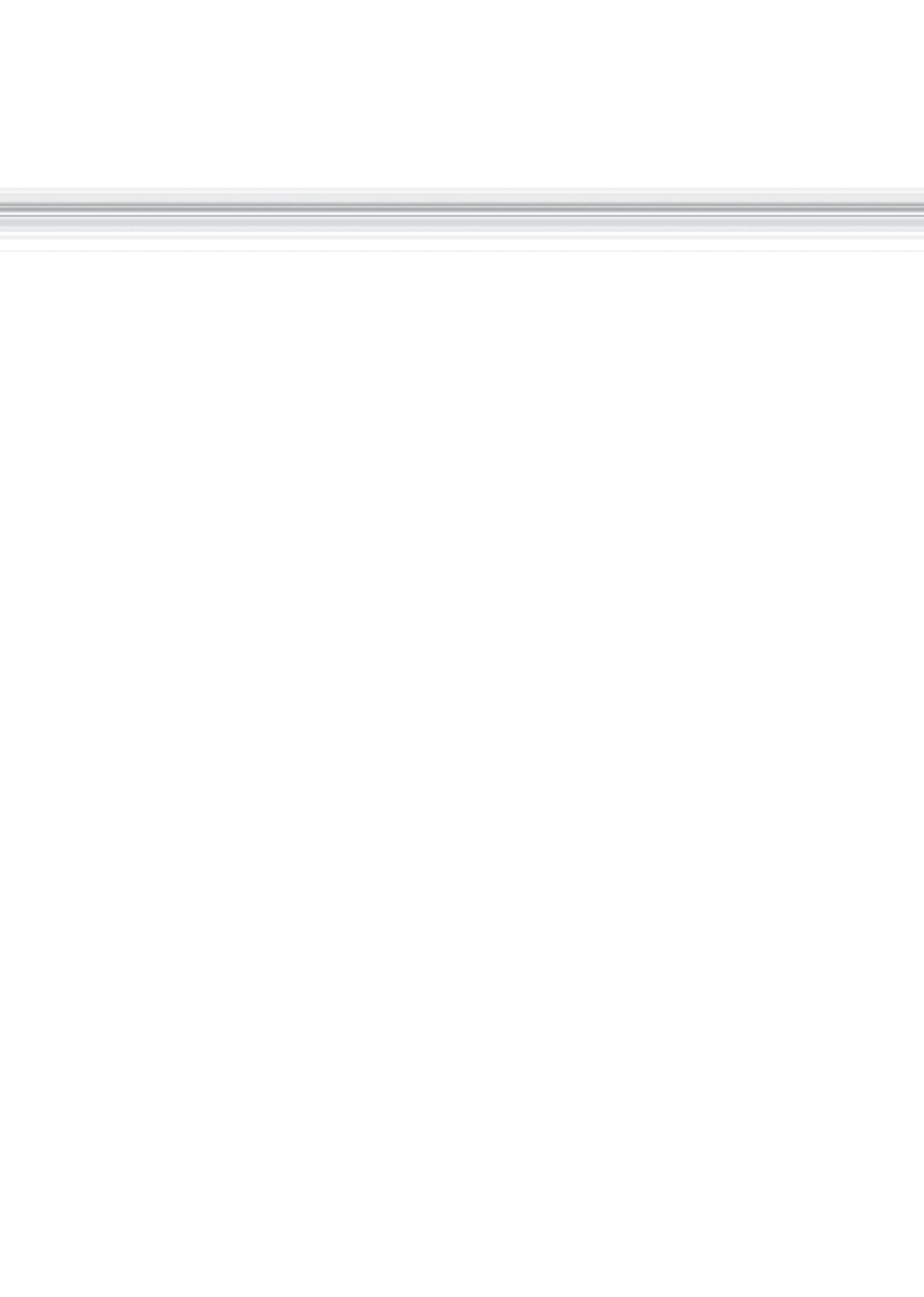


Non-Ionizing Radiation – Health and Environment

Implementation Plan of the National Research Programme NRP 57

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Non-Ionizing Radiation – Health and Environment

Implementation Plan of the National Research Programme NRP 57

The Implementation Plan was approved by
The Federal Department of Home Affairs, 4 November 2005.

