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## HERITAGE SURVEY IN ESTONIA

### Aerial and ground-based evidence in partnership

*Ants Kraut, Project Co-ordinator, National Heritage Board of Estonia*

#### Background and objectives

Traditional field survey techniques are well developed in Estonia but less use has been made in the past of geophysical prospection and virtually none of aerial survey, whether for exploration or for conservation. The Culture 2000 project has permitted the National Heritage Board to take the first steps in training Estonian archaeologists in the techniques and uses of exploratory air survey, air-photo interpretation and mapping, including initiating a limited programme of active aerial survey. Throughout the project the aerial work has been linked closely to ground-based observation and geophysical prospection in a complementary application of techniques not previously practiced in Estonia. Selective fieldwork and aerial observation have been carried out on carefully chosen sites, mostly in the north and north-eastern coastal areas, where forest cover is less dense and there was potential for recording wrecks and other submerged features.

#### Achievements in 2004-2007

The project team consisted of Ants Kraut, the Board's Chief Inspector of Archaeological Monuments, Armin Rudi, undertaking fieldwork and photo interpretation, and Endel Grensmann managing photographic and technical support. Professor Valter Lang of Tartu University and Professor Marika Mägi of Tallinn University were involved as consultants. Administration and financial issues were first handled by Riin Alatalu and later by Helle Solnask of Muinasprojekt OÜ, whose previous experience of EU-funded projects had been valuable at application stage.

The main activities included the testing of various methods of aerial archaeology in the specific environmental circumstances of Estonia, including the discovery of previously unrecorded sites from the air and the inspection of already-known sites (both archaeological and architectural) for a more precise definition of their boundaries and state of preservation. The aerial work was supplemented with extensive ground-inspection of the sites and study areas. A total of 27 hours of aerial reconnaissance were flown during the project, producing about 1000 photographs of 200 sites and locations, many of them not previously recorded from the air. Ground-based inspections were made at over 100 individual sites as well as of large tracts of landscape of potential heritage significance. Tests were also made with aerial reconnaissance along the route of large motorways, where there will in future be large-scale soil disturbance.

Aerial inspection in the chosen study-area was in the event impeded by extensive tracts of forest and mire, aerial observation normally working best in 'open' landscapes. Nevertheless,



*Preparing for an air-photographic sortie, and a typical landscape, with bog, in northern Estonia.*





*Caption*



*A typical view from the eastern part of Estonia. In the open fields some of the stone-piles represent prehistoric graves, others are the result of stone-clearance during the extensive landscape re-ordering undertaken during the 1960s and 1970s*

large bogs are not without interest and aerial inspection helped to reveal or medieval sledge routes. The study of historical maps can also contribute to the understanding of historical communication routes. The comparison of data obtained from the air with that gathered from the ground was one of the main objectives of the program.

Aerial exploration revealed several complex aggregations of archaeological sites that were settled during the Middle Ages and therefore bore traces of such as the ruins of a medieval feudal stronghold overlying a Viking Age settlement. In the majority of cases the reconnaissance flight was followed by on-ground inspection. All seemingly positive results need to be cross-checked by visits on the ground, a phase of work partly completed during the course of the project.

The project team's particular interest focused on manorial estates. At several sites aerial photographs have provided good overviews of the often extensive complexes and of the exact relationship of individual buildings to one another, especially regarding possible connections of the manorial buildings with former (archaeological) settlement areas.

*The site of the Viking harbour at Tornimäe in the island of Saaremaa. The Viking-age sea level occupies the right-hand half of the picture. Remains of the harbour were excavated to the right of the white-walled Russian church, just left of centre.*



*The site of the harbour at the medieval castle of Maasi. The castle and its adjacent bay lie to the left of centre. There are documentary sources to shipwrecks not far from the castle but aerial photography has not as yet been able to locate them.*



*The medieval stronghold on the island of Saaremaa. This was the scene of the last 'War of Independence' against the Germans and Danes in March 1227. Aerial photographs of this kind are valuable for documenting the character and state of preservation of such monuments. They are also used in both popular and scientific publications.*



*Professor Marika Mägi with participants in the Tallin Workshop of October 2006, at the site of the ancient harbour at Tornimäe on the island of Saaremaa.*

## **Aerial Archaeology Workshop**

One of the key events in the Estonian part of the project was an international seminar and workshop on *Aerial Archaeology and Maritime Landscapes* held in October 2006 in Tallinn and on the island Saaremaa. This provided opportunities for promoting cooperation between coastal archaeologists from various parts of the Baltic and Scandinavian area and offered the possibility to integrate the methods of aerial archaeology into this kind of work. An important part of the seminar involved meetings and networking with experts from project co-partners, discussing the possibilities of applying aerial photography in the recording of the Estonian landscape.



