It with great pleasure that I introduce the Meteorological Service’s annual report for 1995. Its pages reveal an ever widening range of activities, centred, of course, on our core roles of weather forecasting, observations and climatological services.

A highlight early in the year was the signing of the Administrative Budget Agreement between the Secretary of the Department of Transport, Energy and Communications, John Loughrey, and myself conferring greater financial control and flexibility on the Meteorological Service. This was another welcome step in a trend towards more autonomy and accountability for the Service. The overall context is one of reducing financial resources for the Department and for the Meteorological Service and much belt-tightening was necessary in order to stay within allocations. It is a tribute to the staff that service to the public and to customers was maintained at a high standard and indeed expanded in several areas.

A major pre-occupation of the management team was an involvement in the Strategic Management Initiative (SMI) for the Meteorological Service. This was in the context of the overall SMI exercise in the Civil Service and will continue into 1996 and will form the basis for the Meteorological Service’s planning to the end of the century and beyond.

An example of the increasingly distinct role and identity of the Service within the Civil Service is of course our new logo which I hope will help to make our profile with the public an even higher one.
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MISSION STATEMENT

Our Mission is to meet the national requirement for high-quality weather forecasts and associated services, with optimum efficiency and value for money.

This Mission Statement implies that we, as the National Meteorological Service, will:

- help to ensure the protection and safety of life and property by issuing public weather forecasts and warnings
- contribute effectively to national prosperity and to government objectives by supplying relevant meteorological services to all sections of the economy
- ensure customer satisfaction by continually improving the range and quality of our forecasts, the cost effectiveness of our operations and our overall standard of service
- foster a professional and supportive work environment which attracts, retains and develops committed employees
- ensure the maintenance of a high quality and cost effective meteorological infrastructure, consistent with national requirements and resources
- meet the State's obligations to provide meteorological services to the aviation sector
- enhance the quality of our meteorological archives and provide easy and effective access to our databases
- participate in the on-going development of meteorological science and its applications in collaboration with our European partners and with the wider international community
- contribute to the effective monitoring and good management of the natural environment
Responsibility for the production of the report has now passed to the newly formed Commercial Division. This report and (hopefully!) future annual reports will be published in March - World Meteorological day, 23rd March, being a suitable target date.

With the ever increasing emphasis on a commercial approach and customer focus within the Meteorological Service, the current report marks a departure in format and content from previous ones. Readers will notice, for example, the higher quality paper and the introduction of colour. The layout has changed to encompass two ‘review’ type articles and a number of articles highlighting particular aspects of our work. Appendix II contains reports from each of our eight Divisions - such reports tended to dominate some of our previous annual publications. Other items in the appendices are Staff Movements (Appendix I), Training (Appendix III), External activities undertaken by our staff (Appendix IV) and some budgetary information (Appendix V).

Further evidence of the new businesslike attitude is our plan to take on a new corporate image starting with the adoption of a new logo - this being our first publication in which it is used (see New Logo article in this volume). Some details of a new formal Administrative Budget agreement with the Department of Transport, Energy & Communications, our parent Department, are also to be found in this annual report. We are also involved in our own Strategic Management Initiative as shown in another Spotlight article. One of the first results of this initiative is our Mission Statement quoted on the previous page. Commercial meteorological concerns on the European level have now been formalised with the formation of ECOMET - see International Affairs article.

The major article in this years report deals with meteorological observations - the raw material for essentially all activities of the Service. A summary of some of the services we provide to Government Departments and Local Authorities is to be found in the second article in this issue.

It is planned to include an article in most of our annual reports on forecast accuracy - forecast verification being an important yardstick by which we can measure our progress. This year’s article concentrates on accuracy of aviation terminal forecasts. We also have a short article on the premium rate weather service WEATHERDIAL, our major commercial revenue earner.

Finally, no annual report from the Meteorological Service would be complete without some mention of the weather during the year in question and this can be found just before the appendices.
Since the earliest days, observations have been central to meteorological activity. People whose activities were weather dependent - especially those in the marine and agricultural areas - have throughout history attempted to predict weather based on the current weather at their location. Astute observers have often been able to produce credible short range forecasts for their locations and to make decisions based on what we might now call climatological observations made over many generations. The development of and improvements in meteorological observing instrumentation followed by the invention of the telegraph in the middle of the last century led to the establishment of many National Meteorological Services (NMSs) during the second half of the nineteenth century. Standardisation of observing practice and coding and the establishment of the means of rapid international exchange of the observations ensured the success of these NMSs. In spite of the more recent developments in observing techniques all forecasting centres are still heavily dependent on the traditional weather reports, albeit the trend is for more and more of the reporting stations to become automated. Indeed, as supercomputer based Numerical Weather Prediction (NWP) models become more and more sophisticated and strive for more accurate forecasts both in the short and extended range, recent evidence seems to suggest that the limitations are due mainly to the accuracy of the initial conditions (i.e. the current observed state of the atmosphere) as presented to these models.

SYNOPTIC NETWORK

Surface reports

Reports used for forecasting purposes are usually referred to as 'synoptic' reports as opposed to 'climatological' reports. There are about 10,000 stations in the global land based synoptic network. Many of these report on an hourly basis, the remainder reporting on a three or six hour basis. Additionally there are about 7,500 mobile reporting ships as well as other marine reporting platforms (see Marine Observations below). The typical synoptic station reports conditions on the hour which include mean wind speed and direction; gusts; visibility; air, grass and soil temperature; atmospheric pressure and change tendency; cloud amounts, type and height. Most stations will report numerous other items some of which are for national use only, some for regional use and others for global distribution. An example of observations for national use would be a report at 2100 UTC of the maximum temperature read during the day.

Global Telecommunications System (GTS)

The GTS must ensure the coded observations are rapidly collected at the National Meteorological Centres (at the Meteorological Service HQ in our case), transmitted from there to Regional Meteorological Centres (at Bracknell, UK in our case) and from them to the three World Meteorological Centres (Melbourne, Washington and Moscow) and then back down the pyramid to the forecast offices which require data from an area of millions of square kilometres to produce even a short range forecast. Most of the main telecommunication circuits are high speed satellite, cable or microwave circuits but problems are still experienced in certain regions with reliability and timeliness of observations. The section for regional distribution (for distribution throughout most of Europe, in our case) includes amplified cloud information and information on special phenomena observed.

In Ireland we have synoptic stations at Belmullet, Malin Head, Rosslare, Claremorris, Birr, Clones, Kilkenny, Mullingar and an automatic station at Roche's Point. Hourly synoptic reports are made also at Shannon, Dublin and Cork Airports, at Casement Aerodrome and at Valentia Observatory. Thus the forecasters in Ireland and elsewhere have access to 12 to 14 (two of the inland stations do not report at night) surface synoptic reports in almost real time. This represents a staff resource commitment of about 70 people.
THE METEOROLOGICAL OBSERVING NETWORK
(cont'd)

Upper Air reports
Information regarding meteorological conditions throughout the depth of the atmosphere is essential for accurate forecasts for all time scales and all locations. The need is obvious in the case of aviation forecasting, but one has only to think on the fact that rain, hail and snow are normally the result of vertical motions some kilometres above the ground to realise that all users of forecasts are ultimately dependent on the accuracy of the information regarding meteorological conditions at upper levels.

Radiosondes
A radiosonde is attached to a lighter-than air balloon and measures air temperature, humidity, atmospheric pressure and location as the balloon rises through the atmosphere until it bursts. There are about 1,000 stations world-wide routinely launching such sondes. Signals are transmitted to the ground station which transforms them into scientific units. The wind speed and direction are calculated from the successive locations of the balloon, using a navigational system. Global Positioning System (GPS) radiosondes have just been introduced to the market. Radiosonde ascents are made three times a day at Valentia Observatory. The balloon is filled and launched manually. During the ascent, the operator manipulates the vertical profiles on a PC screen to provide a concise summary for coding and onward transmission world-wide. There is another radiosonde station in Northern Ireland.

Climate Network
The requirements of the climatologist for observational data are more stringent in many ways than those of the forecaster. In order to accurately define the climatology of a region, a much denser network of observations is required. Also a number of high quality stations with long and homogeneous series of reports is essential when we wish to examine inter-annual relationships or to determine if a climate change is occurring. However, in regard to the need for rapid communication of observations, the climatologist will normally be less demanding. A considerable amount of extra information is supplied by our synoptic stations for climatological purposes on a daily basis. This includes hourly and daily means, totals and extremes of the normal meteorological variables as well as some extra soil and ground temperatures and global radiation data, for example.

In addition to the synoptic stations there are 82 Climate stations reporting daily maximum and minimum temperatures and rainfall totals. A number of these stations also report daily sunshine values and soil temperatures.

480 rainfall stations scattered around the country report daily (0900 to 0900 UTC) rainfall totals. There are also 40 mountain rainfall stations reporting monthly total rainfalls. The non-Meteorological Service stations are operated by individuals and co-operating bodies.
THE METEOROLOGICAL OBSERVING NETWORK
(cont’d)

Marine Observations

The Voluntary Observing Ships (VOSs) mentioned earlier generally report at 6 hour intervals with about 40% of them reporting at any one time. They tend to be confined to the major shipping routes, with data becoming increasingly sparse away from these routes. In the continental shelf areas there are some hundreds of moored buoys and fixed marine (oil and gas, mainly) platforms. Drifting buoys report from deeper waters. Improvements in technology have led to reduction in operating costs for these automatic observing platforms but deployment remains expensive. Scientific and technological advances are leading to increased importance for space based marine observations.

There were 9 Irish VOSs reporting mostly off the South and East coasts during 1995. Our Port Meteorological Officers make regular visits to these ships, both for training and equipment checking. With the automation of lighthouses around our coasts, an important source of coastal meteorological observations is rapidly diminishing - by the end of 1995, only the Baily lighthouse observations remained. Routine real-time observations are received from the Marathon Gas platform off County Cork. Some non-real-time wave data was received from wave-buoys operated by the Department of the Marine.

