THE AEROSPACE ENVIRONMENTAL HAZARDS: DIAGNOSIS AND PROPOSALS FOR INTERNATIONAL REMEDIES

by

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DEDICATION

To my parents, brothers and sisters whose encouragement supported me; to my daughter Hidayari; to the Venezuelan National Guard Institution, and to my fellow countrymen.

"TO MY COUNTRY TO WHOM I SWEAR ALLEGIANCE"

LIST OF ABBREVIATIONS

ATA	Air Transportation Association of America
CAEE	Committee on Aircraft Engines Emissions
CEQ	Council on Environmental Quality
CAN	Committee on Aircraft Noise
CARFE	Conference on Airports and Route Facility Economics (ICAO)
COSPAR	Committee on Space Research (U.N.)
COPUOS	Committee on the Peaceful Uses of Outer Space (U.N.)
EIS	Environmental Impact Statement
ECB	Environmental Coordination Board (U.S.)
EEI	Exclusive Economic Zone
EPNdB	Decibels
EPA	Environmental Protection Agency (U.S.)
ECOSOC	U.N. Economic and Social Council
ECD	Economic Commission for Europe (U.N.)
FAO	Food and Agriculatural Organization
FAA	Federal Aviation Administration
H.S.	High Seas
IATA	International Air Transport Association
IAAC	International Agricultural Aviation Centre
ICSU	International Council of Scientific Union
ICAO	International Civil Aviation Organization
ILO	International Labor Organization
J.F.K.	John Fitzgerald Kennedy
JT3D	"Class T3" means all aircraft gas turbine engines of the JT3D model family
LAX	Los Angeles International Airport
MSC	Maritime Safety Committee (IMCO)
MEPC	Marine Environmental Protection Committee (IMCO)

a. The politicians whose demagoguery decry the inevitable predicament of mankind;

b. the cheermongers who are convinced that the "environmental crisis" is essentially a practical problem, suceptible to ordinary negotiating techniques of U.N. debates;[4]

c. those who are truly concerned, believe that the environmental crisis requires an urgent solution.

Included in the latter group are my former superiors and my academic advisers to whom I wish to express my deep gratitude and appreciation for their generosity which has greatly assisted me in the preparation and completion of this modest work.

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THE AEROSPACE ENVIRONMENTAL HAZARDS: DIAGNOSIS AND PROPOSALS FOR INTERNATIONAL REMEDIES

INTRODUCTION

On the one hand, over a long period of time, scientists, designers and engineers have been actively engaged in the development of civil aviation and space technology. Until recently they have devoted themselves exclusively to that task; consequently they gave little regard to the environmental consequences of development other than the most obvious ones. On the other hand, environmentalists have a broader perspective. They consider: 1) that there is a network of complex, interrelated and interdependent natural and cultural components known as the planetary ecosystem which must be protected;[1] 2) that untrammeled growth and uncontrolled technology could eventually destroy the ecosystem that sustains us (especially through damage to outer-space).[2] The aviation and space technologies are two component of technology which if uncontrolled could contribute to the destruction of the ecosystem. In the case of aerospace activities the social and economic benefits from them, have to be balanced against certain potential environmentally harmful consequences such as: smoke emissions, noise and contamination from spatial satellites carrying new and unknown debris which might pollute the air and outer space.[3]

In this study we will make a diagnosis of the pollution problems in the airspace briefly summarized above aiming for a

system of global protection of the earth environment. Further we will develop the theory of "Specific Environmental Protection Zone", defined as areas outside territorial sovereignty where states may have jurisdiction to control and regulate on the matter of environmental protection.

Afterwards, a description of the origin and development of this theory will be discussed, through an interpretation of the legal status of the Exclusive Economic Zone and will suggest its assimilation to the proposed zone in outer space.

This task presents an intent to find solutions for a better protection of the earth environment. There, we also suggest the creation of an efficient international super-agency for environmental protection. This organization should be the leader to guarantee effective measures for the protection of the airspace, although, to this end, special consideration to the protection of the sea should be given taking account to the fact that: 1) generally, pollution is divided in air pollution, land pollution and water pollution, but in fact, there is only one pollution because every single thing, every chemical whether in the air or on land will end up in the ocean,[4] and many of the pollutants find their way into the rivers, lakes and oceans;[5] 2) everything within the ecosystem affects everything else and indeed the system of which the ocean is a part, is a large and complex one, therefore, we can not speak intelligently of airspace environmental protection

without due regard to ocean pollution mitigation;[6] 3) air pollution entering the oceans directly through rainfall or indirectly through river systems, are a major source of ocean contamination;[7] 4) the process of "wash-out" by rainfall is a particularly important means of transferring from the atmosphere to the surface and to the ocean.[8] For the purpose of this work it is important to emphasize the above aspects because it is desirable that an international organization should take responsability for marine pollution as an efficient way to mitigate all the other sources including these of the airspace.

The first chapter in this study aims to identify areas of aviation and satellite pollution in the airspace and in outer space. It also will focus on how an increasing environmental concern could affect the overall legal system to be applied in areas of outer space. It will make suggestions to facilitate understanding among members of the international community, taking account of pollution problems which threaten the integrity of States' territories.

The second chapter is a convergence to the concept of Specific Environmental Protection Zone approaching it, through a brief history and development of the legal status of the Exclusive Economic Zone of the sea. This chapter will also identify the new formulas already studied in the law of the sea conferences dealing with pollution abatment and how this system can be transferred to the airspace legal regime. Furthermore, we will make an analytical

examination of the main pollution provisions in the new Draft Convention.

The last chapter is an attempt to complete the proposal for a system of global protection of the airspace environment. To this ends we will firstly examine the definition of pollution as an approach for a further analysis through the structure of the different international organizations engaged in pollution control trying to present viable solutions and suggesting the creation of a single international organization within the U.N. system able to solve the issue.

In addition, this chapter will focus on the magnitude of the provisions contained in the Draft Convention on the Law of the Sea, recalling that a well organized plan will be demanded to implement these policies and also bearing in mind that an efficient system of defence of the airspace environment equally demands effective policies for the minimization of the ocean pollution.

CHAPTER I

THE AIR AND OUTER SPACE ENVIRONMENTAL HARMS

CHAPTER I: THE AIR AND OUTER SPACE ENVIRONMENTAL HARMS

1. ENVIRONMENTAL HARMS CAUSED BY AIRCRAFT

A. Aircraft Noise and Sonic Boom

a. Facts and Some Legal Aspects

Noise pollution is usually defined as "unwanted sound", "sound not wanted by the recipient" or "the wrong sound, in the wrong places, at the wrong time". All these definitions agree that noise is a manner of sound.[1] The term "environmental noise" means the intensity, duration, and the character of sounds from all sources.[2]

Noise and its concomitant vibration are among the most widespread and once least recognized environmental pollutants; furthermore, noise constitutes a public health problem and is one of the most frequent subjects of individual complaint. Some physiological harms such as destruction of the receptor cells in the inner ear, nervousness, hypertension and cardiac symptoms, as well as assorted mental problems can be caused by aircraft noise. At least one study indicates that there is a higher incidence of mental breakdown requiring hospitalization in residential areas touched by aircraft noise. Furthermore, aircraft noise causes psychological injury including interference with jobs. It can also cause fatigue and general stress. Any intensity of noise is enough to reduce the restful benefits of sleep. Chronic sleep deprivation causes symptoms ranging from simple fatigue to psychotic episodes.[3]

U.S. Courts have recognized that noise pollution may adversely affect health. In Greater Westchester Homeowners Association, et al

v. City of Los Angeles, et al, the California Supreme Court on December 14, 1979 affirmed the decision of a lower court and in conformity with decisions of other U.S. courts, awarded damages against the airport authority in favor of homeowners in the vicinity of Los Angeles International Airport. The Court held that the homeowners were entitled to seek just compensation on a nuisance theory for inter alia mental and emotional distress caused by the noise of aircraft.[4]

All the above problems can be produced by aircraft noise. Direct physical damage to property can be caused by sonic boom emitted by SST,[5] e.g. cracking building structures, damaging glass windows A supersonic airplane is "an airplane capable of sustaining level flight at speeds exceeding flight Mach number 1, in opposition to a subsonic airplane, which is incapable of holding such speed.[6]

The operation of aircraft engaged in international commercial flights has created three main problems in areas of common interest. These are the following: increased noise levels near airports; damage caused to property distant from airports by sonic boom; and noise caused by aircraft wherever this becomes noxious to health.[7]

In addition, damage to animals can be produced by aircraft noise. In United States v. Causby, a U.S. Supreme Court case, the Court of Claims awarded damages to compensate plaintiff. The suffering arose from noise emitted by low flights of U.S. military planes over a chicken farm. The facts of the complaint were that as a result of the noise the respondents had to give up their chicken business; as many as six to ten of their chickens were killed in one day by

flying into the walls from fright; the total chickens lost in that manner was about 150. Production also fell off. The result was the destruction of the use of the property as a commercial chicken farm.[8]

Other legal problems in the vicinity of airports have been also focused on by U.S. Courts. In Griggs v. County of Allegheny, Pennsylvania, the U.S. Supreme Court, found the county which had designed the airport for public use liable for damage to property owner when noise from aircraft landing or taking off made a home located off the end of the runway unbearable for residential use.[9] Decisions concerning aircraft noise in the vicinity of the airports have also dealt with the legal authority to regulate noise around the areas. In American Airlines, Inc., et al, the Port of New York Authority v. Town of Hempstead, et al, the United States Court of Appeals Second Circuit, held that ordinance controlling patterns and procedures of aircraft flying into and out of the airport was invalid, when it was in direct conflict with valid applicable regulations of the F.A.A.[10] In City of Burbank, et al, v. Lockheed Air Terminal Inc., et al, the U.S. Supreme Court, held that Federal Aviation Act and Noise Control Act, preemptes city ordinances imposing a local curfew to protect the city against noise.[11]

The U.S. Government has found a solution to the environmental problem around airports' areas. For instance, the newly projected airports are considered as major federal action significantly affecting the quality of the human environment, therefore, an environmental impact statement is required.[12]

Sound is measured in decibels. Normal conversation at a distance of three feet measures 65 decibels. Tests show that 175 decibels has killed mice during research. Lengthy exposure to industrial noise measuring 80 decibels has caused hearing loss. Tone and duration are measured by effective perceived noise decibels (EPNdB). Subjective loudness is measured in decibels, and is a function of magnitude or pressure and of frequency (rate of pressure oscilation with time). Thus, decibels (EPNdB) measures noise for legal purposes.[13] The average human noise toleration is 98 (EPNdB), and some countries have adopted a maximum permitted level of aircraft noise of 98 (EPNdB) during the day and 90 (EPNdB) during the night for residential areas near airports. Other facts to be taken into consideration in order to regulate aircraft noise are the following: the type of aircraft, the type of engines, and whether the aircraft is landing, taking off, or cruising overhead.[14] All of the above elements ought to be considered in regulating noise caused by aircraft activities.

b. International Noise Policy

ICAO has taken important steps towards an international treaty on aircraft noise and emissions. An ad hoc group on the matter of assessment of noise abatement strategies, including noise charges is presently at work. Alternative texts of an instrument on the liability for damage caused by noise and sonic boom were studied by the 21st session of the Legal Committee, and a sub-

committee worked to prepare a text to amend the Rome Convention,[15] but they were not successful.

