The Armagh Observatory Revised Business Plan 2006/2007

Revised Business Plan for Period 1 April 2006 to 31 March 2007

Prepared by the Director

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2006 October 23

1 Summary

This Business plan, prepared half-way through the financial year, supersedes that submitted to the DCAL in March 2006 and presented to and agreed by the Board of Governors of the Armagh Observatory and Planetarium at their annual meeting on 2006 March 30. The principal changes refer to new key performance indicators and Business Plan targets agreed with the DCAL in-year, and new priorities and targets agreed in response to the provision of additional funding under the DCAL Skills and Science programme.

1.1 Review of Prior Year

1. The Armagh Observatory achieved considerable success during 2005/2006. During 2005, Armagh Observatory staff produced a record 47 publications in refereed scientific journals, and the number of identified media citations (349) and the number of Distinct e-Visitors to the Observatory web-sites (http://star.arm.ac.uk/, http://climate.arm.ac.uk/ and http://arpc65.arm.ac.uk/∼spm/), namely 1,012,000, were also all-time records. Total external grant receipts during Financial Year 2005/2006 were approximately £208,000, above the target of £200,000 set in April 2005, and the total external income, considering all sources, was £221,000.

2. With sufficient resources to carry out its work, the Observatory remains in a strong position to maintain this level of activity and to play an influential role in UK and international astronomy for years to come. In recent years, however, the organization's capacity to plan strategically has been put at risk by insufficient funding. The principal risk is that more than a decade of improved performance in virtually every aspect of the Observatory's activities could be undermined.

3. In order to avoid this risk materializing, it is essential that the Observatory has access to a secure level of grant-in-aid adequate for its needs and sufficient to support a reasonable number of senior research-active staff. The two issues are closely connected; total salary costs (approximately £700k) amount to approximately 70% of total expenditure. In 2001 there were, for a time, 6 Research Astronomers in post but this fell to 3 in 2005. Indeed, in 2004/2005 the Bloomfield Report had concluded that it was desirable to recruit at least 2 new Research Astronomers, and preferably 3 or 4 such staff, bringing the total to between 7 and 9 such staff. For these reasons, it was agreed to replace in the current financial year at least those staff who had left.

4. The resulting recruitment process, which was started during summer 2006, is designed to increase the number of senior Research Astronomers. This is to increase the Observatory's capacity to attract external grant income; to increase the Observatory's research output; and to maintain or improve the Observatory's position in the forthcoming Research Assessment Exercise (RAE), which has a census date 2007 October 31. The recruitment process is expected to be completed by the end of the year.

5. Background information about the Armagh Observatory is provided in Appendix A. The Observatory's contribution to the New Targeting Social Need programme is provided in Appendix B.

1.2 Review of Present Year to Date

1. Up to the end of 2006 September, the number of publications in refereed scientific journals was approximately 30; the number of identified media citations was in excess of 200; and the number of Distinct e-Visitors to the Observatory web-sites was in excess of 1.1 million. Total external grant receipts were approximately £88,100, reflecting the lower grant-earning potential of an observatory with just 3 Research Astronomers.

2. At the start of the year, the Observatory's element of the total DCAL recurrent grant was £660,000, the same in cash terms as it had received the previous year, the year before that, and the year before that as well. Salary inflation is inexorable, and it is not possible to maintain a high level of research activity without additional income. In the past, additional funds have been obtained from (1) external grant income (e.g. from sources such as CosmoGrid and the PPARC), and (2) successful in-year bids to the DCAL to support specific in-year projects and other activities.

