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Presenting The Hidden Past

Highlights and impressions from the lowlands


europalia
traject noord
Antoine Dansaert straat
Huidige Straat
Oude Graan markt
Volgende Straat
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GPS
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Sint-Katelijneplein

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New visions on a hidden past

The region *Kop van Noord-Holland* in the Netherlands is situated 50 km north of Amsterdam and shows a remarkable variety of landscapes. The area consists of a combination of various natural structures such as dunes and Pleistocene deposits and man-made landscapes such as polders. Part of the area contains vast quantities of important prehistoric remains, both cultural and natural. The cultural remains are not visible or recognisable in the landscape. The natural remains are visible on-site, but need support to be understood and appreciated.

The territory is accessible by cycle routes and walking trails and major projects are planned in the domain of cultural heritage and tourism. During Spring 2008 the Cycle Route Network will be introduced in the area. In the second decade of this millennium, the Wieringerrandmeer project will be well on its way to completion [WRM]. This project creates a new lake next to the former island of Wieringen, which will turn it back into an island, so it will have great influence on the landscape and will be vital for economic development of the region.

This KNOWHOW booklet deals with practical ICT solutions for supporting heritage in the tourism domain and helping to create new tourism destinations in the Groetpolder-De Gouw/Wieringermeer/Wieringen area. The suggested developments are based on the Tourism Marketing Framework of the region and can be used as inspiration for other regions to build on their tourism assets and to promote their region.

The former island of Wieringen stands out clearly against the polders on the right hand side

Background

Why was this area selected?

The area Groetpolder-De Gouw/ Wieringermeer/Wieringen, which is the focus of this KNOWHOW booklet, has the following assets and policies in the area of tourism development and heritage:

- Unique archaeological and geological remains
- A history of several thousand years as a unique showcase of continuity and change
- The Wieringerrandmeer project as an evocative project for the future
- New tourist destination potential for exploring the rural hinterland
- Two designated areas on the Dutch Tentative List for UNESCO World Heritage Sites

This area provides excellent potential to be further developed as a tourist destination through ICT, as the available prehistoric heritage is of high value but needs support to be entertaining and understood.

The Wieringerrandmeer project will enhance the cultural and natural heritage of Wieringen

A short overview of the prehistoric heritage

The area hosts the cultural remains of the Funnel Beaker Culture (c. 3300-2800 BC) and the Single Grave Culture (c. 2800-2400 BC). As archaeologists assume a certain transition between both cultures within European prehistory, it is very likely that this will be discovered in the northern parts of the county of Noord-Holland. This conclusion was made after an intensive study and interpretation of several thousands of photographs using infrared technology, made by the Royal Dutch Air Force.
The excavated sites were intact, showing daily life in a settlement around 2400 BC. On one of the sites, one gets the impression that the people who lived here moved on from one day to the next, so the site gives a real snapshot of the daily life 4400 years ago. Around fifty non-excavated sites are still being preserved in the agricultural soil. The importance of the archaeological archive is recognised by the State Survey for Archaeological Investigations and the County Council of Noord-Holland.

Evocation around 2400 BC of Winkel-Zeewijk (Groetpolder) in a tidal landscape with a reconstruction of the village based upon archaeological evidence

Extensive excavations in Winkel-Zeewijk and near Slootdorp revealed many thousands of objects, including previously unknown types of pottery, amber working and a new type of battle-axe, which were meticulously documented in a three-volume handbook. The significance of the prehistory in the area was highlighted with the discovery in September 2007 of an eight metre long boat, made out of a single oak tree, dated around 3300 BC. Situated adjacent to the polders, the former island of Wieringen rises up to 14 meters above sea level. It was mainly formed about 150 000 years ago, during the Pleistocene Saalien period. Today, the hilly landscape with its till core is still in a remarkably good state of preservation. Wieringen is a geological landmark within the man-made polders and the seascape that has already received major recognition. The north coast of Wieringen, that gently slopes into the Wadden Sea, is a nominated World Heritage area, as the area possesses unique natural and cultural heritage. The local heritage centre *OpZeeLand* in Kolhorn provides information about the history of the

area, with a focus on both the Neolithic period and the ongoing agricultural activities. Information on the Pleistocene landscape of this former island is available in the visitor centre *Vikings on Wieringen* in Den Oever [VIC].

