Project Number: **017728**

Project Acronym: **Pallas Athene**

Project Title: **Ambassadors for Women and Science**

Specific Support Action

Thematic Priority: Science and Society

Final report

Period covered: from Nov. 01, 2005 to Oct. 31, 2007 Date of preparation: 14.12.07

Start date of project: Nov. 01, 2005 Duration: 2 years

Project coordinator name: Dr. Barbara Bertram Revision:
Project coordinator organisation name:
Deutsches Krebsforschungszentrum Heidelberg

6. Publishable final activity report

6.1 Summary of project objectives, work performed, contractors and results

The call for "Ambassadors for Women and Science" in the 6th framework programme represented a new and promising instrument to establish policies favourable to female researchers. Six centres of the German Helmholtz-Association (coordinator: Deutsches Krebsforschungszentrum) applied for a grant in this call and got a financial support of 220.000 € for a two years period (Nov. 2005 – Oct. 2007). The project was then called "Ambassadors for Women and Science – Pallas Athene". Its objectives were to stimulate the participation of women in science and technology and to prepare them for leading positions in Science Organisations. At the start there were nine, then around 20 ambassadors (excellent female researchers) who took part in this project. The ambassadors contributed as role models to the empowerment of women in science. They used best practice instruments which were already established or were especially inaugurated for the project.

Several facts are identified as being causes for the under-representation of women in higher positions: the lack of role models, a working culture which is nearly exclusively embossed by men and an unassertive integration of the gender dimension in EU-funded research. The fact that gender action plans are no longer required in grant applications makes projects like Pallas Athene even more important.

One major instrument carried out in the project was „*Science goes public*" (SGP), inaugurated and carried out successfully by the Deutsches Krebsforschungs-zentrum (DKFZ) in the years 2001 – 2003 together with the Pädagogische Hochschule Heidelberg. In SGP, the ambassadors presented their research findings to the public. Since this tool wants to arouse interest for science in the public and in young people, SGP worked together with schools, universities and teacher training institutes. One of these, the Pädagogische Hochschule Heidelberg, was subcontractor of the DKFZ. By way of acquiring the scientific background of the ambassadors' research findings, the students and pupils developed sketches and scenes, thus transforming the highly complex scientific subjects into generally understandable matter. The tool *Science goes public* was adopted by two further Centres of the Helmholtz-Association, namely the Alfred Wegener Institut für Polar- und Meeresforschung (AWI) and the Deutsches Zentrum für Luft- und Raumfahrt (DLR). In the years 2006 and 2007, SGP was carried out five times in each of these three centres.

The Deutsches Elektronen Synchrotron in Hamburg (DESY), the Institut für Plasmaphysik in Garching (IPP) and the Forschungszentrum für Umwelt und Gesundheit (GSF) were carrying out three other measures: „*physik.begreifen"* (DESY), "*kidsbits*" (IPP) and *"Women in Science – Science for Women*" (GSF),

the latter instrument being especially invented for Pallas Athene. It placed special emphasis on the information of stakeholders such as policy-makers, media, Bavarian government, ministry of health etc. Five special events carried out by GSF presented many reports on scientific fields like

- „Lock and key principle – How is ELISA involved?“
- “Heart attack – do hearts of women beat irregularly?”
- “Cancer – the danger from inside“
- “Ultrafine particles – small and dangerous“
- „From cell to network – how nerve-fibres find their way“

kidsbits wanted to arouse the interest for science and research especially in children and to promote the understanding of the scientific context. The target group of this project were children at pre- or elementary school level, up to 12 years. Although these children are very young, they already know a lot about science - many TV series for kids focus on that and most of the kids love their "Discovery Channel" as an animated picture book. Even more valuable is the possibility to have hands on the real thing. The IPP realized about 20 visits in schools and kindergardens. The content of the visits were focused on energy: its supply, limitations and fusion research to develop new supplies. A brochure on this topic was produced in 2007. The consortium members Ute Schneider-Maxon, Iris Eckl (both IPP) and Karen Ong (DESY) visited the EU-Parliament in Brussels on the occasion of the school labs exhibition of the Helmholtz-Association (March 19 – 23, 2007).