The above facts evidenced an increased interest leading ICAO to create the first international aircraft noise legal instrument, Annex 16 to the Chicago Convention adopted in April 1971 which, in fact, established the minimum international standard and recommended practices to compel states to unify noise regulations. The legal support for this instrument is Article 54 of the Chicago Convention on International Civil Aviation which sets forth that the ICAO Council shall adopt international standards, recommended practices and procedures (SARPS), in accordance with Chapter VI of the Convention and designate them as annexes to the Convention. Likewise, Article 38[16] imposes an obligation on contracting states to inform ICAO of the impracticability to comply with these SARPS, and to notify ICAO of the differences found between its own practice and those established by the Organization. ICAO has published in Annex 16, guidance material regarding the following: airport planning, reduction of run-up noise on the ground, noise limits for aircraft landing or taking off, and noise certification standards for future subsonic aircraft.[17]

Environmental conditions in aerodrome planning, design and operation have also been considered by ICAO. During the 8th Air Navigation Conference in 1974, a working paper was presented containing guidance material regarding the following:

a. Aerodrome planning considerations such as:

   i. aircraft noise;
   ii. air pollution;
   iii. contamination from draining systems;
   iv. judicious locations of runways, taxiways, aprons, and engine testing areas.

b. ICAO development of a document to assist states in dealing with:

   i. aerodromes should be located within reasonable distance of the population areas to be served, and
   ii. adverse effects of excessive urban development in the vicinity of aerodromes.[18]

The ICAO Committee on Aircraft Noise (CAN), which was created in 1970, has expanded coverage of Annex 16 to deal with the following items:

a. The development of noise certification standards for new subsonic jet and propellor driven airplanes submitted for type design which may affect its noise characteristics;

b. noise certification of future supersonic aircraft, propellor driven short take-off and landing aircraft;

c. installed auxiliary power units and associated aircraft systems during ground operations;

d. determining the technical feasibility of retrofitting schemes developed for different types of airplanes to meet Annex 16 noise certification requirements.[19]

ICAO has reached the present level of noise regulations by the following steps:

ICAO ACTIVITY IN THE FIELD OF AIRCRAFT NOISE

September 1968	Sixteenth Session of ICAO Assembly held in Buenos Aires adopts Resolution A16-3 instructing the Council to call an international conference to establish international specifications and associated guidance material relating to aircraft noise.
November - December 1969	A Special Meeting on Aircraft Noise in the Vicinity of Aerodromes was convened in Montreal in response to Assembly Resolution A16-3.
February 1970	ICAO establishes the Committee on Aircraft Noise (CAN) to assist in the development of international specifications for noise certification of aircraft and associated equipment.
April 1971	ICAO Council adopts Standards and Recommended Practices for Aircraft Noise in the form of Annex 16 to the Convention on International Civil Aviation with applicability date of 6 January 1972.
November 1971	CAN/2 Meeting. The Committee develops Standards to cover production and developed versions of non noise-certificated subsonic jet aeroplanes manufactured after January 1976.
March 1973	CAN/3 Meeting. The Committee develops recommendations for the extension of applicability of noise certification Standards to subsonic jet aeroplanes of 5700kg or less and for the noise certification of light propeller-driven aeroplanes.
January - February 1975	CAN/4 Meeting. The Committee develops: a) more stringent noise certification Standards for new subsonic jet aeroplanes (for which the application for type certification is submitted after 6 October 1977) and their derivatives;

b) standards for noise certification of heavy propeller-driven aeroplanes other than STOL aeroplanes; and

c) guidelines for noise certification of future supersonic transport aeroplanes, propeller-driven STOL aeroplanes and installed auxiliary power units (APUs) and associated aircraft systems when operated on the ground.

October 1976 — Second Edition of Annex 16 incorporating all the above-mentioned amendments issued with applicability date of 6 October 1977.

November 1976 — CAN/5 Meeting. The Committee develops revisions to noise certification requirements for new subsonic jet aeroplanes formulated at the CAN/4 Meeting, introducing number of engines as an additional parameter for determining the permissible noise levels.

March 1978 — Third Edition of Annex 16 incorporating amendments resulting from CAN/5 recommendations issued with applicability date of 10 August 1978.

May - June 1979 — CAN/6 Meeting. The Committee develops:

a) noise certification standards for helicopters;

b) noise certification standards for future production and derived versions of existing supersonic aeroplanes; and

c) further refinements in the existing noise certification requirements for subsonic jet aeroplanes and propeller-driven aeroplanes.[20]

The last modification to Annex 16, Amendment 5, stems principally from the recommendations of the 6th Meeting of the Committee on

aircraft noise and introduces:

a) standards for noise certification of helicopters;

b) standards for noise certification of derived versions and future production of existing supersonic aeroplanes;

c) improvements in the noise certification requirements for conventional propeller-driven aeroplanes and subsonic jet aeroplanes;

d) improvements in the guidelines for noise certification of auxiliary power units (APUs);

e) units of measurement in System International (SI) in conformity with the provisions of Annex 5 (Fourth Edition); and

f) reorganization of the Annex so that all provisions related to environmental aspects of aviation are covered in one document.

The above amendment which now forms part of Annex 16 on Environmental Protection, Volume I was adopted by the Council at the 1st Meeting of its 103rd Session on 11 May 1981, and will become effective on 11 September 1981[21] (Appendix "A"). The CAN also during the 6th Meeting (Montreal, 23 May, 1 June 1979) recommended uniform application of the Annex provisions as well as harmonization between Annex 16 and national noise regulation. During the 97th Session held in the same period, the ICAO Council agreed to request all member states to take no action before January 1, 1988, and then to limit any prohibition of operations by non-complying airplanes only at the most noise sensitive airports.[22] The purpose of this resolution is to protect economically weak air carriers against the risk of being put out of business, especially carriers belonging to developing countries, taking account of the

high cost of aircraft retrofitting. Thus an economic analysis made in the U.S. by the Air Transport Association estimated that replacement of all 707's and McDonnel Douglas DC-8's, about 320 aircraft, would cost more than $6 billion in 1980 dollars. Total cost for retrofitting quiet nacelles to the approximately 1,000 Boeing 727's, 737's, and McDonnel Douglas DC-9's would be about $234 million in 1975 dollars. Northwest airlines' officials considered that they will not have serious difficulties in complying with F.A.A. noise policy, but questioned the rationale for forcing retrofit of two and three-engine aircraft, by saying that they had expected to have 23 Boeing 727-200's still out of compliance in 1983, when the noise rule must be met. Those aircraft were delivered in late 1960's and will still have several thousand hours of use left, but they probably will not be worth a retrofit expenditure.[23] The above picture, brought serious conflict linked with the date of compliance of the noise regulations. While ICAO requires compliance by January the 1st, 1988, the Federal Aviation Administration (F.A.A.) of the U.S. pursuing the instructions set forth in the Federal Aviation Act of 1958, Section 611, published an Amendment to Part 36 (Noise Limits) of the F.A.A. Noise Abatement Regulations of 1971, obliging compliance plan by 1985 in which all U.S. and international carriers shall comply with the current Part 36.[24] Also an interim program is imposed on carriers as follows:[25]

B 707/720/DC-8	25% compliance by 1981 50% compliance by 1983 100% compliance by 1985
Early version of B 747	50% compliance by 1981 100% compliance by 1983
B 727	50% compliance by 1981 100% compliance by 1985

The reaction against these measures taken by the F.A.A. resulted in an international protest reflected in the 23rd Session of ICAO General Assembly held in Montreal (September 16 to October 7, 1980). The text of the resolution issued states:

AIRCRAFT NOISE AND ENGINE EMISSIONS
FROM SUBSONIC JET AIRCRAFT

WHEREAS the restrictions on the utilization of aircraft operated by the carriers of the Member States of ICAO constitute a problem of general interest which must be solved by the international aeronautical community;

WHEREAS unilateral measures in this field pose a serious risk for the stability of air transport and the principles laid down in the 1944 Chicago Convention for co-operation and utilization of international civil aviation for the benefit of all nations and peoples of the world;

WHEREAS the decision of the ICAO Council at the Second Meeting of the 97th Session (May-June 1979) relating to the noise certification standards of Chapter 2, Part II of Annex 16 (Third Edition) represents the consensus of the international aeronautical community in this matter;

WHEREAS the concern for the quality of the environment and the need for technical and economic solutions which led to the Council's decision apply also to the engine emissions of these aircraft, and unilateral restriction

in either case has as its final objective the prohibition of aircraft operated by the carriers of the Contracting States;

THE ASSEMBLY REQUESTS THE CONTRACTING STATES:

1. (a) not to prohibit before 1 January 1988 the operation of foreign registered subsonic jet aeroplanes not conforming to the noise certification standards of Chapter 2, Part II of Annex 16 (Third Edition) into and out of their territories;

(b) to limit prohibition of operations to those airports which have been identified by them as having noise problems and have been so declared through appropriate means and to inform ICAO accordingly;

(c) not to adopt, with regard to the engine emissions of these aircraft, restrictive unilateral criteria different from those contained in (a) and (b) above.

