Environmental

Issue 9 – 2007

# Care for the ENVIRONMENT

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"Care for the Environment" is printed on recycled paper.

**Message from the CEO**

Assuming the duties of CEO of Athens International Airport "Eleftherios Venizelos", it is my great pleasure to introduce the brand new version of our environmental publication for the year 2006, reiterating our commitment that the responsible and effective management of all environmental challenges will continue to be one of our company's top priorities.

In the context of the continuous improvement and consistent provision of high-level environmental services, our Environmental Services Department was re-certified in December 2006 according to the international environmental standard ISO 14001:2004.

Amongst last year's initiatives, we commenced the Aircraft Noise Study that will be completed in 2008, in cooperation with the Ministry of Environment, Town Planning & Public Works, and the Hellenic Civil Aviation Authority. The integration of the HCAA radar data to the airport's Noise Monitoring System and the installation of new air quality monitoring systems, makes Athens International Airport one of the best equipped airports in the world. Regarding the global issue of climate change, our company is investigating future initiatives to contribute to the reduction of greenhouse gas emissions.

We completed the upgrade of the airport's Sewage Treatment Plant, and managed to increase recycling by more than 14% over the total waste produced at the airport, by consistently implementing the "Polluter Pays" principle and the company's financial incentive policy. We expect that the implementation of new programmes will lead us to surpass our target of 20%.

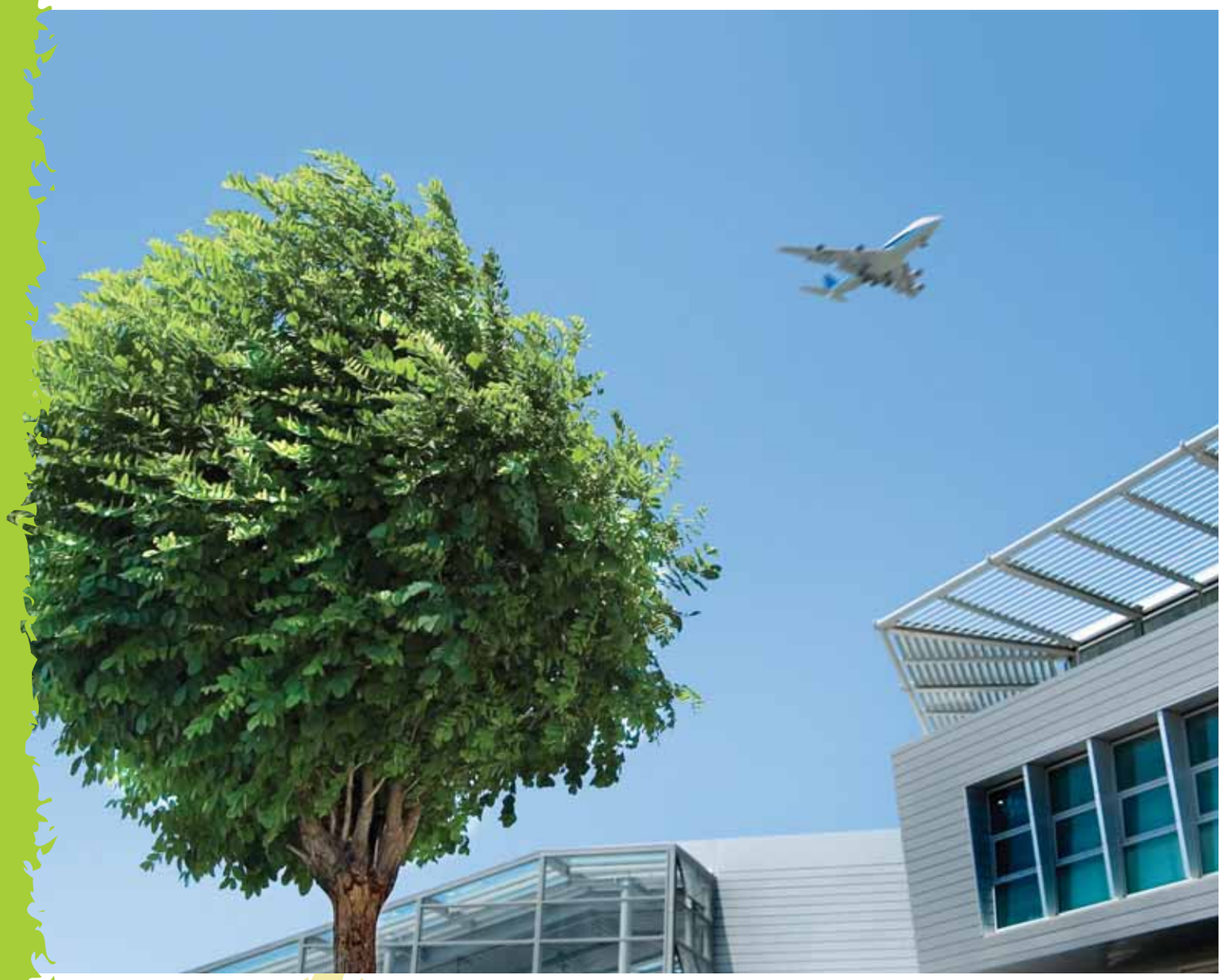
Aiming at the implementation of measures for the protection and improvement of the natural environment, we commenced the second phase of the programme for the systematic recording of the flora and fauna in the airport's vicinity, in cooperation with the University of Patras.

During 2006, we also developed a number of projects, among which the completion of a park in the neighbouring Koropi Municipality and the Artemis Municipality coastal forest project, the airport's recycling programme at schools of the area, the provision of scholarships to postgraduate students of the University of the Aegean, the upgrade of the surrounding area of the Tavropolos Artemis Sanctuary, the funding for the purchase of a firefighting vehicle for Penteli, and the improvement of the courtyards of two kindergartens in Artemis Municipality.

Environmental protection is a prerequisite for the continuous development of the airport and the harmonious co-existence with the local communities. We shall continue to monitor the environmental conditions, while keeping the authorities and the public informed, and undertaking effective initiatives to manage environmental issues responsibly and consistently.

**Yiannis N. Paraschis**

# 10 YEARS OF ACHIEVEMENTS



In June 1996 Athens International Airport established the Environmental Services Department. Its fifteen scientists and administrative personnel strive for the effective operation and development of the airport, preventing or minimising the environmental effects. During those ten years our achievements have been many and significant, and so we would like to share them with you.

- Our airport is the only one in Greece with an Environmental Services Department certified according to the international environmental standard EN ISO 14001 since December 2000. In 2005 we made the necessary changes to our system in order for it to be in compliance with the new issue of the standard (EN ISO 14001:2004), and we were recertified accordingly.
- We have developed a waste management system across the airport site based on the "Polluter Pays" principle, in order to reduce the amount of waste produced at the airport and encourage recycling. The implementation of the economic incentive policy, which started with zero charges for paper in 2002, and now offers a refund for all recyclable materials, contributes to the above goal. The adoption of this policy resulted in an increase in recycling from 3% in 2001 to over 14% in 2006.
- We successfully implement a paper-recycling programme in the schools of the Artemis Municipality, aiming to enhance environmental awareness and reduce waste. During the first year of implementation, i.e. in the school year 2005-2006, the children embraced the initiative with great enthusiasm and managed to collect approximately 9.5 tonnes of paper.

