

# Where is MIDAS Available?

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Institutes interested in using MIDAS

must sign a User Agreement before distribution material can be shipped. The necessary forms can be obtained by contacting Resy de Ruijscher at the Image Processing Group (ESO-Garching, address on the last page) or by sending an e-mail message to "midas@eso.org".

Date	Institute	Location
<b>Argentina</b>		
14 Jul 92	Instituto de Astronomía y Física del Espacio	Buenos Aires
<b>Australia</b>		
23 Jun 92	Mount Stromlo and Siding Spring Observatory	Weston A.C.T.
<b>Austria</b>		
05 Nov 90	Institut für Astronomie der Universität Innsbruck	Innsbruck
06 Nov 90	Institut für Astronomie der Universität Wien	Wien
23 Jun 91	Institut der Astronomie der Universität Graz	Graz
<b>Belgium</b>		
12 Nov 90	University of Antwerp	Antwerpen
18 Nov 90	Institut d'Astrophysique de Liège	Liège
18 Nov 90	Koninklijke Sterrewacht van België	Brussel
25 Nov 90	Sterrenkundig Observatorium	Gent
17 Mar 92	Université Libre de Bruxelles	Bruxelles
<b>Bulgaria</b>		
15 Jun 92	Bulgarian Academy of Sciences	Sofia
<b>Canada</b>		
08 Jan 91	Dept. of Physics and Astronomy/Univ. of Calgary	Calgary, Alberta
<b>Chile</b>		
08 Jan 92	Pontificia Universidad Católica de Chile	Santiago
31 May 92	Instituto Isaac Newton	Santiago
<b>P.R. China</b>		
12 Mar 91	Beijing Astronomical Observatory	Beijing
09 Sep 91	Shanghai Observatory	Shanghai
<b>Czechoslovakia</b>		
24 May 92	Ondrejov Observatory	Ondrejov
15 Jun 92	Astronomical Institute, Slovak Academy of Sciences	Bratislava
<b>Denmark</b>		
04 Nov 90	Niels Bohr Institut	Copenhagen
<b>Estonia</b>		
05 Nov 90	Tartu Astrophysical Observatory	Toravere
<b>Finland</b>		
02 Nov 90	University of Helsinki Observatory	Helsinki
<b>France</b>		
11 Nov 90	Observatoire de Lyon	St. Genis Laval
11 Nov 90	Observatoire de Meudon	Meudon
11 Nov 90	Groupe d'Astrophysique de Grenoble	Grenoble
12 Nov 90	CEN-SACLAY/DPHPE/SEPH	Gif/Yvette
18 Nov 90	Observatoire de Marseille	Marseille
18 Nov 90	Observatoire de Haute-Provence	St. Michel l'Observatoire

Date	Institute	Location
25 Nov 90	Laboratoire d'Astronomie Spatiale	Marseille
29 Nov 90	Département d'Astrophysique Université de Nice	Nice
06 Dec 90	Petrou Service d'Astrophysique	Gif-sur-Yvette
11 Dec 90	Equipe d'Astrophysique Université Montpellier II (Sciences)	Montpellier
02 Dec 90	Centre d'Océanologie de Marseille	Marseille
13 Dec 90	Laboratoire de Cancérologie Expérimentale, Faculté de Médecine	Marseille
20 Jan 91	Institut d'Astrophysique de Paris	Paris
12 Mar 91	Observatoire de la Côte d'Azur	Nice
15 Apr 91	Observatoire Midi Pyrénées	Bagnères Bigorre
02 Jul 91	Observatoire Astronomique de Strasbourg	Strasbourg
02 Sept 91	Observatoire de Besançon	Besançon
10 Jan 91	Laboratoire de Mécanique et d'Acoustique	Marseille
03 Jul 91	LSEET, Université de Toulon	La Garde
13 Feb 92	Centre de Physique Théorique	Marseille
18 Feb 92	Centre d'Etude Spatiale des Rayonnements	Toulouse
26 Mar 92	IRAM	St.-Martin-d'Hères
<b>Germany</b>		
05 Nov 90	Universitäts-Sternwarte München	München
06 Nov 90	Landessternwarte Königstuhl	Heidelberg
11 Nov 90	Astronomisches Institut der Universität Tübingen	Tübingen
11 Nov 90	Institut für Astronomie und Astrophysik TU Berlin	Berlin
11 Nov 90	Dr. Remeis-Sternwarte	Bamberg
12 Nov 90	Radioastronomisches Institut der Universität Bonn	Bonn
14 Nov 90	Max-Planck-Institut für Aeronomie	Katlenburg-Lindau
25 Nov 90	Max-Planck-Institut für Extraterrestrische Physik	Garching bei München
29 Nov 90	Zentralinstitut für Astrophysik	Potsdam
02 Dec 90	Institut für Theoretische Physik und Sternwarte der Universität	Kiel
02 Dec 90	Institut für Theoretische Physik und Astrophysik	Frankfurt am Main
09 Dec 90	Max-Planck-Institut für Astrophysik	Garching bei München
20 Dec 90	Max-Planck-Institut für Extraterrestrische Physik	Garching bei München
20 Jan 91	Institut für Astronomie und Astrophysik	Würzburg
31 Jan 91	Astronomisches Institut der Ruhr-Universität Bochum	Bochum
06 Feb 91	Max-Planck-Institut für Astronomie	Heidelberg

