

Forschungsgemeinschaft Funk e. V.

Research Association for Radio Applications

Annual Report

2004



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Preface

The FGF in its 13th year of existence

No, we are not superstitious. Moreover, we wouldn't have had the time to indulge in superstition.

Another year filled with hard work and events to be taken care of has drawn to an end, so one rubs one's eyes, asking oneself where all the time has gone. But taking a closer look at the list of successfully organized events and the projects that have been done, one lets go, asking instead how it was that all this could be done.

Of course, it was not done alone. It was only through the help of dedicated supporters and staff, whom we would like to thank for their work and initiative, especially with regard to the smaller tasks that are not too attractive but require much concentration, that this was made possible; the sort of work that is not at the center of attention, but all the same must not be overlooked: Sisyphus work involving constant repetition, that swallows up a large part of resources and that is necessary for the successful performance of projects and public relations activity. Of such tasks there have been many. The Annual Report 2004 will have to say a lot about this. On the following pages, we will thoroughly explore the activities of the FGF's bodies and its Administrative Office resp. their successful collaboration.

It is a matter of great satisfaction for any association when new members enroll. It is widely seen as a confirmation of past action. Departures of members, in contrast, are better avoided, especially founding members that have done a lot in the past to promote the goals and objectives of the association. An example of this is Lucent Technology (formerly Philips, PKI) that recently has announced its departure. It is a thought-provoking challenge: One tries to understand motives and motivations. Has the Association done something wrong? Is it not up to par in meeting its tasks? Is it its profile that is no longer up to present necessities? Is there anything that has to be changed to better meet the needs of the individual members? Or – as was claimed – were economic reasons really the only explanation for the departure?

To validate the objectives and the organizational structure of the Association and to decide whether its mission is still up to present and future needs, three strategic workshops were organized in the past year under professional supervision, involving the Board of Directors and the working groups Research and Public Relations. The beginning was made by the WG Public Relations, followed by the WG Research and, eventually, in autumn, the Board of Directors itself. Many ideas and opinions were exchanged and written down, which will be evaluated in 2005 and shall then be implemented.

The following conclusions served as a basic understanding: "Since its foundation in the year 1992, the FGF deals with issues related to biological effects from electromagnetic fields according to its motto 'Competent research – responsible action', having achieved great scientific reputation. The FGF promotes high-level research and provides information to the scientific community, politics and public based on scientific knowledge. The FGF's 'principle of independent research' has been crucial in achieving acceptance and facilitating a more objective debate on EMCE".

The following task fields were defined and targeted for further development:

- **Mission and aims of the Forschungsgemeinschaft Funk**

Ensuring the acceptance of the key technologies of wireless communications and thus the supply of the general population with radio solutions based on scientifically sound exposure limits by

- enabling an objective, science-based opinion-formation
- management of risk opinion (risk opinion = perceived/alleged risk)
- watchdog function
- policy advice resp. influencing evaluation processes through the dissemination of science-based knowledge (e.g. the debate on exposure limits)

- **Positioning Research**

- Research provided (funded) by the FGF has to contribute to achieving strategic goals (such as the WHO research agenda, quality assurance, identification of gaps of knowledge, etc.).
- The FGF promotes experimental research reinforcing its competence profile (acceptance, credibility, respectability, topicality, etc.).
- The strategic orientation of research is controlled by the Board of Directors.

- **Strategic process**

- The Board of Directors sessions will put more emphasis on strategic topics in future.
- The results of the working groups dealing with FGF strategies will be presented in the spring of 2005.

“Did we succeed in meeting our goals for 2004?”

The answer to this question is yes, with few minor exceptions. This becomes impressively clear when comparing our plans with our achievements. The segment of public relations work received much recognition for the Infoline, the Newsletter, and - in the field of research - for our workshops and our support of many international activities. These were the most prominent, spectacular events which, however, would not have been possible without the tireless, less visible groundwork. Detailed activity reports are found under the respective paragraphs of this paper.

“What are our goals for 2005?”

As indicated above, we will take an in-depth look at the strategies of the Association. Based on the general considerations, the working groups will then review the individual task fields. The Board of Directors has appointed several working groups the proposals of which will be discussed and decided upon during the Board of Directors session in the spring.

Besides, day-to-day work has lost nothing of its relevance. The working groups Public Relations and Research will continue their work striving for step-by-step improvement. Aside from the weekly Infoline and the daily information presented on the FGF's intranet, four editions of the Newsletter and several issues of the Edition Wissenschaft will be published in German and English. The Working Group Research is planning at least two scientific workshops in addition to the continuation of ongoing research projects. There is much to do – we will certainly not get bored.

With its newly created "Fast Response Team", the FGF has managed to successfully launch a new platform for members enabling fast evaluation of new research events resp. projects, which, if the need arises, can be reactivated very quickly also in 2005.

There are also plans to intensify collaborations with other national and international organizations. It is necessary, especially in times of limited funds, to find synergies benefitting all involved parties.

Last but not least, in 2005 we will continue to accept all kinds of support, ideal as well as financial, that will help us to meet our goals. As a non-ideological association, we are open to various kinds of cooperation.

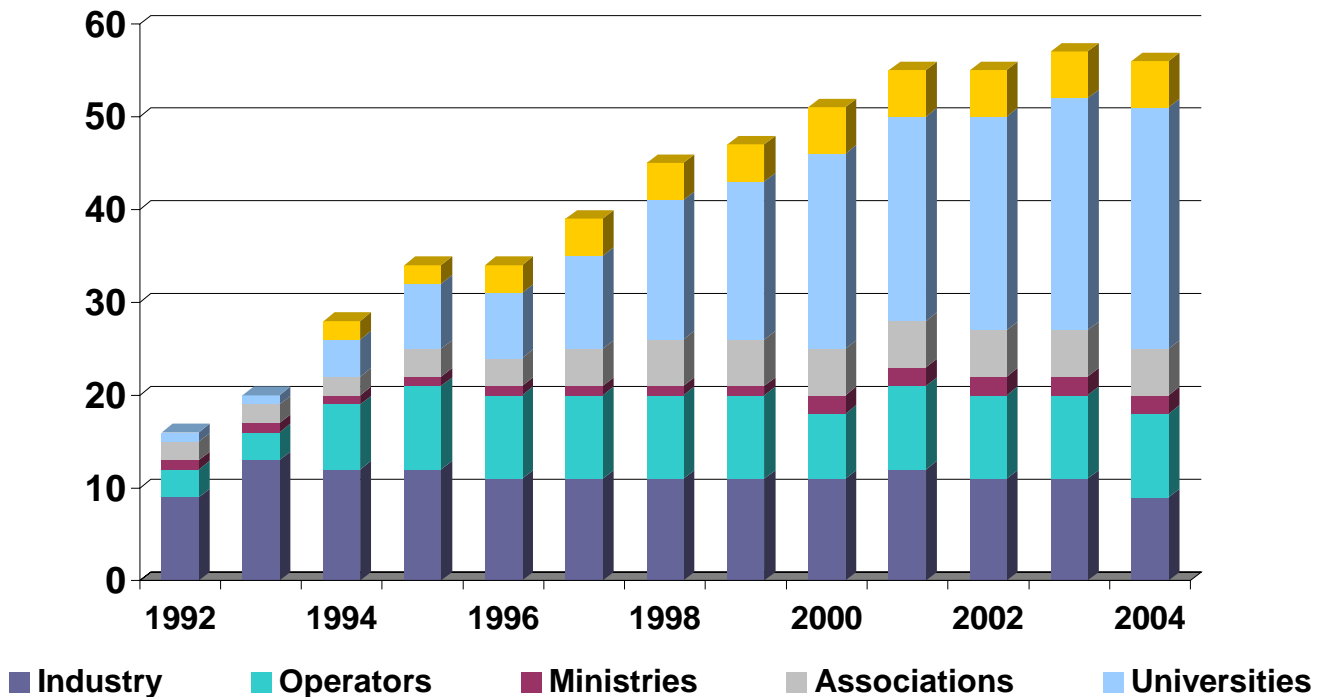
Association

Membership development

In 2004, membership development was characterized by two leaves and one new member. The number of members of the Forschungsgemeinschaft Funk e.V. thus amounts to 56. The companies Alcatel SEL AG and Rohde & Schwarz GmbH & Co. KG left. The new member is the Fachhochschule Dortmund (University of applied sciences).

As the strongest member group remains the group of universities and scientific institutes with 35 members. The distribution of members is shown in the following graph.

Membership development 1992 to 2004



Members

Network operators

- Deutsche Telekom AG
- T-Mobile Germany GmbH
- E-Plus Mobilfunk GmbH & Co. KG
- Vodafone D2 GmbH
- Mobilcom Multimedia GmbH
- New Radio Tower GmbH
- Swisscom AG
- O2 (Germany) GmbH & Co. OHG

Public Broadcasting Services

- ARD/ZDF

Industry

- Daimler Chrysler AG
- Ericsson Telefonaktiebolaget LM

- Lucent Technologies Network Systems GmbH
- Marconi Communications GmbH
- Motorola GmbH
- Nokia Mobile Phones GmbH
- Robert Bosch GmbH
- Siemens AG
- Kathrein-Werke KG