3. Early in financial year 2006/2007 the Armagh Observatory and Planetarium were together awarded significant additional funds from the Government's new Skills and Science Funding Package, announced by the Secretary of State towards the end of February 2006. The overall objective of this

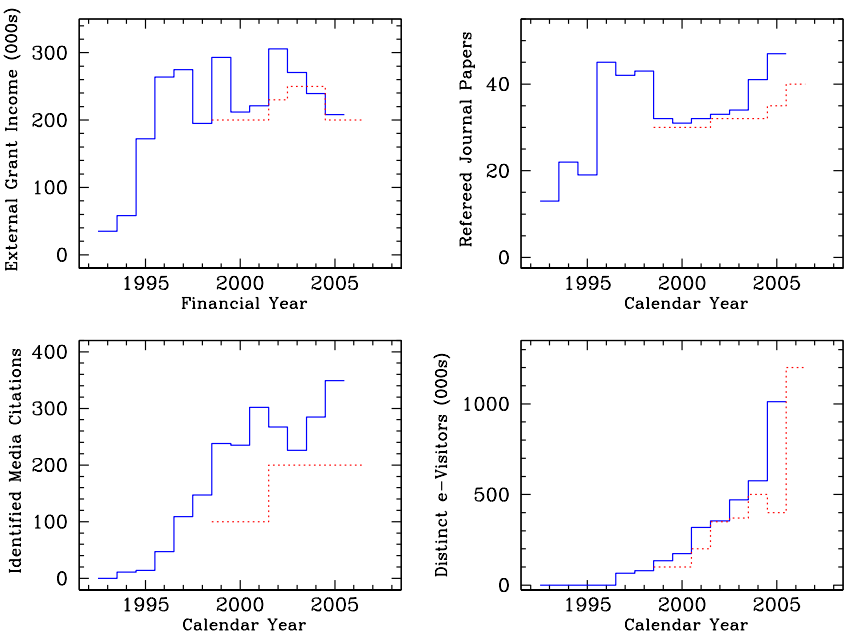

Figure 1: Histograms showing various performance indicators for the Armagh Observatory during the past decade. The different panels show the variation of External Grant Income (£000s) per financial year, the number of Refereed Journal Publications, the number of Identified Media Citations and the number of Distinct e-Visitors, all per calendar year. Solid lines denote actuals; dotted lines, prior-year Business Plan targets. The financial year runs from 1 April to 31 March, so external grant income for 2005 corresponds to the period 1 April 2005 to 31 March 2006 and so on.

funding programme is "to enhance investment in skills and training programmes for employment for young people, to tackle economic inactivity, increase the skills of the working age population and improve the science base to compete more effectively in highly skilled international markets and to complement this with targeted investment in research and development and promoting greater links between industry and the research base". The Armagh Observatory and Planetarium have agreed that the amount, £300,000 per annum in each of 2006/2007 and 2007/2008, will be divided so that the Observatory receives £125,000 in 2006/2007 and £175,000 in 2007/2008.

4. The Observatory's contribution to the DCAL's component of the Skills and Science initiative requires it to (i) deliver a work-experience programme between May 2006 and June 2008; (ii) provide an education and outreach programme catering for a minimum of 1,000 children per annum between October 2006 and June 2008; and (iii) deliver three highly trained PhD graduates into the workforce in each of the next two years.

This revised Business Plan provides a summary, in Table 1, of the Observatory's Income and Expenditure during the past two years and the corresponding budget for 2006/2007 taking account of additional Skills and Science activities. The following Table 2 shows revised Business Plan targets for new key performance indicators agreed during the first half of 2006. In order to maintain a link with previous Business Plans, Figure 1 shows the yearly trend of previous key performance indicators, full details of which are presented in tabular form in Table 3.

These data demonstrate that the Armagh Observatory has consistently achieved a high level of scientific output and an exceptionally high public profile at the regional, national and international level during recent years. Staff at the Armagh Observatory play an influential role in UK and international astronomy and make a unique contribution to projecting a positive image of Northern Ireland, and Armagh City and District, on the world stage.