What are National Research Programmes (NRP)?

The research carried out by National Research Programmes is targeted research that contributes to the solution of contemporary problems of national importance. Under the provisions of Article 6, paragraph 2, of the Law on Research of 7 October 1983 the Federal Council selects the topics and foci to be researched in NRPs and mandates full responsibility for implementing the Programmes to the Swiss National Science Foundation (SNSF, Division IV).

Article 4 of the Federal Ordinance to the Law on Research of 10 June 1985 (as of 7 December 2004) describes the purpose and contents of the NRP instrument as follows (here translated freely):

¹National Research Programmes are a means to direct and support programmes of co-ordinated research projects that all target a common goal. Where needed, National Research Programmes should foster the strengthening of scientific research potential.

²Topics of research are appropriate for National Research Programmes if, in the main,

- a. scientific research of the problem is of national importance;*
- b. Swiss research can make a significant contribution to the resolution of the problem;*
- c. problem solutions require research contributions from multiple disciplines;*
- d. the problem cannot be assigned exclusively to pure basic research, to research within a specific Section of the Administration, or to industrial applications research;*
- e. research on the problem can be expected to produce research results that have practical applications within a five-year duration.*

³The following criteria should be taken into consideration in setting forth the topics of National Research Programmes:

- a. the programmes can provide the scientific basis for decision-making by government and the Administration;*
- b. the programmes could be conducted in international collaboration and are also of great interest to Switzerland.”*

1. Summary

The main objective of this National Research Programme (NRP) is to address key scientific questions regarding the potential adverse health effects of non-ionizing radiation (NIR) emitted by the range of present and future technologies. The programme is complementary to international research activities in the field of NIR and focuses on specific issues defined in the EMF research agenda of the WHO. Thereby it directly attends to the ever-increasing uncertainties in the Swiss population regarding potential health hazards by NIR in our environment.

Since the international focus lies primarily on the endpoint of cancer, the NRP will address other potentially adverse health effects such as e.g., changes in well being and behavior, brain or sleep physiology, and clarify the underlying basic mechanisms between electromagnetic fields and biological systems. A better understanding of the causal relationship between NIR and neurophysiologic responses as well as responses at the cellular level will facilitate the risk assessment of current and future technologies.

Consequently, the main topics of research within the framework of this NRP are:

- Dosimetry and exposition
- Human epidemiological and experimental exposure studies, including electro hypersensitive subgroups
- Cellular biology of NIR effects
- Risk management, risk stratification and risk communication

A total budget of CHF 5 million is available for funding this interdisciplinary, four-year research programme.

2. Introduction

Despite the considerable international research effort to investigate potential adverse health effects of non-ionizing radiation (NIR) at levels below the threshold of thermal responses or nerve excitation, many scientific issues have not yet been closed. The uncertainty associated with unknown risks combined with the fast penetration of new wireless technologies in everyone's life has resulted in widespread public concern in Switzerland as well as in other countries. This NRP shall complement the international research effort in the risk assessment of NIR by covering a comprehensive and well-targeted segment of the open scientific issues.

During the last five to ten years international (e.g., 5th Framework Program), national (e.g., Great Britain, Finland, France, Italy, Japan and others) as well as industry programmes (e.g., MMF, NTTDoCoMo) mainly focused on those topics of the WHO Agenda that are directly related to cancer risk, i.e. epidemiological and animal studies evaluating the exposures of current 2G mobile phone systems such as GSM. Isolated studies also addressed other endpoints. Little attention has been paid to exposures other than those of mobile phone systems and only few studies explored the interaction mechanisms between EMF and biological responses.

