Second Periodic Progress Report

and

Mid-Term Report

Network title: EUROPEAN SOLAR MAGNETISM NETWORK

Network short title: ESMN

Contract number: HPRN-CT-2002-00313

Commencement date of contract: November 1, 2002

Contract duration: 48 months

Period covered by this report: November 1, 2003 – October 31, 2004 plus Mid-Term overview

Network coordinator: Robert J. Rutten

Organisation: Universiteit Utrecht

Address: Sterrekundig Instituut, Postbus 80 000, NL-3508 TA, Utrecht, The Netherlands

Telephone: +31-30-2535226/5200

Fax: +31-30-2535201

Email: R.J.Rutten@astro.uu.nl

Part A – Research results

A.1 Scientific Highlights

Overview: in its second year the *European Solar Magnetism Network* again fared very well. Nine ESMN Fellows are at work; seven of the eight hiring partners reached or surpassed the halfway mark in their contractual person-month delivery (see totals in the summary table on page 22, Fellow specifications in the team tables on page 9 ff). The outlook is that the ESMN will easily deliver the contract volume of Fellow training, if not more. The ESMN science production, specified by the list of ESMN-acknowledging publications on pages 4 ff, grew as expected. The various telescope developments progressed very well. The number of collaborative observing campaigns again exceeded the projected number significantly. The second ESMN school took place, the third one is on track and fully booked. The ESMN members met at many occasions. Most ESMN Fellows visited partners and many already presented their research at conferences.

The second ESMN year began as spectacularly as the first one ended. As if to celebrate the changeover on November 1, 2003, the Sun featured three unusually large sunspot groups around this date which produced a dozen large flares including the strongest yet recorded, together with numerous Earth-directed mass ejections and proton storms. The resulting failures in power and communication systems brought much attention to the ESMN study object – our not-so-quiet magnetic star[1].

Another peak in public attention was reached on June 8, 2004 during the first Venus transit in 122 years. Very high interest levels were reached all over Europe, with much collaboration between ESMN institutes and ESO to furnish European-wide web serving, interest channelling, and science outreach[2].

Additional high-visibility outreach occurred through the July 2004 issue of National Geographic Magazine. It featured articles on the sun displaying SST and SOHO imagery from partners KVA, UiO, and ESA.

The solar images from the SST also earned KVA scientist-in-charge G.B. Scharmer the 7th Lennart Nilsson Award (see URL http://www.rit.edu/~mrppph/nilsson/scharmer/scharmer.html) for recognition of extraordinary scientific photography phrased as: “Scharmer has succeeded in making visible what was previously hidden from us. His unique close-up images of the sun combine research of outstanding quality with aesthetic beauty”.

The remainder of this section lists a few less publicly visible highlights, selected from the large variety of ESMN advances. The list is necessarily incomplete and aims only to illustrate the spread of ESMN activities and collaborations.

[1] For example, wiping out all previous SOHO web traffic records. The new ones set in this period are, in numbers of requests and volume of data served: monthly 31 million/4.3 TB, weekly 16 million/2.6 TB, daily 4.8 million/0.7 TB, and hourly 0.4 million/33 GB, where the daily and hourly records were bandwidth limited.

[2] For example, the ESMN-operated Dutch portal for this event received close to 18 million hits on June 8 itself, serving 110 GB of DOT images to a hundred thousand unique visitors.

A major publication highlight is the appearance in print of the 900-page monograph *Polarization in Spectral Lines* by E. Landi Degl'Innocenti and M. Landolfi (OAA) in Kluwer's Astrophysics and Space Science Library (volume 307). This long-awaited book will be the principal reference in astrophysical and laboratory spectropolarimetry for years to come. Although its writing was not an ESMN effort (in fact preceeding the network by many years), this book is quite pertinent to fulfilling ESMN goals.

One ESMN campaign to highlight out of many was the July one bringing young AISAS researchers on ESMN and OPTICON funding to the Canary Islands to combine observations with the VTT, DOT, SOHO and TRACE. They collected quiet and active-sun spectra at the diffraction limit of the VTT thanks to good seeing and the new adaptive optics system, catching a flare both in Hα and in EUV lines with SOHO. Such exciting "hands-on training" is a key asset in promoting science career choices.

The GREGOR development remains on schedule (AIP with other German institutes and AsU, IAC, UU). AIP produced the mirror mounts; a new polarimeter is under construction. The IAC designs the spectrograph and will install an upgrade of its Tenerife Infrared Polarimeter (TIP). The image derotator developed by AsU will soon be tested at Ondřejov Observatory and mounted at Tenerife. The GREGOR dome follows the DOT folding-clamshell design; its successful installation at Tenerife, with experts from UU and Delft (Netherlands) where the dome was constructed under UU supervision, was celebrated with a festive ceremony in July.

At the SST the new spectrograph saw first light in June and commenced regular observations in September. KVA and IAC collaborate in its expansion into a spectropolarimeter and also made progress into building an imaging Fabry-Perot polarimeter for the SST. Lockheed-Martin (USA) refurbished its tunable SOUP filter for use at the SST. These industrial American colleagues also obtained a NASA grant for co-pointed deployment of the SST and DOT. Phase-diverse image restoration used to be a KVA speciality but is now also pursued at UiO, AsU and IAC in various ESMN collaborations using SST images.

The DOT team successfully bid for funding continuation throughout the ESMN duration and started "Open-DOT" time allocation by an international selection committee including the KVA and ESA scientists-in-charge. The Hα channel of the multi-wavelength DOT imaging and speckle registration system, using a tunable Lyot filter, was completed; the initial observations are very promising. The advanced DOT speckle processing computer cluster was installed, after having been shown by the manufacturer at the CeBIT fair in Hannover as state-of-the-art water-cooled multi-processor hardware. The parallel speckle reconstruction code is in the debugging phase.

The OAA's IBIS became regularly available to the worldwide community at the Dunn Solar Telescope in the USA. OAA collaborates with the IAC team on the polarimetric characterisation of this advanced multi-Fabry-Perot magnetometer.

A new stochastic polarised radiative transfer approach based on artificial neural networks was developed together with a Stokes inversion code in a collaboration between AIP and IAC. A similar AIP collaboration on the 3-D magnetic structure of flaring loops through nonlinear force-free field extrapolation involved several members of the sister RTN-network PLATON.

The IAC's TIP at the German VTT was used to obtain the first spectropolarimetric observations of chromospheric spicules in the He I 1083 nm lines. Modeling of the observed Hanle and Zeeman effects allows to infer both the strength and the orientation of the magnetic field which channels spicular motions (IAC + OAA).

A new project "Solar Turbulence" at the International Space Science Institute in Bern includes members of ELTE, ESA and OP. It is well underway to produce a comprehensive review of the subject including a unified model to explain turbulence spectra in the solar wind.

The long-standing collaboration between OP and AsU on filaments and flares now involves the OP ESMN Fellow. An estimation of filament mass content using multi-telescope data confirms that filaments provide the matter for coronal mass ejections. Space data, especially from the new RHESSI mission, show that even in the late phases of a flare non-thermal electrons play an important role in producing flare ribbons.

Sometimes ESMN highlights hark back to the ESMN's previous incarnation, the *European Solar Magnetometry Network*. A principal one was the PhD defence of Boris Gudiksen, former ESMN-1 Fellow, in March 2004 at Stockholm. His thesis is widely seen as a major step forward in understanding the coronal heating problem. Boris is now postdoc at UiO on non-ESMN funding.

A.2 Joint Publications and Patents

The ESMN publications which appeared during the second ESMN year are listed here in alphabetical order. The list contains:

- ESMN-acknowledging multi-partner papers
- ESMN-acknowledging single-partner papers from ESMN Fellows
- ESMN-acknowledging single-partner papers from New-Member-state partners ("Associated-State" partners from Eastern Europe in FP5 context).

The latter are added to show the ESMN affinity of the three partners without ESMN Fellow funding. All listed papers acknowledge the ESMN, but for a few this is actually the previous ESMN incarnation since they are due to ESMN-1 Fellows, as specified. These are added since the ESMN-1 addressed similar science and tasks and because these papers originated directly from ESMN funding. Some ESMN-2 papers are not yet in print but are expected to be so by November 1, 2004, as specified. The ESMN-2 papers that are expected to appear in print after November 1, 2004 will be listed in the Year 3 report.

The ESMN papers published during the first ESMN year were listed, using the same format and selection criteria, on pages 4–6 of the First Periodic Report.

All papers in regular astronomy journals (*Astronomy & Astrophysics, Astrophysical Journal, Astrophysical Journal Letters, Solar Physics*) can be accessed at URL http://adsabs.harvard.edu/default_service.html/ by simply entering an author's name. The same holds for many proceedings papers.

There were no patent applications or awards.