Part of the Western Wadden Sea nominated World Heritage Site (north coast of Wieringen)

Established tourist destinations in the area and the potential of the hinterland

Kolhorn, once an old Zuiderzee port, lies on the edge of the old and new land. The village is listed in the monument protection scheme. This is a typical Zuiderzee village and a well visited tourist destination, accessible by bike and boat. The old village is both the start and the finish of various roundtrips for bikers and hikers.

With the exception of Wieringen and Kolhorn, the rest of the area is not an attractive tourist destination today. But this situation is changing. The realisation of the Wieringerrandmeer project will have a huge impact on the landscape and its inhabitants as it will restore the Wieringen area as an island. It will contribute to regional development, produce new waterways between the North Sea area and the IJsselmeer and become a new tourist destination on its own.

In spring 2008, the Cycle Route Network (CRN) will be established in the area. This CRN consists of a signposted network of safe roads that are well suited for biking, were every junction has a unique number. The CRN will be implemented in the entire county of Noord-Holland.

Wieringen, the former Zuiderzee island, is a tourist attraction in its own right. The Pleistocene landscape setting with its specific monuments and buildings, medieval churches, museums and Viking Age heritage make this an excellent tourist destination that focuses on sustainable tourism development by local small and medium entreprises (SMEs).

Policies and integration

Local municipalities like to create sustainable products to develop the local economy. Tourism remains one of the most important domains to realise this goal, as it continues to grow on a global scale and will certainly continue to do so for many years to come. Within this domain, the importance of cultural heritage in the Netherlands is ever increasing. Hence

there is a profound interest to create and develop a new tourist destination for a wider audience in the rural hinterland of the coastal zones in the north of Noord-Holland.

The tourism domain is part of a region's economic policies. Economic policies are based on marketing principles, in other words on supply and demand. In making the area an attractive destination for visitors, local policies include an integrated approach for regional development, and therefore should deliver products in various domains like economic development and education.

Within the heritage domain (the "supply" side), the first priority is to conserve the archaeological remains in an undisturbed way on site. In accordance with Dutch law, partly an implementation of the Valletta Treaty, excavation of archaeological sites is strictly prohibited with only very few exceptions. If excavation becomes necessary, the archaeologists have to deliver information on the archaeological remains for public, scientific and educational purposes. The results may also be of importance for the tourist destinations and products.
In developing new tourist destinations, we distinguish the following target groups (the "demand" side):

- Families with children
- Active 55+ persons (bikers, hikers)
- Tourists
- School children
- Special interest groups
- Local and regional inhabitants

The suggested new tourist destinations should cater to a variety of target groups, including the occasional users of the cycle routes and the walking trails. So the route itself should be attractive to ride or walk along. This can be stated as a clear requirement for the development of these destinations and sites and the marketing of new packages.

To cater to the visitor, some local SMEs have the opportunity to extend their business offerings, for example through bike rental and repair facilities close to the routes.

Exploring the route network

We considered the use of *digital technology* to support these new tourist destinations based upon the value and content of the existing assets in the heritage and tourism domain in the selected area. We focused on the support for routes and on-site presentation technology that helps to tell the story of the hidden heritage of the area. We used also a route network, based upon existing routes, that allows us to offer a wide range of options.

We built a *route network*, based upon the existing Wiringerlant cycle route and the Noord-Holland trail, and upon the Cycle Route Network (CRN). These sign-posted routes cover the selected area, and will act as the main infrastructure for developing new and sustainable tourism destinations. These well-promoted routes are documented and will be marketed within the CRN from mid 2008 onwards.

This route network links to various interesting sites, monuments and

landscapes to form an extensive heritage trail and provide the tourist with an interesting heritage offering. As it also contains walking trails, both bikers and hikers can use this network. As it is also linked to the surrounding areas through the CRN, we can expect that many tourists using the CRN will find their way to the Kop van Noord-Holland area, especially if the proposed heritage presentations offer sufficient added value and get sufficient promotion.

Along this route network, *ICT-based presentation systems* provide an innovative approach for understanding and enjoying the cultural and natural heritage (see map below). The **Talking Tower** systems focus on audio information while the **Augmented Reality (AR) Telescopes** provide a more visual approach.

The route network is supported by two visitor centres: *OpZeeLand* in Kolhorn and *Vikings in Wieringen* in Den Oever. Pre-visit systems in these visitor centres help the

The proposed use of ICT along existing routes in the selected area

tourist to get an overview of the available heritage and to understand its value and uniqueness.