Numerous comprehensive research reviews from national and international agencies (including the WHO, the U.S. National Institute of Environmental Health Sciences, the National Radiological Protection Board in the U.K, the SAEFL in Switzerland and reports from the Netherlands, France, Canada and Sweden) have summarized the findings from these studies. The reports generally conclude that whilst many issues can be brought to a close, several questions regarding possible effects of NIR on human health remain to be addressed. Besides the association of an increased incidence in childhood leukemia with ELF exposure and acoustic neuroma with RF exposure, the findings include a variety of subtle effects on animals, humans and cells, such as changes in brain activity, cell proliferation or signal transduction pathways. In addition, the data suggest

that the effects may depend on intermittency, ELF frequency content and other signal characteristics. This increases the uncertainties in the evaluation of other technologies since the spectra investigated so far are rather narrow.

Due to the persisting uncertainty and given that even small health effects could have considerable implications for public health, Swiss agencies as well as other governmental bodies have requested further research to close the existing knowledge gaps.

Accordingly, the main thrust of this NRP is research that enhances our knowledge on signal characteristics and field strengths arising from current as well as new telecommunication systems and related technologies, the assessment of the exposure of people and a deepening of our understanding regarding the potential biological effects on the human body. Of specific interest to the NRP is research investigating the basic mechanisms between electromagnetic fields and biological systems, as there are no comprehensive initiatives in the international context to systematically foster in vitro and mechanistic evaluations. Whereas the focus lies on RF EMF, studies investigating the effects of ELF EMF (e.g., power line frequency electric and magnetic fields) should be included. Research regarding occupational exposure and exposure from medical treatments and diagnostics will not be supported.

Another emphasis of the NRP is the growing concern among large parts of the Swiss population with respect to NIR and NIR risk management and the determination of parameters influencing public awareness and perception, so that results obtained in the prospective studies can be adequately communicated.

3. Current State of Research

To day, research in the field of the effects of non-ionizing radiation (NIR) on health and basic biological processes has become of worldwide interest. Accordingly, many international and national public and private research agencies have solicited projects aimed at the assessment of possible health effects of NIR at intensities below the values suggested by the ICNIRP “exposure guidelines” (International Commission on Non-Ionizing Radiation Protection). Despite numerous studies carried out in a large number of research fields, such as epidemiology, cellular biology and toxicology, the picture of potential low-dose NIR effects on human health is far from being distinct.

The research carried out at the international level concentrates on the following subtopics:

- *Epidemiology*
- *Controlled exposure studies in humans, i.e. studies related to human hypersensitivity and changes in human behavior and well-being*
- *Animal experiments*
- *Effects of NIR on biological systems in vitro*
- *Dosimetry*
- *Risk management and communication*

Epidemiology: In recent years, large resources have been dedicated to multinational large scale studies (e.g., Interphone Study) that focused on the association between the exposure to electromagnetic fields emitted by mobile phones and the development of brain cancer or other forms of cancer. As yet only a few of these studies have been published, and the final evaluation by the International Agency for Research on Cancer

(IARC) regarding RF fields is not expected before next year. Exposures by power lines and other ELF sources have been classified as possibly carcinogenic (2B) by the IARC as well as the National Institute of Environmental Health Sciences (NIEHS).

Regarding health effects other than cancer, the Swiss Agency for the Environment, Forests and Landscape (SAEFL) inferred from a number of studies that have investigated effects on well being (considering symptoms such as e.g. headaches, dizziness, fatigue, insomnia or tinnitus) that no conclusive assessment of the risk to human health may be made on the basis of present data. With respect to ELF exposures, the NIEHS concluded that there is little, if any, evidence from epidemiological studies so far for an association between ELF exposure and the incidence of neurodegenerative and neurobehavioral disorders, cardiovascular disease or pregnancy outcome.

In general, epidemiological studies on NIR and well being and health are limited by uncertainties in exposure measurement and consequently a lack of a clear dose/response relationship. Rapid changes in technology resulting in fast changes of exposure conditions pose further difficulties.

In view of the large cost and the comprehensive international research effort, support for large cohort and case control studies in the framework of this NRP must be evaluated carefully.

Exposure studies in humans: Laboratory studies on non-cancer health effects in humans cover a wide array and have investigated the effects of NIR on EEG activity, sleep physiology, cognition and performance, heart rate variability, mood disturbances, hormone levels and immune function.

