

A person wearing a blue lab coat and gloves is working in a laboratory. They are holding a small metal component with a circular opening. A microscope is positioned above the component, and a flexible metal hose is connected to the microscope. The scene is illuminated with a blue light, creating a high-tech, scientific atmosphere.

FFI

Norwegian Defence Research Establishment (FFI)
Annual Report in Brief 2013



FFI was ranked among Top 10 ideal employer in Norway by young professionals in the international employer branding organisation Universum's survey 2013.

See FFI's Electronic Annual Report: www.ffi.no/2013 and the video: "*A small institute with challenging missions - missile technology*".

The photo on the front page shows the nozzle that sends impulses to the missile's "brain". This Naval Strike Missile is a flying computer compared to earlier generation missiles.

Photo: Einar Aslaksen

CONTENTS

| | |
|---|----|
| Outlook – Director General: <i>Three keys to innovation</i> | 4 |
| About FFI | 6 |
| FFI's organisation 2013 | 6 |
| Employees | 7 |
| Board of Directors: | 8 |
| Excerpt from Board of Directors' report: <i>Research-based knowledge contributes to better decisions</i> | 8 |
| Financial results | 10 |
| Equal opportunity and research man years | 11 |
| Research divisions | 12 |
| Research activities | 14 |
| Research cooperation | 16 |
| Lectures and teaching | 17 |
| Publications | 18 |
| FFI's organisation 2014 | 19 |
| Vision, values and goals | 20 |

FFI is the prime institution responsible for defence related research in Norway. Its principal mission is to carry out research to meet the requirements of the Armed Forces. FFI also serves in an advisory capacity to the Ministry of Defence and the Norwegian Armed Forces. The Institute focuses particularly on developments in science and military technology, which have an impact on political security and defence planning.

OUTLOOK:

Three keys to innovation

FFI develops world-class technology. To succeed, the Institute must encourage and facilitate innovation and possess the courage to take on tasks that are both challenging and difficult.

When FFI was first established in 1946, it was with the purpose of contributing to the modernisation of Norway, first and foremost the Norwegian Armed Forces, national industry and the scientific milieu. The role and significance of technology to security and the national defence was recognised very early. The connection between technology and national security has not changed over time: technology is even more important to the Armed Forces in today's operations as it was back then.

What makes FFI so successful in developing innovative solutions for the defence sector? Three key factors particularly stand out:

USER PARTICIPATION

The first reason behind the defence sector's success in focusing on innovation

is a strong degree of user participation and user orientation. FFI works closely with the Armed Forces and other entities in the defence sector throughout the lifetime of a given project. FFI researchers are out in the field where the technology will be used, participating in exercises and conducting experiments; they are up in the air and out at sea. FFI scientists meet regularly with the people who will make use of their research results, often several times a year, both when important decisions are made on the direction of a prospective project, and before the concrete project even begin. This is done to ensure that the right goals and premises are set.

In Norwegian research, the degree of success is often measured by counting citations and publications. However, cited publications alone are not necessarily an indication of innovation. If the primary goal of a project is publication in a professional journal by itself, it can create a culture decoupled from the world. To FFI, cited publications are important and

necessary, but they are not a sufficient condition for turning knowledge and ideas into an effective defence. If the aim is to aid the defence sector in solving large and complex tasks, high quality publications will be a natural side result.

LONG-TERM PERSPECTIVE

The second reason why the defence sector is innovative is its ability to maintain a long-term perspective.. A long-term focus presumes the freedom to keep going over time and not have to give up a good idea in order to save money on the way towards a realistic goal. An example of this is the Kongsberg Group's entrance into a bridging contract at Stage 3 with the Norwegian Defence Logistics Organisation for the further development of the Joint Strike Missile. An early forerunner in the development of this missile was the rocket research carried out at FFI at the end of the 1940s in the form of the Terne anti-submarine system, and later the first target-seeking anti-ship missile in NATO, the Penguin. Missile research was carried further with work on a new

anti-ship missile, now known as the Naval Strike Missile. The first test firing of this missile from a Norwegian vessel took place in 2012. Research and development in a long-term perspective, such as this project, resulted in the development of a world-class missile suitable for use in the new fighter aircraft Norway has ordered from the United States.

