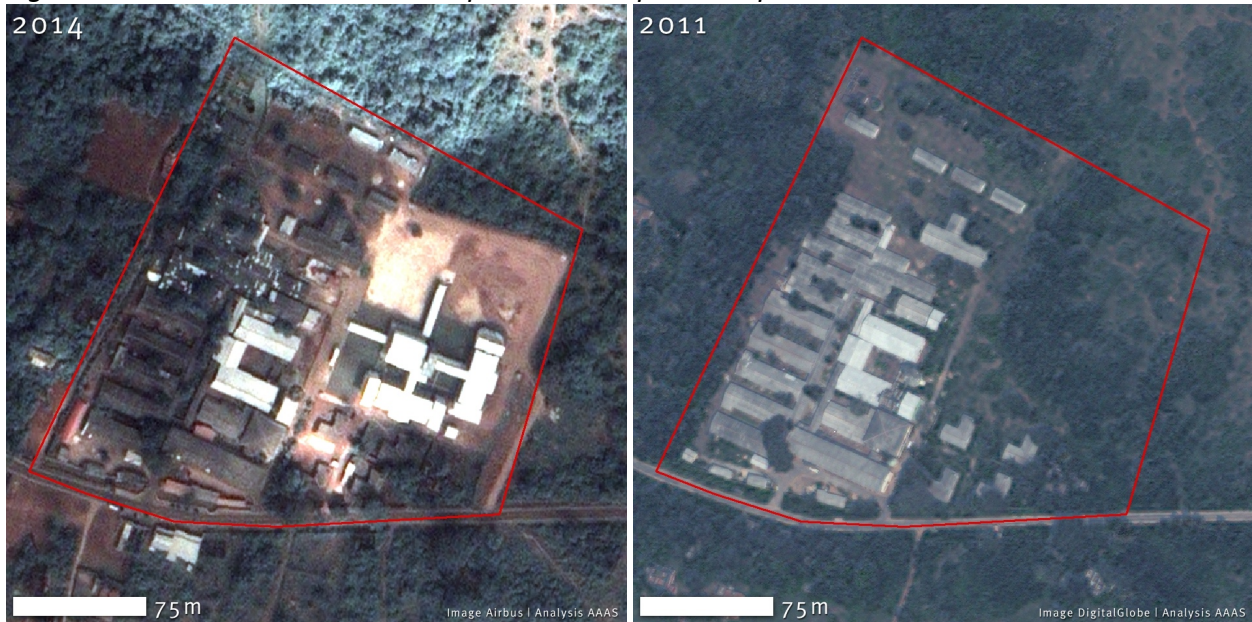


*Between 2011 and 2014, several small structures (yellow arrows) were removed and a half of the roof of larger structure (purple arrow) was damaged. In the same time period, multiple larger structures (red arrows) were constructed. Left Image: DigitalGlobe | Right image: Airbus Defense and Space | Analysis AAAS. Location: 9.7995N, 80.0525E.*

<sup>11</sup> <http://wikimapia.org/#lang=en&lat=9.784830&lon=80.040518&z=17&m=b>