Date	Institute	Location
27 Feb 91	Max-Planck-Institut für Radio-astronomie	Bonn
03 Mar 91	Karl-Schwarzschild-Observatory (Thüringer Landessternwarte)	Tautenburg
02 Apr 91	Deutsches Museum	München
10 Apr 91	Universitäts-Sternwarte	Jena
03 Oct 91	Hamburger Sternwarte	Hamburg
17 Nov 91	Sternwarte Sonneberg	Sonneberg
21 Jan 92	Max-Planck-Institut für Kern-physik	Heidelberg
17 Jan 92	Max-Planck-Institut für Extraterrestrische Physik	Garching bei München
24 May 92	MPE-Außenstelle Berlin	Berlin
27 Oct 92	Institut für Physikalische Elektronik	Stuttgart
<b>Greece</b>		
29 Oct 91	Foundation for Research and Technology	Heraklion
<b>Hungary</b>		
02 Dec 90	Konkoly Observatory	Budapest
13 May 92	Gothard Observatory	Szombathely
<b>Ireland</b>		
05 Dec 90	The Dublin Institute for Advanced Studies	Dublin
17 Feb 91	University College Galway/Department of Physics	Galway
24 May 92	University College Dublin/Physics Department	Dublin
<b>India</b>		
09 Dec 90	Indian Institute of Astrophysics	Bangalore
13 Dec 90	Inter University Centre for Astronomy and Astrophysics	Pune
11 Jul 91	Udaipur Solar Observatory	Udaipur
27 Feb 91	U.P. State Observatory	Nainital
02 Nov 92	ISRO Satellite Centre	Bangalore
<b>Italy</b>		
18 Nov 90	ASTRONET Documentation Facility	Trieste
07 Jan 91	Dipartimento Scienze Fisiche	Napoli
07 Jan 91	Istituto T.E.S.R.E./C.N.R.	Bologna
08 Jan 91	Istituto di Fisica Cosmica	Milano
08 Jan 91	Osservatorio Astrofisico di Arcetri	Firenze
07 Jan 91	Istituto di Fisica Cosmica e Applicazione dell'Informatica/CNR	Palermo
07 Jan 91	Stazione Astronomica – Cagliari	Cagliari
28 Jan 91	Dipartimento di Fisica, Università della Cantabria	Arcavacata di Rende
20 Feb 91	Teramo Astronomical Observatory	Teramo
10 Mar 91	IFSI-CNR	Frascati, Roma
10 Mar 91	Dip. Astronomia Università di Bologna	Bologna
10 Mar 91	Cattedra di Astrofisica, Università di Perugia	Perugia
02 Apr 91	International Center for Relativistic Astrophysics	Roma
02 Apr 91	Osservatorio Astronomico di Capodimonte	Napoli
02 Apr 91	Osservatorio Astronomico di Brera	Milano
02 Apr 91	Astronomical Observatory	Monte Porzio Catone, Roma
24 Apr 91	Osservatorio Astronomico di Trieste	Trieste
24 Apr 91	Osservatorio Astronomico di Palermo	Palermo
13 May 91	Dipartimento di Fisica, Università di Milano	Milano
22 May 91	Istituto Astronomico	Roma
05 Aug 91	Osservatorio Astronomico di Padova	Padova
05 Aug 91	Osservatorio Astronomico di Torino	Pino Torinese, Torino

