

Årsmelding  
Annual Report **2010**



**NORSAR**

# THE NORSAR FOUNDATION

**NORSAR is an independent foundation established with the following objectives:**

- To conduct research and development in the areas of geophysics and geophysical software.
- To promote the application of research results for the benefit of the Norwegian society and Norwegian industry.
- To establish and further develop the professional competence of its staff within its areas of activity.
- To act as a Norwegian national resource center for verifying compliance with the Comprehensive Nuclear-Test-Ban Treaty (CTBT).

**NORSAR's research activities are focused on three main areas:**

1. Development of methods and processing systems for seismic monitoring and verification of compliance with the Comprehensive Nuclear-Test-Ban Treaty.
2. Basic seismological research associated with the recording of small and large earthquakes as well as assessing earthquake hazard.
3. Developing methods and software for seismic modelling and imaging of geological structures.

- NORSAR is an internationally recognized research institution in seismology, and provides advanced, innovative products and services to its customers both in the public and private sectors.
- Seismic modelling methods developed by NORSAR provide value-added services to oil companies, seismic contractors and consultant companies.
- Safety and security for society and the environment in a global, regional and local context is an appropriate designation of NORSAR's activities in seismological R&D and in the data acquisition at NORSAR and the NORSAR field installations.
- The Annual Report gives an overview of activities that have generated interest among our customers, cooperative partners and governmental agencies.
- Highlights from some selected research activities in 2010 are presented.
- The Annual Report from the Board of Directors includes the consolidated financial result of the NORSAR organization, which comprises the NORSAR Foundation together with the wholly owned subsidiary NORSAR Innovation AS and its subsidiaries.
- Furthermore, a list is provided of scientific publications as well as professional presentations in 2010 based on work by the NORSAR staff or in cooperation with scientists from other institutions.

# STIFTELSEN NORSAR

**NORSAR er en uavhengig, idéell og samfunnsnyttig forskningsstiftelse som har som formål å:**

- Utføre forskning og utvikling innen geofysiske og datatekniske fagområder.
- Arbeide for anvendelse av denne forskningens resultater i praksis til fremme av norsk nærings- og samfunnsliv.
- Bidra til opparbeidelse og utvikling av kompetanse og utdanning av fagpersonell innen stiftelsens fagområder.
- Fungere som nasjonalt kompetanse- og driftssenter knyttet til den internasjonale avtalen om forbud mot kjernefysiske prøvesprengninger, Comprehensive Nuclear-Test- Ban Treaty (CTBT).

**Forskningen ved NORSAR omfatter:**

1. Utvikling av metoder og systemer for seismisk overvåkning og verifikasjon av etterlevelse av prøvestansavtalen.
2. Grunnleggende seismologisk forskning knyttet til registrering av små og store jordskjelv og risiko ved jordskjelv.
3. Utvikling av metoder og software for seismisk modellering og avbildning av geologiske strukturer.

- NORSAR er en internasjonalt orientert og anerkjent aktør innen forskning og utvikling av innovative seismiske løsninger for energisektoren.
- Sikkerhet for samfunn og miljø; globalt, regionalt og lokalt, er betegnende for den seismologiske FoU og datainnsamling som utføres ved NORSAR og NORSARs feltanlegg.
- Årsmeldingen gir opplysninger om forhold som ofte blir etterspurt av NORSARs oppdragsgivere, samarbeidspartnere og offentlige organer.
- Noen utvalgte eksempler fra NORSARs faglige virksomhet er presentert.
- Årsmeldingen omfatter årsberetning og økonomiske resultater for konsernet NORSAR, bestående av forskningsstiftelsen NORSAR og det heleide datterselskapet NORSAR Innovation AS med datterselskaper.
- Årsmeldingen inneholder også årets publikasjoner, foredrag og posters produsert av, eller med medvirkning av, forskere ved NORSAR.

Forsidebildene er tatt av NORSARs forskere Volker Oye og Michael Roth. NORSAR har to permanente feltstasjoner på Svalbard og deltar i flere forskningsprosjekter på øygruppen.

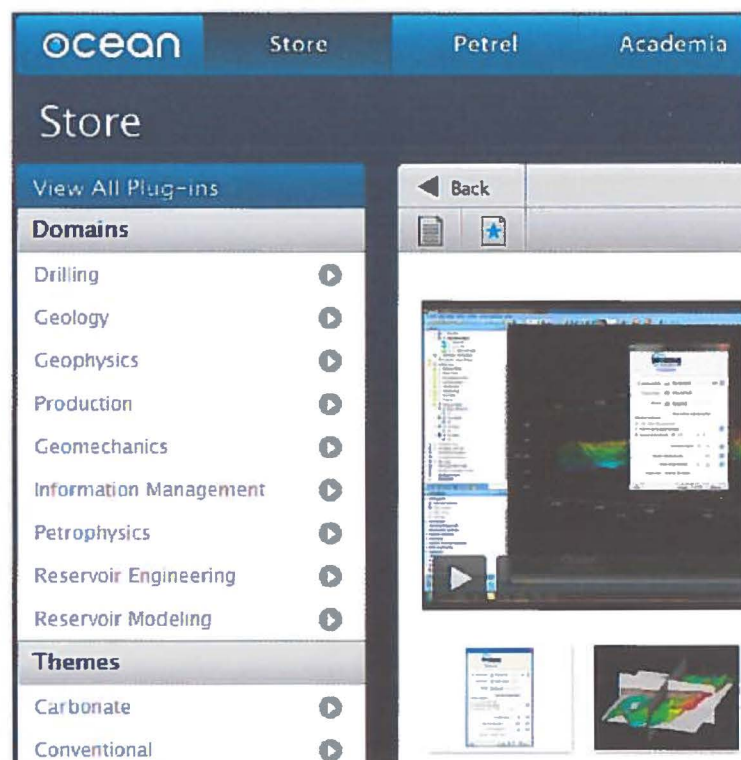
## NORSAR participates in a new venue for marketing of software products

■ Effective dissemination of research results is a priority issue for the Research Council of Norway, as well as for NORSAR as a research institute. Within the field of seismic modelling, NORSAR has traditionally aimed at applying and integrating scientific results and methods into software products for teaching, research or industrial activity. In recent years, new possibilities have emerged for introducing such products to the market. The major players within seismic prospecting offer their platforms for adapting software to their own main products in the form of so-called 'plug-ins'. This possibility represents an interesting new venue for bringing scientific results to specific applications in the form of software products.

■ NORSAR's first plug-in was made for Schlumberger's Petrel-software under their Ocean Store platform, see : <http://www.ocean.slb.com/pages/product.aspx?category=geophysics&cat=ocean&id=ps3d-b1>

■ This installed plug-in represents a functionality in NORSAR's software for simulation of seismic responses in reservoirs based on NORSAR's patented SimPLI-technology which is implemented in the NORSAR software product SeisRoX.