Aviation Observations

Our staff at the airports provide half hourly reports specifically for aviation use. Additionally non-Meteorological Service observers at Waterford, Sligo, Kerry and Galway Regional Airports supply weather reports to Shannon.

Weather Surveillance Radar

The Meteorological Service maintains radars at Dublin Airport and Shannon Airport. There is another radar at Castor Bay in Northern Ireland. These systems detect and display the location and intensity of precipitation - rain, hail, snow, etc. - over a large area. Composite images from various combination of radars in Britain and Ireland are prepared by the UK Meteorological Office. These images are updated every 15 minutes. They are displayed in forecast offices, pilot briefing rooms at airports and on TV.

Environmental Monitoring

As part of an Atmospheric Chemistry programme, our Laboratory analyses daily precipitation and air samples from Valentia Observatory and monthly precipitation samples from nine of the meteorological stations. Most of the analysis is carried out using an Ion Chromatograph. The pH of daily precipitation samples is measured locally at five stations. Data over many years are available for about 13 species, e.g. the pH of rainfall. In many cases these are the only long-term records available nationally for the analysis of trends.

Reports from commercial aircraft are a growing source of observational data contributing to the World Weather Watch (WWW). At the moment about 10,000 aircraft reports (mainly of wind and temperature) are distributed per day. These are mainly from aircraft in the cruising phase, but as automated systems are implemented an increase to about 100,000 per day is expected and these will include more reports from ascent and descent phase. These reports are extremely valuable for all forecasting activities, but aircraft also report meteorological observations (turbulence, icing) which are of primary interest to the aviation forecast offices.
As well as being a synoptic and upper air reporting station, the Valentia Meteorological and Geophysical Observatory is responsible for the management of the network of solar radiation sensors at seven meteorological stations and for the quality control of the data. These sensors are calibrated regularly against a travelling standard instrument. A new procedure was introduced in 1995, whereby the latter was calibrated by Meteo France against an international standard.

The Observatory is a designated regional WMO Global Atmospheric Watch (GAW) station. The on-site GAW monitoring programmes include total column ozone and UV radiation, ozonesonde ascents, precipitation chemistry and atmospheric turbidity. Daily rainfall samples are analysed in the Observatory laboratory for NO2 and pH. The data from the precipitation chemistry and additional air sampling are supplied to the European Monitoring and Evaluation Project. A phenological garden is maintained at the Observatory.

**Ground Level Ozone Monitoring**

A network to continuously monitor ground level ozone at five non-Meteorological Service locations is operated by the Environmental Protection Agency. Real-time data are transmitted to the Central Analysis and Forecast Office which issues alerts or warnings whenever the concentration of ground-level ozone regionally exceeds levels specified by the European Union.

Whenever the doserate exceeds a specified limit, the RPII is alerted. In addition, a trajectory model is run by the Meteorological Service to determine the source of the airmass involved. In an emergency, special measures are taken at the stations, e.g. iodine sensors are activated, air filters are removed from the sampling unit and rushed to the RPII HQ for immediate analysis.

**UV-B radiation** is monitored at three locations in the State - at Malin Head, Co Donegal, Mace Head, Co Galway and Valentia Observatory, Co Kerry. The broadband sensors at the first two locations are leased from the UK National Radiological Protection Board (NRPB). These instruments are calibrated and the data quality-controlled as part of the NRPB network. One of the sensors was funded by the EU STRIDE programme. The Mace Head observatory is operated by the Physics Dept of University College, Galway. The Brewer Spectrophotometer in Valentia Observatory monitors not only UV-B radiation but also the total column ozone, sulphur dioxide and nitrogen dioxide. The purchase, calibration and data quality control of this system has been borne by the Meteorological Service alone.

**Ozonesonde ascents** are carried out at the Observatory in a joint project with the Chemistry Dept. of UCD. Funding to date has been primarily from the EU STRIDE programme. An ozonesonde and meteorological sensors are attached to a lighter-than-air balloon and as it rises through the atmosphere it transmits the local concentration of ozone, etc. to a ground station. Ultimately the balloon bursts and the ozonesonde parachutes to the ground.
For many years the Meteorological Service has supplied services to official bodies including government Departments and Local Authorities. Many of these services have been on an ad-hoc or when-requested basis, but during the past year or two an attempt has been made to put a number of these on a more formal footing. Some services are still provided free of charge on the basis of our Public Service role, whereas we now charge for some of the newer improved services which require a greater amount of staff or other resources.

New Weather Warning system for Local Authorities.
Following discussions with the Department of the Environment we have now introduced a standard warning service which is of interest to Local Authorities and others whose needs are catered for by the standard criteria listed below. Most Local Authorities are now on our lists for both Weather Warnings and Severe Weather Alerts. Dissemination is by means of fax or telephone. In the future, pagers or other means of dissemination may be introduced.

Flooded roads at Tierneevin, Gort  
(Photo: Joe O'Shaughnessy)

<table>
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<tr>
<th>Criteria Element</th>
<th>Weather Warning Criterion</th>
<th>Severe Weather Alert Criterion</th>
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<tr>
<td>Wind</td>
<td>Gusts 60 knots (Kt)</td>
<td>Gusts 70 kt</td>
</tr>
<tr>
<td>Rain</td>
<td>&gt; 50mm /24 hour</td>
<td>&gt;30mm/6hr, &gt;45mm/12hr, &gt;65mm/24hr</td>
</tr>
<tr>
<td>Snow</td>
<td>Any below 250 meters AMSL (above Mean Sea Level)</td>
<td>Snow or frequent snow showers likely to cause accumulations of more than 2.5 cm below 100 meters</td>
</tr>
<tr>
<td>Fog</td>
<td>Widespread and dense</td>
<td></td>
</tr>
<tr>
<td>Frost</td>
<td>Widespread Road Ice</td>
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The minimum target time for issue for the Weather Warnings and Severe Weather Alerts is 6 and 24 hours respectively in advance of the occurrence. The various terms used (widespread, probable etc.) in messages have been defined so that the possibility of misunderstanding is minimised.
SERVICES TO GOVERNMENT DEPARTMENTS AND LOCAL AUTHORITIES

(cont'd)

Road Ice Prediction System (RIPS)

Following discussions with the Department of the Environment and the National Roads Authority, the Meteorological Service is providing the forecast element for a sophisticated RIPS. The system is based on a number of roadside sensors on national primary roads. The sensors are essentially automatic weather stations with the addition of temperature sensors embedded beneath the roads and road condition sensors on the road surface. Additionally, some hundreds of kilometers of roads have been thermally mapped under a variety of meteorological conditions. This enables the road maintenance engineers to estimate the temperature on the surface of any part of the mapped road based on the known or forecast temperature at one point.

The Meteorological Service has taken delivery of a PC based system developed by Vaisala TMI which interrogates the roadside sensors hourly. During the early afternoon, the forecasters enter forecasts of air temperature, wind, cloud, humidity etc. at three hour intervals out to mid-day the following day for each observing site. A computer model is then run which produces a graphical forecast of the surface temperature and condition for the site. A text forecast is added and the final result is available to the Local Authority staff via a dial-up modem. The operation is rather labour intensive from the point of view of forecast office staff time, but by the end of the year a means of automatically inserting first-guess atmospheric forecast data (based on our HIRLAM forecast model) was almost ready. It is hoped in the near future to improve this first guess information by using statistical relationships between observed temperatures and the HIRLAM forecast temperatures.

While the observations are not as meteorologically complete as those from synoptic reporting stations, it is hoped that, as the network expands in the future, such reports may become a useful additional source of data for other applications within the forecast offices.

Similar systems are in operation elsewhere and have been shown to produce significant savings in salt usage and staff costs. It is likely that many other reporting sites will be added to the network over the coming years.

Other Forecast Services

The Meteorological Service is frequently called on to provide forecasts for emergency services. This would most commonly be for marine rescue, where the Central Analysis and Forecast Office (CAFO) would be called on to provide frequently updated special sea area forecasts to Irish Marine Emergency Service as well as telephone briefings while Shannon would provide briefings and documentation for related helicopter operations.

The Meteorological Service has a place on the Emergency Response Co-ordination Committee which is convened in the event of a nuclear accident abroad and we have two special air particle trajectory models to provide guidance in this event. We also have a role in the Local Authorities' Major Accident Plans.

A special semi-automated system to provide marine forecasts for long distance animal transport shipments was agreed with the Department of Agriculture during the year. An arrangement has been in place for some years now whereby we supply an index to some Local Authorities in the East of the country of the likelihood of road ice. The index was chosen as a quicker means of disseminating the information in view of the large number of depots within a Local Authority routinely making calls to CAFO during the Winter months.
SERVICES TO GOVERNMENT DEPARTMENTS AND LOCAL AUTHORITIES (cont’d)

Marine Services

About 20% of the time of our Marine unit is spent dealing with enquiries from Government Departments with over 100 being dealt with during 1995. The most common type of enquiry centres round likely meteorological conditions and sea state at the time and location of an accident. There were additionally a number of queries relating to statistically normal conditions at certain times on particular routes.

Climatological Services

Local authorities often ask for climatological data for planning and design purposes. Tables of extreme rainfall amounts for various durations and return periods are used in calculating the size of drainage pipes, for example. During 1995 the Climate Enquiries Office also dealt with a major enquiry from Cork County Council, which required comprehensive and detailed climatological data in relation to possible routes for the Fermoy-Rathcormac by-pass.