Balthasar, H. and Collados, M.: 2004, "Some properties of an isolated sunspot", *Astronomy & Astrophysics* in press (October)

- *Balthasar: AIP; Collados: IAC*
- *Objectives (a), (b), (c), (f)*

Bellot Rubio, L. R., Balthasar, H., and Collados, M.: 2004, "Two magnetic components in sunspot penumbrae", *Astronomy & Astrophysics* in press (October)
- *Balthasar: AIP; Collados: IAC*
- *Objectives (a), (b), (f)*

Berlicki, A. and Heinzel, P.: 2004, "Soft X-ray heating of the solar chromosphere during the gradual phase of two solar flares", *Astronomy & Astrophysics* **420**, 319–331
- *Berlicki: OP Fellow; Heinzel: AsU*
- *Objectives (b), (e), (f)*

Berlicki, A., Schmieder, B., Vilmer, N., Aulanier, G., and Del Zanna, G.: 2004, "Evolution and magnetic topology of the M 1.0 flare of October 22, 2002", *Astronomy & Astrophysics* **423**, 1119–1131
- *Berlicki: OP Fellow; Schmieder, Vilmer, Aulanier: OP*
- *Objectives (a), (b), (d), (e)*

Bonet, J. A., Márquez, I., Muller, R., Sobotka, M., and Tritschler, A.: 2004, "Phase diversity restoration of sunspot images. I. Relations between penumbral and photospheric features", *Astronomy & Astrophysics* **423**, 737–744
- *Bonet, Márquez: IAC; Sobotka: AsU*
- *Objectives (a), (b), (d)*

Derouich, M., Malherbe, J. M., Bommier, V., Landi degl'Innocenti, E., and Sahal-Bréchot, S.: 2004, "Second solar spectrum observed at the Pic-du-Midi: depth probing of the turbulent magnetic field intensity in a quiet region.", in F. Combes, D. Barret, T. Contini, F. Meynadier, and L. Pagani (Eds.), *SF2A-2004: Semaine de l'Astrophysique Francaise*, Conference Series, EdP Sciences, 346
- *Malherbe, Bommier: OP; Landi degl'Innocenti: OAA*
- *Objectives (a), (f)*

Forgács-Dajka, E., Major, B., and Borkovits, T.: 2004, "Long-term variation in distribution of sunspot groups", *Astronomy & Astrophysics* **424**, 311–315
- *Forgács-Dajka, Major: ELTE*
- *Objectives (a), (b), (f)*

Forgács-Dajka, E., Petrovay, K., and Erdélyi, R. (Eds.): 2003, *Contributions on Turbulence, Waves and Instabilities in the Solar Plasma*, Publications of the Astronomy Department of Eötvös University, No. 13, Budapest
- *Forgács-Dajka, Petrovay: ELTE*
- *Objectives (a), (b), (c), (f)*

Gömöry, P., Rybák, J., Kucera, A., Curdt, W., and Wöhl, H.: 2004, "On Mutual Relation Among the Outer Atmospheric Layers in Network: SOHO/CDS Study", in *Proceedings SOHO 13 Workshop*, ESA Special Publication SP-547, 303–306
- *Gömöry, Rybák, Kučera: AISAS*
- *Objectives (b), (c)*

Gudiksen, B. V.: 2004, *The coronal heating problem*, Ph.D. Thesis Stockholm University
- *Boris Gudiksen: ESMN-1 KVA Fellow*
- *Objectives (c), (f)*

Koza, J., Kučera, A., BEllot Rubio, L., Rybák, J., Hanslmeier, A., and Wöhl, H.: 2004, "Velocity field in the intergranular atmosphere", *Hvar Observatory Bulletin* **28**, 19–26
- *Koza, Rybák, Kučera: AISAS*
- *Objectives (a), (f)*

Langhans, K., Schmidt, W., and Rimmele, T.: 2004, "Diagnostic spectroscopy of G-band brightenings in the photosphere of the sun", *Astronomy & Astrophysics* **423**, 1147–1157
- *Kai Langhans: KVA Fellow*

• *Objectives (a), (d)*

Manso Sainz, R., Landi Degl'Innocenti, E., and Trujillo Bueno, J.: 2004, "Concerning the Existence of a "Turbulent" Magnetic Field in the Quiet Sun", *Astrophysical Journal Letters* **614**, 89–91
• *Manso Sainz, Trujillo Bueno: IAC; Landi Degl'Innocenti: OAA*
• *Objectives (d), (f)*

McIntosh, S. W., Fleck, B., and Judge, P. G.: 2003, "Investigating the role of plasma topography on chromospheric oscillations observed by TRACE", *Astronomy & Astrophysics* **405**, 769–777
• *McIntosh: ESA ESMN-1 Fellow; Fleck: ESA*
• *Objectives: (a), (b)*

Régnier, S. and Amari, T.: 2004, "3D magnetic configuration of the Hα filament and X-ray sigmoid in NOAA AR 8151", *Astronomy & Astrophysics* **425**, 345–352
• *Régnier: ESA Fellow*
• *Objectives (b), (f)*

Régnier, S. and Canfield, R. C.: 2004, "Energetics of Flares: How is the Magnetic Energy Stored and Released?", in *SOHO 15 Coronal Heating*, ESA-SP 575
• *Régnier: ESA Fellow*
• *Objectives: (b), (f)*

Régnier, S. and Fleck, B.: 2004, "Magnetic Field Evolution of AR 0486 before and after the X17 flare on October 28, 2003", in *SOHO 15 Coronal Heating*, ESA-SP 575
• *Régnier: ESA Fellow*
• *Objectives: (b), (f)*

Rouppe van der Voort, L. H. M., Löfdahl, M. G., Kiselman, D., and Scharmer, G. B.: 2004, "Penumbral structure at 0.1 arcsec resolution. I. General appearance and power spectra", *Astronomy & Astrophysics* **414**, 717–726
• *Rouppe van der Voort: UiO Fellow; Löfdahl, Kiselman, Scharmer: KVA*
• *Objectives (a), (b)*

Rutten, R. J., de Wijn, A. G., and Sütterlin, P.: 2004a, "DOT tomography of the solar atmosphere II. Reversed granulation in Ca II H", *Astronomy & Astrophysics* **416**, 333–340
• *Suetterlin: ESMN-1 UU Fellow*
• *Objectives (a), (c)*

Rutten, R. J., Hammerschlag, R. H., Bettonvil, F. C. M., Sütterlin, P., and de Wijn, A. G.: 2004b, "DOT tomography of the solar atmosphere I. Telescope summary and program definition", *Astronomy & Astrophysics* **413**, 1183–1189
• *Suetterlin: ESMN-1 UU Fellow*
• *Objectives (d), (e)*

Rybák, J., Bendik, P., Temmer, M., Veronig, A., and Hanslmeier, A.: 2004a, "Merging two data sets of hemispheric sunspot numbers", *Hvar Observatory Bulletin* **28**, 63–70
• *Rybák: AISAS*
• *Objective (b)*

Rybák, J., Kucera, A., Curdt, W., and Wöhl, H.: 2004b, "On Relations among the Calibrated Parameters of the Transition Region Spectral Line", in *Proceedings SOHO 13 Workshop*, ESA Special Publication SP-547, 311–314
• *Rybák, Kučera: AISAS*
• *Objective (c)*

Rybák, J., Wöhl, H., Kučera, A., Hanslmeier, A., and Steiner, O.: 2004c, "Indications of shock waves in the solar photosphere", *Astronomy & Astrophysics* **420**, 1141–1152
• *Rybák, Kučera: AISAS*
• *Objectives (a), (c), (f)*

Sánchez Cuberes, M., Puschmann, K., and Wiehr, E.: 2004, "Spectro-polarimetry of a sunspot at disk

center", *Astronomy & Astrophysics* in press (October)
• *Sánchez Cuberes: AIP Fellow*
• *Objectives (a), (b), (f)*

Schmieder, B., Lin, Y., Heinzel, P., and Schwartz, P.: 2004, "Multi-wavelength study of a high-latitude EUV filament", *Solar Physics* **221**, 297–323
• *Schmieder: OP; Heinzel, Schwartz: AsU*
• *Objectives (b), (e)*

Schwartz, P., Heinzel, P., Anzer, U., and Schmieder, B.: 2004, "Determination of the 3D structure of an EUV-filament observed by SoHO/CDS, SoHO/SUMER and VTT/MSDP", *Astronomy & Astrophysics* **421**, 323–338
• *Schwartz, Heinzel: AsU; Schmieder: OP*
• *Objectives (b), (f)*

Sobotka, M., Bonet, J., Márquez, I., Muller, R., and Roudier, T.: 2004, "Motions of photospheric features in a sunspot moat", *Hvar Observatory Bulletin* **28**, 27–36
• *Bonet, Márquez: IAC; Sobotka: AsU*
• *Objective (a)*