*NORSAR plug-in software for Petrel as advertised in Schlumberger's Ocean Store.*

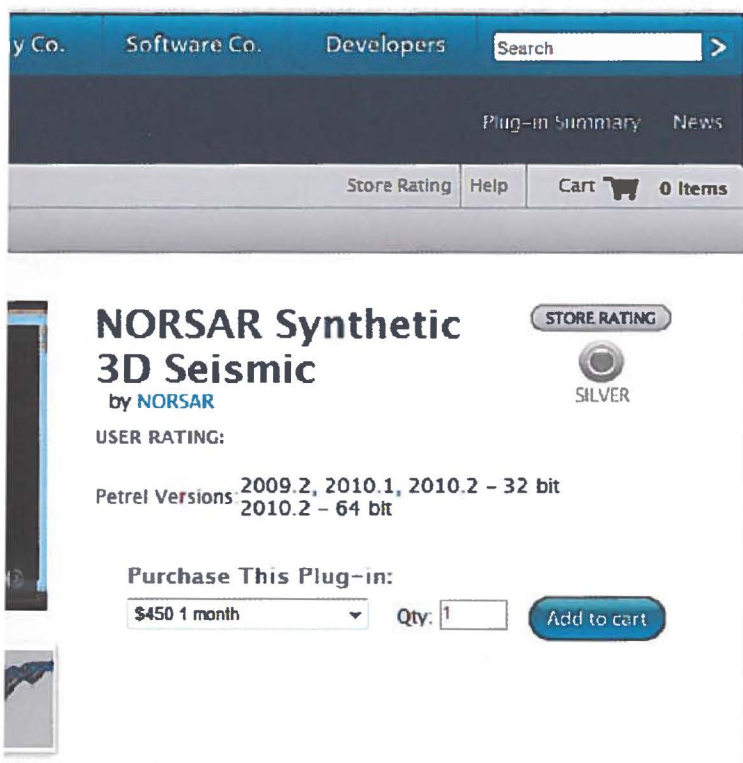


# NORSAR deltar i ny kanal for markedsføring av softwareprodukter

■ Formidling av forskningsresultater er et prioritert tema sett fra Norges forskningsråds side så vel som fra NORSAR som institutt. Forskningsresultater innen seismisk modellering, som NORSAR ofte viderefører til softwareprodukter for undervisning og forskning eller industriell virksomhet, har de seneste årene fått en ny mulighet for lansering i markedet. De store aktørene innen seismiske undersøkelser tilbyr plattformer for tilpasning av software til sine egne hovedprodukter i form av såkalte "plug-ins". Denne muligheten representerer en ny, interessant kanal for formidling av forskningsresultater, der slike resultater bringes fram til konkrete anvendelser i form av softwareprodukter.

■ NORSARs første plug-in ble laget for Schlumbergers Petrel-software under deres Ocean Store platform, se : <http://www.ocean.slb.com/pages/product.aspx?category=geophysics&cat=ocean&id=ps3d-b1>

■ Den installerte plug-in representerer en funksjonalitet i NORSARs software for simulering av seismiske responser i reservoarer basert på NORSARs patenterte SimPLI-teknologi realisert i NORSARs softwareprodukt SeisRoX.



The screenshot shows a web browser interface for the Ocean Store. At the top, there are navigation tabs for 'y Co.', 'Software Co.', and 'Developers', along with a search bar. Below the navigation, there are links for 'Plug-in Summary' and 'News'. A shopping cart icon shows '0 Items'. The main content area features the product title 'NORSAR Synthetic 3D Seismic' by NORSAR. It includes a 'STORE RATING' badge for 'SILVER' and a 'USER RATING' section. The 'Petrel Versions' are listed as '2009.2, 2010.1, 2010.2 - 32 bit' and '2010.2 - 64 bit'. At the bottom, there is a 'Purchase This Plug-in:' section with a price of '\$450 1 month', a quantity input field set to '1', and an 'Add to cart' button.

*NORSAR plug-in software til Petrel slik den annonseres i Schlumbergers Ocean Store.*

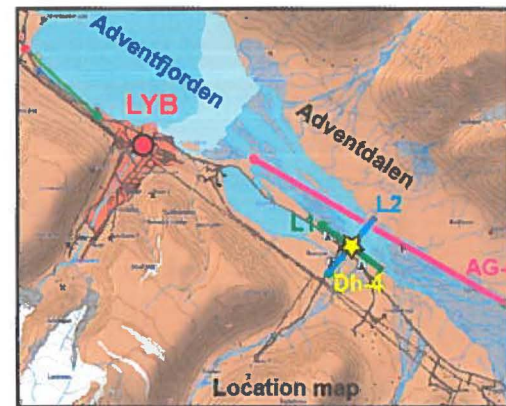
## NORSAR contributes to safety of underground reservoirs

■ Modelling and mapping by seismic methods play a major role in characterization and exploitation of underground reservoirs for hydrocarbons, geothermal energy or storage of CO<sub>2</sub>. In recent years, increased focus has been on monitoring the effects of injection into underground reservoirs, regardless of the purpose of the injection. Key issues are related to process control, and in particular avoiding adverse effects on human safety and on the environment. More than ten years ago, NORSAR began R&D within the field of microseismic monitoring, also denoted passive monitoring, as a method for mapping small stress releases in or near the reservoir caused by the injection.

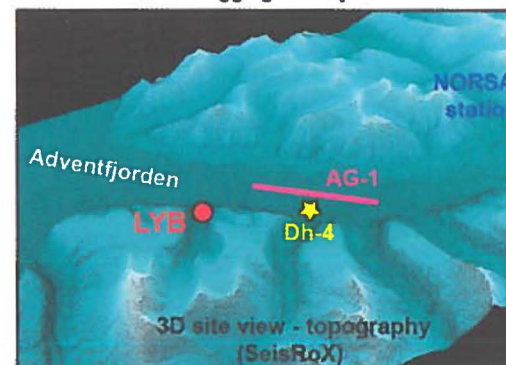
■ Microseismic monitoring of underground CO<sub>2</sub> storage sites both before, during and after injection will contribute to a safer application of this storage technique. NORSAR's KMB project SafeCO<sub>2</sub>, which is funded by the Research Council of Norway together with several leading oil companies, is focused on this aspect, and additional projects are planned in order to further develop the microseismic monitoring method and determine its potentials and limitations.

■ The CO<sub>2</sub> storage project in Adventdalen near Longyearbyen on Spitsbergen is one of the projects in which NORSAR contributes its expertise and technology.