Authorities

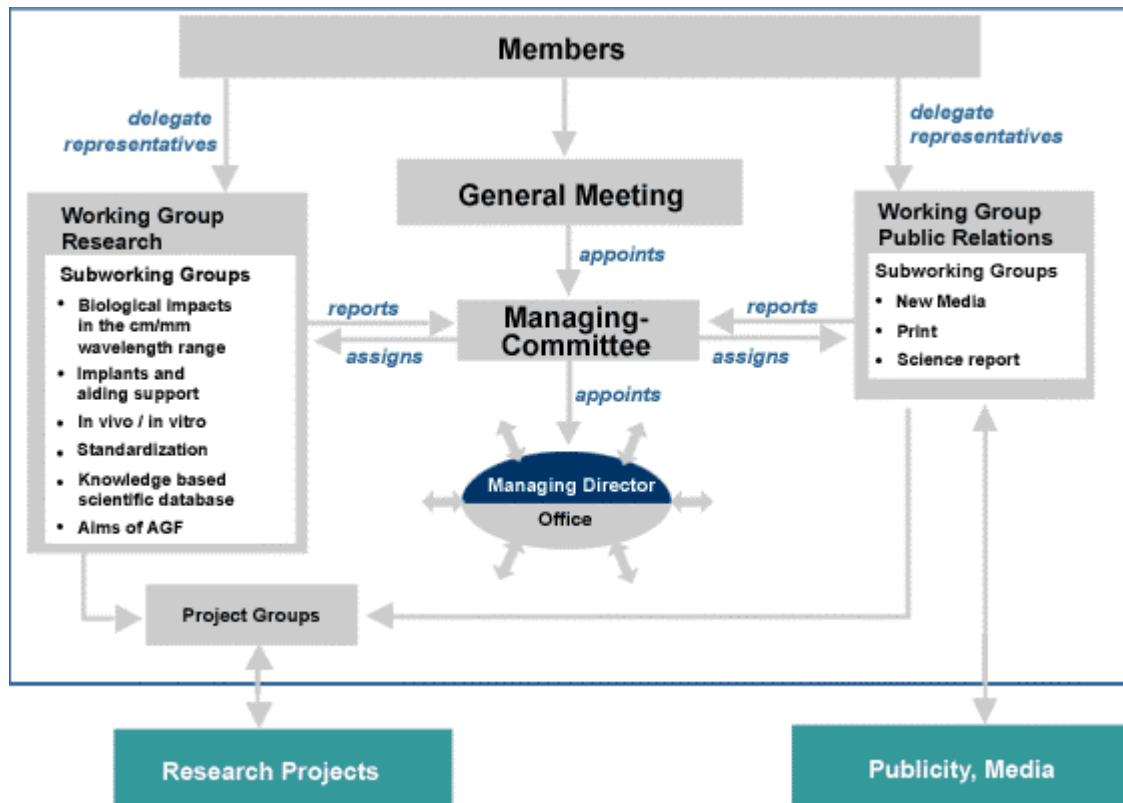
- Federal Ministry of Economy and Labour (BMWA)
- Federal Office of Communications (BAKOM), Switzerland

Others

- German Working Committee for CB Emergency and Personal Radio (DAKfCBNF e.V.)
- German Amateur-Radio-Club (DARC e.V.)
- Swiss Technical University Zurich (ETH)
- University of applied sciences Berlin
- University of applied sciences Deggendorf
- University of applied sciences Dortmund
- University of applied sciences Kiel
- University of applied sciences Cologne
- University of applied sciences Leipzig
- Distance Teaching University Hagen
- Forum Mobilkommunikation Vienna
- Research Institute for Telecommunications Dortmund
- GMT Bergische Universität GH Wuppertal
- Society for the Scientific Examination of Parasciences (GWUP e.V.)
- Humboldt University, Berlin
- University of Economy and Technology, Saarbrücken
- Institute for Occupational Research and Continuing Education (IABW)
- Institute of Mobile and Satellite Communication Techniques (IMST)
- Institute for Hygiene and Epidemiology, Warsaw/Poland
- Austrian Research Center Seibersdorf
- PIOM Bordeaux
- Police Academy, Münster
- Aachen University of Technology (RWTH), Research Center for Bioelectromagnetic Interaction (femu)
- Technical University of Braunschweig, Research Association: Electromagnetic Compatibility of Biological Systems
- Technical University of Graz
- Technical University of Hannover
- Technical University of Ilmenau
- Technical University of Karlsruhe
- Technical University of Munich
- Universidad Politecnica de Madrid
- University of Dortmund
- University of Mainz, Clinics of Psychiatry and Psychotherapy
- University of Montpellier, Medical Physics Laboratory, Section Nimes/France
- University of Stuttgart
- University of Witten-Herdecke

Organizational structure

The organizational structure of the Forschungsgemeinschaft Funk is depicted in the following graph:



Individual tasks are taken care of collaboratively by the Administrative Office and the working groups Research and Public Relations resp. the subgroups. The monitoring of the FGF's research projects takes place through the subgroups as competence centers, and the project groups.

FGF research activity

The focus of the FGF's research activity in 2004 was – true to its reorientation in 2003 – "data collection and analysis" through the evaluation of literature and the arrangement of international workshops rather than – as was the case in the past - on the monitoring of individual research projects initiated by the FGF (see also Annual Report 2003). The activities related to **knowledge transfer** as well as **scientific discussion** and **preparation** of available research results were further extended. Internal workshops of the FGF's working groups were part of a process of optimization that is still ongoing.

According to the decision of the Board of Directors, the performance and monitoring of **own research**, however, as one of the classic fundamental tasks of the FGF, shall not be given up. It is only through this research that the scientific expertise of the FGF in relation to *current* international research can be ensured. Thus, the FGF continued to fulfill its core tasks also in 2004, even if less intensively so, compared to past years.

Status of projects (at the end of 2004)

Overall, the FGF dealt with 21 research projects resp. literature studies or workshops in 2004. 16 of these projects are based on earlier calls for tender resp. direct commissioning and planning. Five projects were newly planned resp. directly commissioned and launched in 2004, three of which were completed already in 2004. Project monitoring begins with the first planning phase and ends with the peer-reviewed publication of results.

Due to the research promotion provided by the FGF, in 2004 a total of 6 papers were submitted for peer-reviewed publication. 3 others are prepared for submittance at present (2) or have been submitted already a longer time ago (1). (for further details see below.)

In the following, the projects promoted resp. published in 2004 are listed – subdivided according to their present status (the projects where 'UMTS' is included in the title/description applied exclusive or optional exposure to a UMTS test signal):

1. Publication of past completed projects:

- Addendum to FGF project no. 33: ***Short- and long-term effects of radiofrequency EMF on human sleep quality and the resulting daily well-being*** (Prof. Aldenhoff, Dr. Fritzer, University of Kiel; Prof. Hansen, University of Wuppertal)
Complete performance in 2001. Final report accepted in 2002.
The manuscript for publication has long been submitted to a peer-reviewed special journal.
- ***EMF field sensor in cell membranes (experimental investigations of artificial lipid membranes – bilayers)*** (Prof. Boheim, University of Bochum; Prof. Hansen, University of Wuppertal)
Performance over a period from 1995 to 1997. Final report accepted in 2003. Final presentation in May 2003.
Submitted for peer-reviewed publication and accepted by **Bioelectrochemistry**.
- ***Influence of high GHz signals (5.8 to 110 GHz) on the vegetative nervous system*** (Prof. Landstorfer, University of Stuttgart; Prof. Hadel, Prof. Lang, both University of Tübingen)
Experiments performed from November 2001 to November 2002. Final report accepted in 2003. Final presentation in February 2003.

Submitted for peer-reviewed publication and accepted by **Int. J. Environm. Health Res. (IJEHR)**.

- **Investigation of potential non-thermal effects from cm/mm waves (77 GHz) on the autonomous nervous system**
(Prof. Landstorfer, University of Stuttgart; Prof. Hadelar, Prof. Lang, both University of Tübingen)
Experiments performed from November 1998 to June 1999. Final report accepted in 2000. Final presentation in May 2000.
Peer-reviewed publication in 2004: Müller, J. et al.: **Influence of low power cm/mm microwaves on cardiovascular functions. Int. J. Environm. Health Res. (IJEHR) 14/5: 331-341 (2004).**
- Project "FGF Workshop Series"
Phase IV: International Workshop "**The Blood-Brain Barrier (BBB) – Can it be influenced by RF-field interactions?**", at Schloss Reisenburg (near Ulm), Nov 3 to 6, 2003.
Workshop performed in 2003. Detailed report in FGF Newsletter 4/2003.
Two rapporteur reports in 2004 on the subtopics of the workshop, and an independent report as well as a workshop documentation on the **web pages of COST 281** (www.cost281.org/documents.php). CD-ROM with the workshop documentation sent to all attendees and other persons interested worldwide in 2004.

2. Ongoing projects, completed in 2004, and publication of earlier commissioned literature studies:

- **Human provocation study on physiological parameters of the visual system at exposure to radiofrequency EMF (exclusively UMTS)**
(Prof. Zeitlhofer, University Clinics for Neurology, Vienna; Dipl. Ing. Schmid, ARC Seibersdorf Research GmbH, Seibersdorf/Austria)
Experiments performed from December 2001 to June 2003. Final reports (technical and biomedical parts) accepted in 2003 resp. 2004. Final presentation in July 2004.

The results of the completed practical part of the project were discussed on July 1, 2004, during a session of the FGF Working Group Research (AG F). Both working groups involved in the project sent a representative involved in experimental work, who presented project results in detail. The subject of the study was the influence of a simulated UMTS signal of a mobile phone on the functions of the human visual apparatus and its performance in visual stimuli processing. Strictly defined UMTS test signals were used for exposure of the heads of a total of 58 voluntary, healthy test persons without visual impairments via a modified headset in a RF-shielded cabin. Over the course of the experiment, the volunteers had to perform a set of four different standardized visual tests resp. visual capacity tests (e.g. traffic test) several times, using a monitor or a visual testing device. An optical interference signal was used as a positive control in each testing phase. The maximum field strength of the UMTS test signal was selected so as to produce distinctly less than half the permitted part-body limit of 2 W/kg (SAR) in the head region with the strongest exposure: 0.63 W/kg in the respective brain region according to computer modelling. Neither the testing scientist nor test persons knew when the UMTS signal was "on" or "off" (double-blinded test design). It was only after completion of tests that the encoded test results were decoded and evaluated. There was no evidence of an influence on the tested visual system in the performed tests. In part of the tests, the interference signal used as a positive control provoked the expected distinct decrease in the processing of visual stimuli. But another part of the tests demonstrated improved performance that was explained by an unexpected increase in attention performance due to the inter-

ference signal. Nonetheless, the positive control provided evidence of both the sensitivity and the detection limits of measurements. Discussion among the attending experts mainly focused on issues related to the statistical evaluation of measurements. Proposals voiced with regard to data evaluation were welcomed by the representatives of the project.