Date	Institute	Location
06 Jan 92	Scuola Normale Superiore	Pisa
30 Jan 92	SISSA	Trieste
11 May 92	Istituto Astrofisica Spaziale	Frascati
<b>Israel</b>		
10 Sep 91	School of Physics and Astronomy/ Tel Aviv Univ.	Ramat Aviv
<b>Japan</b>		
21 Oct 91	National Astronomical Observatory	Tokyo
15 Jun 92	University of Tokyo	Tokyo
<b>Mexico</b>		
04 Mar 91	Instituto Nacional de Astrofisica, Optica y Electrónica	Puebla
<b>The Netherlands</b>		
18 Nov 90	Astronomical Institute, University of Amsterdam	Amsterdam
25 Nov 90	Space Research Organization Netherlands	Utrecht
24 Jan 91	Kapteyn Astronomical Institute	Groningen
14 Apr 91	Laboratory for Space Research	Groningen
11 Jul 91	Sterrewacht Leiden	Leiden
17 Nov 91	Astronomical Institute BBL	Utrecht
05 Mar 92	ESA Astrophysics Division	Noordwijk
<b>New Zealand</b>		
06 Dec 90	Department of Physics University of Canterbury	Christchurch
<b>Poland</b>		
17 Feb 91	Astronomical Observatory of the Warsaw University	Warszawa
09 Sep 91	Institute of Astronomy/N. Copernicus University	Torun
<b>Portugal</b>		
24 Mar 92	Centro de Astrofisica da Universidade do Porto	Porto
<b>Russia</b>		
13 Jan 91	Institute of Astronomy, Russian Academy of Sciences	Moscow
<b>Spain</b>		
11 Nov 90	Universidad Complutense Facultad de Físicas	Madrid
25 Nov 90	Laboratori d'Astrofisica I.E.C.	Barcelona
07 Jan 91	Nordic Optical Telescope	Santa Cruz de La Palma
10 Mar 91	ESA Villafranca Satellite Tracking Station	Madrid
10 Apr 91	Dept. de Fisica Moderna, Facultad de Ciencias/Univ. de Cantabri	Santander
22 Apr 91	Universidad Autónoma de Madrid	Madrid
30 Oct 91	Instituto de Astrofisica de Canarias	Tenerife, Islas Canarias
04 Mar 92	Centro Astronómico de Yebes	Guadalajara
<b>South Africa</b>		
15 Oct 92	University of South Africa	Pretoria
<b>Sweden</b>		
11 Nov 90	Astronomical Observatory	Uppsala
11 Nov 90	Stockholm Observatory	Saltsjöbaden
02 Dec 90	Lund Observatory	Lund
04 Jun 91	Onsala Space Observatory	Onsala
<b>Switzerland</b>		
18 Nov 90	Observatoire de Genève	Sauverny
11 Jan 91	Astronomisches Institut der Universität Basel	Binningen
19 Feb 91	Institut d'Astronomie/Université de Lausanne	Chavannes-des-Bois
16 Jun 91	Institute of Astronomy ETH Zürich	Zürich
24 May 92	University of Berne/Astronomical Institute	Berne



Date	Institute	Location
<b>Turkey</b>		
26 May 91	Istanbul University Observatory Research Center	Istanbul
<b>Ukraine</b>		
28 Feb 91	Main Astronomical Observatory, Ukrainian Academy of Sciences	Kiev Goloseevo
<b>United Kingdom</b>		
13 Nov 90	Armagh Observatory	Armagh
19 Aug 91	Leicester University X-ray Astronomy Group	Leicester
24 May 92	University College London/Optical Science Lab.	London
20 Oct 92	Department of Astronomy/University of Manchester	Manchester
<b>United States</b>		
02 Dec 90	Physics Dept., University of Wisconsin	Madison
19 Apr 91	NASA/IUE Observatory	Lanham
24 Apr 91	University of Wisconsin Astronomy Department	Seabrook Madison