*The figure shows a geographical, topographical and geophysical description of the CO<sub>2</sub> storage project in Adventdalen. NORSAR's seismic monitoring station SPITS (shown in the bottom left illustration) is situated only 10 km from the planned injection site.*



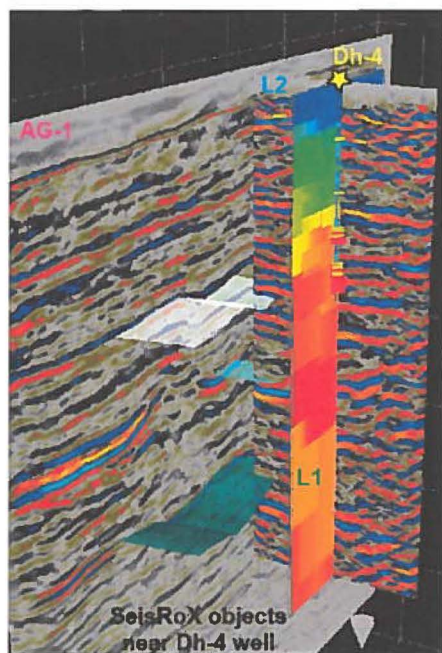
LYB: Longyearbyen.  
AG-1: 2008 UiB seismic line.  
L1 and L2: 2010 UiB seismic lines.  
Dh-4: logging and injection well.



# NORSAR bidrar til sikkerhet for underjordiske reservoarer

- Ved utnyttelse av underjordiske reservoarer for hydrokarboner, geotermisk energi eller lagring av CO<sub>2</sub> spiller modellering og kartlegging med seismiske metoder en vesentlig rolle for reservoarbeskrivelse og utnyttelsesgrad. Kontroll med virkningen av injeksjon i underjordiske reservoarer har i den senere tid fått økt fokus, uavhengig av hensikten med selve injeksjonen. Stikkord er her kontroll med prosessen og da spesielt uønskede virkninger med tanke på sikkerhet for mennesker og for miljø. NORSAR satset for mer enn 10 år siden på FoU innen temaet mikroseismisk monitorering, også kalt passiv lytting, som metode for kartlegging av små spenningsutløsninger i og nær reservoaret forårsaket av injeksjon.
- Mikroseismisk monitorering av underjordiske CO<sub>2</sub> lagre både før, under og etter injeksjon vil bidra til en sikrere utnyttelse av denne lagringsløsningen. NORSARs KMB-prosjekt SafeCO<sub>2</sub> finansiert av Norges Forskningsråd og flere ledende selskaper i oljeindustrien fokuserer på dette aspektet, og flere prosjekter vil bli igangsatt for å videreutvikle og kartlegge denne metodens muligheter og begrensninger.
- CO<sub>2</sub>-lagringsprosjektet i Adventdalen nær Longyearbyen på Svalbard er et av de prosjektene der NORSAR deltar med sin spisskompetanse.

## isRoX - UNIS CO2 Lab project (NORSAR SafeCO2)



Time-migrated, depth-converted seismics  
Vp velocities along L1 and in Dh-4 well  
Interpreted horizons (Mikkelsen, 2009)

*Geografisk, topografisk og geofysisk beskrivelse av CO<sub>2</sub>-lagringsprosjektet i Adventdalen. NORSARs seismiske stasjon (nederste venstre panel) SPITS ligger bare ca 10 km fra det planlagte injeksjonsområdet.*

## International cooperation for a nuclear test ban

■ One aspect of NORSAR's role as Norway's national data center (NDC) for the Comprehensive Nuclear-Test-Ban Treaty (CTBT) is to participate in cooperative projects with similar organizations in other countries. Kazakhstan is one of the countries with which NORSAR has had such cooperation ever since the treaty was opened for signature in 1996. In their capacity as national delegates to the CTBT organization in Vienna, representatives of NORSAR and Institute of Geophysical Research (IGR) in Kazakhstan have worked together to contribute to the buildup of the CTBT verification regime. A project of three years duration (2009-2012), financed by the Norwegian Ministry of Foreign Affairs, was highlighted in June 2010 through the official opening of an international training center at IGR in Almaty. The training center is focused on development and transfer of methods in seismology and infrasound (sound waves below audible frequencies) for verification of compliance with the CTBT.

■ Kazakhstan's NDC, which hosts the training center in Almaty, is technologically advanced and has a staff with high technical expertise. It represents a regional center for implementing the CTBT technologies in other countries in Central Asia. Through courses of up to a month's duration at the training center in Almaty, representatives of other Central Asian countries are given the opportunity to develop their competence in order to take part in the international verification effort, and at the same time improve their skills to carry out their national functions in this regard. During 2010, specialists from Tajikistan and Turkmenistan participated in this training program.

■ The project also includes an institutional research cooperation between NORSAR and IGR within the fields of seismology and infrasound. This includes an opportunity for research stays at NORSAR for scientists from Kazakhstan, in order to work together with colleagues at NORSAR on problems relevant to verification of compliance with the CTBT.

*Fra åpningen av opplæringscenteret i Almaty med representanter fra blant annet NORSAR og Institute of Geophysical Research (IGR), et institutt i tilknytning til National Nuclear Center (NNC) i Kasakhstan.*

*The picture is from the opening of the training center in Almaty, with representatives from NORSAR and Institute of Geophysical Research (IGR), an institute associated with the National Nuclear Center (NNC) in Kazakhstan.*





# Internasjonalt samarbeid for atomprøvestans

■ NORSARs rolle som norsk nasjonalt datasenter (NDC) for prøvestansavtalen åpner for institusjonelt samarbeid mellom NORSAR og tilsvarende organisasjoner i andre land. Kasakhstan er et av de landene NORSAR har samarbeidet med siden avtalen ble åpnet for undertegning i 1996. Blant annet har representanter for NORSAR og Institute of Geophysical Research (IGR) i Kasakhstan sammen bidratt til oppbyggingen av verifikasjonsregimet for prøvestansavtalen, som nasjonale delegater til prøvestansavtaleorganisasjonen i Wien. Et treårig prosjekt (2009-2012), finansiert av det norske Utenriksdepartementet, ble i juni 2010 markert med åpningen av et opplæringscenter ved IGR i Almaty. Opplæringscenteret fokuserer på utvikling og formidling av seismologiske metoder og bruk av infralyd (lyd under hørbar frekvens) for verifisering av at prøvestansavtalen blir overholdt. Kasakhstans NDC, som er vertskap for opplæringscenteret i Almaty, har topp kompetanse og holder et høyt teknologisk nivå, og representerer et regionalt kraftsenter for implementering av prøvestansavtalens teknologier i andre land i Sentral-Asia.

■ Gjennom opphold av en måneds varighet ved opplæringscenteret i Almaty får representanter for landene i Sentral-Asia muligheten til å utvikle sin kompetanse for å kunne ta del i det internasjonale arbeidet for prøvestansverifikasjon, og samtidig dyktiggjøre seg for sine nasjonale oppgaver i denne sammenhengen. I 2010 deltok spesialister fra Tadsjikistan og Turkmenistan i opplæringsprogrammet ved senteret i Almaty.