1.3 Objectives and Targets for 2006/2007

The Observatory's Mission is to advance the knowledge and understanding of astronomy and related sciences through the execution, promotion and dissemination of astronomical research nationally and

	2006/2007 Budget	2005/2006 Actual	2004/2005 Actual
Income			
DCAL Recurrent Grant	660.0	750.0	754.0
DCAL Capital Grant	6.5	41.5	129.8
DCAL Additional Restricted Funds	5.0	21.9	74.0
DCAL Skills and Science Funding	125.0		
Total DCAL Funding	796.5	813.4	957.8
External Grants and Other Restricted Funds	178.0	167.4	226.4
Miscellaneous Income	11.0	12.9	11.0
Total External Grants and Other Income	189.0	180.3	237.4
Total Income	985.5	993.7	1195.2
Expenditure			
Research and Research Support Costs	647.0	769.2	847.1
Skills and Science Costs	125.0		
Buildings, Buildings Refurbishments and Grounds Costs	125.0	137.1	251.7
Administration and Corporate Governance Costs	88.5	72.8	78.0
Total Expenditure	985.5	979.1	1176.8

Table 1: Summary of Armagh Observatory Income and Expenditure, presented on an accrual basis. Income is separated into two principal categories: DCAL sources, and External Grants and Other Income. Expenditure is presented under the principal headings of Research and Research Support Costs; Buildings, Buildings Refurbishments and Grounds Costs; and Administration and Corporate Governance Costs. The Table was last updated on 2006 October 21. All tabulated values have been rounded, in comparison with the Accounts, to the nearest £100.

Year	Percentage Rate of Return	Percentage Administration Efficiency	Number of Days Absence Per Person Per Year	Number of Refereed Scientific Journal Publications Per Year
2006	20.0	10.0	12.0	40

Table 2: Targets for 4 key performance indicators for calendar year 2006 or financial year 2006/2007. Targets are expressed in round figures.

internationally in order to enrich the intellectual, economic, social and cultural life of the community. In order to achieve this goal, the principal objectives during 2006/2007 are to:

- maintain existing high-quality research programmes;
- obtain grants and additional external funding to support new research projects;
- strengthen the Observatory's research capability in solar system and stellar astrophysics in readiness for the next Research Assessment Exercise (RAE 2008; census date 31 October 2007);
- enhance the Observatory's use of research infrastructure such as CosmoGrid, the Southern African Large Telescope (SALT), and the Northern Ireland Regional Area Network (NIRAN);
- promote use of the Armagh Observatory Grounds and Astropark, and widen access to astronomy at Armagh by continuing to develop the Observatory's Education and Public Outreach (EPO) programme;
- progress plans for a new Library, Archives and Historic Scientific Instruments Building; and
- deliver the Skills and Science programme, the targets for which are outlined below in Section 1.6.

Relevant targets for these objectives, which together span the Observatory's principal areas of activity (research, education and public outreach, and heritage), are indicated in Table 3.

1.4 Key Tasks

There are two key tasks for the year ahead, namely to:

1. recruit additional, high-quality senior research staff; and
2. deliver the Observatory's commitments under the Skills and Science programme.

The first is to maintain the heritage of frontline astronomy at Armagh and to lay a strong foundation for the forthcoming Research Assessment Exercise. Replacing the senior research staff who left the organization during 2005 will ensure that the Observatory's ability to obtain external research grants, and to respond to new Government education and research initiatives, is not compromised.

The second task is linked primarily to delivery of the DCAL's component of the Skills and Science Funding Package, which under the heading "The Appliance of Science" is aimed primarily at encouraging young people to consider careers and opportunities in science in Northern Ireland.

Table 1 shows that the total projected income and expenditure for 2006/2007 is approximately £985.5k.

Pension Provision Owing to a change in the regulations affecting pensions, the Observatory's pension provider, the NILGOSC, now has to provide details of each contributing institution's share of the total scheme assets and liabilities. Under Financial Reporting Statement 17, the Armagh Observatory therefore has to incorporate its share of the pension scheme's assets and liabilities, as computed by the scheme actuary, and the information has to be incorporated into the accounts for 2006/2007.

