

Hipparchos

The Hellenic Astronomical Society Newsletter

Hellenic Astronomical Society

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February 2001

Volume 1, Issue 9, Year 3

Message from the President

I expect that you have already been informed about the upcoming 5th Hellenic Astronomical Conference, organised by our Society and the University of Crete. The first announcement has been issued and a well-constructed web conference site has been set up by the Local Organising Committee. Chairman J. Ventura and the other members of the LOC, are working hard in order to attract sponsors and deal with the final details. In particular, I would like to thank D. Hatzidimitriou and her team of students, who has been particularly active and productive. I foresee a very successful conference and I hope that we may all meet at Hersonissos next September.

Meanwhile the 2.3-m "Aristarchos" telescope of the National Observatory of Athens is making good progress. The quality of the mirror is much better than the original specifications (diffraction limited—0.16"). The telescope tube is ready and the mechanical assembly is slightly behind the original sched-

ule (~6 months). Tests on the acquisition and guidance unit have started and according to the updated schedule of the manufacturer (Zeiss GmbH of Jena, Germany) the telescope will be shipped to Greece by June 15 this year. Meanwhile the building permission has been obtained, a small ISOBOX container is already anchored on top of Mt. Chelmos and, hopefully, immediately after the snow season, the building construction will be started. The managing team is making enormous efforts towards obtaining worthy auxiliary equipment. We are all looking forward to use the new telescope.

Looking beyond our national borders and well above our planet, a team of astronauts is working towards a very large construction, the International Space Station, which already extends to an area of about 80m × 55m. It circles the earth every 1.5 hours and it is a spectacular bright object, comparable with the brightness of Sirius.

I take the opportunity to wish you in print a very happy and construc-

tive year. May it be the best year so far and the worst among those that will follow.

The President of Hel.A.S.
J.H. Seiradakis

THE 5th HELLENIC ASTRONOMICAL SOCIETY CONFERENCE

The fifth Hellenic Astronomical Society meeting will be held between the 20th and 22nd of September 2001 in Crete. The Scientific Organizing Committee decided to invite the following distinguished scientists to give invited talks: Prof. G. Efsthathiou (Cambridge University), Dr. C. Kouveliotou (NASA), Dr. M. Mathioudakis (Queens University of Belfast), Dr. D. Vassiliades (NASA) and Dr. A. Renzini (ESO). The Local Organizing committee, led by Prof. J. Ventura, has already issued the 1st Announcement. All relevant information, including the registration forms, can be found in the following internet address: <http://astrophysics.physics.uoc.gr/conf>. If you have trouble connecting to the above address please contact the LOC by telephone: (+30)-81-394200, FAX: (+30)-81-394201 or email: dh@physics.uoc.gr.

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THE STEPHANION OBSERVATORY

The first observations at the Stephanion Observatory, in southern Peloponnese, were undertaken in March 1967 (seven years before the establishment of the Kryonerion Astronomical Observatory) with a *guest* 38-cm reflector and a UBV photometer that belonged to the Bergedorf Observatory of the University of Hamburg, Germany. Since then a large number of instruments have been hosted at the 800-m altitude observatory, which is located at $\lambda = 22^\circ 49' 45''$, $\phi = +37^\circ 45' 9''$, including French telescopes for monitoring satellites, and a 40-cm reflector from the Utrecht Observatory, Holland. The Observatory is established on a 4100 m² plot, owned by Professor L.N. Mavridis, who has kindly granted it for use by the University of Thessaloniki staff.

In June 1971, the 30-inch (76-cm) Cassegrain reflector of the University of Thessaloniki was installed at the Observatory. Until 1975 (when the 120-cm Cassegrain Coudé reflector at Kryonerion became operational), this was the largest telescope in Greece.

The 30-inch reflector is mounted asymmetrically. Its focal ratio is f/3 for the primary hyperbolic mirror and f/13.5 for the Cassegrain focus. It was constructed by Astro Mechanics, USA, a firm that has long ago discontinued making astronomical instruments. The majority of observations are carried out with a Johnson dual channel photoelectric photometer with an offset guider unit mounted in the Cassegrain focus. It includes an RCA 1P21 and an RCA 7102 photo-multipliers, both of which are refrigerated by dry ice (-70°C).