INTERNATIONAL COOPERATION

The third reason behind the Norwegian defence sectors ability to carry out applied innovation is international cooperation. Cooperative research efforts in NATO and the European Defence Agency in particular provide platforms for Norwegian defence researchers and developers, both in the research sector itself and the overall defence industry, where they can cooperate at a broad international level. The Norwegian emphasis on international cooperation is noticeable in statistics maintained by the NATO Science and Technology Organisation on member country participation in research activities. Norway is involved in about half as many

activities as Great Britain, for example. However, if the figures are adjusted to reflect the size of the population, Norway is seen to be the most active country in NATO research cooperation. For a small country like Norway, it is of immeasurable value to be so active in such important arenas of defence cooperation, both in opening doors for Norwegian industry and to benefit from research and development of other countries.

The R & D model upon which the Norwegian defence sector relies places strong emphasis on user participation, a long-term perspective and international cooperation. This works well, especially if the end product takes the form of innovation we can use in both the military and civil spheres of society.



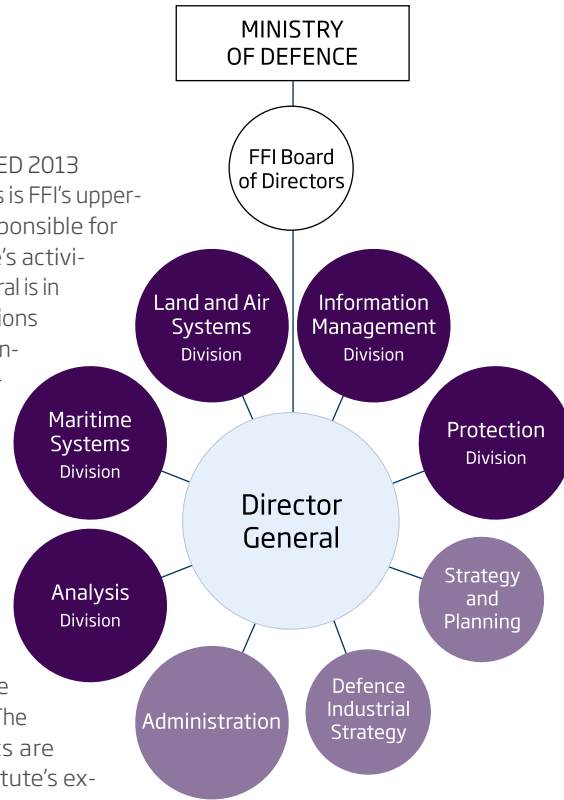
John-Mikal Størdal
Director General

ABOUT FFI

The Norwegian Defence Research Establishment (FFI) was founded on 11 April 1946. The Institute is organised as an administrative agency subordinate to the Ministry of Defence.

HOW FFI IS ORGANISED 2013

The Board of Directors is FFI's uppermost body and is responsible for running the Institute's activities. The Director General is in charge of daily operations and also serves in the Institute's advisory capacity. FFI is organised into five research divisions, with support from a strategy and development unit, a defence industrial strategy group and a central administrative staff that discharges common administrative duties and functions. The heads of these units are members of the Institute's executive group.



FFI's research activities are carried out in project form and each individual project is discussed and assessed in the Defence Research Review Board. Contact between FFI and the Armed Forces is further reinforced by regular meetings with the Ministry of Defence, the different branches of the Armed Forces and the Defence Staff. Here the Armed Forces' needs, with respect to research and development, are laid out and FFI's proposals for projects are presented.

FFI'S EMPLOYEES



720

Employees



LOCALISATION

FFI is located at Kjeller near the town of Lillestrøm, 25 km northeast of Oslo. The Institute has also a research unit at Karljohansvern in Horten south of Oslo.

EDUCATION LEVELS

Doctorate degree/PhD: 163
 Master's degree: 313
 Bachelor's degree: 124
 Craft certificate: 49
 Other: 71



705

man years

FFI'S BOARD OF DIRECTORS

As of the annual meeting in April 2013, the FFI Board of Directors consisted of the following members:

Olaf Valeur, chairman and board members
Kristin Misund,
Jo G. Gade,
May Kristin Haugen,
Jørn Rangnes,
Monica Endregard and
Tor Berger. The latter two are representatives for FFI's employees.

EXCERPT FROM THE BOARD OF DIRECTORS' REPORT:

Research-based knowledge contributes to better decisions

The development of a modern defence places great demands on existing knowledge and expertise. FFI has an important role to play in understanding and evaluating the importance of technological developments, and to give advice on the possibilities and challenges associated with procuring and using military materiel. With its thorough understanding of the forces that drive and affect Norwegian security policy at any given time, FFI is well positioned to offer sound advice on how to tackle the challenges facing both today's armed forces and civil society.