2. INSTRUCTS the Council to expedite the studies on aircraft emissions and report on the matter to Contracting States in the near future.[26]

Despite this Resolution, the F.A.A. noise rules went into force and adverse results can be expected at the expiration of the proposed date, if the U.S. position does not change.[27] There is a direct relation between the above problem and certain matters treated by the Conference on Airport and Route Facility Economics (CARFE) held in Montreal from 19 May to June 1981, when this Conference considered the problem of recovery from airport users of the noise-related costs assumed by airports. The Conference

agreed that the following list outlined the types of airport noise alleviation or prevention measures which could incur costs, deemed to be attributable at the discretion of States:

a) Land use planning around airports

Acquisition of land or property around airports in connection with land use planning.

b) Operational measures for noise abatement

Operational measures for noise abatement (e.g. take-off/climb procedures, minimum noise routes and arrival procedures).

c) Construction of new airports or runways

Adoption of alternative runway alignments or lay-outs for noise alleviation measures which are usually taken for a variety of reasons, including aircraft noise.

d) Compensation and other payments for aircraft noise

Sound proofing to reduce noise levels near airports, for which various schemes have been devised; compensation and other payments arising from legal or governmental requirements.

e) Other noise abatement measures

Other measures involving costs include noise monitoring systems, noise suppressing equipment and noise barriers. [28]

It was also agreed that noise charges should be applied in such a manner as not to encourage claims being made on the airport with respect to aircraft noise; the charges should not be set at such levels as to be prohibitively high for the operation of certain aircraft; these charges should be associated with the landing fee, expressed as a surcharge for aircraft non-noise

certificated in accordance with Annex 16, or as surcharges, but not related to actual noise levels measured by noise monitoring systems; and they should not be related to aircraft weight alone.[29]

The Conference also in its Recommendation No. 2 suggested the adoption of the following principles:

"a) The costs incurred in implementing noise alleviation or prevention measures at airports may, at the discretion of States, be attributed to airports and recovered from users.

b) Consultations should take place concerning any items of expenditure which States consider should be recovered from users. States should have the flexibility to decide on the charging method to be used in the light of local circumstances.

c) Noise-related charges should be levied only at airports experiencing noise problems and should be designed to recover no more than the costs applied to their alleviation or prevention.

d) Any noise-related charges should be associated with the landing fee, possibly by means of surcharges or rebates, and should take into account the noise certification provisions of Annex 16.

e) Such charges should be non-discriminatory between users and not be established at such levels as to be prohibitively high for the operation of certain aircraft."[30]

Despite the fact of the advisory character of these recommendations the legal and economic implication of its application for contracting states could be, in our opinion, very undesirable for the air carriers specially those of developing countries which still

operate two and three engine aircraft. The high cost of retrofitting aircraft engines was discussed before and it was stated that the intention of Resolution 7/4 on aircraft noise of 3 October 1980, is to protect air carriers of weaker countries against the risk of being put out of business.[31] There is also a time limit to comply with the requirement of Annex 16 which implies an increase in the operational cost for the air carriers. Later on the ICAO CARFE, agreed upon the imposition of surcharges on air carriers for costs incurred by airports for noise alleviation or the taking of preventive measures including payments arising from legal or governmental requirements which, in our opinion, is inconsistent with the principle of promotion of the civil aviation, set out in the Chicago Convention and which directly conflicts with the intent of Resolution 7/4 where the General Assembly agreed in order to protect weaker carriers, not to take prohibitive measures against the operation of the foreign registered subsonic jet airplanes not conforming to noise certification standards, before 1 January 1988.[32] In a working paper presented by IATA to the Conference, the view was expressed that other entities among them federal and local governments are jointly responsible for the aggravation of noise problems in the vicinity of airports.[33] This statement is completely valid and expressed the opinion of the court, in the Greater Westchester Case, referred to above where the Court inter alia found the City of Los Angeles responsible because it initially located the two north runways with full knowledge that the noise from their use would reach nearby established residences; the north runways

were constructed with substantial federal financial assistance under grant agreements between City and the F.A.A.; and all commercial aircraft using LAX have federal airworthiness certificates which indicate compliance with federal noise emission standards.[34] This case confirms that not solely the airport user or the non-certificated aircraft are responsable for noise problems, although in the future states will be allowed to recover costs incurred for this concept only from the air carriers. Among other implications of this Recommendation we can foresee the following:

1. probability of an anarchical system in the imposition of landing fees because there are no guidelines to orient contracting states on the regulation of major amounts to be charged to airport users for this concept and there is not determined the joint responsibility of other entities.

2. This Recommendation affects specially air carriers whose aircraft already have the noise problem, thus the Recommendation becomes in substance and effect a punitive charge (inflicting a penalty) affecting retroactivally only certain categories of aircraft.

3. The increase of landing fees will directly affect consumers in general because it will be reflected in higher prices for air travel tickets.

4. Article 15 of the Chicago Convention states:

   "Every airport in a contracting State which is open to public use by its national aircraft shall likewise, subject to the provisions of Article 68, be open under uniform conditions to the aircraft of all the other countries States. The like uniform conditions shall apply to the use, by aircraft of every contracting State, of all navigation facilities... Any charges that may be imposed or permitted to be imposed by a contracting State for the use

> of such airports and air navigation facilities by the aircraft of any other contracting State shall not be higher... than those that would be paid by its national aircraft engage in similar operations."

This Recommendation also conflicts with the intention of Article 15 of the Chicago Convention for the following reasons:

(a) Its application will be discriminatory affecting only certain categories of aircraft;

(b) it is a weapon in the hands of contracting States if they wish to violate Article 15. If they impose the surcharge on foreign aircraft using these airports, this may unfairly discriminate against the aircraft of countries which have followed a rational airport planning policy, not because of the aircraft using these airports do not require special noise modification. In these countries there is no need for the noise surcharges or indeed for modifications to the aircraft. Effectively when such states because of this foresight will be subsidizing other countries not in this unreasonable situation and will be unable to impose surcharges on the aircraft of countries which have themselves imposed surcharges. These prudent countries will thus be penalized for their foresight and will be deprived of the ability to take reprisals, the most sure way in international air law of repairing a wrong;

(c) it will probably result in airlines having to withdraw some aircraft from services until appropriately modified engines are installed or result in a reduction in utilization of unmodified aircraft, all causes involving economic penalties. Alternatively the unmodified aircraft will be confined to operations in places where there are no surcharges. This of course

> represents an export of the noise problem, which is particularly ironic having regard to the fact that most civil aircraft have been manufactured in a highly noise sensitive country.

Another conclusion in this regard is that the cost for improvement the quality of the human environment is very high and states should make an effort to face them, however, the problem of aircraft noise around airport areas is a major concern of the highly populated urban areas specially those of developed countries. This fact, makes this Recommendation unfair. Despite the good intentions of the Recommendation aimed at motivating airliners to:

(i) use only aircraft which pay no noise charge, or a lesser charge;

(ii) retrofit aircraft paying a noise charge, or accelerate their replacement, so that they no longer pay a noise charge, or pay a lesser charge;

(iii) select the quietest aircraft available when buying new aircraft, and/or

(iv) put pressure on manufacturers to make quieter aircraft.[35]

We consider that the issuance of this kind of recommendations require major reflections, especially a study including a cost benefit analysis of the environmental problems should be considered in advance.

The Executive Committee, in ICAO Resolution 22-3 proposed for consideration a working paper making the following recommendations regarding supersonic aircraft use:[36]

a. Governments associated with supersonic civil aircraft will ensure the airworthiness for such before they enter into commercial international service;

b. supersonic aircraft must: i) be able to operate at aerodromes designed for large subsonic jet aircraft; ii) operate without creating unacceptable situations due to sonic boom; and iii) integrate with existing patterns and movements of subsonic aircraft jet services;

c. The noise levels applicable to subsonic jet airplanes would be used as guides to apply to supersonic transport airplanes until such time as standards and recommended practices for the noise certificate will be adopted by ICAO.

Action respecting sonic boom has been undertaken by the Sonic Boom Committee of ICAO.[37] In fact, such committee concluded that states have the power to regulate sonic boom, including prohibition of supersonic flights over their territory, but they have no power to prohibit such flights outside their state.[38]

Standards, recommended practices and rules for international aircraft noise control are authorized in the Chicago Convention and issued by ICAO in Annex 16. The Air Transit Agreement and bilateral air services agreements are based on Article 6 of the Chicago Convention, which grants states authority to forbid foreign international scheduled flights over their territory, thereby, states have authority to regulate noise pollution. These rules, however, are directly applicable to international carriers when they do not conflict ICAO rules, in respect of which they have not notified differences.[39]

Concerning sonic boom, the United States Court of Appeal, Second Circuit in British Airways Board v. The Port Authority of New York and New Jersey, denied the privilege of the Port Authority to establish noise regulations for Concordes at J.F.K. when they conflict federal rules or a decision and order of the secretary of the Department of Transportation but Port Authority would be authorized to adopt new, uniform, and reasonable noise standard subject to the overriding control of the federal authority.[40] As a result of this decision, and other conflicts the F.A.A. issued supersonic transport rules to be effective on July 31, 1978. The new regulations:

a. Allow local airports to ban aircraft including the Concorde by adopting reasonable nondiscriminatory noise rules;

b. prohibit scheduled Concorde flight operations between 10p.m. to 7a.m.;

c. prohibit any modifications to the aircraft that will make it noisier;

d. prohibit the Concorde from creating sonic booms that can be heard in the U.S.;

e. prohibit the Concorde from flying at supersonic speeds inside the U.S.[41]

Finally the last development of aircraft noise (SARPS) includes amendments to Annex 16, Annex 6 and PANS-OPS. These amendments are now to be presented for review to the ICAO Council and they incorporate the following aspects:

To be inserted to Annex 16:

Part V - Aircraft Noise Abatement Operating Procedures

1. Aircraft operating procedures for noise abatement shall only be implemented at an aerodrome when studies confirm* that a noise problem exists in the vicinty of the aerodrome which the intended procedures will significantly alleviate, without compromising the safety of flight operations

   Note.-The effectiveness of aircraft operating procedures for noise abatement represents the balance between the noise alleviation achieved, and the extent to which aerodrome efficiency is maintained.