Key photometric observations of variable stars (flare stars, cepheid variables, RS CVns, etc) have been undertaken in co-operation with large ground or space



The 30-inch Cassegrain reflector of the Stephanion Observatory

instruments, yielding more than 100 publications in international journals in recent years. The international demand for co-operative and simultaneous observations at the Stephanion Observatory stems from the strict differential method used for obtaining absolute, above atmosphere, stellar magnitudes in the international UBV system. The error in the calibrated magnitudes obtained is usually of the order of 0.02 magnitudes.

J.H. Seiradakis

APPLY FOR THE BEST PHD IN ASTRONOMY FOR THE YEAR 2000

The first candidatures for the best PhD in Astronomy for the year 2000 have already been submitted to the Council of Hel.A.S. The prize, which will be accompanied by the sum of 120.000 GDR, will be awarded to active junior members of the Society, who have successfully defended their PhD thesis during the calendar year 2000. The recipient will be selected by the Council. All members of the Society and other colleagues (PhD supervisors in particular) are strongly encouraged to bring to the attention of the Council of Hel.A.S., as soon as possible, any candidates of this year's prize, by sending details to the Secretary of Hel.A.S., Dr. Harry Varvoglis, at the University of Thessaloniki, Department of Physics, GR-54006 Thessaloniki, Greece (E-Mail: varvogli@astro.auth.gr).

Harry Varvoglis
Secretary of Hel.A.S.

SOLAR ECLIPSES IN 2001

21 June 2001: A total solar eclipse will take place, with totality visible in the South Atlantic Ocean off the east coast of Uruguay, crossing the Atlantic, crossing Angola (totality duration 4.5 minutes), Zambia (totality 3m 14s in Lusaka, the only major city in the path), Zimbabwe, Mozambique (duration 3 m), southern Madagascar (duration 2 m and 30 sec) and the Indian Ocean. Partial phases will be visible throughout Brazil, sub-Saharan and East Africa.

14 December 2001: A annular solar eclipse will take place with annularity visible in southern Nicaragua and northern Costa Rica (duration 3 m and 15 sec), following maximum duration over the Pacific of 3 m and 56 sec. Partial phases will be visible in the Pacific Ocean, NW South America, Central America, continental USA, western and southern parts of Canada.

Exploring the Web with Hipparchos

With the advent of electronic publishing most major scientific journals are available online. This saves researchers from a trip to the library and makes the task of locating that "special paper" much faster. However, in order to access most the journal contents an electronic subscription is necessary. Luckily most institutions which receive paper copies of those journals for their libraries also have domain name/system-wide electronic subscription that allow free browsing of the journals from all computers of their network.

In this issue we provide a list of the most common journals in astronomy and astrophysics.

1) <http://www.journals.uchicago.edu/ApJ/journal/>

The Astrophysical Journal (ApJ), ApJ Letters, and ApJ Supplements, is the most widely used astronomy journal. For european users faster access can be achieved via a mirror site at CDS in France (<http://cdsaas.u-strasbg.fr:2001/ApJ/journal/>)

2) <http://www.journals.uchicago.edu/AJ/journal/>

The Astronomical Journal (AJ) is also a north American publication that focuses more on observational results and has also a mirror site at CDS (<http://cdsaas.u-strasbg.fr:2001/AJ/journal/>)

3) <http://www.edpsciences.org/aa/>

As of January 2001 Astronomy and Astrophysics (A&A), the main european journal in astronomy, is published by EDP Sciences. Older issues (1997-2000) are still available via Springer Verlag at: <http://link.springer-ny.com/link/service/journals/00230/>

4) <http://www.blackwell-synergy.com/Journals/member/institutions/issuelist.asp?journal=mnr>

The full text of The Monthly Notices of the Royal Astronomical Society (MNRAS) has only recently become available online. The titles/abstracts of the papers can be read without a subscription.

5) <http://astro.AnnualReviews.org/>

The Annual Reviews in Astronomy & Astrophysics (ARA&A) is as suggested by its title probably the best source of extended review articles.

6) <http://licarus.cornell.edu/>

ICARUS is a journal mainly focusing on results of Solar System studies.

7) <http://www.elsevier.nl/gej-ng/10/33/29/show/>

New Astronomy, the first fully electronic research journal in astronomy was created in 1996.

8) <http://www.wkap.nl/journalhome.htm/0004-640X>

Astrophysics and Space Science frequently includes many papers published in refereed conference proceedings.

9) <http://www.kap.nl/journalhome.htm/0038-0938>

Solar Physics, a Journal for Solar and Solar-Stellar Research and the Study of Solar Terrestrial Physics.

10) <http://www.wkap.nl/jrnltoC.htm/0001-7701>

A more specialized journal on General Relativity and Gravitation.