Socas-Navarro, H., Trujillo Bueno, J., and Landi Degl'Innocenti, E.: 2004, "Signatures of Incomplete Paschen-Back Splitting in the Polarization Profiles of the He I λ10830 Multiplet", *Astrophysical Journal* **612**, 1175–1180
• *Trujillo Bueno: IAC ; Landi degl'Innocenti: OAA*
• *Objective (f)*

Socas-Navarro, H., Martínez Pillet, V., Sobotka, M., Vázquez, M: 2004, "The thermal and magnetic structure of umbral dots from the inversion of high-resolution full Stokes observations", *Astrophysical Journal* in press (October)
• *Martínez Pillet, Vázquez: IAC; Sobotka: AsU*
• *Objectives (a), (d), (f)*

Temmer, M., Veronig, A., Rybák, J., Brajša, R., and Hanslmeier, A.: 2004a, "Importance of magnetically complex active regions on solar flare occurence", *Hvar Observatory Bulletin* **28**, 95–102
• *Rybák: AISAS*
• *Objective (b)*

Temmer, M., Veronig, A., Rybák, J., Brajša, R., and Hanslmeier, A.: 2004b, "On the 24-day period observed in solar flare occurrence", *Solar Physics* **221**, 325–335
• *Rybák : AISAS*
• *Objective (b)*

Tomasz, F., Rybák, J., Kucera, A., Curdt, W., and Wöhl, H.: 2004, "SUMER/SOHO and TRACE Study of the Transition Region Blinker", in *Proceedings SOHO 13 Workshop*, ESA Special Publication SP-547, 307–310
• *Tomasz, Rybák, Kučera: AISAS*
• *Objectives (b), (c)*

Trujillo Bueno, J., Shchukina, J., and Asensio Ramos, A.: 2004, "A Substantial Amount of Hidden Magnetic Energy in the Quiet Sun", *Nature* **430**, 326–329
• *Trujillo Bueno: IAC; Asensio Ramos: OAA Fellow*
• *Objectives (a), (c), (d), (f)*

Tsiropoula, G. and Tziotziou, K.: 2004, "The role of chromospheric mottles in the mass balance and heating of the solar atmosphere", *Astronomy & Astrophysics* **424**, 279–288
• *Tziotziou: UU Fellow*
• *Objectives (a), (b), (f)*

Tziotziou, K., Tsiropoula, G., and Mein, P.: 2004, "On the nature of the chromospheric fine structure. II. Intensity and velocity oscillations of dark mottles and grains", *Astronomy & Astrophysics* **423**, 1133–

1146
- *Tziotziou: UU Fellow; Mein: OP*
- *Objectives (a), (b), (f)*

Part B – Comparison with the Joint Programme of Work

B.1 Research Objectives

The ESMN research objectives remain as defined in Section B.1 of Annex I of the contract. They remain relevant and achievable.

B.2 Research Method

There is no change in the ESMN research methods as defined in Section B.2 of Annex I of the contract. The Canary Island telescopes, SOHO, polarimetric diagnostics, and numerical modelling together remain the methodological ESMN backbone. The GCT (German Gregory Coudé Telescope on Tenerife) was already taken out of service during Year 1. Its replacement by GREGOR progresses on schedule.

B.3 Work Plan

The ESMN *task definition* remains as specified in Section B.3 of Annex I of the contract, also the task breakdown in the table given there.

The *schedule and milestone delivery* are very well on track. The status of all milestones defined for the mid-term review is (at the time of writing, over a month before the actual review but where possible extrapolating to the end of ESMN Year 2 = October 31) is:

- *young researchers hired*: nine ESMN Fellows are at work, effectively already one more than anticipated in the contract. In addition, there is a postdoc opening at IAC. This "surplus" (not literally, the ESMN would love to hire more Fellows) results from predoc hiring as agreed upon earlier, from differences between budgeted and actual salaries, and from anticipated personnel changes. The projection is that the ESMN will easily fulfil its contract obligation of supplying 240 person-months of Fellow effort.
- *gender aspects positive*: three of the present ESMN Fellows are female. Half of the 35 students who will participate in the Third ESMN School at Tatranská Lomnica are female, setting a record in solar physics if not for all of astronomy.
- *initial results in hand and joint publications on science objectives (a) – (c) in print or in press, including international presentations*: as demonstrated in the Year-1 publication list in the First Periodic Report and the list above for Year 2. The number of papers from ESMN-2 Fellows is still likely to grow at increasing rate in view of the backlog between actual research and eventual publication.
- *demonstrated progress in implementation objectives (d) – (f)*: vigorously pursued with much progress in hardware development at all telescopes (d), many more collaborative campaigns than originally anticipated (e), and new initiatives in numerical data inversion and simulation (f).

- *effective multi-telescope campaign coordination*: obvious from the large number of successful campaigns. An example is the current preparation for campaign "The Three-Dimensional Structure and Dynamics of Sunspots" led by AIP and scheduled as CCI International Time Project for November. It involves THEMIS, VTT, SST, and DOT on the Canary Islands, the SOHO and TRACE in space, and also telescopes at OP and in the US, with a team totalling 17 ESMN members including 6 ESMN-2 Fellows and one ESMN-1 Fellow (now in the US).
- *multi-telescope campaigns completed and successful*: see list on page 14 and the corresponding list on page 12 of the Year-1 report.
- *summer/winter schools completed and successful*: two are done, the third one takes place in November (and became fully booked even before the school poster found its way across Europe).
- *technological, observing and analysis training given*: in extenso, with the upcoming campaign described above in which 6 Fellows participate a good example. Most ESMN Fellows participate in all three activities.
- *industrial training started*: some Fellows participate in hardware development involving industrial contacts including Lockheed-Martin (KVA, UiO).
- *effective networking between partners*: as specified by the multi-partner publications above, the Fellow travel lists on pages 16 ff, and the activity matrix on page 21.
- *presentation training successful*: many ESMN Fellows presented their work at international conferences (see their travel lists on pages 16 ff) and participated in public outreach.
- *public outreach effectuated*: not only during major media events such as the Venus transit but also at other times there is much outreach effort. The famous Astronomy Picture of the Day at URL http://antwrp.gsfc.nasa.gov/apod/astropix.html showed SST images on June 10 and August 2, SOHO images on October 29, 2003, March 30 and September 25, 2004. Many ESMN members including Fellows give public lectures on astronomy and write popular-science articles.

The *research effort of the participants* is detailed in the team tables below. In continuation of the reporting practice developed in consultation with the program officer during ESMN-1, these tables split the effort over individual researchers identified by name and include specification of funding sources.

UU (Utrecht)

Name	Position	Funding	Year 1	Year 2	Total
Felix Bettonvil	Engineer	NWO/UU	9	10	19
Rob Hammerschlag	Staff Engineer	UU	9	8	17
Jorrit Leenaarts	PhD Student	UU	1	4	5
Rob Rutten	Senior Scientist	UU	6	5	11
Pit Sütterlin	Post Doc	NWO/UU	10	10	20
Kostas Tziotziou	Post Doc	ESMN	8	12	20
Alfred de Wijn	PhD Student	UU	7	5	12
7			50	54	104

NWO = Nederlandse Organisatie voor Wetenschappelijk Onderzoek
ASTRON = The Netherlands Foundation for Research in Astronomy

IAC (La Laguna)

Name	Position	Funding	Year 1	Year 2	Total
Andrés Asensio Ramos	PhD Student	IAC	6	8	14
Jose Antonio Bonet	Senior Scientist	IAC	3	4	7
Manolo Collados Vera	Professor	ULL	6	4	10
Rafael Manso Sainz	Post Doc	IAC	6	2	8
Valentin Martínez Pillet	Senior Scientist	IAC	3	2	5
Laura Merenda	Pre Doc	ESMN	8	12	20
Ines Rodriguez Hidalgo	Associate Professor	ULL	3	3	6
Basilio Ruiz Cobo	Professor	ULL	3	4	7
Jorge Sánchez Almeida	Senior Scientist	IAC	6	7	13
Javier Trujillo Bueno	Senior Scientist	CSIC	6	6	12
10			50	52	102

CSIC = Consejo Superior de Investigaciones Científicas
ULL = University of La Laguna

OAA (Florence)

Name	Position	Funding	Year 1	Year 2	Total
Andrés Asensio Ramos	Post Doc	MIUR/ESMN	0	4*	4
Gianna Cauzzi	Research Astronomer	OAA/MIUR/CNR	5	7	12
Fabio Cavallini	Associate Astronomer	OAA/MIUR	8	8	16
Ambretta Falchi	Associate Astronomer	OAA/MIUR	4	2	6
Cristina Gabellieri	PhD student	UF	0	4	4
Katja Janssen	Postdoc	ESMN	2	12	14
Egidio Landi Degl'Innocenti	Professor	UF/MIUR	8	8	16
Marco Landolfi	Astronomer	OAA	6	6	12
Rafael Manso Sainz	Postdoc	MIUR	2	0	2
Kevin Reardon	Graduate Researcher	OAA	8	4	12
10			43	55	98