2. Recommendation.-Aircraft operating procedures for noise abatement should be developed in consultation with the operators which use the aerodromes concerned.

3. Recommendation.-The factors to be taken into consideration in the development of appropriate aircraft operating procedures for noise abatement should include the following:

   a) the nature and extent of the noise problem including:

      i) the location of noise sensitive areas; and

      ii) critical hours.

   b) the types of traffic affected, including aircraft weight, altitude, temperature considerations; and

   c) the types of procedures likely to be most effective.

To be inserted to Annex 6, Part I, Chapter 4 - (Flight Operations)

1) Aircraft Operating Procedures for Noise Abatement

2) Aircraft operating procedures for noise abatement shall comply with the provisions of PANS-OPS, Volume I, Part V.

3) Recommendation.-Take-off climb procedures for noise abatement specified by an operator should be the same for all aerodromes for any one aircraft type.

To be inserted to PANS-OPS, Volume I, Flight Procedures:

Part V - Noise Abatement Procedures

Introductory Note

The procedure herein describe the methods for noise abatement when a problem is shown to exist. They have been designed principally for application to turbo-jet aeroplanes, however they may be adapted after suitable modification to operations by other aircraft. They can comprise any one or more of the following:

a) use of noise preferential runways to direct the initial and final flight paths of aircraft away from noise sensitive areas;

b) use of noise preferential routes to assist aircraft in avoiding noise-sensitive areas on departure and arrival; including the use of turns to direct aircraft away from noise-sensitive areas located under or adjacent to the usual take-off and approach flight paths;

c) use of noise abatement take-off or approach procedures, designed to minimize the overall exposure to noise on the ground and at the same time maintain the required levels of flight safety.[42]

B. Aircraft Engine Emissions

a. Facts and Some Legal Aspects

Air pollution by smoke is not a new phenomenon. It has been known since the twelfth century and has been the subject of strict laws.[43] Aircraft engine emissions are a problem of

the twentieth century. It is a product of aviation development and has gradually become a threat to the human environment.

Although atmospheric pollution by aircraft near ground level is a problem only in a few particular aerodromes, it has been scientifically recognized that aircraft engine emissions must be controlled,[44] to avoid future harmful consequences to the human environment. Despite the fact that aircraft engine emission is not a grave problem at low altitudes, it is suspected that large scale release from SST's combustion products in the stratosphere could have serious adverse effects on climate.[45] There is a likelihood that aircraft fleet emissions can affect the tropospheric ozone budget; but, the magnitude of the effect and its nature (i.e. whether or not it is of concern) still remain to be ascertained.

In the 1970's, fears were expressed that large scale commercial operation of supersonic aircraft might bring about possible adverse health effects. At that time it was considered that the aircraft engine exhaust emissions, through complex chemical reactions, would reduce the amount of ozone in the atmosphere. Also there was concern that any ozone reduction would permit biologically harmful solar ultraviolet radiation to penetrate to the earth's surface in increasing intensity and also in increasingly shorter wave lengths. Lastly, there were also fears that any increase in such radiation would have the potential of increasing the incidence of skin cancer in fair-skinned humans. As a result

several nations undertook extensive research programs to study these possibilities. These programs considered the flight operations of subsonic aircraft in the stratosphere as well as supersonic aircraft.

The results of these research programs, which consisted of laboratory chemical investigations, improvements in atmospheric modelling and new measurements, have demonstrated two important points; first, that existing atmospheric models tend to show a substantially smaller effect by aircraft on atmospheric columnar ozone with most models now showing either no change or a slight increase in ozone; second, the uncertainty in model predictions is greater than previously estimated.

Another important fact to be taken into consideration is that SST Aircraft emit approximately four times more pollutants than comparable subsonic aircraft even applying the new standards, to regulate them.[47] Thus, the control of high altitude pollution may require special rules to minimize its effect. Some of the pollutants emitted by aircraft engines which may be regulated include inter alia: smoke, carbon monoxide (CO), unburned hydrocarbons (HC) including vented fuel, and oxides of nitrogen (NOX).[48] The effects caused by aircraft emissions on the human health includes: loss of visual amenity, irritation of the eyes and respiratory tract, impairment of visibility if the phenomenon occurs during cold foggy weather,[49] production of photochemical air "smog" in certain metropolitan regions, odors around airport

areas, and toxic gases which can damage public health.[50] High contamination originating from air pollutants, though not produced by aircrafts, have, over a short period of time, caused disasters, death and damage to plant and animal life.[51]

An interesting legal situation arose from the harmful effect of air pollution on human health. There are several air pollutants which cannot be seen with the naked eye, such as fluoride and carbon monoxide, however, damage to plants, animals or humans could be a result from short or long exposure to them. Because of this peculiar feature of these gases, courts have found that neither a trespass nor a nuisance can be proved when there is not direct invasion of property or present damage to a person.[52] In Fairview Farms, Inc. v. Reynolds Metals Co. a U.S. case, the court did not award damages for the commission of trespass, eventhough the intrusion of the fluoride particulates could have been detected through modern technological methods, because the court considered that there was no direct invasion.[53] Additionally, nuisance can not be proved without present damage to person or property. Special situations have arisen with the problem of accumulated damage for long or short exposure to air pollution. Because of its peculiarity, new techniques should be found to develop system of liability when unseen gas particles cause damage.[54]

Another approach to the legal question of how to claim damages from air pollution is by basing the suit on strict product liability. In City of Chicago v. General Motors Corp., a U.S. case, the city sought from the court a mandatory order that the defendant equip all new, and recall and furnish all old vehicles operating in Chicago with tamper-proof emission control devices to solve problem of the city's air pollution. Relief was denied and the court held that the test of what is "unreasonably dangerous" to prove strict liability must be applied to each automobile and not to all vehicles, because the evident damage is that caused by a particular vehicle to a particular person.[55] Even though this case involved motor vehicles, the same litigation could arise in class action cases for aircraft pollution in the vicinity of airports where, though a particular aircraft is not causing damage alone, the community is endangered by poison smoke. Therefore, strict product liability has not solved this problem.[56]

Water vapour, sulphur dioxide, carbon dioxide and oxides of nitrogen can affect the climate; emission of water vapour and oxides of nitrogen at high altitudes can also affect the ozone layer which is critical to the biosphere because it absorbs most of the powerful solar ultraviolet radiation which can harm life on the earth's surface. The most serious effect of a reduction of ozone is associated with an increase in the incidence of skin cancer in humans. Furthermore, adverse changes in the ozone layer might harm plant life and animals, reduce forest resources

and decrease the population of certain acquatic species.

Reduction of ozone can produce climatic changes in a region, including unpredictable and often undesirable extremes of flood, drought, hot and cold spells, changes in precipitation and wind. Significant amount of stratospheric ozone destruction might cause added cooling of the earth's surface because of the lowered ozone concentration.[57] The "no change" or slight increase in ozone, which was determined by one-dimensional models, may be so artificial as to be meaningless. Improvement and refinement of available two-and-three dimensional models is essential to a satisfactory resolution of the issue. Because the "no change" result is due to significant reduction of upper level (stratospheric) ozone balanced by increases in lower level (tropospheric) ozone, unique effects may be induced on other atmospheric characteristics such as circulation and heat balance. There are no models sufficiently developed to address this issue. Further, the increase in tropospheric ozone may have some effect on agriculture and human health. It is important that this effect be quantified for all projected fleet emissions.[58] The above facts have led to international concern for the need of maintaining the air quality around the major air terminals, as well as establishment of standards along international air routes which could be served by supersonic aircraft.

b. International Policy on Aircraft Smoke Emissions Control

Several international organizations are concerned with the problem of trans-frontier pollution caused by aircraft. Among them the Council of Europe, ICAO, UNEP, WHO (World Health Organization), WMO (World Meteorological Organization), may be mentioned. Research is being done by them in the area of aircraft emissions.[59]

The UNEP has been functioning since 1973 as a focal point for environmental action and coordination with the U.N. system. Biennial meetings are being held by the specialized agencies of the U.N. and ICAO is represented at these by the Secretary General. Working level contact and exchange of correspondence have been maintained between ICAO and UNEP.[60]

ICAO has worked towards the control of aircraft engine emissions in the vicinity of airports and has encouraged designers to use the best available emission reduction technology in the next generation of aircraft engines, trying to avoid the possibility of expensive retrofitting in the future. ICAO has also produced a certification scheme for aircraft engine emission control for future engines, and schemes to reduce the time spent with engines idling on the ground in order to reduce smoke emissions. The Organization has also stimulated States during the last few years to consider the problem of high altitude pollution and has participated in an UNEP meeting to consider specifically the possible effects of pollutants on the earth's ozone layer.[61]

ICAO has studied aircraft smoke emission limits and has developed certification schemes, however, they are not still binding the states members of the organization.[62] Fortunately, the ICAO Council at the 1st Meeting of its 103rd Session on 11 May 1981, agreed to retitle and rearrange Annex 16, calling it "Environmental Protection", composed by Volume I Aircraft Noise and Volume II Aircraft Engine Emissions. The drafted Volume II was approved by the Council on 30 June 1981, and shall become applicable on 18 February 1982.[63] (Appendix "B")