- We provide scholarships to postgraduate students of the University of the Aegean on environmental issues related to the airport.
- We have installed extensive systems in order to monitor the environmental conditions such as air quality and noise, in the wider airport area.
- We implement, in cooperation with the Hellenic Civil Aviation Authority, the Noise Abatement Procedures, in order to minimise aircraft noise in the residential areas in the vicinity of the airport. These procedures include measures such as the preferential runway use (during night and afternoon hours takeoffs do not take place from the eastern runway).
- We have created the dedicated "We Listen" telephone line (210-3530003), through which citizens may discuss their concerns and receive information on noise issues.
- We became the first Hellenic company to receive the European Commission's GreenLight Award for the implementation of a series of energy efficient measures in lighting, thus reducing emissions related to the greenhouse effect. Our actions led to savings of 3,300MWh during 2003, equal to the energy consumed by 2,000 households in a period of 5 months.


- We actively participate in the GreenBuilding Programme, in order to save energy not only from lighting but also from all energy consuming activities in buildings. The initiatives taken by the Technical Services Department during 2006 led to savings of 3,750 MWh, resulting to a reduction of $CO_2$ emissions by 3,560 tonnes.
- We delivered ten cleaning machines to the Municipalities of Spata, Koropi, Markopoulo, Pallini and Glyka Nera, and two fire-fighting vehicles to the Koropi Fire Brigade Station.
- We funded the construction of the following parks and squares in the municipalities of the wider Mesogaia area, contributing to the enhancement of the environmental conditions in the area and offering the citizens an ideal place for relaxation and entertainment.
  - Markopoulo Municipality (2001): 9,000$m^2$ park with refreshment stand, open theatre, playground and landscaped area with plants of the local flora.

- Glyka Nera Municipality (2003): "Agia Triada" square covering an area of 3,000m$^2$.
- Pallini Municipality (2003): 12,000m$^2$ park at "Pedion Areos" area, planted with more than 1,000 plants of the local flora and comprising a refreshment stand, numerous resting areas, a playground and a parking lot.
- Koropi Municipality (2006): 10,000m$^2$ park featuring a refreshment stand, an open theatre, a playground and a landscaped area with plants of the local flora.
- Artemis Municipality (2006): 26,000m$^2$ park in the costal forest of the Municipality comprising a playground, an arboretum and a landscaped area with more than 3,000 plants of the local flora.

• Employing an innovative method, we moved (on rails) St Peter's and Paul's Church from its original place (at the western runway) to a new position outside the airport site.

• In cooperation with the Ministry of Culture, we created an archaeological laboratory for cleaning, maintaining and classifying the archaeological findings discovered during the airport's construction.
• We funded the publication of the archive edition "Mesogaia – History and Culture of Mesogaia in Attica", honouring the long and significant history of the airport region.
• We created the "Permanent Exhibition of Archaeological Findings from the Airport Area – The Museum" and the Environmental Information Centre in the Main Terminal Building.

• We published the bilingual leaflet "Museum: Mesogaia Attica, History and Civilisation" including information on the museum's creation and exhibits.
• We received the "Commendation" in the culture category, in the context of the 2003 Corporate Social Responsibility Excellence Awards, organised by the Greek Advertisers Association, for our contribution in promoting our country's cultural heritage.
• In 2005 we were honoured with the "Aerospace Industry Award" in the "Infrastructure and Environment" category for our efficient operation during the Olympic Games in the fields of organisation of operations, infrastructure, passenger and airline services, and environmental protection.

We would like to emphasise that the achievement of the above objectives was the result of team effort and cooperation with other departments of our company, such as Facilities and Business Control, Asset Management, Technical Services, Airport Services, Communications & Marketing, as well as all airport community personnel.

# ENVIRONMENTAL MANAGEMENT SYSTEM

The Environmental Management System (EMS) comprises all procedures, guidelines and programmes that we implement in every sector of everyday work in order to achieve our environmental goals. The EMS gives us the opportunity to efficiently tackle all environmental issues related to airport operations and thus offer high-quality environmental services.

This system was implemented for the first time in 1999 and certified according to the international standard EN ISO 14001 in December 2000. Believing that we should keep abreast of new developments, in 2005 we made the necessary changes in our system in order to comply with the new version of the standard (EN ISO 14001:2004), and were re-certified accordingly.

In the framework of EMS, we annually compile an Environmental Plan consisting of environmental management programmes with specific measurable targets that are to be implemented within a specified timeframe. During the year we continuously monitor the progress of these programmes through environmental indicators in order to undertake any necessary corrective actions. Furthermore, we evaluate the results and accomplishments aiming to continual improvement of our environmental performance.

Moreover, we ensure that all operators at the airport follow responsible environmental practices. For this purpose, a set of environment-regulating guidelines has been issued, tackling issues such as waste management. We organise special seminars, and issue leaflets to inform airport Third Parties on how to deal with environmental issues, and we are at their disposal to answer their questions and requests in a very short time. Daily inspections and regular environmental audits are conducted in order to ensure that proper practices are followed.

# 2006 ENVIRONMENTAL PLAN
## Performance Report

| PROGRAMME TITLE | OBJECTIVE | TARGET | RESULTS |
|---|---|---|---|
| Environmental awareness | Raise environmental awareness of Athens International Airport's personnel | 82% of Athens International Airport's employees to obtain environmental awareness training | **ACHIEVED** |
| Internal Assessment of Services of the Environmental Services Department | Assess internally the quality of services of the Environmental Services Department | Undertake a survey of selected AIA Departments | **ACHIEVED** |
| Implementation of a radar interface with the NOise MOnitoring System (NOMOS) | Monitor noise abatement procedures | Integrate radar data in the noise monitoring system | **PARTLY ACHIEVED (due to connection on 31/12/2006)** |
| Recycling on airport site | Minimise waste disposal to landfill | Achieve 20% recycling rate on airport site by the year 2008 | **ONGOING (2006: 14.2%)** |
| Evaluation of the quality of the air quality monitoring network (AQMN) measurements | Evaluation of the quality of measurements collected by the AQMN | Assess uncertainty of time average air quality measurements of NOx, $O_3$, $SO_2$, CO, and HCs analysers | **ONGOING** |
| Aircraft emissions inventory | Monitoring of aircraft emissions of atmospheric pollutants | Semi-automated monitoring and reporting of current and past aircraft emissions at AIA | **ACHIEVED** |
| Airport site emissions inventory | Monitoring of airport-site generated emissions of atmospheric pollutants | 100% semi-automated monitoring and reporting of airport operation emissions on airport site | **ONGOING** |
| Recycling programme at the schools of the Municipality of Artemis | Raise environmental awareness in the greater Mesogaia area / Minimise waste disposal at landfill | Collect at minimum 10 tonnes recyclable paper & aluminium cans from the schools in Artemis Municipality | **ONGOING** |
| Community projects - Construction of urban green areas | Create urban green areas in the Municipalities in the Mesogaia area | Create and hand over 3 parks in the Municipalities of Koropi, Spata and Artemis | **ONGOING (The Koropi and Artemis parks have been completed)** |
| Bio-monitoring programme Phase II | Perform 1st Survey of Phase II, recording the status of the ecosystems defined in Phase I | Record the existing status of fauna, flora and vegetation in order to define possible variations versus the baseline | **ONGOING** |
| Reduction of phosphorus and nitrogen concentrations in the airport's main Sewage Treatment Plant (STP) effluent | Improve wastewater quality in respect to the Ratifying Law (Law 2338/1995) limits | Reduce phosphorus and nitrogen concentration by 73% and 80% respectively compared to 2004 average yearly values | **ONGOING** |