Various types of data and reports are provided for Government Departments such as the Departments of the Environment, Marine, Transport, Energy and Communications, the State Solicitors office, the Gardai, and the Office of Public Works. Semi-state agencies such as Forbairt, Teagasc and the EPA are also regular customers. As well as providing reports, the attendance of a Meteorologist at court as an expert witness is sometimes required.
SPOTLIGHT ON
THE ACCURACY OF FORECASTS

There is an ongoing evaluation of the quality of ECMWF forecasts and a comprehensive evaluation scheme is under development for the new HIRLAM model. While measurement of accuracy for these guidance products is essential, most important to our customers is the accuracy of the final product delivered to them. To this end a number of forecasts issued by CAFO are evaluated for accuracy. For the purposes of this article, however, we deal only with a new evaluation scheme developed within the Aviation Services Division for measurement of accuracy of the AERODROME FORECASTS issued for Irish airports by the Aviation Division at Shannon.

At present the procedure is applied to the terminal area forecasts - both short (9 hour with one hour lead time and long (18 hour) with 6 hours lead time - for Shannon, Dublin and Cork Airports and Casement Aerodrome. The elements evaluated include wind speed and direction, gust speed, visibility, CB (a deep convective cloud associated with thunderstorms or showers of rain, hail or snow) occurrence and cloud ceiling height. The accuracy of these elements is of obvious importance for the safe and economical movement of aircraft. The motivation and guiding rationale for the procedure is the requirement to ensure that aerodrome forecasts issued by the Meteorological Service conform to the “operationally desired accuracy” (ODA) criteria set out in Attachment E of the WMO Technical Regulations (Volume II).

The procedure involves running an ongoing check of forecast elements against equivalent SYNOP reported values. The results can then be supplied in tabular and/or graphical form, with explanatory notes included, to customers such as airlines, airport authorities, the Irish Aviation Authority and others. Accuracy tables and graphs for temporal subdivisions can be abstracted as required for internal use. These could be of value, for example, during periods of particular interest allowing us to analyse in detail forecasts of fog visibilities, low cloud and strong and variable winds. They could also be of advantage in comparing forecast accuracy across different synoptic, mesoscale and other situations. In the future it might also be possible to adapt the procedure to allow for an automated comparison of the relative accuracy of forecast surface winds output by HIRLAM and those issued by the Shannon forecasters.

In broad terms the procedure operates on the basis of a hit/miss principle. Forecasts are subdivided into hourly intervals and the forecast element for each of these intervals is compared to the relevant SYNOP value. A “hit” is obtained if the difference between the forecast value and its equivalent synoptic values is within allowable margins derived from the ODA criteria, Otherwise a “miss” is obtained. A “hit” is scored 1 and a “miss” is scored 0. The change groups TEMPO and BECMG add another level of complication that is also dealt with by the procedure. A more sophisticated version of the procedure supplies detailed information on the extent of the inaccuracy of a forecast element. A paper will be published shortly outlining the procedure in detail.

The diagram below highlights one way the results of the procedure can be presented (based on data from May to December 1995).
SPOTLIGHT ON
ADMINISTRATIVE BUDGET AGREEMENT

On 28 February, 1991, a Memorandum of Agreement was concluded between the Minister for Finance and the Minister for Tourism, Transport and Communications, and the Secretaries of their Departments which was in accordance with the GENERAL DECISIONS set out in ANNEX III of Government decision S. 26492/26493C of 29 November, 1990. These state that:

All Ministers must conclude agreements with the Minister for Finance by 1 March 1991 (at the latest) which will:

- Set out a three year budget for the cost of administration in each Department/Office for the years 1991-1993 inclusive,
- Provide for a reduction of 2% in the cost of administering each Department in 1992 and a further 2% reduction in 1993,
- All reductions to be made on the 1991 allocations,
- The cost of pay and similar increases approved by the Minister for Finance may be added to Department’s budgets.

The key objectives were (1) to reduce the cost of running the Department of Tourism, Transport and Communications while at the same time maintaining levels of service and (2) to improve efficiency and effectiveness in the Department of Tourism, Transport and Communications through:

(a) delegating greater authority from the Minister for Finance to the Minister for Tourism, Transport and Communications in relation to administrative expenditure and related matters; and

(b) encouraging and facilitating the delegation of greater authority to line managers in the Department of Tourism, Transport and Communications in relation to administrative expenditure.

The Meteorological Service was then given an allocation from the available funds and advised of the need for tight control and close monitoring of the allocation.

As a natural progression from (b) above, it was decided that certain sections of the Department should be given greater responsibility and control over their own financial affairs and, on 31 March 1995, an Administrative Budget Agreement was signed by the Secretary of the Department of Transport, Energy and Communications Mr John Loughrey and by the Director of the Meteorological Service Mr Declan Murphy. This Agreement covers the years 1995 and 1996 and the conditions are generally similar to those in the 1991 agreement, including the 2% per annum reduction in the allocation.

From the point of view of this Service, the main thrust of the agreement is seen as providing increased flexibility, a greater delegation of authority and, in particular, the ability to plan ahead. The total financial allocation for the Service was specified, based on the 1994 outturn.

A Monitoring Committee consisting of representatives of the Meteorological Service, the Personnel Unit and the Finance Unit and chaired by the Assistant Secretary with responsibility for Personnel and Finance was established with the following functions:

(a) to resolve any difficulties that arise in the operation of the contract
(b) to assess the impact of the contract on the activities of the Service
(c) to discuss, as necessary, various specific aspects of the contract
(d) to provide input for the discussions/ negotiations in advance of the next Administrative Budget Agreement between the two Departments.

The Monitoring Committee met on 23 May and on 6 December 1995.

The agreement, while providing greater flexibility to the Service together with greater independence in determining the priorities for expenditure also brings greater responsibility to ensure that the expenditure is closely monitored and within the permitted limits.
SPOTLIGHT ON
NEW LOGO

The Logo is based on the triskele, or semi-spiral motif from the Ultimate La Tène design, featured on the back of the 8th century Irish Tara Brooch, now in the National Museum.

In the meteorological world, the inward spiralling of air and cloud towards low pressure centres is a commonly observed phenomenon, as can be seen in the satellite image below. At the same time, it has been decided to adopt the new operating title of Met Éireann. The new logo unites these two concepts to reflect both the Irishness and the core activity of the Meteorological Service.
SPOTLIGHT ON
WEATHERDIAL

The strong growth in call numbers to WEATHERDIAL, our premium rate weather service, of the previous two years slowed considerably due to a reduction in the peak Summer demand because of the unusually settled weather in Summer 1995.

Regular meetings to discuss technical matters and promotion of the service took place with Independent Information Services Ltd., our Service Provider. The latter provided WEATHERDIAL trophies for Mirror Class sailing events which were presented by our Directorate at the Provincial and National events.

WEATHERDIAL FAX was launched on World Meteorological Day, March 23rd 1995 by Minister of State Mrs. Avril Doyle and for the first time in Ireland, it became possible to directly download meteorological data to a fax machine. The product range, initially aimed at the marine community, contains isobaric charts (of which the page opposite is an example), wave charts, other graphical products and text forecasts. Later in the year, climate-type products were added to the range and next year it is hoped that further expansion will take place with the addition of aviation products. The system operates by dialling 1570-131-838 from the tone-dialling handset attached to the fax and at the voice prompt, entering the code 0000 for a full list of products and their codes.
Irish Meteorological Service: WeatherDial: Product 0015

Mean Sea Level Pressure / 10-Metre Wind

Analysis valid on Fri 1 Mar 1996 at 6 UTC

Based on data from Fri 1 Mar 1996 at 6 UTC

WEATHERDIAL

Issued at 1000 UTC on Fri: Next update due before 1600 UTC on Fri: Copyright IMS 1996

Product list last updated on 03-Nov-1996: [Enter code 0000 for product list]

For detailed winds on coastal waters: see latest sea-area forecast text [Code 0021]
SPOTLIGHT ON
THE STRATEGIC MANAGEMENT INITIATIVE

In February 1994 the then Taoiseach launched a new initiative aimed at increasing the efficiency and effectiveness of the Civil Service. Termed the Strategic Management Initiative (SMI), the exercise involved all government departments undertaking a process using the techniques of strategic management to work out strategies for the future.

The aim of the SMI in the Irish Civil Service is to inculcate in every level of the system (not least senior management) that we are in an era of rapid change, that the rate of change is increasing and that we need to adopt certain management and organisational techniques to cope with change. The essence of Strategic Management techniques is planning ahead, and planning with a keen awareness of the changes affecting the environment we operate in. By anticipating change and planning for it we can expect to have some control over our future and thereby minimise the threats posed by change and make the most of any opportunities.

Features of the approach are a systematic examination of the 'external environment', i.e. the factors which affect the organisation from the outside, and an internal analysis which examines what the organisation is doing, why and how, and what are its strengths and weaknesses. All organisations face change driven by external factors and have a need to position themselves as best they can to cope with change.

The particular benefits the Government is expecting from the Civil Service SMI are a more effective contribution to the objectives of the Government Programme (mainly job creation and development of the economy), a greater emphasis on quality of service and customer culture, and a more efficient use of resources.

SMI and the Meteorological Service

Having participated fully in the Department of Transport, Energy and Communications' SMI exercise in 1994, the Meteorological Service embarked on a separate SMI process in 1995. With a focus on the Service's own role and environment.

The issues that arise for the Meteorological Service in the context of SMI include a re-examination (and re-definition) of its role and how it is fulfilled. The organisational status of the Meteorological Service within the public service also comes under scrutiny - would it be integrated into a Civil Service department if it were set up in 1996?

The work so far carried out within the Meteorological Service on SMI, with the assistance of a consultant/facilitator from the Galway firm De Courcy Nyland, has partly been to train management in the Strategic Management process. The external analysis, the internal analysis, the review of mandate, the creation of a Mission Statement and the preparation of a set of key objectives and strategies for the organisation have all been undertaken. The external analysis, for example, involved the members of the management team going out individually and interviewing a total of over sixty people representing various elements of private industry and business, of government departments and semi-state bodies and individuals who are seen as influencers.