Preliminary results of the project were already presented in June 2003 during the Annual Meeting of the BEMS in Maui/USA. Two publications in peer-reviewed special journals are in preparation: submitted to **Bioelectromagnetics** (technical part) resp. in preparation for submittance to **Neuroreport** (biomedical part). An article on the UMTS signal was published in 2004: **Ndombè Mbonjo Mbonjo, H. et al.: A generic UMTS test signal for RF bio-electromagnetic studies. Bioelectromagnetics 21/6, 415-425 (2004).**

- **Effects of RF-EMF on the function of the blood-brain barrier in vitro (GSM 1800 and UMTS)**
(PD Dr. Stögbauer, Clinic and Polyclinic for Neurology at the University of Münster; Prof. Hansen, University of Wuppertal)
Experiments performed from August 2001 to March 2004. Final reports (technical and biological parts) accepted in 2004. Final representation in July 2004:

The public **final representation** of this project took place on July 13, 2004, at the Clinic and Polyclinic for Neurology at the University of Münster. More than 20 persons were attending, among them a number of acknowledged experts involved in international blood-brain barrier research. The results of the biological part of the investigation were presented by Dr. Helmut Franke from the working group around PD Dr. Stögbauer. During in vitro experiments, cell layers cultivated from fresh cells were exposed to simulated 1800 MHz GSM mobile radio fields or to simulated UMTS mobile radio fields inside a cell culture cabinet. To a large part, the cell layers were identical with those involved in the formation of the blood-brain barrier in the rat brain. Various, even novel methods were applied to measure the permeability of these cell layers, which normally have to be practically impenetrable to certain substances, thus protecting the brain of the living animal (as well as the human brain) against the passage of toxic substances from blood circulation. Certain publications had raised suspicions that mobile radio fields could lead to an unnatural opening in the blood-brain barrier.

Dr. Franke reported that he had worked intensively on improving the quality of his cellular model at first. This resulted in a distinct decrease – for a limited time period used for later measurements – in the basic permeability of cultivated cell layers compared to preceding experiments, and thus an almost perfect approximation to the corresponding conditions in the living brain. Moreover, possible thermal influences of the radiofrequency fields were strictly avoided, since the cell layers have been proven to be susceptible and to respond to minimum thermal variances above a certain limit. Their cell cultures thus widely improved – even compared to another publication of the same working group –, Franke and colleagues did not find any influences of the applied simulated mobile radio fields in their results. This is also true for field strengths far above values reached in the brain during mobile phone calls. In contrast, positive controls with added chemical substances impressively confirmed the sensitivity of applied methods in demonstrating actually existing external influences.

Dr. Andreas Bitz from the working group around Prof. Hansen described the long, twisted road towards the development of an utterly novel and, for dosimetric purposes, highly precise exposure system for their project. Particular difficulties arose from the plan to simultaneously measure the impedance at the cell layers and radiofrequency exposure inside the sample dishes, which had to be examined inside a radial waveguide, in a cell incubator. Furthermore, precise temperature control was an absolute must. Technical innovation and extensive dosimetric calculations were required to achieve this goal.

Discussion stressed the good, fruitful interdisciplinary cooperation among the two working groups, but also the effective project monitoring provided by the FGF. External experts primarily emphasized the innovative character of the project, its thoroughness and reliability, as well as the pioneer technology used in experiments.

The preliminary results of the projects were presented already in June 2003, during the Annual Meeting of the BEMS in Maui/USA. Two publications dealing with the biological part are in preparation for peer-reviewed special journals. A third publication dealing with the applied UMTS signal was made available in 2004:

Ndoubè Mbonjo Mbonjo, H. et al.: A generic UMTS test signal for RF bioelectromagnetic studies. *Bioelectromagnetics* 21/6, 415-425 (2004).

- Project "FGF Workshop Series"
Phase V: International Workshop "***Can electromagnetic fields used in mobile communications provoke sleep disorders and other cognitive changes?***", at Schloss Hersberg in Immenstaad (Bodensee), December 7 to 10, 2003
Workshop planned and conducted in 2003.
A summary report was published in 2003 on the **website of the FGF**. Detailed **report in the FGF Newsletter 1/2004**. Four rapporteur reports on the subtopics of the workshop and the workshop documentation were published in 2004 on the **web pages of COST 281** (www.cost281.org/documents.php). A CD-ROM containing the workshop documentation was sent to all attendees in 2004.
- Literature study:
Influences of EMF on heat-shock proteins (Dr. Cotgreave, Karolinska Institutet, Stockholm/Sweden)
The study was performed from April 2003 to May 2004. Manuscript for publication accepted as final report in 2004.
Submitted for peer-reviewed publication in 2004 and accepted by the **Archives of Biochemistry and Biophysics (ABB)**.
- Theoretical prestudy:
Exposure systems for animal studies in the frequency range between 2 GHz and 10 GHz (Prof. Hansen, University of Wuppertal)
(Study on the preparation of exposure and dosimetry for expected research projects in this frequency range.)
Study performed from August 2003 to December 2003. Final report accepted in 2004.

3. New products planned and completed in 2004:

- Project "FGF Workshop Series"
Phase VII: ***International Workshop "Are RF fields able to raise the risk of cancer?"***, in Schriesheim, near Heidelberg, Nov 15 to 17, 2004
The workshop was planned and performed in 2004.
Summary report published on the **web pages of the FGF** in 2004, and in **FGF Newsletter 4/2004**. Two rapporteur reports on the workshop's main topics (epidemiology, in vivo long-term studies) and the workshop documentation were published in 2004, on the **web pages of COST 281** (www.cost281.org/documents.php). A CD-ROM containing the workshop documentation was sent to all attendees.
For the third time in three years the autumn workshop took place in Schriesheim/Heidelberg, on November 15 to 17, with the generous support of the Baden-Württemberg Ministry of Environment and Transport.

Titled "**Are RF fields able to raise the risk of cancer?**", the workshop gave the attending international experts the opportunity to discuss the association between radio-frequency fields and carcinogenesis, based on ongoing and completed epidemiological studies and long-term animal studies. A short report on the workshop was published in Newsletter 4/2004; the lectures and rapporteur reports are found at: http://www.cost281.org/documents.php?node=87&dir_session.

- Pilot study: **EPROS: Electrosensitives Protected Sleep Study) – Feasibility Study (Prof. Leitgeb, Technical University of Graz)**

Feasibility study performed with three volunteers in 2004. Final report was accepted in 2004.

The project "Electrosensitivity and Sleep Disorders" (Electrosensitives Protected Sleep Study – EPROS) planned by Prof. Norbert Leitgeb at the Technical University of Graz was supported by the FGF as a feasibility study performed in three human volunteers. The participants, who were self-reportedly electrosensitive and therefore suffered from sleep disorders, were examined during sleep in their normal domestic environment. Electromagnetic fields normally occurring at the respective locations were either neutralized by a RF-shielding canopy attached above the bed, or there was only pseudo-shielding, without test persons knowing about the actual status of the canopy (shielding and non-shielding materials were not discernible). During sleep, a sleeping EEG, an ECG, eye movement and body position changes were recorded (polysomnography) in order to allow drawing conclusions on sleep quality. Measurements were completed by other data collected prior to and following the night of the test using questionnaires and other tests. Results showed that the novel test design is feasible, the large expenditure notwithstanding. One or two repeat nights per volunteer will have to be included, so problems with acceptance can be expected, at least with a considerably larger number of test nights. The main study will have to examine a correspondingly large number of volunteers. The two shielding materials were in fact non-discernible. Due to the results of the feasibility study supported by the FGF, another organization granted the financing of the main study, which is already underway.

More details on the feasibility study are found in the paper of Leitgeb et al., published in 2004: **Leitgeb, N. et al.: Investigations of Sleep Disorders in the Vicinity of RF Transmitters. Biomed. Technik 49, 186-193 (2004).**

- Additional promotion of the "Mechanisms" project:
International workshop "Quantifying Biophysical Mechanisms for RF Interactions", Motorola Labs, Plantation/USA, March 22 to 23, 2004.

Workshop planned and performed, with additional funding of the FGF, by the Mobile Manufacturers Forum (MMF) in 2004.

Short report published in FGF Newsletter 2/2004. Rapporteur's report obtained in December 2004.

For the time being, the workshop will be the last in a series of international workshops dealing with potential mechanisms underlying the interaction between electromagnetic fields of radio applications and biological material. The workshop series started in 2000 with a *FGF workshop* taking place in *Bad Münstereifel* and was then continued with the following workshops resp. seminars, alternately organized by the FGF or the MMF:

- *Washington, May 2001 (MMF)*
- *Dresden, December 2001 (FGF)*
- *Rockville, October 2002 (MMF)* and
- *Plantation, March 2004 (MMF/FGF).*

Following each of these workshops, the FGF published detailed reports in its Newsletter and also in its respective annual reports.

The last workshop 2004 in Plantation was attended by three representatives of the FGF. The FGF also provided part of the funding. A short report published in FGF Newsletter 2/2004 summarizes the complicated issues dealt with in presentations and discussion in a relatively comprehensive manner. In December 2004, a detailed official workshop report was submitted to the FGF as a provisional document for internal use. The main topic of this workshop were the results of by six different research projects commissioned by the MMF, which were aimed at supporting or disproving various theoretical approaches for the identification of possible interaction mechanisms by realistically calculated or experimentally determined numbers. For further information on this topic see the mentioned reports.

4. Ongoing projects

- ***Effects of weak radiofrequency EMF (383 MHz, 900 MHz, and 1.8 GHz) on melatonin synthesis and reproductive functions in male Djungarian hamsters: Design, construction and computer simulation of exposure systems for investigating the melatonin synthesis in male Djungarian hamsters***

Experiments were performed from June 1997 to June 2000. Four partial final reports on the biological part and the final report on the exposure part are available. The last report submitted was the partial final report on the tests performed in cells, delivered in March 2003.

A report on the results obtained from isolated pineal organs and an overall final report on the biological part are still to be submitted.

There is no new information available with regard to the publication of results resp. reports, despite several inquiries made in 2004.

- **Knowledge-based literature database
(Prof. Jiri Silny, 'femu', University Hospital of the RWTH Aachen)
(WBLDB/EMF Portal, www.femu.de)**

The expansion and filling of the database is continuing. The reinforcement commissioned for 2003 was completed at the end of 2004. The hiring of two additional staff members with a background in biology in 2003 was part of the basic measures taken collaboratively with the FGF for ensuring data consistency, quality control and a distinctly improved evaluation and presentation of literature contents.

Further, the FGF continued its intense support of the preparation and conceptualization of a new "EMF Portal", achieved provisional presentability by femu in the end of 2004.