“Physik.begreifen“ was carried out by the DESY ambassadors together with the Q-lab (quantum physics laboratory) of the physik.begreifen pupil laboratory led by Karen Ong. Pupils who are in the process of making their career choices are shown how exciting science can be and discussed their opportunities in science. During the first day of the two-day events, secondary school pupils age 17 to 19 had the opportunity to experience the fun and excitement of performing their own hands-on experiments in the Q-lab. The second day was devoted to a discussion round with female scientists at various career stages at DESY and a tour to the scientists’ work places at the world-wide unique vacuum-ultraviolet free-electron laser FLASH as well as the synchrotron radiation source DORIS. Thus, the pupils had the opportunity to learn about and discuss the research, work places and opportunities, as well as the curriculum vitae of the researchers. Several events of the “physik.begreifen” program have been organized by the ambassadors together with university students of the University of Hamburg, who are in the teacher training program. Thus, the university students could gain experience with

the presentation of scientific findings and work places outside the university and school system.

Besides the public, the four best practice instruments addressed also special target groups like pupils, students and stakeholders. During the two years of the project, over 40 events were carried out with approx. 2000 – 3000 participants. Many newspapers and online articles reported about the project. Statistics of the Helmholtz-Association show that between 2003 and 2007 many numbers of female scientists in higher positions have grown in the six centres involved in Pallas Athene, e.g. Rhein-Neckar-Zeitung, Heidelberg, Mannheimer Morgen, Mannheim, Der Standard, Vienna, etc., www.morgenweb.de, www.merkur-online.de, www.news.ch, www.euractiv.com, www.euobserver.com, www.duz.de , etc.

Table 1

Women in leading positions (2003/2007) (in %)

Helmholtz centres	* C4 / W3		C3 / W2		BAT I (15Ü)		BAT 1a (E15)		BAT Ib (E14)	
AWI	0	0	0	0	50	0	11,1	10	25,8	26,5
DESY	0	0	0	no data	5	0	11,8	5,6	15,1	8
DKFZ	6,3	7,1	24,3	no data	0	33,3	26,7	23,1	28,7	30,9
DLR	0	0	0	0	1,4	3,1	6,9	4,7	13,8	13,8
FZJ	0	2,6	0	no data	7,3	3,8	8,5	5,7	22,2	16,3
FZK	5	5	33,3	0	2,6	1,6	6,5	5	16,2	9,9
HZI	0	0	0	0	0	0	15,3	5,3	30,4	15,9
GFZ		0		0		0		15,5		7
GKSS	0	0	0	0	0	0	14,7	6,7	20,1	3,1
GSF	13,6	10	0	no data	14,3	7,1	19,4	16,7	34,9	24,3
GSI	0	0	0	no data	0	0	5	0	34	23,3
HMI	11,1	11	0	100	0	0	13	3,4	21,7	12,9
IPP	11,1	12,5	9,1	8,3	6,7	4,3	5,1	3	14,1	16,4
MDC	C4-C2= 8,3		C4-C2=8,3			14,3		25		30
UFZ	0	0	14,3	25	25	22,2	25	36,4	35,3	29,9

Centres involved improved numbers

*C4 corresponds to the payment of a Professor, C3 = Junior Professor, BAT I = Leading Scientist, BAT1a = Senior Scientist, BAT Ib = Scientist.

The table shows that from 2003 – 2007 many of the numbers have improved

Incidentally, the female scientists in the project Pallas Athene turned out to be good role models also in the sense of work-life-balance: many of them have children and are still successfully pursuing their careers. All of the 15 centres of the Helmholtz-Association provide child care facilities. Beyond that, we hope that Pallas Athene will have an impact on the conditions concerning the reconciliation of work and family life such as availability of the scientists taking care of their children, transparency of management decisions etc.

Altogether, over 40 events took place at different locations. The titles of the events stand for the scientific contents: e.g. “Skin cancer – some souvenirs stay forever”, “experiment gravitation biology”, “fusion – energy”, “quantum physics”.