An important element of the exercise was to get an input from staff and this was done in the form of a survey of a sample of 31 members of staff chosen at random.

The first output of the SMI exercise, scheduled for early 1996, will be a Statement of Strategy outlining the lessons learned from the exercise and management's overall strategy for the Meteorological Service, on lines similar to that carried out by Government Departments, including our own, in the last year. A Corporate Plan will follow, and this in fact is a commitment entered into in the Administrative Budget Agreement with the Department Secretary.

Results of the Staff Survey

The survey was aimed at getting staff perceptions of seven aspects of the working environment, i.e. Clarity of Purpose, Morale, Fairness, Recognition, Teamwork, Communications and Healthy Human Environment.

The categories of Clarity, Morale and Teamwork scored best. The major feedback for the Meteorological Service is to identify and strive to correct the deficiencies in the areas of Fairness, Recognition, Communications, and Healthy Human Environment.
SPOTLIGHT ON INTERNATIONAL DEVELOPMENTS

There were a number of developments in 1995 in international meteorology which were of particular interest to the Irish Meteorological Service. Two new European Meteorological organisations came into being, for example.

ECOMET

Traditionally European meteorological services did not compete directly with each other and confined their activities to their national territories and to the high seas, an arrangement known as the 'Gentlemen's Agreement'. That arrangement is contrary to EU Competition Law and had to be changed. To cope with this and also to bring some regularity into relations between the meteorological services and the private meteorological sector, the European meteorological services have developed a concept called ECOMET (European Co-operation in Meteorology). This is based on the idea called an Economic Interest Grouping which is recognised by the European Commission and which is being used in this case because normal full-blooded competition between the services would be disastrous and inappropriate because of the 'shared ownership' of the international data upon which forecasts are based. European Commission approval in principle for the concept has been obtained, although there are still some issues to be resolved, including some views put forward by the private meteorological sector.

Under the ECOMET arrangements customers in Europe are free to place their business with any of the meteorological services by choosing from a Catalogue of products available from the Members of ECOMET. The tariffs for basic data and computer forecasts would be fixed by ECOMET, while the individual meteorological service would determine the tariffs for 'value-added products'. The revenue would be shared in a standard way (and not equally) between the providing state, the Meteorological Service in whose territory the product was made available, and the ECOMET members as a whole (since they all to contribute the international data set).

ECOMET was formally established on 12 December 1995. Ireland expects to become a full member in early 1996.

EUMETNET

The meteorological services of Europe have a great tradition of co-operation, as in the case of ECMWF and EUMETSAT, for example. Now the meteorological services have come together to create a new framework for increased co-operation, i.e. the European Meteorological Network, EUMETNET. The new organisation, which formally came into being on 4 December, has at its core a small co-ordination office in the French Meteorological Service and will provide a forum where suitable projects for co-operation will be discussed and acted upon. The idea stems from a desire to have an increased European dimension in the spirit of the European Union, and to pool resources and avoid duplication of effort - all European meteorological services are hard-pressed financially. Among the initial ideas for co-operation which are under discussion are the production of computer-aided learning modules for meteorology, greater co-operation in the field of observations, and joint procurement of meteorological equipment.

It is expected that Ireland will also become a member of EUMETNET in early 1996.
SPOTLIGHT ON
THE WEATHER OF 1995

Most Sunshine in a day:
16 hours at Malin Head
on June 26th

No air frost at Belmullet
during Winter 1994/95

Sunniest year on record
at Clones: 1468 hours

Severe flooding follows
wettest winter on record
in the west

Warmest, driest summer at
Dublin (Phoenix Park) for
over 100 years

Highest temperature of the year
at Kilkenny: 30.8 degrees C
on August 2nd

Lowest ever December
ground temperature at
Valentia Observatory:
-9.0 degrees C on 26th

Highest gust ever
recorded at Rosslare:
111 m.p.h. on October 24th

Wettest day of the year:
55.8mm at Cork Airport
on October 16th
SPOTLIGHT ON
THE WEATHER OF 1995

- Temperatures above normal most months, warmest summer on record
- Very wet during first three months, long dry spell during summer
- Very sunny summer and autumn after extremely dull opening months

It was the warmest year on record at most stations in the country, the majority of these with records since the 1950s. At the long-term stations of Valentia Observatory and Dublin (Phoenix Park) it was the warmest since 1949, while 1959 was warmer at Malin Head. Mean temperatures ranged between 10°C and 11°C generally, around a degree higher than normal. August was the warmest of any month ever recorded at most stations, while mean temperatures were also well above normal in February, July, October and November. December was the only month with below normal temperatures everywhere.

Kilkenny recorded the highest temperature of the year, 30.8°C on August 2nd. The lowest temperatures of the year were observed during the last week of December. Clones recorded an air temperature of -11.0°C on December 27th, the lowest at any station since 1982, while the same station also recorded the lowest grass minimum temperature of the year, -13.4°C on December 26th. Rainfall totals for the year were normal in most places, ranging from 90% of normal at Rosslare to 113% at Malin Head. The first three months of the year were very wet, particularly in the west, while April, June and August were the driest relative to normal. It was the driest summer on record at a number of stations, with some eastern counties recording only around half the normal rainfall for the period from April to September. Cork Airport measured the year’s highest daily fall of 58.8mm on October 16th.

Sunshine was above normal for the year at all stations except Belmullet, ranging from 94% of normal there to 124% at Clones, where it was the sunniest year on record. June and August were exceptionally sunny and all stations recorded their highest daily values of the year during late June, the highest of all being 16.0 hours recorded at Malin Head on June 26th, its sunniest day since 1971. On October 24th Rosslare recorded the highest gust of the year, 96 knots (111 m.p.h.), the highest gust ever recorded at the station.

Note: This summary is based on readings from the thirteen synoptic stations operated by the Meteorological Service.

| County/Station          | Rainfall (mm) | Temperature (°C) | Sunshine (hours) | Number of Days with
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>most in a day</td>
<td>Extremes</td>
<td>Rain</td>
</tr>
<tr>
<td></td>
<td>of average</td>
<td>amount</td>
<td>Highest Lowest</td>
<td></td>
</tr>
<tr>
<td>Co.Clare</td>
<td>1031.7</td>
<td>112 39.3 29</td>
<td>11.4 +13.0 30.2 -5.6</td>
<td>3.86 106 15.7 27 Jun</td>
</tr>
<tr>
<td>Shannon Airport</td>
<td>1254.1</td>
<td>102 55.8 16</td>
<td>10.7 +1.2 28.0 -3.2</td>
<td>4.33 110 15.6 27 Jun</td>
</tr>
<tr>
<td>Co.Cork</td>
<td>1176.3</td>
<td>113 47.5 24</td>
<td>10.1 +0.6 25.2 -4.8</td>
<td>3.74 106 16.0 26 Jun</td>
</tr>
<tr>
<td>Cork Airport</td>
<td>711.2</td>
<td>n/a 39.0 16</td>
<td>10.1 n/a 27.1 -7.9</td>
<td>4.41 110 15.9 27 Jun</td>
</tr>
<tr>
<td>Co.Donegal</td>
<td>691.9</td>
<td>95 31.4 25</td>
<td>10.3 +1.0 28.8 -7.9</td>
<td>4.17 109 15.8 27 Jun</td>
</tr>
<tr>
<td>Malin Head</td>
<td>822.5</td>
<td>100 51.5 24</td>
<td>10.7 +1.3 30.8 -7.2</td>
<td>4.15 113 15.9 27 Jun</td>
</tr>
<tr>
<td>Dublin Airport</td>
<td>1107.9</td>
<td>99 24.5 16</td>
<td>10.0 +1.0 29.0 -6.6</td>
<td>3.79 115 15.8 27 Jun</td>
</tr>
<tr>
<td>Casement Aerodrome</td>
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<td>3.49 94 15.9 27 Jun</td>
</tr>
<tr>
<td>Co.Kerry</td>
<td>1540.7</td>
<td>110 42.6 16</td>
<td>11.5 +0.9 28.3 -3.5</td>
<td>3.66 103 15.3 22 Jun</td>
</tr>
<tr>
<td>Valentia Observatory</td>
<td>894.4</td>
<td>97 53.7 24</td>
<td>9.9 +1.1 28.3 -8.6</td>
<td>4.16 115 15.8 27 Jun</td>
</tr>
<tr>
<td>Co.Kilkenny</td>
<td>962.9</td>
<td>105 48.2 24</td>
<td>10.1 +1.2 29.3 -11.0</td>
<td>4.02 124 15.8 26 Jun</td>
</tr>
<tr>
<td>Co.Mayo</td>
<td>828.6</td>
<td>102 55.1 24</td>
<td>10.4 +1.0 29.7 -7.1</td>
<td>3.62 102 15.7 27 Jun</td>
</tr>
<tr>
<td>Claremorris</td>
<td>1125.2</td>
<td>102 55.1 24</td>
<td>10.7 +0.7 28.0 -3.2</td>
<td>3.49 94 15.9 27 Jun</td>
</tr>
<tr>
<td>Belmullet</td>
<td>894.4</td>
<td>97 53.7 24</td>
<td>9.9 +1.1 28.3 -8.6</td>
<td>4.16 115 15.8 27 Jun</td>
</tr>
<tr>
<td>Co.Monaghan</td>
<td>962.9</td>
<td>105 48.2 24</td>
<td>10.1 +1.2 29.3 -11.0</td>
<td>4.02 124 15.8 26 Jun</td>
</tr>
<tr>
<td>Clones</td>
<td>828.6</td>
<td>102 55.1 24</td>
<td>10.4 +1.0 29.7 -7.1</td>
<td>3.62 102 15.7 27 Jun</td>
</tr>
<tr>
<td>Co.Offaly</td>
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<td>10.4 +1.0 29.7 -7.1</td>
<td>3.62 102 15.7 27 Jun</td>
</tr>
<tr>
<td>Birr</td>
<td>894.4</td>
<td>97 53.7 24</td>
<td>9.9 +1.1 28.3 -8.6</td>
<td>4.16 115 15.8 27 Jun</td>
</tr>
<tr>
<td>Co.Westmeath</td>
<td>801.6</td>
<td>90 26.6 27</td>
<td>11.2 +1.0 24.7 -2.0</td>
<td>4.63 104 15.5 23 Jun</td>
</tr>
<tr>
<td>Mullingar II</td>
<td>1254.1</td>
<td>102 55.8 16</td>
<td>10.7 +1.2 28.0 -3.2</td>
<td>4.33 110 15.6 27 Jun</td>
</tr>
<tr>
<td>Co.Wexford</td>
<td>1203.2</td>
<td>109 41.8 25</td>
<td>10.7 +0.7 28.0 -3.2</td>
<td>3.49 94 15.9 27 Jun</td>
</tr>
</tbody>
</table>
### APPENDIX I
Personnel Changes January - December 1995