How the ideas are implemented

Concept development

To present the highlights and impressions of the hidden past of the Wieringen area, we use an *e-tourism* approach based on cultural routes, as defined in the related EPOCH showcase (see EPOCH website [EPOCH] under scenarios/e-tourism). This approach is based on a *route network*, on *pre-visit* and *post-visit* support, on the *integrated* use of ICT to make the hidden past presentable and available to a wide public and on *rich content* with a *thematic* structure.

The *route network* is preferrably built on exisiting routes, which have proven to be suitable and safe roads for hiking and biking and which have an existing infrastructure, such as route signs, picnic places, bridges, safe road crossings, etc. A route network offers the tourist a choice in the duration of the itinerary, in the items that are considered interesting or in the kind of roads that are used to make the trip (type of pavement, suitability for children, safety, presence of woods or water, presence of other traffic, etc.).

It is a known fact in tourism that preparing a journey is in fact as important as making the journey itself. Providing the right information through the Internet is therefore an important step in building a new tourist destination. It not only helps the tourist to select the items that are of interest and plan the journey, but it also helps to *structure* the information that is given along the route. As the tourist encounters the information as it comes up during the trip, there is no guarantee that this makes a coherent story. Providing an overarching structure during the pre-visit phase creates a better understanding and structure of the information during the trip.

The latter is quite useful as the order in which information is presented along the route is defined by the itinerary and the selected points of interest, hence it is not guaranteed that a coherent story can be told along the trip. Implementing this *pre-visit stage* through ICT is quite useful as all kinds of information and media can be offered, such as opening hours, photographs, maps, panoramas, video sequences and interactive applications. To give potential tourists a flavour for the importance and richness of the cultural and natural heritage that is present, *explorative applications* can be provided, such as interactive landscapes (see also the KNOWHOW booklet on Interactive Landscapes) that allow seeing the evolution of the landscape and discovering the stories connected to the different phases of that evolution.

Support by innovative ICT applications along the route allows the visitors to *read* and *understand* the landscape in a much easier and engaging way, and *appreciate* the cultural and natural heritage in a more profound way while on site. The implementation of such technology needs

to take into account the defined target groups and goals, the sustainability and cost efficiency of the selected technologies and the potential impact on the tourists that choose to come to Noord-Holland and use those technologies.

Additional support to the tourists is given by the *visitor centres*, which not only have a role to provide information, but also play an integral role in the visit by housing exhibitions and pre-visit technology for people that have no access to the Internet or that haven't prepared their visit beforehand.

Post-visit functionality is typically implemented by selling publications on the topics visited, but can also be implemented through the Internet, linked with the applications on site and in the visitor centres. This helps to create a psychological bond with the visited site, which in turn stimulates re-visiting and further promotion of the site by the visitors.

The right concept can only be defined in close consultation with the involved *stakeholders*, and takes into account the *strengths* and *weaknesses* of the area and looks for *opportunities* and *threats* that are present in the assets and policies of the area. In addition, the various target groups are defined and a list of user needs per target group is made. This SWOT-analysis and the user needs list are the basis for defining the concept, creation and implementation of new tourist destinations, supported by ICT.

Pre-visit and educational applications

Pre-visit information should clearly *inform* the potential visitor, *convince* that visitor to come by showing the added value and advantages of the destination and *structure* that information in a coherent image of the area.

Typically this is done through travel guides and tourist brochures. More and more, this is complemented with a *pre-visit Internet portal* that acts as an information source and marketing instrument. It is also important however to provide this pre-visit functionality in the visitor centres on site, not only for people that have no access to the Internet but also to structure the information and provide hints for an on-site visit immediately after obtaining the information in the visitor centre.
The same approach is useful for educational purposes. By providing the right tools in the visitor centre to visualise and understand the landscape evolution, for example, one can then complement this information with an on-site visit to obtain a deeper insight in the processes that create and shape the landscape.

Educational department of the visitor centre Vikings on Wieringen

The current state of technology allows us to recreate landscapes in an interactive, *serious game* and show the evolution of the landscape through games technology. Although the resulting application is not a game but rather a virtual environment for exploration, it can be used to visualise complex geological, historical and natural processes in an intuitive way and provide a direct link with the exhibition in the visitor centre and with the current landscape that can be visited immediately after using the "game". In this way, it becomes a powerful educational tool that is appealing to both children and adults.

In the case of the Den Oever and Kolhorn visitor centres covered in this booklet, the game is able to show the landscape evolving back from today to 2400 BC. The backwards evolution shows transgression and regression by the sea, tidal waters, settlements disappearing and emerging and man-made structures disappearing in the landscape. By walking through a virtual ancient landscape, visitors can enjoy the flora, fauna and sounds of that era, and learn about the way of living in that period.