11) <http://publish.aps.org/>

The starting page of most journals of the American Physical Society (including Physical Review and Physical Review Letters)

One should keep in mind that direct links to the published papers of all the above journals can be found via the NASA Astrophysics Data System (http://adsabs.harvard.edu/abstract_service.html) which can be used to search for a specific publication using the author name, keywords, etc. Furthermore, ADS maintains scanned versions of past articles published in several of the above journals and provides a complete archive of ApJ, AJ, A&A, MNRAS, and ARA&A.

Vassilis Charmandaris
(vassilis@astro.cornell.edu)

BOOK REVIEWS

Review by X. Moussas, University of Athens,
xmoussas@cc.uoa.gr

It is always a temptation to present to friends, students and colleagues good and useful books. During the last few months several astronomy & physics books have been published in Greece. I will present here a few of them, which I have read and liked. These books are in Greek and inexpensive.

Two colleagues and good friends, Manos Danezis and Stratos Theodossiou of the National and Kapodistrian University, have written a very nice book entitled "*The Universe I loved*". It is published in two volumes by *Diavlos Publications*, Athens. The two volumes cover most fields of astronomy in a very good manner and they are suitable for the first year student and even for the layman, who can skip the mathematics. The book contains many photographs and graphs and is used by our first year students in Physics, who like it very much.

A useful book on **Plasma Physics** has been written by my colleague and friend Lukas Vlahos of the Aristotelian University of Thessaloniki, published by *Tziola Publisher*, Thessaloniki. The book covers the classical chapters of plasma and it is very useful for greek physics students and physicists.

My friend Vaggelis Spandagos (*Aithra Publications*, Athens, e-mail: aithra@otenet.gr), a well known mathematician, publisher and writer of over 100 books, has written three more interesting books during the last few months. The 1st book, entitled "*The life and work of C. Caratheodory*", will be extremely

(Continued on page 8)

REPORT OF THE "COMMITTEE OF OPERATIONS AND EQUIPMENT DEVELOPMENT OF THE 2.3m ARISTARCHOS TELESCOPE"

It has been now 1 year since the "Committee of Operations and Equipment Development of the 2.3m ARISTARCHOS Telescope" was assigned the task of building a project management structure to address the development and operation of the new NOA telescope. This has included coordination with other Observatories, instrumentation planning, partnerships, and operations planning.

In regard to coordination with other Observatories, there has been some technical support and consultancy from the British/Dutch telescopes at La Palma (Isaac Newton Group of Telescopes). Furthermore, we were invited to participate in the first meeting of the European mid-sized telescope representatives at Lyon, 14-15 December. The other participants were ESO, ING, Calar Alto, AAO, CFHT, Galileo, Haute Provence, Pic du Midi, IAC, NOT and government officials. During the meeting, ways were sought to establish *Centres of Excellence* in Astronomy in Europe and to coordinate more efficiently the facilities at a European level. One way that this can become possible is by exchanging telescope time and instrumentation and by offering specialized observing techniques and instrumentation which can, overall, reduce the operational costs. ARISTARCHOS may have a future in such an international coordination only by offering large allocations of time on hot topics and by playing a complementary role on scientific endeavours which are not possible at the main sites (La Silla, La Palma, Calar Alto; the NOA presentation is available by anonymous ftp, ftp ultra.astro.noa.gr, cd pub/ehh, binary, get lyon.ppt).

The original budget for purchasing the telescope did not include any instrumentation, except for a first-light CCD camera. We are, therefore, seeking to have visiting instruments (Phase-I) after commissioning the telescope. Official negotiations on a pioneering British 3-CCD camera (ULTRACAM) have started. We aim at an agreement according to which ARISTARCHOS will be the base telescope for the ULTRACAM camera when not in use at larger telescopes (a few nights per year). NOA is also interested to participate initially in the construction of 2 instruments (core instrumentation) based on the priorities of the Greek observational community; a spectrograph which will offer a competent facility for astrophysical research and a high-speed multi-channel camera, perhaps a second-generation ULTRACAM,

which would build on traditional strengths of the Greek observers. The specifications, cost, work-package and a preliminary optical design for a multi-purpose spectrograph are ready and we are in the process of seeking funding. More instrumentation development (Phase-II) will depend on the partnerships and agreements that will be achieved with other Institutes.



The 1st meeting of representatives of the European Observatories, Lyon, 14-15 December 2000.