In 2013 the board of directors employed a new chief of staff and three new division directors. Another important task for the board has been to ensure that the maximum carry-over of funds paid in for work not yet carried out remains below 25 percent of the Institute's annual turnover. This goal has been attained. In 2013, the net carry-over was 24.2 percent

of the annual turnover, compared to 29.2 percent in 2012.

The board has recommended an overall strategy and game plan for FFI based on the strategic planning and objectives of the defence sector. At the direction of the board, a research group at FFI is selected for assessment by an external evaluating committee. The board has also followed up on the Institute's recruitment policy and stepped up its effort in the area of societal security.

ECONOMY

FFI is an administrative agency vested with special powers of authorisation. This means that the Institute does its own accounting and maintains accounting records dependent of the central government. FFI's operating revenues from 2013 were NOK 866,8 million, of which 10 percent came from public and private projects outside the defence sector. FFI's total operating costs for 2013 were NOK

852,3 million. The final statement of the year shows a profit of NOK 14,5 million. This amount is entered as a corresponding increase under the item Vested Business Capital in the balance sheet.

FFI is permitted by MoD to accumulate equity capital up to approximately 10 percent of the operating revenues. By the end of 2013, the figure stands at 7,2 percent.

FUTURE POSSIBILITIES AND CHALLENGES

FFI continues to increase its efforts within the area of societal security. This is supported by the Ministry of Defence and is in accordance with the Prime Minister's request for intersectoral cooperation to strengthen preparedness and contingency planning. Intersectoral cooperation could be challenging to achieve in practice, but the success FFI has achieved with its participation in EU projects and the Institute's increasing collaborative ties with

the justice and emergency preparedness sector are very encouraging.

In all of FFI's activities, it is important to maintain a good balance between a short-term and a long-term perspective. Decisions made today and in the immediate short term will have a large impact on Norwegian defence in the future. Research-based knowledge contributes to good decision-making, and room must therefore be made for innovation and innovative thinking. Two areas in particular stand out:

Satellite technology is indispensable in a modern and technologically advanced defence system such as the Norwegian Armed Forces. This area will also be of great importance in the further development of a well-functioning network-based defence. A large part of the national competence building in the area of satellite technology is conducted at FFI in close cooperation with civil au-

thorities, the Norwegian space industry and the Norwegian Space Center, the Norwegian Coastal Administration, and the Kongsberg Group. FFI has advocated the development of a well-planned space strategy for the Armed Forces.

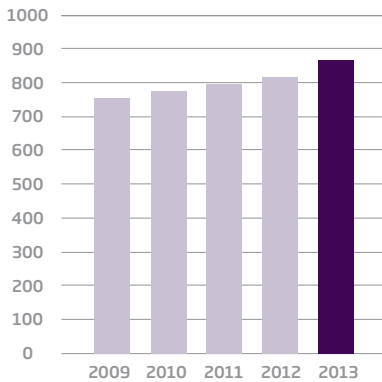
Another area of rapid development that will have a major impact on military systems of the future is robotics and unmanned systems. From the perspective of Norwegian defence, unmanned systems, although initially operating in conjunction with manned systems, have the potential to carry out tasks in new and better ways while reducing costs and saving lives. The field of robotics and unmanned systems is a priority area of research to the Institute, and within certain areas of the field, one in which Norway has the potential to become a leading nation. It also holds the potential to yield spinoffs in several areas of relevance to the civil sector.

Kjeller, 13 March 2014

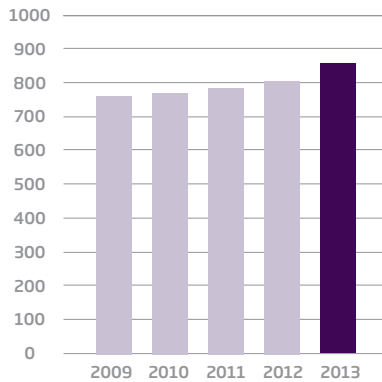
FINANCIAL PERFORMANCE



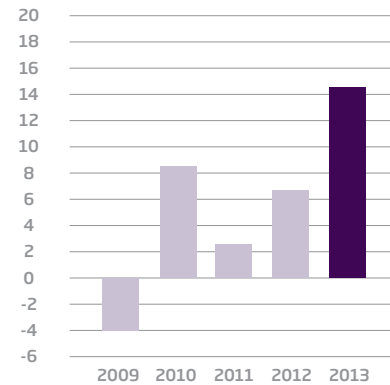
OPERATING REVENUES (MILL. NOK)