A serious game example

A good example of a serious game for water management is the Dike Inspection Simulator, launched at the end of 2006 and developed by Delft University and the GeoDelft Institute in the Netherlands [GEO]. It trains dike inspectors to recognise the symptoms of a weakening dike and to take timely measures before the dike breaks. The same technology and approach can be used to turn our knowledge about the ancient landscape and its inhabitants into virtual environments for different periods that can be explored interactively (see the KNOWHOW booklet on "How to make sustainable visualisations of the past"). Several examples of visualisation of prehistoric landscapes and glaciation processes through games technologies can be found at the Virtual Landscape Centre in Scotland [VLC].

Screenshot from the Dike Inspector Simulator serious game

Archaeological objects and traces of early agriculture (cowhoof imprints, ploughing lines, etc.) can be linked to this virtual environment, providing an appealing way to learn about archaeology. For example, the evocation of the Winkel-Zeewijk site can be turned into a virtual environment that can be seen both from a bird eye's point of view as well as from a normal point of view on the ground.

Technological advances allow us to make the virtual environments found in serious games available on the Internet, so they can be integrated in a pre-visit portal and provide an innovative way to explore the history and evolution of a certain area before visiting it.

In this way, the serious game makes the history of the landscape accessible and understandable in an educational and entertaining way. It thus caters not only to the needs of a few target groups, like tourists and local inhabitants, but may extend to specific needs in various other domains like heritage, education, history, nature and water management.

The heritage centre OpZeeLand

The exhibition in *OpZeeLand* has been supplied with tangible artefacts from Winkel-Zeewijk and from Aartswoud, further south. These artefacts include a new type of battle-axe, made out of boulders from Wieringen, amber beads, the remains of the daily diet and – last but not least – the skeletal remains known as Cees (male) en Mien (female).

An educational package, based on the book "Bekermensen aan Zee" (Beaker People at Sea) and linked to the national curriculum, is available for both schools and tourists [BEK].

The storyline of the book focuses on three themes:

- The struggle against water: how people adapted to life in an area that is under constant threat of flooding
- Technology and trade: the use of the natural habitat for cultural expansion, creating and using arable land, trading amber along routes
- Life and death: the daily life on site is illustrated by the impressions of the early ploughing, pottery production, harvesting and the beads industry, the death is illustrated by the skeletal remains discovered in Aartswoud and Winkel-Zeewijk, telling a horrifying yet entertaining story

Other issues that currently get a lot of attention, such as climate change and migration of people, are also dealt with in a historical perspective. The cultural and natural assets in the area, especially those that are nominated for the UNESCO World Heritage List, are also highlighted in this exhibition.

The exhibition and educational programme provides information for various target groups based upon these three major themes. The list of user needs of various target groups helped to produce various layers of specific information, linked with the aspect of "continuity and change" to make a reference to the present day and

create a better understanding of the past. The information is also available on the Internet through the website of the Regional Tourist Board [RTB]. Only small parts of the content are offered as an appetizer for potential visitors and therefore this web presence can be considered as a marketing instrument.

The visitor centre Vikings on Wieringen

The visitor centre *Vikings on Wieringen* will develop an extension of the present building to host a permanent exhibition on the geology of Wieringen, with a special focus on the Pleistocene era (popularly known as the Ice Age), including the genesis and evolution of the Wieringen landscape.

Currently, there are already interactive multimedia systems (called **Timescope**) available in the heritage centre OpZeeLand in Kolhorn and in the visitor centre in Den Oever that have a pre-visit functionality [PLE]. The visitor can get thematic information about the history of the area and many interesting places in the

The visitor centre “Vikings on Wieringen” in Den Oever

TimeScope system in the visitor centre “Vikings on Wieringen”

Screenshot of the TimeScope system, showing the Viking treasure found on Wieringen

neighborhood of both centres, before actually visiting these places. It is the goal to complement this information with more detailed on-site information through specific presentation systems.

On-site storytelling

As most of the heritage in the selected region is hidden, though nevertheless of international value, we look into alternative ways to tell thematic stories on site in an appealing way. These stories deal with the landscape evolution, man-made structures and the socio-economic development of the flatland and its villages. We will discuss three presentation systems (GPS-based multimedia systems, MP3-based Talking Towers and AR telescopes) and their advantages and disadvantages, and propose locations where these storytelling devices can be installed.

