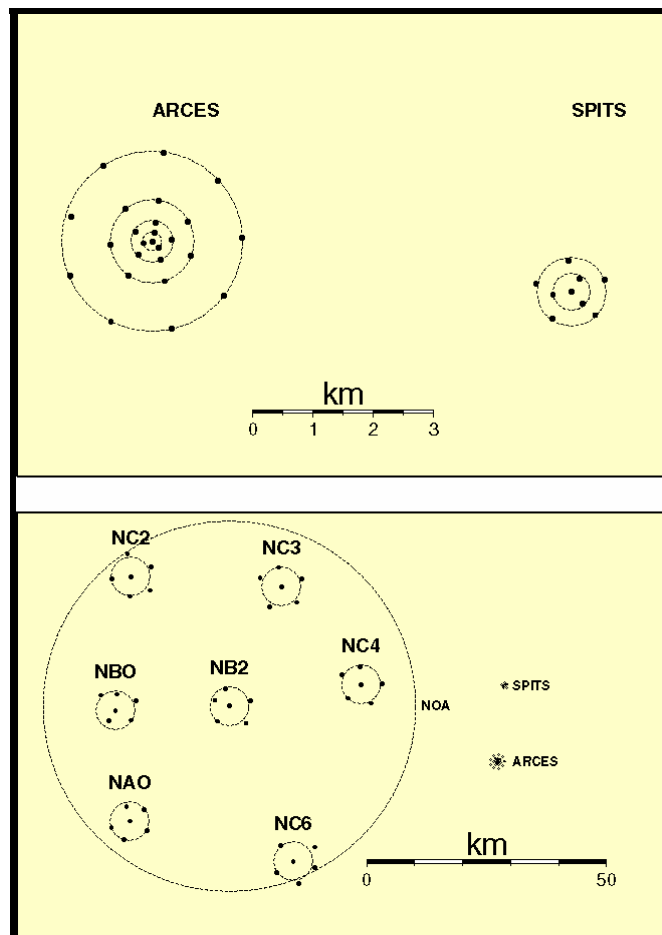


**DETAILED DESCRIPTION OF THE NORSAR INFRASTRUCTURE**

The NORSAR facilities are located at the city of Kjeller, 25 km northeast of Oslo, and the infrastructure to which access is offered comprise databases and research facilities for research in seismology and related sciences at the NORSAR main office and data center. In addition NORSAR has a maintenance center at Hamar, about 100 km north of Kjeller, and an office in Bergen on the west coast of Norway. More information about NORSAR can be found on NORSAR’s web pages ([www.norsar.no](http://www.norsar.no)).

The infrastructure of the NORSAR institute consists primarily of a data center and field installations, consisting of several seismic arrays and one broadband 3C seismic station and constructed for the recording of seismic signals from earthquakes and underground explosions (see Figures 1 and 2 and Table 1).



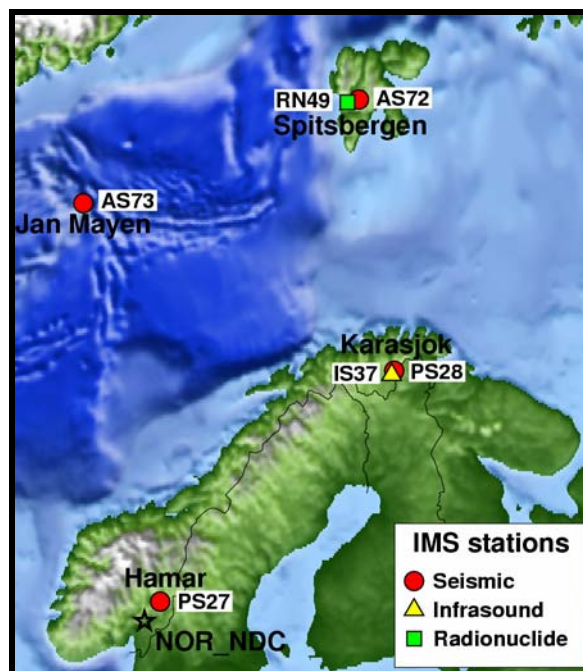
**Figure 1** - Geometry and size of the three NORSAR arrays currently in operation. The NORES array has a geometry identical to that of ARCES and is co-located with site NC602 of the large NORSAR array.

## NERIES: Transnational Access Opportunities at NORSAR

NORSAR is a seismological observatory specializing in seismic arrays. Continuous real-time data is obtained from the arrays operated by NORSAR and from additional stations in neighbouring countries obtained through mutual agreements. Scientists at NORSAR have over several decades been at the forefront of international research in the design, installation, and operation of seismic arrays and in the analysis and interpretation of array data. NORSAR has been a significant contributor to the technologies currently implemented at the International Data Center (IDC) of the Provisional Technical Secretariat of the Comprehensive Nuclear-Test-Ban Treaty Organisation (CTBTO) in Vienna.

Seismic array research at NORSAR dates from the beginning of the 1970s when signals detected by the large-aperture NORSAR array were measured to locate events at teleseismic distances. In the 1980s, NORSAR was central in the design and development of small-aperture arrays for the detection and location of lower magnitude events at local and regional distances.

In the 1990s, researchers at NORSAR developed methods of associating seismic phases detected by a sparse network of several small aperture arrays to provide robust, exhaustive and fully-automatic seismic event bulletins.



**Figure 2** - A map of all existing and planned Norwegian IMS stations. NORSAR, as the Norwegian NDC, is responsible for the seismic auxiliary stations AS-72 (SPITS array) and AS-73 (3C stations JMIC), the primary stations PS-27 (NORSAR array) and PS-28 (ARCES array), the yet to be built infrasonic array close to ARCES (IS-37) and the radionuclide station on Spitsbergen (RN-49).