■ Dette prosjektet innebærer også et institusjonelt forskningssamarbeid mellom NORSAR og IGR innenfor fagfeltene seismologi og infralyd. Forskere fra IGR gis anledning til opphold ved NORSAR for å arbeide sammen med NORSAR-forskere på problemstillinger av relevans for verifikasjon av etterlevelse av prøvestansavtalen.



*Bildet er fra avslutningen av et kurs ved opplæringscenteret i Almaty i desember 2010. Kursdeltakerne fra Turkmenistan har fått sine diplomer og er her avbildet sammen med instruktørene fra IGR.*

*The picture is from a course at the training center in Almaty in December 2010. The course participants from Turkmenistan have received their diplomas, and are pictured together with the instructors from IGR.*

# Organisasjon

## Organization

Program 1:

### **Nasjonalt Datasenter**

*National data Center (NDC)*

Jan Fyen – Programleder

Ulf Baadshaug

Paul W. Larsen

Kjell Arne Løken

Berit Paulsen

Michael Roth

Program 2:

### **Seismologi og prøvestanskontroll**

*Array Seismology and Monitoring Research*

Tormod Kværna – Programleder

Steven John Gibbons

Svein Mykkeltveit

Myrto Pirli

Frode Ringdal

Johannes Schweitzer

Program 3:

### **Jordskjelv og Miljø**

*Earthquakes and the Environment*

Conrad Lindholm – Programleder

Julie Albaric (Postdoc)

Emrah Erduran (Postdoc)

Hom Nath Gharti (ph.d.-stipendiat)

Daniela Kühn

Dominik Lang

Volker Oye

Zhao Peng (Postdoc)

Program 4:

### **FoU Seismisk modellering**

*Seismic Modelling Research*

Håvar Gjøystdal – Programleder

Einar Iversen

Tor Arne Johansen

Tina Kaschwich

Isabelle Lecomte

Program 5:

### **SW Produktutvikling**

*Software Product Development*

Arve Mjelva – Programleder

Håkan Bolin

Kamran Iranpour

Håvard Iversen

Lars W. Lind

Stein Inge Moen

Andreas Paulsen

Ludovic Pochon-Guérin

Ketil Åstebøl

### **Administrasjonsenhet:**

*Administration*

Anders Dahle (Adm. direktør)

Gunn Berget

Rune Lindvik

Winnie Lindvik (Personalleder)

Linda Loughran

Mette Berg Sandvold

Turid Schøyen

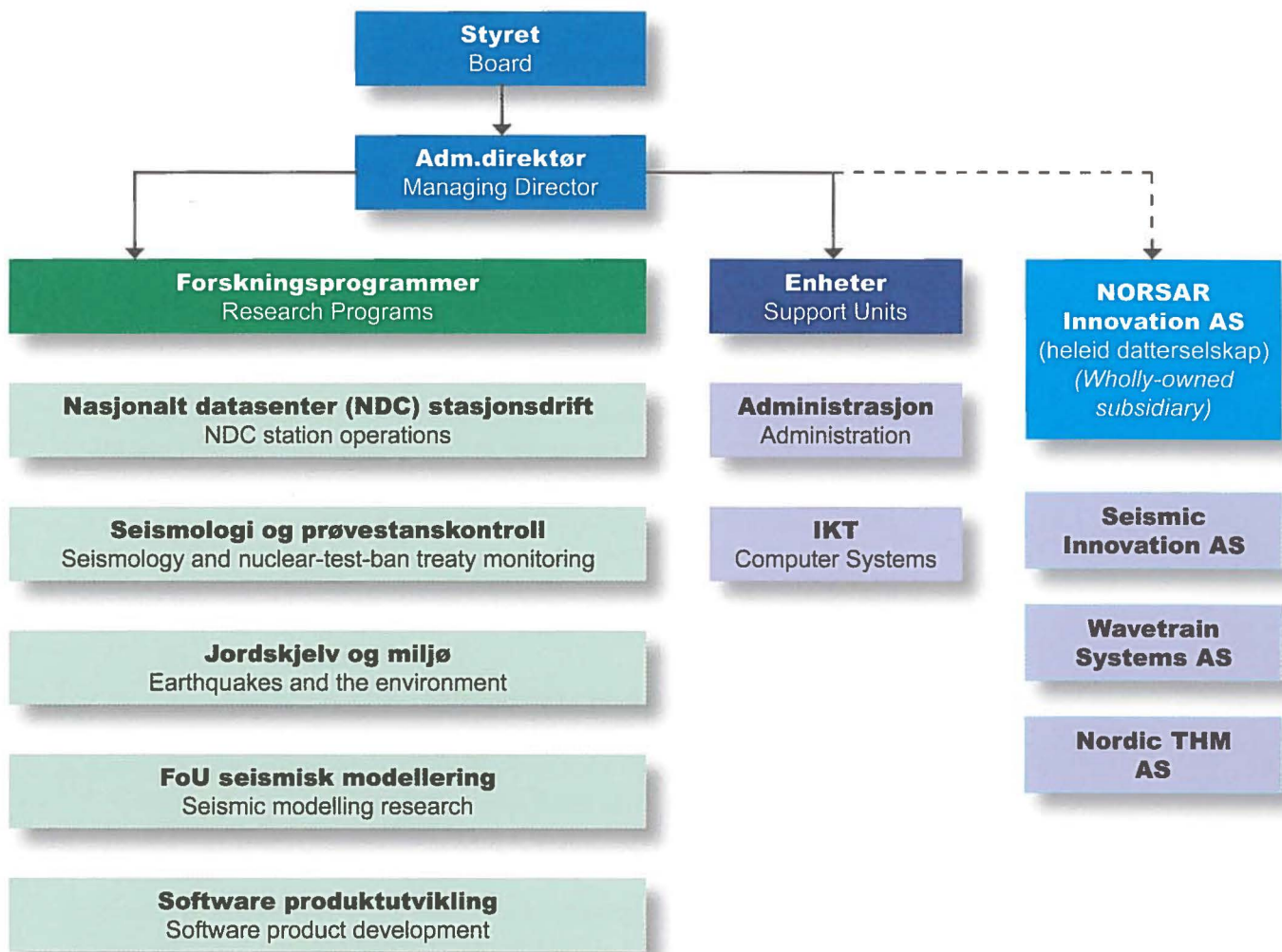
### **IKT enhet**

*Computer Systems*

Nils K. Schøyen – Leder IKT enhet

Vidar Døhli

Frode Johansen



# Annual Report 2010

■ The NORSAR organization comprises the NORSAR Foundation, NORSAR Innovation AS and Seismic Innovation AS. The areas of activity are research, innovation and commercialization of research results within the core disciplines seismology and seismic modelling.