GPS-based multimedia systems

The latest generation of GPS-based multimedia systems consist of weatherproof pocket computers (PDA) with GPS-navigation [TOU]. These systems have sun-readable screens, shockproof casings and can be used with wired headphones or wireless Bluetooth earpieces. They provide an optimal combination of GPS-navigation, both for biking and hiking, and multimedia information, such as images, spoken text, music and video. As both hardware and software are custom made, they have to be hired at the tourist office or visitor centre that organises such a GPS-based route.

On the other hand, navigation information can be downloaded from a website onto a personal GPS-system. Most of these systems are not yet capable of playing sound or multimedia files. Some pocket computers have integrated GPS-capabilities, but lack

Latest generation of weatherproof GPS-based multimedia systems with navigation (left) and multimedia content (right)

the appropriate software to make a proper integration with their multimedia capacities. This means that the visitor can have navigation support through the downloaded file, but no audio or visual information, linked to the location. Typically, the information is provided as a booklet or an illustrated text file that can be printed. Good examples of routes with GPS-support on personal systems are the most recent TRAP routes, which are published as travel guide booklets with downloadable GPS-files [TRAP].

Another solution is providing the information as downloadable audio files in MP3 format with music, a professional voice and a well-written text. These files have to be played on personal MP3 systems. The navigation is provided as a downloadable roadbook, a written description of the route to follow, that can be printed out. A good example of this approach is the Limes Audio Tour, a cultural route along the historical borders (Limes) of the Roman Empire in the Netherlands [LIM]. The route is set in an attractive landscape, and caters to various target groups. The information is provided by archaeologists, telling the story about daily life on both sides of the Limes and giving information at various spots, some near physical remains or reconstructions.

Things to consider regarding GPS-based multimedia systems

There is a major difference in cost and implementation issues between the professional GPS-based multimedia systems that have to be hired and returned at a certain location, and providing downloadable files for personal GPS or MP3 systems. Solutions for personal systems don't provide an engaging presentation of the information and can be used only by owners of GPS or MP3 systems that have no problem in putting downloaded files on their personal systems. Solutions with professional systems on the other hand require one or more locations with permanent staff where the devices can be handed out and collected.

Although these professional systems provide a very good support for heritage routes, there is however a tradeoff when the area to cover is large and/or when the expected number of users is high. The larger the area, the more difficult it becomes for people to start and end their tour at a fixed point and within the opening hours of the office that hands out the devices. The larger the anticipated number of users, the higher the cost to procure and maintain the devices.

In the case of the area selected for this booklet, it probably is more efficient to work with fixed systems that are placed along the route.

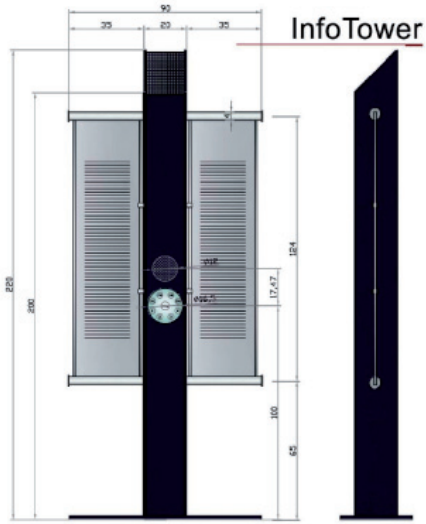
MP3-based talking towers

As we want to address not only the tourist that is motivated to visit the Kop van Noord-Holland area, but also the occasional visitor of the Cycle Route Network (CRN), we

can adopt the strategy of a *self-promoting presentation system* that is distributed over the selected area. For this purpose, MP3-based **Talking Towers** were developed.

These systems are basically a combination of an information panel and an MP3 player. In this way, information can be conveyed through iconography and some concise texts, while a small keypad allows the visitor to listen to more detailed spoken information, music, environmental sounds or other audio sources. Through the use of audio information, we can create not only a second layer of information for the interested visitors, but we explore new ways of visitor engagement by providing for example local stories, told by actors in the local dialect, or sounds of rare birds that can be seen in the area.

Talking Towers should be placed at various designated sites and monuments and provide multi-theme information that can be further expanded through the audio information. The self-promoting character of the Talking Towers is realised by making reference on the panel where the neighbouring Talking Towers are. This is quite easy when the route is implemented on a signposted route network such as the CRN so the visitor only has to remember the numbers of the nodes to pass. Occasional visitors of the CRN that encounter a Talking



Design of a Talking Tower

Tower can easily discover the other Talking Towers and the heritage that is present along the route.