Current data provide little evidence for an association between NIR and heart rate variability, mood disturbances, immune function as measured by various immunological variables (blood chemistry, leukocyte or lymphocyte counts and others) as well as changes in the concentration of hormone levels. Various immediate effects due to NIR have been observed in studies on cognitive function and sleep physiology. They related to subtle changes regarding memory and reaction speed and an increase of the alpha power of the sleep EEG induced by RF exposure, indicating an influence from electromagnetic fields on brain activity under certain circumstances.

With respect to electromagnetic hypersensitivity, only a small number of studies are currently conducted due to experimental difficulties.

In general, a frequent shortcoming of exposure studies in humans is a lack of comprehensive dosimetry, which makes it difficult to compare conflicting results. A significant research need has been identified in this area.

Animal studies: Currently, a number of large-scale animal studies on carcinogenicity are being conducted internationally. So far, and in consistency with human carcinogenicity data, no consistent association of electromagnetic fields with any particular malignancy could be noted. The results of the largest studies have not been published, however, and yet more comprehensive studies are underway. Small-scale studies have concentrated on issues relevant to human endpoints, such as behavior (e.g. maze performance), effects on the inner ear and cochlea, the permeability of the blood-brain barrier as well as on neurodegenerative diseases, but the evidence for an association remains inconclusive. Similarly, no evidence in experimental animals for NIR effects could be found with respect to hematological parameters, the immune system, development and reproduction.

In view of the large cost and the comprehensive international research effort, large-scale animal studies are not in the focus of this NRP.

In vitro studies: Even though studies at the cellular level are essential to determine the possible mechanisms of adverse effects, no comprehensive international or national research programmes are dedicated to this issue. Isolated studies have examined potential NIR effects on the cell membrane level, gene expression, and signal transduction pathways. In addition, various studies have investigated in vitro cell proliferation and cell cycle regulation and reported modifications as well as hinted at potential genotoxic and cytotoxic effects. For instance, increased DNA strand breaks have been reported in brain cells of exposed rodents, yet the results could not be reproduced so far in other studies. As of recently, focus is also shifting to calcium homeostasis and the expression of stress (heat shock) proteins in mammalian cells under exposure.

In view of the importance of in vitro studies regarding causality between NIR and biological systems and their suitability to detect dependences with respect to signal characteristics, such studies shall be a major focus of this NRP.

Dosimetry: Significant progress in dosimetry was achieved during the last decade. Methodologies, instrumentation and procedures for detailed dosimetric analyses have been developed for bioexperimental and epidemiologic as well as for exposure assessments of current technologies. Very few assessments however have been conducted regarding exposure from new and future technologies.

Since optimized exposure setups and comprehensive dosimetric information is a precondition for any sound EMF studies, dosimetry will be of high priority in this program.

Risk assessment and communication: In recent years, several research programmes included projects on the subject of risk management and communication. The respective studies considered the evaluation of the impact of risk communication strategies, individual risk perception, cognitive maps of electro hypersensitive persons and the interpretation and evaluation of the impact of precautionary measures.

4. Origin of the NRP

In June 2003, the Federal Office for Education and Science (FOES) requested the Swiss National Science Foundation (SNSF) to evaluate the establishment of a National Research Programme related to potential effects of non-ionizing radiation on human health. This initiative was based on an extensive report by the SAEFL (Swiss Agency for Environment, Forests and Landscape) that included a meta-analysis of over 200 scientific publications.

Prior to a detailed evaluation process, the SNSF submitted the SAEFL study to three international experts (Prof. M. Egger, Berne, Prof. H. Krueger, Zurich and Prof. N. Leitgeb, Graz, AU) in order to assess the general feasibility of such a research programme in Switzerland.

The positive outcome of the feasibility study (June 2004) initiated the formal procedure that is set off by a Programme Proposal submitted by the SNF to the Swiss Government. Based on the SAEFL and the feasibility study and on an additional evaluation by an international expert panel, the Programme Proposal was accepted by governmental decision on 11 March 2005.