Left-to-right: G. Fahlman (CFHT/France), C. Tinney (AAO/UK), W. Boland (NOW, Netherlands), C. Vincent (PPARC/UK), G. Monnet (ESO/Munich), G. Andreoni (ESO/La Silla), R. Rutten (ING/La Palma, UK/Netherlands), R. Gredel (Calar Alto/Heidelberg), J. Melnick (ESO/La Silla), P. Murdin (PPARC/UK), A. Aparicio (IAC/Spain), E. Oliva (TNG/Italy), J. Sivan (Haute Provence/Marseilles), V. Piirola (NOTSA/Scandinavia), G. Gilmore (IoA/UK), M. Auriere (Pic du Midi/Toulouse), E. Harlaftis (NOA/Greece). The picture was taken by our host, Deputy Director of CNRS, Prof. Bacon. Ms. Nordstrom (EAS), another participant, is not shown.

It is acknowledged that it will be difficult for one Institute alone to operate the telescope. Therefore, we have set as one of our highest priorities to upgrade the NOA 2.3m telescope, if possible, as a national facility. In order to achieve this we have made so far presentations to the Universities of Cre-

te (04/10/2000), Athens (17/10/2000) and Thessaloniki (24/01/2001), seeking to attract the Universities into a national partnership. Furthermore, it is our ambition to make ARISTARCHOS an international facility with a visible scientific activity and a reliable service and operation. There is a strong interest to join the NOA telescope project by the Slovak and Czech astronomical communities (meetings at Tatranska Lomnica, 22-23 June, at Brussels, 4-7 July 2000, and at Prague, 26 January 2001). We are finalising the negotiations now and scrutinize the legal framework. Interest has also been shown by Belgian, French & German Institutes.

Operationally, we envisage that the telescope will be under remote-control operation (2-12 Mbits/sec, Athens), with long observing shifts (minimum 1 week and up to 12 weeks) with 2-3 instruments requiring minimal maintenance. Particular attention will be given to *target of opportunity* programmes (γ -ray bursts, black-hole transients, supernovae). It is estimated that 1.5 man-years will be required for night support and 5.0 man-years for day-time technical support, with the operational expenses running at 435 keuros per year (~175 keuros running costs plus ~260 keuros for manpower), still at a fraction of operating a typical 2.5m telescope at an international remote site (for example, the 2.5m NOT at La Palma requires ~1 Meuros per year). For up-to-date information, download from the anonymous-ftp site "ftp ultra.astro.noa.gr" a presentation of the telescope project ("telescope3.ppt") or ask for the minutes of the monthly meetings of the Committee.

Emilios Harlaftis, Chairman of the Committee

PROGRESS OF THE 2.3m ARISTARCHOS TELESCOPE PROJECT

NOA has performed two inspections (18-19 September and 12-13 December 2000) at CARL ZEISS Jena since the new principal investigators took over the telescope project. These visits have been made in order to monitor telescope progress, study in detail the designs, identify possible design problems and, most importantly, recommend actions and tests to the contractor in areas which are not clarified and potentially could lead to controversy in the future operation of the telescope.

Our expert engineers, Martin Fisher (systems engineer) and Sue Worswick (optical engineer), whose working experience includes participation in the design and commissioning of the 4.2m WHT, 8m GEMINI (and recently 4m VISTA) telescopes, provide advice on the critical elements of the design, recommend solutions and tests to resolve "grey" areas of the design. They will participate in the factory acceptance tests and commissioning of the telescope at Chelmos in order to support NOA's efforts against a professional delivery and acceptance of the telescope, according to international standards. Their participation has already started bearing fruits by suggestions which have led, so far, to minor improvements of the design.

The telescope is now at the mechanical assembly stage and the last parts of the telescope are expected to be delivered to the factory by the beginning of March 2001 (mirror cell and secondary mirror unit). Next NOA inspection at the factory is scheduled for 21-23 March 2001.