# 2007 ENVIRONMENTAL PLAN
## Objectives and Targets

| PROGRAMME TITLE | OBJECTIVE | TARGET |
|---|---|---|
| Recycling on airport site | Minimise waste disposal to landfill | Achieve 20% recycling rate on airport site by the year 2008 |
| Evaluation of the quality of the air quality monitoring network (AQMN) measurements | Evaluate the quality of measurements collected by the AQMN | Assess uncertainty of time average air quality measurements of NOx, $O_3$, $SO_2$, CO, and HCs analysers |
| Environmental awareness I | Raise environmental awareness of Athens International Airport's personnel | 84% of Athens International Airport's employees to obtain environmental awareness training. Three (3) site tours to be conducted regarding environmental issues |
| Environmental awareness II | Inform the Public & the Third Parties on AIA's environmental activities and initiatives | Organise a site visit for 30 local community and/or Third Party personnel |
| Airport site emissions inventory | Monitor airport site generated emissions of atmospheric pollutants | 100% semi-automated monitoring and reporting of airport operation emissions on airport site |
| Recycling programme at the schools of the Municipality of Artemis | Raise environmental awareness in the greater Mesogaia area / Minimise waste disposal at landfill | Collect at minimum 10 tonnes recyclable paper & aluminium cans from the schools in Artemis Municipality |
| Community projects - Construction of urban green areas | Create urban green areas in the Mesogaia Municipalities | Creation and handover of 3 parks in the Koropi, Spata and Artemis Municipalities |
| Bio-monitoring programme Phase II | Perform Ist Survey of Phase II, recording the status of the ecosystems defined in Phase I | Record the existing status of fauna, flora and vegetation in order to define possible variations versus the baseline |
| Reduction of phosphorus and nitrogen concentrations in airport's main Sewage Treatment Plant (STP) effluent | Improve wastewater quality in respect to Ratifying Law (Law 2338/1995) limits | Reduce phosphorus and nitrogen concentration by 73% and 80% respectively compared to 2004 average yearly values |
| Wildlife Hazard Control and Reduction | Airport's Wildlife Hazard Control and Reduction Programme to be audited by external party | Re-certify the airport's Wildlife Hazard Control and Reduction Programme |

# AIRCRAFT NOISE

Noise is one of the main environmental issues associated with the operation of an airport. Our company addresses noise issues in a responsible manner by taking measures to reduce annoyance.

Aircraft noise is generated by the aircraft engines and the airflow around the aircraft fuselage and control surfaces (aerodynamic noise). The engine noise depends on the size, type and power of the engine and is an important source of noise during aircraft takeoff. The aerodynamic noise depends on the aircraft type, its velocity and flight characteristics, and is the main source of noise during aircraft landing.

In the past few years the most noisy aircraft (e.g., Chapter 2 aircraft) have been withdrawn and replaced with latest-technology aircraft, which emit less noise, thus reducing the annoyance in the residential areas in the vicinity of the airport.

**Noise Abatement Procedures**

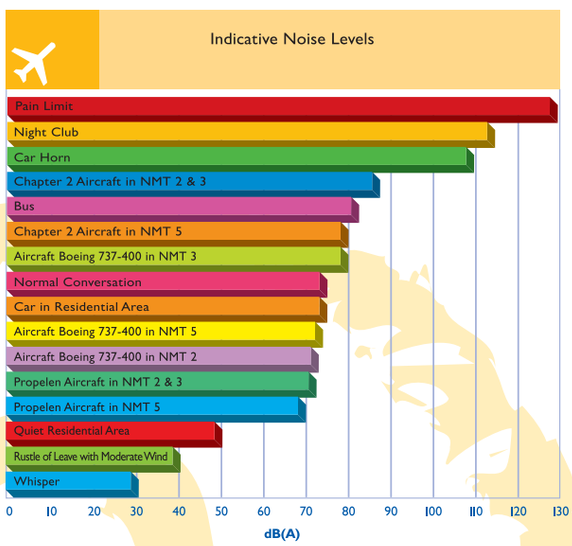
Noise Abatement Procedures have been defined for the reduction of noise levels in the residential areas around the airport and along the flight paths. These include measures such as preferential runway use or avoidance of use of reverse thrust. More specifically, the preferential runway use system includes the following:

- Avoidance of the use of the eastern runway (03R) for departures to the north during the night (23:00-07:00).
- Avoidance of the use of the eastern runway (21L) for landings to the south during the night (23:00-07:00).

Additionally, for further reduction of noise nuisance, departures to the north during afternoon hours (15:00-18:00) are mostly realised from the western runway (03L), while during the same period landings to the south are avoided on the eastern runway (21L).

**Comparative Noise Levels**

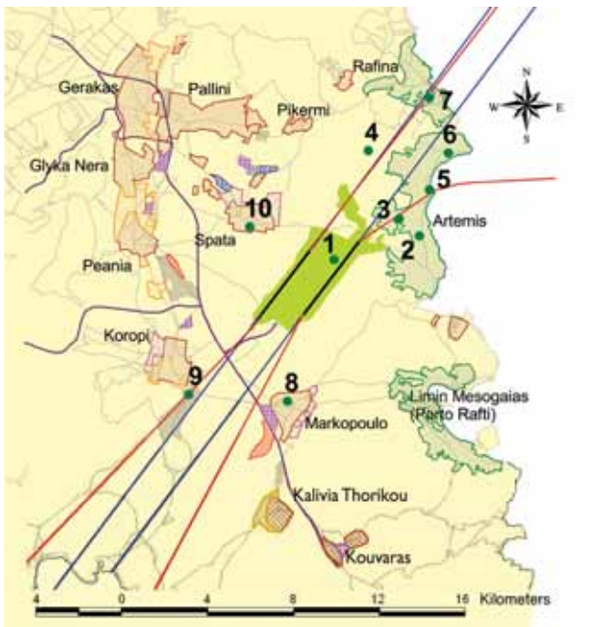
Noise levels are measured in dB(A), a unit that describes the sound pressure in the human ear. Additionally, the values of the decibels represent the sensitivity of the human ear that is related to the frequency of the sound. Thus every increase in the sound level by 10 dB(A) is perceived as doubling of the sound level.



### Noise Monitoring System

We have installed a permanent NOise MOnitoring System (NOMOS) for the continuous monitoring of noise levels and automatic correlation with aircraft flights. Furthermore, this system is connected with the Hellenic Civil Aviation Authority radar so that correlations can be established based on the actual flight track information.

The Noise Monitoring System comprises ten (10) permanent and one (1) mobile Noise Monitoring Terminals (NMT) installed in residential areas along the flight paths.