6.2 Final Plan for using and disseminating the knowledge

Website	A website on the aims and of the events carried out in Pallas Athene exists: www.dkfz.de/de/pallas. Here the partners of the consortium reported on their different deliverables under the heading "Berichte/reports".
Brochures 1 - "Career opportunities for Women in Science" and 2 - "Science for Children – Energy and Fusion" ISBN-10: 3-00-019999-3	1 - On 80 pages the goals and results of the project are described. The brochure can be ordered at Deutsches Krebsforschungszentrum, Dr. Barbara Bertram M080, Im Neuenheimer Feld 280, 69120 Heidelberg 2 - The brochure of IPP describes on 18 pages small experiments on the topic „energy" , magnetism, and energy by fusion, the research topic of IPP .
CEWS	Contact to the Center of Excellence Women in Science (CEWS) exists to Jutta Dalhoff, Division Manager, and news of PA are spread in the monthly newsletter of CEWS
Helmholtz-Association	The Helmholtz-Association was regularly informed on the issues of PA by the coordinator and the equal opportunity officers of the Helmholtz Centres involved. The envisaged lecture series "Pallas Athene" shall perpetuate the goals of PA
European Platform of Women Scientists EPWS	The coordinator attended the first official meeting organised by EPWS (19/20.10.06) in Brussels. Allmut Hörmann attended the meeting in 2007 on April 27/28. Pallas Athene is an associate member of EPWS since 2007. Close contacts exist to Professor Adelheid Ehmke, Maren Jochimsen and Adelina Huminic of EPWS
Technik Diversity Chancengleichheit (Competence Area Higher Education, Science and Research)	The coordinator is director in the Competence Area Higher Education, Science and Research of the Competence Center Technology, Diversity, Equal Chances Bielefeld. Thus, a close contact to Professor Barbara Schwarze, the managing director of this center, was guaranteed. She is a member of numerous networks (e.g. of the Initiative D21, Europe's biggest Public Private Partnership) and helped in disseminating knowledge gathered in the project PA
EMBL Meeting "The Way Forward"	DESY's ambassador Dr. Karen Rickers gave a talk on the work of Pallas Athene and especially on the DESY project *physik.begreifen* within PA. Thus, there was a mutual profit of the Set Routes Ambassador programme and Pallas Athene, which will be continued
Publications	Höttecke, Dietmar (Hg.) (2007). Naturwissenschaftlicher Unterricht im internationalen Vergleich. Gesellschaft für Didaktik der Chemie und Physik, Jahrestagung in Bern 2006, Bd. 27, Münster: LIT- Verlag. Darin sind folgende Beiträge erschienen: • Rehm, M.: Berufsidentität im Lehramtsstudium, eine empirische Studie. S. 427-429 • Wellensiek, A. & Eysel, C.: Lehrerbildung und Spitzenforschung in Kooperation, zum gesellschaftlichen Integrationspotenzial des naturwissenschaftlichen Unterrichts, S. 430-432. • Lembens, A. & Eysel, C.: Schule, Lehrerbildung & Forschung: Ein Plädoyer für die Ermöglichung von Erfahrungslernen in Schulen und lehrerbildenden Hochschulen. S. 433-435 In: Naturwissenschaftliche Bildung im internationalen Vergleich. Gesellschaft für Didaktik der Chemie und Physik, Jahrestagung in Bern 2006, Bd. 27. Höttecke, Dietmar (ed.), 2007, Münster: LIT- Verlag.
place/time for final meeting	In Berlin (Spree Palais), the final meeting took place on Sept. 20, 2007