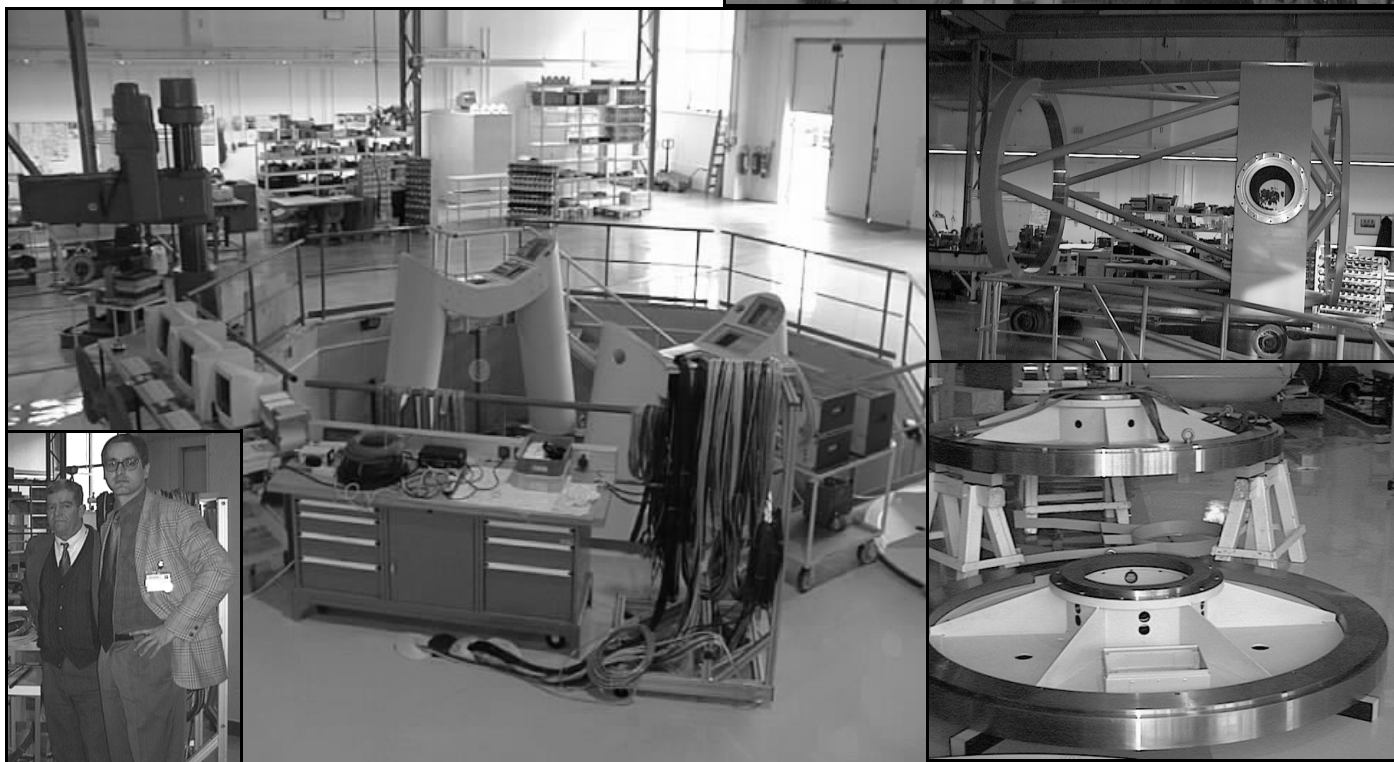
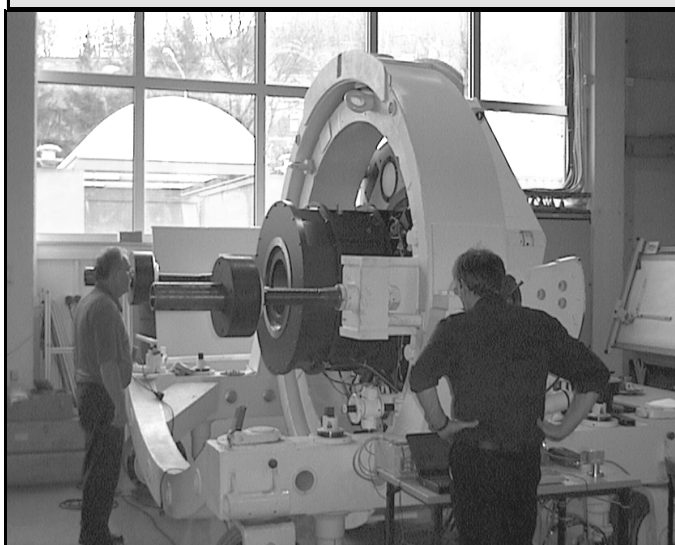
The interested reader can download technical pictures of the telescope parts, obtained during the last two inspections, from the following anonymous-ftp address:

"ftp ultra.astro.noa.gr, cd pub/ehh" (zeiss_sep.zip and zeiss_dec.zip).