The Talking Tower has been designed to be vandalism resistent and weather proof. It is an environmental friendly product as it can be powered either manually through a hand crank or by solar energy (the image of the Talking Tower shows a version with solar cells). Although there are mechanisms available to prevent vandalism and theft of components, Talking Towers should be placed at locations with sufficient social control.

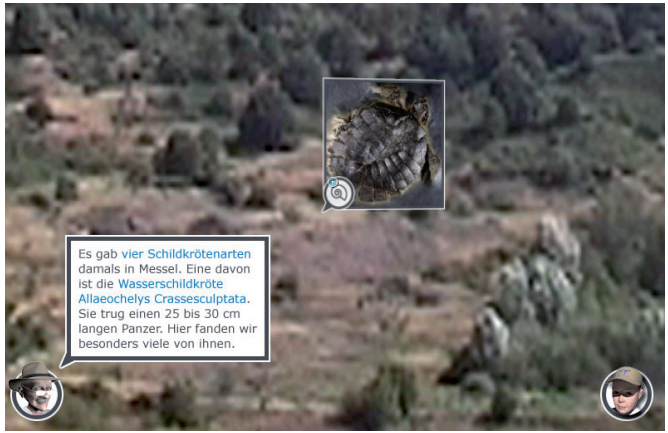
AR telescope

The old land of Wieringen and the Kolhorn area are connected by the 19th and 20th century polders Groetpolder, De Gouw and Wieringermeer. The old land provides the visitor with an extensive array of visible and recogniseable remains, explained by on-site and portable traditional (written) information. However, despite these clues, it remains difficult to imagine the extensive changes of the landscape that occurred over

This 14th century dike (Wierdijk) separates the former Wieringen island from the new polders

the centuries. As we also want to engage the occasional user of the biking and hiking trails, we need a way to present visual information on site in an exciting, inituitive way.
The augmented reality (AR) telescope, developed by the Fraunhofer Institute, allows the projection of contextual information or virtual objects on top of the view seen through the telescope.
The telescope consists of a vandalism resistant case, a high-resolution camera, a high contrast LCD-display, a precise hardware tracking system, a computer, air conditioning for outdoor use to keep the electronics at the right temperature and a coin unit. The camera, located in the front of the telescope, films the real scene. Internally there is an LCD-display showing the final image, augmented with virtual overlays.
The hardware tracking system delivers the absolute values of the vertical and horizontal rotation of the telescope's head. It needs a common power outlet to work.

The augmented reality telescope is weather-proof for all seasons



The augmented reality telescope provides an annotated landscape at the Messel quarry in Germany

The telescope can work in two ways. It can be used to create an *annotated landscape* where information pops up in the telescope view when an interesting item appears in the middle of the image. The prototype of the AR Telescope at the Messel quarry World Heritage Site near Darmstadt, Germany, works in this way and illustrates the position of skeletal remains of locally discovered fossils against the visible stratigraphy.
The telescope can also work in a 3D mode, where 3D visualisations are superimposed on the telescope view. As the software knows exactly where the telescope is aimed, it can superimpose virtual objects or landscapes on top of the real view, so that the user gets the impression that the virtual object (for example a castle) is present at a certain location (where the foundations have been found through excavations) or that the landscape has been transformed into an ancient state. This is called *augmented reality*, and is a powerful, intuitive way to visualise structures that are reduced to ruins or don't exist anymore, or to show how landscapes looked in ancient times.

In the selected area, this telescope can be used at several locations. One of them is the geological monument at Westerland. Currently, on-site information is limited to a well-designed panel with a comprehensive text that can be somewhat too scientific to the average visitor. To understand and imagine what really happened about 150 000 years ago, we can visualise the glaciation processes through this AR telescope, as an excellent addition to the already existing information on site. This additional technology will certainly attract more visitors to the spot, and appeal to a wider range of tourists, as it acts as a gateway to the natural history of the former island.

Information panel on the geological monument in Westerland

How the AR telescope reveals the geological history at Westerland

This AR telescope will be used to visualise the genesis and development of the later Pleistocene landscape for various target groups. The application will show the geological monument, which is the highest natural structure on Wieringen, and the evolution of the landscape at that spot from 2000 AD to about 150 000 BC. It shows, superimposed on the landscape of today, the growth and retreat of the glaciers, how boulders and clay are transported and deposited, the rise and extinction of specific flora and fauna and cultural changes through the ages. In other words, through the AR telescope, you will see those processes happening on site in front of you, even looking into the underground of the site. The AR telescope allows for several languages or target groups, so the content can be adapted to the users.