5. Main Research Topics

5.1. General Objectives of the Programme

The primary goal of the NRP is to establish a coordinated and comprehensive effort to address some of the existing knowledge gaps regarding the effects of low-dose non-ionizing radiation on human health by accentuating particular human and in vitro studies, including dosimetry. The prospective studies will not be isolated projects but will be embedded in such a context as to make a significant, complementary contribution to the international research effort. It is also expected that the studies conducted under the framework of the NRP aim for international collaborations and have the potential for practical implementation, e.g. propose solutions for protective measures. Well designed replication studies that comply with the general objectives will be supported, however the uncoordinated duplication of research efforts conducted elsewhere shall be avoided.

More specifically, the main topics to be researched using an interdisciplinary approach and corresponding to international state-of-the-art with respect to scientific originality and methodological standards are:

- the characterization and measurement of NIR caused by the range of present technologies
- epidemiologic and in vivo studies to assess the various effects of NIR on the human body using sufficiently sensitive systems to detect even small changes
- in vitro cell biology
- risk communication and enhancement of public perception

5.2. Focus of Research*

5.2.1. Dosimetry and Exposition

This subproject is aimed at the characterization and measurement of NIR emitted by the most prominent sources in our society at present. The full spectrum of signal components that are relevant from a biological or technological point of view (frequency range, type of modulation, envelope of spectrum) should be considered, as well as future exposition scenarios and the problem of repeated exposure.

The dosimetry studies should include the assessment of whole body exposure as well as exposure of specific parts of the body. The consequences of exposure must be assessed relative to biologically relevant endpoints.

In addition, exposure systems need to be developed that provide well characterized and uniform exposures while proving minimal disturbance to the experiment. A large predicament of epidemiological studies is the classification of exposure, which necessitates new models and assessment techniques. A close collaboration among the projects involving dosimetry and the epidemiologic and experimental studies seems mandatory.

* The perspective concept of the distribution of the programme budget (5 Mio CHF) is as follows: 0,6 Mio CHF: Dosimetry and Exposition; 2 Mio CHF: Human Epidemiological and Experimental Exposure Studies; 1,0 Mio CHF Cellular Biology and NIR Effects; 0,5 Mio CHF Risk Management, Risk Stratification and Risk Communication; 0,9 Mio CHF Implementation, Final Report, Administration and Reserve. It is self-evident that the final attribution of funds will be made in accordance with a detailed analysis and the decision-making related to the submitted research proposals.

5.2.2. Human Epidemiologic and Experimental Exposure Studies

Two types of human studies are of particular importance:

- a) Experimental studies testing biological effects of NIR including the investigation of neurological and physiological effects, effects on health and well-being, as well as the investigation of changes in cognitive function and psychological behavior. These studies can consider the general population as well as subjects claiming to be hypersensitive to electromagnetic fields.
Animal studies are not to be excluded if they are appropriate for the consolidation of findings from human studies.
- b) Epidemiologic studies
 - Studies to validate the exposition measurements. It is necessary to estimate the individual dose with a sufficient precision for the assessment of NIR on human health, psychological behavior, well-being and cognitive functions.
 - Studies in the general population and fringe groups of specific interest (i.e. subjects claiming to be hypersensitive to EMF, adolescents or the elderly, as people might vary in their susceptibility to environmental hazards or there might be a dependency on age) involving short-term and long-term end points. Preferably, these studies should include the assessment of human well-being and health. Epidemiologic studies should be coordinated and embedded in an international framework.

5.2.3. Cellular Biology of NIR Effects

Cell biological studies should be aimed at the development of in vitro methods that allow the unequivocal assessment of NIR effects on cellular functions, changes in gene expression or changes in the morphological or functional phenotype.

The respective experimental studies can either be directed towards the basic mechanisms of cellular NIR effects or towards developing test systems for the reproducible assessment of dose/effect relationships. They should be designed in such a way as to clearly identify low-dose effects and separate them from thermic effects.

Animal studies are not to be excluded if they are appropriate for the consolidation of in vitro findings.