The intense support of the FGF's subgroup (UAG WBLDB) responsible for the project was continued in 2004. The development of the database project, as presented in detail in the FGF Annual Report 2003, continued in 2004, reinforced by the involvement of the two biologists newly hired by femu, Aachen. The focus of the FGF with regard to quality management on one hand was to ensure the quality of extracted data sets (ie the new abstracts of the most relevant information taken from peer-reviewed publications – "basic data" or "main characteristics"). On the other hand the quality of basic data extraction and their presentation was optimized further, and a new concept for "full extraction" of part of the available literature on EMF was collaboratively designed and implemented. The focus of this work now was the contents of the new "EMF Portal", which will replace the old "WBLDB" with the start of the year 2005.

For external quality assurance (complementing parallel internal quality assurance established by femu), samples taken from the original literature already processed were sent to the experts of the UAG WBLDB, and information contained in these samples was compared to the extracted information included in the database. The result was a distinct

optimization both of the input of extracted information and of the output, which will become visible to future users (data output after the use of search routines). Expert evaluation of literature contents, as offered in the past, was not continued.

Full extraction done according to the newly designed concept (ie the extensive extraction of *all* relevant information from a publication) shall be performed only for a relatively small part of the literature made available in the WBLDB. These data sets will in future replace in the "EMF Portal" the old full extractions found in the WBLDB. However, the old full extractions can be used as a basis for the new evaluations. A fully automated transformation of the old data sets into new ones was not possible, due to the newly designed requirements to data output.

The filling of the "EMF Portal" with extracted basic data was top priority in 2004. By the end of the year, approx. 900 data sets were inserted, all of them referring to the RF range. In total, approx. 7550 publications were included in the database until the end of 2004 (growth 2004: approx. 750), approx. 2330 of them referring to the RF range. Thus the "EMF Portal", which had been available as a beta test version, achieved provisional presentability with the end of 2004. Further details on WBLDB and the EMF Portal are found in the femu Research report 2004:

www.femu.rwth-aachen.de/pdf/femu_forschungsbericht_2004.pdf

- **Literature review on thermal and athermal effects of electromagnetic fields in the frequency range between 2 and 3 GHz and between 3 and 300 GHz (Lutz Haberland, University of Rostock)**

A preliminary final report on the literature review (2 to 3 GHz, through 2002) is available.

The commissioned extension of literature evaluation including the present state of research, as well as an update of older literature reviews referring to the frequency range 3 to 300 GHz are underway.

Preliminary results (2 to 3 GHz) were presented at the Annual Meeting of the BEMS 2004 in Washington.

A short-communication manuscript for publication is in preparation.

- **Provocation study on electrosensitivity in human individuals (Dr. Kunz, Fraunhofer Gesellschaft)**

The experiments performed in a small number of volunteers were provisionally finished in 2003. A draft of the final report was submitted in 2003; revision was completed at the start of 2004.

Efforts initiated by the FGF in 2004 to further increase the number of test volunteers were successful: Additional volunteers are now available for follow-up investigations.

The experimental phase with a minimum number of 13 volunteers needed for tests had been completed, and a draft of the final report submitted in 2003. In 2004, the efforts made by the FGF to achieve a distinct increase in the number of volunteers by own recruiting were underway. At the turn of the year, there were 26 additional volunteers (in the meantime, the 27th volunteer has come forward) for the continuation of the project.

Difficulties: To increase the study's conclusiveness, the FGF made an attempt to significantly increase the number of participants (tested at the time: 10). Whereas volunteer recruiting until then had been managed by the project director, efforts were intensified in the middle of the year by the FGF's activity. An advertisement placed with the Science Information Service (Informationsdienst Wissenschaft - IDW), which targets scientific institutes and is often used by the media, was crucial. This ad then was

published on the ARD videotext (ARD = public television), as well as - for a longer time period - on several internet pages and in newspapers. It was also sent to the project "Mainz EMF Watchdog" (a state initiative for the subjective response to EMF exposure). As a result of this FGF action, 26 new volunteers came forward, as the project director later reported. The continuation of the experiment is planned for the end of February to March. Agreement on expenses per participant has not yet been reached.

- **Experimental study on potential interactions between 3rd generation (UMTS) mobile radio systems and biological systems for the investigation of human health risks** (exclusively UMTS)

Prestudies, dosimetric tests and the technical construction were completed. The first of three planned test series with a first 90-day study in rats was completed as planned, in November 2004. The evaluation of these tests is underway.

- **Investigation into potential effects of mobile phones on the human central nervous system**

The experimental phase for the first part of the program (investigation of cognitive capacity) was completed in 2003. Part II with EEG examinations had to be extended and is now nearly finished, with the exception of tests to be performed with the last four volunteers.

Methodological difficulties arose within this project, as is described more thoroughly in the Annual Report 2003. After financial reinforcement was approved by the FGF Board of Directors, the project holders had to recruit four times as many test persons as originally planned in order to obtain the required number of evaluable EEG recordings (150 persons instead of 36). Thus, considerably more time and resources than planned were needed for EEG examinations. Moreover, the fairly long-term failure of a device for exposure led to an additional delay. Except final tests still to be performed with four volunteers, experiments were finished at the end of 2004; so the completion of the whole project including evaluation of all data is expected in the first half of the year 2005.

5. Ongoing projects newly launched in 2004

- Project FGF Workshop Series
Phase VI: International Workshop "**Influence of RF fields on the expression of stress proteins**", STUK, Helsinki/Finland, April 28 to 29, 2004

The workshop was planned and performed collaborately with STUK in 2004. A press release was soon issued in 2004. A detailed report is found in FGF Newsletter 2/2004.

Three rapporteur's reports on the subtopics of the workshop as well as the workshop documentation were published (in a joint document) in 2004 on the internet pages of COST 281 (www.cost281.org/documents.php). A CD-ROM with the workshop documentation was sent to all attendees in 2004. A consensus paper accepted by all participants is still in preparation.

The first workshop of the year this time took place in Finland, in the capital Helsinki. In cooperation with the Finnish Radiological Protection Authority STUK and the European Research Association COST 281, a symposium drawing high-ranking attendees was hosted on April 28 to 29, titled "**Influence of RF Fields on the Expression of Stress Proteins**". Potential influences of radiofrequency fields on stress proteins (also called heat-shock proteins, HSP) have been studied only in recent years; the workshop therefore was a good opportunity to convene the majority of scientists doing research in this field. A meeting report is found in the Newsletter 2/2004, in-depth information is found on the internet:

http://www.cost281.org/documents.php?node=71&dir_session.

- Project support by coordinating measures:
Influences of radiofrequency fields on the expression of endothelial tight junction genes and proteins in the blood-brain barrier

The FGF's support for this project in 2004 was limited to basic coordinating measures during project planning:

With regard to the planned project "**Influences of radiofrequency fields on the expression of endothelial tight junction genes and proteins in the blood-brain barrier**", the FGF, due to its experience in project management, was able to support the project in its planning phase, with very small expenditure. Due to its close contact with other working groups and through its mediation, a required pretest could be performed at a guest laboratory. Furthermore, the coordinating measures were aimed at forming an interdisciplinary team of different working groups (from biology, radiofrequency technology, statistics). Several meetings were held to launch this joint effort that is meant ensure high-quality research.

The project description includes the exposure of rats to a simulated UMTS field resp. sham exposure, and thereafter the examination of cellular material from the brain of these rats, determining the formation of essential structures of the blood-brain barrier. With or without field exposure, the expression of genes and proteins shall be measured that determine the density of the barrier against harmful substances threatening the brain.

The project thus constitutes an urgently required link between EMF studies of the blood-brain barrier of animals (in vivo) and cell cultures (in vitro). Statistical uncertainties observed during the test planning have already been eliminated.

A novel, specialized exposure system for the brain of living rats has already been designed and is presently constructed, without any financial involvement of the FGF. Despite the AG F's vote in favor of the support of this project, the FGF Board of Directors, as the deciding body, did not clearly approve financial support for the project in 2004.

Other activities of the Working Group Research (AG F)

- **Publications in peer-reviewed special journals**

All project holders are urged by the FGF to publish their study results – as far as possible – in scientific journals. As shown above, after acceptance of the final reports, results moreover were or are published in the FGF Newsletter resp. Newsletter Edition Wissenschaft. The inclusion of results in the WHO's EMF database as well as in other databases was provided. In 2004, there were further intense efforts of the Administrative Office to correct and complete wrong or lacking entries on FGF studies in the WHO database. In the meantime, these efforts have proved successful.

Whenever possible, the results of FGF studies also are sent to standardizing bodies.

- **Publications in English**

Besides, English versions of three published German issues of the Edition Wissenschaft, and an English version of one issue of the Newsletter were completed in 2004 and published online on the internet pages of the FGF. Two other issues of the Edition Wissenschaft and seven issues of the Newsletter were translated in 2004 and will soon be published online after revision.

- **Publications related to FGF projects 2004**

Cotgreave, I.A.: Review article: Biological stress responses to radiofrequency electromagnetic radiation: Are mobile phones really so (heat)shocking? Arch. Biochem. Biophys. (accepted)

Franke, H., Streckert, J., Bitz, A., Goeke, J., Hansen, V., Ringelstein, E.B., Stögbauer, F.: Effects of universal mobile communication system (UMTS) electromagnetic fields on the blood-brain barrier in vitro (submitted)

Franke, H., Ringelstein, E.B., Stögbauer, F.: Electromagnetic fields (GSM 1800) do not alter BBB permeability in vitro in models with high barrier tightness. Brain Res. (submitted)

Haberland, L., Simeonova, M., Alsbach, W., Brandt, S., Dubois, W., Gimsa, J., Friedrich, G.: Short communication: Analysis of literature on biological effects of EMF in the frequency range 2 to 3 GHz (in preparation)

Kantz, J., Müller, J., Hadeler, K.P., Landstorfer, F.M., Lang, F.: Insensitivity of cardiovascular function to low power cm/mm microwaves. Int. J. Environm. Health Res. (accepted)

Leitgeb, N., Schröttner, J., Cech, R., Kerbl, R.: Investigations of Sleep Disorders in the Vicinity of RF Transmitters. Biomed. Technik 49, 186-193 (2004)

Müller, J., Hadeler, K.P., Müller, V., Waldmann, J., Landstorfer, F.M., Wisniewski, R., Kantz, J., Lang, F.: Influence of low power cm/mm microwaves on cardiovascular function. Int. J. Environm. Health Res. 14/5: 331-341 (2004)

Ndoubè Mbonjo Mbonjo, H., Streckert, J., Bitz, A., Hansen, V., Glasmachers, A., Gencol, S., Rozic, D.: A generic UMTS test signal for RF bioelectromagnetic studies. Bioelectromagnetics 21/6: 415-425 (2004)

Sauter, C., Stepansky, R., Lobentanz, I.S., Zeitlhofer, J., Schmid, G.: Provocation study on physiological parameters of the visual system under the influence of radiofrequency EMF in humans. Neuroreport (in preparation)

Schmid, G., Sauter, C., Stepansky, R., Lobentanz, I.S., Zeitlhofer, J.: No influence on selected parameters of human visual perception during 1.970 MHz UMTS-like exposure. Bioelectromagnetics (accepted)

Wrobel, G., Wienand, A., Boheim, G.: Athermal or thermal effects of radiofrequency electromagnetic fields on planar lipid membrane systems. Bioelectrochemistry (accepted)

- **Status reports**

The regularly prepared written "status reports" of the project monitoring team utilized for internal project monitoring by the FGF were standardized in 2004. In future, there will be detailed written descriptions of the objectives of new research projects at the start of project work in order to further improve the monitoring of project performance. All status reports are to be communicated to the project directors; the aims of the projects, as presented in the tables, shall be agreed upon between the FGF and the project holders at the start of project work.

