Luftwaffe-experiments on the Veluwe moraines in the Netherlands: archaeology of Teerose III (English summary of the report)[1]

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Introduction

On the high moraines of the Veluwezoom (Gelderland, the Netherlands) the German Luftwaffe during World War 2 (WW2) built two radio range and bearing stations (Y-Stellungen): Teerose I and II. About these two stations a lot has already been written. These "Teerose"-stations were the only ones with another third substation, the purpose of which is still unclear and is the subject of this research. This station (Teerose III) wasn't a typical radio range and bearing station. On the basis of a renewed historical research, complemented by archaeological data, an attempt is being made to retrieve more information on this Luftwaffe site. Furthermore, the Teerose station is part of a larger “ensemble” of Luftwaffe-sites that were built north of Arnhem in with the aim of developing radar and radio techniques during the whole occupation period (1940 – 1945). The research has been conducted with the help and consent of the municipality of Rozendaal, the landowner (association of Natuurmonumenten) and the regional archaeologist.[2]

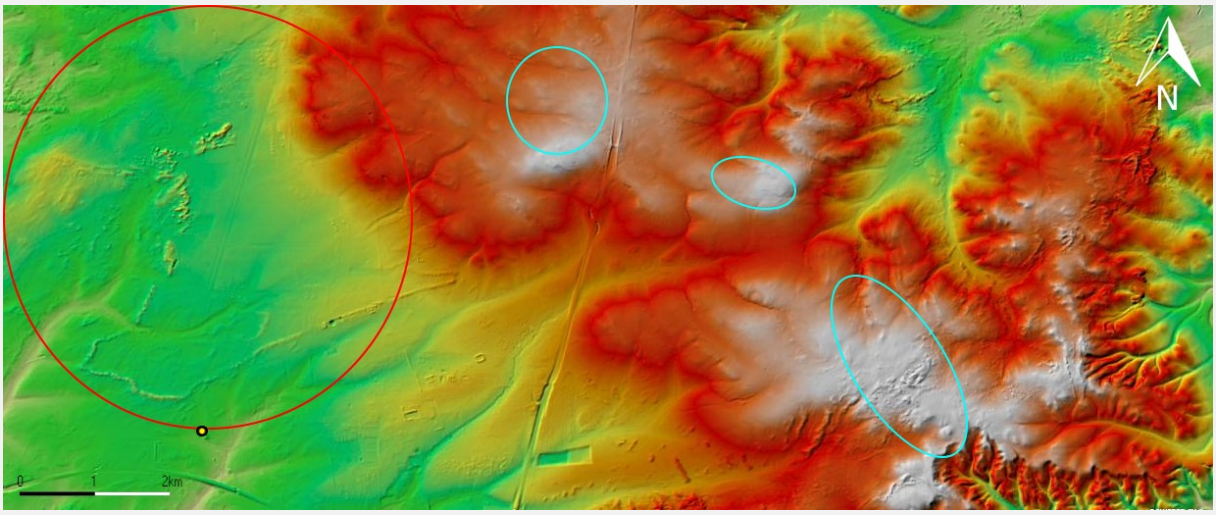

Figure 1: Relief map of the area north of Arnhem called Veluwezoom. Plotted are the three Teerose-stations on the glacial moraines in the blue circles (highest parts, in red and white), the German airfield or Fliegerhorst Deelen on the wide and flat outwash plain or sandr in the red circle and the command bunker Diogenes south of it (Actueel Hoogtebestand Nederland, illustrated by M. Reinders).

Methods

The basis of the historical research consisted of previously published literature on German Luftwaffe-sites, the air defence or Nachtjagd in general and specifically about the situation of Fliegerhorst Deelen and the Teerose-sites. Most information came from the work of “Teerose-pioneer” W.H. Tiemens (1944 – 2005) and the research of local expert H. Timmerman. In this renewed historical research,

several sources have been used that hasn't been consulted before. Among them are post war memories of W. Fricke (Luftwaffe engineer), the administration of the creditor of the military airfield Deelen and original paper administration found at the Teerose II site just after the war. These documents give specific and new information on the Teerose-stations and Teerose III (the research area) in particular. The historical research has been complemented by a detailed analysis of aerial reconnaissance pictures of the Royal Air Force, dated between September 1944 and March 1945. From them, a detailed map of the sites could be drawn. The long shadows on the late December pictures pointed out the different shapes of the buildings and other devices so that particular spots could be interpreted. Also, the pictures of the different dates made it possible to create a phasing of Teerose III. In Augustus 2017 an archaeological research was conducted during three days which consisted of a survey of the area. This non-destructive type of research left out the use of a metal detector. Features and clusters of finds were descripted and registered using GPS. This data could be compared with the 'map' made using the aerial pictures.