This application uses the same 3D models as the serious game installed in the visitor centres and is another visulisation of the same content that focuses on the *on-site experience* and on the *authenticity* of the landscape. In this way, the serious game gives the overview both in time and space of the landscape evolution of Wieringen, while the AR telescope gives the on-site experience.

For other sites like Kolhorn, Dijkgatsweide, the Wadden Sea area at Vatrop and Winkel-Zeewijk, the same technology with different scenarios is planned. At the Kolhorn site, the former tidal area, which has been turned into polders, will be visualised through AR superposition. At the Dijkgatsweide site, where the prehistoric boat has been found during restoration of the historical creeks, inhabitation and daily life in the prehistory can be shown through AR superposition. At the nominated World Heritage site in Vatrop, the evolution of the landscape and the value of the site can be presented as an annotated landscape. In Winkel-Zeewijk

The Wadden Sea area at Vatrop, one of the places where an AR telescope may be installed

(see evocation above), the prehistoric landscape and the reconstructed dwellings can be visualised through AR superposition.

Post-visit

After tourists or school children have visited a site or region, they may feel the need to get more information on certain topics they are interested in. It is an interesting business model to provide this information only to people who have visited that site or region. Through the visitor centres, where information is given in a digital way, access can be granted to such additional information through *bookmarking*. By asking a visitor to provide their email address when they start using an application such as the TimeScope or the landscape simulator, an email can be sent to the visitor with a link to extra information for every item that the visitor earmarks by clicking a bookmark button.

Steps for creating ICT-based tourism products

The workflow can be divided in the following stages:

Pre-production:

An *inventory and selection* of sites and monuments is needed as input for creating new tourism products. Furthermore, a *list of required competencies* and a *project structure* needs to be made. Part of that structure is a stakeholder workgroup, with specialists from the tourism and heritage domain, governmental institutions, museums, the regional development agency, local history groups and SMEs in tourism and rural products.
The stakeholders included are:

- Municipalities of Wieringen, Wieringermeer and Niedorp
- Heritage Centre *OpZeeLand* in Kolhorn
- Visitor centre *Vikings on Wieringen* in Den Oever
- Regional Tourist Board
- Regional Development Agency NHN
- Local SMEs on rural products, tourism, heritage and digital support
- Local History Groups, including the Regional Archaeological Society
- County council of Noord-Holland
- Cultural Heritage Centre Noord-Holland
- State Service for Archaeology, Cultural Landscape and Monuments (RACM)

The stakeholder workgroup produces a communication plan in this pre-production stage, coordinates work on various levels, has a qualitative input in all products and addresses financing and legal aspects, such as fundraising and copyrights.

Production:
To prepare the stories, based on the selected sites and monuments, an experienced scenario writer with historical knowledge delivers a story framework that maps which information is provided where, and in what form.

Based on this framework, a detailed scenario is made for each device. This leads to final scripts that need to be recorded in a studio, the creation of 3D models, the design of interactivity for the serious games and the AR telescopes and the graphic design of the Talking Tower panels and the annotated landscapes. After an integration and testing phase, the devices need to be installed on site. The project proposal in this KNOWHOW booklet involves five AR telescopes and fifteen Talking Towers. Prior to installation, detailed site plans need to be made and building permits need to be granted. Upon installation, a detailed maintenance scheme is implemented to provide regular preventive maintenance and cleaning and defines corrective actions when problems occur.

Post-production:
The stakeholder workgroup creates a monitoring scheme to assess the performance of the new tourist products. Training is offered to employees of the heritage centre OpZeeLand and visitor centre Vikings on Wieringen to manage the content of the digital presentations systems. This training may be disseminated to facilitate other heritage centres and the Regional Tourist Board.

Use in education
Not only can this framework for using digital technology to create new tourist destinations be used in an educational context, but we can also develop systems and applications that are specifically used in education. In the Kop van Noord-Holland region, some experience has already been built up in this domain, through close collaboration with partners from educational institutions.

The use of techniques such as bookmarking allows students to focus on enjoying and

understanding our hidden past on site and study further material at home or in the classroom.

The selection of the content reflects the new national history curriculum of Prof. R. van Oostrom and the historical periods presented by the De Rooy Commission.

Benefits

As part of the cultural and natural heritage of the Kop van Noord-Holland region has an outstanding value but is hidden, the use of digital presentations tools has a positive impact on the quality of information sharing and the engagement of the visitor. As this project shows, these tools have a paramount importance in the development of new, sustainable tourist destinations that can be integrated into an educational context.