If the pension scheme is in deficit, which is likely to be the case, bearing in mind the overall scheme deficit, the Observatory will therefore need to create a provision in the accounts for the corresponding amount. This will affect the balance sheet for 2006/2007, but as the amount is not known at the time of writing the amount of the required pension provision is not included in this year's Business Plan. It should be noted, however, that if the required sum is not matched by additional in-year funds from the DCAL, the accounts will inevitably show a deficit.

1.5 New Key Performance Indicators

In discussions with the DCAL during the first half of 2006, four new key performance indicators were agreed. These are as follows:

1. total external income as a percentage of overall income, representing the 'rate of return' on DCAL investment in astronomy at Armagh;

2. total administration costs as a percentage of total costs, representing the 'efficiency' of the Observatory's governance and administration systems in delivering high-quality astronomical research for the lowest reasonable cost;

3. average number of days absence per person per year, representing the motivation and commitment of Armagh Observatory staff to their work; and

4. total number of scientific papers in refereed scientific journals per year, representing the volume of highest quality scientific output of Observatory staff per calendar year.

The first three of these key performance indicators have been chosen so as to align with those of other DCAL-funded NDPBs. This will allow rough comparisons to be made between the performance in these areas of different government-funded organizations. The fourth key performance indicator, in common with the first, provides a measure of the Observatory's performance as a third-level astronomical research institute.

For ease of reference, the 2006 targets for the new key performance indicators are presented in Table 2.

1.6 Skills and Science Programme

The Observatory's Skills and Science programme seeks to (i) deliver a work-experience programme between May 2006 and June 2008; (ii) provide an education and outreach programme catering for a minimum of 1,000 children per annum between October 2006 and June 2008; and (iii) deliver three highly trained PhD graduates into the workforce in each of the next two years.

As part of this activity, the Observatory will recruit additional staff during 2006/2007: a Skills and Science postdoctoral research fellow with some postgraduate and postdoctoral assistance, and new Research Astronomers to help supervise and train the Observatory's PhD students and to participate in the Observatory's EPO programme and enhance its capacity to offer periods of work experience for school children.

Calendar Year	DCAL Grant-in-Aid (£000s)				External Grant Income (£000s)		Refereed Scientific Journal Publications		Distinct e-Visitors (000s)		Identified Media Citations		RAE Grade	Days Absence Per Person Per Year	
	Recurrent Funding	Capital Funding	Additional Funding	Total	Actual	Target	Actual	Target	Actual	Target	Actual	Target	Actual	Actual	Target
1992	374.0	83.3	0	457.3			14						4		
1993	399.0	46.0	0	445.0	35.0		13								
1994	369.5	33.6	22.5	425.6	58.0		22				11				
1995	412.5	56.0	0	468.5	172.0		19				14				
1996	424.0	56.0	0	480.0	264.0		45				47		4	0.4	
1997	428.0	37.7	7.5	473.2	275.0		42		66		109			3.8	
1998	418.0	25.0	0	443.0	195.0		43		80		147			0.3	
1999	452.0	6.5	0	458.5	293.0	200	32	30	134	100	238	100		0.5	
2000	452.0	6.5	80.0	538.5	212.0	200	31	30	174	100	235	100		0.3	
2001	466.0	7.5	240.0	713.5	221.3	200	32	30	318	200	302	100	4	1.8	
2002	616.0	7.5	110.0	733.5	305.7	230	33	32	354	350	267	200		0.2	
2003	660.0	6.5	115.0	781.5	270.4	250	34	32	470	370	226	200		0.4	
2004	660.0	6.0	218.0	884.0	239.4	250	41	32	576	500	284	200		0.4	
2005	660.0	6.5	125.0	791.5	207.9	200	47	35	1012	400	349	200		0.4	13
2006	**660.0**	**6.5**	**125.0**	**791.5**		**200**		**40**		**1200**		**200**			**12**