Historical sources

The historical research proved that the first construction works on the site started as early as summer 1941, before the Teerose I and II stations. Although, during the end of 1943 another phase of construction activities is known where among other facilities "7 Sendebaracken" or barracks for transmission were built (Figure 2). At the same moment the Dutch resistance mentioned these masts. During the rearrangement of the Luftwaffe in early September 1944, the personnel of Teerose III was already ordered to move to western Germany. On 29 September, shortly after Operation 'Market Garden', Teerose I was completely destroyed by an air raid. Probably the Teerose III site was attacked during the same raid. Within a few days both sites were abandoned. Teerose II however functioned until mid-April 1945 and was never attacked by air. This site was abandoned just a day before the liberation of the Veluwezoom area by British units.

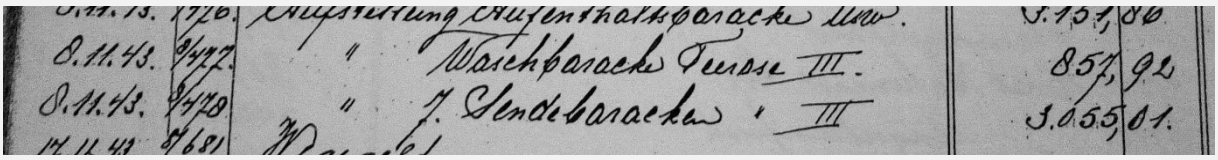

Figure 2: Detail of the creditor administration of the German airfield of Deelen, mentioning the building of one barrack for washing (Waschbaracke) and seven barracks for transmission (7 Sendebaracken) and its costs at Teerose III in November 1943 (NIOD, Amsterdam).

The presence of the Teerose III site corresponds with several events in the direct vicinity of the research area. First of all the development of radar and radio range and bearing was still in its infancy compared to the different combinations and techniques used during 1943 until the end of the war. It became clear already at the start of the war that these "all-seeing-eyes" would play a significant role in winning the war. Eventually a technological warfare was fought between the air forces of England and Germany and later also the USA. They had to create intelligent solutions and countermeasures. The start of the construction in the research area in the summer of 1941 can be seen in the light of this early stage of the development. Furthermore, the staff of 1. Nachtjagddivision (1 NJG, later: 3. Jagddivision) moved to Deelen in January 1942. This military airfield or Fliegerhorst would become the major and biggest in the occupied Netherlands. 1 NJG/3 JG and Deelen played an important role in the development of the air defence of the Reich. The experimental center called "Y-Arnheim" was stationed in the city of Arnhem in May 1942, followed by the Luftnachrichten-Ausbaustab 7 a few months later. Both Teerose I and II served as a practise centre of the scientific Luftwaffe bureau Y-Arnheim. Then, the follow up and "mature" version of the battle command bunker for the Luftwaffe in the Netherlands, Belgium and the Ruhr district codenamed Diogenes became operational in September 1943. It was built at Fliegerhorst Deelen. From the end of July, the Allies were able to jam German radar systems

successfully using metallic strips they named 'Window'. It didn't took long before counter-measures could be taken. The Luftwaffe underwent a major rearrangement that summer. With this sequence of events it can maybe be explained that the Teerose III site was extended in the same period. Probably from the summer of 1943 on Teerose III was inhabited by signal personnel of 2./Luftnachrichten-Regiment 201. What the exact function, the personnel and what kind of devices were placed at the site before fall 1943 is unknown. It's obvious the codename was different, since T III could only receive its name when T II became operational, so after spring 1943. There is a hiatus in historical sources for the summer 1941 – summer/fall 1943 era. In conclusion it can be stated that Teerose III in it's different phases was a part of the major operations of developing radar for the air defence of Germany.