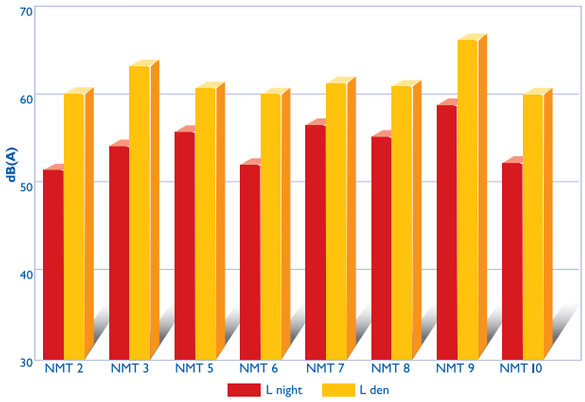



Indicative flight paths during landing
Indicative flight paths during takeoff
Noise Monitoring Terminals

### Noise Indices

Two noise indices are mainly used for the assessment and management of environmental noise, Lden and Lnight. These describe the total noise level at a measurement point, i.e. the noise from all sources, such as aircraft, road traffic, industry, construction works etc. Lden is calculated by taking into account that during the evening (19:00-23:00) and night (23:00-07:00) noise nuisance is greater, and therefore a "penalty" of 5 and 10 dB(A) is added to the evening and night noise levels respectively. Lnight is calculated by considering the noise level during the night only. Furthermore, in all NMTs the maximum noise level for each noise event is also recorded.

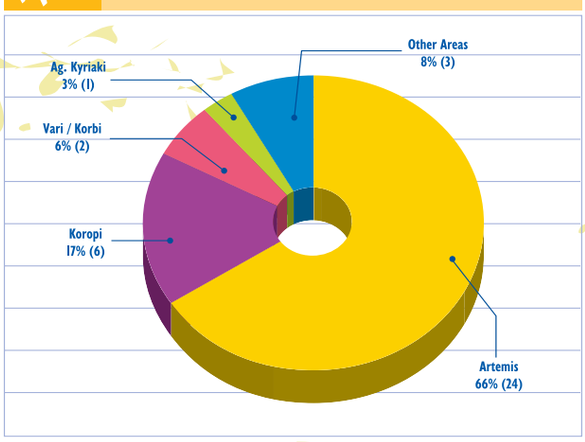
Average Leq Levels per NMT during 2006




### Relations with the Local Communities

Given that noise is one of the main environmental issues affecting the lives of residents in the vicinity of airports, we have taken several initiatives, such as the creation of the "We Listen" telephone line, and the periodic meetings with representatives of local authorities and groups aiming at informing citizens.

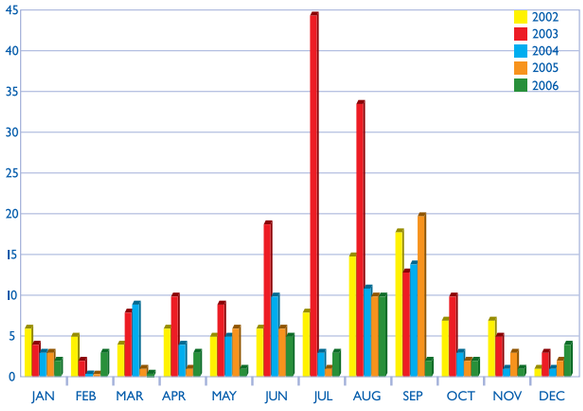
Telephone Calls to the "We Listen" Line per Area during 2006




Concerned citizens may call the "We Listen" telephone line (210-3530003) on a 24-hour basis in order to register their complaints and request information on noise issues. During 2006, 36 noise complaints in total were received (mostly from Artemis Municipality). This number of complaints is very small in comparison with other European airports (e.g. Amsterdam Airport, where thousands of complaints are received on an annual basis). Most complaints are received

during the summer period, when air traffic is highest and noise nuisance is increased due to local living conditions (open windows, staying outdoors).

Telephone Calls to the
"We Listen" Line 2002–2006




The "We Listen" telephone line has been operating during the last 5 years. From the above chart it is evident that the maximum number of noise complaints was received in 2003, while since 2004 the number of noise complaints has been significantly decreasing.

# AIR QUALITY

Air is one of the Earth's most valuable natural resources. At the same time, however, a variety of pollutants are emitted into the atmosphere, causing air quality deterioration, and contributing to climate change.

**Climate Change**

The main contributor to climate change is the increase of greenhouse gases (e.g. carbon dioxide – $CO_2$) in the atmosphere. These amplify the natural greenhouse effect and lead to an increase in global temperature. Evidence of climate change is growing, including observations of rising temperature and sea level as well as an increasing frequency of severe storms and floods.

Climate change is a global problem, however each of us has the power to be part of the solution. Even small changes in our everyday life can help reduce emissions of greenhouse gases without negatively affecting the quality of our lives, such as:

- **Turn off lights when you don't need them.** If you turn off 5 lights in the halls and rooms of your house when you do not need them, you can save approximately 60 euros on your annual electricity bill and reduce $CO_2$ emissions by 400 kg a year.
- **Drive economically.** Driving economically uses less petrol and emits less $CO_2$. Driving at speeds above 120 km/hour increases fuel consumption by 30% in comparison to driving at 80 km/hour.
- **Regulate your thermostat.** By turning down the temperature setting by 1°C you can decrease your fuel bill by 5-10% and cut $CO_2$ emissions by 300 kg per year per household.
- **Plant a tree.** A medium-sized tree absorbs approximately 6 kg of $CO_2$ a year, which corresponds to nearly 250 kg of $CO_2$ in 40 years.

Air pollution is the presence of various substances in the atmosphere which, when present at a certain concentration for a given period of time, can have negative consequences on human health, living organisms and ecosystems. These substances are called pollutants and the main ones are nitrogen oxides (NO and $NO_2$), ozone ($O_3$), sulphur dioxide ($SO_2$), particulate matter ($PM_{10}$, $PM_{2.5}$), carbon monoxide (CO) and hydrocarbons (HCs). Pollutants are classified as primary when directly emitted from a source (e.g., NO, CO, HCs) and as secondary when produced by reactions of primary pollutants in the atmosphere (e.g. $NO_2$, $O_3$).

**Main Pollutant Sources**

$SO_2$ : It is primarily emitted from power plants, but also from factories, central heating, oil refineries, chemical and paper industries.

CO : It is emitted from the exhaust pipes of petrol-powered vehicles and other engines during incomplete combustion.

$PM_{10}$ : It is emitted from natural sources like volcanoes, the sea, dust from dry land, dust transport from deserts as well as from human activities like cement or plaster production, foundries, fireplaces, construction activities, combustion etc.

HCs : They are emitted from natural sources like vegetation, but mainly from human activities like fuel transport and storage, oil refineries, fuel consumption in vehicles etc.

$NO_2$ : It is formed by nitrogen monoxide (NO), which is emitted from fuel consumption in automobiles, aircraft etc, as well as from boilers and power plants.

$O_3$ : It is formed by chemical reactions involving oxygen, hydrocarbons and nitrogen oxides in intense sunlight and high temperature conditions.