Notes to Table of Performance Indicators:

1. Financial figures refer to the corresponding financial year, so that recurrent funding for 2005 refers to the total DCAL recurrent funding received in cash terms during 2005/2006 and so on. All other figures are per calendar year.
2. Total DCAL grant-in-aid, i.e. income received in cash terms during each financial year, is broken down into Recurrent Funding, Capital Funding and Additional Funding (both Resource and Capital). The latter represents additional funding provided by the DCAL in response to competitive bids from the Observatory to support specific in-year projects and other activities.
3. The Table includes a statement of the Sickness Record for Armagh Observatory staff, defined as the ratio S/N, where S is the total number of days lost due to staff sickness per calendar year, and N is the total number of staff in post at the end of the corresponding year. It is noteworthy that the results under this heading are many times better than the best recorded in any government department or higher education institution (these figures range between 3 and 17 days per person per year). The results reflect the strong commitment and motivation of Armagh Observatory staff to their work. For comparison, the DCAL sickness targets for 2005/2006, 2006/2007 and 2007/2008, which refer to the percentage of working days lost, are 5.8%, 5.3% and 5.0%. Assuming 220 working days in a year, the corresponding DCAL targets are respectively $S/N = 12.8$, 11.7 and 11.0.
4. Targets for calendar year 2006 (or financial year 2006/2007) include the Additional Funding (£125,000) provided by the DCAL from the Skills and Science funding package. Targets are expressed in round figures.

Table 3: Trends of income and expenditure together with a comparison of actual results versus targets for various performance indicators (PIs) versus calendar year.

A Institutional Background

Vision

The Vision of the Armagh Observatory is:

> *"To maintain and build on its position as a thriving astronomical research institute, and to continue to expand our understanding of the Universe and of humanity's place in it."*

The Mission is:

> *"To advance the knowledge and understanding of astronomy and related sciences through the execution, promotion and dissemination of astronomical research nationally and internationally in order to enrich the intellectual, economic, social and cultural life of the community."*

The Armagh Observatory (see http://star.arm.ac.uk/) is a modern astronomical research institute, the oldest scientific institution in Northern Ireland. Founded by Archbishop Richard Robinson in 1790 as part of his dream to see the creation of a university in the City of Armagh, the Observatory stands close to the centre of the City of Armagh together with the Armagh Planetarium in approximately 14 acres of attractive, landscaped grounds known as the Armagh Astropark. The Observatory Grounds and Astropark include scale models of the Solar System and the Universe, two sundials and two historic telescopes, as well as telescope domes and other outdoor exhibits (see http://star.arm.ac.uk/astropark/). A new public outreach facility, the Armagh Human Orrery (see http://star.arm.ac.uk/orrery/), is located close to the historic main building of the modern Observatory. The Observatory's Library and Archives, and its specialist collection of scientific instruments and artefacts associated with the development of modern astronomy over more than two hundred years, rank amongst the leading collections of their kind in the UK and Ireland.

The principal function of the Armagh Observatory, which is a third-level institution funded by the Northern Ireland Department of Culture, Arts and Leisure (DCAL), is to undertake original research of a world-class academic standard that broadens and expands our understanding of astronomy and related sciences. In recent years key programmes have focused on Stellar Astrophysics, the Sun, Solar System astronomy, and Solar System – Earth relationships including the Sun's influence on climate and the impact of interplanetary dust, comets and asteroids on the Earth. Other activities include maintaining the unique 210-year meteorological series and data-bank (http://climate.arm.ac.uk/), the longest in the UK and Ireland from a single site, and playing a key role together with the Armagh Planetarium in promoting the public understanding of astronomy and related sciences.