Analysis of aerial pictures

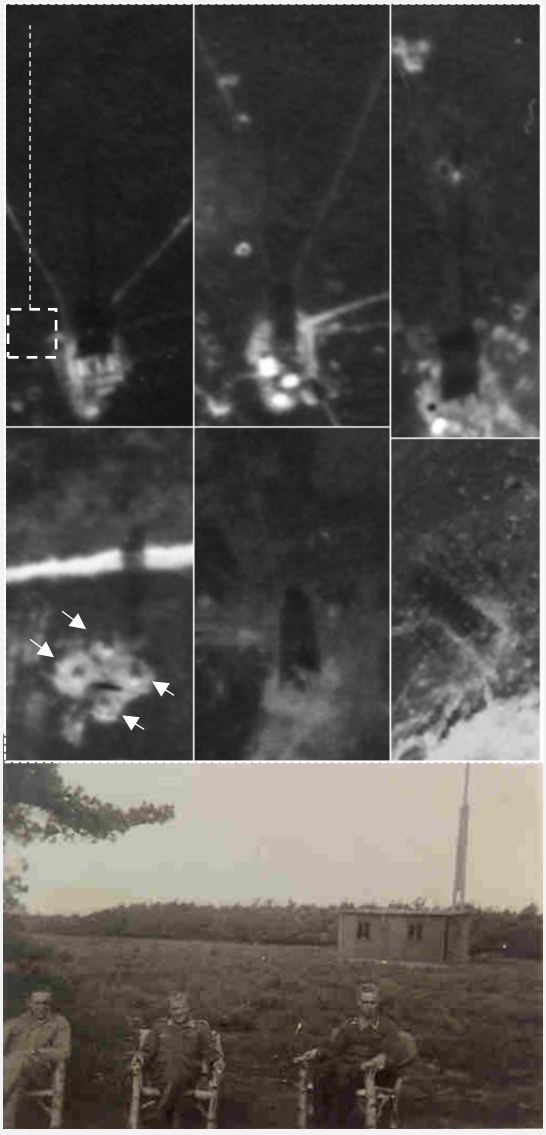

Figure 3 (left): Comparison of long shadows on details of aerial pictures between September and December 1944. From left to right, from top to bottom: three long and thin stripes with a wider structure at the bottom (antenna mast for transmission); four dots without a shadow and a shadow of a tree just right of it (four concrete pedestals for a never built Y-tower); two examples of a very wide and thick shadow of a classic wooden Y-tower at Teerose I and II (Wageningen University and Research, Special Collections). Figure 4 (left below): antenna mast with transmission hut at the Teerose III site, probably during Spring or Summer 1944 (Collection W.H. Tiemens).

The analysis of WW2 aerial pictures gives us more information on details of the site itself. Firstly, Teerose III consisted of two or even three sub-parts, several hundred meters apart from each other. Secondly, a detailed 'map' of the complex could be made. In the biggest of three parts, nineteen buildings or devices were discovered. The shadows of them revealed the presence of eight long and thin antenna masts for transmission and one Freya "LZ" type of radar. These eight masts corresponds to the historical reference of building "7 Sendebaracken" in November 1943 if the complex already had one transmission mast at it's disposal in an earlier phase. A central building was positioned in the middle of the site. This rectangular half-buried barrack doesn't correspond with the typical T-shaped Stellungszentrale or Auswertung, like in Teerose I and II or other Jägerleitstellungen in Western Europe. Another important discovery is the proof that not a single Y-tower for radio range and bearing like the other two Teerose-sites was present. Known shadows of other Y-towers don't correspond at all with the shadows with the research area (Figure 3). Several bomb craters of the air raid are visible on pictures after 19 September 1944. This attack destroyed the central building and another small barrack just east of it, but left the other masts and devices intact.