*Emilios Harlaftis
Deputy Principal Investigator for the project
"Installation of 2.3m telescope at Chelmos Kalavriton"*

The assembly of the telescope at the factory:

The image shows a compilation of pictures which includes the azimuth mount, the telescope tube, the altitude mounts, the Acquisition and Guidance Unit mounted on the test rig, the 4 PCs required for the operation and the NOA representatives during the December 2000 inspection, P. Rovithis and E. Harlaftis



EDITOR'S COMMENT

"Greece should abandon a short-sighted policy"

This was one of Nature's (1st February 2001 issue), probably the most prestigious scientific journal, editorial column. The article elaborates on a well known, among Greek scientists, fact which is the completely inadequate funding of research by the Greek State. Greece spends on research the least, not only among the EU states but also among many developing countries—just 0.5% of the GDP. Salaries are uncompetitively low, state funding of the research institutes cover only salaries, and there is no well defined procedure to obtain research grants, even on a competitive basis, unless you can find an industrial partner and on very specific topics chosen by the government. As the article says: *"If they have their way (the Greek politicians), as from this year there will be no single source of money for research that does not require an industrial partner"*.

On the other hand, the recent evaluation, by international panels of experts, of the Greek research establishments that are under the direction of the General Secretariat for Research and Technology (GSRT), has shown that the research pursued in Greece is of high quality and in many occasions Greek Institutes harbour groups that can be considered to be *Centres of Excellence*.

It seems therefore that there is a clear dichotomy between the research efforts of Greek scientists and the support they get from the Greek state.

Further below, I will concentrate mostly on the outcome of the international evaluation procedure for the Institutes which are related to Astronomy and Astrophysics. These are the In-

stitute of Astronomy & Astrophysics (IAA) and the Institute of Space Applications and Remote Sensing (ISARS) of the National Observatory of Athens as well as the Institute of Deep Sea Research & Neutrino Astroparticle Physics (NESTOR). The international evaluation committee consisted of Prof. R. Wielebinski, (Director, Max Planck Institute for Radio Astronomy, Germany), Prof. K. O. Mason, (University College London, Mullard Space Science Lab, U.K.), Dr. R. Gredel, (Director, Centro Astronomico Hispano-Alleman, Almeria, Spain), Prof. G. Wilkinson, (Kingston University, Head of School of Computing and Information Systems, U.K.) and Dr. Th. Spathopoulos, (Director, Scientific Advisor, Hellenic Aerospace Industry Ltd, Greece).

I will attempt to point out the most important results of this evaluation by presenting extracts from the report. Of course, I strongly suggest that the interested reader should refer directly to the report, which can be found in the web-page of GSRT (www.gsrt.gr), since

here you will find my personal view of what are the main and most important issues, raised by the committee.

I will start with the two NOA Institutes. The report says, among other things: *"Both institutes have made considerable progress in restructuring over the past five years, bringing in active young researchers and developing a modern and internationally competitive research programme...."*. Furthermore: *"ISARS has re-generated its programme very successfully and now has internationally competitive research groups in Remote Sensing and Solar-Terrestrial Physics...."*. *"IAA has also made substantial progress in regenerating their research programme and now has internationally recognised and competitive groups in Observational Cosmology and Interacting Binaries...."*. A very important development at the Institute is the construction of a new 2.3m telescope at the high-altitude Chelmos site. This is a key element in an overall strategy for modernising Greek astronomy that should include membership of ESO at the earliest opportunity."

The evaluation of NESTOR showed that the avenues, opened by this important research establishment, could lead to very prestigious results; in their own words: *"The Neutrino telescope project is very exciting and has the potential for Nobel Prize winning science. Neutrino astronomy is an infant field and Greece is at the forefront of world developments"*.

Of course the evaluation committee identified lots of problems as well, most of them having to do, however, with legislation weaknesses, management and

staffing problems, inappropriate balances between research staff, technical staff, and administrative support staff, lack of experienced commercial

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project managers for major research infrastructure developments, low funding of major projects, inappropriate state policies, bureaucratic attitudes etc. In concordance with Nature's article, the evaluation committee identified as a major problem the inappropriate attitude of the governing bodies towards fundamental research: *"The pure research activities appear to be under the most pressure, and one of the challenges of the next five years will be to maintain the pure research programmes at an appropriate level, which is vital to the long-term health of the applied programmes, and the Institutes in general"*. I think that the best way of finishing this article is by quoting directly from the report that: *"Greece needs a strategy to give full support to space-related and astronomy research and development activities which can contribute both to the economic prosperity and scientific prestige of the country."*