Despite the fact of the ICAO orientation and work aiming toward international rules some states have developed internal regulations to control aircraft smoke emissions. Special references should be made to the United States regulations as the leading generator of international air traffic in the western world. By special mandate of the U.S. Congress set forth in the Clean Air Act of 1970 Section 231, the Administrator of the Environmental Protection Agency, commenced studies and investigation of air pollution from aircraft, having resulted in the publication of the Emission Standard and Test Procedures for Aircraft, of 1973. In pursuance of Section 232 of the Act, the Secretary of Transportation prescribed regulations to ensure compliance with all standards issued by the Administrator of the E.P.A.[64] These regulations to amend the F.A.A. airplane emissions rules were published in Washington on April 8, 1980. Among other provisions the amendment set forth a final

compliance date for the E.P.A.'s regulations Part 87 of July 1, 1985, with intermediate phased compliance dates of January 1, 1981, and January 1, 1983.[65] The proposed regulations include retrofitting of a combustor for the in-use JT3D engines to comply with Part 87 of the E.P.A.'s regulations. Under 87.1(a) gas turbine engines of the JT3D model family, may not exceed a smoke number of 25 when measured in accordance with the related test procedures under E.P.A.'s regulations.[66] The above regulation is aimed at manufacturers, who shall comply with such rules by making new engines produced on or after January 1, 1978, in accordance with the rules. They also oblige air carriers who by petition of the Air Transport Association of America (ATA) were released to permit phased compliance for 1/4 of its operational class JT3 engines by January 1, 1981, 1/2 by January 1, 1983, and full compliance by January 1, 1985. The standards specified are to be applied to civil JT3D-powered airplanes which have a U.S. standard airworthiness certificate or foreign equivalent and operating in the U.S. The standards will be applied to foreign, as well as to national air carriers.[67]

The obligation imposed by U.S. law on international carriers, in our opinion, could impose an economic hardship on small airlines if appropriate measures are not taken. The cost estimated by the E.P.A. in the explanatory statement to its standards, showed that the total cost of this requirement to the U.S. airline industry is $141 million, over a ten years

period. This represents for newly designed commercial engines an increase in cost of at most three percent.[68] On the other hand, a fuel saving of $29 million only from piston type aircraft is expected in a period of ten years.[69] In addition, compliance with the noise limit rules will be required from foreign carriers; in the U.S. these noise rules require different kinds of modifications from those that the smoke emission standards require.[70] Therefore, a political problem could arise in the near future when foreign carriers flying to and from the U.S. see their economic interests being adversely affected. Against these financial considerations there must be weighed the advantages to the environment. In our opinion, ICAO members should initiate a study to determine whether the benefits to the international community are exceeded by the harm to international air carriers. Once the question has been answered authoritatively, then there is a probability that international agreement could be reached.

2. ENVIRONMENTAL HAZARDS IN OUTER SPACE

A. Outer Space Pollution

Environmental harms in outer space can be produced by a variety of human activities.[71]

The use of Nuclear Power Sources in outer space (N.P.S.) is probably one of the most important forms of pollution in this area, and it has special implications for the safety

and integrity of the human environment. The conduct of nuclear tests in space is a form of N.P.S. pollution.

Thermonuclear tests by the United States in 1954, had already brought reactions from Japanese citizens who suffered injuries and apparently, the United States paid compensation.[72]

Another probability is physical harm of the kind resulting from the collision of space objects whose fragments remain in the orbit around the space.[73] The orbiting in space of the first satellite, the U.S.S.R.'s Sputnik I shows that heavier pieces of hardware launched into outer space would not be entirely consumed in the earth's atmosphere upon return.[74]

The interfering use by many broadcast entities with a given radio spectrum, the attempt by several states to place several space objects in a given geostationary orbital position at the same time, the use of electronic impulses employed by an interceptor type satellite against another space object, the use of high-energy laser beams, possible harms from high-frequency microwave emissions, the insertion of ozone debilitating aerosols in the stratosphere and the introduction of disease laden objects into the space environment,[75] are all examples of activities that could affect detrimentally the space environment.

Other kinds of damages may also occur even from the safe return of satellites to earth, by bringing back unknown microbes or poisonous matters which could pollute the air and

endanger human life.[76] The appearance of new unknown contaminants in outer space is also a concern when activities developed by humans could adversely affect the outer space environment. For example the controversial communication experiments of the United States in 1961 and 1963, known as "Westford" which was constituted by launches of dipole reflectors, would not qualify as a pollution situation since it produced no known harms. However, a vast quantity of copper needles, to transmit radio signals, in a circular orbit around the earth, placed at an elevation of approximately 2,000 miles are identified under the heading contamination or pollution. This is so because they constitute an interference in a valued course of action; unacceptable destruction, loss or modification of the value of an essential resource.[77] Another unexpected pollutant could also appear from the exploitation of solar and other related energies. It is generally recognized that one of the most important resources which may be found in outer space is that of solar energy. In considering the implications for the application of this revolutionary technology, the development of which can be foreseen in a more or less distant future,[78] it is reasonable to foresee the possibility of the appearance of unknown outer space environment pollutant such as probable destructive effects on the ozone layer of solar reflectors.

B. International Treaties Referring to Outer Space Pollution

Many of the articles of the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies are based on the expectation that the space environment will not be adversely affected by any form of pollution. Indeed, Article IV sets forth an obligation for contracting states not to place in orbit around the earth any objects carrying nuclear weapons or any other kind of weapons of mass destruction, install such weapons on celestial bodies, or station such weapons in outer space in any other manner. Article VII imposes international liability on states party to the treaty for damages to another state party to the treaty, and Article IX sets out measures to avoid harmful contamination and adverse changes in the environment of the earth resulting from the introduction of extraterrestial matter.[79] Some other articles of the Treaty refer to outer space pollution but they are of a very general nature.[80]

The Convention on International Liability for Damages Caused by Space Objects, of March 29, 1972,[81] tends to enlarge the liability of states engaged in activities in outer space, which were initially stated in the Principles Treaty. In fact, this convention places restrictions on the exploration and use of the space environment. The most important articles in the Liability Convention linked with environmental harm to outer

space are: Article I(a) which defines "damage" to mean "loss of life, personal injury or other impairment of health; or loss of or damage to property, and Article XXI which creates a system of cooperation among contracting states to assist any state which has suffered a large scale danger to human life or interference with the living condition of the population or the functioning of vital centers.[82]

The Convention on Registration of Objects Launched into Outer Space which entered into force on January 14, 1975, specifies in Article IV what information shall be provided concerning each space object.[83] Clearly in the opinion of the U.N. Sub-Committee on Outer Space additional information would be helpful in the case of space objects carrying N.P.S. or other material which could affect the environment.[84]

The Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space, and Under Water, signed on August 5, 1963,[85] set forth in Article I an obligation to state parties to prohibit, to prevent and not to carry out any nuclear weapons test explosion, or any other nuclear explosion, at any place under its jurisdiction or control.[86] Finally, the treaty on the Non-Proliferation of Nuclear Weapons signed on July 1, 1968, has contributed to the absence of contamination in the space environment.[87]

3. THEORIES DEALING WITH THE DELIMITATION OF AIRSPACE

A brief analysis of some theories dealing with the delimitation of airspace will lead us to understand the purpose of this study which introduces the theory of specific environmental protection zone for the implementation of a better system of protection and control of the global aerospace environment.

The two main international conventions on air and space law which are considered to be the constitution of the respective areas have not defined the boundary line between air and outer space. In fact,the Chicago Convention on International Civil Aviation of 1944 sets forth in Article I that the contracting states have complete and exclusive sovereignty over the air space above their territory.[88] On the other hand, Article I of the Outer Space Treaty sets out that outer space, including the moon and other celestial bodies, shall be free for exploration and use by all states without discrimination of any kind, on a basis of equality and in accordance with international law. These different legal regimes established by the above-mentioned conventions gave a new impetus to many legal scholars to search for a new border line between air and outer space.[89]

Several theories, proposing border line between air and outer space, will be briefly summarized.

According to the scientific approach to the definition of atmosphere it is divided into troposphere, stratosphere, ionosphere and exosphere; the atmosphere reaches a height of

20,000 km or more.[90] This scientific definition leads to various results and airspace boundary is proposed between 10,000 km and 20,000 km. The scientific bases to determine the height of this boundary depends on factor of duration of twilight, the height at which meteors become luminous and the observation of the ways of the Aurora borealis.[91] This theory reflects the interpretation given by the Permanent Court of International Justice to the term atmospheric air space.[92] Article I of the Paris Convention also used the term "atmospheric space" in its French version. The above data leads to different results in determining the height altitude of the atmosphere, thus, it seems that the scientific definition of the airspace creates difficulties in the establishment of its upper limits.[93]

The most extreme theory puts forward the view that sovereignty of a state extends "ad infinitum".[94] Under this approach, the states have jurisdiction both over the atmospheric space and the upper space above their territory.[95] This theory is today practically rejected and abandoned. Clear evidence of this is the international agreements reached by states.[96]

Some functional definitions based on flight as a means of transportation places the upper limit of air space at an altitude where the existence of the air gives adequate aerodynamic lift to maintain the flight of an aircraft.[97]

Consequently, according to this approach, the "territorial" air space could be called "navigable air space" or effective air space, the possible maximum height being about 30-35 km (20 to 25 miles).[98]

Functionalists can be divided into the following categories, unified only by their belief that spatial delimitation is either not required at all or not required for the present:

a. Spatial delimitation not required at all for:

(i) astronautics can be regulated by reference solely to the nature of the activities; and

(ii) astronautics can be regulated by reference solely to the nature of the activities and the nature of the space objects;

b. Spatial delimitation not required at present at either a (i) or a (ii) above.[99]