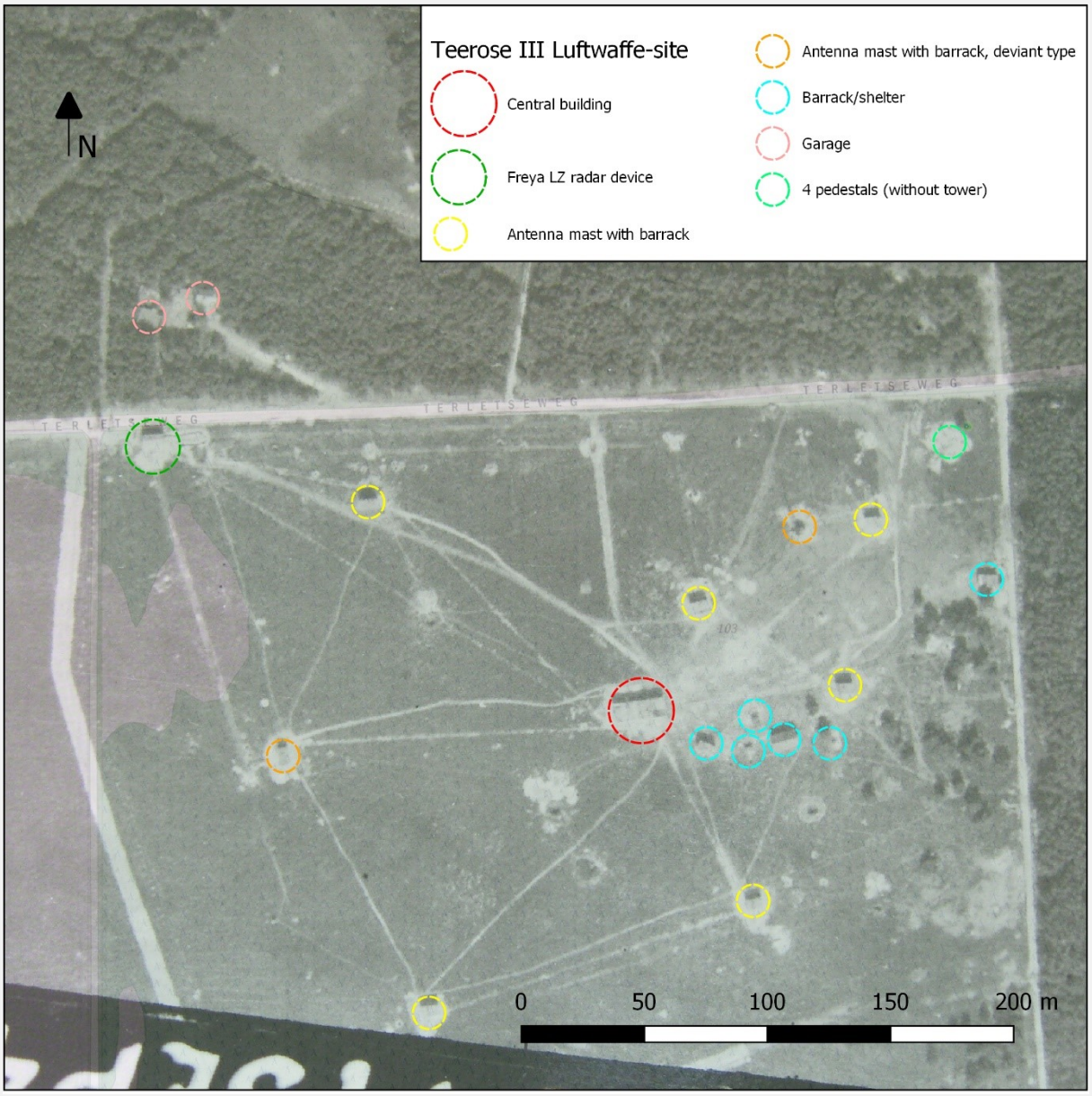

Figure 5. Plan of the Teerose III Luftwaffe-site on the Veluwe moraines, north of Rozendaal-Arnhem. A half-transparent aerial picture of 19 September 1944 is provided with interpretations of all different buildings, barracks and devices according to the date from the analysis of aerial pictures and archaeological evidence (Illustration by M. Reinders).

Field results

During the archaeological survey a total of 88 features was discovered and registered. Because of the non-destructive character of the field research, all these features are still present in the landscape and so not 'classic' ground features. These features vary from rectangular surface depressions or trenches in the landscape to concrete pedestals, iron anchors for guy-wiring and about 30 fox holes for air cover. It was possible to extend the layout of the site that was already made with the results of the analysis of the aerial pictures. Aside from the remaining (or disappeared) features of different masts and devices, some field data gave more insight on spots on the aerial pictures that weren't immediately clear. In one instance, four concrete pedestals that are still present today are generally accepted as the "remnants of an Y-tower" on the internet and in literature. These Y-towers are classic examples of