Person-Month Status Table

CONTRACT N°:	SAS6-CT-2006-017728			Partner - Person-month per Workpackage							AC - own staff				
ACRONYM:	Pallas Athene														
PERIOD:	P1	month 13 to month 24		**TOTALS**	**Coord. DKFZ**	Partic. 2 AWI	Partic. 3 DESY	Partic. 4 DLR	Partic. 5 GSF	Partic. 6 IPP	**AC TOTALS**	Partic. 3 DESY				**For AC contractors, in addition estimate the number of person-months of permanent staff**
Workpackage 1:	**Science Goes Public**	**Actual WP:**		**11,55**	1,05	8,4		2,1			**0**					
		Planned WP total:		**3**	1	1		1			**0**					
Workpackage 2:	**Women in Science - S for W**	**Actual WP:**		**3,6**					3,6		**0**					
		Planned WP total:		**2,1**					2,1		**0**					
Workpackage 3:	**KIDSBITS**	**Actual WP total:**		**0,39**						0,39	**0**					
		Planned WP total:		**1,2**						1,2	**0**					
Workpackage 4:	**physik.begreifen**	**Actual WP total:**		**1,8**			1,8				**4,5**	4,5				
		Planned WP total:		**6**			6				**0**					
Workpackage 5:	**Meetings**	**Actual WP total:**		**1**	1,0						**0**					
		Planned WP total:		**1**	1						**0**					
Workpackage 6:	**Management**	**Actual WP total:**		**1,22**	1,2						**0**					
		Planned WP total:		**1**	1						**0**					
		Actual total:		**19,56**	**3,27**	**8,4**	**1,8**	**2,1**	**3,6**	**0,39**	**4,5**	**4,5**				
Total Project Person-month		**Planned total:**		**14,3**	**3**	**1**	**6**	**1**	**2,1**	**1,2**	**0**	**0**				

Contractors

Partic. no.	Participant representatives and ambassadors	Participant name	Participant short name	Country
1	Dr. Barbara Bertram (coord.) PD Dr. Angela Risch Dr. Silvia Vosseler Dr. Stefanie Laufs	Deutsches Krebsforschungszentrum	DKFZ	Germany
2	Dr. Elke Plönjes Dr. Karen Rickers Dr. Ute Krell Dipl. Phys. Karen Ong Dipl. Phys. Simone Johnas Dr. Barbara Keitel Dr. Marion Kuhlmann Dr. Jenny List Dr. Christiane Risler Collaboration with Prof. Dr. Anneliese Wellensiek and Simone Abels (Universität Hamburg)	Deutsches Elektronen Synchrotron	DESY	Germany
3	PD Dr. Bilge Saruhan Dr. Marion Bartsch Dr. Gabi Karpinski Andrea Ebach Elke Rabbow Petra Frings	Deutsches Zentrum f. Luft- und Raumfahrt e.V. Inst. f. Werkstoff-Forschung	DLR	Germany
4	PD Dr. Annette Peters PD Dr. Michaela Aubele Dr. Hannelore Löwel Dr. Christa Meisinger PD Dr. Leticia Quintanilla-Fend PD Dr. Irmela Jeremias PD Dr. Petra Krämer PD Dr. Christine Falk PD Dr. Claudia Traidl-Hoffmann Dr. Andrea Huber Brösamle Dr. Marion Frankenberger Dr. Ingrid Beck-Speier	Forschungszentrum f. Umwelt u. Gesundheit GmbH	GSF	Germany
5	PD Dr. Elisabeth Wolfrum Dr. Petra Nieckchen Iris Eckl	MPI für Plasmaphysik	IPP	Germany
6	Prof. Dr. Angela Köhler-Günther Prof. Dr. Karen Wiltshire Dr. Anja Engel Dr. Claudia Hanfland	Alfred-Wegener-Institut für Polar- und Meeresforschung	AWI	Germany

Subcontractors of DKFZ (in WP1, Science goes public)

1	Dr. Anja Lembens Dr. Veronika Strittmatter-Haubold	All: Pädagogische Hochschule Heidelberg	PH	Germany
2	Dr. Rainer Greifeneder	Psychologist (Mannheim)		Germany

Summary of expected result at the end, potential impact

The final aims of Pallas Athene were to overcome the under-representation of women in scientific careers especially in higher positions, and to arouse the interest of the public and of younger people for Science. After the twp years pf the project, female scientists in the six centres of the Helmholtz-Association taking part in the project Pallas Athene are found in fact in higher numbers (table 1). Of course, the consortium is aware of the fact that the success of the project is difficult to measure, since e.g. “awareness of the public” and “empowerment of women” are not expressed by mere figures. However, it may be stated, that the measures taken aroused the interest of the public, as demonstrated in many articles, press releases etc.