UF = University of Florence
MIUR = Ministero Istruzione Universitá e Ricerca
CNR = Consiglio Nazionale delle Ricerche
* two months on MIUR funding, two months as ESMN Fellow

UiO (Oslo)

Name	Position	Funding	Year 1	Year 2	Total
Mats Carlsson	Professor	UiO	8	8	16
Oddbjørn Engvold	Professor	UiO	1	1	2
Astrid Fossum	PhD Student	NFR	12	10	22
Boris Gudiksen	Post Doc	NFR	0	6	6
Viggo Hansteen	Professor	UiO	6	6	12
Andrew McMurry	Post Doc	NSF	11	0	11
Michiel van Noort	Post Doc	NFR	12	10	22
Luc Rouppe van der Voort	Post Doc	ESMN	8	12	20
Saadatnejad Bard	PhD Student	UiO/NFR	12	10	22
9			70	63	133

NFR = Norsk Forskningsråd
NSF = National Science Foundation

KVA (Stockholm)

Name	Position	Funding	Year 1	Year 2	Total
Peter Dettori	Science Engineer	KVA	10	10	20
Boris Gudiksen	PhD student	KVA	10	4	14
Dan Kiselman	Research Associate	KVA	6	6	12
Kai Langhans	Post Doc	ESMN	5	10	15
Mats Löfdahl	Research Associate	KVA	5	5	10
Gautam Narayan	PhD student	KVA/SU	0	4	4
Göran Scharmer	Professor	KVA	8	8	16
7			44	47	91

SU: Stockholm University
At the time of writing ESMN Fellow Kai Langhans is on paternal leave (twins!).
ESMN-1 Fellow Boris Gudiksen obtained his PhD and went to UiO on other funding.

AIP (Potsdam)

Name	Position	Funding	Year 1	Year 2	Total
Kurt Arlt	Computer Engineer	AIP	0	3	3
Horst Balthasar	Scientist	AIP	8	8	16
Thorsten Carroll	Post Doc	AIP	0	4	4
Axel Hofmann	Scientist	AIP	7	6	13
Emil Popow	Scientist/Engineer	AIP	0	2	2
Jürgen Rendtel	Scient. Assistant	AIP	4	4	8
Monica Sánchez Cuberes	Post Doc	ESMN	6	12	18
Jürgen Staude	Professor	AIP	3	4	7
Gherardo Valori	Post Doc	AIP	0	4	4
9			28	47	75

OP (Paris)

Name	Position	Funding	Year 1	Year 2	Total
Guillaume Aulanier	Scientist	OP	5	5	10
Arkadiusz Berlicki	Post Doc	ESMN	9	12	21
Veronique Bommier	Scientist	CNRS	3	2	5
Pascal Démoulin	Scientist	OP	3	4	7
Jean Claude Hénoux	Senior Scientist	retired	3	1	4
Jean Marie Malherbe	Senior Scientist	OP	6	5	11
Nicole Mein	Senior Scientist	Paris VII	5	4	9
Pierre Mein	Senior scientist	retired	5	4	9
Etienne Pariat	PhD student	EN Lyon	2	2	4
Brigitte Schmieder	Senior Scientist	OP	10	11	21
Lidia van Driel-Gesztelyi	Senior Scientist	UCL	1	5	6
Nicole Vilmer	Senior scientist	CNRS	4	4	8
12			56	59	115

CNRS: Centre National de la Recherche Scientifique
Paris VII: Université Paris VII
EN Lyon: Ecole Normale supérieure de Lyon
UCL: University College London

ESA (Noordwijk/Greenbelt)

Name	Position	Funding	Year 1	Year 2	Total
Danielle Bewsher	ESA Research Fellow	ESA	9	10	19
Paal Brekke	Scientist	ESA	2	2	4
George Dimitoglou	Computer Scientist	ESA	2	0	2
Bernhard Fleck	Scientist	ESA	3	3	6
Bernard Foing	Scientist	ESA	1	1	2
Stein Haugan	Scientist	ESA	4	4	8
Scott McIntosh	ESA Research Fellow	ESA	4	0	4
Stephane Régnier	Post Doc	ESMN	0	9	9
Luis Sanchez	Scientist	ESA	2	2	4
9			27	31	58

Most of the ESA team resides at the SOHO Experimenters Operations Facility at the Goddard Space Flight Center.

AsU (Ondřejov)

Name	Position	Funding	Year 1	Year 2	Total
Pavel Ambrož	Senior Scientist	AsU	5	5	10
Petr Heinzel	Senior Scientist	AsU	4.5	4.5	9
Jan Jurčák	PhD Student	AsU	3	3	6
Marian Karlický	Senior Scientist	AsU	2	3	5
Jana Kašparová	PhD Student/Post Doc	AsU	3	3	6
Miroslav Klvaňa	Senior Scientist	AsU	5	5	10
Pavel Kotrč	Senior Scientist	AsU	5	5	10
Pavol Schwartz	Postdoc	AsU	0	4	4
Michal Sobotka	Senior Scientist	AsU	5	5	10
9			32.5	37.5	70

AISAS (Tatranská Lomnica)

Name	Position	Funding	Year 1	Year 2	Total
Katarína Brčeková	PhD Student	AISAS	8	3	11
Peter Gömöry	PhD Student	AISAS	6	8	14
Július Koza	Scientist	AISAS	8	9	17
Aleš Kučera	Senior Scientist	AISAS	4	3	7
Ján Rybák	Senior Scientist	AISAS	4	4	8
Július Sýkora	Senior Scientist	AISAS	3	3	6
František Tomasz	PhD Student	AISAS	6	8	14
7			39	38	77

ELTE (Budapest)

Name	Position	Funding	Year 1	Year 2	Total
Balázs Major	PhD Student	ELTE	6	12	18
Kristóf Petrovay	Associate professor	ELTE	5	7	12
Emese Forgács-Dajka	PhD Student/Post Doc	ELTE	6	6	12
Dániel Marik	PhD student	ELTE	5	0	5
Ágnes Kóspál	PhD student	ELTE	0	2	2
5			22	27	49

B.4 Organisation and Management

The ESMN *organisation and management* adheres to the practices specified in Section B.4 of Annex I of the contract. The administration and reporting are web-based, the selection and hiring of Fellows went fully by email. Ing. Pieter Thijssen of the UU Finance Department controls the financial administration. Planning meetings take place during international conferences and collaborative campaigns (listed below).

The *result dissemination* is primarily through the major refereed international journals and conference proceedings, as evident from the ESMN publication lists in this report, the previous one, and in future reports. The travel lists below show at which meetings Fellows and New-Member-State partners have represented and presented the ESMN.

As to *non-EU travel*, no ESMN Fellow has so far travelled to ESA's experimenters facility at the Goddard Space Flight Center, USA, which is deemed approved in the Contract. Nor has prior approval been sought to fund other outside-EU travel. It is the ESMN's policy that non-ESMN funding is used for all such travel.

ESMN websites:
main site: URL http://esmn.astro.uu.nl
outreach site: URL http://www.astro.uio.no/~rouppe/esmn
1st school: URL http://www.astro.uio.no/school-03
2nd school: URL http://www.iac.es/winschool2003/info.html
3rd school: URL http://esmn2004.astro.uu.nl

The lists in the remainder of this section hold for Year 2. Corresponding lists for ESMN Year 1 are give on pages 11–16 of the First Periodic Report.

ESMN Schools

- The second ESMN school was integrated into the XVth Canary Island Winter School, making it part of this prestigious sequence (just as was the case for the second school of the ESMN-1 network). The school title was "*Mission and Payload Definition in Space Sciences*". The program covered a wide range of space astrophysics including much emphasis on solar particle detection and the SOHO mission. It took place on Tenerife November 17–28, 2003. There were 75 students from 19 different countries, including ESMN partner institutes. More detail is given at URL http://www.iac.es/winschool2003.
- The third ESMN school is titled "Solar Magnetometry and Solar Magnetism" and is organised by UU and AISAS to take place at Tatranská Lomnica during November 3–10, 2004. The eleven ESMN scientists-in-charge constitute the school teachers. The website is at URL http://esmn2004.astro.uu.nl. The school is fully booked. It is held sooner than originally anticipated because the ESMN hired most of its complement of Fellows sooner than anticipated, so that the Network will effectively outlast most of its hirings. Since it makes less sense to organise this school when most Fellows have left already it was moved forward and now coincides with the ESMN Mid-Term Review which already brings all Fellows and scientists-in-charge together.