Senior research staff at the Observatory are employed as Research Astronomers on a scale equivalent to the NICS Grade 7, which is roughly equivalent to the level of a university senior lecturer, reader or professor. Postgraduate students are registered at various UK and other European universities, but they are normally registered at the Queen's University of Belfast (QUB), which has recognized the Observatory as an approved institution for the supervision of PhD and MPhil. students. There is currently a fluctuating population of around 20 research staff including students, who are supported by a pool of 2 technical (computer-related) staff, 1 librarian, 1 secretary, 1 finance officer, and a senior administrator shared (50%) with the Armagh Planetarium. The 14 acres of landscaped Observatory Grounds and Astropark are maintained by an assistant groundsman and a senior grounds/meteorological support officer, the latter responsible also for taking the daily meteorological readings.

Technical equipment at Armagh, which is used primarily for numerical analysis, computer modelling and data reduction, is funded by the PPARC, PRTLI, and the DCAL. Facilities presently comprise several iMac workstations, approximately 40 Linux workstations and peripherals, and a computer cluster comprising 25 dual-processor work nodes and one master node with a total of 50 GB memory. These are used mainly for computationally intensive research projects in areas such as solar physics, stellar atmospheres, numerical magneto-hydrodynamics, and solar system dynamics.

The internal network is a 1 Gbps backbone ethernet linked with switched hubs. The external network is connected to the Joint Academic Network (JANET) through a 10 Mbps link provided through the Observatory's participation in the Northern Ireland Regional Area Network (NIRAN). The increase in the Observatory's network capacity together with a continuing programme of equipment upgrades provides the capacity for the Observatory to participate in new developments such as the Virtual Observatory, the UK AstroGRID, the European Grid of Solar Observatories, the ESA SpaceGRID, and GRID Ireland. Access to Grid technology is currently provided via CosmoGrid (http://www.cosmogrid.ie/). This provides access to three high-performance supercomputer clusters, each comprising 128×1 GHz PCs, one in Galway and two in Dublin (DIAS and UCD).

Armagh Observatory staff regularly receive awards of telescope time on national and international facilities, and research grants from various grant awarding bodies. The Observatory is also a member of the UK SALT Consortium (UKSC), providing access to the 10-metre class Southern African Large Telescope (SALT: see http://star.arm.ac.uk/SALT/), located at the Sutherland Observatory, South Africa. The recent restoration of the Observatory's historic telescopes has brought opportunities to reintroduce professional observing from Armagh, both for research and student training, particularly through use of the 18-inch Calver reflector equipped with a new CCD camera and by the creation of a new video camera system systematically to record meteors.

Research interests of Observatory staff currently focus on (i) Stellar and Galactic Astrophysics (including star formation, brown dwarfs, hot stars, helium stars); (ii) the Sun (the dynamic solar atmosphere, chromosphere and corona, and Sun-Earth relationships including climate); and (iii) Solar System Astronomy (including celestial mechanics, planetary science, the interrelationships between comets, asteroids, meteoroids and interplanetary dust, and NEOs). In addition, Observatory staff participate in an active programme of education and public outreach via lectures, popular astronomy articles and interviews with the press, radio and television. Further details concerning recent and current research interests of Armagh Observatory staff may be obtained from the Observatory web-site, at http://star.arm.ac.uk/.

The Armagh Observatory participates in the UK Research Assessment Exercise (RAE), held in 1992, 1996, and 2001. This gives external partners, such as UK charities and the research councils, information upon which to base their funding allocations. Staff at the Observatory achieved a Grade 4 in the Physics Unit of Assessment in each of the 1992, 1996, and 2001 RAEs, corresponding to "Quality that equates to attainable levels of national excellence in virtually all of the research activity submitted, showing some evidence of international excellence." The census date for the next RAE, called "RAE 2008", is 31 October 2007.

In addition to the institution's primary research role, the Observatory has an important responsibility to maintain and preserve the fabric of the historic buildings, the library, historic books and archives, and the collection of scientific instruments and other artefacts built up over more than 215 years of continuous astronomical activity in Armagh. The main historic buildings of the Observatory have unique architectural features and together house some of the most valuable collections of scientific books, instruments and archives in Northern Ireland. Full details about the Armagh Observatory and its current research and other activities can be obtained from recent annual reports, at http://star.arm.ac.uk/annrep/.