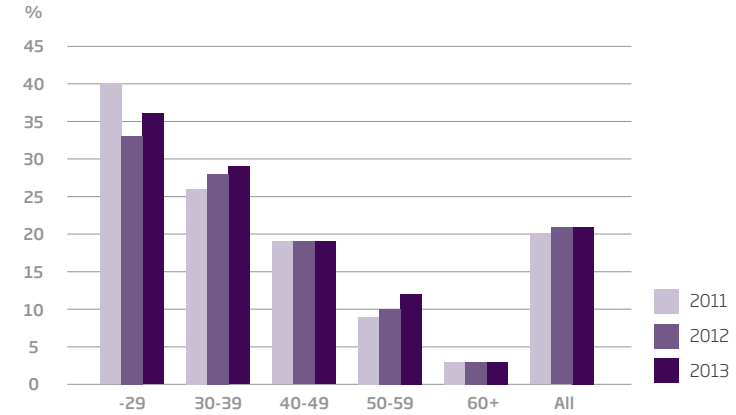
RUNNING COSTS (MILL. NOK)



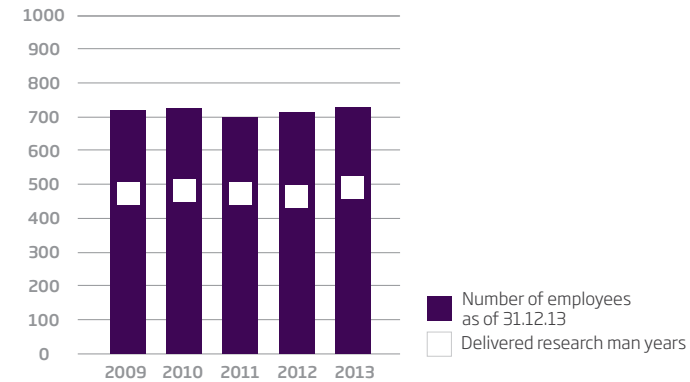
PROFIT (MILL. NOK)



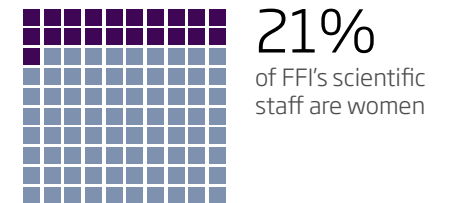
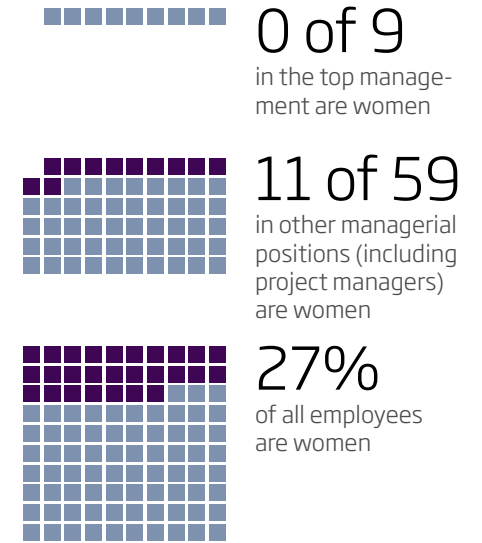
Scientific staff
AGE DISTRIBUTION, WOMEN



Development in the number delivered
RESEARCH MAN YEARS AND EMPLOYEES



GENDER EQUALITY



8 percentage point increase in the number of women among the scientific staff since 2004

FFI'S DIVISIONS

FFI's research activity is organised into five divisions reflecting the needs of FFI clients and collaborative partners.

Five user-oriented divisions facilitate cooperation with FFI. Each division is headed by a division director, and the division director in conjunction with the individual project managers and research directors, constitute the executive management of that particular division. This means that FFI is a linear, project-based organisation where overall responsibility for results lays with the division directors.



ANALYSIS DIVISION

The role of the Analysis Division is to support the strategic management of the Armed Forces, and the Institute in its advisory role to the MoD. The division conducts broad analyses of matters affecting future tasks, structure and economy of the Norwegian Defence. It places research-based knowledge into an integrated whole, an approach which requires professional depth and scope and the ability to participate in interdisciplinary collaborations.