The creation of such an overarching, regional project reinforces the cooperation between the involved tourism, heritage and educational departments and is beneficial in the dissemination and transfer of knowledge in the region. It also highlights the needs for conservation and sustainable development, and provides input to a regional cultural biography. The results of such a project can be useful in other domains such as nature and water management.

By bringing together a wide range of competencies, rich and engaging content is created that fits the needs of the various target groups identified by the stakeholder workgroup. Hence, the investments that are made for such a project are spread over a wider range of users, so that the cost per use of the infrastructure is lowered, compared to standard route development. The project is more likely to receive external funding by incorporating the proper integration in regional policies and programmes, the reinforcement of cooperation between regional partners and the use of ICT.

Summary

Digital technologies can play a major role in presenting the cultural and natural heritage of a region, in making hidden heritage understandable and enjoyable, in creating new, sustainable tourist destinations and educational programmes and in creating a regional cultural biography. These technologies can be combined easily with traditional tourism products.
This KNOWHOW booklet describes how to implement such technologies in the context of the region Kop van Noord-Holland and how to integrate it in regional programmes, structures and policies.
An additional value is the probable contribution to needs in other domains like heritage, education, nature and water management, and to facilitate new tourism destinations.

Presenting The Hidden Past

Technology/Interaction

Augmented Reality (AR) Telescope

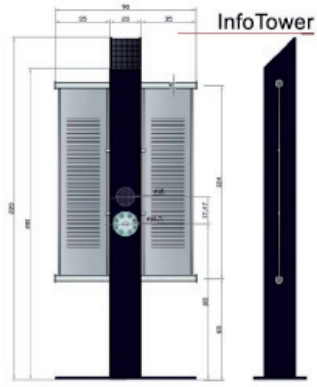
Talking Tower

(MP3 based info panel)

Landscape Simulator

(serious game)

TimeScope (interactive storytelling system)



Ideas for implementation

In connection with other tourism related products, this project helps to implement:

- Development of new tourist destinations
- Heritage preservation
- Nature and water management
- Storytelling
- Cultural biography
- Educational programmes

Summary

This KNOWHOW booklet deals with practical ICT solutions for supporting heritage in the tourism domain and helping to create new tourism destinations. It particularly focuses on heritage that is difficult to present, and develops an integration with education.

Required competencies

Project manager
Textwriter
Storywriter
Archaeologist
Geologist
Local historian
Graphic artist
Software designer
Tourism marketing officer
Education officer
Technician
Stakeholder workgroup

Resources

Man hours: 2 000 hours

Technology: 150 000 euro

Production costs: 100 000 euro

These resources have been estimated for a total of 5 AR Telescopes, 10 Talking Towers and one Landscape Simulator through games technologies.

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Illustrations

The following images have been kindly provided by:

- Provincie Noord-Holland, Netherlands: pp. 4, 7
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- Uitgeverij Uniepers, Abcoude, Netherlands: pp. 2, 6
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- Connecto bvba, Heist op den Berg, Belgium: pp. 17, 23

All other images are provided by the authors

Presenting The Hidden Past

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The region Kop van Noord-Holland in the Netherlands shows a remarkable variety of landscapes. The area consists of a combination of various natural structures, such as dunes and Pleistocene deposits, and man-made landscapes, such as polders. Part of the area contains vast quantities of important prehistoric remains, both cultural and natural. The cultural remains are not visible or recognisable in the landscape, and the natural remains are visible on site, but need support to be understood and appreciated.

This KNOWHOW booklet deals with practical ICT solutions for supporting heritage in the tourism domain and helping to create new tourism destinations in the Kop van Noord-Holland region. The suggested developments are based on the Tourism Marketing Framework of the region and can be used as inspiration for other regions to build on their tourism assets and to promote their region.

The KNOWHOW booklets are an inspirational series cataloguing existing examples of a variety of projects which use ICT for the recording, display and interpretation of cultural heritage. These booklets highlight functional information covering the design, development and implementation of ideas and their solutions, and give thoughtful suggestions for alternative applications within the cultural heritage sector. The KNOWHOW booklets aim to support people working in the area of museums, heritage sites and monuments. The information covered within the booklets benefits managers, exhibition producers/curators, pedagogues and professionals working with digital restoration, as well as those working with communication and audiences. These booklets cover projects developed by the partners of EPOCH, and are divided into the following categories: MUSEUMS, HERITAGE SITES and MONUMENTS.

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