

COUNCIL OF EUROPE



CONSEIL DE L'EUROPE

THEMATIC SESSION

Archaeology and digital technologies -

**Exchange of best practices, with particular reference to the
European Convention on the Protection of the
Archaeological Heritage (revised, Valletta, 1992)**

- NORWAY -

Thematic session – Archaeology and Digital Technologies

NORWAY

1. Examples of how digital technologies are contributing to the implementation of the Valletta Convention, with reference to the main chapters in the Convention.

Digital technologies provides new opportunities for the management of the cultural environment. This includes the possibility to create good overviews as a basis for assigning priorities and designing long-term preservation strategies, as well as new possibilities for inventories, monitoring, research and dissemination.

The following examples are also presented in the white paper [New goals for Norway's cultural environment policy - Involvement, sustainability and diversity](#) in 2019 (Meld. St. 16 (2019-2020))

1.1 Identification of the heritage and measures for protection (Art. 2-4)

Non-invasive prospection methods are increasingly being used in mapping, monitoring and documentation in cultural environment management. Ground-penetrating radar (GPR) and other geophysical methods have been used in Norway for decades, especially in connection with archaeological surveys. The use of technology, such as digital mapping data, 3D models, LiDAR (Light Detection and Ranging) and satellite data, can further enhance the precision of different types of mapping. Developments within processing, data storage and accurate measuring have contributed to important advances in recent years.

A GPR survey carried out in 2018 revealed traces of a Viking ship and a number of Iron Age burial mounds and houses in [Jellhaugen](#) in the municipality of Halden, cf. Figure 1.1.

Through the extensive mapping work being carried out under the project National Elevation Model of Norway a detailed overview of the terrain and built elements has been developed. The elevation model is based on LiDAR with 2 p/m² and image matching, The Elevation Model has great potential for use in cultural environment management, including for mapping, monitoring, and quality assurance of location data, and to enable the combined assessment of larger areas.



Figure 1.1 The Gjellestad ship (Photo: The Norwegian Institute for Cultural Heritage Research)

The [National Elevation Model of Norway](#) has revolutionised some aspects of cultural environment management. This regards mapping in particular. While some selected areas in Norway are mapped well, other areas only contain chance discoveries. The Elevation Model provides overviews and enables assessment of the archaeological potential of large landscape areas in a cost-effective way. The Elevation Model also provides the authorities with a good starting point to process data that have been entered and made available through the European Earth Observation Programme – Copernicus.

In Nordland County a courtyard site dating back to the Iron Age was recently discovered in a densely forested area through analysis of data from the Elevation Model, cf. Figure 1.2.



Figure 1.2 Use of data from the National Elevation Model of Norway.

The image on the left shows how the courtyard site appears in the National Elevation Model. The picture on the right is a visualisation of a courtyard site in Hjelle in the municipality of Stryn.

Photo / source: Kartverket, Geovekst og kommuner – Geodata, the Directorate for Cultural Heritage and © Arkikon AS

1.2 Integrated conservation of the archaeological heritage (Art. 5)

Askeladden is the Directorate for Cultural Heritage's official national database for cultural monuments, sites and environments in Norway. The database contains map-linked data on cultural monuments, sites, environments and landscapes. This kind of digital source of information, which can be used across administrative levels, is also an important tool in regional and municipal planning processes. Askeladden will be further developed as a central register of cultural monuments, sites and environments and will also be adapted to be able to retrieve data from reports, overviews, articles and registers that are owned and shared by other actors. The further development will also incorporate other databases with historical data on the same locations, such as the university museums' databases, with information about the archaeological excavations that have been carried out.

Environmental monitoring provides knowledge about the state of the environment, which is an important basis for developing, evaluating and following up national goals, measures and instruments related to environmental policy. Monitoring is repeated regularly over extended periods of time, with an increasing use of digital technology. There are currently four environmental monitoring programmes in the cultural environment sector. Two of these are focusing on archaeological monuments and sites, where the purpose is to identify causes of loss and damage, potential threats, and the effectiveness of various forms of protection in selected municipalities and to map the preservation conditions and status of selected cultural layers from the Middle Ages in Bergen, Tønsberg and Trondheim.

In 2020, the Norwegian Environment Agency was commissioned on behalf of the Ministry of Climate and Environment to carry out a study of current challenges, status and needs in environmental data management. The assignment was to include a study of alternative solutions to the current challenges within environmental data management in Norway, including cultural environment data. The report will be used as a basis for decisions on measures to streamline infrastructure for environmental data (data, statistics) and to make data more open and accessible.

1.3 Collection and dissemination of scientific information (Art. 7-8) and Promotion of public awareness (Art. 9)

Digital documentation provides a wide range of new opportunities within research, management and dissemination of cultural heritage. Digital solutions are important instruments for fostering citizen involvement and participation, enabling everyone to have the opportunity to get involved in and assume responsibility for the cultural environment. Although digital documentation can never replace the real thing, digital documentation methods and various digital solutions can be important tools in the work to preserve knowledge, ensure accessibility, and engender participation.

"[Kulturminnesøk](#)" is the Directorate for Cultural Heritage's digital dissemination service. It contains information on over 220,000 cultural monuments, sites and environments. In Kulturminnesøk, anyone can enter information about and upload images of the cultural environment.

Technology provides a number of new opportunities for dissemination. Digital visualisation methods such as augmented reality (AR), virtual reality (VR) and 3D models can provide better, more user-friendly solutions for dissemination and knowledge sharing in the cultural heritage sector going forwards. In connection with an archaeological excavation in Trondheim in 2016/2017, [3D models](#) were created and shared to convey information from the excavation as it progressed.

2. Strengths, obstacles and needs for future work

It is important that the cultural environment authorities are aware of and make good, active use of the various possibilities afforded by digital technology. Large amounts of cultural environment data exist, and there is potential for huge gains through collaboration on structuring and organising this data, including efficient sharing of open data, leading to better digital solutions for audiences. There is a need to pave the way for a greater degree of sharing and coordination of data and digital solutions.

Though methods like LiDAR and GPR provide new, cost-effective and interesting possibilities for identification, mapping, monitoring and documentation, there are some limitations in terms of use in different topographies, and when it comes to detection of different types of cultural heritage objects. Not all structures can be detected by these methods, and one must be aware of what the technology can and cannot provide.

There is a need for further development of semi-automatic detection technology and post-processing software. However, all digital data must be interpreted and there will still be a need for visual verification. Therefore, these new technologies should be seen as complementary tools for archaeological investigation and not a replacement.