Collaborative ESMN observing campaigns

1. "Flaring activity and CMEs", October 20–29, 2003, THEMIS, partners OAA, OP
2. "Evolution of the magnetic field in solar active regions", November 24–30, 2003, THEMIS, partners OP, OAA
3. "Transverse magnetic field and second solar spectrum", December 1–13, 2003, THEMIS, partners OAA, OP
4. "Photospheric response to flares", February 1–10, 2004, IBIS (NSO/DST), TRACE, partners OP, OAA
5. "Dynamics of small-scale magnetic field structures", April 30 – May 14, 2004, combining SST, SOHO and TRACE, partners UiO, KVA, ESA

6. “Venus transit”, June 8, 2004, SST, DOT, VTT, THEMIS and very many smaller telescopes
7. “Solar network: variability and dynamics of the outer solar atmosphere”, MEDOC 13 = JOP 171, June 5–9, 2004, combining SOHO and TRACE, partners AISAS, ESA, UiO
8. “Spectroscopy of the solar photosphere”, July 8–15, 2004, VTT, DOT, SOHO, TRACE, partners UU, AISAS, ESA
9. “Onset and properties of umbral flashes”, July 20–28, 2004, THEMIS, Teide Observatory, Tenerife, Spain, partners UU, OP
10. “Moving magnetic features and associated events”, July 29–August 5, 2004, THEMIS, Ondřejov, SOHO, TRACE partners OAA, OP, AsU
11. “Chromospheric response to flux emergence”, August 5–11, 2004, THEMIS, Teide Observatory, Tenerife, Spain, partners UU, OP
12. “H-alpha observations of filaments in quiet and active regions”, August 16–28, 2004, SST, partners UiO, KVA
13. “Oscillations in prominences”, September 10–21, 2004, SST, DOT, partners KVA, UU
14. “Center-limb variation of photospheric bright points”, September 23 – October 1, 2004, SST, VTT, DOT, THEMIS, partners KVA, UU, OP
15. “Filaments and their environment”, October 5–15, 2004, DOT, THEMIS, VTT, OP telescopes at Meudon, Pic du Midi, NSO/DST, SOHO, TRACE, partners OP, UU
16. “Wave propagation through the solar atmosphere”, October 20 – November 1, 2003, combining SST, SOHO, TRACE, possibly DOT, partners UiO, KVA, ESA

ESMN planning meetings

The ESMN adheres to its policy to let collaboration-planning sessions take place at international conferences and workshops where ESMN members meet anyhow. In addition, there are many ESMN discussions taking place during bilateral visits not listed here because most of these are not ESMN-funded. However, ESMN-related partner visits by Fellows and New-Member-State partners are specified in their travel lists on page 16 ff. The overall ESMN traffic is summarised in the table on page 21.

1. at the GREGOR Project Meeting, Göttingen, Germany, November 13–14, 2003, partners AIP, AsU, IAC
2. at the meeting “European Participation in ATST”, Madrid, Spain, November 24, 2003, partners OAA, OP, UU, AISAS, IAC, KVA
3. at the MSDP workshop, Toulouse, France, December 11–14, 2003, partners UU, OP
4. at the GREGOR Project Meeting, Potsdam, Germany, March 9–12, 2004, partners AsU, AIP
5. at the 17-th Solar Meeting, Stará Lesná, Slovakia, May 24–28, 2004, partners AsU, AISAS
6. at the 204th AAS/SPD Meeting, Denver, USA, May 30 – June 3, 2004, partners UU, ESA

7. at IAU Symposium 223 “Multi-Wavelength Investigations of Solar Activity”, St. Petersburg, Russia, June 13–19, 2004, partners UU, UiO, OAA, AIP, OP, ESA, AISAS, ELTE
8. at the SPIE Conference “Astronomical Telescopes and Instrumentation”, Glasgow, June 22, 2004, partners UU, KVA, IAC
9. at the workshop “Solar Coronal Loops”, Palermo, Italy, September 1–3, 2004, partners OAA, AsU, UiO
10. at SOHO 15 Workshop “Coronal Heating”, St. Andrews, Sept. 6–9, 2004, partners ESA, AISAS
11. at the EAS JENAM Conference “The Many Scales of the Universe”, Granada, Spain, September 13–17, 2004, partners OAA, IAC
12. at the GREGOR Project Meeting, Ondřejov, Czech Republic, September 24–25, 2004, partners AsU, AIP, IAC
13. at the summer school “Analysis Techniques for Turbulent Plasmas”, Calabria, Italy, September 28 – October 2, 2004, partners OAA, UiO
14. at the Seventh Hvar Astrophysical Colloquium “Solar Activity Cycle and Global Phenomena”, September 19–25, 2004, partners AsU, AISAS, OP

ESMN travels

The following lists, ordered per partner per person, specify travels only for the ESMN Fellows and New-Member-State partners. It is impractical to tabulate all pertinent travels of all ESMN team members, and that would represent unjust over-claim of the ESMN’s role since most of these travels are not funded by the ESMN. The lists below are therefore restricted to, firstly, the ESMN Fellows (but then these lists include also their travels on other funding, in order to demonstrate their integration in European solar physics) and, secondly, to ESMN-related travel, whether ESMN-funded or not, of New-Member-State researchers (where all ESMN funding goes to such travel, without ESMN Fellow hiring).

Note that the activity matrix on page 21 summarises all ESMN traffic irrespective of the funding sources.

Kostas Tziotziou (ESMN Fellow at UU since March 2003)

- Collaborative visit to AsU, Ondřejov, Czech Republic, November 23 – December 6, 2003
- MSDP workshop, Toulouse, France, December 11–14, 2003
- Collaborative visit to OP, Meudon, France, February 9–15, 2004
- Collaborative visit to National Observatory of Athens, Greece, March 28–April 7, 2004
- 59th Nederlandse Astronomenconferentie, Vlieland, The Netherlands, May 26–28, 2004
- Observing campaign at THEMIS, Teide Observatory, Tenerife, Spain, July 18–29, 2004

Laura Merenda (ESMN Fellow at IAC since March 2003)

- Working visit to the Istituto Ricerche Solari, Locarno, Switzerland, January 12 – February 6, 2004
- Working visit to the Istituto Ricerche Solari, Locarno, Switzerland, August 23–27, 2004
- Collaborative observing campaign at VTT, Teide Observatory, Tenerife, Spain, September 7–14, 2004

Katja Janssen (ESMN Fellow at OAA since September 2003)

- Collaborative visit to UU, February 9, 2004
- Collaborative visit to National Solar Observatory, Sacramento Peak NM (USA), February 10-22, 2004
- Collaborative visits to University Tor Vergata, Rome, Italy, April 3 and May 5, 2004
- IAU Symposium 223 "Multi-Wavelength Investigations of Solar Activity", St. Petersburg, Russia, June 14–19, 2004
- JENAM 2004, "The many Scales in the Universe", Granada, Spain, September 13–17, 2004
- Summer School on "Analysis Techniques for Turbulent Plasmas", Calabria, Italy, September 28 – October 2, 2004

Andrés Asensio Ramos (ESMN Fellow at OAA since September 2004)

- Collaborative visit from IAC to OAA, as graduate student prior to taking up ESMN-fellowship, Firenze, Italy, May 2 – June 23, 2004

Luc Rouppe van der Voort (ESMN Fellow at UiO since March 2003)

- Observing campaign at SST, Observatorio del Roque de los Muchachos, La Palma, Spain, April 28 – May 15, 2004
- Observing campaign at SST, Observatorio del Roque de los Muchachos, La Palma, Spain, August 14–21, 2004
- Observing campaign at SST, Observatorio del Roque de los Muchachos, La Palma, Spain, October 18–27, 2004

Kai Langhans (ESMN Fellow at KVA since June 2003)

- Observing campaign at SST, Observatorio del Roque de los Muchachos, La Palma, Spain, June 3–9, 2004
- Collaborative visit to Kiepenheuer Institut für Sonnenphysik, Freiburg, Germany, June 15, 2004

Monica Sánchez Cuberes (ESMN Fellow at AIP since May 2003)

- Collaborative visit to IAC, La Laguna, Tenerife, Spain, November 3–12, 2003
- Observing campaign at VTT, Teide Observatory, Tenerife, May 15 – June 1, 2004
- Collaborative visit to IAC, La Laguna, Tenerife, Spain, June 2–9, 2004
- IAU Symposium 223: "Multi-Wavelength Investigations of Solar Activity", St. Petersburg, Russia, June 13–19, 2004

Arkadiusz Berlicki (ESMN Fellow at OP since February 2003)

- Collaborative visit to the Astronomical Observatory of Wroclaw, Poland, November 1–9, 2003
- MSDP workshop, Toulouse, France, December 11–14, 2003
- Collaborative visit to AsU, Ondřejov, Czech Republic, November 17–29, 2003
- Collaborative visit to AsU, Ondřejov, Czech Republic, March 18–21, 2004
- Observing campaign at THEMIS, Teide Observatory, Tenerife, Spain, July 29 – August 5, 2004

Stéphane Régnier (ESMN Fellow at ESA/ESTEC since February 2004)