■ The NORSAR Foundation, which is a research institution with basic funding from the Norwegian government, is the parent company and carries out R&D besides acting as the administrative headquarter of the organization. NORSAR Innovation AS is a wholly owned subsidiary of the NORSAR Foundation, and is responsible for the commercial exploitation of research results achieved by the NORSAR Foundation.

■ Both the parent company and the subsidiary have their headquarters at Gunnar Randers vei 15, 2007 Kjeller, Norway.

■ The NORSAR Foundation has permanent seismic field installations in Hedmark (southern Norway), Finnmark (northern Norway), and on the islands of Svalbard and Jan Mayen. A monitoring station for radionuclide measurements is also located at Spitsbergen. NORSAR's technical field maintenance center is located at Ajerhagan 98, 2319 Hamar.

■ Due to the substantial reduction of the workforce at NORSAR Innovation AS in 2010, this company now has moved its main activity to Thormøhlensgate 49, 5006 Bergen.

## Consolidated financial statement

### The Parent Company (The NORSAR Foundation)

■ Gross revenues in 2010 for the NORSAR Foundation totaled 56.2 MNOK (53.9 MNOK in 2009). The result was 6.6 MNOK (3.2 MNOK in 2009). Financial transactions resulted in a loss of 0.08 MNOK (profit of 0.02 MNOK in 2009).

■ The operating result corresponds to 11.7 % of total revenues (6.2% in 2009) The capital assets at the end of the year amounted to 67.0% of total assets (60.2% in 2009).

■ The overall result before taxes was 6.8 MNOK (+3.2 MNOK in 2009) and the net tax liability for 2010 is estimated to be 1.9 MNOK (+0.4 MNOK in 2009).

■ The capital assets have been strengthened with a deferred tax asset of 9 MNOK. Reference is made to notes 11 and 15 in NORSAR's accounts for 2010.

### The NORSAR Organization

■ Gross revenues in 2010 for the NORSAR organization totaled 64.9 MNOK (60.5 MNOK in 2009). The result amounted to an operating profit of 4.1 MNOK (loss of 7.6 MNOK in 2009). Financial transactions resulted in a profit of 0.5MNOK (loss of 1.2 MNOK in 2009).

■ The operating result corresponds to 6.3% of total revenues (-12.6% in 2009). The capital assets at the end of the year amounted to 61.6% of total assets (52.1% in 2009).

■ The overall result before taxes was 4.6 MNOK (-8.8 MNOK in 2009) and the net tax liability for 2010 is estimated to be 0.8 MNOK (-3.5 MNOK in 2009).

# Årsberetning 2010

- Stiftelsen NORSAR, NORSAR Innovation AS og Seismic Innovation AS utgjør til sammen konsernet NORSAR. Konsernets virksomhetsområder er forskning, innovasjon og kommersiell videreføring av forskningsresultater innen kjerneområdene seismologi og seismisk modellering.
- Stiftelsen NORSAR, forskningsstiftelse med statlig basisbevilgning, er morselskap i konsernet og står for utførelse av FoU, konsernledelse og konsernadministrasjon. NORSAR Innovation AS, er et heleid datterselskap, ivaretar oppgaven med kommersiell videreføring av Stiftelsen NORSARs resultater fra forskningen. Det var ingen aktivitet i selskapet Seismic Innovation AS i 2010.
- Morselskapet og datterselskapene er registrert med adresse i Gunnar Randers vei 15, 2007 Kjeller, Skedsmo kommune.
- NORSAR driver permanente feltanlegg for seismologisk dataregistrering i Hedmark, i Finnmark, på Svalbard og på Jan Mayen. En stasjon for måling av radioaktive partikler i atmosfæren er også etablert på Svalbard. Det tekniske vedlikeholdssenteret for feltanleggene er lokalisert i Ajerhagan 98, 2319 Hamar.
- En betydelig nedbemanning i datterselskapet NORSAR Innovation AS i 2010 medførte at dette selskapet nå har sin hovedvirksomhet i Bergen med adresse Thormøhlensgate 49, 5006 Bergen

## Økonomi

### Morselskapet

- Driftsinntektene for morselskapet beløp seg i 2010 til 56,2 mill kroner (fjorårets tall 53,9). Driftsresultatet ble 6,6 mill kroner (fjorårets tall 3,2). Finanspostene summerer seg til -0,08 mill kroner (fjorårets tall 0,02).
- Driftsresultatet tilsvarer en resultatgrad på 11,7 % (fjorårets tall 6,2) av driftsinntektene, og egenkapitalen beløp seg til 67,0 % (fjorårets tall 60,2) av total kapitalen.
- Resultat før skatt er 6,8 mill kroner (fjorårets tall 3,2) og årets skattekostnad er beregnet til 1,9 mill kroner (fjorårets tall 0,4).
- Selskapets egenkapital er styrket med balanseføring av utsatt skattefordel på 9 mill. Det vises i denne forbindelse til note 11 og 15 i regnskapet.

### Konsernet

- Driftsinntektene for konsernet beløp seg i 2010 til 64,9 mill kroner (fjorårets tall 60,5). Driftsresultatet ble 4,1 mill kroner (fjorårets tall -7,6). Finanspostene summerer seg til 0,5 mill kroner (fjorårets tall -1,2).
- Driftsresultatet tilsvarer en resultatgrad på 6,3 % (fjorårets tall -12,6) av driftsinntektene og egenkapitalen beløp seg til 61,6 % (fjorårets tall 52,1) av total kapitalen.
- Resultat før skatt er 4,6 mill kroner (fjorårets tall -8,8) og årets skattekostnad er beregnet til 0,8 mill kroner (fjorårets tall -3,5).
- Driftsresultatet domineres i hovedsak av en post, endring i balanseført pensjonsforpliktelse. Teknisk sett bokføres dette (endringen) som et fradrag i kostnader i driftsregnskapet. For 2010 ble endringen spesielt stor, noe som i hovedsak skyldes et lovvedtak i det norske Stortingets vedtak av 17. juni, 2010 om at framtidige pensjoner i Statens pensjonskasse skal reguleres 0,75 prosentpoeng lavere enn den årlige G-reguleringen. Isolert ga dette en

■ The positive financial result is to a large extent due to a change in pension liabilities. This change is recorded as a decrease in operating costs. The unusually large amount of change in 2010 is mainly due to a bill approved by the Norwegian Parliament on 25 June 2010, stating that future pension payments of the Government Pension Fund will be regulated by an amount corresponding to 0.75 percentage points below the annual increase in basic social security payments. This decision increased the operating result by as much as 5.584 MNOK. Without this increase, the operating result of the NORSAR Organization for 2010 would be negative. The estimated pension costs for 2011 is as high as 6.3 MNOK.