## **Network contacts and meetings**

Project members participated in meetings in partner-countries (Finland, Belgium, the UK and the Czech Republic) to broaden their experience through discussion with air photographers and landscape archaeologists from other parts of Europe. Attendance at courses in Finland and Poland proved of great value, providing extensive experience in the practice of aerial archaeology, both in the air and in the office, and offering supportive contacts for the future.

## **General Assessment of the project**

The National Heritage Board feels that the project objectives were realized to the full.

- Networking on a European level was enhanced and the exchange of information strengthened.
- New experience was gained at two specialist workshops and the acquired knowledge was tested in Estonia, an important gain from the European project.
- Two major universities specializing in archaeology in Estonia were engaged in the project and a joint seminar took place.
- Exploratory flights were carried out and valuable experience gained in active aerial work.
- On the basis of the flights a database of aerial photographs was compiled.
- The results of the air photographic recording were tested on the ground.
- In areas searched by aerial reconnaissance historical maps were digitized for further research work in the future.
- A methodology was developed for the comparative analysis of historical maps and freshly-taken aerial photographs, a technique until now little used in Estonia.
- Technical equipment was updated and the know-how to use it was developed.

### ***Changes in the planned activities***

- It was decided not to attempt taking photographs from a tethered balloon. Instead, the project team concentrated on light-aircraft flights, drawing on experience gained from European colleagues in the decade since the first aerial archaeology workshop in Hungary in 1996.

### ***Problems***

- There were significant differences in the air-survey results as compared with those achieved in Lithuania and Poland. It will be necessary to make comparisons also with the results achieved in Latvia (outside the Culture 2000 project) to establish whether the differences might be caused by the specifics of landscape development in the various countries.
- The search for sunken wrecks and other possible features in coastal waters did not produce the expected results. It will be necessary to carry out a larger number of flights, in varying weather and lighting conditions, to explore the possible reasons.
- Further experience is needed to achieve success in some aspects of the project, especially in areas where the natural conditions are unfavourable. For example, attempts to use aerial survey to establish the precise location of buildings on archaeological sites have so far had limited success, though patches of darker soil indicating intensive human activity have been detected on numerous occasions.

### ***Added value***

- Excellent aerial photographs have been taken of the built heritage and historic parks and some have already been used in publications, mainly in overviews of the local cultural heritage published by rural municipalities.
- Based on experience gained in the Culture 2000 project, aerial photography may be used for future environmental monitoring and for determining the state of protected areas.
- The project offered valuable experience in co-operation, in the creation of a unique data-bank based on aerial photography, and in establishing the basis for future research and collaboration.



### HIGHLIGHTS 2004-2007

**Belgium** Air photographs uncover the battlefields of Ypres

**Czech Republic** Air survey, excavation and a grand exhibition

**English Heritage** Air photo training schools at home and abroad

**Estonia** Estonian archaeologists take to the air

**Germany (Mecklenburg-Vorpommern)** Seeing beneath the waves

**Germany (Baden-Württemberg)** Iron Age fortresses in their landscape setting

**Germany (Freiburg)** Airborne laser scanning to 'see through the trees'

**Hungary** Combining techniques to explore the Neolithic

**Italy (Puglia)** Uncovering and mapping the past through aerial survey

**Italy (Salento)** Modern techniques and a Roman harbour

**Italy (Tuscany)** Air survey, laser scanning and geophysics

**Lithuania** Raising awareness through aerial archaeology

**Poland** New discoveries and new systems for heritage conservation

**Slovakia** Stone Age monuments from the air and on the ground



### A LOST TOWN RE-FOUND

Szamotuly, in Poland is a medieval town, its originally open market square now filled with later buildings (top). Until recently historians believed that the town always occupied its present site. This view changed dramatically in July 2006 when spectacular air photographs, taken as part of the Culture 2000 project, revealed its original location at Mutowo, 2.5km away, where it had stood before a disastrous fire in the 14th century. One of the photographs is shown here (centre), rectified to fit the present-day map. In the bottom image the town's large open square, outlined by the dark marks of cellars beneath its surrounding buildings, has been plotted on the rectified photograph, along with the presumed lines of the linking streets.