5.2.4. Risk Management, Risk Stratification und Risk Communication

Within the scope of this NRP special consideration will be given the increased concerns among large parts of the Swiss population with regard to potential effects of NIR.

Projects involving social sciences should be aimed at the definition and clarification of the parameters and processes that determine the controversial attitudes towards NIR in the political, social, economic and cultural domains of our society. Such studies may be based on investigations of individuals, population subgroups or political institutions. In addition to studies that assess the general mechanisms determining the evolution of attitudes and opinions about NIR, emphasis will be put on studies related to the communication of results obtained in epidemiologic and laboratory studies. Such studies should provide answers about the mechanisms responsible for the perception of research communications by the general population not being familiar with the science and the methodology involved.

5.3. Areas of Application of the Findings

The findings should increase our understanding of a potential causal association between EMF and health effects and thereby significantly contribute to the international risk assessment and evaluation. To achieve that aim not only a high quality of the studies is mandatory but also a special emphasis on the search for causal associations. A close collaboration between different disciplines is necessary to be able to test certain causality hypotheses.

Short term and medium to long term benefits can be distinguished:

- As a short term aim, politics and industry shall be provided with better data to more accurately assess and evaluate potential risks for health and well being by today's existing technologies. Depending on the outcome and the strength of evidence, the results might help to adapt the current legal prescriptions and guide the industry in the development of new technologies. If no convincing evidence for a causal association between EMF and health effects can be found, the results will help in restoring public trust into the respective technologies and the protection measures in place.
- As medium and long term aims, the findings from cellular experiments on basic biological effects and interaction mechanisms will be of prime importance. The understanding of exposure parameters eliciting biological responses and the respective interaction mechanisms will foster a comprehensive risk assessment including the evaluation of NIR from new technologies. The NRP will lay the foundations for this ambitious task, yet will most probably not finalize it.

In addition, the results obtained in this NRP might strengthen the position and competitiveness of national research, as well as provide a basis for further research on both the national and international level and thus promote larger collaborative efforts.

6. Organisation of the NRP

6.1. Project Outlines and Research Proposals

The duration of the whole programme is limited to 4 years. Project outlines and research proposals should not exceed a period of 3 years. The last year will be devoted to the synthesis and discussion of the main findings of the programme.

In accordance with customary procedures for NRPs, the Steering Committee has agreed on a two-phased submission procedure for research projects. This procedure will facilitate the coordination of the research projects and the definition of priorities.

Authors of project outlines and research proposals being of potential interest for Federal Offices, other public institutions and private organizations are asked to establish a first contact to make the necessary topical and organizational arrangements and to investigate the possibilities of co-financing. The Steering Committee will ensure co-ordination with these institutions. Letters of intent expressing the interest of involved parties are expected with the submission of project outlines and research proposals.

In a *first phase* researchers who are interested in NRP 57 will submit a project outline containing a concise summary of the research project envisaged. The project outlines should have the following format:

- Summary
- Topic of the project, rationale and main goals
- Methods
- Timeframe and milestones
- Possible implementation of results
- Cooperation with researchers from other fields and/or with private or public institutions, as well as international collaboration.
- Approximate costs in human and financial resources (budget).
- Short curriculum vitae of the main applicant (max. 2 pages) and a publication list of the 10 publications considered to be the most important

Project outlines have to be written in English and should not exceed a maximum of five pages (single-spaced, Arial font (size 11) or Times New Roman font (size 12), with 2 cm margins (top, bottom, left and right), including figures, tables and literature references.

In addition to the project outline, applicants must complete the specially designed coversheet for this NRP. The coversheet and the template for the project outline can be downloaded from our Website www.snf.ch

The Steering committee will evaluate all the project outlines in association with international experts, according to the criteria listed below (6.2.). The authors of the selected project outlines will be invited to submit detailed research proposals.

In a *second phase* the Steering Committee will evaluate the research proposals, limited to a period of max. 36 months, in consultation with international experts according to the selection criteria listed below. The detailed research proposals have to be written in English (single-spaced, Arial font (size 11) or Times New Roman font (size 12), with 2 cm margins (top, bottom, left and right).