## NERIES: Transnational Access Opportunities at NORSAR

NORSAR provides access to its unique digital database of seismic recordings reaching back to April 1971. This database and the real-time data stream can be used to develop and to test all types of methods for real-time data analysis. Of special interest are detection algorithms, the automatic parameter extraction of declared detections, classification and association of single-phase observations to seismic events and finally the automatic event location. NORSAR's installations offer unique opportunities to combine the single instruments to virtual arrays, seismic networks or combinations of single sites and seismic arrays.

The large amount of continuous digital data, recorded during the last three decades, can be used for many types of array based research. These data are particularly suitable for studies long time spans are needed to get sufficient observations, such as, studies of source characteristics for specific source regions, detailed structural investigations by seismic waves for all parts of the Earth's interior, and the observation of microseisms, which is dependent on the meteorological conditions (low pressure activity) in the North Atlantic, Barents Sea and along the coast of Norway.

**Table 1** - Periods of operation for the different NORSAR installations and direct accessibility to their data (outages due to upgrading or repair activities are not tabled).

Station	Time Period	Direct Accessibility
Old NORSAR	04.1971 – 09.1976 event triggered	yes
NORSAR	09.1976 – 09.1982 event triggered	Yes
NORSAR	09.1982 – today continuous	yes (without 1994/95)
ARCES	10.1987 – today continuous	1987 – 1989, 1996 – today
NORES	09. 1984 – 06.2002 continuous	1984 – 1989, 1991, 1997-1999, 11.2000 – 06.2002
SPITS	11.1992 – today continuous	1999 – today
JMIC	10.2003 – today continuous	10.2003 – today

# NERIES: Transnational Access Opportunities at NORSAR

## **ACCESS PROVIDED**

A typical TA user will be provided with all of the internal services that a NORSAR scientist normally enjoys, including an office equipped with Unix, Linux and personal computers that are tied to 100 Mbps Internet lines, a variety of advanced peripheral equipment (plotters, printers, scanners, etc.), and a friendly human environment where there always will be somebody to answer questions, at all levels.

A visiting scientist to NORSAR will moreover be primarily assigned to one particular NORSAR scientist as his or her main scientific contact point, dependent on the research subject and the problems to be addressed. The degree of independence given to a user will be first of all dependent on the user's needs and preferences, since this program allows for users at a variety of scientific levels in terms of qualifications and experience. The main point here is that there always will be one or more scientists within the regular NORSAR staff who will be interested in the study subject and who will have time for the visitor.

The main research topic at NORSAR during 35 years of operation has been seismic arrays, their optimum configuration and utilization for monitoring and verification of a future nuclear test ban treaty. However, seismic arrays are especially designed for enhancing seismic signals and produces high quality data for general seismological research. Array data therefore represent a unique collection of seismic data, which for more than three decades has inspired NORSAR and visiting scientists to conduct research within a broad range of research topics that go beyond the array seismology per se, including for example seismic event detection and location, seismic wave propagation and Earth structure, methods for discrimination between earthquakes and nuclear explosions, seismotectonics and characterization of seismic sources, and soil (site) response investigations.

NORSAR provides access to data from a variety of seismic arrays and stations for seismological research and proposes research topics for users and user groups within the mainstream of NORSAR activities, in order to optimise the interaction and support from NORSAR scientists to the external research visitors under this project.

# NERIES: Transnational Access Opportunities at NORSAR

## HOW TO APPLY FOR ACCESS GRANTS?

Applicants must be affiliated with an Institution located within the EC Member States or Associated States but not in Norway. Proposals for visits of up to 2 months, including a description of the proposed research (max 3 pages) and a short CV, can be submitted at any time to NORSAR or the NERIES management and will be considered every three month by the user selection panel. The first deadline for a panel decision is set to 15<sup>th</sup> of September 2006.

Template for application form:

- Name(s) of user(s), institution, country, details (address, phone, email)
- Name of the User Group Leader
- Chosen infrastructure
- Project proposal (max 3 pages)
- Special needs (if appropriate)
- Expected benefits
- Requested duration of stay
- Preferred time schedule
- CV (max 2 pages)

## SELECTION PROCEDURE OF VISITORS

The selection of the successful research applicants will be governed by a user selection panel consisting of one member from NORSAR and three senior scientists from the NERIES consortium. The panel will select the users according to the following guidelines:

- 1 Priority will be given to researches which had not earlier been at NORSAR for a longer research visit and which are coming from countries, in which array seismology is not yet well established.
- 2 The proposed research should be consistent with the NERIES Consortium objectives (see also next point).
- 3 The proposed research should emphasize the use of seismic or seismo-acoustic array data, the knowledge transfer of array technologies, advancements in array technologies (see e.g., JRA4), multiple array processing, developing and testing of tools for real-time data analysis (see e.g., JRA5), or the analysis of data from the NORSAR data archive with respect to the Earth's structure (see e.g., JRA1).
- 4 The proposed research should be anticipated (by the panel) to have a certain scientific innovation potential.
- 5 Applicants' scientific qualifications as based on previous work as judged by the panel and opinions from personal references.

# NERIES: Transnational Access Opportunities at NORSAR

## **FINANCIAL ASPECTS**

Each TA guest will be hosted for free in one of NORSAR's guest apartments and will receive a monthly support for 1400 € to cover the living costs in Norway and in addition, the two-way travel costs (cheapest fare, maximum 1000 €) will be covered.

## **REPORTING REQUIREMENTS**

Before the end of the visit, all visitors have to write a report about their work done at NORSAR, answering the User Group questionnaire on the CORDIS web-page (<http://cordis.europa.eu/infrastructures/questionnaire.htm>) about their visits, and all future publications using results of their visits must acknowledge the received support by the NERIES Project, EC Contract Number 026130.