Functionalists consider that the acts can be regulated solely by reference to its nature.[100] Several other theories have been proposed trying to fix the lower limit and/or the upper limit of national air space. There are as many criteria as there are speakers or writers on the subject, but none of them has proposed the criteria of environmental zones which in our opinion should be a major concern because pollution involves grave danger to the human race. Among the most important theories we find inter alia; the gravitational effect of Joseph Kroell who in 1953 suggested that the boundary be set where the mathematical value of the field of the earth's

gravitation is nil, or in other words where weight ceases to manifest itself.[101]

The actual lowest perigee of orbiting satellites puts the idea of the delimitation of space at an altitude between 90 and 110 km, on the assumption that usually satellites cannot remain orbiting lower than 90 km and inevitably begin to disintegrate if they reach lower altitude.[102] This theory was analyzed by COSPAR.[103]

Another theory is based on Kepler's Laws which was developed by Dr. Von Karman. He proposed a line located at an altitude of about 85 km height where aerodynamic displacement is exceeded by centrifugal force. However, this Karman primary boundary line is now placed at a height of about 100 km according to new scientific research.[104]

Other theories include: limit of air drag, the atmosphere and its various layers,[105] altitude of effective control, the theory of contiguous zone, etc. It is stated that, as many theories find acceptance of boundaries between 80-120 km, it would be simple to conclude that the limit of outer space should be considered at the altitude of 100 km above the earth's surface measured in a direction perpendicular to the geoid.[106]

Pronouncements made during meetings in the U.N. Outer Space Committee before 1976 showed that, in the view of the two superpowers (U.S. and Soviet Union) any satellite in orbit, at whatever height, was in outer space, but they did not see

any great urgency in fixing a precise boundary between air space and outer space. Later on, an important claim made by several equatorial states probably is going to change the original thinking of the superpowers on the lack of urgency in defining a precise boundary line for the application of the two different legal regimes governing air and outer space.[107] In November 1976, eight equatorial countries (Brazil, Colombia, Congo, Ecuador, Indonesia, Kenya, Uganda and Zire) met in Bogota to hammer out a unified position on the legal status of the geostationary orbit and ended with what is known as the Bogota Declaration.[108] The basic argument reveals the position of the equatorial countries summarized as following:[109]

(1) the geostationary orbit is a physical fact arising from the nature of our planet because it depends exclusively on its relation to gravitational phenomena caused by the earth;

(2) under the current rules of the International Telecommunication Union, the geostationary orbit is a limited natural resource over which the equatorial countries exercise permanent sovereignty in line with U.N. resolutions;

(3) there is no satisfactory definition of outer space to support the argument that the geostationary orbit is included in outer space;

(4) the ban on national appropriation is not applicable in veiw of the lack of definition of outer space;

(5) technological partition of the orbit is inappropriate;

(6) the geostationary orbit is not covered by the Outer Space Treaty; and

(7) the Outer Space Treaty cannot be a "final answer".

To the preceding considerations certain additional points were added in the course of subsequent U.N. discussions in 1977 and 1978. Some of them were expressed by the Colombian delegate and can be paraphrased as follows:

(1) the prevailing uncertainty on the matter of outer space is illustrated by the variety of criteria suggested for its definition;

(2) until an international definition of outer space is arrived at the provisions of domestic law will apply to demarcate space;

(3) there is no right of succession in regard to satellites;

(4) exercise of sovereign rights is in keeping with positive international law;

(5) countries that have not ratified the treaty are not bound by it;

(6) the orbit is unique because it is the only point at which it is economically feasible to maintain a satellite in a stationary position and because it is the only feasible position for solar energy platforms; and

(7) the geostationary orbit is a limited natural resource because of its possible saturation with solar energy platforms and telecommunication frequencies.

4. SPECIFIC ENVIRONMENTAL PROTECTION ZONE OF OUTER SPACE (SEPZ)

The increasing concern over environmental matters and the insufficiency of the theories to include pollution problems and to definitely present acceptable solutions to the

problem of delimitation of the airspace, has led us to develop the theory of S.E.P.Z.. This is the most reasonable addition to the theory which, in our opnion, deals with the subject[110] of finding a boundary line between the air and outer space. Professor Bin Cheng in a recent article[111] has emphasized the difficulties created by the application of a functional legal regime to the air and outer space. The major difficulties in determining the legality or illegality of an act based on its nature without considering the location where the act is committed raises several legal questions. In Las Palmas Arbitration case (1928), Judge Max Huber argued that international law has established the principle of exclusive competence of the state in regard to its own territory in such a way as to make it the point of departure in settling most questions which concern international relations. Territorial sovereignty belongs always to one, or in special circumstances to several states, to the exclusion of all others. The fact that the functions of a state can be performed by any state within a given zone is, on the other hand, precisely the characteristic feature of the legal situation pertaining in those parts of the globe which, like the high seas or land without a master, cannot or do not yet form the territory of a state.[112] Thus, the delimitation of states boundaries as recognized by international law is a necessity.[113]

Another aspect to be taken into consideration is that international law recognizes three kinds of jurisdictions:

a) Territorial Jurisdiction;

b) Quasi-territorial Jurisdiction; and

c) Personal Jurisdiction.[114]

For example, when a United States national is on board a Polish ship docked in a United Kingdom port[115] he is at one and the same time under the laws of the United Kingdom (territorial), Poland (quasi-territorial) and the United States (personal), a hierarchical application will give priority to first, the territorial; second, quasi-territorial (the law of the flag of the ship); and thirdly, personal. Thus, in the above example, as long as the Polish ship remains within United Kingdom territory, the United States national on board is subject exclusively to the United Kingdom territorial jurisdiction. When the ship reaches the high seas he is subject exclusively to the quasi-territorial jurisdiction of Poland, and if he leaves the ship to live on a desert island belonging to no state, he will be under the exclusive personal jurisdiction of the United States.[116] In order to avoid any conflict of jurisdiction, the avoidance of which can be said to be one of the primary functions of international law, a delimitation of areas of state competence is essential.[117]

Several other aspects such as the monitoring of electronic defense installations above a foreign state is not a matter of functional determination. The legality depends upon the locus. In the same way, the legality of the observation of

another state territory for military purposes, depends on the areas from which it is carried out.[118] For example, on 1 May 1960 the Soviet Union shot down a United States U-2 reconnaissance aircraft while it was flying over the Soviet Union and had its pilot tried, convicted and imprisoned. The U.S. accepted the lawfulness of the Soviet Union without demure. Two months later on 1 July 1960, the Soviet Union shot down another U.S. reconnaissance aircraft, a RB-47, this time over the high seas, the U.S. protested and took the matter to the Security Council of the U.N. The Soviet Union in due course implicitly admitted the illegality of its action by returning to the U.S. the two survivors from the RB-47 without attempting to try them for espionage.[119]

After the analysis of all the above legal elements Professor Bin Cheng, considering the background papers on the study on altitudes of Artificial Earth Satellites,[120] presented by the U.N. Secretariat to the Outer Space Committee, has concluded that all the satellites which have gone into orbit sine 1957, excepting two of them, have perigees above the 110 km line.[121] Therefore, the 110 km line should satisfy even the most sceptical. Above this height one is definitely in outer space, according to lex lata.[122] This theory which, in our opinion, is satisfactory to solve the delimitation problem between the air and outer space is being affected by circumstancial elements among the most important of which are the environmental protection

concerns. The Bogota Declaration of 1976, for example, raised new problems which would bring barriers to reach international agreement on the matter. One of the issues regarding the geostationary orbit included the prevention of electromagnetic interference with other satellites and other uses of the radio spectrum at a height about 35,800 km, this constitutes a form of pollution threatening the telecommunication medium.[123]

Another fact includes the great disparities in the estimation of the maximum number of satellites (ranging from 180 to 1800) that could occupy the geostationary orbit at a given time.[124] Despite the fact that it is impossible to state how many satellites can be accommodated in the orbit, it is possible to determine interference among them.[125] In 1977, for example, there were nine satellites placed in the geostationary orbit,by 1979 the total number of satellites reached about a hundred. It has been estimated that between 1980 and 1991, 274 geosat's will be launched and that in 1990 there will be 239 active satellites in the geostationary orbit.[126] Thus, the orbit is limited in size and an overcrowding of satellites around the orbit is a probability which would affect this natural resource, as it is called by the International Telecommunication Convention (I.T.C.) of 1973.[127]

There are other factors which could indirectly affect the integrity of states territory. The outer space pollution problems, already referred to in this chapter, could partially

affect states sovereignty, thus for reasons of state self-defense an international agreement should permit direct control of them for the overflown states in a specific zone. These regulations should inter alia include control of Nuclear Power Sources (NPS); Nuclear Test, placement of fragments or pieces of material remaining in orbit around the earth in order to avoid interferences, broadcasting satellites and many other sources of pollution. The view expressed in the U.N. Outer Space Committee considered that the other most crucial problem at present, arising from the use of outer space is connected with remote sensing satellites. This committee also considered that the expectation of a consensus on binding legal rules governing these fundamental issues involved will not be reached in the near future.[128] The reason is that the integrity of territorial states is violated when exploration of natural resources using remote sensing satellites is made without states authorization or consent.

All the above mentioned problems could be better handled with the establishment of specific protection zones, where states should have jurisdiction to regulate certain matters. This idea of the establishment of a specific environmental protection zone assimilates longer experiences acquired by the U.N. through the discussions in the law of the sea conferences and is proposed for application in the Exclusive Economic Zone (E.E.Z.). A further development of the special legal

regime to be applied in the suggested zone is explained more fully in Chapter II. A final resumé also will furnish with a clear view of the proposal suggested:

1. The territorial air space of the states would be a boundary line 110 km height from the sea level, where states have completely and exclusive sovereignty and the navigation right will be regulated according to the principales of International Air Law.[129]

2. A specific environmental protection zone, up and above 110 km but lower than 35,800 km. In this zone States:

   a) could exercise partial sovereignty on the matter which affect the integrity of their territories. Therefore, laws and regulations could be adopted by states but giving effect to generally accepted international rules and standards established through the competent international organization or general diplomatic conferences. That last system is an assimilation to the law of the sea drafted rules.[130]

   b) the area would be free for navigation, exploration and exploitation provided the rights acquired by the states over-flown are respected.