Manolis Plionis

SPACE STORMS AND SPACE WEATHER HAZARDS IN GEOSPACE

Hersonissos, Crete, June 2000

A ten-day Advanced Study Institute (ASI) on Space Storms and Space Weather Hazards was held in Hersonissos, Crete, between June 19-29, 2000. The ASI was organized by the Institute for Space Applications and Remote Sensing of the National Observatory of Athens (NOA) and was attended by more than 130 participants from 26 countries. Ioannis A. Daglis (NOA) and Yuri Galperin (Russian Academy of Sciences) were the co-directors of this ASI. The members of the Scientific Committee were D. N. Baker, I. A. Daglis, Y. Galperin, J. G. Kappenman, J. F. Lemaire, and M. Scholer. Six topical workshops were convened by M. H. Acuña, V. Bothmer, E. J. Daly, I. Doxas D. Heynderickx and L. J. Lanzerotti.

The meeting was organized under the auspices of the NATO Scientific & Environmental Division, the European Space Agency (ESA), the Committee on Space Research (COSPAR), the International Association of Geomagnetism and Aeronomy (IAGA) and the Scientific Committee on Solar-Terrestrial Physics (SCOSTEP). Financial support was provided by a number of international and national organizations, including NATO, AFRL, ONR, NASA, NSF, the Greek General Secretariat for Research and Technology, the National Observatory of Athens and the University of Crete.

The aims of the ASI were to provide a systematic overview and rigorous introduction to the physics of space storms; to review recent spacecraft measurements; to review space weather hazards associated with space storms and pertinent to the operations of technological systems in space and on ground; and to discuss and assess methods of space weather forecasting.

Space storms have a number of effects in geospace, i.e., the near-Earth space environment: global magnetic disturbances on the Earth surface, acceleration of charged particles in space, intensification of electric currents in space and in the ionosphere, and induced in the ground, impressive auroral displays, and many other phenomena both dramatic and subtle. The classical name "magnetic storms" arises from their effect with respect to the first area in the foregoing list that was also the first experimentally detected manifestation (by Alexander von Humboldt in 1806) of space storms.

The structure of the ASI was defined by the decision to cover all aspects of space storm physics and space weather hazards. Some of the 'hottest' issues presented

and discussed in the ASI were:

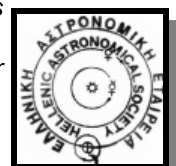
- The physical processes leading to the eruption of solar coronal mass ejections (CMEs), the propagation characteristics of CMEs through the interplanetary medium and the predictability of their "geoeffectiveness".
- The storm-substorm relationship, the growth and decay of the magnetosphere ring current, and the precision of measurements of the storm intensity.
- The astounding capability of the terrestrial magnetosphere to rapidly accelerate charged particles to very high energies over relatively short times and distances.
- Space weather hazards at various altitudes from the Earth's surface to the edge of the magnetosphere.
- The advances in detail modeling of space storm impacts on terrestrial infrastructures such as power grids etc.
- The possible effects of space weather on tropospheric climate and weather.
- The advances and the novel techniques in space

weather monitoring and forecasting.

Finally, it has to be stressed that the key issues regarding the relevance of space weather and especially its hazards to society should be brought to the attention of the appropriate policy makers, service providers and, probably, insurance agencies. Centrally recognized is that

improvements in forecasts will play an important role in managing space storm risks. Continued improvements in forecasting will absolutely require the application of space-based monitoring. Important observational infrastructures need to be recognized from an operational forecast perspective. The most important and expensive assets are the space-based systems such as SOHO for solar observations and ACE for continuous real-time solar wind monitoring at L1. These systems have been funded under investigative science programs, but the long-term operational forecast role and the commitment to funding a continuing series of such observation platforms has not been adequately addressed or committed to by any nation.

A. Anastasiadis and I. A. Daglis
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useful for most physicists, mathematicians, astronomers, historians of science, students and some educators. The book has a prologue written by Mrs Despina Rodopoulou-Caratheodory, the daughter of the great mathematician, and contains several chapters on his life and work, as well as photographs and letters. The sources of Spandagos have been the rich archives of Mrs Caratheodory, the Caratheodory's filling cabinet which belongs to the rich and well preserved archives of the Science and Technology Museum of the University of Athens (Chimion, at 104 Solonos Street). The cabinet is part of the archives of the University of Smyrna, which are also kept and restored properly together with other treasures at Museum. The book covers the life and work of the great Greek scientist, who, in my opinion, was the greatest during the last two millennia, only comparable to Claudius Ptolemy. The book gives lots of information concerning the important contribution of Caratheodory to the establishment of the University of Smyrna, the Aristotelian University of Thessaloniki, the educational system in Greece and, of course, all the revolutionary contributions in Mathematics and Physics. Also very interesting to me was the correspondence between Caratheodory and Einstein concerning relativity.