■ NORSAR is exposed to financial risk through fluctuations in exchange rates. The risk is sought mitigated through contract clauses allowing for rate adjustments where possible, and otherwise through forward contracts with the bank for about 50% of the total volume of foreign currency. The NORSAR Organization has low debt, and is therefore exposed to fluctuations in interest rates mainly for its liquid assets.

■ Traditionally, the NORSAR Foundation has had very few losses due to non-paying customers. The gross credit risk (outstanding receivables from debtors) by 31 December 2010, including debt between parent company and subsidiary, was 22.8 MNOK (16.4 in 2009).

■ A bond in the amount of 3 MNOK was redeemed at a rate of 100.90% in December 2010. The liquidity of the NORSAR Organization is satisfactory, and consequently no decision has been made to take further action. The Board considers that the annual report presents an accurate view of the NORSAR organization's assets and obligations, financial situation and operating result.

### Future Perspectives

■ The increased oil prices in 2010 did not lead to a significant improvement in the sale of NORSAR's software products. The effects of the worldwide financial crisis in 2008 and the ensuing steep decline in oil price was still noticeable during the main part of the year, although the results in the last quarter of 2010 could be interpreted as a beginning improvement.

■ During 2010 an extensive reduction in the workforce and associated restructuring of NORSAR Innovation AS took place. The subsidiary reached its budgeted sales for the year, but activities carried over from 2009, both for personnel and contracted deliveries, made it impossible to avoid a deficit also during 2010.

■ The restructuring of NORSAR Innovation AS has led to a business strategy based on technological expertise and sales purely based on commission, and has significantly reduced the exposure of the company to risk caused by possible future decrease in sales of software products. In 2011, the operation is expected to be in balance or give a positive result.

■ Obtaining funds from governmental sources for carrying out scientific research in the disciplines covered by NORSAR has in recent years become increasingly difficult. The reason is that research programs which originally were focused on themes suitable for NORSAR's cutting-edge research have been more and more oriented towards broader research topics and interdisciplinary work. For a small research institute like NORSAR, which lacks a broad coverage of various research fields, such orientation is a strong disadvantage.

positiv engangseffekt på hele 5,584 mill. Holdes denne posten utenfor, blir driftsresultatet for morselskapet negativt for 2010. Estimert regnskapsmessig pensjonskostnad for 2011 er hele 6,3 mill.

■ Stiftelsen er eksponert for finansiell markedsrisiko ved endring i valutakurser. Risikoen søkes redusert ved oppdragsavtaler med justering for valutaendringer, der dette er oppnåelig og terminavtaler for om lag 50 % av valutainntektene. Konsernet har lav gjeldsgrad, og er hovedsakelig eksponert for endringer i rentenivået på innskuddsmidler.

■ Historisk sett har det vært få tap på fordringer mot Stiftelsens kunder. Brutto kredittrisiko for kundefordringer pr 31.12.10, inkludert gjeld mellom selskaper i konsernet, utgjør kr 22,8 mill kroner (16,4).

■ En obligasjon på 3 mill kroner, med forfall i juni 2011, ble innløst til kurs 100,90 i desember 2010. Konsernets likviditet er tilfredsstillende og det er ikke besluttet å innføre ytterligere tiltak.

■ Styret anser årsregnskapet å gi et rettviseende bilde av konsernets eiendeler og gjeld, finansielle stilling og resultat.

### Framtidsutsikter

■ Høyere oljepris resulterte ikke i et vesentlig bedre marked for NORSARs softwareprodukter i 2010. Virkningen av finanskrisen i 2008 og det påfølgende oljeprisfall var fremdeles merkbar i oljeindustrien mesteparten av året, selv om resultatene i siste kvartal kan tolkes i retning av en markedsmessig bedring.

■ Året 2010 var preget av bemanningsreduksjon og strukturendring i datterselskapet NORSAR Innovation AS. Selskapet nådde sine inntektsbudsjetter for året, men kostnader for personell og avtalte leveranser knyttet til det tidligere, høye bemannings- og aktivitetsnivået kunne ikke reduseres raskt nok til at selskapet kom driftsmessig helt i balanse.

■ Strukturendringen i NORSAR Innovation AS, der strategien nå er rendyrking av *teknologisk kompetanse* og omsetning basert på *kommisjonssalg i nettverk*, har i vesentlig grad redusert selskapets risikoeksponering knyttet til eventuell framtidig svikt i markedet for salg av softwareprodukter. I 2011 forventes inntekter og kostnader igjen å balansere, eller gi et positivt resultat.

■ Finansiering av forskning gjennom bidrag fra offentlige kilder er mer krevende enn tidligere, idet programmer som opprinnelig var faglig og tematisk fokusert og passende for NORSARs spisskompetanse i økende grad endres og innrettes mot breddeforskning og tverrfaglighet. For små institutter som NORSAR, som ikke har en bred portefølje av fag og kompetanse, virker slik spredning i innretningen diskvalifiserende.

■ Mikroseismisk monitorering, en teknologi der NORSAR startet FoU for ca 10 år siden, er inne i en god utvikling. Prosjekter innen dette temaet gir NORSAR direkte kontakt med industrien og er ofte fullfinansiert. Vi ser en bred anvendelse av denne teknologien i industriell virksomhet knyttet til underjordisk utvinning eller lagring, men det kan bli utfordrende for NORSAR å utvikle kapasitet på dette feltet i takt med etterspørselen.

■ NORSARs oppdrag for Utenriksdepartementet, i egenskap av norsk nasjonalt datasenter (NDC) for prøvestansavtalen, står foran utfordringer knyttet til en avtalefestet økning i antallet feltstasjoner/teknologier og kompetanseoverføring knyttet til et forestående generasjonsskifte. Det er vanskelig å se for seg en god løsning på disse utfordringene uten tilførsel av ekstra ressurser.

■ Microseismic monitoring, a field in which NORSAR began R&D about ten years ago, is having a positive development. Projects within this field give NORSAR direct contact with the industry, and are often fully funded. We anticipate a broadly based application of this technology in future industrial activity connected with underground mining or storage, and it is a challenge for NORSAR to develop sufficient capacity in this regard.

■ In its role as the Norwegian national data center as well as a center of competence for the Comprehensive Nuclear-Test-Ban Treaty (CTBT), NORSAR faces challenges connected to a planned increase in the number of monitoring facilities and technologies, as well as with transfer of competence in connection with retirement of key personnel. It is difficult to foresee a good solution to these challenges without an increase in funding. In 2009, the NORSAR Foundation received a request from Skatt Øst (the tax authorities) to submit a declaration of its financial activities in 2008, in order to assess the status of the foundation with regard to taxes. Subsequently, Skatt Øst determined that the NORSAR Foundation is indeed liable to pay taxes. This decision was appealed in March 2010.