Air quality depends not only on the pollutant concentrations, but also on the prevailing meteorological conditions. For example, air quality in an area will be better on days with strong winds that disperse pollutants versus days with calm conditions.

Our company acknowledges the importance of air quality and addresses the issue by assessing emissions from relevant sources, monitoring pollutant concentrations and meteorological parameters at the airport and in the surrounding communities, and adopting measures aiming to reduce emissions. At the same time, in the context of limiting emissions of carbon dioxide and other greenhouse gases that contribute to climate change, measures such as the European Union's proposal to include aviation in its Emissions Trading Scheme are being reviewed.

**Emissions Inventory**

When kerosene is burned in aircraft engines the fumes produced consist of nitrogen oxides (NOx), hydrocarbons (HCs), carbon monoxide (CO), carbon dioxide ($CO_2$), water, sulphur oxides (SOx) and particulate matter ($PM_{10}$, $PM_{2.5}$). The concentrations of pollutants emitted depend on the stage of flight (Landing/Takeoff cycle), and are affected by several factors, including aircraft and engine type as well as aircraft weight at takeoff.

**Landing/Take-Off (LTO) Cycle**

The LTO cycle consists of the following phases:

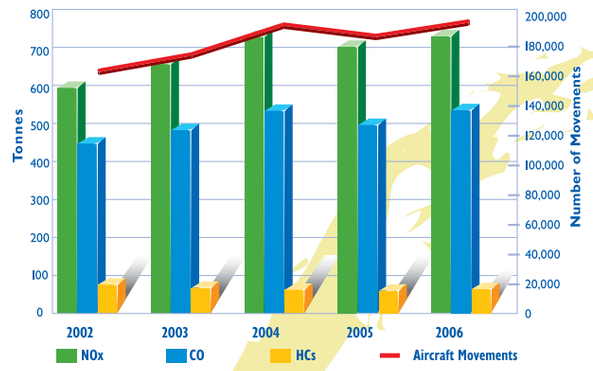
- Approach
- Landing
- Taxiing to and from parking area
- Takeoff
- Climb Out

The LTO cycle addresses emissions occurring up to a height of 1000 meters above ground and several kilometers NE and SW of the airport along the Landing/Takeoff axis.

Our company has initiated an emissions inventory to estimate emissions of nitrogen oxides (NOx), hydrocarbons (HCs) and carbon monoxide (CO) from the airport site, including LTO cycle emissions, emissions during aircraft handling and emissions from other sources.

In order to estimate aircraft emissions during the Landing/Takeoff cycle, the guidelines issued by the International Civil Aviation Organisation (ICAO) were followed, and fuel consumption and pollutant emission factors from ICAO's public Aircraft Engine Emissions Databank were used for the calculations. Based on the

Aircraft Emissions 2002–2006
in Relation to Aircraft Movements




results, NOx and CO emissions have increased in proportion to the increase in air traffic, while HCs emissions are decreasing as jet engine efficiency improves and older, less efficient aircraft are withdrawn from the active fleet.

Emissions from aircraft handling are produced mainly during the following activities:

- Use of Auxiliary Power Units (APUs)
- Use of Ground Support Equipment (GSE)
- Aircraft engine ignition in parking areas.

In 2006, aircraft handling emissions totalled 56.6 tonnes of NOx, 33.1 tonnes of CO and 65.6 tonnes of HCs.

**Air Quality Monitoring**

Our airport is one of the best-equipped airports in the world with respect to air quality and meteorology monitoring. The equipment includes an Air Quality Monitoring Network (AQMN), a Differential Optical Absorption Spectroscopy (DOAS) system, a SOnic Detection And Ranging (SODAR) system, a Radio Acoustic Sounding System (RASS) and a Meteorological Station.


The AQMN, which consists of five (5) permanent monitoring stations installed in the Municipalities of Glyka Nera, Koropi, Markopoulo, Pallini and Spata and one (1) mobile station, has been operating since 1998. Ground level concentrations of the major pollutants ($NO_x$, $O_3$, $PM_{10}$, $SO_2$, CO and HCs), as well as basic meteorological parameters (wind speed and direction, temperature, relative humidity, precipitation, total solar radiation and atmospheric pressure) are measured.

The DOAS System, which measures pollutant concentrations, contributes not only to the assessment of the air quality on the airport premises, but also to the monitoring of aircraft emissions during takeoff.

Finally, the SODAR, RASS and Meteorological Station monitor several meteorological parameters that affect air quality in the wider Mesogaia area.

**Emission Reduction Measures**

The measures we adopt in order to reduce emissions include:

- The use of environmentally-friendly energy sources (e.g., natural gas).
- The use of staff buses.
- Encouragement of the use of public transportation for airport access (buses, metro, suburban railway).
- Supply of power and pre-conditioned air to aircraft to minimise APU usage.
- Fuel supply to aircraft through underground tanks located in the aircraft parking areas to avoid airside tanker vehicle traffic and emissions.
- Use of hybrid vehicles.
- Reduction of electricity consumption (e.g., GreenBuilding Programme).

**Results**

The monitoring results show that, in general, air quality in the Mesogaia region is satisfactory.

Most pollutant concentrations are low and, for some pollutants, even 10 times lower than those recorded in the centre of Athens.

It should be noted that the airport is just one of many sources of air pollution in the Mesogaia area. Other sources include road traffic (Attiki Odos and other high-traffic roads) and the widespread development of the area (industry, construction of new roads, residential development etc).

**Mean Concentrations of Monitored Pollutants at the AQMN Stations**

| Station | $NO_2$ μg/m³ | $O_3$ μg/m³ | $PM_{10}$ μg/m³ | $SO_2$ μg/m³ | CO mg/m³ | HCs ppm |
|---|---|---|---|---|---|---|
| Glyka Nera | 27.6 | 70.7 | 39.3 | 8.7 | 0.4 | - |
| Koropi | 17.8 | 65.6 | 64.7 | - | - | 2.6 |
| Markopoulo | 18.7 | 71.3 | 40.6 | - | 0.4 | - |
| Pallini | 15.5 | 70.2 | 35.0 | 9.4 | 0.3 | - |
| Spata | 18.8 | 67.5 | 47.6 | 6.7 | 0.4 | 2.9 |

# ENERGY

Energy is a vital part of our daily life. We depend on energy for transport, heating, cooling and lighting of our homes and other buildings as well as for the operation of agriculture and other industries. On the other hand, energy production from fossil fuels is responsible for the emission of several pollutants into the atmosphere, including greenhouse gases (e.g., carbon dioxide – $CO_2$). In Europe 80% of the emitted greenhouse gases come from energy production and consumption.

In order to minimise the environmental impact of energy use at the airport, we closely monitor the consumption of energy resources, implement measures to reduce consumption and promote the use of alternative energy sources.

**Electricity Consumption**

Total electricity consumption during 2006 decreased by 1.3% in comparison to 2005, mainly due to our company's efforts to reduce consumption, such as fine-tuning of the central lighting and air-conditioning controls. Moreover, the average electricity consumption per passenger has decreased consistently since 2003 due to the application of energy-saving measures.