The Steering Committee will pass the evaluated projects to the Research Council of the Swiss National Science Foundation (Division IV and Presidency) for final decision with a specific recommendation.

6.2. Selection Criteria

Project outlines and research proposals will be evaluated on the basis of the following criteria:

- **Scientific quality and originality:** the project outlines and the research proposals should correspond to international state-of-the-art with respect to scientific originality and methodological standards.
- **Feasibility and Compliance with the objectives of NRP 57:** the projects should reflect the programme’s scientific objectives (see point 5.1.) and comply with its overall framework.
- **Applicability:** National Research Programmes are explicitly called upon to promote practical applications and implementation. In consequence, priority will be accorded to projects that are implementation-oriented and have a high level of practical relevance.
- **Personnel and infrastructure:** Projects have to be carried out in an environment providing adequate infrastructure and personnel.

6.3. International Collaboration

The main applicants have to originate from a Swiss academic research institution. International collaboration with respective funding of research outside Switzerland is possible if the collaboration is essential for the success of the project. The funding of institutions outside Switzerland has to be in adequate proportion to the overall budget of the respective project.

6.4. Schedule

The following deadlines have been set for

Public call for project outlines:	December 2005
Submission of project outlines:	28 February 2006
Assessment of project outlines:	March/April 2006
Submission of research proposals:	presumably July 2006
Start of projects:	presumably November 2006

Project outlines and research proposals must be addressed to:

Swiss National Science Foundation
Division IV, NRP NIS
Wildhainweg 3, CH-3001 Bern
Phone +41-(0)31 308 22 22
E-mail: bbutz@snf.ch

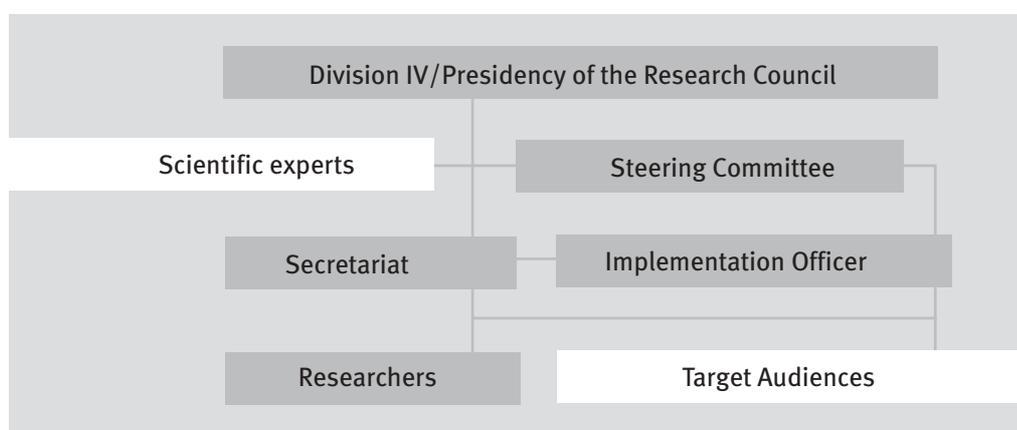
Assessment of the contents of the project outlines and research proposals is preceded by a formal inspection by the secretariat of Division IV (use of official forms, completeness of application, adequate formal presentation (see above for page limits) and submission within the set deadlines). Documents that do not meet these formal criteria may be excluded from further processing.

The NRP 57 implementation plan as well as the coversheets and the template for the project outline can be downloaded from the website www.snf.ch Project outlines (incl. coversheets) and research proposals should be sent to the Swiss National Science Foundation both by postal mail and electronically in PDF-format by e-mail. For legal reasons outlines and proposals sent only by electronic means cannot be accepted.

The SNSF funds awarded are exempted from VAT taxation (art. 33, par. 6). The SNSF does not issue contracts under the National Research Programmes, but instead awards grants for the promotion of scientific research in Switzerland.