In short, the Armagh Observatory is a modern astronomical research institute with a rich heritage. It provides a high-quality research environment and diverse opportunities for education and public outreach. The Observatory is well placed to contribute to fundamental discoveries in astronomy on the national and international stage, and to a broader appreciation locally of the importance of scholarship and research in the past and future developments of the City of Armagh and the region.

B New TSN Action Plan 2006

The Vision of the Armagh Observatory is:

> *"To maintain and build on its position as a thriving astronomical research institute, and to continue to expand our understanding of the Universe and of humanity's place in it."*

The Mission is:

> *"To advance the knowledge and understanding of astronomy and related sciences through the execution, promotion and dissemination of astronomical research nationally and internationally in order to enrich the intellectual, economic, social and cultural life of the community."*

Who We Are

The Armagh Observatory (see http://star.arm.ac.uk/) is a modern astronomical research institute, the oldest scientific institution in Northern Ireland. Founded by Archbishop Richard Robinson in 1790 as part of his dream to see the creation of a university in the City of Armagh, the Observatory stands close to the centre of the City of Armagh together with the Armagh Planetarium in approximately 14 acres of attractive, landscaped grounds known as the Armagh Astropark. The Observatory Grounds and Astropark include scale models of the Solar System and the Universe, two sundials and two historic telescopes, as well as telescope domes and other outdoor exhibits (see http://star.arm.ac.uk/astropark/). A new public outreach facility, the Armagh Human Orrery (see http://star.arm.ac.uk/orrery/), is located close to the historic main building of the modern Observatory. The Observatory's Library and Archives, and its specialist collection of scientific instruments and artefacts associated with the development of modern astronomy over more than two hundred years, rank amongst the leading collections of their kind in the UK and Ireland.

The principal function of the Armagh Observatory, which is a third-level institution funded by the Northern Ireland Department of Culture, Arts and Leisure (DCAL), is to undertake original research of a world-class academic standard that broadens and expands our understanding of astronomy and related sciences. In recent years key programmes have focused on Stellar Astrophysics, the Sun, Solar System astronomy, and Solar System – Earth relationships including the Sun's influence on climate and the impact of interplanetary dust, comets and asteroids on the Earth. The Observatory also maintains a unique 210-year long meteorological record and data-bank (http://climate.arm.ac.uk/), the longest in the UK and Ireland from a single site, and it plays a key role together with the Armagh Planetarium in promoting the public understanding of astronomy and related sciences.

In addition to the institution's primary research role, the Observatory has an important responsibility to maintain and preserve the fabric of the historic buildings, the library, historic books and archives, and the collection of scientific instruments and other artefacts built up over more than 215 years of continuous astronomical activity in Armagh. The main historic buildings of the Observatory have unique architectural features and together house some of the most valuable collections of scientific books, instruments and archives in Northern Ireland.

What We Do

Astronomy provides a singular perspective on our place in the Universe, addressing fundamental questions such as the origin of the Earth, the origin of Life, and 'Are we Alone?'. Curiosity-driven research is important in its own right and attracts the most able people into physics and astronomy. It also provides the foundation for the improvements in the quality of life and wealth creation that lie at the heart of a knowledge-based society. As our society becomes increasingly technological, the understanding of basic physical concepts becomes an integral part of our culture. Widening knowledge of these scientific concepts to other fields is therefore an increasingly important part of the role of a research scientist. Research into astronomy at Armagh Observatory brings important indirect benefits, for example by

- attracting and maintaining the interest of young people in science, and towards a scientific way of thinking;
- contributing to a better understanding of global environmental change, for example global warming;
- predicting the effects of asteroid impacts, and the effects of space debris and meteoroids on artificial satellites.