The other two books by the mathematician Vaggelis Spandagos are Euclid's "*Optica and Catoptrica*" and "*Phenomena*". Both books contain the ancient text as well as a modern translation and comments by Spandagos. These books present the essence of the scientific knowledge of the time on Optics and some aspects of Mathematical Astronomy using 3D geometry for the theoretical proofs. The books contain a large number of theorems and propositions of Mathematical Astronomy. The reader will have a good idea of the advanced status of exact Optics and Astronomy of the fourth century B.C. I believe that Euclid in "*Phenomena*" presents only a small part of the Astronomy of his time, as one can infer comparing this work with Autolycus books on "*Epitoles of stars*" and "*Spherica*". This is the second publication of "*Phenomena*" in Greece, 11 centuries after its appearance in the Byzantine period. The book contains comparisons of "*Phenomena*" with Autolycus's books (mainly "*On the moving Sphere*") and the book of Theodosius "*Spherica*", which is another rare book in preparation by Spandagos. Euclid's "*Phenomena*" is one of the very first books of Physics (Mechanics). These two inexpensive and easy to find books are an important contribution to the Greek literature, since they give access to the original text.

Finally, the book "*Astronomy*" by the well known astronomers and writers Simon & Jaqueline Mitton (I personally like their books) has been translated into Greek and published by Doudoumis publishing company. The book, originally published by Oxford University press, is very well written and it is suitable for the amateur astronomer and for the non-specialist. It is worth buying a copy to a non-astronomer friend as a nice present.

Review by Kleomenis Tsiganis, Ph.D. student, University of Thessaloniki, tsiganis@astro.auth.gr

During the last 20 years, a series of new and fascinating phenomena were discovered in the field of celestial mechanics, in particular concerning the motion of celestial bodies in our solar system. Most of this progress emanated from understanding the importance of chaotic motion in Hamiltonian systems and the subsequent application of the methods of nonlinear dynamics in astronomical models, such as the notorious three-body problem. Since the early 80's, with the pioneering work of Jack Wisdom, the amount of scientific literature produced on these topics and the variety of long-standing problems that were solved (or those that we only recently began to understand) is enormous. Typical examples include the formation of the Kirkwood gaps in the asteroid belt, the origin of Near-Earth-Objects, the chaotic motion of the planets, the formation of planetary rings, the role of the Moon in the stability of the Earth's axis, etc. However, until now, the core literature, for these outstanding breakthroughs, was not conveniently located in a single comprehensive source. The classic books by Brower & Clemence (1961), Szebehely (1967), Hagihara (1970-1976), Danby (1988) and Roy (1988) were really state-of-the-art sources for their time, not reporting however on contemporary methods of celestial mechanics.

Finally, a new publication that, to quote Prof. B. Marsden (the "*space-cop*", Director of the *Minor Planet Center* at the Harvard-Smithsonian Center for Astrophysics), "*beautifully bridges the gap between the old and the new celestial mechanics*", appeared last year. The title is "**Solar System Dynamics**" (Cambridge University Press) and it is written by Professors **Carl Murray** (Queen Mary and Westfield College, London) and **Stanley Dermott** (University of Florida, Gainesville). So far it has received excellent critics from top researchers in solar system science and is expected to become the new "classic" reference source. Its content reviews the basic knowledge prior to 1980, starting from Kepler's laws, the two-body problem, the restricted three-body problem, potential theory and development of the disturbing function, satellite theory and the Laplace-Lagrange planetary theory of secular motion. Furthermore, it includes chapters on chaotic motion and long-term stability, resonant motion and planetary rings. Within each chapter all major scientific advances and newly applied methods, up to 1999, are reported. Despite being written by mathematicians, it can be easily read by physicists, since some of the math-oriented terminology of Celestial Mechanics is changed and the mathematics is clearly presented. Moreover, the book is accompanied by a free *Mathematica* software package that includes animations and computational tools referring to its contents. More information can be found in <http://ssdbook.maths.qmw.ac.uk>