- **Project tables / fact sheets**

The members can find an EXCEL table containing a survey and details of all prior and still ongoing FGF projects on the internal **intranet**. This survey is continually upgraded and updated by the FGF Office. The table also contains data on all reports and publications pertaining to each project.

A short list of all to-date performed FGF projects – sorted by the study levels "human", "animals", "cells and tissues", etc. – was fully revised in 2003 and was made available in early 2004 to FGF members on the intranet. It is regularly updated.

The project tables available on the intranet as PowerPoint sheets, as well as the survey of all research projects funded by the FGF found on its internet pages, are also continuously upgraded and updated by the FGF Office.

Work on the internally available, elaborate **fact sheets on completed FGF projects** (on the FGF **intranet**) was continued in 2004. Their number increased from 10 to 15 (in German and English each). Unfortunately, available fact sheets at present cover only a small part of FGF research results, due to the limited staffing of the FGF Office for this kind of work.

Maintenance of the WHO project database

As part of its mission to protect public health, formulated in its charter, and as a response to concerns spread in the population, in 1996 the World Health Organization (WHO) established the International EMF Project for the assessment of scientific evidence on potential health effects of electromagnetic fields (EMF) in the range between 0 and 300 GHz. A public access database containing relevant studies was implemented which presents an overview of available research:

<http://www10.who.int/peh-emf/emfstudies/database.cfm>

By the end of April, 894 studies were included in the WHO-EMF database; approx. 170 studies were characterized as "ongoing". In agreement with the WHO, the FGF was to determine whether the entries were still correct or whether the studies were completed in the meantime.

New information was obtained on approx. 100 studies, and the entries were updated, in particular regarding their dates of completion. Part of the studies were already finished, and in these cases the entries were extended by the respective publications. In spite of repeated inquiries, no information was obtained on the rest of the 70 studies. Thus it is unknown whether these studies are still ongoing or at all relevant.

In the course of inquiries, new studies not yet included in the database were registered. These - about 60 - new studies have been added to the database.

At present, the WHO EMF database contains 989 studies (state: Dec 21, 2004); the results of about 820 studies are available and linked to the respective references. With regard to the studies for which no information was obtained (about 70), it should be decided whether to remove them altogether from the database.

FGF colloquia / seminars

Final colloquia on completed projects

In 2004, one internal and one public **final** colloquium each were organized (see above, project overview).

Internal FGF seminars (tutorials)

No internal seminars were organized in 2004.

Participation of the FGF in external events

Participation in the sessions of the "Roundtable on the German Mobile Radio Research Program" (Runder Tisch zum Deutschen Mobilfunkprogramm – RTDMF)

The constituting session of the "Roundtable on the German Mobile Radio Research Program" (RTDMF) was hosted by the Federal Office for Radiation Protection (Bundesamt für Strahlenschutz, BfS) in Neuherberg, on June 15, 2004. The FGF was invited to participate in this and other sessions with one representative. In the Autumn of 2004, the second session took place. Reports on the sessions and other information on the RTDMF are found on a special web page of the BfS:

www.emf-forschungsprogramm.de/rtdmf

The German Mobile Radio Program Research is funded in equal parts by the "Self-Commitment of German Mobile Radio Operators" and the Federal Government. The RTDMF was implemented to "fully ensure transparency of proceedings and research results for the public" and to supervise "the German Mobile Radio Program as an independent body for counselling and discussion". The roundtable is composed of representatives of science, authorities and interest groups.

Participation in the workshop "Mediation as an alternative tool for deescalation in the current debate on EMCE"

Organized by the Federal Ministry of Economy and Labour (Bundesministerium für Wirtschaft und Arbeit – BMWA), the workshop took place in Bonn, on November 3, 2004. Several representatives of the FGF were invited to attend the event. The results of an evaluation of a model conflict commissioned by the BMWA were presented by the company WiK Consult GmbH. Moreover, the two mediators involved reported their experiences in dealing with the conflict. New antenna sites had to be found in the vicinity of an elementary school and a kindergarden in the Munich area, in cooperation with network operators, authorities and concerned citizens. A presentation including an international comparison of alternative tools for deescalation as well as describing tendencies in current legislation in cases of conflict surrounding EMCE rounded off the workshop and led to lively discussion.

The observed model conflict showed that mediation is limited as a tool for solving EMCE conflicts. Further information is found at the BMWA's Mobile Radio Portal:

www.bmwa.bund.de/Navigation/root.did=45936.html

Cooperation with organizations and institutions

2004 again was a year of close cooperation with national and international organizations and institutions, especially by fulfilling the tasks of the secretariat of the European Research Association "Cooperation in Science and Technology" (COST 281), which was quite a challenge regarding expertise, time and organizational aspects.

Hosted by the **World Health Organization (WHO)**, the **International Seminar and Working Group meeting on EMF Hypersensitivity** took place on October 25 to 27 in Prague (Czech Republic). Several staff members of the FGF were in attendance. A meeting report was published in Newsletter 4/2004; meeting proceedings are found at:

http://www.who.int/peh-emf/meetings/hypersensitivity_prague2004/en/

Activities within the European Union COST 281 program

Functioning as the scientific secretariat of the European COST 281 program, the FGF again organized two international scientific workshops:

A workshop taking place in Thessaloniki (Greece), on March 17 to 19 dealt with the topic of "**Potential bioeffects of new technologies, in particular in the UHF range (300 MHz to 3 GHz)**". Lectures on technical aspects of new radiofrequency technologies were followed by surveys of biological effects possibly occurring in this frequency range. In addition to the workshop itself, a meeting of the COST 281 working group "Dosimetry" and the inaugural meeting of the EU project "EMF-NET" took place.

The second workshop took place in Paris, on September 20 to 21. The **"Workshop on RF exposure assessment"** brought together especially physicists and engineers who are dealing with exposure systems and related dosimetry. A report is found in Newsletter 4/2004. The website of the workshop is found at:

http://www.cost281.org/documents.php?node=88&dir_session

In cooperation with the World Health Organization, a seminar titled: **"From Bioeffects to Legislation"**, was organized. It took place in Ljubljana (Slovenia), on November 8 to 9. Presentations are found on the internet at:

http://www.cost281.org/documents.php?node=91&dir_session

A meeting report will probably be published in the first 2005 issue of the Newsletter.

26th Annual Meeting of the Bioelectromagnetics Society (BEMS), June 20 to 24, 2004 in Washington, D.C., USA

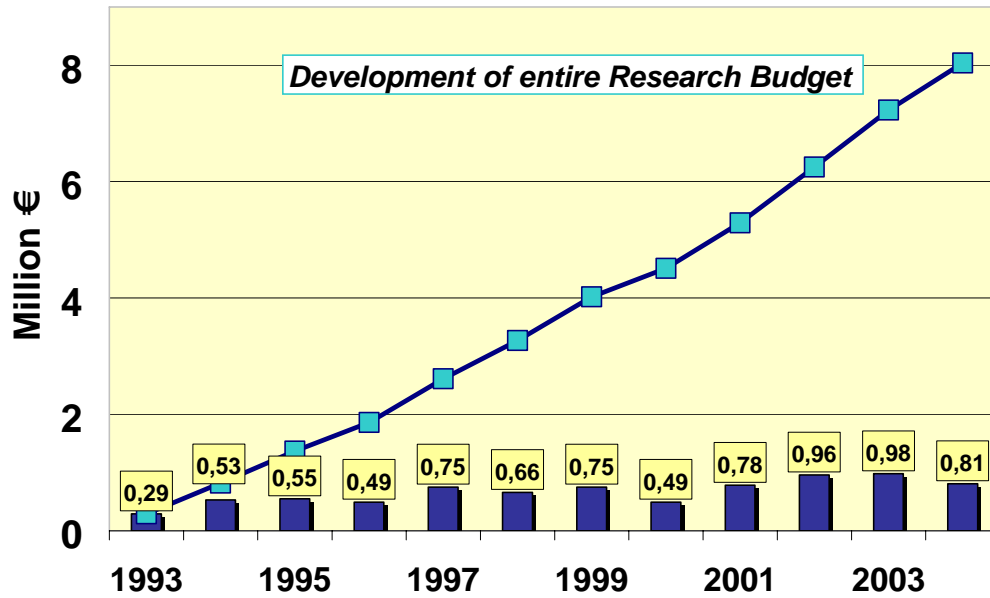
Again, the Forschungsgemeinschaft Funk e.V. sent several representatives and freelancers to the congress. Among other things, a literature study on biological effects of electromagnetic fields in the frequency range of 2 to 3 GHz commissioned by the FGF was presented.

Thorough reports on this congress are found in the Newsletter edition 3/2004.

Funds granted by the FGF

Third-party funds of 0.81 million Euros were distributed in 2004. This is a slight decrease compared to 2003, so not all claims and requests could be considered.

There were neither any new calls for tender in 2004.