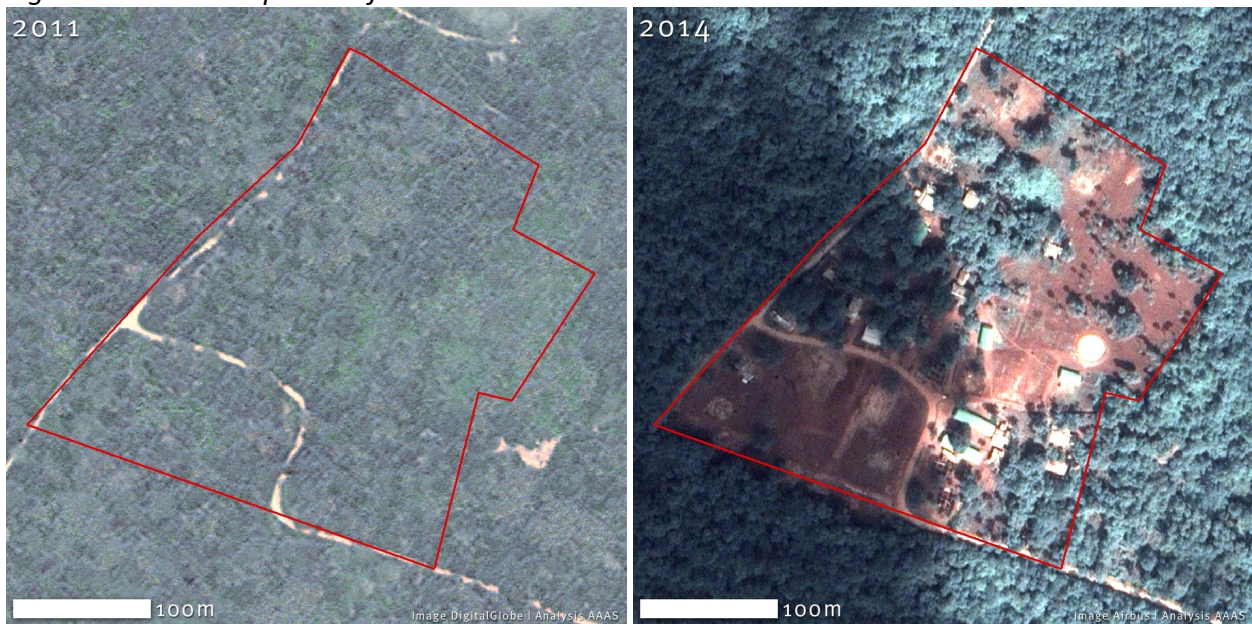
*Figure 14: New structures added to potential hospital complex*



*Between 2011 and 2014, a complex of several structures was added to a potential hospital. Left Image: DigitalGlobe | Right image: Airbus Defense and Space | Analysis AAAS. Location: 9.7852N, 80.0295E.*

In four of the 18 identified institutional areas, no structures were present in 2011. By 2014, several structures had been built in a manner indicating that the land was being put to an institutional use (Figure 15).

*Figure 15: New compound of structures*



*Between 2011 and 2014, a complex of several structures was added to a previously unoccupied area. Left Image: DigitalGlobe | Right image: Airbus Defense and Space | Analysis AAAS. Location: 9.7804N, 80.0535E.*



These examples represent the types of changes that occurred at the 18 areas identified as potentially institutional. They include the removal of older structures and the addition of new, larger structures. In addition, an area that could be a hospital was expanded and four other areas were cleared to make space for new compounds. However, the vast majority of new construction occurred outside of these areas. Most of the construction was clustered in the western third of the study area. These structures ranged in size from 3x3 meters to 15x15 meters and tended to be clustered in a manner consistent with residential development. They were often bordered by cleared fields, indicating that agriculture was also occurring in the area (Figure 16).

*Figure 16: New residential type structures near cleared fields*



*Between 2011 and 2014, large numbers of structures were added to the study area in a manner indicating that they were residential in nature. Left Image: DigitalGlobe | Right image: Airbus Defense and Space | Analysis AAAS. Location: 9.805N, 80.019E.*

## **Conclusion**

At the request of the Sri Lanka Campaign for Peace and Justice, the AAAS Geospatial Technologies and Human Rights Project examined the area known as the Valikamam High Security Zone over the period of 2009-2014. This HSZ, located on the northernmost point of the country, on the Jaffna Peninsula, has been under military control for several decades. AAAS investigated changes within the zone since the end of the 2009 military conflict. Specifically, AAAS aimed to assess claims by the SLC that the area was being developed outside the scope of military usage, particularly in light of assertions from former residents that they are unable to return to their former lands. AAAS observed a number of changes in the Zone during the study period relating to land use. The most obvious change was a dramatic increase in housing-style structures, particularly between 2011 and 2014 (Figure 3). This led to a lack of clarity regarding the delineation of the border between the HSZ and civilian areas (Figure 4).

To further analyze if the land was being put to public use, 18 potential institutional areas were delineated from the 2014 image. Structures in these areas were counted to assess the extent to which new structures were clustered in these areas. Though additional structures were observed in these areas, the number was minimal compared to the total number of structures added to the study area in the time period, indicating that the majority of development consisted of the construction of new residential structures.

In addition, many infrastructure changes were observed, including the creation of a large number of roads and improvements to existing roads, particularly in the form of road paving and widening. Alongside these infrastructure changes were several developments of the coastline, particularly the Thalsevana Holiday Resort and other large complexes of structures (Figures 6-8). Finally, an increased use of the land for farming was observed, but was not quantified because the images used for this analysis were from different times of the year, which precludes vegetation analysis.