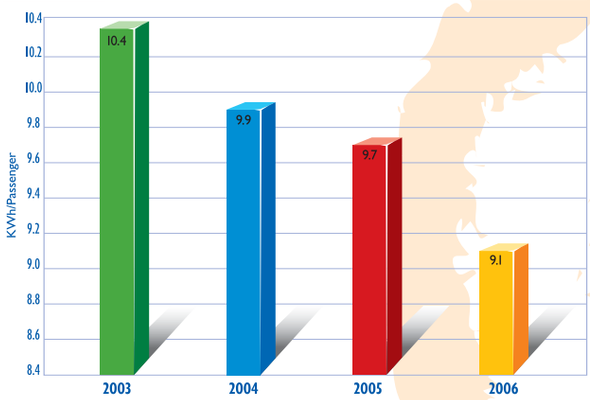
**GreenBuilding Programme**

In 2006, Athens International Airport S.A., a partner in the GreenLight Programme since 2003, participated in the new GreenBuilding Programme aiming to achieve additional energy savings from lighting but also from other energy-consuming activities (e.g., heating, cooling, ventilation etc). A series of measures (e.g., fine-tuning of the central air-conditioning control system) led to energy savings on the order of 3750 MWh, corresponding to a reduction of $CO_2$ emissions of approximately 3560 tonnes.

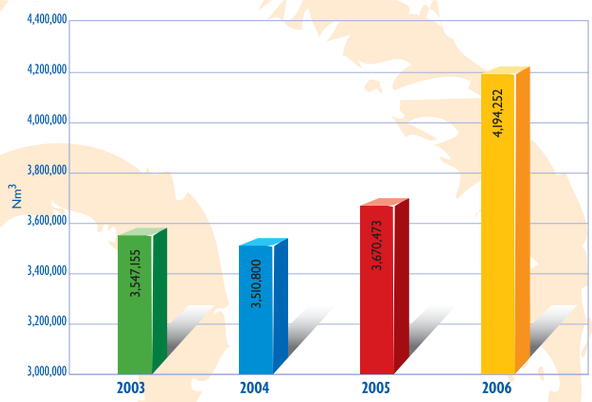
**Fuel**

Environmentally-friendly natural gas is used for heating and cooking purposes at various installations at the airport. Natural gas consumption has increased annually, thereby reducing diesel consumption for heating and hence emissions to the atmosphere. During 2006 natural gas consumption increased significantly (by 14.3%) compared to 2005. This increase can be attributed to an increase in consumption by several companies (e.g., catering) as well as to the connection of more airport installations to the natural gas network.

Electricity Consumption per Passenger




Natural Gas Consumption




Average fuel (petrol and diesel) consumption per kilometer of our vehicle fleet has remained stable in recent years.

Aviation fuel (kerosene) consumption peaks during the summer months when air traffic is at a maximum. During 2006 kerosene consumption increased by 13% compared to 2005. This is attributed to the increase of long-haul routes.

**Pilot Photovoltaic Unit**

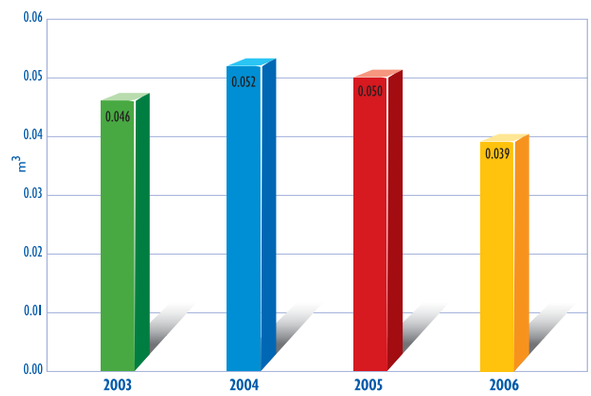
A pilot photovoltaic unit has been operating at the airport's suburban railway station since 2004 further to an initiative of our Asset Management Department with the support of a group of sponsors. The installation produces 1200 kWh of electricity on average per month. The electricity produced supports the building's lighting systems and it is estimated that 14 tonnes of $CO_2$ emissions are avoided annually.

# WATER

Water is a natural element absolutely necessary for every form of life. Water in rivers, lakes and sea is called surface water, while water absorbed through the soil and forming natural reservoirs is called groundwater. Although 70% of the Earth's surface is covered with water, our planet's freshwater reserves (water that may be used as potable) are scarce representing only 0.01% of the Earth's water.

Our efforts aim to reduce water consumption at the airport site and avoid pollution. In this context, we systematically monitor water consumption (potable and for irrigation) as well as the quality of surface and groundwater. Additionally, we take initiatives and measures for water savings, such as the use of treated wastewater from the Sewage Treatment Plants (STPs) for irrigation, the regular maintenance of the water network to avoid leakages and the installation of automatic faucet shut-off valves in the Main Terminal Building toilets.

Water Consumption per Passenger




**Water Quality Monitoring**

Since 1998 our company conducts regular sampling of groundwater at selected points of the airport premises, aiming to monitor the quality of the upper and low aquifers. Additionally, since 2001 we implement a water quality monitoring programme for surface water, involving sampling and chemical analysis.

All sewage coming from the airport buildings through the sewage network ends to the STPs where it is treated and used for irrigation of non-public green areas at the airport. During 2006 the STPs treated approximately 430,000m³ sewage that was used for irrigation. It should be noted that AIA is one of the few airports worldwide that operates STPs.

**Sewage Treatment Plants**

STPs aim to purify sewage from "harmful" ingredients, in order to be safely disposed to the environment. "Harmful" ingredients include large items, sand, suspended solids, organic substances (e.g. hydrocarbons, proteins, fat), pathogenic microorganisms and other elements (nitrogen).

The biological treatment is based on the use of biochemical processes occurring freely in nature, under controlled conditions in "aeration tanks". In these tanks microorganisms (already existing in the sewage) are multiplied due to the oxygen supply, and feeding on the existing organic substances, actually disinfect the sewage. From the aeration tanks sewage is led to "sedimentation tanks" where microorganisms settle to the bottom in the form of sludge. The treated sewage overflows over the tank rims falling in chlorination tanks, where the pathogenic microorganisms are removed. An additional treatment is performed for the removal of nitrogen and phosphorous with a biological method and/or with the use of chemicals. Sewage is purified up to 95%, and can be disposed either to the ground or to water receptors.

Finally, the sludge from sedimentation tanks is thickened and dewatered. The dewatered sludge can then be used in agriculture, in the restoration of old quarries, or it can be properly disposed to landfills.

# WASTE MANAGEMENT

Athens International Airport is responsible for waste management at the airport premises. AIA has developed a comprehensive waste management system based on the "Polluter Pays" principle and promotes waste separation at source and recycling.