The organization is exposed to credit risk through its international activity, especially through the subsidiary NORSAR Innovation AS. The risk is sought mitigated through forward contracts with the bank for EURO and USD.

■ The Board considers the future prospects of the NORSAR organization to be satisfactory, and notes that the organization continues to be in an adequate financial position. In accordance with requirements in the Norwegian accounting legislation, the Board confirms that the annual accounts have properly taken into consideration the continued operation of the organization.

### **Personnel and working environment**

■ By the end of 2010, the NORSAR organization had 47 employees (43 in the NORSAR Foundation), two of whom were working at the field maintenance center at Hamar and four at the branch office in Bergen. A total of 50.35 work-years were conducted during 2010 (51.05 in 2009).

■ The NORSAR organization is an equal opportunity employer. The established working conditions provide equal opportunities for male and female employees with regard to recruiting, conditions of employment, and possibilities for professional development and advancement.

■ Total sick leave at the organization was 2.7% during 2010 (1.9% in 2009). The increase from the previous year is due to a few cases of long-term illness not related to work. No accidents or injuries have been recorded in connection with the activities of the organization during the year.

■ The working environment in the NORSAR organization is considered satisfactory. The organization encourages the improvement of this environment through an active dialog between employees and management, and through emphasis on HSE-work and quality assurance.

■ The organization's activities do not contribute to environmental pollution.

■ The Board of Directors thanks the employees for constructive contributions to the development of the organization during the challenging year of 2010.



- Stiftelsen NORSAR mottok sommeren 2009 krav fra Skatt Øst om levering av selvangivelse for 2008, for vurdering av skatteplikt. Skatt Øst har vurdert Stiftelsen NORSAR som skattepliktig, en avgjørelse som ble påklaget til skatteklagenemda i mars 2010.
- Omsetning internasjonalt, spesielt gjennom datterselskapet NORSAR Innovation AS, eksponerer konsernet for kredittrisiko og valutatap. Valutarisikoen reduseres gjennom terminkontrakter for EURO og USD.
- Styret vurderer konsernets framtidsutsikter som tilfredsstillende, og konsernet er i en tilfredsstillende økonomisk stilling. Forutsetningen om fortsatt drift er lagt til grunn ved avleggelsen av årsregnskapet.

### Personal og arbeidsmiljø

- Antall ansatte i konsernet ved årets slutt var 47 (43 i Stiftelsen NORSAR), hvorav 2 hadde arbeidsplass på Hamar og 4 i Bergen. Det ble utført 50,35 årsverk i konsernet i 2010 (51,05 i 2009).
- Konsernets selskaper har tilrettelagt arbeidsforholdene for arbeidstakere av begge kjønn og praktiserer kjønnsmessig likebehandling i saker som handler om rekruttering, ansettelsesbetingelser og utviklings- og avansementsmuligheter.
- Sykefraværet i konsernet var 2,7 % i 2010 (1,9 % i 2009). Økningen fra fjoråret skyldes i hovedsak et fåtall langtidssykemeldte der sykdommen ikke er arbeidsrelatert. Det har ikke forekommet eller blitt rapportert arbeidsuhell eller ulykker knyttet til konsernets virksomhet.
- Arbeidsmiljøet i selskapene anses som godt, men søkes kontrollert og opprettholdt gjennom aktiv dialog mellom ledelse og personale, internt HMS arbeid, og et system for kvalitetssikring. Konsernets virksomhet forurensrer ikke det ytre miljø. Styret takker de ansatte for gode bidrag til konsernets drift og faglige utvikling gjennom et krevende år, 2010.

Kjeller, 8. april 2011

*Annik M. Myhre*

Annik M. Myhre  
Styreleder

*Rigmor M. Elde*

Rigmor M. Elde  
Styremedlem

*Arne Øfsthus*

Arne Øfsthus  
Styremedlem

*Jarle Skjørestad*

Jarle Skjørestad  
Styremedlem

*Michael Roth*

Michael Roth  
Styremedlem

*Anders Dahle*

Anders Dahle  
Adm. direktør

# Stiftelsen NORSAR

## NORSAR Foundation

### Resultatregnskap 2010 / Profit and Loss 2010

|  | 2010              | 2009              |
|--|-------------------|-------------------|
| Midler fra NFR<br><i>Grants from the Research Council of Norway</i>        | 13 095 637        | 8 321 591         |
| Prosjektmidler fra UD<br><i>Funding by the Ministry of Foreign Affairs</i> | 16 317 000        | 15 790 360        |
| Ander salgs- og oppdragsinntekter<br><i>Other sales and project income</i> | 26 771 669        | 29 749 257        |
| <b>Sum driftsinntekter</b><br><i>Total operating revenues</i>              | <b>56 184 306</b> | <b>53 861 208</b> |
| Lønn og sosiale kostnader<br><i>Pay and social costs</i>                   | 32 154 172        | 33 949 102        |
| Avskrivninger / <i>Depreciation</i>  | 1 664 919         | 1 649 758         |
| Prosjektrelaterte kostnader<br><i>Project expenses</i>                     | 10 746 396        | 10 115 787        |
| Administrative kostnader<br><i>Administrative expenses</i>                 | 5 054 819         | 4 979 699         |
| <b>Sum driftskostnader</b><br><i>Total operating expenses</i>              | <b>49 620 306</b> | <b>50 694 346</b> |
| Driftsresultat / <i>Operating result</i>                                   | 6 563 999         | 3 166 862         |
| Netto finansposter<br><i>Net financial transactions</i>                    | -82 530           | 21 822            |
| <b>Resultat før skattekostnad / <i>Result before taxes</i></b>             | <b>6 481 469</b>  | <b>3 188 684</b>  |
| Skattekostnad på ordinært resultat / <i>Tax</i>                            | 1 861 242         | -442 660          |
| Ekstraordinær inntekt<br><i>Extraordinary income</i>                       |                   |                   |
| <b>Årsresultat / <i>Annual net result</i></b>                              | <b>4 620 227</b>  | <b>2 746 024</b>  |