The astronomical research interests of Observatory staff currently focus on (i) Stellar and Galactic Astrophysics (including brown dwarfs, hot stars, helium stars), (ii) the Sun (the dynamic solar atmosphere, chromosphere and corona), and (iii) Solar System Astronomy (including celestial mechanics, planetary science, the interrelationships between comets, asteroids, meteoroids and interplanetary dust, and NEOs). In addition, Observatory staff participate in an active programme of education and public outreach via lectures, popular astronomy articles and interviews with the press, radio and television. Further details concerning the research interests of the Observatory staff may be obtained from the Observatory web-site at: http://star.arm.ac.uk/.

Astronomy is a highly creative cultural activity. It enjoys a strong public profile, particularly in the printed and electronic media, and in books and film, for example in Hollywood classics such as *2001: a Space Odyssey* and blockbusters such as *Armageddon* and *Deep Impact.* The fruits of astronomy have inspired artists and musicians, poets and authors, as well as scientists, engineers and philosophers. They have often provided the inspiration for works of art, musical compositions, and theatrical performances. In summary, astronomy provides an invaluable resource for education, entertainment and leisure, being featured in film, television documentaries, books and magazines that are seen or read by millions worldwide.

How We Contribute to New TSN

Astronomy is an involving, inspirational activity with the capacity to attract people, especially the young, towards science, engineering and information technology. The Armagh Observatory seeks to strengthen this interest by promoting wider access to scientific knowledge amongst all sections of the community, and disseminating the results of its scientific research through a high-profile programme of education and public outreach. The principal elements of this policy include:

- attracting visitors to Armagh, primarily to the Armagh Astropark, the Observatory Grounds and Phenology Garden, and the new Human Orrery;
- maintaining and extending the Observatory's unique meteorological record, the longest in the UK and Ireland from a single site;
- maintaining and preserving for future generations the Observatory's *cultural* heritage, for example its listed buildings, library and archives, historic scientific instruments, telescopes and telescope domes, and the landscaped grounds and Astropark;
- providing lectures and presentations to interested individuals and groups that together include people of all ages and from all backgrounds;
- partnership with institutions and organizations having similar public education objectives to those of the Armagh Observatory, for example the Astronomical Science Group of Ireland, the Armagh Natural History and Philosophical Society, amateur astronomy organizations, and university research groups;
- answering technical questions about astronomy from members of the public and disseminating astronomical results to the press, radio and television;
- maintaining and developing a web-site to facilitate access to the latest research findings on astronomy and related sciences;

The Armagh Observatory is fully committed to the New TSN Policy, and encourages an institutional culture in which resources in appropriate areas of its activities and interactions with the public are targeted so far as possible on individuals, groups, agencies, and geographical areas that have greatest social need. In this way, the Observatory contributes directly to Northern Ireland's Programme for Government, especially in enhancing access to science, and providing wider choice in education and lifelong learning opportunities for all.

Armagh Observatory New TSN Action Table 2006

Business Area:	**Astronomy and Related Sciences**
Social Need to be Tackled:	**Access to Scientific Knowledge**
Desired Outcome:	**Increased scientific knowledge, promotion of lifelong learning opportunities for individuals and disadvantaged groups, improved science skills for all**

New TSN Objectives:	**Targets or Actions and Time-Scales:**
Objective 1 Improve opportunities for individuals and disadvantaged groups to experience scientific research and learning in a high-technology environment, by:	(a) facilitating an ongoing work experience programme for a person with disabilities; and (b) monitoring participation on school and summer programme placements with reference to New TSN.
Objective 2 Improve access to Northern Ireland's scientific and cultural heritage, by:	(a) promoting e-access to astronomical and meteorological information; and (b) encouraging visits to the Observatory, and the Observatory Grounds and Astropark, by people from socially disadvantaged areas or scientifically disadvantaged backgrounds.

Armagh Observatory
February 2006