47,6
research man years

LAND AND AIR SYSTEMS DIVISION

The Land and Air Systems Division assists in the reorganisation and development of Norwegian land and air forces. It carries out both long term and applied research, and conducts experimentation directed towards operations, including testing and assessments. Areas of priority for the Land and Air Systems division include surveillance, air and surface-based combat systems and precision guided munitions.



136,4
research man years

MARITIME SYSTEMS DIVISION

The Marine Systems Division contributes to the development of Norwegian naval capacities. This work comprises operative experimentation, concept and systems development, testing and evaluation for frigates, missile torpedo boats, submarines, minesweepers and autonomous underwater vehicles. The interface between vessel and system is an important part of the division's work.



98,8
research man years

PROTECTION DIVISION

The Protection Division is a national centre of expertise in protection against weapons of mass destruction and conventional weapons. Protection Division researchers work on threat assessment, vulnerability analysis and protective measures. Competence in these areas is contingent upon an understanding of how different weapon systems work, and their effects. The Protection Division also makes recommendations for improved preparedness and contingency planning within both the Armed Forces and the civil sector.



89,1
research man years

INFORMATION MANAGEMENT DIVISION

The work of the Information Management Division is directed towards joint level operations in the Armed Forces, and covers areas within network-based defence, electronic warfare, the cyber domain, information operations, surveillance, and modeling and simulation technology. The Information Management Division conducts both long-term and applied research in all of the above-mentioned areas in close collaboration with the Armed Forces, our allies and Norwegian industry.



103,2
research man years

DEFENCE RESEARCH

In 2013, research carried out by FFI contributed to improved operational capabilities in the Norwegian Armed Forces. Through 165 different research projects and 187 smaller commissions, 523 FFI research scientists have developed technology and expertise that will help modernise and streamline the Norwegian defence sector.

RESEARCH ACTIVITIES

FFI's areas of activity cover a wide range of fields, including basic research and research to increase the level of knowledge. The Institute also supplies its clients with strategic advice, insight into technical developments and support in the procurement of materiel, as well as knowledge regarding phasing-in and testing of military materiel. The range of academic and technical capabilities at the Institute is significant. At the same time, FFI interacts with many different players within the Armed Forces - from the political and strategic level in the Ministry of Defence and the Defence Staff, to operators and users of different systems in the field. It also interacts with other public agencies and national and international players within military research, academia and industry.

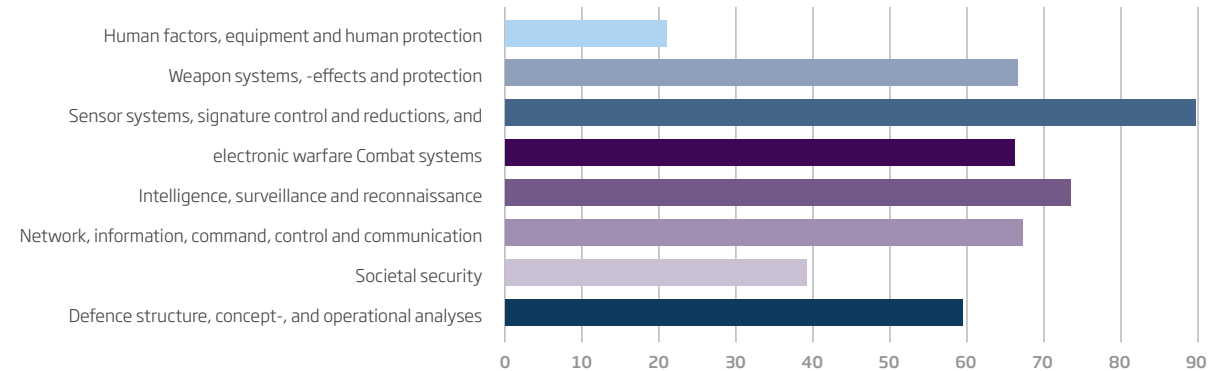
In order to reflect this range of work, which in reports might have several different objectives, the Institute has defined eight areas of activity that form the basis for planning, reporting and presentations.

The demand for professional competence within the Institute's traditional research areas is strong, and in face of complex processes associated with procurement of defence materiel, the need for professional competence and support is increasing. FFI's highest level of activity is within the areas of sensor systems, signature adaptation and electronic warfare.