<table>
<thead>
<tr>
<th>Name</th>
<th>Gender</th>
<th>Position</th>
<th>Change Description</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>T Bourke</td>
<td>M</td>
<td>CAFO</td>
<td>to Shannon Airport</td>
<td>10 January</td>
</tr>
<tr>
<td>T O Sioda</td>
<td>MO</td>
<td>Shannon</td>
<td>Appointed O/C Birr</td>
<td>18 January</td>
</tr>
<tr>
<td>S McCabe</td>
<td>CA</td>
<td>Promoted</td>
<td>CO</td>
<td>10 February</td>
</tr>
<tr>
<td>J Roberts</td>
<td>SMO</td>
<td>Dublin</td>
<td>Airport-Retired</td>
<td>15 February</td>
</tr>
<tr>
<td>S O Mahony</td>
<td>CA</td>
<td>Promoted</td>
<td>CO</td>
<td>17 February</td>
</tr>
<tr>
<td>S Harrisson</td>
<td>CO</td>
<td>Transfer</td>
<td>to Road Haulage</td>
<td>17 February</td>
</tr>
<tr>
<td>M Baker</td>
<td>MO</td>
<td>CAFO</td>
<td>Promoted SMO</td>
<td>20 February</td>
</tr>
<tr>
<td>T Duggan</td>
<td>SMO</td>
<td>CAFO</td>
<td>Retired</td>
<td>28 February</td>
</tr>
<tr>
<td>T Bourke</td>
<td>M</td>
<td>Shannon</td>
<td>to CAFO</td>
<td>01 March</td>
</tr>
<tr>
<td>B Barry</td>
<td>MO</td>
<td>CAFO</td>
<td>Promoted SMO</td>
<td>01 March</td>
</tr>
<tr>
<td>B Flanagan</td>
<td>SMO</td>
<td>CAFO</td>
<td>to Dublin Airport</td>
<td>01 March</td>
</tr>
<tr>
<td>C Daly</td>
<td>MO</td>
<td>Dublin</td>
<td>Airport to CAFO</td>
<td>15 March</td>
</tr>
<tr>
<td>S O'Mahony</td>
<td>CO</td>
<td>Transfer</td>
<td>to Kildare St(Finance Unit)</td>
<td>20 March</td>
</tr>
<tr>
<td>T Daly</td>
<td>MO</td>
<td>Commenced</td>
<td>Training at Casement</td>
<td>03 April</td>
</tr>
<tr>
<td>E Moran</td>
<td>MO</td>
<td>Commenced</td>
<td>Training at Casement</td>
<td>03 April</td>
</tr>
<tr>
<td>A Windsor</td>
<td>CA</td>
<td>Commenced</td>
<td>duty C&amp;O Div</td>
<td>03 April</td>
</tr>
<tr>
<td>S Harten</td>
<td>CA</td>
<td>Promoted</td>
<td>CO</td>
<td>14 April</td>
</tr>
<tr>
<td>B Fitzpatrick</td>
<td>CA</td>
<td>Promoted</td>
<td>CO</td>
<td>14 April</td>
</tr>
<tr>
<td>J Bourke</td>
<td>SMO</td>
<td>IT Div</td>
<td>Promoted PMO, A&amp;T Div</td>
<td>02 May</td>
</tr>
<tr>
<td>R de Barra</td>
<td>SMO</td>
<td>Cork</td>
<td>Airport-Retired</td>
<td>02 May</td>
</tr>
<tr>
<td>B Doyle</td>
<td>MO</td>
<td>Cork</td>
<td>Airport-Promoted SMO</td>
<td>15 May</td>
</tr>
<tr>
<td>B Delaney</td>
<td>MO</td>
<td>Commenced</td>
<td>Training at Casement</td>
<td>29 May</td>
</tr>
<tr>
<td>C Dawson</td>
<td>SMO</td>
<td>CAFO</td>
<td>Retired</td>
<td>02 June</td>
</tr>
<tr>
<td>J O'Brien</td>
<td>MO</td>
<td>CAFO</td>
<td>Promoted SMO</td>
<td>09 June</td>
</tr>
<tr>
<td>E Moran</td>
<td>MO</td>
<td>Posted</td>
<td>CAFO from Training</td>
<td>15 June</td>
</tr>
<tr>
<td>T Daly</td>
<td>MO</td>
<td>Posted</td>
<td>Mullingar from Training</td>
<td>26 June</td>
</tr>
<tr>
<td>B Fitzpatrick</td>
<td>CO</td>
<td>HQ</td>
<td>Transferred to T&amp;RRT</td>
<td>17 July</td>
</tr>
<tr>
<td>M McCarthy</td>
<td>MO</td>
<td>CAFO</td>
<td>Promoted SMO IT Div</td>
<td>17 July</td>
</tr>
<tr>
<td>R McGrath</td>
<td>M</td>
<td>R&amp;A Div</td>
<td>Returned from Career Break</td>
<td>01 August</td>
</tr>
<tr>
<td>R Barry</td>
<td>CA</td>
<td>Commenced</td>
<td>duty HQ</td>
<td>08 August</td>
</tr>
<tr>
<td>J Donnelly</td>
<td>MO</td>
<td>Commenced</td>
<td>Training at Casement</td>
<td>08 August</td>
</tr>
<tr>
<td>M O Duilleain</td>
<td>SMO</td>
<td>Valentia</td>
<td>Obs.-Retired</td>
<td>18 August</td>
</tr>
<tr>
<td>B Delaney</td>
<td>MO</td>
<td>Posted</td>
<td>at Casement after Training</td>
<td>29 August</td>
</tr>
<tr>
<td>P Stokes</td>
<td>MO</td>
<td>Casement</td>
<td>to CAFO</td>
<td>29 August</td>
</tr>
<tr>
<td>T Deegan</td>
<td>CA</td>
<td>Commenced</td>
<td>duty HQ-Job Share</td>
<td>02 October</td>
</tr>
<tr>
<td>R Barry</td>
<td>MO</td>
<td>Commenced</td>
<td>Training at Casement</td>
<td>02 October</td>
</tr>
<tr>
<td>G Mahoney</td>
<td>MO</td>
<td>Commenced</td>
<td>Training at Casement</td>
<td>02 October</td>
</tr>
<tr>
<td>L Truesdale</td>
<td>MO</td>
<td>Commenced</td>
<td>Training at Casement</td>
<td>02 October</td>
</tr>
<tr>
<td>C Kennedy</td>
<td>MO</td>
<td>Commenced</td>
<td>Training at Casement</td>
<td>02 October</td>
</tr>
<tr>
<td>J Donnelly</td>
<td>MO</td>
<td>Posted</td>
<td>to CAFO from Training</td>
<td>16 October</td>
</tr>
<tr>
<td>F Evers</td>
<td>SMO</td>
<td>CAFO</td>
<td>Retired</td>
<td>20 October</td>
</tr>
<tr>
<td>M O Grioja</td>
<td>MO</td>
<td>Promoted</td>
<td>SMO Valentia Observatory</td>
<td>31 October</td>
</tr>
<tr>
<td>E O Ceallaigh</td>
<td>MO</td>
<td>Rosslare</td>
<td>Promoted SMO</td>
<td>31 October</td>
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<tr>
<td>D O'Regan</td>
<td>SMO</td>
<td>Malin</td>
<td>Head-Retired</td>
<td>12 November</td>
</tr>
<tr>
<td>R Barry</td>
<td>MO</td>
<td>Posted</td>
<td>to Shannon Airport from Training</td>
<td>11 December</td>
</tr>
<tr>
<td>C Kennedy</td>
<td>MO</td>
<td>Posted</td>
<td>to Dublin Airport from Training</td>
<td>11 December</td>
</tr>
<tr>
<td>G Mahoney</td>
<td>MO</td>
<td>Posted</td>
<td>to CAFO from Training</td>
<td>11 December</td>
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<tr>
<td>L Truesdale</td>
<td>MO</td>
<td>Posted</td>
<td>to Rosslare from Training</td>
<td>11 December</td>
</tr>
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</table>
APPENDIX II.i
Aviation Services Division

There was an overall increase of 3% in the number of aircraft provided with Flight Documentation from Shannon. Verbal briefings to aviation, including company and ATC briefings decreased by 6%. The following are the relevant figures for 1995:

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<thead>
<tr>
<th></th>
<th>1995</th>
<th>1994</th>
<th>1993</th>
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<tbody>
<tr>
<td>Westbound Flights (Flight Documentation)</td>
<td>3656</td>
<td>3769</td>
<td>4151</td>
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<tr>
<td>Eastbound Flights (Flight Documentation)</td>
<td>5207</td>
<td>4896</td>
<td>4608</td>
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<tr>
<td>Briefings for Training Flights</td>
<td>81</td>
<td>33</td>
<td>34</td>
</tr>
<tr>
<td>Verbal Briefings to Aviation including ATC and Companies</td>
<td>3052</td>
<td>3264</td>
<td>4087</td>
</tr>
</tbody>
</table>

The provision of Terminal Aerodrome Forecasts for Shannon, Dublin, Cork, Casement and Gormanston Airports continued. Local Area Forecasts were provided for the regional Airports, Waterford, Kerry, Galway, Connaught, Sligo and Donegal, on a scheduled basis and other forecasts and actuals were supplied to them on request. The Air Rescue Service and Aer Aran were supplied with forecasts and actuals on a routine basis.