7. NRP Management and Administration

7.1. Organisation



Division IV (Research Programmes) of the Research Council; Expert Advisor

Division IV consists of 20 members representing a wide range of scientific disciplines. Division IV of the Research Council has overall responsibility for conducting the National Research Programmes (NRP) and the National Centres of Competence in Research (NCCR). The decisions taken by Division IV on accepting or rejecting research projects are submitted to the Presidency of the Research Council for ratification.

Expert Advisor

The Expert Advisor represents Division IV of the Research Council in the Steering Committee. The Expert Advisor submits the Steering Committee's decisions on acceptance or rejection of research proposals to the Research Council for ratification.

Steering Committee

The Steering Committee is a small and flexible body that takes on primarily strategic responsibilities for the entire duration of the National Research Programme. It is the formative body giving the programme its profile, and guaranteeing the necessary continuity and coherence in any decision; it is responsible for assessing the scientific quality and implementation of the NRP. The Steering Committee is flexible in so far as its composition may change according to different needs during the programme.

The Steering Committee can also call in experts best suited for special tasks during a limited period of time; such tasks can be, e.g., assisting the Steering committee in reviewing research projects or, towards the end of the programme, integrating the results of the individual projects in a final report.

Secretariat

The Secretariat of Division IV of the SNSF is responsible for operations management and implementation of decisions taken by the Research Council and the Steering Committee. The Secretariat co-ordinates administrative and financial support functions and is in charge of project supervision and co-ordination. A particular task of the Secretariat is to ensure the communication of the NRP with comparable programmes within (e.g. the Swiss Research Foundation on Mobile Communication) or outside Switzerland (e.g. the International EMF Project).

Expert Review Panel

For the review of project outlines and research proposals the Steering Committee consults external experts.

Implementation Officer

In consultation with the SNSF Press and Information Office, the Steering Committee nominates an Implementation Officer, who is then appointed by the Research Council. The Implementation Officer has a clearly defined mandate of responsibility for assuring that implementation of the NRP fulfils the demands of the research topics, assuring that realisation of implementation measures meets professional standards, and for assuring quality in the public relations sector. The Implementation Officer works closely with the Administrative Offices of the SNSF. The purpose of this supervisory role – checking the implementation of the NRP – is to provide added value to the programme as a whole.

7.2. Steering Committee

Steering Committee Members

Prof. Alexander Borbély (President), Institute of Pharmacology and Toxicology, University of Zurich, Switzerland

Prof. Anders Ahlbom, Karolinska Institute, Epidemiology, Stockholm, Sweden

Prof. Jørgen Bach Andersen, Institute of Electronic Systems, Aalborg, Denmark

Prof. Elisabeth Cardis, Centre international de recherche sur le cancer (CIRC), Lyon, France

Prof. Yngve Hamnerius, Department of Electromagnetics, Chalmers University of Technology, Göteborg, Sweden

Prof. Christian Hess, Neurologische Klinik, Inselspital, Berne, Switzerland

Prof. Dariusz Leszczynski, Department of Research and Environmental Surveillance, STUK-Radiation and Nuclear Safety Authority, Helsinki, Finland

Prof. Ragnar Löfstedt, King's College London, King's Centre for Risk Management, London, United Kingdom

7.3. Other Actors

Federal Representatives

Dr. Jürg Baumann, Swiss Agency for Environment,
Forest and Landscape (SAEFL), Berne

Dr. Mirjana Moser, Swiss Federal Office of Public Health (SFOPH), Berne

Delegate Division IV of the Research Council of the SNSF

Prof. André Kléber, Institute of Physiology, University of Berne

Implementation Officer

Mathis Brauchbar, advocacy ag, Zurich

Programme Coordinator, Division IV

Dr. Beat Butz

State Secretariat for Education and Research (SER), Berne

Dr. Claudine Dolt

Editor

Swiss National Science Foundation
Division IV, Wildhainweg 3
P.O.Box, CH-3001 Berne
Phone +41 (0)31 308 22 22
Fax +41 (0)31 305 29 70
E-Mail: nfp@snf.ch
www.snf.ch

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