- Collaborative visit to UU, Utrecht, The Netherlands, March 24, 2004
- Collaborative visit to OP, Meudon, France, May 3–7, 2004
- Workshop on Nonlinear Force-free Modeling, Palo Alto, USA, May 17–20, 2004
- Collaborative visit to Montana State University, Bozeman, USA, May 21–29, 2004
- 204th AAS/SPD Meeting, Denver, USA, May 30 – June 3, 2004
- IAU Symposium 223 "Multi-Wavelength Investigations of Solar Activity", St. Petersburg, Russia, June 14–18, 2004
- SOHO 15 Workshop "Coronal Heating", St. Andrews, UK, September 6–9, 2004

Pavel Ambrož (AsU staff)

- 17th Solar Meeting, Stará Lesná, Slovakia, May 24–28, 2004

Petr Heinzel (AsU staff)

- Collaborative visit to OP, Meudon, France, December 6–9, 2003
- Collaborative visit to OP, Meudon, France, January 22 – February 24, 2004
- Collaborative visit to OP, Meudon, France, June 17–19, 2004

Marian Karlický (AsU staff)

- Collaborative visit to OP, Meudon, France, March 1–13, 2004

Jan Jurčák (AsU PhD student)

- 17th Solar Meeting, Stará Lesná, Slovakia, May 24–28, 2004
- Observing campaign at VTT, Observatorio del Teide, Tenerife, Spain, June 11–21, 2004
- Collaborative visit to IAC, La Laguna, Spain, June 22–25, 2004.

Miroslav Klvaňa (AsU staff)

- GREGOR Project Meeting, Potsdam, Germany, March 9–12, 2004
- 17th Solar Meeting, Stará Lesná, Slovakia, May 24–28, 2004

Pavol Schwartz (AsU postdoc)

- 17th Solar Meeting, Stará Lesná, Slovakia, May 24–28, 2004

Michal Sobotka (AsU staff)

- GREGOR Project Meeting, Potsdam, Germany, March 9–12, 2004
- 17th Solar Meeting, Stará Lesná, Slovakia, May 24–28, 2004
- Observing campaign at SST, Observatorio del Roque de los Muchachos, La Palma, Spain, June 11–28, 2004
- Collaborative visit to IAC, La Laguna, Spain, June 29–July 2, 2004.

Peter Gömöry (AISAS PhD student)

- collaborative visit to Institute d'Astrophysique Spatiale, Orsay, France, June 2–11, 2004, to manage the MEDOC 13 Campaign = JOP 171
- Observing campaign and training at VTT, Observatorio del Teide, Tenerife, Spain, July 3–17, 2004
- SOHO 15 Workshop "Coronal Heating", St. Andrews, UK, September 6–9, 2004
- Seventh Hvar Astrophysical Colloquium, September 19–25, 2004

Július Koza (AISAS PhD student)

- Observing campaign and training at VTT, Observatorio del Teide, Tenerife, Spain, July 3–17, 2004
- Seventh Hvar Astrophysical Colloquium, September 19–25, 2004

František Tomasz (AISAS PhD student)

- Observing campaign and training at VTT, Observatorio del Teide, Tenerife, Spain, July 3–17, 2004

Jan Rybák (AISAS staff)

- Observing campaign and training of ESMN students at VTT, Observatorio del Teide, Tenerife, Spain, July 3–17, 2004
- SOHO 15 Workshop "Coronal Heating", St. Andrews, UK, September 6–9, 2004

Aleš Kučera (AISAS staff)

- Observing campaign and training of ESMN students at VTT, Observatorio del Teide, Tenerife, and collaborative visit to IAC, July 3–24, 2004
- Seventh Hvar Astrophysical Colloquium, September 19–25, 2004

Július Sýkora (AISAS staff)

- IAU Symposium 223 "Multi-Wavelength Investigations of Solar Activity", St. Petersburg, Russia, June 14–18, 2004

Balázs Major (ELTE PhD student)

- Romanian-Hungarian Workshop on Astronomy, Babes-Bolyai University, Cluj-Napoca, Romania, May 23–30, 2004
- IAU Symposium 223, St. Petersburg, Russia, 14–19 June, 2004
- Collaboration at Indian Institute for Science, Bangalore, India, 11–25 July, 2004
- Collaboration at OP, August 2–13, 2004

Kristóf Petrovay (ELTE staff)

- Collaborative project "Solar Turbulence", ISSI, Bern, Switzerland, January – June 2004 (three weeks in total)

ESMN networking matrix

The *networking table* below displays the intensity matrix of interactions between ESMN partners during the report year, with as scale 0 = no collaboration, 1 = some collaboration, 2 = much collaboration, 3 = intense collaboration. The estimates include both ESMN-funded travel (primarily by ESMN Fellows and young New-Member-State researchers)

and networking funded from other sources.

Team	UU	IAC	OAA	UiO	KVA	AIP	OP	ESA	AsU	AISAS	ELTE
UU	–	1	0	3	3	2	2	1	2	2	0
IAC	1	–	3	1	3	2	2	1	1	1	0
OAA	0	3	–	0	0	1	3	1	1	0	0
UiO	3	1	0	–	3	0	2	3	0	1	0
KVA	3	3	0	3	–	1	0	1	1	0	0
AIP	2	2	1	0	1	–	1	1	2	0	1
OP	2	2	3	2	0	1	–	3	3	1	3
ESA	1	1	1	3	1	1	3	–	2	2	1
AsU	2	1	1	0	1	2	3	2	–	3	0
AISAS	2	1	0	1	0	0	1	2	3	–	0
ELTE	0	0	0	0	0	1	3	1	0	0	–

B.5 Training

The ESMN vacancies were announced in international electronic newsletters, the most important being SolarNews, on the ESMN website, at other job-market sites including the EU's, through email to colleagues at other institutes, and through emails to likely candidates. As anticipated, SolarNews advertisements were most useful. Most non-pertinent applications came from Asia.

At the time of writing, a postdoc opening exists at the IAC which has been advertised in SolarNews, at the ESMN website, at the EU website, and through email to colleagues at many institutes.

The overall recruitment status per October 31, 2004 is given in tabular form on page 22. The change from postdoc to predoc at partner IAC was explained in a letter to the Project Officer on March 27, 2003. The change at UiO is conform the original ESMN proposal; the subsequent 6/24 split was subsequently entered to accommodate a specific candidate but turned out unnecessary.

The *training programme* follows the element list given in Section B.5 of Appendix I to the contract. Most ESMN Fellows take part in observing with the Canary Island telescopes but no Fellow (or New-Member-State young researcher) has yet worked at the SOHO EOF at Goddard. They all gain experience in observing strategies, data reduction, and analysis techniques, and they all participate in institute seminars and all will have presented their work in international meetings before they leave ESMN. The detailed lists in Section B.4 above specify all their travels since becoming Fellow.

Participant	Contract deliverable of Young Researchers to be financed by the contract (person-months)			Young Researchers ("Fellows") financed by the contract so far (person-months)		
	Pre-doc (a)	Post-doc (b)	Total (a + b)	Pre-doc (c)	Post-doc (d)	Total (c + d)
1. UU	0	30	30	0	20	20
2. IAC	0	30	30	20	0	20
3. OAA	0	30	30	0	16	16
4. UiO	6	24	30	0	20	20
5. KVA	0	30	30	0	15	15
6. AIP	0	30	30	0	18	18
7. OP	0	30	30	0	21	21
8. ESA	0	30	30	0	9	9
9. AsU	–	–	–	–	–	–
10. AISAS	–	–	–	–	–	–
11. ELTE	–	–	–	–	–	–
TOTAL	6	234	240	20	119	139

B.6 Difficulties

No major one, fortunately. There is a difficulty beyond our control which impedes the planned and contractually allowed traineeships of ESMN Fellows and New-Member-State youngsters at ESA's experimenters facility for the SOHO mission at the Goddard Space Flight Center near Washington DC, USA. As a result of the strict security measures following 9/11, a US National Agency Check (NAC) is now required to gain escort-less access to Goddard. This procedure may take well over a year. However, the ESA team is trying to work out a solution. The ESMN still anticipates to provide hands-on training at the SOHO EOF.