Sigmet for Shannon FIR/UIR, Wind Shear Warnings and Local Warnings issued, are listed below:

<table>
<thead>
<tr>
<th>Forecasts</th>
<th>1995</th>
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<th>1993</th>
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<tr>
<td>Shannon FIR/UIR Sigmet</td>
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<td></td>
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<tr>
<td>Shannon Local Warnings</td>
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<tr>
<td>Shannon Wind Shear Warnings</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Dublin Local Warnings</td>
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<td></td>
</tr>
<tr>
<td>Dublin Wind Shear Warnings</td>
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<td></td>
</tr>
<tr>
<td>Cork Local Warnings</td>
<td>115</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Services were provided for 11 Airlines who operated crew training at Shannon.

Forecasts were provided by prior arrangement for the following events:

- German Aerospace Research Institute for Flight programme based at Shannon, 21st June - 6th July inclusive.
- National Gliding Championships, Kilkenny Airport, 22nd - 30th July inclusive.
- Irish Hot Air Ballooning Championships, 25th - 29th September inclusive.

The Shannon weather radar was out-of-service for several periods during the year although this is not too surprising when one considers that it is circa 25 years old. The good news is that a new modern Doppler Weather Radar has been ordered from the German manufacturer Gematronik and this will replace the Plessey radar during 1996.

Work continued in Shannon on SFERIC/Aircraft Reports/Hurricane Programmes, TAF Verification System, the SODS project, a new plot for Aviation Hourlies, Amendments to Aviation Codes and on the proposed new IDS system.

Most non-aviation visitors to the Shannon Meteorological Office during the year were school groups. M. Alain Joly from Meteo France visited the office in connection with FASTEX, a major meteorological observational campaign scheduled to be held in late 1996 and to be based at Shannon.
APPENDIX II.ii
Administration and Training Division

Safety

As in 1994, particular emphasis was again placed on the matter of safety, health and welfare at work. Safety Statements were finalised for the Glasnevin Headquarters building, for Shannon Airport Meteorological Office and for Valentia Observatory.

All the fire extinguishers at HQ were inspected by the Office of Public Works in January. A safety consultant retained by our parent department carried out an inspection at Rosslare and Kilkenny stations and a safety statement for each of those locations is awaited. He also visited the hydrogen generation plant at Valentia Observatory, Cahirciveen in the company of an expert consultant chemical engineer.

Our own Safety Officer carried out a safety audit at Casement Aerodrome, Mullingar and Connaught Airport meteorological offices and safety statements for these places will be prepared and will follow the format of those for Kilkenny and Rosslare when available.

A fire audit was done in HQ in March at the behest of the Department and the report was received in October. The recommendations were prioritised by the firm of consultants contracted to undertake the audit and attention was devoted immediately to the highest priority items.

Emergency lights and exit signs were upgraded in Headquarters.

Staffing

In January, a request was made, via our parent Department, to the Civil Service Commission to provide 8 new Meteorological Officer trainees. A competition had been held the previous September/October. Two recruits arrived in April, one in May and one more in August. A new competition was held in July and four new recruits from this competition reported for training in October. A proposal to commence procedures for holding a competition for Meteorologists was considerably delayed as a debate developed about the status of the panel from a competition held in 1992.
APPENDIX II.ii
Administration and Training Division
(cont'd)

Accommodation

Some of the more costly works completed during the year included the installation of a new anemometer at Rosslare in conjunction with the transfer of the operations function from a road-facing room to a sea-facing room; the installation of security fencing around the synoptic station at Claremorris in advance of the proposed move of the personnel from Claremorris to Connaught Airport; the complete overhaul of the HQ elevator and the installation of a new uninterruptible power system and a new telephone switchboard system, including Voice Mail, in HQ.

One side of the HQ facade was cleaned again as the first attempt in 1994 was not regarded as up to specifications. The costs for this cleaning were borne by the contractors who had replaced the cladding in 1994. Some small painting and recarpeting jobs were completed in HQ in a number of rooms which suffered during the time when the cladding was faulty.

Administration

One of the big events of the year was the signing of the Administrative Budget Agreement on 31 March by the Director, on behalf of the Meteorological Service and the Secretary, on behalf of the Department of Transport, Energy and Communications.

Preparations for the transfer from Claremorris to Connaught Airport continued to make progress but, due to a number of factors, it seemed unlikely that the move would take place before March/April 1996 at the earliest.

Budgetary and personnel issues together with accommodation and safety matters accounted for much of the time devoted by staff from the Administration and Training Division. Towards the end of the year intensive discussions/negotiations commenced on the possible implementation of some of the terms of the Programme for Competitiveness and Work agreement to a section of the workforce.

Training

Many of the courses mentioned in appendix III were organised through this Division.
This was the first full operational year for this Division which was formally set up in December 1994. Much of the energies of the Division (the smallest in the Service) were expended in communicating with individual customers, organising itself and drafting a plan for the future.

Attendance was organised at 4 events during the year, beginning with the Aer Lingus Young Scientists in January, the Boat Show in March, National Sheep Day in June and finally, the National Ploughing Championships in September.

World Meteorological Day on March 23rd coincided with the Boat Show and the opportunity was taken to launch a new Weatherdial FAX service (see separate article), aimed initially at the Marine community and 1995 also saw the inauguration of the Weatherdial perpetual trophies for Mirror dinghies. See separate article on WEATHERDIAL.

Commercial Division liaises with many Government Departments on the supply of meteorological data. Following agreement with the Department of the Environment, service to Local Authorities was improved with the setting up of a new standardised weather warning system and later in the year, RIPS (the Road Ice Prediction System) went operational.

The tax incentives available to companies shooting films in Ireland had led to an increased use of the Telephone Consultancy Service. During the year discussions with the Department of Agriculture took place, resulting in agreement on the supply of forecasts for the transport of live cattle to the Middle East.

Towards the end of the year discussions took place with RTE radio following an indication from them that they intended taking over the live weather forecast broadcasts. The media continue to be a major customer area and with the majority of Local Radio stations now taking our services, we look forward to the challenges that will arise when new radio and TV stations go on air in the next few years.
Database

Systems were put in place to send data automatically to a number of customers by e-mail, and a mail-server was prototyped which would be capable of processing requests for data from authorised users and replying automatically. The Database Server became unacceptably slow under increased demand. A request for tenders for a faster machine was issued and a selection made. Permission to proceed with this acquisition was awaited from the Government Contracts Committee at the year's end.

Monthly Weather Bulletin

There were a number of layout changes during the year. A Marine section was introduced, more graphical Agmet information was included, and a daily plot of mean sea level pressure values at two stations was added to the 'Weather' pages. The target of producing the Bulletin within a month was close to being achieved by the end of the year. There was a small increase in the number of paying subscribers, which rose from 227 in 1994 to 235. The Monthly Press Statement was expanded to include maps showing difference from normal temperature and percentages of normal rainfall and sunshine at the synoptic weather stations.

Observations Unit

Much time and energy was taken up during 1995 in retrieving data missed from the Automatic Weather Stations (AWS) at Dublin Airport and Roche's Point. Three new AWSs at Knock Airport, Claremorris and Finneer Camp are due to come on stream in early 1996. The aim of this unit to visit up to 50% of the 80 Climatological and 650 Rainfall stations during 1995, as part of the plan to streamline these networks was not fully achieved due to staff shortages.

1961 - 1990 averages

A DCU student was employed over the summer to help produce the rainfall averages for a total of 700 stations, which will be published in 1996. Work on climatological station data began with a view to producing the temperature and sunshine averages in 1997.

Climate Enquiries

Approximately 1,400 enquiries requiring the supply of climatological data or a report were dealt with during the year, together with about 5,000 telephone enquiries. Invoices in respect of services provided by the division increased by approximately 20% on the income of the previous year. In October, a formal system for logging and monitoring climatological enquiries was introduced. A new version of the program used to generate tables of synoptic station data, was made available for assessment late in the year.

A new network computer printer was provided early in the year, and the arrival of two PCs during the summer provided the potential for both easier access to the climatological database and improved presentation of output. Partly as a result of the new possibilities opened up by the PCs, investigation commenced late in the year into the possibility of acquiring a colour computer printer. The increase in the number of requests for data from third level students led to preliminary consultations with the universities on a more convenient method of providing data for academic research and educational purposes. The provision of selected datasets on CD-ROM seems the best option, and it is hoped to further investigate this in 1996.
APPENDIX Il.v
General Forecasting

Early in the year four operational runs per day of the Hirlam model were introduced. This meant that guidance from four different numerical models are now available in CAFO. The main advantages of having our own Hirlam model are that the output is available very quickly and the model and its products are tailored for our own needs. A number of changes were made during the year to X-CHARTS, the forecaster graphics presentation system.

During the year, CAFO commenced archiving all its text forecasts using a tape drive attached to one PC. Almost all forecasts issuing from CAFO are now typed and presented with attractive headers and footers. Work was done by CAFO staff to enable the transfer of model data output from the CAFO workstation to the PCs and converting to a MS Word format for user friendly editing and transmission to end users.

A new recording system for WEATHERDIAL was installed in the radio broadcast room. Telex lines and the MUFAX were discontinued.