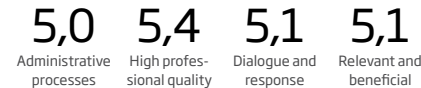
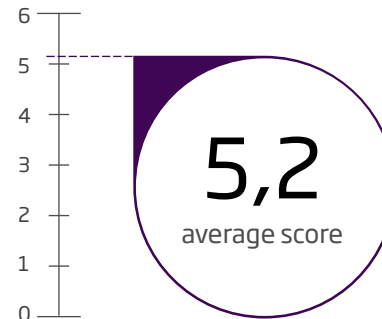
CUSTOMER SATISFACTION

A fundamental success factor for FFI is being able to provide research that clients can benefit from. FFI's success depends on a thorough understanding of client needs, concerns and existing solutions. The Institute routinely surveys customer satisfaction upon the conclusion of projects. On a scale from 1 to 6, the average score for customer satisfaction in 2013 was 5.2.

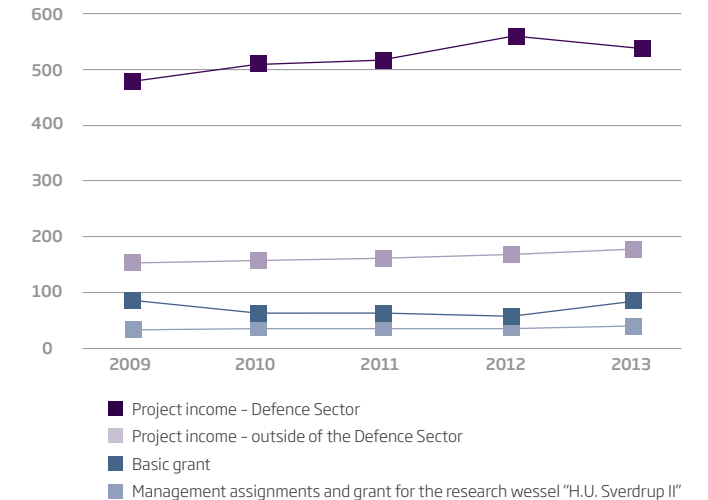
RESEARCH MAN YEARS DISTRIBUTED ACROSS EIGHT AREAS OF ACTIVITY



CUSTOMER SATISFACTION



DEVELOPMENT IN SOURCES OF FUNDING



NATIONAL

As with its international collaborative work, FFI seeks close contact with academia and other research institutions in Norway. The aim is to increase the quality and effectiveness of research, and contribute to transferring knowledge to external institutions.

COLLABORATIVE RESEARCH

Part of FFI's purpose is to carry out research and development for the Norwegian Armed Forces not covered by other national institutions. This objective is influenced by its goal of being an institution of applied research with close connection to different parts of the Norwegian Defence. There will therefore be areas where other national institutes and academia also contribute relevant expertise. FFI seeks to utilise civilian expertise while avoiding duplication of research and on-going development activities in the civil sector.

In recent years, FFI has developed a close cooperation with SINTEF, especially in the field of materials science and micro-electronics - in addition top-level management meets annually. This cooperation is carried out in the form of projects that typically have both civilian and military applications, and where FFI accesses and applies the appropriate expertise to meet the needs of the defence sector.

FFI also collaborates with other relevant Norwegian research communities and institutions such as the Norwegian Research Council, Norwegian University of Science and Technology, the Universities in Oslo, Bergen, and Tromsø, Norwegian University of Life Sciences, Norwegian School of Economics, The University Centre at Kjeller, Vestfold University College, Gjøvik University College, Norwegian Institute for Defence Studies, Norwegian Defence Cyber Academy, The Norwegian Police University College, Institute of Marine Research, Norwegian Space Centre, Norwegian Institute of International Affairs, Institute for Energy Technology, Norwegian Mapping Authority, Geological Survey of Norway, Norwegian Geotechnical Institute, Simula Research Laboratory, Eastern Norway Research Institute, Fafo Institute for Applied International Studies, and Eastern Norway Research Institute, Norwegian Institute for Defence Studies, Directorate for Civil Protection and Emergency Planning, Oslo University Hospital HF, Statistics Norway, NORSAR and Norwegian Radiation Protection Authority.

INTERNATIONAL

Through comprehensive cooperation and collaboration with foreign research communities and sister organisations in NATO and through bilateral and multinational cooperation agreements, FFI can deliver far more knowledge and expertise to the Armed Forces than would be possible only based on its own research. In 2013, FFI collaborated on specific research projects with close to 20 other countries. Furthermore, through working groups and similar arrangements, FFI was also involved in collaborative efforts with approximately 30 countries.