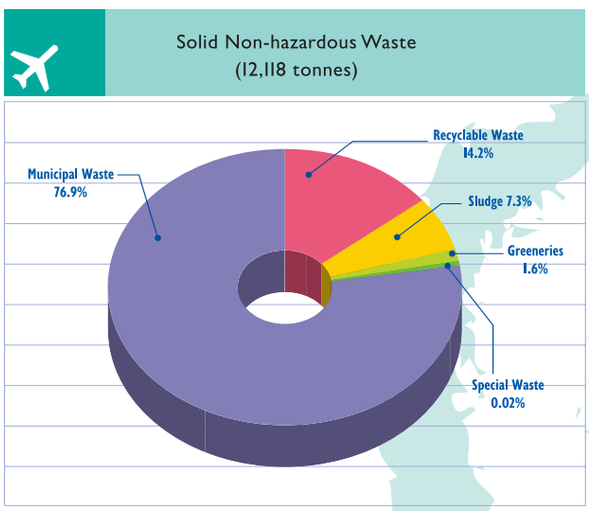
The major types of waste generated at the airport are:

- Solid Non Hazardous Waste
- Hazardous Waste
- Medical/Clinical Waste.

During 2006, Athens International Airport generated 12,823 tonnes of waste in total, 12,118 tonnes of which were solid non-hazardous waste, 705 tonnes hazardous waste and 355 kg medical/clinical waste.

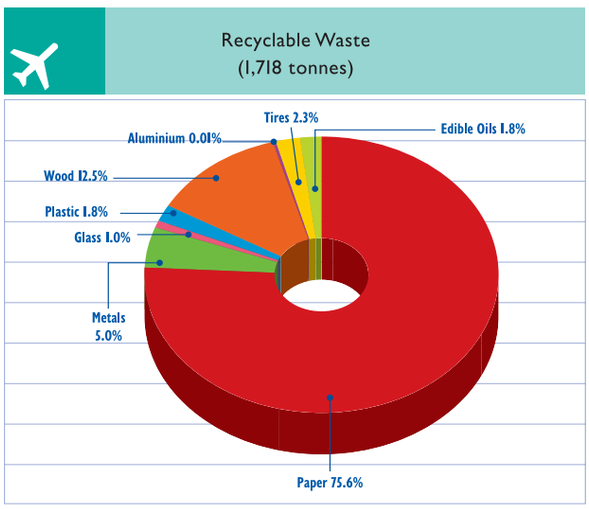
### Solid Non-hazardous Waste

During 2006, the total quantity of municipal-type waste generated at the airport was 9,323 tonnes. The recyclable materials sent to treatment facilities were 1,718 tonnes, representing 14.2% of the total solid non-hazardous waste. The sludge from the Sewage Treatment Plant (STP) was 884 tonnes, while 189 tonnes of organic waste coming from landscaping maintenance and 2.5 tonnes of special waste were generated.




### Recycling

The implementation of financial incentives (AIA provides a refund to Third Parties for all recycling materials generated at the airport site) led to the recycling of 1,299 tonnes of paper, 214 tonnes of wood, 86 tonnes of metals, 40 tonnes of tires, 31 tonnes of plastic, 32 tonnes of edible oils, 17 tonnes of glass and 0.25 tonnes of aluminium.




Additionally, AIA implemented a paper-recycling programme at AIA offices. Every working place is equipped with a special box for paper separation. Furthermore, the programme for aluminium recycling at Athens International Airport offices and the staff restaurants was extended to include plastic recycling.

**Paper Recycling**

Do you know that for every tonne of recycled paper we save:

- 17 trees
- 32,000 litres of water and 300 litres of petrol
- 4,000 KWh of electrical energy

Thus, with recycling 1,299 tonnes of paper in 2006 at the airport, we saved 22,000 trees, 41,500,000 litres of water, 390,000 litres of petrol and 5,200,000 KWh of electrical energy.


**Aluminium Recycling**

Do you know that for every aluminium can of 15g recycled we save the energy required to listen to the radio for 4 hours?

Thus, with recycling 250kg of aluminium (approximately 16,500 cans) at the airport, we saved enough energy in order for 1,000 households to listen to the radio for 66 hours.

**Hazardous Waste**

Hazardous waste is defined as waste containing substances that could harm our health and the environment. For example, computers contain substances such as mercury, cadmium and chromium that are very toxic. Hazardous waste cannot be disposed to municipal waste landfills, because during their degradation the dangerous substances they contain can pollute the ground, the air and the water. Hazardous waste must be subjected to special treatment in order for these dangerous substances to be neutralised. Additionally, several kinds of hazardous waste can be reused or recycled.

The major categories of hazardous waste produced at the airport are liquid wastewater from oil separators, oil and grease mixture and sludge from the industrial waste treatment facility, used batteries, used oil, waste from oil packaging, e-waste and various chemicals.

During 2006, 705 tonnes of hazardous waste was produced at the airport site, 20% of which was managed by Alternative Management Systems (e.g., recycling), while 80% was transferred to other licensed management facilities.

Furthermore, the Industrial Waste Treatment Facility treated industrial waste from Olympic Airways and the airport. The waste produced during the treatment process, such as filters and sludge, was managed at licensed facilities.

**Profile: Battery Recycling**

100 million household type batteries are sold annually, in Greece. Despite their small weight (approximately 25g), batteries can have significant consequences if disposed uncontrollably, due to the fact that they contain toxic substances. Just consider that one battery can pollute a cubic meter of soil and 400 cubic meters of water!!!

The study of the natural ecosystems, the airport's landscaping and the wildlife hazard control and reduction programme are our company's activities related to the natural environment.

**Ecosystems**

A number of natural and human-influenced ecosystems sustaining a significant number and variety of animals and plants are located at the airport's vicinity. The natural ecosystems include:

- Woodlands and tufts
- Shrublands
- Wetlands
- Dunes and rocky shores

The human-influenced ecosystems include:

- Residential zones
- Rural areas (mainly olive groves and vineyards)
- Stockbreeding

The operation of the airport affects directly or indirectly, through changes in land uses, both the natural and the human-influenced ecosystems of the wider Mesogaia area. In order to assess these impacts we are continuously monitoring the status of the ecosystems, through the bio-monitoring programme at the airport's vicinity.

This programme was launched in 1997 with a survey of the status of the ecosystems before the airport opening in order to create a baseline for the comparison with future situations, and assess the impact from the airport's operation. The survey recorded birds, other animals, plants, vegetation types and ecosystems.

**Bio-monitoring – Phase II**

The first results of the programme show that the natural ecosystems recorded before the airport opening still exist, but their area is altered mainly due to human activities, such as intense and unruly residential development, installation of industrial units, construction of new roads, unauthorised waste dumping, intensive grazing, and fires. The areas mostly affected by residential development are Artemis, Rafina, and Ag. Ioannis and Kamara hills.

The second phase of the programme started in 2005, in cooperation with the University of Patras, and will be completed at the end of 2007. The main targets of this phase are the recording of plant and animal populations, vegetation types and ecosystems, as well as the recording of variations against the baseline, the assessment of the source of the alterations, and the submission of proposals for conservation.

**Airport Landscaping**

The airport's landscaping meets the operational requirements and environmental terms for the airport, such as soil stabilisation and the reduction of noise and dust dispersion, while it provides a visual continuation between the landscaping of the Mesogaia and the airport area.

The plants used for the airport's landscaping are mainly species found at the local flora, with a low demand for water and adapted to the local climatic conditions. In addition, during the design and implementation of landscaping, parameters reducing the attraction of birds, like fruitless plants and dense vegetation, were taken into consideration.