FGF Press and public relation activities

In 2004, great efforts were again undertaken by the Working Group Public Relations (AG Ö) to provide its members and the public with information on the topic of EMCE:

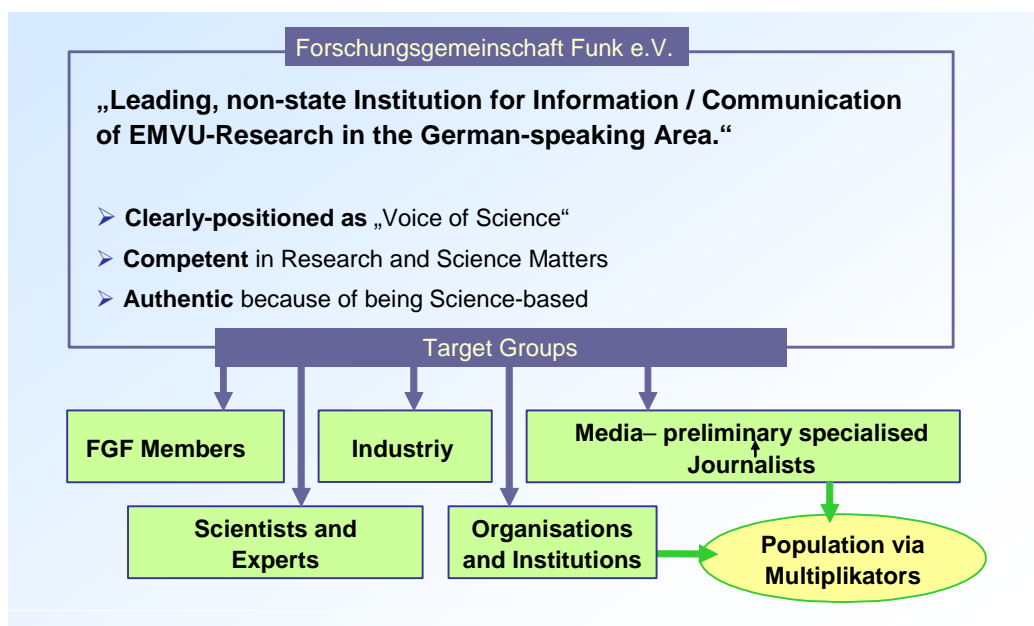
- by expansion and user-friendlier design of the internal information network, the "FGF intranet"
- revision and expansion of the internet service (www.fgf.de) including new options, such as downloads of selected Newsletter articles
- the active participation of the Forschungsgemeinschaft Funk in public events; as in previous years, the FGF also supported the preparation of events
- Many oral and written inquiries from authorities, scientists and the public were answered in depth.

Some of these activities are first results of the measures decided upon at the beginning of the year during an internal strategic workshop of the AGÖ. The workshop was organized for implementing internal review of the FGF's objectives and concepts of communication. The most relevant results are summarized in the following.

Strategic workshop of the AGÖ

The FGF provides good public relations under complicated environmental conditions. As this environment is changing, the orientation of the FGF's public relations work changes too.

The objective is to establish the FGF as the leading non-governmental scientific organization in the field of information/communication on EMCE research in the German-speaking region, acknowledged by science, media and the relevant social stakeholders alike. To reach this goal target groups shall be addressed more specifically and adequately. The FGF's profile as perceived by the target groups shall be sharpened, and the strategies of the FGF's public relations work shall be better defined and implemented. Clear positioning is necessary for the FGF to be perceived as a voice of science, as competent in research and science, and as credible since science-based.



FGF target groups are the members of the FGF, scientists and experts, associations and institutions, the industry as well as multipliers, such as the media. The interested public is basically an indirect target group of the FGF obtaining information via multipliers.

The following measures were agreed upon:

- continuous optimization of internal information and communication services
- the expansion of relationships with contact persons of external target groups and intensification of active communication
- evaluation of target group expectations
- adjustment of existing media with regard to target groups
- exchange of information and, possibly, coordination with other organizations

Newsletter

This year four issues with a total of 310 pages were published, at the beginning of each quarter. The number of printed copies was 4500.

All 2004 issues had the new design. The redesign of the layout and the graphic works, as well as the new concept with its regular columns, help to improve readability. For a better use of the material, the names of the authors are included in the index, and there is a year index listing all contributions; the index pages can be taken out. A summary given at the beginning of longer articles helps to assess their content.



The issue 2/2004 was translated into English and published on the internet.

<http://www.fgf.de/english/fup/fqfpub/newsletter.htm>

Year	Published Newsletters	Number of contributions	Number of pages
2000	4	24	100
2001	3	17	108
2002	3	18	104
2003	4	35	240
2004	4	45	310

Infoline

Infoline presents worldwide news worth knowing surrounding the topic of EMCE in German and English. It is available on the website of the FGF and is sent via e-mail to members and external subscribers.

The members can request additional background information related to the news, the so-called HOTs (printed on paper), at the FGF Office.

Year	Published infolines	Number of articles	Offered HOT's
2000	36	161	390
2001	37	167	577
2002	36	226	732
2003	44	226	537
2004	50	617	611

50 Infolines with a total of 617 articles and 141 pages were published in 2004.



Beginning with issue 28 from July 22, 2004 Infoline too had a new outfit conforming to the corporate design of the Newsletter. Aside from the new layout, revision included a subdivision into columns: On Our Own Behalf, Research, Environment and Society, Politics and Law, Technology and Dates.

Edition Wissenschaft

There were no new issues of the Edition in 2004.

The issues

- no. 15, April 2002: "Effects of electromagnetic fields on the function of the blood-brain barrier", by Dr. med. Florian Stögbauer,
- no. 18, April 2003: "Requirements for technical equipment for investigating the effects of radiofrequency electromagnetic fields on biological systems", by Dr. Joachim Streckert, and
- no. 19, July 2003: "In vivo studies on potential effects of radiofrequency electromagnetic fields (RF-EMF), especially as used by mobile radio – A literature study on long-term experimental studies with animals (carcinogenicity studies)", by Dr. Thomas Tilmann and Dr. Jochen Buschmann

were translated into English and can be downloaded at:

<http://www.fgf.de/english/fup/fgfpub/edition.html>

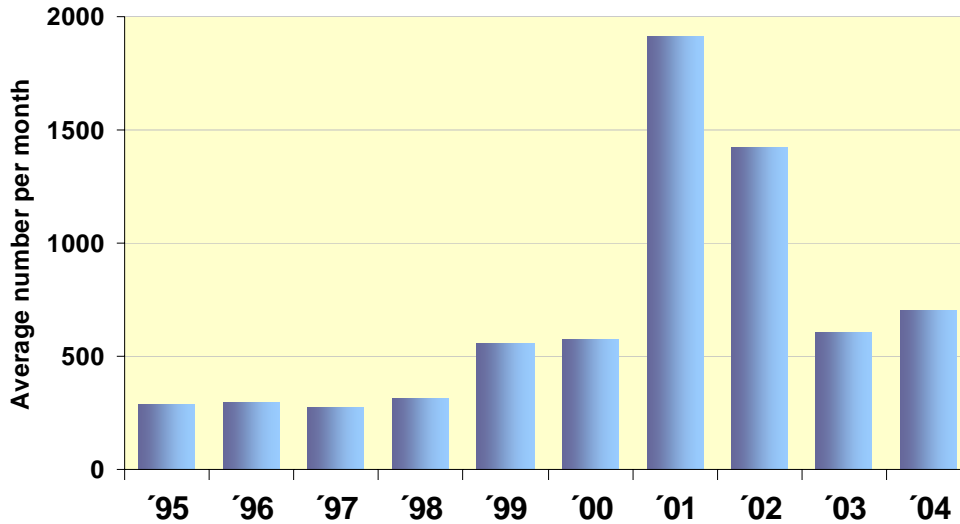
Press clippings

Since 1995 the FGF monitors press coverage of EMCE topics for its members (since October 2002 also online coverage). The monitoring comprises both quantitative and qualitative aspects.

Qualitative evaluation is done according to a classificatory scheme for detailed scrutiny of news, especially health-relevant news. Thus, current trends can be made transparent, and even long-term effects of individual arguments can be elaborated.

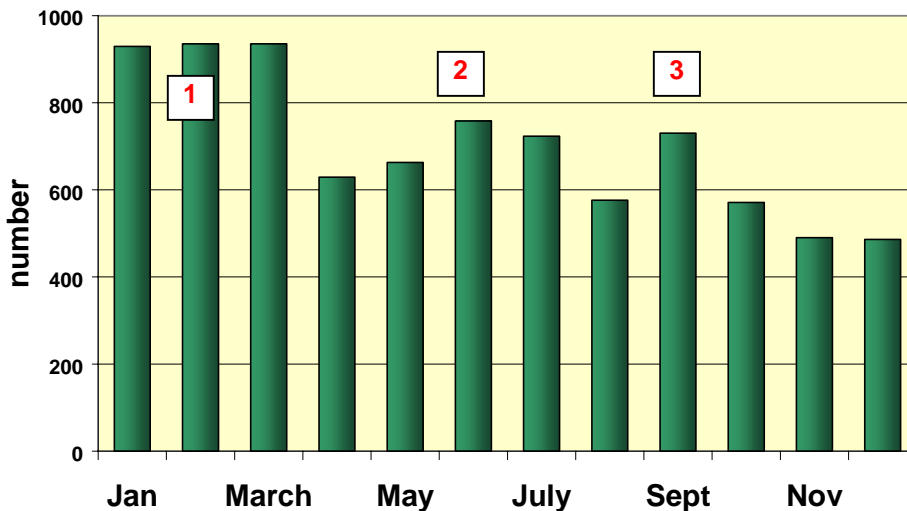
The development of the presence of the topic EMCE in the media over the years 1995 to 2004 is illustrated by the following graph:

Number of Press Clippings 1995 - 2004



Compared to the year before, 2004 showed a slight increase regarding public debate about the risks related to electromagnetic fields, which strongly varied over the course of the year:

Press Clippings in 2004



In retrospective, the peaks from January to March 2004 (1), the June 2004 peak (2), and another peak in September 2004 (3) are noteworthy:

(1) At the beginning of the year, due to the publication of the BfS brochure: "Mobile radio: How does it work?", there was some coverage explicitly referring to the interaction between mobile phones with high exposure values and possible health risks related to the use of these devices.

There was also a number of articles in this time period dealing with the study of the 'Radiation and Nuclear Safety Authority Finland (STUK), which, after investigation of 12 popular mobile phone models, showed that radiation was below the levels given by manufacturers and within the framework of accepted standards.