CAFO MOs took over some Agmet work in June. A new pentium PC was brought into use in November. Special route forecasts were introduced for Dept. of Agriculture - as part of an upcoming Ministerial Order governing the transport of live animals.

The introduction of WEATHERDIAL fax service and the RIPS placed a considerable extra burden on staff. Moves are afoot, however, to automate the updating of some of the fax products and to automatically insert statistically processed Hirlam data as first guess into the RIPS model.

Quite a lot of search and/or rescue forecasts were provided to IMES, particularly late in the year. Consultancy services continued to be very popular and some new local radios were serviced. The first ground level ozone warning was issued on May 27th.

Warnings issued by CAFO during 1995

The following numbers refer to the number of days for which warnings were issued - in most cases warnings would have been issued to a number of customers on the particular days.

<table>
<thead>
<tr>
<th>Warning Type</th>
<th>To Local Authorities</th>
<th>To Commercial and other customers</th>
<th>showers etc</th>
<th>significant amounts</th>
<th>storm/severe weather alert category</th>
<th>total number of hours with observed 10-minute wind &gt; 33kts at coastal stations</th>
<th>% of these hours when gale warnings were current for sea areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frost Warnings</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Snow</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wind</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thunderstorm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rain</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ozone (at ground level)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blight</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Amongst visitors to CAFO during the year were PC Pilot Club of Ireland, Society of Irish Plant Pathologists, Group from City Art Centre, a Meteo France student and numerous work experience/transition year students. 2 students visited CAFO as part of their Young Scientist project.
APPENDIX II.vi
Instrumentation and Environmental Monitoring Division

Laboratory
The backlog of work was cleared in May 1995. The Laboratory successfully participated in two laboratory tests, involving the analysis of samples supplied by the co-ordinators of two international programmes - the Global Atmospheric Watch (GAW) and the European Monitoring and Evaluation Programme (EMEP).

The increasing requirements for quality assurance by the international programmes is a major factor driving developments in operating procedures in the Laboratory and throughout the sampling network.

An Atomic Absorption Spectrophotometer - funded originally by the Dept of the Environment and now surplus to requirements - was presented to University College, Maynooth.

Instruments Unit
An Automatic Weather Station (AWS) was installed in September at each of three sites in the west of Ireland - at Claremorris synoptic station, Knock Airport and Finner Camp, near Ballyshannon. The AWS and ceilometer at Finner Camp was funded by the Dept of Defence with a small financial contribution from the Meteorological Service, which will maintain them. The facilities at Finner Camp are being upgraded in support of Air Corps helicopter Search and Rescue operations.

The commissioning of the three AWSs was the culmination of a major project. The technical specifications had been prepared in-house after consultation with several other national Meteorological Services. The successful system was recently designed and developed by the UK Meteorological Office for its own network and supplied under licence by Aeronautical and General Instruments Ltd, UK. Every set of sensors, the PC and the modem are individually linked to a Local Area Network (LAN) by a customised microprocessor. The synoptic, aviation and climatological reports from the AWSs are collected on a PC in HQ by a Data Collection System developed by AGI in co-operation with the IT Division.

Vaisala anemometers with ICAO-compliant software were installed at Knock Airport and Finner Camp in accordance with Meteorological Service policy at airports.

A second major project underway in 1995 involved the replacement of the Weather Surveillance Radar at Shannon Airport. Five tenders were received in January 1995. In June a contract was signed with Gematronik GmbH (Germany). Installation is planned for May 1996. The contract includes the integration of the data from both the Gematronik radar at Shannon Airport and an existing modern radar at Dublin Airport, so that images from either radar can be examined interactively by a forecaster on a workstation in either the Central Aviation Office or CAFO.

The Uninterruptible Power Supply (UPS) unit in HQ was replaced in 1995 in conjunction with the Office of public Works. Preliminary work was carried out on the installation of a Primary Data User System for the reception of high resolution data from METEOSAT geostationary satellites.

A two year project to renovate all the Dines Pressure-Tube Anemographs at the synoptic stations was completed in 1995. Two different anemometers - a Solent ultra-sonic sensor at Rosslare Harbour and a Vector Instrument cup-and-vane unit at Claremorris - are under test as possible replacements. A major part of the work of the Unit consisted of routine maintenance and repairs of instrumentation at HQ and in the outstations.
APPENDIX II.vi
Instrumentation and Environmental Monitoring Division (cont’d)

Valentia Meteorological and Geophysical Observatory

The Observatory contributes to a wide range of programmes. The resulting data are archived in the Meteorological Service database or in the appropriate World Data Bases. The basic upper air programme consists of three radiosonde ascents a day. The upper air data are quality-controlled locally. Tests continued throughout the year on developing a cost-effective remote antenna system. At present in certain wind conditions the signals from the radiosonde are cut off by a local mountain. Further renovations were carried out on the hydrogen gas generation plant during the year. Geomagnetic and seismological monitoring is maintained continuously. Absolute geomagnetic measurements are made three times a week. A new building for these absolute measurements was erected during the year at a location remote from passing motor traffic. A magnetic survey was carried out by Observatory staff at four locations throughout the country, as part of the process of updating the Isogonics - lines of equal magnetic declination - on aviation charts. From August 1994 until May 1995 the Malin Head unit was installed at Valentia Observatory to compare simultaneous measurements on the Brewer Spectrophotometer and the NRPB modified Robertson-Berger sensor. 53 ozonesondes were launched in 1995; of these 19 were recovered for further use. From January to March 1995, the Observatory participated in the Second European Stratospheric Arctic and Middle-latitudes Experiment. This involved both routine ascents and frequent special ascents when the polar vortex had swung down over Ireland. Immediately after an ascent, the data were transmitted by the INTERNET to a dedicated database in Norway, where the data were accessible to researchers investigating the depletion of the ozone layer. SESAME supplied some ozonesondes for the experiment.

Forecasts of UV-B Radiation

The intensity of UV-B radiation reaching the ground depends inter alia on the total column ozone - the cumulative concentration of this gas from the top of the atmosphere to the ground. A statistical investigation was made in 1995 to determine the correlation at Valentia Observatory between measurements of total column ozone on the Brewer Spectrophotometer in bright sunshine at noon and simultaneous measurements of various meteorological parameters in the stratosphere from the noon radiosonde ascent. Forecasts of these meteorological parameters in the stratosphere are routinely available from meteorological Numerical Weather Prediction models. Hence forecasts of total column ozone can be made. This in turn can be related to UV-B radiation intensities on the ground, using a quasi-empirical relationship developed by the Canadian AES. The Meteorological Service intends to introduce such forecasts, as required, from May 1996.
Operations
At the beginning of 1995 the main server computers on the Headquarters local-area network (LAN) were:

VAX cluster (2 VAX 4200 and MicroVAX 3100), MIPS R4000 and MIPS R3000, Silicon Graphics Challenge L, DECserver 5200, VAXserver 3300, Two DECpc 466d2 MTE.

These computers are used for a variety of different purposes including telecommunications, database of meteorological observations, graphics services, database of numerical forecast products, NWP (HIRLAM model), relational database of climatological data, Dublin Airport weather-radar data processing and network servers.

A PC was used for the distribution of radar composite images.

User machines included 25 networked PCs, 12 DECstations used as clients in the Ingres relational database system, 9 SGI workstations used mainly in connection with NWP and a small number of 'dumb' terminals and stand-alone PCs.

In August eight extra PCs were added to the network in order to extend it to parts of HQ which were not originally included. One machine was provided with the hardware and software needed for desktop publishing. An additional PC was obtained in order to investigate the use of PCs as clients in the climatological database system.

On 9-10 February the computer operations staff moved from their old accommodation to a new room which had been constructed at the south-eastern end of the third floor. The new room is entered directly from the central lobby. It also provides a more pleasant and convenient working environment for the operations staff.

T4-fax project
One of the main projects of the IT Division in 1995 was the replacement of analogue-facsimile products received from the UK Met. Office, Bracknell by digital products in 'T4' code. These products consist mainly of weather charts and are used both in CAFO and in the aviation meteorological offices. The replacement of analogue by coded, digital fax has many advantages. It enables expensive analogue leased lines to be discontinued. The products are now printed conveniently on A4-size paper rather than on the special 'crinkly' paper used in old-fashioned facsimile machines; savings on the purchase of this paper and on the maintenance of the machines are themselves significant. Also, the digital products can be stored on the computer and are available at any time through a request facility.

The system was running successfully in test mode by the end of the year and it is planned to make it fully operational in January 1996.

New PABX for HQ
Installation of the equipment took place during the second half of October and training was provided by Ericsson for all users. The new system has 30 ISDN and 16 analogue exchange lines. It has 90 extensions to multi-line digital telephones and includes DID and voicemail facilities. The transition from the old PABX took place without any undue difficulty and the new system was in full operation by November.
Other projects

The following is a selection of the large number of projects completed:

In the desktop services area, the Castelle Faxpress package was installed on the PC network at the end of April. It enables fax messages to be sent direct from a PC screen without having to print out a document and feed it manually into a fax machine. An extra HP Laserjet 4Si printer was added to the network and a tape backup device was installed on a CAFO PC to enable a copy of forecasts issued to customers to be archived.

The following new numerical weather prediction (NWP) products were received and decoded in 1995:

- forecasts from the German (DWD) model
- products from the ECMWF model run starting from the midnight analysis
- ECMWF ‘cluster’ charts based on the new N. Atlantic / W. Europe area

These increase significantly the range of information available to the forecaster.

A telecommunications system to collect reports from the new automatic weather stations (AWSs) at Claremorris, Connaught Airport and Finner was installed in September and extensive testing was carried out. Software to process the AWS reports and distribute them to users was developed.

A new manual for the request/reply facility was issued; this facility enables current aviation weather reports and forecasts to be obtained via telex and other means of communication. A dial-up connection to the Regional Telecommunications Hub in Bracknell was installed in October. This will act as backup to the existing leased-line connection.