# Konsernet NOR SAR

## NOR SAR Organization

### Resultatregnskap 2010 / Profit and Loss 2010

|  | 2010       | 2009       |
|--|------------|------------|
| Midler fra NFR<br><i>Grants from the Research Council of Norway</i>        | 16 395 637 | 13 029 095 |
| Prosjektmidler fra UD<br><i>Funding by the Ministry of Foreign Affairs</i> | 16 317 000 | 15 790 360 |
| Andre salgs- og oppdragsinntekter<br><i>Other sales and project income</i> | 32 173 626 | 31 648 313 |
| Sum driftsinntekter<br><i>Total operating revenues</i>                     | 64 886 263 | 60 467 768 |
| Lønn og sosiale kostnader<br><i>Pay and social costs</i>                   | 38 301 018 | 42 286 659 |
| Avskrivninger / <i>Depreciation</i>  | 1 664 919  | 1 649 758  |
| Prosjektrelaterte kostnader<br><i>Project expenses</i>                     | 13 718 107 | 16 568 384 |
| Administrative kostnader<br><i>Administrative expenses</i>                 | 7 054 255  | 7 556 776  |
| Sum driftskostnader<br><i>Total operating expenses</i>                     | 60 774 298 | 68 061 577 |
| Driftsresultat / <i>Operating result</i>                                   | 4 111 965  | -7 593 809 |
| Netto finansposter<br><i>Net financial transactions</i>                    | 454 405    | -1 174 922 |
| Resultat før skattekostnad / <i>Result before taxes</i>                    | 4 566 370  | -8 768 731 |
| Skattekostnad på ordinært resultat / <i>Tax</i>                            | 759 601    | 3 469 448  |
| Ekstraordinær inntekt<br><i>Extraordinary income</i>                       |            |            |
| Årsresultat / <i>Annual net result</i>                                     | 3 806 769  | -5 299 283 |

# Stiftelsen NOR SAR

## NOR SAR Foundation

### Balanse 2010 / Balance 2010

|  | 2010              | 2009              |
|--|-------------------|-------------------|
| Utsatt skattefordel / <i>Deferred tax asset</i>                              | 7 185 479         | 0                 |
| Eiendeler / <i>Assets</i>  |                   |                   |
| Anleggsmidler / <i>Fixed assets</i>  | 24 025 303        | 25 046 590        |
| Langsiktig lån til datterselskap<br><i>Long-term loan subsidiary company</i> | 0                 | 6 000 000         |
| Investering i datterselskap<br><i>Investment in subsidiary company</i>       | 10 000 000        | 1 000 000         |
| Oppdrag i arbeid / <i>Work in progress</i>                                   | 1 297 890         | 3 529 620         |
| Debitorer / <i>Debitors</i>  | 22 730 074        | 17 101 064        |
| Andre kortsiktige fordringer<br><i>Other short-term receivables</i>          | 456 752           | 629 105           |
| Kasse, bank / <i>Cash, bank</i>  | 11 157 191        | 9 543 524         |
| <b>Sum eiendeler / <i>Total assets</i></b>                                   | <b>76 852 689</b> | <b>62 849 903</b> |
| Egenkapital / <i>Equity</i>  |                   |                   |
| Grunnkapital / <i>Basic capital</i>  | 200 000           | 200 000           |
| Overkursfond / <i>Share premium reserve</i>                                  | 843 000           | 843 000           |
| Annen egenkapital / <i>Other equity</i>                                      | 50 429 000        | 36 765 031        |
| <b>Sum egenkapital / <i>Total equity</i></b>                                 | <b>51 472 000</b> | <b>37 808 031</b> |
| Gjeld / <i>Liabilities</i>   |                   |                   |
| Pensjonsforpliktelser / <i>Pension allocation</i>                            | 0                 | 2 646 638         |
| Avsetning for feltanlegg<br><i>Allocation field installations</i>            | 1 500 358         | 1 500 358         |
| Langsiktig gjeld / <i>Long-term debt</i>                                     | 4 437 500         | 4 687 500         |
| Leverandørgjeld / <i>Suppliers</i>   | 1 928 790         | 3 249 735         |
| Betalbar skatt / <i>Tax liability</i>  | 3 009             | 472 290           |
| Skyldige avgifter og skattetrekk<br><i>Tax withholding reserves</i>          | 4 301 356         | 3 283 934         |
| Annen kortsiktig gjeld<br><i>Other short-term liabilities</i>                | 13 209 676        | 9 201 417         |
| <b>Sum gjeld / <i>Total liabilities</i></b>                                  | <b>25 380 689</b> | <b>25 041 872</b> |
| <b>Sum egenkapital og gjeld<br/><i>Total equity and liabilities</i></b>      | <b>76 852 689</b> | <b>62 849 903</b> |

# Konsernet NOR SAR

## NOR SAR Organization

### Balanse 2010 / Balance 2010

|  | 2010              | 2009              |
|--|-------------------|-------------------|
| Utsatt skattefordel / <i>Deferred tax asset</i>                              | 12 435 956        | 4 148 832         |
| Eiendeler / <i>Assets</i>  |                   |                   |
| Anleggsmidler / <i>Fixed assets</i>  | 23 766 421        | 25 235 490        |
| Langsiktig lån til datterselskap<br><i>Long-term loan subsidiary company</i> | 0                 | 0                 |
| Investering i datterselskap<br><i>Investment in subsidiary company</i>       | 0                 | 0                 |
| Oppdrag i arbeid / <i>Work in progress</i>                                   | 1 498 377         | 3 529 620         |
| Debitorer / <i>Debitors</i>  | 16 397 840        | 9 289 849         |
| Andre kortsiktige fordringer<br><i>Other short-term receivables</i>          | 3 356 949         | 3 550 766         |
| Kasse, bank / <i>Cash, bank</i>  | 14 634 704        | 14 862 430        |
| <b>Sum eiendeler / <i>Total assets</i></b>                                   | <b>72 090 247</b> | <b>60 616 987</b> |
| Egenkapital / <i>Equity</i>  |                   |                   |
| Grunnkapital / <i>Basic capital</i>  | 200 000           | 200 000           |
| Overkursfond / <i>Share premium reserve</i>                                  | 843 000           | 843 000           |
| Annen egenkapital / <i>Other equity</i>                                      | 43 385 483        | 30 535 801        |
| <b>Sum egenkapital / <i>Total equity</i></b>                                 | <b>44 428 483</b> | <b>31 578 801</b> |
| Gjeld / <i>Liabilities</i>   |                   |                   |
| Pensjonsforpliktelser / <i>Pension allocation</i>                            | 0                 | 3 578 452         |
| Avsetning for feltanlegg<br><i>Allocation field installations</i>            | 1 500 358         | 1 500 358         |
| Langsiktig gjeld / <i>Long-term debt</i>                                     | 4 437 500         | 4 687 500         |
| Leverandørgjeld / <i>Suppliers</i>   | 2 607 124         | 4 718 007         |
| Betalbar skatt / <i>Tax liability</i>  | 3 009             | 472 290           |
| Skyldige avgifter og skattetrekk<br><i>Tax withholding reserves</i>          | 4 561 809         | 3 699 915         |
| Annen kortsiktig gjeld<br><i>Other short-term liabilities</i>                | 14 551 991        | 10 381 664        |
| <b>Sum gjeld / <i>Total liabilities</i></b>                                  | <b>27 661 791</b> | <b>29 038 186</b> |
| <b>Sum egenkapital og gjeld<br/><i>Total equity and liabilities</i></b>      | <b>72 090 274</b> | <b>60 616 987</b> |

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