Amongst others the paper "Süddeutsche Zeitung" (Munich) responded to this study and related issues by publishing an article titled: "Insurances fear mobile phone risks", indicating that claims brought against manufacturers (mobile phone manufacturers, mobile radio operators) would no longer be covered by insurance policies.

This article received great attention in the media, which was further increased by a release of the BfS that strongly warned against 'electrosmog' produced by mobile radio and provided practical advice on how to avoid it. Discussion at last quieted down, partially due to the release issued by the Informationszentrum Mobilfunk, which, based on current research results and expertise, supported the precautionary principle applied in Germany.

(2) Against the background of the positive or neutral coverage of the measurement campaign performed by the Informationszentrum Mobilfunk in Hessen, the petition for a referendum on mobile radio submitted by the environmental party ÖDP made a national big splash. Nearly all dailies reported on this.

Less attention was given to a press release of the Stiftung Warentest: The Berlin Consumer Protection Agency examined the emission produced by 19 phone models. All devices were below the legal SAR by at least 50 percent.

The focus was then on the coverage of the 20th Conference of the European Society for Human Reproduction and Embryology (Berlin). A Hungarian research team (Fejes et al.) presented the results of a long-term study dealing with the association between "Mobile phone radiation and sterility".

(3) In September, positive coverage of the possible removal of the mobile phone ban was published in all daily newspapers. Emphasizing the harmlessness of electromagnetic radiation for onboard instruments in airplanes, reports dealt with the plans to allow phone calls during flights. Coverage of the "info packet mobile radio" of the Informationszentrum Mobilfunk was published in the same time period.

A big splash was made by two BfS press releases. Again, the Federal Office for Radiation Protection advised "caution with mobile phones"; and the coverage of a study of the Federal Office's Mobile Radio Research Program eventually led to controversy. The planned study was aimed at examining health effects of mobile radio emission on the sleep behavior of people living in the vicinity of transmitters. Cooperation with the mobile radio operators was difficult to begin with, as there were strict regulations with regard to emergency call provision. Its conclusions were simplified and made headlines such as: "Mobile radio industry favors corporate profits over consumer safety", or: "Mobile radio industry to allow extensive risk research". The impression was created that research into risks in this field was generally hindered by mobile radio industry. Press releases issued by mobile radio operators strongly emphasizing the numerous cooperations of the industry with the BfS and other research institutions then put a halt to discussion.

FGF internet presence

Various functional improvement have been implemented over the past year.

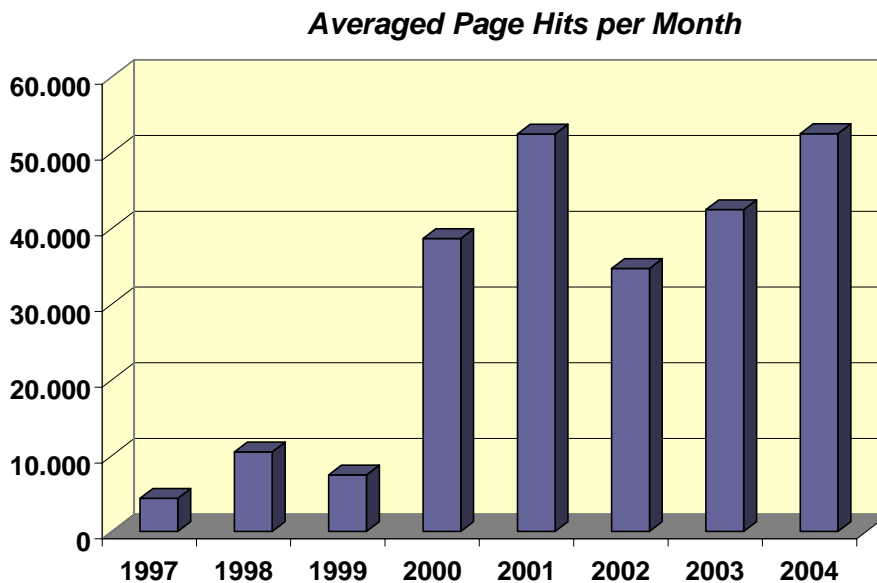
First of all, single **Newsletter** articles were made available for download. The advantage of this new service is that internal and external pages can be directly linked to single articles, and that articles now can be separately indexed and shown in search results by internal site and web search engines. Moreover, also users with slower internet connections can quickly reach the desired information.

The screenshot shows the website for 'Forschungsgemeinschaft Funk e.V. Research Association for Radio Applications'. The main heading is 'Publikationen der FGF - Newsletter'. Below this, there are links for 'Jahrgang' (years 2003-1995) and 'Newsletter Abonnement'. A sidebar on the left contains a navigation menu with items like 'Die FGF', 'Forschung und Publikationen', 'Tagungsberichte', etc. The main content area displays the year '2004' and a list of articles under the heading 'Nr. 4, Dezember 2004 (Gesamtausgabe, 1.050 kb)'. Two callout boxes are overlaid on the page: a green box labeled 'Download whole Document' with an arrow pointing to the year '2004', and a red box labeled 'Download single Article' with three arrows pointing to individual article titles in the list.

This service has already been made available for the years 2004 and 2003; the other years will be included successively.

The new layout of the weekly Infoline was also adopted for the website. In addition, a separate print version is offered.

The development of page requests for the FGF internet presence (<http://www.fgf.de>) is illustrated by the following graphic:



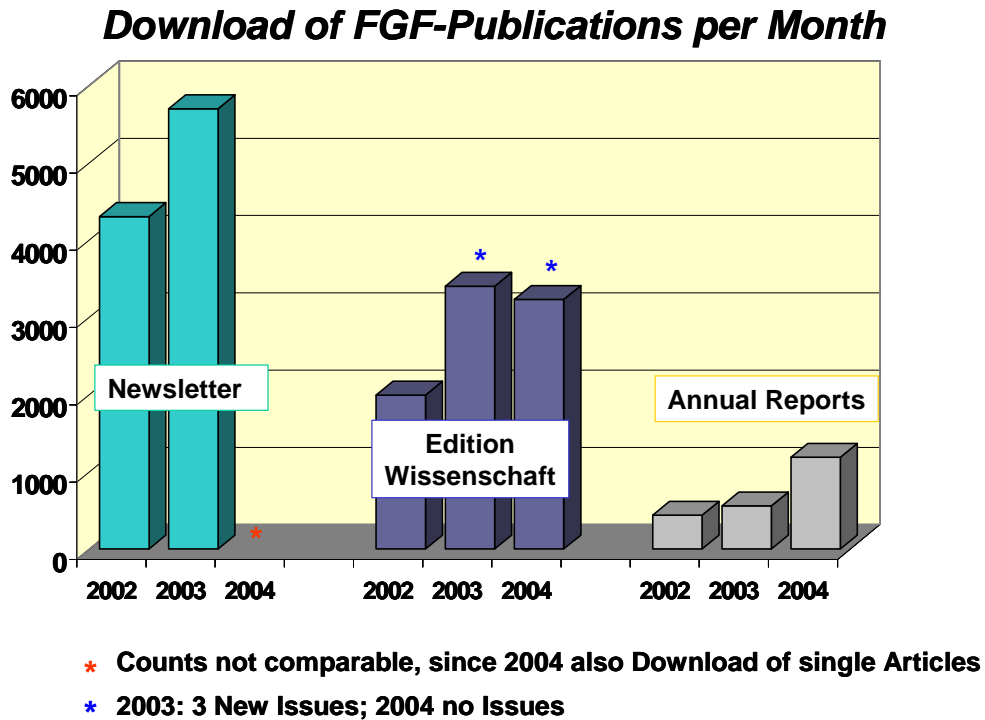
After the decrease in the number of requests in the year 2002, which, aside from the general decrease in media coverage of the topic (see graphic "Press clippings" above), can certainly be also explained by the new information services offered by other organizations and interest groups, the number of the requested pages again is on the rise. The percentage of English-language pages of the total statistics amounts to 35% (in the past year 23%).

The origin of requests in detail:

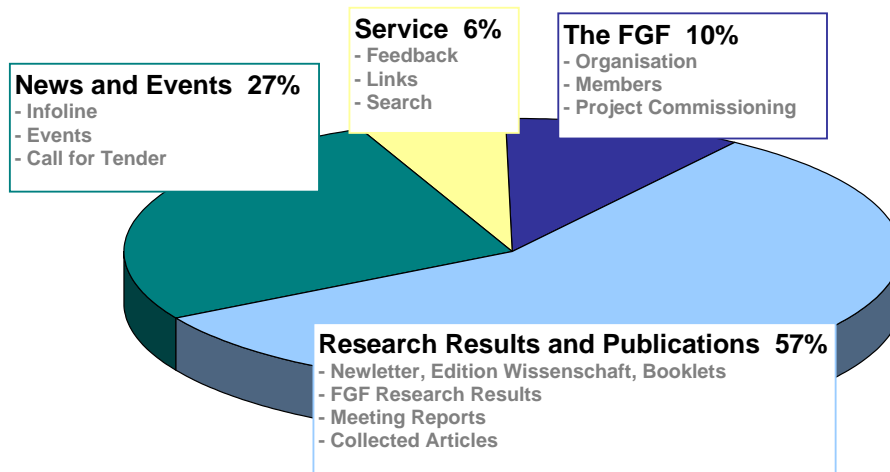
Origin of Requests in Percent

	2000	2001	2002	2003	2004
.de (Germany)	44,8	34	29,2	23,5	18,03
.com	16,4	16,8	13,4	26,4	44,02
.net	12,5	22,1	27,4	25,1	27,09
Europe	9	7,1	9,1	9,5	8,84
North- and South America	0,4	0,8	0,8	1	0,87
Middle East and Africa	0,03	0,3	0,1	0,2	0,2
Asia and Oceania	1,23	1,2	0,6	0,7	0,7

The development of downloads of FGF publications over the last three years is shown in the following graphic:



The total number of page requests was distributed across the four main segments of the FGF internet service as follows:

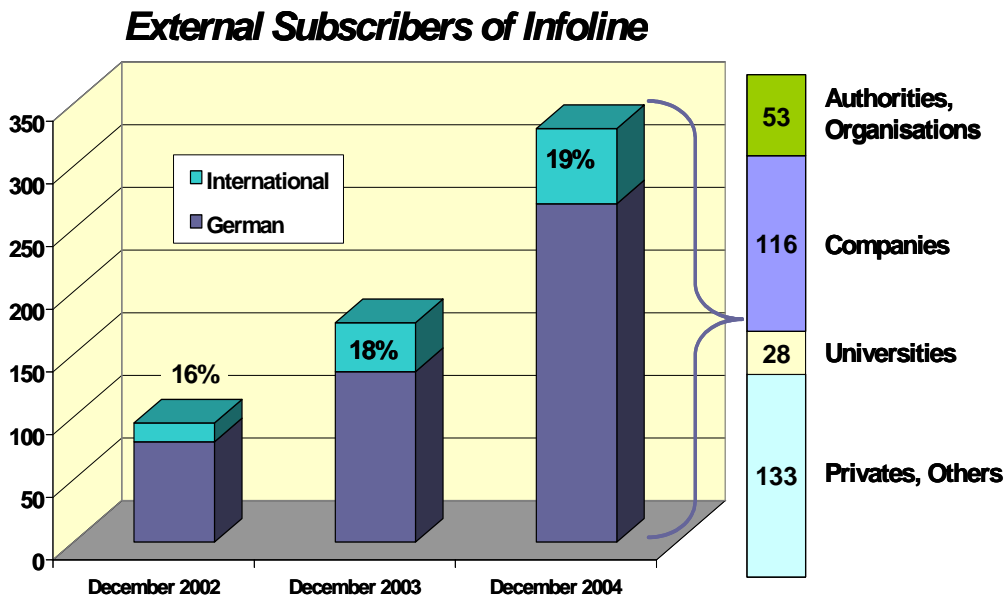


With approx. 60% of page requests, the segment "Research Results and Publications", the core segment of the FGF's internet service, is requested most often, as in the years before.

The percentage of the segment "News and Events" increased in 2003 from 22% to 27%. This is

due to the steady increase in requests for "Infoline", the weekly information service of the FGF. An exemplary evaluation performed for the month of September showed a total of requests of 4739 for the segment "Infoline" (all issues); there were 3083 requests for the German version and 1575 for the English version.

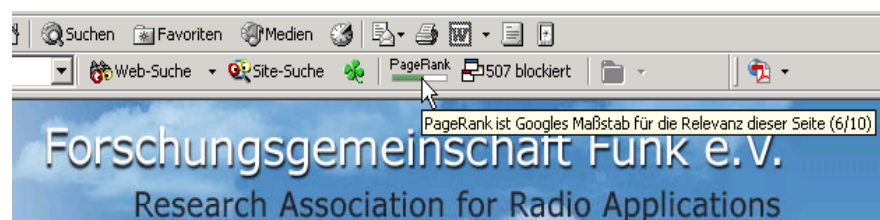
The heightened interest can also be seen in the increasing number of subscribers (e-mail subscription at: <http://www.fgf.de/service/abo.html>) of the "Infoline":



In the reporting period, the number of subscribers increased from 175 to 330, 19% of which came from the English-speaking region.

The internet pages of the FGF have become well-established over the years. An evaluation made by means of the search engine Altavista e.g. showed that more than 900 different web sites worldwide are linked to FGF pages. The spectrum of linked pages ranges from official web sites via companies, universities and organizations to private home pages.

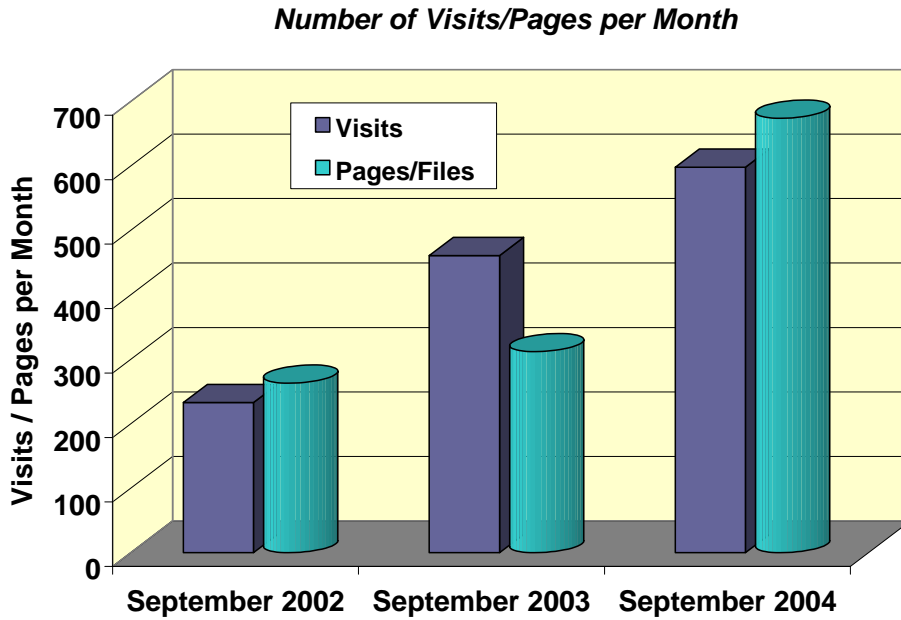
This might be the reason for the high "PageRank" value of the FGF home page determined by the search engine Google. PageRank is a method to evaluate the relevance of websites used by Google. The FGF is now at 6 of 10 possible points (www.t-online.de and www.bundesregierung.de have a page ranking of 7), an exceptionally high ranking for German-language pages.



The FGF internet presence will be further extended, conceptually and structurally, in the coming year. There are plans for a revision of the segment with selected articles, the glossary and the list of links.

FGF intranet

Over the past year the intranet has been further extended form and functionality. Its acceptance as a central information platform of the FGF was further increased, as one can see in the development of user and download numbers.



The expansion of the FGF intranet will be continued next year.

Events / cooperations

In 2004, the Forschungsgemeinschaft Funk again participated actively in various public events. The spectrum of events ranged from citizen information meetings on EMCE to presentations held at conferences and workshops.

In May, the **14th Conference of the Society for the Scientific Investigation of the Parasciences** (Gesellschaft zur wissenschaftlichen Untersuchung von Parawissenschaften – GWUP) took place in Würzburg. The GWUP informs about parasciences and pseudosciences from a scientific perspective; its goal is to minimize susceptibility to pseudo-scientific concepts and promises by providing well-founded information. The contribution prepared by the FGF dealing with the state of the art of research on the compatibility of electromagnetic fields in the radiofrequency range with humans helped to clarify the scientific point of view in the 'electrosmog' debate.

May 21, 2004 Würzburg, GWUP

The participation of the FGF in the program committee of the 36th Annual Meeting of the Association of Radiation Protection (Fachverband Strahlenschutz), already mentioned in previous annual reports, was completed by a lecture held on current international research in the field of EMCE. The **NIR 2004** took place in Cologne in September, attended by experts from industry, authorities and organizations with a professional or private interest in non-ionizing radiation resp. who work or bear responsibility in this field. The FGF introduced the topic of biological effects from electromagnetic fields by giving an overview of international research programs and current research foci. The meeting's spectrum comprised the current state of science and technology with regard to biological effects, exposure dosimetry and related national and international settings.

August 31, 2004, Cologne, NIR

In November, a **panel discussion about 'electrosmog'** took place in Andernach, initiated by the CDU (Conservative Party). Representatives of Andernach, the mayor, as well as representatives of network operators, of the RegTP (Regulierungsbehörde Telekommunikation und Post – Regulation Authority for Telecommunications and Posts) and the FGF, provided information on legal, technological and health aspects of mobile radio and engaged discussions with interested citizens.

August 11, 2004, Andernach, Citizens' Information Meeting, CDU

The North Rhine-Westphalia Ministry for the Environment, Nature Conservation, Agriculture and Consumer Protection regularly organizes **workshops** on the topic of "electromagnetic fields in the environment". The objective is to collect as broad information as possible with regard to current questions and answers in science and technology; authorities, companies and research are the main target group. During the workshop in Schriesheim/Heidelberg in December, the FGF used the opportunity to report the results of the FGF workshop "Are electromagnetic fields able to raise the risk of cancer?"

*December 12, 2004, Düsseldorf, MUNLV
(Bonn, IDR)*

"KnowledgeAbles" ("WissensWerte") conference in Bremen

The conference took place at the Kongresszentrum Bremen, from November 22 to 24, 2004. "KnowledgeAbles" is a specialists conference for science journalists, science communicators and researchers from the fields of natural sciences, technology and medicine, for the first time organized in 2003. Its objective is to establish a forum in the German-speaking region where target groups can discuss professional issues, collect information about recent developments in science and journalism, and for networking.

Within the parallel special exhibition "WissensCampus" ("KnowledgeCampus"), selected

departments of research from science and industry, as well as science promotion institutions, presented themselves and their work. On Field Trip Day, called "WissensOrte", (Nov 24, 2004 – "KnowledgeSites"), participants could visit internationally acknowledged research facilities located in Bremen.

The FGF was represented by two staff members. They attended a large part of the meeting lectures and panel discussions; one of them also took part in the "campus tour" at the International University of Bremen (IUB). Several more lectures and discussions as well as a visit to research laboratories of the IUB were on the day's agenda.

Meetings with media representatives on the sidelines of the conference made obvious that the FGF was scarcely or not known at all among some of the asked attendees. So it is planned to present the work of the FGF next year during the special exhibition "WissensCampus". Moreover, a mailing of the Working Group Public Relations is planned for the nearer future which is intended to inform about the FGF by giving out an advance copy issue of Newsletter and Infoline to a pre-selected part of the approx. 350 attendees.

Preview 2005

New actions

Based on already started activities of the Board of Directors and working groups, the FGF's strategies and related action shall be further revised and implemented. The Board of Directors will deal with this in detail during its first session in 2005.

The Working Group Research will continue its monitoring of ongoing research projects and help to improve the database. Due to the strained financial situation, there will be no new project commissioning in 2005. Special emphasis will be put on the expansion of the "Fast Response Team".

The objective to further establish the FGF as an information platform with regard to EMCE in the German-speaking region shall be reached by reinforcing its internet and intranet activities. To this end, the Working Group Public Relations will perform several inquiries on the acceptance of its publications and services: Infoline, Newsletter, Edition Wissenschaft and internet/intranet.

Planned workshops

In 2005, the FGF will again organize two workshops in cooperation with partners from science and politics.

Furthermore, it will participate in two workshops planned by the COST 281 action, in its function as the scientific secretariat.

A continuation of the participation in the WHO EMF Project and corresponding support of all preparatory measures are also planned.