Part C. Mid-Term Review Particulars

C.3 Factual Information on the ESMN Fellows

UU
Name: K. Tziotziou
Nationality: Greek
Age at start of appointment: 35
Appointment start and likely end dates: March 1, 2003; August 31, 2005
Category of researcher: postdoc
Scientific specialty: solar chromosphere
Place and country of work: Utrecht, The Netherlands

Previous ESMN connection: PhD thesis at UU, ESMN-1 Fellow at OP

IAC
Name: L. Merenda
Nationality: Italian
Age at start of appointment: 26
Appointment start and likely end dates: March 1, 2003; October 31, 2006
Category of researcher: predoc
Scientific specialty: Observational and theoretical spectropolarimetry
Place and country of work: La Laguna, Tenerife, Spain
Previous ESMN connection: student at OAA

OAA
Name: K. Janssen
Nationality: German
Age at start of appointment: 29
Appointment start and likely end dates: September 1, 2003; August 31, 2005
Category of researcher: postdoc
Scientific specialty: photosperic small-scale structures
Place and country of work: Firenze, Italy
Previous ESMN connection: none

Name: A. Asensio Ramos
Nationality: Spanish
Age at start of appointment: 27
Appointment start and likely end dates: September 1, 2004; June 30, 2005
Category of researcher: postdoc
Scientific specialty: Observational and theoretical spectropolarimetry
Place and country of work: Firenze, Italy
Previous ESMN connection: PhD student at IAC, guest at OAA

UiO
Name: L.H.M. Rouppe van der Voort
Nationality: Dutch
Age at start of appointment: 29
Appointment start and likely end dates: March 1, 2003; August 31, 2005
Category of researcher: postdoc
Scientific specialty: observational solar physics
Place and country of work: Oslo, Norway
Previous ESMN connection: graduation at UU, PhD thesis at KVA

KVA
Name: K. Langhans
Nationality: German
Age at start of appointment: 32

Appointment start and likely end dates: June 1, 2003; January 31, 2006
Category of researcher: postdoc
Scientific specialty: spectroscopy, small-scale magnetic elements
Place and country of work: Stockholm, Sweden
Previous ESMN connection: none

AIP
Name: M. Sánchez Cuberes
Nationality: Spanish
Age at start of appointment: 29
Appointment start and likely end dates: May 1, 2003; October 31, 2005
Category of researcher: postdoc
Scientific specialty: observational solar physics
Place and country of work: Potsdam, Germany
Previous ESMN connection: PhD student at IAC

OP
Name: A. Berlicki
Nationality: Polish
Age at start of appointment: 31
Appointment start and likely end dates: February 1, 2003; July 31, 2005
Category of researcher: postdoc
Scientific specialty: solar chromosphere, solar flares
Place and country of work: Meudon, France
Previous ESMN connection: none

ESA
Name: S. Régnier
Nationality: French
Age at start of appointment: 31
Appointment start and likely end dates: February 1, 2004; January 31, 2006
Category of researcher: postdoc
Scientific specialty: solar coronal magnetic fields
Place and country of work: Noordwijk, The Netherlands
Previous ESMN connection: none

Name	Age	Type	Partner	Location	Nationality	Period
A. Asensio Ramos	27	Postdoc	OAA	IT	ES	01-09-2004 – 30-06-2005
A. Berlicki	31	Postdoc	OP	FR	PL	01-02-2003 – 31-07-2005
K. Janssen	29	Postdoc	OAA	IT	DE	01-09-2003 – 31-08-2005
K. Langhans	32	Postdoc	KVA	SE	DE	01-06-2003 – 31-01-2006
L. Merenda	26	Predoc	IAC	ES	IT	01-03-2003 – 31-10-2006
S. Régnier	31	Postdoc	ESA	INT (NL)	FR	01-02-2004 – 31-01-2006
L.H.M. Rouppe van der Voort	29	Postdoc	UiO	NO	NL	01-03-2003 – 31-08-2005
M. Sánchez Cuberes	29	Postdoc	AIP	DE	ES	01-05-2003 – 31-10-2005
K. Tziotziou	35	Postdoc	UU	NL	GR	01-03-2003 – 31-08-2005

D.1 Sketches by the ESMN Fellows

Andrés Asensio Ramos (OAA). Background: I have defended my PhD thesis in July 2004 at the IAC under the supervision of Dr. Javier Trujillo Bueno and Dr. José Cernicharo (DAMIR-CSIC). The main idea behind my thesis was the development and application of radiative transfer tools for the physical interpretation of spectroscopic and spectropolarimetric observations of molecular lines. During my PhD years, I have gained experience into the development of computer codes based on powerful numerical techniques for the solution of radiative transfer problems. What is more important, we have successfully applied these tools for the interpretation of observations performed with the most advanced spectro-polarimeters like TIP and ZIMPOL II.

Network participation: I have just joined the OAA (September 2004) as an ESMN postdoc fellow. My participation is therefore very reduced so far. However, we have plans to continue applying the radiative transfer tools we have developed for the interpretation of available and future observations of molecular and atomic lines in (small scale) magnetic solar structures.

Network experiences: Since I have joined the network so recently, my experience with the ESMN is very limited. However, I am sure it will allow me to interact with other colleagues and will become a very positive experience.

Arkadiusz Berlicki (OP). Background: My scientific interests are, in general, focused on solar active events. So far, I was mainly involved in observations and analysis of physical processes in solar flares. I am familiar with the reduction and interpretation of the MSDP observations including spectro-polarimetric line-of-sight magnetic field data obtained with the Themis telescope. Comparison of ground-based observations with the data obtained with satellites (YOHKOH, RHESSI, TRACE, SOHO) for solar active events is also one of the points of my interest. Recently, in cooperation with Petr Heinzel (AsU), I work mostly in the field of non-LTE modelling of chromospheric structure within solar flares and plages.

Responsibilities in the network: a) development of non-LTE codes to calculate theoretical models of solar atmosphere mainly in solar flares and plages, b) reconstruction of the chromospheric line profiles used to find model chromospheres with the non-LTE codes using an inversion technique, including the velocity field and its temporal evolution, c) using space data in X-rays and EUV (RHESSI, SOHO, TRACE) to analyse the thermal and non-thermal heating processes in the chromosphere during the solar flares, d) solar observations (MSDP at Themis, Meudon, Wroclaw) and data processing.

My experiences in the network: mainly positive. The ESMN has provided me the possibility of development of my scientific background. I already had great opportunities to meet many interesting people and I can work on different topics with many people at Meudon. ESMN gave me also a possibility to learn new observing techniques. During this contract I can visit other ESMN partners e.g. to work on non-LTE modelling. The summer (or winter) schools organised by ESMN give a chance to meet other young col-

leagues and discuss (mainly) about science. A negative thing is that the scientific visits and collaborations are restricted only to network partners.

Katja Janssen (OAA). Concerning my scientific background, for my PhD I worked on small scale magnetic fields, their structure and dynamics. I finished my PhD thesis in July 2003 at the Universitäts-Sternwarte Göttingen, Germany, under supervision of Prof. Franz Kneer. In this period I had the possibility to gain large experience with the German VTT telescope on Tenerife, Canary Islands, and the data reduction of two-dimensional spectral scans.

The ESMN Network gave me the chance to enlarge my knowledge of solar physics. With respect to the instrumental point of view, it gives me the opportunity to work with a new, highly sensitive 2d spectrometer, and for the physical point of view, it deepens my insight in the structure of the atmosphere above granular and intergranular regions in the solar photosphere. I really appreciate the opportunity to visit various conferences in order to discuss my results and ideas. An aim for the near future is collaboration with ESMN network team members on comparison of our results with highly sophisticated simulations of the solar atmosphere.

My experiences with the network are very good. The network gave occasion to many fruitful discussions with other members, both on conferences and meetings, and also in telephone sessions. Further collaborations are already planned. And last but not least the network allows me to live and work in one of the most beautiful countries with connections all over the world.

Kai Langhans (KVA). Background: I received my PhD in 2003 from the Albert-Ludwigs-Universität Freiburg, doing the thesis work at the Kiepenheuer Institute for Solar Physics. As a PhD student I acquired observing experience with the German VTT on Tenerife and the Dunn Solar telescope of the US National Solar Observatory. The thesis was a spectroscopic study of photospheric bright points.

Network responsibilities: my main task is observational work at the SST, so far using imaging instruments studying mainly sunspots but soon I hope to use the new spectrograph and spectropolarimeter. I have assisted in their development. I am also involved in upcoming joint observing campaigns with DOT and VTT.

Experience: very good so far. I really enjoy living in Sweden and working with the sharpest solar telescope on Earth! The insights that I get from taking part in the development of instrumentation will be most useful for me. I also expect that my contacts with the rest of the network will develop into lasting bonds.

Laura Merenda (IAC). My main scientific background when I arrived at the IAC was the theoretical modeling of the Hanle and Zeeman effects in spectral lines formed in solar prominences. In 2003 I received my Master's degree at Trento University, Italy. I discussed a master thesis about magnetic fields measurements in solar prominences with

Profesor G. Viliani (University of Trento) and Profesor E.Landi Degl'Innocenti (University of Firenze) as supervisors. In 2001 I spent 7 months at IAC with a studentship of the previous ESMN. In 1999 I studied at La Laguna University (Tenerife, Spain) with an Erasmus fellowship.

My research activity during this first period of ESMN fellowship at the IAC has allowed me to gain experience with spectropolarimetric observations of neutral helium lines in a variety of solar plasma structures, and to improve the theoretical modeling of the observed polarization signals via the consideration of radiative transfer effects. In this way, we aim to improve drastically our empirical knowledge on the strength and geometry of the magnetic fields that confine the plasma of solar coronal filaments and channels the spicular motions. I started my PhD at La Laguna University on October 2003 and I have attended several doctoral courses as part of my first academic year.