a radio range and bearing station from 1942 – 1945 in the Netherlands and elsewhere in occupied Europe. Both Teerose I and II had five Y-towers each at it's disposal. However, analysis of the aerial pictures already showed these pedestals as four dots and without a trace of a tower or other building. Another example is a cluster of features that in first instance looked like bomb craters. These six pits (4 -5 m in diameter) lie in a chequered pattern and are presumed to be man-built. After finding several brass shells with the remains of a wooden bullet in the high grass and blueberries in these "craters", the spot is being interpreted as a training range for the Teerose-personnel. The shells are of the calibre 7,5x54mm MAS and are of pre-war French production. This kind of captured arms (Beutewaffen) was widely used by the Wehrmacht. Pictures of veterans from Teerose I show a shooting practice with a MAC mod. 1924/29, a French light machine gun that shoots the same calibre as found.

Figure 6 (left): Concrete part of a construction, found in the direct vicinity of the Freya radar. According to an employee of landowner Natuurmonumenten, it has been removed from it's in situ spot by foresters during the 80s of the last century as it stood in the way. Figure 7 (right): one of the iron anchors for guy-wiring in situ at the location of one of the eight known antenna masts for transmission (Photographs by M. Reinders, August 2017).

Figure 8 (left): All found small arms ammunition in the research area. From the left: five brass French 7,5x54 MAS shells, one containing part of the wooden bullet indicating the training purpose; two at the right: regular German 7,92,x57 Mauser shells from 1937 and 1935 (Photograph by M. Reinders).

This field data furthermore was evaluated and valued so that the most prominent features in the landscape including its interpretation could be pointed out on a map. This map can be used by the landowner to take into account and save these original remnants in the future. It also serves as a beginning of the archaeological inventory of all different Luftwaffe-sites built on the Veluwe moraines that collaborated in disturbing the allied bomber traffic, defending the Reich and extending the war.

Conclusions

All information combined concludes that Teerose III was no classic Y-station or Jägerleitstellung so not a copy of its "sisters" Teerose I and II. Based on the WW2 aerial pictures it consisted mainly of antenna masts for transmission, one Freya radar device and no radio range and bearing or Y-tower. Judging the early construction activities in the area and the important role the region of Arnhem played in the development of radar and radio techniques and the combination with leading fighter planes and anti-air craft batteries (Flak), it most probably served as an experimental and practice centre for the Luftwaffe in first instance. During the major rearrangements of the Luftwaffe in the fall of 1943 Teerose III was expanded. This could be seen in the light of developing and usage of a new technique, like the Y- und EGON-Verfahren. In that case, Teerose III received a specific purpose and an own 'identity'. It can also not be ruled out that Teerose I and II supported Teerose III, or vice versa.

Besides the discoveries that have been made at the site itself, the archaeological project of Teerose III serves as a first endeavour to map out all different Luftwaffe-sites at the Veluwe moraines north of Arnhem. These include the airfield of Deelen, the radio range and bearing and other radar stations, the anti-air craft batteries (Flak) and all other smaller sites that contributed to the development of the German air defence. Never before has a systematically inventory been made on these remnants that can be referred to as the "Deelen ensemble".

All these different sites, today in different states of preservation, were built in order to disturb the allied Air Forces as much as possible. These individual sites and the collaboration between them caused to prolong the war in the advantage of the Third Reich with numerous of both Allied and German pilots and civilian casualties as a direct consequence.

Figure 9: View from the relatively high Teerose III site to the lower southwest (Photograph by M. Reinders, May 2018).