Review of Information Technology Plan

An IT Plan for the Meteorological Service was issued in July 1992. By the end of 1994 the work programme had largely been completed and it was decided to carry out a review of the Plan, in cooperation with Central IT Services, Dept. of Finance, with the aim of extending its validity to the end of 1996. This process commenced in April with the holding of a Management Workshop at which strategic issues were discussed. A questionnaire was issued to users in order to obtain feedback on the effectiveness of computer applications and the opinions of staff on IT matters. This was followed up by a User Workshop on 19 June which was attended by 26 staff members representing 13 divisions or offices. A third workshop, for IT staff, was held on 23 June. The IT Plan was finalised in December.
1995 has been the first full year of the joint Division of Research and Applications and the first full year of operational experience with the HIRLAM (High Resolution Limited Area Modelling) model, version 2.4 (horizontal resolution 0.5° and vertical resolution 16 levels) introduced in October, 1994. HIRLAM is run on a 32 bit Challenge-L computer every 6 hours out to 48 hours and its outputs have become the main short-range guidance for operational forecasters. Considerable attention has been devoted to deriving various model outputs and to using the HIRLAM model as a driver for application linked models. The current research programme in the Division is focussed on the needs of the Meteorological Service and on the research objectives as set out for members of the HIRLAM Group of North European countries.

The 2.2 version of HIRLAM which was the first to be introduced here was replaced by an upgraded version 2.4 on September 26, 1995. HIRLAM 2.4 has a new radiation scheme, a new physiography and more accurate databases of surface parameters such as soil temperature, soil water content and sea surface temperature. The main effects of the changes are expected to be improved forecasts of the 10 metre wind speed and of the maximum surface temperature.

Application Developments

A series of guidance materials based on HIRLAM have been introduced. These include frontal indicators, cross sections and snow indicators. The minimum 2-metre temperature from HIRLAM over central Ireland on calm clear nights can be approximately 4°C too high while the temperatures in coastal areas are generally good. Currently a Kalman filtering technique procedure is being developed to help reduce the error. Automation of HIRLAM surface temperature forecasts using Kalman filtering for road ice forecasts is also nearing completion.

Other application models using HIRLAM include a UV Index, trajectory models and the WAM wave model (producing sea wave heights and wave spectra) as well as products for agricultural and other specialist and general users. Improvements to the graphical presentation of model outputs on forecaster workstations were made. Automatic generation of a range of plots from HIRLAM for the Weatherfax Service was completed in time for its official launch on World Meteorological Day, March 23.

Quality Assurance and Future Plans

A measure of the accuracy of the numerical guidance is essential for building confidence in the products. Up to the end of August, HIRLAM was being verified against the previously run numerical model. This verification showed that the HIRLAM model was performing substantially better. Other verification schemes were also run and a new scheme verifying HIRLAM against weather observations was introduced at the end of the year. It is planned to upgrade the present computer with a faster CPU performance and increased memory to increase model resolution to 0.2° and the vertical resolution to 25-31 levels as well as increasing the forecasting area. The suite of linked application models using HIRLAM outputs will continue to be developed.
A considerable amount of training was undertaken by the Meteorological Service staff during 1995. This included:

<table>
<thead>
<tr>
<th>Course Subject</th>
<th>Numbers of staff</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Aid (Interactive Video)</td>
<td>64</td>
</tr>
<tr>
<td>Working Safely</td>
<td>55</td>
</tr>
<tr>
<td>Developmental</td>
<td>28</td>
</tr>
<tr>
<td>First Aid</td>
<td>14</td>
</tr>
<tr>
<td>Third Level (fee refunds)</td>
<td>11</td>
</tr>
<tr>
<td>Induction</td>
<td>10</td>
</tr>
<tr>
<td>MS Windows / Word / Mail</td>
<td>8</td>
</tr>
<tr>
<td>Safety Representative</td>
<td>6</td>
</tr>
<tr>
<td>Retirement</td>
<td>5</td>
</tr>
<tr>
<td>DECUS-VMS</td>
<td>2</td>
</tr>
<tr>
<td>DECUS Seminar</td>
<td>2</td>
</tr>
<tr>
<td>Commercial Skills in Meteorology</td>
<td>2</td>
</tr>
<tr>
<td>Laboratory Safety</td>
<td>2</td>
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<tr>
<td>Service Costing</td>
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<td>Business Words</td>
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<tr>
<td>Certificate in Finance</td>
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<tr>
<td>Craigs Financial</td>
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<tr>
<td>Interpretation of Accounts</td>
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<tr>
<td>Interviewee Skills</td>
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<tr>
<td>Mod 6 HEO / CSTC</td>
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<tr>
<td>Winows NT</td>
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<td>UV Workshop</td>
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<td>EMEP Workshop</td>
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<tr>
<td>ECMWF Meteorology</td>
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<tr>
<td>ECMWF communications</td>
<td>1</td>
</tr>
<tr>
<td>ECMWF Parallel processing</td>
<td>1</td>
</tr>
</tbody>
</table>

A number of the Service’s forecasters attended a three day course in satellite meteorology provided at Glasnevin by EUMETSAT staff.

During 1995 the Meteorological Service has provided two training courses in meteorological observing to staff of regional airports which resulted in the participants gaining a certificate enabling them to carry out meteorological observations for aviation purposes at these airports.
APPENDIX IV
External Activities and Meetings

The following is a selection of meetings attended outside the Meteorological Service, talks presented to external bodies etc. during 1995.

Numerous press and radio interview were given - by CAFO staff especially - particularly during the first quarter of the year regarding inclement weather and during the third quarter regarding the unusually good weather.

The Director attended two meetings of the Council of the European Centre for Medium-range Weather Forecasts (ECMWF), one in Bruges in June and the second in Reading in December. He also attended the Informal Conference of Western European Directors in Seville in April, the 12th Congress of the World Meteorological Organisation in Geneva in June (together with the Head of Administration and Training), and the first General Assembly of ECOMET in Brussels in December.

The Assistant Director with responsibility for scientific and technological development attended a number of meetings relating to the HIRLAM project including a two day meeting of the Hirlam Advisory Committee (as Secretary and Organiser) in Dublin. He presented a number of talks on Hirlam and Numerical Weather Prediction in general both at home and abroad. He also attended the 48th meeting of the National Committee for Geodesy and Geophysics and the IUGG General Assembly as Secretary and National delegate respectively. He attended some meetings in relation to the upcoming FASTEX experiment, the European Working Group on Limited Area Modelling and the Scientific Advisory Committee of ECMWF.

Two delegates from the Meteorological Service (H/R&A and H/CD) attended the European Conference on the Applications of Meteorology in Toulouse and H/GF attended a CALMET (computer aided learning in meteorology) conference in Toulouse in July.

A total of 16 staff members helped man our stands at the Young Scientists Exhibition, the Boat Show, Sheep Day and the National Ploughing Championships.
APPENDIX IV
External Activities and Meetings
(cont’d)

Two meteorologists prepared and presented a course of lectures on Atmospheric Physics and Meteorology to engineering M.Sc. students in UCD.

One of our meteorologists was elected chairman at the first AGM of the International Association of Broadcast Meteorology.

A lecture was presented to Teagasc Advisors as part of a course on the REPS scheme and to teachers involved in the GLOBE project. Talks were given on various aspects of the Meteorological Service to the Society of Irish Plant Pathologists. The Airline Owners and Pilots Association were provided with a talk on the Meteorological Service products and services.

Our Research & Applications staff attended a number of conferences and workshops during the year related to the Hrlam project and numerical modelling in general, meteorological operational systems, agricultural meteorology and ocean wave prediction.

H/AS attended the 5th meeting of the METG Advisory Group of ICAO, at the ICAO European H.Q., Paris from 30th October to 3rd November.
APPENDIX V
The Meteorological Service's Finances

The figures presented below are approximate and for information only. They do not form part of the official annual accounts of the Service.

**Income & Expenditure 1995**

<table>
<thead>
<tr>
<th></th>
<th>£,000</th>
<th>£,000</th>
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</thead>
<tbody>
<tr>
<td>Salaries and Related Expenses</td>
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</tr>
<tr>
<td>Other Operating Expenses</td>
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<tr>
<td>Capital Expenditure</td>
<td>638</td>
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</tr>
<tr>
<td>Contributions to International Organisations</td>
<td>981</td>
<td></td>
</tr>
<tr>
<td>Total (approx. from Dept. Trans., Energy &amp; Comms.)</td>
<td>9,444</td>
<td></td>
</tr>
<tr>
<td>Receipts from Eurocontrol (Route Charges)</td>
<td>4,677</td>
<td></td>
</tr>
<tr>
<td>Receipts from Commercial / cost recovery activities</td>
<td>566</td>
<td></td>
</tr>
<tr>
<td><strong>Total Receipts</strong></td>
<td>5243</td>
<td></td>
</tr>
</tbody>
</table>

Net cost of operations in 1995 4,201

Note: Revenue generated by the Meteorological Service in 1995 amounted to £5,243,000 approximately. This revenue is not retained within the Service and was composed of revenue from route charges (calculated on a ‘full cost recovery’ basis) and commercial revenue (generated mainly by General Forecasting Division and Climatology and Observations Division activities).

All but a few of our ‘deliverables’ for the year and the cost targets for 1995 were met. Our Commercial revenue target was exceeded.
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Director

Brendan McWilliams
Assistant-Director

Dr. Peter Lynch
Assistant-Director

DIVISIONAL HEADS

Eamon Murphy
Administration and Training

Sean Connolly
Aviation Services

Seamus Ó'Laoghóg
Information Technology

Tom Sheridan
Commercial

Michael Walsh
General Forecasting

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Photo: Outside back cover, HQ building (Photo OPW)