LECTURES, SEMINARS AND CONFERENCES UNDER FFI AUSPICES

633

lectures

82

FFI seminars
in Norway and
abroad

22

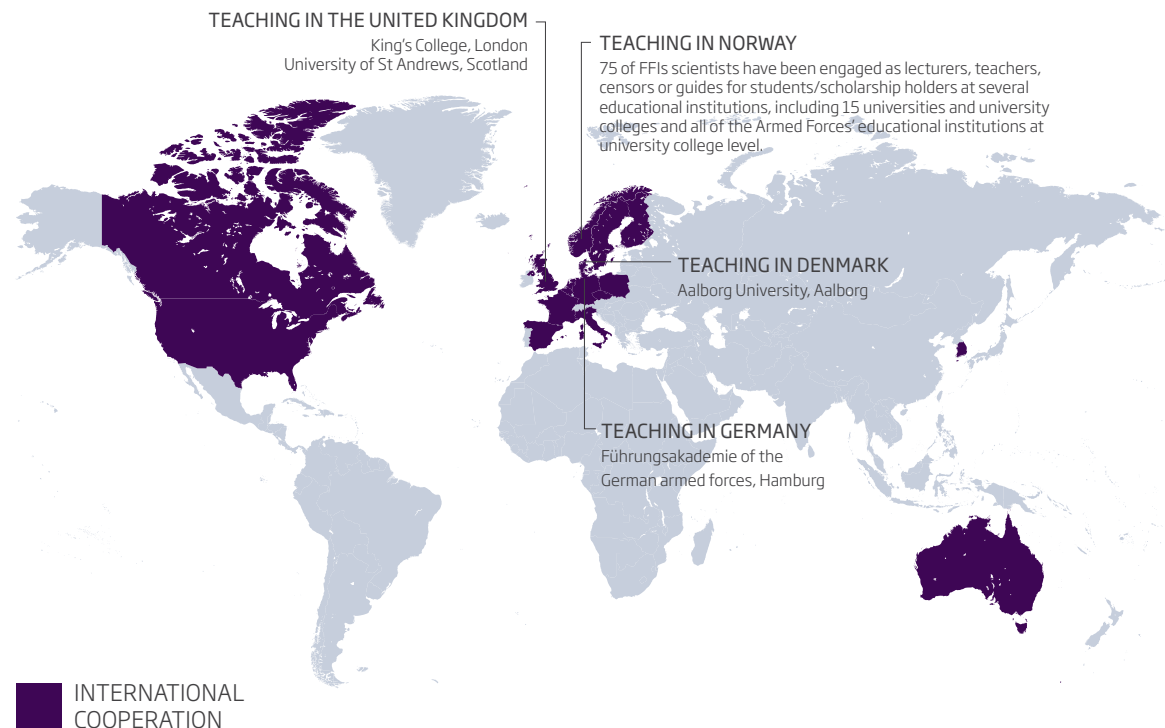
PhD-students

62

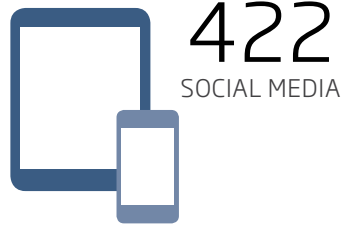
Master's degree
students

33

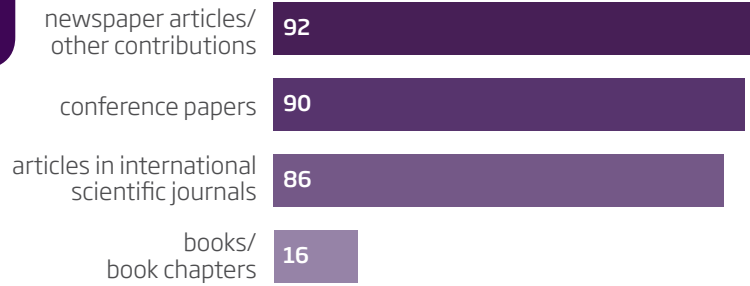
students from
other categories



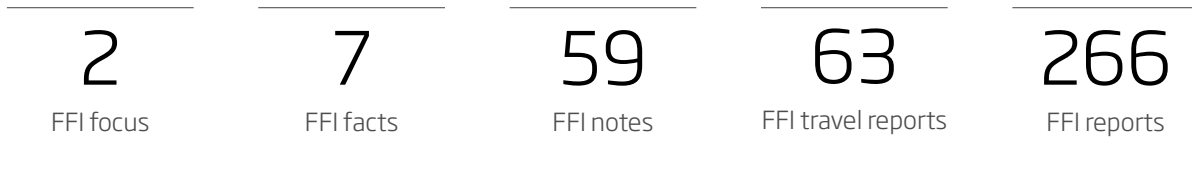
PUBLICATIONS



284 external publications



FFI PUBLICATIONS

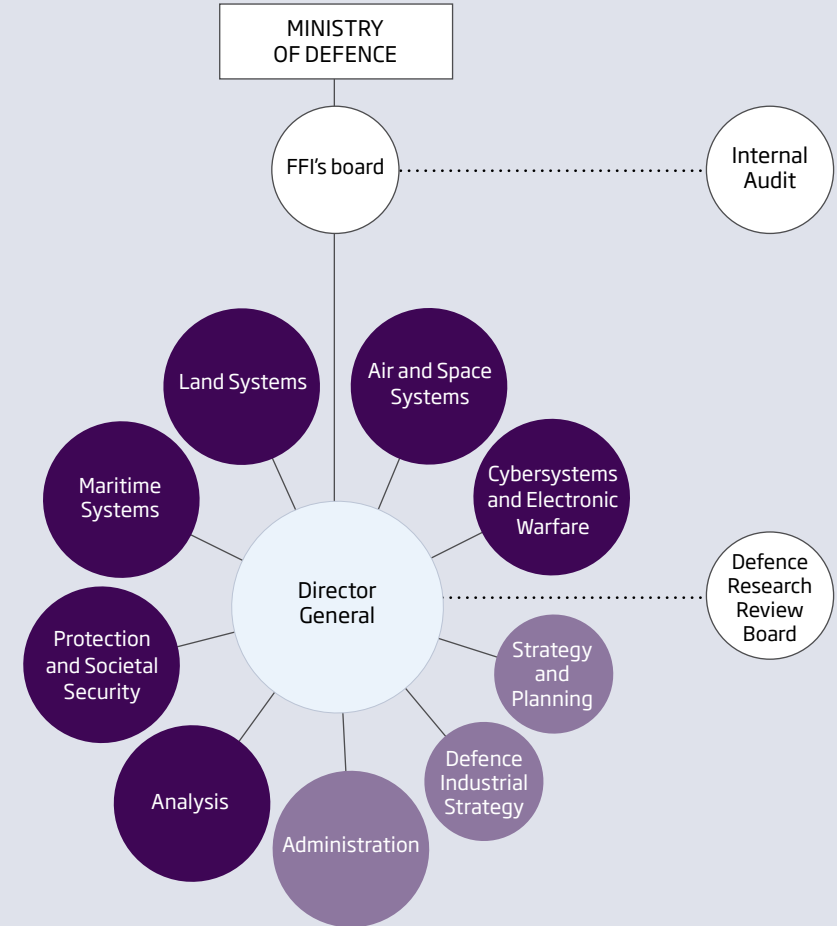


FFI'S ORGANISATION 2014

FFI's research activity was re-organised from five to six divisions first of January 2014. The new divisions are: Analysis, Cyber Systems and Electronic Warfare, Land Systems, Maritime Systems, Air and Space Systems and Protection and Societal Security.

The new organisation and division terms will to a larger extent reflect the division's area of research and facilitate better cooperation. Each division is headed by a division director, and the division director in conjunction with the project managers, constitute the executive management of that particular division.

The Institute's Internal Audit reports to the Board. The Defence Research Review Board is led by the Director General of FFI and the Head of the Department of Defence Policy and Long-Term Planning at The Norwegian Ministry of Defence.



FFI'S VALUES

Innovative, energetic, far-sighted, responsible

FFI'S VISION

FFI turns knowledge and ideas into an effective defence

FFI'S OBJECTIVES

As a research Institute, FFI will:

- ▶ contribute to an effective and relevant defence
- ▶ contribute to the overall safety of society
- ▶ contribute to national industrial development

For our clients and for society we will:

- ▶ be innovative and quality-conscious
- ▶ communicate research results effectively to targeted recipients
- ▶ operate the Institute efficiently and justifiable

For the FFI community we will:

- ▶ be ethically aware and responsible
- ▶ be an inspiring and motivating workplace
- ▶ recruit the right competence

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Print: 07 Gruppen
Circulation: 500
Text, photo and design: FFI
ISBN: 978-82-464-2090-6

FFI is member of "Grønn stat"