My experience with European exchange programs is positive.

Stéphane Régnier (ESA). Background: during my PhD thesis (defended in 2001), I mostly worked on the nonlinear force-free modelling of the coronal magnetic field using vector magnetograms as boundary conditions. During my 2-year postdoc at the Montana State University (USA) I developed my thesis work to a wide range of active regions and eruptive events (flares, filament eruptions). I also work on the reduction of vector magnetograms. My research interest also includes the existence of MHD waves in filament-prominence magnetic structures.

Network participation: in joining the ESMN my goal was to extend my experience in both modelling and observation. The observational techniques developed inside the network allow me to work on new data as well as new solar phenomema like small-scale structures or the quiet sun. We are working on the Halloween events which produced the biggest-ever observed flares in 2003. I also collaborate with colleagues at Lockheed-Martin in Palo Alto and at the Montana State University.

Network experiences: we have started collaboration with Meudon Observatory on the Halloween events and with AISAS on small-scale photospheric magnetic fields and their coronal counterparts. Bad experiences: not yet.

Luc Rouppe van der Voort. My background: During my PhD-studies at KVA I have been working with observations from the SST. My research focused on the structure and dynamics of sunspots using spectroscopic and imaging observing techniques. After completion of my thesis in the beginning of 2003, I was happy to start working at UIO where I could continue working with SST observations. Currently, my research has shifted more towards the study of small-scale magnetic field structures.

My network responsibilities: observational. Through partnership in the SST, UIO has quite extensive observing time and I have been involved in all the UIO observation campaigns so far. The solar group at UIO has great expertise in theoretical modeling and as an observer, I find it very fruitful to work in close collaboration with theoreticians. This year, we have started to collaborate with KVA on the development of the phase-diversity

image restoration technique. During our last two observing campaigns we obtained very exciting results. I expect to have more collaborations with the KVA group now that the spectrograph is being installed on La Palma. The reduction of our first data with the new spectrograph will be done in collaboration with KVA. I am also involved in a collaboration with UU where we use Ca K spectra as fluxtube diagnostic.

My network experiences to date are positive. I find the UIO a very pleasant and stimulating working environment. During my visits to La Palma I often have fruitful discussions with the UU team members who I meet when they are observing with DOT, in addition to my regular contacts with the ESMN coordinator when he visits Oslo.

Mónica Sánchez Cuberes. Prior to taking up my position as a post-doc within the ESMN network I performed my PhD at the Instituto de Astrofíca de Canarias under the supervision of M. Vázquez and J.A. Bonet. The topic of my thesis was the study of the center-to-limb variation of photometric properties of the solar granulation, faculae and, to some extent, pores. I preformed basically an observational approach which allowed me to get familiar with image treatment and reconstruction techniques besides, some forward simulations were also performed, through which I got a closer insight into radiative transfer theory and the codes existing to solve its equations.

I joined the network because of several reasons. On the one hand, it offered me the posibility of establishing contacts with the international solar physics community, and to work with large groups of people, which is very fruitful and satisfying. Besides, the wide experience of the AIP optical group with spectropolarimetry, and the extended international contacts of its members, allowed me to enter into this fascinating field of work.

Apart from my personal collaborations with various members of institutes (IAC and USG, specially) with whom we are presently analyzing several data sets, I am presently collaborating in the planning of a Joint Observing campaign which will take place at the end of November 2004, in which most of the ESMN partners will take part.

The so far obtained results have been presented in an IAU Symposium in June 2004, in a submitted paper, as well as in other publications which are still in preparation.

So far, my experience in the ESMN has been very fruitful and satisfactory.

Kostas Tziotziou (UU). My background: I received my PhD in 1997 at UU on the dynamics of solar and stellar coronal heating. After a compulsory 18-month military service in Greece I worked as ESMN fellow for three years at partner OP, focusing on a) non-LTE inversion techniques for the Hα and Ca II 8542 Å lines, b) sunspot oscillations, observations and theoretical interpretation and c) filament structure. Prior to my current position, I have worked for one year at the National Observatory of Athens, concentrating on sunspots and the dynamics of the chromospheric fine structure.

My network responsibilities: both observational and theoretical. My main project involves the detailed study of the dynamic behaviour of the chromospheric fine structure (mottles, spicules, surges etc) in the Hα line and its influence on the upper levels of the solar atmosphere. The observations used so far were made with telescopes of ESMN partners

but we will also start using speckle reconstructed, high spatial and temporal resolution Hα observations with the DOT telescope. My project involves very active collaborations with both OP and AsU as well as the National Observatory of Athens. Other research topics are inversion methods, the nature of sunspot oscillations and waves, and the physical properties and structure of filaments and prominences.

My network experiences to date: definitely positive. My integration into the solar group at UU was fast due to my prior experience in Utrecht. Being at UU enables me to work with a top solar telescope (DOT). My collaborations with OP and AsU are extremely inspiring and fruitful, and also very complementary to my work at UU. A very rewarding experience is also my large involvement in organising the third ESMN school "Solar Magnetometry and Solar Magnetism".

E.1 Network Financing

The table on the next page specifies the ESMN expenditures to date, in comparison with the detailed budget on which the contract is based. The Year-2 entries are fairly close estimates.

Overall, the expenditures are very well on track. Some partners may increase their ESMN-financed networking without endangering salary obligations. It should be noted that the larger part of ESMN-related travelling is paid from other funding. It should also be noted that the long wait for the money transfer concluding approved cost declarations effectively requires more and more pre-financing with time lags that extend well beyond a full year after the actual expenditure. This long delay is administratively difficult to handle at some partners, in particular in New-Member States.

Partners UU and IAC have enhanced networking allocations concerning their contractual obligations in ESMN school organisation. For the IAC these expenses fell in Year 2. The UU expenses for the Third ESMN School at Tatranská Lomnica come in Year 3. The First ESMN School at UiO was largely paid from other funding, as planned already at contract time.

The enhanced ESA allocation for networking is intended for contract-allowed travels of ESMN Fellows and New-Member-State young researchers to the SOHO EOF at Goddard. Our expectation is that this component of the training programme will be effectuated when the security problems at Goddard have been ironed out.

F.1 Proposed Revision to this Contract

None.

			budget	actual year 1	expected year 2
Utrecht University	RUUTR	Personnel	126.863	37.298	53.170
		Networking	34.887	3.363	5.000
		Overheads	32.350	8.132	11.634
		Total	194.100	48.793	69.804
Instituto de Astrofisica de Canarias	IAC	Personnel	103.771	11.187	15.330
		Networking	31.489	2.903	21.455
		Overheads	27.052	2.818	7.356
		Total	162.312	16.907	44.141
Instituto Nazionale di Astrofisica	INAF.OAA	Personnel	114.647	7.595	46.655
		Networking	14.742		4.400
		Overheads	25.878	1.519	10.211
		Total	155.267	9.114	61.266
University of Oslo	uoslo.ita	Personnel	153.157	40.972	57.451
		Networking	10.903	7.516	122
		Overheads	32.812	8.698	11.515
		Total	196.872	57.185	69.087
Royal Swedish Academy of Sciences	RSAS.ISP	Personnel	141.664	22.510	49.000
		Networking	11.966	1.439	300
		Overheads	30.726	4.790	9.860
		Total	184.356	28.739	59.160
Astrophysikalisches Institut Potsdam	AIP.SOE	Personnel	131.190	21.160	66.857
		Networking	15.000	2.815	3.760
		Overheads	29.238	4.795	14.123
		Total	175.428	28.770	84.740
Observatoire de Paris-Meudon	OBSP.ESIA	Personnel	111.318	32.320	46.930
		Networking	11.682	1.900	6.000
		Overheads	24.600	6.732	10.580
		Total	147.600	40.952	63.510
European Space Agency	ASE.RSS	Personnel	97.137		27.000
		Networking	29.614		3.500
		Overheads	25.350		6.100
		Total	152.101	0	36.600
Astronomical Institute - Academy of Sciences of the Czech Republic	CSALSOLAR	**Personnel**			
		Networking	20.000	4.805	420
		Overheads	4.000	961	84
		Total	24.000	5.766	504
Astronomical Institute of the Slovak Academy of Sciences	ASIAS.SOPH	**Personnel**			
		Networking	20.000	7.049	5.728
		Overheads	4.000	1.410	1.146
		Total	24.000	8.459	6.874
Eotvos Lorand University, Budapest	UEOT.AS	**Personnel**			
		Networking	20.000	5.546	4.800
		Overheads	4.000	1.109	960
		Total	24.000	6.655	5.760
Total		**Personnel**	979.747	173.042	362.393
		Networking	220.283	37.336	55.484
		Overheads	240.006	40.963	83.569
		Total	1.440.036	251.341	501.446