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CHAPTER II

THE LAW OF THE SEA AND THE HUMAN ENVIRONMENT: ANALYSIS RELATED WITH AIR AND SPACE LAW

CHAPTER II

THE LAW OF THE SEA AND THE HUMAN ENVIRONMENT: AN ANALYSIS RELATED WITH AIR-SPACE LAW.

1. ESPECIAL LEGAL STATUS OF THE EXCLUSIVE ECONOMIC ZONE (EEZ)

Judge Max Huber, in the Las Palmas Arbitration case delivered his award on April 4, 1928, he defined therein territorial sovereignty as the exclusive right to display the activities of a State. This right includes two duties:

a) the obligation to protect within the territory the rights of other States, in particular their right to integrity and inviolability in peace and in war;

b) the right which each State may claim for its nationals in foreign territory. Furthermore, he pointed out that these rights cannot be limited to a negative sense, i.e., to exclude the activities of other States in the space upon which human activities are employed and where international law is the guardian to insure a minimum protection. [1]

This definition touches upon two important aspects:

1. The areas where States exercise the exclusive right to display the activities must be well defined.
2. The obligation of a State to protect within the territory the right of other States, in particular the right to integrity and inviolability.

This second element could be analyzed as a right rendered by international law to countries to take measures when pollution (coming from areas even submitted to territorial sovereignty of other States), affect the physical integrity of their State.

Article 1 of the Geneva Convention on Territorial Sea and the Contiguous Zone of 1958, states that the sovereignty of a State extends to its Territorial Sea including the air space over its Territorial Seas, as well as to its sea bed and subsoil, but subject to the rules of international law. [2] The Chicago Convention on International Civil Aviation of 1944, Art. 1 stated: "Contracting States recognize that every State has complete and exclusive sovereignty over the air space above its territory;" in this Article it is tacitly understood that the right is limited by the rules of international law. [3] None of the International Conventions mentioned determine the height of the air space, at which the sovereignty of the State ends though the legal competence of the States and the rules for their protection depend on the assumption of the existence of a stable, physically delimited homeland. [4] The delimitation of air space and outer space has been very controversial. Several theories have already dealt with the matter of finding a boundary line between the territorial air and outer space. [5] The Outer Space Treaty of 1967, declared outer

space free for exploration, exploitation and not subject to national appropriation. [6] Until 1976, prior to the promulgation of the Bogota Declaration, where eight equatorial States (Colombia, Brazil, Ecuador, Congo, Indonesia, Kenya, Uganda and Zaire) claimed sovereignty over a segment called the geostationary orbit which is 35,800 Km above earth's equator, [7] many of the theories agreed upon a boundary line between 80 and 110 Km. For example, the theory based on Kapler's laws (85 Km), [8] the Kerman line (100 Km), [9] altitude at which earth's gravity ceases, [10] theory of the perigee of satellites (90 and 160 Km), [11] etc.

The study of Professor Bin Cheng, already mentioned in Chapter I, based on COSPAR research has determined that most of the spatial satellites with the exception of two, have perigee higher than 110 KM. [12] As a result of this practical fact, a boundary of 110 Km could be a satisfactory solution. [13] We agree with this theory, but there are two very critical areas in the U.N. outer space negotiation where no agreement is going to be reached in a near future. These are telecommunication satellites including environmental protection and the remote sensing satellites. [14] These fields are sensitive because harm to territorial integrity is involved. For example, when a satellite causes damage to the outer space, environmental harm

could be transferred endangering the physical integrity of the State overflown or when exploration of a State's natural resources is carried out by a remote sensing satellite belonging to another State without previous consent, an international protest could be expected.

The two activities described above will be obstacles in the discussions to find agreement on the delimitation of air and outer space. Similarly the satisfaction of States' particular claims is another critical area requiring solution. The law of the sea has already found answers by adopting a special legal regime for the exclusive economic zone.

This solution could be similarly applied to a specific area in outer space. In this study the adoption of a "Specific Environmental Protection Zone" in outer space is proposed. It is an area above the probable boundary line between air and outer space (110 Km) [15] and below 35,000 Km. This area could be subjected to a special legal regime, where States may exercise partial jurisdiction to adopt law and regulation in certain matters but, in conformity with generally accepted international rules and standards prescribed by the competent international organization.

The competence of States respecting their territory is usually described in terms of sovereignty and jurisdiction,

however, these terms are different, sovereignty involves legal personality of a certain kind and it includes imperium and dominium. [16] Jurisdiction refers to particular aspects of the substance, especially rights (or claims), liberties, powers to regulate. It can be defined as the authority of a court to hear and determine a judicial proceeding within a geographical area. [17] The usual confusion is that sovereignty is not only used as a description of legal personality, accompanied by independence, [18] but also as a reference to various types of rights, indefeasible except by special grant, in the patrimony of a sovereign State. For example, the sovereign rights a coastal State has over the resources of the continental shelf or [19] the sovereign rights for exploring and exploiting natural resources which the New Draft Convention on the Law of the Sea renders to Coastal States in the Exclusive Economic Zone, are not to be confused with "territorial sovereignty". [20] Likewise, the Draft Convention asserts that Coastal States have jurisdiction (authority to regulate) over the protection and preservation of the marine environment [21] in the area mentioned above. The statement above explains the special legal status of the Exclusive Economic Zone.

The jurisdiction exercised by States on matters of pollution control is not a new one. The Geneva Convention on the

High Seas of 1958, in Article 24, gives States the authority to draw up regulations to prevent pollution on the high seas from oil spills, from dumping of radio-active waste, and from any activity with radio-active materials or other harmful agents, at the same time taking into account the existing treaty provisions on the subject, and conforming the regulations with those of the competent international organization. [22]

Pollution problems have brought a new factor affecting the concept of sovereignty. The general view is that Coastal Sates may take action against a polluter even on the high seas, which is beyond their own jurisdiction, and invoke the doctrine of self-defense enunciated in Article 51 of the U.N. Charter.[23] In international law, self-defense refers inter alia, to the measures which a State may take outside its own jurisdiction to refrain from or defend against acts which threaten its territorial integrity or political independence. [24] Its origin and vitality seem to be closely associated with that of the sovereignty of states. Moreover, the international rule, superior in authority, is the duty which States owe to their citizens to ensure security and well-being. [25] Therefore, the right of self-defense is inherent in every sovereign State and is implicit in every treaty. [26]

The Geneva Convention on the Continental Shelf of 1958, recognized the sovereign rights of Coastal States to the exploration and exploitation of the natural resources of the subsoil and sea bed of the continental shelf beneath the High Seas, but adjacent to the coast outside territorial sea and to a depth of 200 meters. [27] The execution of activities on the continental shelf has long been a cause for concern, and experience has been a harsh teacher. For example when the U.S. started oil exploitation, offshore drilling six miles off the California coast in the Santa Barbara Channel, caused one of the major oil disasters, a total of a quarter million gallons of oil poured into the Pacific Ocean, in 1969. [28] This dramatic event, is an example of a phenomenon which affects all life on earth in the twentieth century and raised a wide spectrum of legal, political, and economic considerations. [29] In that sense a large gap was left by Article 24 of the Geneva Convention on the High Seas. It specifically failed in developing systems of liability to punish foreign ships causing oil spills on the high seas and in differentiating areas of pollution control in the sea. The new Draft Convention covers the omissions left by Geneva, establishing specific environmental protection zones on the high seas and grants to Coastal States specific jurisdiciton to prevent, reduce and control pollution of the marine environment in the EEZ. [30]

2. SPECIFIC ENVIRONMENTAL PROTECTION ZONE OF THE SEA.

In 1954, when the first formal conference met to examine the technical aspects of ocean pollution, they recommended that each State should be free to determine areas for pollution protection. [31] The experts recommended that Coastal States adjoining widely open sea should protect a belt not exceeding fifty miles and that, in special circumstances this zone could be extended to 150 miles. [32] By 1978, a great number of States claimed more than twelve miles territorial sea and adopted regulations determining specific areas for fishing control and other environmental protection matters. An example is found in Sec. 101 of the U.S. Fishing Act, of 1976. [33] A partial list of States'claims is set out below to illustrate the statement:

(Affecting air space)

Congo	15 miles
Cameroon	18 miles
Gabon	30 miles
Mauritania	30 miles
Nigeria	200 miles
Chile	200 miles
Brazil	200 miles
Ecuador	200 miles

El Salvador	200 miles	
Gambia	50 miles	
Guinea	100 miles	
Argentina	200 miles	

(not affecting air space)

Honduras	200 miles	
Peru	200 miles	
Uruguay	200 miles	
Sierra Leone	200 miles	
Panama	200 miles	

Fishing and Fisheries Conservation Limits

Senegal	18 miles	
Iceland	50 miles	
South Korea	200 miles	
Ghana	100 miles	Seaward 12 miles Terr. Sea
India	100 miles	Seaward 12 miles Terr. Sea
Pakistan	100 miles	Seaward 12 miles Terr. Sea

Sri Lanka	100 miles	Seaward 12 miles Terr. Sea
Costa Rica	200 miles	Seaward 12 miles Terr. Sea
Canada	Pollution Control in Arctic Waters 100 miles [34]	

The concept of Exclusive Economic Zone was originally proposed by Kenya in the Summer of 1971. [35] This concept gradually matured to the point where it received the widest support from member States participating in the Law of the Sea Conference. The Draft Convention informal text, set forth in Part XII, a large number of provisions for the protection and preservation of the marine environment, in the EEZ.