The irrigation of landscaped limited-access areas is mainly based on treated water from the Sewage Treatment Plants.

# NATURAL ENVIRONMENT

**Wildlife Hazard Control and Reduction**

The activities of birds and other animals at the airport site may entail the risk of their collision with the aircraft. Although the energy released during the collision of an animal (usually birds) with an aircraft is in some cases significant, the resulting damages are usually minor. According to statistical data provided by the International Birdstrike Information System of the International Civil Aviation Organisation, 92% of the strikes occurred worldwide had none or a minor impact on aircraft movements.

For the reduction of the strike risks at the airport, long-term (passive) and short-term (active) methods are used. The long-term measures reduce and eliminate the factors attracting wildlife at the airport and include:

- An airport design unattractive to wildlife, i.e. birds and other animals, can not find:
  - food, since there are no fruit-bearing plants, and waste is placed in closed containers;
  - water, since permanent water concentrations like the sedimentation tank of the Sewage Treatment Plant is covered with special nets that keeps wildlife away;
  - nesting and perching places, as the buildings are specially designed to exclude such activities.
- Continuous study of the wildlife (mainly birds), on the airport site and in the vicinity.
- Submission of proposals regarding land uses at the airport vicinity, such as the exclusion of facilities or activities that could provide wildlife with food and water (e.g. waste management facilities).

Short-term methods aim to disperse birds from sensitive areas of the airport. They cause stress and pressure to the wildlife. These include:

- Bio-acoustics: Natural sounds like distress or alarm calls, predator calls etc.
- Pyro-acoustics: Sharp, loud sounds (e.g. explosions) either electronic or from guns (e.g., shotgun blanks).

**Wildlife Hazard Control and Reduction**

The team charged with this task patrols the airport area every day from dusk to dawn, recording the birds' and other animals' activities in order to implement the appropriate measures to disperse them when necessary.

A specially equipped vehicle –with sound system for the reproduction of natural sounds (bioacoustics), wireless communication (VHF, TETRA, IP telephone), wireless connection, computer and printer, equipment for trapping animals, and other portable items– provides valuable assistance to achieve the above goals.

# SOCIAL INITIATIVES

## Environmental Awareness

### Recycling Programme for the Schools of Artemis Municipality

The first year of the Recycling Programme for the Schools at the Municipality of Artemis, launched in November 2005 to enhance environmental awareness and reduce waste production, was a great success.

The programme includes paper and aluminum recycling at the Lyceum, the High School and the five Elementary Schools, and paper recycling at the five Kindergartens of Artemis Municipality. The Airport Company organises the transportation and recycling of collected materials, holds informative meetings and gives out leaflets that provide information regarding the implementation of the programme.

During the school year 2005–2006, the children collected 42kg of aluminium and 9,360kg of paper, 2,040kg of which was collected during the "Book Recycling Day".

At the beginning of the new school year (2006–2007), the schools were rewarded for their efforts with educational material and infrastructure projects.

### Environmental Scholarship Programme

Aiming to enhance environmental knowledge, our company grants scholarships for postgraduate environmental studies, in cooperation with the University of the Aegean. The subjects of these scholarships are related to Athens International Airport's activities. In the same context, we organise seminars addressed to the postgraduate students of the University's Postgraduate Environmental Policy and Management Programme, concerning the environmental activities of Athens International Airport.

### Environmental Information Centre

The Environmental Information Centre is located next to the Museum and provides information regarding the environmental activities of our company. In the summer of 2006, we staged an exhibition displaying the artworks created by students who participated in the "Ecological Transportation – Contribution to the Environment" Programme, held by the non-profit EcoCity organisation under the auspices of the Ministries of National Education & Religious Affairs; Transport & Communications; Environment, Town Planning and Public Works; Development; and Macedonia & Thrace.


## Construction Projects

### Artemis Municipality

On 5 July 2006, we delivered to Artemis Municipality the 26,000m$^2$ park we constructed at the Artemis coastal forest.

This project contributes to the improvement of the environmental conditions in the area and provides an upgraded environment for the citizens and visitors of the Artemis beach.

Construction works included the cleaning and repair of existing tile-paved paths, the construction of a playground and an arboretum, the installation of wooden benches and tables as well as kiosks, the installation of a lighting system and the planting of more than 3,000 trees and shrubs of the local flora.
Additionally, in close cooperation with the 2nd Ephorate of Prehistoric and Classical Antiquities, we funded the restoration of the fencing and the cleaning of the area of the Tavropolos Artemis Sanctuary, located near the park.

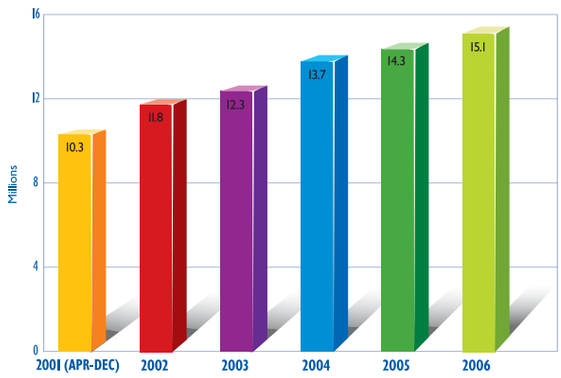
**Koropi Municipality**
On 10 July 2006, the park at "Dexameni", also constructed by our company, was inaugurated.
The area around the old water reservoir building (Dexameni) was transformed into a beautiful park of approximately 10,000m$^2$. This new park offers visitors recreation infrastructures, a playground and an area with more than 600 trees and shrubs of the local flora, combined with ornamental plants.
At the same time, the "Dexameni Theatre", the first theatre in the city of Koropi with a capacity of approximately 900 spectators, was inaugurated. Throughout the summer, a number of cultural events were held both in the area of the park and in the outdoor theatre, giving citizens an opportunity for relaxation, entertainment and cultural enhancement.

# STATISTICS

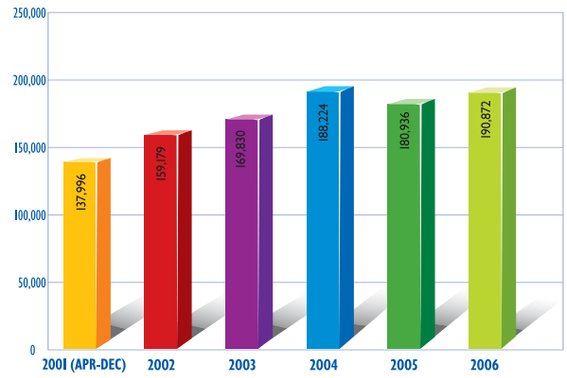
Athens International Airport "Eleftherios Venizelos" is located 33km northeast of Athens, in the Mesogaia area. It covers an area of approximately 17km$^2$, has two independent runways approximately 4,000 meters each, one main terminal building, one satellite terminal building and 89 aircraft stands.

The total number of passengers in 2006 was 15.1 million, an increase of 5.7% compared to 2005, while the number of aircraft movements increased by 5.5% to 191 thousand movements. Total cargo handled through AIA in 2006 reached 120 thousand tonnes, an increase of 3.5% compared to 2005.

Passengers




Aircraft Movements



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