Moreover, discussions and exchange of experiences concerning gender equality were promoted and are going on. Several presentations were offered in the DKFZ, e.g. a talk of the coordinator on the goals of Pallas Athene, invited by the *Deutsche Akademikerinnen Bund* (DAB) at September 29, 2006. Discussion rounds at DKFZ on gender equality and specific measures to strengthen women in science have been established, thus disseminating the aims of the project. A poster on the project Pallas Athene was presented at the Conference *“Exzellenz in Wissenschaft und Forschung – Neue Wege in der Gleichstellungspolitik”* of the Wissenschaftsrat at 28./29. Nov. 2006 in Cologne.

The ambassadors were invited to the Conference *Women in Science and Technology* in Vienna, May, 15/16, 2006. There the Ambassadors were interviewed by EU-Commissioner J. Potocnik. Shortly before the end of the project, the final event of the project took place on Sept. 20, 2007 in the Spree-Palais, the residence of the Helmholtz-Association. It had the title “Art in Science in Art”.
The project wants to draw the attention of the Helmholtz-Association centre heads and of the public to the scientists represented by the ambassadors, that they be installed in leading positions.
In October 2007 the coordinator and three other members of the consortium: Eva Viehoff (AWI), Ulrike Rachow (DLR) and Allmut Hörmann (GSF) had a meeting with Professor Mlynek, the president of the Helmholtz-Association. There Barbara Bertram presented the aims and scopes of Pallas Athene.

In order to find out how the principal players of Pallas Athene judge the outcome of this project, the ambassadors and the management of the 6 centers involved were interviewed. Six of the nine ambassadors answered the questions.
- 1) whether they reached a higher position after the end of PA: four said yes,
- 2) whether their influence/ their standing was better: 1 said yes, five said no, but

that they learned much in the programme, that they had a better network now and that in any case the cooperation in a EU-funded programme will adorn their CVs. From the 11 scientific and administrative heads of the six centers (one just recently took up her job and could not answer the questions) nine answered from 5 centers. The questions were
-1) Do you know the ambassadors in your centre personally? 3 said yes, 4 said partially, 2 said no
- 2 / - 3) Do you think that Pallas Athene can help to overcome the underrepresentation of women in leading positions and help the ambassadors to fill in a higher position? Only two said no, two thirds gave positive answers. All centre heads answered yes when asked: do strategies exist in your centre to bring women in higher positions.

Another goal of PA, described in the concept for research to accompany the project (Begleitforschung), is to contribute to teacher training in natural sciences ("Nature of Science", NoS). The subprojects *Science goes Public* and *grasp.physics* do especially address and are working together with schools and teacher training Institutes (Heidelberg University of Education and Faculty for Pedagogy, Psychology and kinesiology Hamburg University). In this context, the scientific design of Pallas Athene tried to relate the punctual interventions in schools presenting events like e.g. "Cigarettes tar the road to death – you're your decision for life and against smoking" with longer lasting measures in teacher training.

Similarly it attempted to interrelate these two approaches and to position them within the context of both higher-education didactics and science policy. Pallas Athene also took on its task to clarify which specific characteristics of the ambassadors as female role models are helpful in the dialogue with the public.

Several types of questionnaires have been designed to find out whether the interventions provided i) a transfer of knowledge to the pupils and ii) whether the teacher education students were more pedagogically or more scientifically oriented: 1) Questionnaires to be used by pupils before and after the respective intervention („prä": 27 in Heidelberg and 89 in Hamburg, „post": 16 in Heidelberg and 74 in Hamburg). 2) Questionnaires for teacher education students at eight different universities, used at the start and after the respective semester (before: 665 and after: 492). In all questionnaires an item battery was used to collect the epistemological theories ("culturalism of science"). The reliability test (Cronbach's Alpha: prä .30 and post .44) showed, that the items were not to be merged. In contrast, the knowledge test used in the pupils' questionnaires revealed a significant increase of knowledge already in the first interrogation round. An

assessment and evaluation of the data will follow when the total inquiry is finished.

In the students' questionnaires the item battery to assess the competence profiles (which competence profiles do teachers of natural sciences need) and their evaluation (how important is the competence in their eyes) showed a reliable answer at first go (Cronbach's Alpha prä: .87 (competence) und .76 (important). The increase in competence in the Pallas-group in Hamburg was significant at the first pass.