Date	Institute	Location
20 Jun 91	Smithsonian Astrophysical Observatory	Cambridge
23 Jun 91	Space Telescope Science Institute	Baltimore
29 Sep 91	University of Wisconsin/Space Physics Dept.	Madison
03 Oct 91	NASA Goddard Space Flight Center	Greenbelt
03 Oct 91	Canada-France-Hawaii-Telescope Corp.	Hawaii
17 Nov 91	University of Colorado	Boulder
31 May 92	University of Maryland	College Park
29 Jul 92	Penn State University	University Park
06 Aug 92	Naval Research Laboratory/Space Science Division	Washington
10 Nov 92	Steward Observatory	Tucson
<b>Uruguay</b>		
31 Mar 92	Departamento de Astronomía/Facultad de Ciencias	Montevideo
<b>Venezuela</b>		
23 Oct 91	Centro de Investigaciones de Astronomía	Merida

# The End of the Earth?

Titles play an important role in all areas of communication. A catching line on top of a long (and boring) text seduces the reader to have a closer look – you realize of course that that is exactly the reason why you are reading this! The boulevard press plays this game all the time, and most often you will find that the implied sensation isn't one, after all. But you spend your valuable time reading on to the end... hoping that something really interesting will show up further down the column.

Scary titles like the one above sell well nowadays. That is at least the impression we just had here at ESO, trying to answer a true deluge of questions about cosmic catastrophes. During the recent months, newspapers all over the world have been full of stories about "Lurking Danger from Space", "Giant Comet Will Collide with the Earth", "The World Ends in 2126", and the like. Solar-system astronomers from many countries have done their best to explain a frightened public about the real risks of cosmic collisions, why the dinosaurs were extinguished, how many Megatons the energy of a 1-km asteroid moving at 20 km/sec is equivalent to, how big the hole will be or what happens if it falls into the ocean, etc.

Much of this activity is the outcome of the recent announcement about the possibility that the Earth may be hit by comet P/Swift-Tuttle, which was finally recovered earlier this year after 130 years. This comet, which is named after

two American astronomers who discovered it in 1862, was already seen in Beijing in 1737, and possibly even much earlier in that same country. It seems to have a rather unpredictable motion because of irregular outgassing from the cometary nucleus which causes a variable, decelerating jet-effect. This is known as the "non-gravitational force", a phenomenon that has been known since the 1820's, when it was found impossible to explain the motion of comet P/Encke by the gravitational attraction from the Sun and the planets alone.

Extrapolating the motion of P/Swift-Tuttle forwards in time, it can be seen that it will take about another 134 years before it again comes close to the Earth. According to one particular orbital prediction, and further assuming that the comet for some reason will be about 14 days late, it can be shown that it will pass very close to the Earth on August 14, 2126; a further empirical fine-tuning of the predicted orbit will actually make it collide with the Earth. The very whisper about this possibility was of course more than enough to immediately alert the media; from a vague possibility with a lot of "if's", the unavoidable took its course and in many newspapers a disastrous collision soon became the firm reality. Most of the reports of course completely failed to mention the vanishing probability of such an event – if the comet would be just a few minutes too early or too late, it would pass by

without any damage, although it would still be a very spectacular sight in the sky.

Such encounters with long-period comets are much more rare than asteroid fly-bys. For instance, the one on December 8 by (4179) Toutatis was pretty close, at a distance of about 3.5 million kilometres only, and giving the astronomers a great opportunity to watch an asteroid from close quarters. Since asteroids are not plagued by non-gravitational forces (they supposedly have no ices which evaporate when they are near the sun), Toutatis' orbit can be calculated with great accuracy and there is no risk that it hits the Earth, at least this time. Still, there have been reports in the press that this will surely happen in a not too distant future.

As a solar-system astronomer, I must admit that I read such catastrophic reports with very mixed feelings. On the one hand, it gives you an impression of being a useful member of society when the media ask you to express your opinion about these events, and especially when you can put things right by referring to the extremely low probability of something disastrous happening. (You may sometimes have a brief thought about the precarious position of the astronomer-priests of earlier ages who were believed to be the masters of nature, at least until they made a wrong prediction).

On the other hand, I think that we astronomers must be extremely cau-