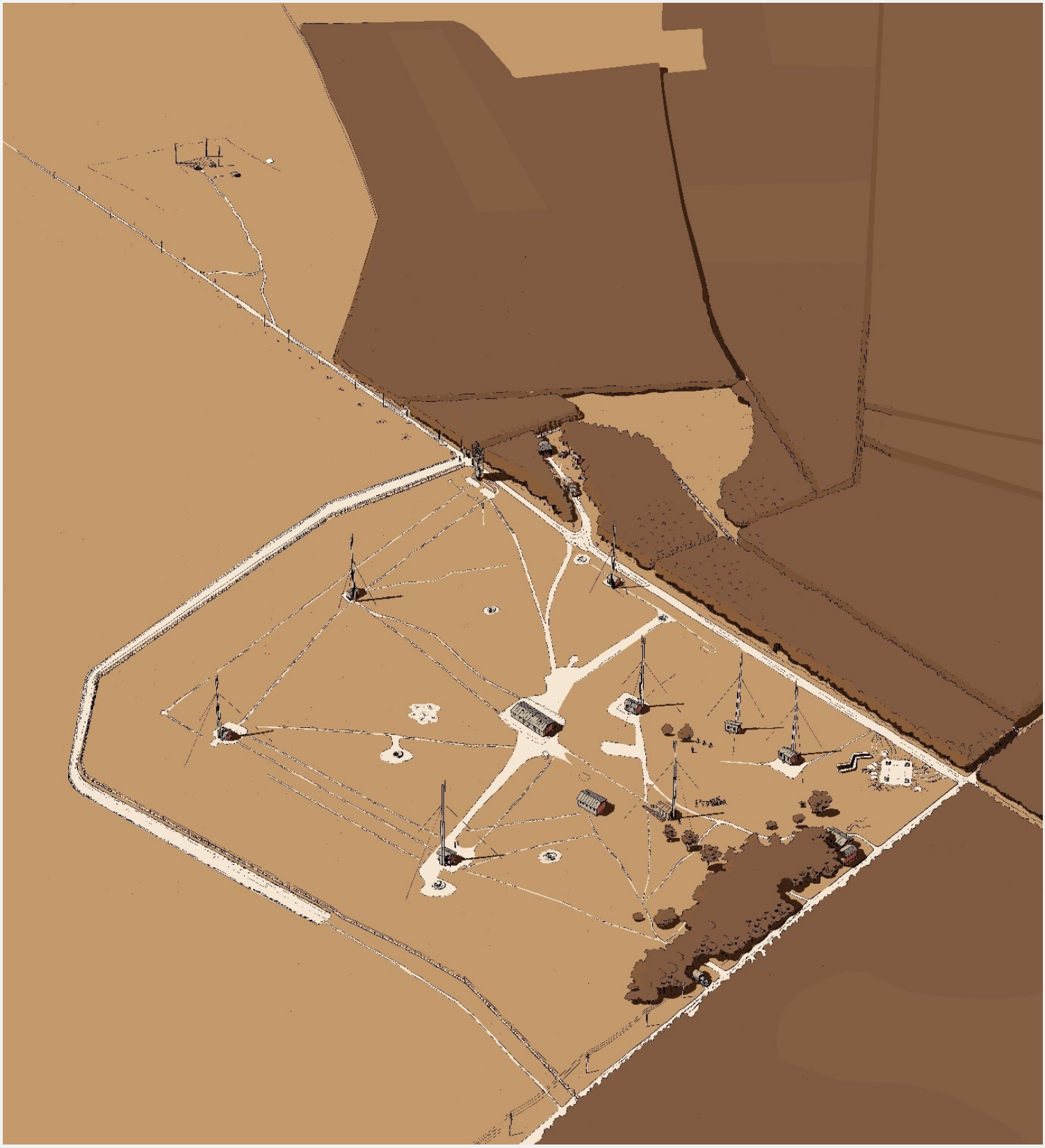

Figure 10. Artist impression of the Teerose III site, dating between fall 1943 and September 1944. The interpretation of the different buildings, masts and other devices has been done using archaeological and historical references (Drawing: M. van Willigen).

Notes

1. This English article is just a summary of the complete research that has been published as a report, written in Dutch.

2. In accordance with the landowner, this summary leaves out the specific locations within the research area in order not to publish a “treasure hunt map” for metal detecting souvenir hunters.

Acknowledgements

For several reasons I would like to thank the following people: Hans Timmerman (Arnhem) for sharing his decennia long research and most of the historical sources I used and not to mention his help during the field survey. André ten Hoedt of the association Natuurmonumenten for his willingness to help during the field survey and most important of all to give access to the area. Michiel van Willigen (Sint-Oedenrode) for his superb designs and drawings of the research area. Dwayne Beckers (Herkenbosch), Joris Habraken (regional archaeologist of Arnhem), Henk Jacobsen (municipality of Rozendaal), Ruurd Kok (Leiden), Kees Neisingh (Stichting Menno van Coehoorn), Michaël Svejgaard (www.gyges.dk), René Voulon (www.luchtoorlog.net) and Nick Warmerdam (Utrecht) for mail conversations, sharing sources, thinking with me and function as a sounding board during the research and writing of the report.