Conclusion: A double impact of the project Pallas Athene could be noticed in this context: On the one hand the pupils could develop a more realistic view of research and science and on the other hand the future teachers are gaining competence for the supply of appropriate teaching arrangements.

Networks:

The six representatives for equal opportunities of the consortium including the coordinator, are part of the special network of the Helmholtz-Association, the "Arbeitskreis Frauen in Forschungszentren (*akfifz*)".
The coordinator is director of the Competence Area Higher Education, Science and Research in the *Competence Center Technology, Diversity, Equal Chances* and is involved in the projects of this institution. Finally, since 2007, Pallas Athene is an associate member of the European platform women in science (EPWS).

State-of-the-Art

Many institutions offer programmes concerning teaching of younger people* in e.g.

- **Kinderuniversitäten (Childrens' Universities),** existing since 2002. Today more than 50 universities and polytechnics offer this kind of teaching. The aim is to awaken the interest of children for learning as such and to raise the enthusiasm of teachers and professors in knowledge transfer.
- **Science Labs**. These labs were founded in 2002 as private initiatives teaching especially Natural Sciences for younger people. They want to innovate the learning process in early childhood. Up to now ca. 12.000 children took part in Science Labs, supported by ca. 4.000 teachers and educators.
- **Helmholtz School labs.** The first Helmholtz school lab of 23 by now in the Helmholtz Association was founded 1997 at DESY. Many exciting experiments in the labs aim to inspire the next generation of scientists and researchers by communicating to young people an authentic picture of science and technology,

providing educational materials that enhance formal school instruction and consistently stimulating young people's enthusiasm for scientific inquiry. A few school labs provide training for school teachers.

- **Girls' Day.** Since the year 2000, technical enterprises, enterprises with technical departments and technical training facilities, universities and research centres organise once in a year an open day for girls - the Girls' Day.

Through a great variety of events young women are able to gain an insight into working life and get in touch with Human Resources Managers and personnel responsible for traineeships. For this purpose, the participating institutions open their laboratories, workshops and offices to give concrete examples that show girls how interesting and exciting this work can be. Employees are often personally available for discussions.

- **Sonnentaler (La main à la pâte).** This programme was invented in France in the year 1996 for pre- and primary schools. Its goal is the promotion of learning natural sciences by practical exploring.
- **IPN (Leibniz Institute for Science Education)**. The institute provides projects on learning Chemistry and Physics, e.g. Science Teachers Education, Gender Innovation and Mentoring in Mathematics and Science many other topics
- **Haus der kleinen Forscher ("Early Discovery Center")**, founded in 2006 by the Helmholtz-Community, Siemens, Hopp-Stiftung and McKinsey. This programme goes into day-care facilities to give children aged 3-6 the opportunity to experience nature and technology. The programme is sponsored by Dr. Annette Schavan, German Federal Minister for Education and Research.

Many of the ideas of these programmes are followed also in the projects of Pallas Athene. However, Pallas Athene emphasizes the transport of knowledge to be effected especially by female scientists for the reasons outlined above.

The goals and methods of SET Routes are comparable to those of Pallas Athene.

- **SET Routes**, a programme of EMBL, CERN and EMBO wants to encourage more girls and women to study Science, Engineering and Technology (SET) and to help them to bring forward their careers. For this purpose SET Routes educates school and university ambassadors (also sponsored in 6th Framework EU). It started in autumn 2006.

* The German journal "DER SPIEGEL" dedicated an extra issue (2007) "Schüler forschen. Expedition in die Wissenschaft" to this topic.

Conclusion:

The objectives of the project Pallas Athene were severalfold. At first the project was carried out in order to stimulate the participation of women in science and technology. Secondly, the project tried to arouse interest for Natural Sciences in young people and in the public. Thirdly, teacher students were involved in order to relate the punctual interventions of Pallas Athene in schools with longer lasting measures in teacher training.

Excellent female scientists were involved in the project as “Ambassadors for Women and Science”. They acted as role models for other women and for children encouraging them to go into science. Together with the teacher students they helped to implement higher education didactics and science policy in the curriculum of the students.

Finally, the ambassadors became “visible” and some of them already reached a higher position in her respective center.