The idea of specific protection zones arose from Article 56 of the Draft Convention where a special legal regime for the EEZ is proclaimed; for instance, paragraph 1(a) states that "Coastal States have sovereign rights for the purposes of exploring and exploiting, conserving and managing the natural resources", [36] and because of these sovereign rights, paragraph 1(b) states that "Coastal States have jurisdiction with regard to the protection and preservation of the marine environment". This is the special legal regime of the EEZ, and "Specific Environmental Protection Zones" are geographical areas in the sea and outer space where States should have jurisdiction to legislate on vital matters of pollution control.

3. LEGAL ANALYSIS OF THE DRAFT CONVENTION PROVISIONS CONCERNING THE NEW POLLUTION CONTROL REGIME.

From a legal point of view the new Draft Convention defines three different areas. Territorial Sea of Coastal States is defined to abreadth of 12 N.M. measured from the baseline; [37] in this area Coastal States shall exercise complete and exclusive sovereignty including over the airspace above, [38] without violating the rules of International Law. [39] The Exclusive Economic Zone is said to be an area between the high seas, and Territorial Sea, 188 NM breadth wherein States have sovereign rights over natural resources and jurisdiction to regulate certain defined matters; in this second zone, the competent international organization exercises custodianship only in matters affecting the rights of other States. [40] Finally, the High Seas Zone where a new system of "Common Heritage of Mankind" is implemented to protect the mining resources of the "area" (resources beyond the EEZ), [41] and a sea-bed authority will be appointed to organize, control and administer the activities in the area. [49] From this point of departure, we start to focus on possible gaps and defects which the Conference , in our opinion, has still not filled. Examples of this include Articles 194, 196, 199 which set forth

the obligation of Coastal States to harmonize policies with other States; in this respect, specially in the Territorial Sea States have different internal legislation, and the only way to harmonize policies would be by adhering to international conventions. This obligation should not be mandatory because some States rely more on their own rules, and they are free to adhere to international conventions,[43] and they could consider this obligation an intervention in their internal policy.

Other aspects are those referring to the introduction of alien or new species. They are set forth in Article 196 which specifies:

"1. States shall take all necessary measures to prevent, reduce and control pollution of the marine environment resulting from the use of technologies under their jurisdiction or control, or the intention of accidental introduction of species, alien or new, to a particular part of the marine environment, which may cause significant and harmful changes thereto.

2. This article does not affect the application of this Convention regarding prevention, reduction and control of pollution of the marine environment."

It is our view that this matter should be subject to a system of international liability through the implementation of international conventions, especially when the introduction of such species is made in Territorial Sea, and may affect the

environment of other States. However, a system of authorization and advisement by an international organization could be implemented when the alien species are going to be introduced in the EEZ. [44] In this areas, when alien or new species are going to be introduced, especially when they are of a kind which could endanger the marine environment or could lead to the extinction of other species, an authorization could be required and the presentation of documents and data to obtain the permit should be submitted to the competent international organization, establishing an accelerated procedure for the granting of the permit.

Concerning the joint development to promote contingency plans to respond to incidents of pollution (Article 199), reads as follows:

"In the cases referred to in article 193, States in the area affected, in accordance with their capabilities, and the competent international organizations shall co-operate, to the extent possible, in eliminating the effects of pollution and preventing or minimizing the damage. To this end, States shall jointly develop and promote contingency plans, for responding to pollution incidents in the marine environment."

In this Article, different treatment should be given to the Territorial Sea, the EEZ, and the High Seas. In Territorial Water States are free to decide adhesion to a

regional co-operation programme to face these disasters and to implement regional plans in coordination with the competent international organization and other neighbouring States.

One of the most efficient ways to approach marine disasters could be by organizing a regional programme composed of contingency planning centres to help Coastal States. This function should be the responsibility of a determined international organization. Moreover, such agency could act in the promotion of co-operation and as co-ordination centre through which regional offices could work in case of a massive pollution incidents especially in the EEZ. In the future perhaps contingency plans might be required to combat pollution disasters in the specific environmental protection zone in outer space. To this end, international co-operation would be required, perhaps through an environmental protection agency. On the High Seas, an international convention has already dealt with the problem. The Brussels International Convention Relating to Intervention on the High Seas in Cases of Oil Pollution Casualties, of 1969, states in Article I that parties undertake to take measures to prevent, mitigate or eliminate grave and imminent danger to their coastline or related interests from oil pollution casualties and prior consultation with the Marine Environment Protection Committee of IMCO is required unless extreme urgence forces the taking of immediate measures.[45] This Convention is

an example of the need for contingency plans to face casualties in the High Seas where no State has jurisdiction, and where an international organization through organized regional agencies with trained personnel and adequated equipment to confront these situations is required. Although the intention of the Brussels Convention of 1969, and its amendment signed in 1970, a recent report submitted by a group of experts to the U.N. Secretary-General has shown that the dumping of oil has reached the level of 10 million tons a year and to-day many ocean species are endangered. [46] This waste of efforts should also be considered by the Law of the Sea Conference. Further, Article 199 does not determine the mechanism to invoke effectively a system of contingency plans through a defined international organization.

One of the most transcendental provisions included in the text of the Draft is postulated in Article 206 which states:

"When States have reasonable grounds for expecting that planned activities under their jurisdiction or control may cause substantial pollution of, or significant and harmful changes to, the marine environment, they shall, as far as practicable, assess the potential effects of such activities

on the marine environment and shall communicate reports of the results of such assessment in the manner provided in Article 205."

This article imposes an obligation on States for activities within their jurisdiction which may cause substantial pollution or significant and harmful changes to the marine environment, to assess the potential effects of the activities and communicate its assessment to the competent international organization." Although the article uses the word "assessment", it is clear that the reference is to the parallel of an Environmental Impact Statement as provided for in the U.S. N.E.P.A. Section 102 (e) of the Act which prescribes that in respect of every recommendation or report on proposals for legislation and other major Federal actions significantly affecting the quality of the human environment, a detailed statement by the responsible official shall be made including within it the impact on environment of the proposed action, effects which cannot be avoided, alternatives, etc. [47] Article 206, is not intended to refer to the concept of "Environmental Assessment" as used in the U.S. Law. The environmental assessment is used to refer to non-significant activities affecting the environment. The rules of the U.S. Council on Environmental Quality (R.C.E.Q.)in rule 1508.9 defines an environmental assessment as it

"a) is a public document for which a Federal agency is responsible and serves to:

1. Briefly provide sufficient evidence and analysis for determining whether to prepare an environmental impact statement or a finding of no significant impact.

2. Aid an agency's compliance with the Act when no environmental impact statement is necessary.

3. Facilitate preparation of a statement when one is necessary.

b) Shall include brief discussions of the need for the proposal, of alternatives as required by sec. 102(2)(E), on the environmental impacts of the proposed action and alternatives, and a listing of agencies and persons consulted.[48]

The importance of this U.S. legislation is that it establishes a complete and complex system of rules and mechanisms through agencies. Likewise, in the near future this system of environmental assessment could be implemented for large projects significantly affecting the quality of the outer space environment, and the competent international organization should organize time limit and other procedures.

Despite the fact that Article 205 would introduce a very advanced system which evidently will benefit the international community, we wish also to call the attention of the Conference to improve the ambiguous language used in the text of this article, especially in defining zones of the sea which are affected by this provision. Our consideration is that environ-

mental assessment should be required only from enterprises or States engaged in large projects in the "Area". Another aspect is that this system of obligatory assessment and reporting activities which significantly affect the marine environment, specially those which could produce transfrontier pollution, should not be imposed upon States when the project is going to be executed in Territorial Waters particularly in several developing countries where the adoption of the system is still impracticable. Then, the only function of the competent international organization is to advise them on the advantages of its adoption. Another consideration is, that a system of such magnitude should be developed through an effectively efficient international organization with all the machinery required to implement it.

The Conference places great trust on regional and global co-operation because this is one efficient way to face pollution problems. For instance, several Articles refer and tend to encourage that idea. For example, Article 207 provides that:

"1. States shall adopt laws and regulations to prevent, reduce and control pollution of the marine environment from land-based sources including rivers, estuaries, pipelines and outfall structures, taking into account internationally agreed

rules, standards and recommended practices and procedures.

2. States shall take other measures as may be necessary to prevent, reduce and control pollution of the marine environment from land-based sources.

3. States shall endeavour to harmonize their national policies at the appropriate regional level.

4. States, acting especially through competent international organizations or diplomatic conferences, shall endeavour to establish global and regional rules, standards and recommended practices and procedures to prevent, reduce and control pollution of the marine environment, from land-based sources, taking into account characteristic regional features, the economic capacity of developing States and their need for economic development. Such rules, standards and recommended practices and procedures shall be re-examined from time to time as necessary.

5. Laws, regulations, measures, rules, standards and recommended practices and procedures referred to in paragraphs 1, 2 and 4 respectively shall include those designed to minimize, to the fullest extent possible, the release of toxic, harmful or noxious substances, especially persistent substances, into the marine environment."

In this respect, the harmonization of policies to control airspace pollution from the different sources among neighbouring countries is desirable. The adoption of laws, regulations,

standards, recommended practices and procedures, likewise should be made through international unification with other States on a regional or global basis.

In the same way, Article 208 declares:

"1. Coastal States shall adopt laws and regulations to prevent, reduce and control pollution of the marine environment arising from or in connexion with sea-bed activities subject to their jurisdiction and from artificial islands, installations and structures under their jurisdiction, pursuant to articles 60 and 80.

2. States shall take other measures as may be necessary to prevent, reduce and control such pollution.

3. Such laws, regulations and measures shall be no less effective than international rules, standards and recommended practices and procedures.

4. States shall endeavour to harmonize their national policies at the appropriate regional level.

5. States, acting especially through competent international organizations or diplomatic conference, shall establish global and regional rules, standards and recommended practices and procedures to prevent, reduce and control pollution of the marine environment arising from or in connexion with sea-bed activities subject to their jurisdiction and from artificial

islands, installations and structures under their jurisdiction referred to in paragraph 1. Such rules, standards and recommended practices and procedures shall be re-examined from time to time as necessary."

The trust of articles 207 and 208 adds to the power of States to regulate on the prevention and control of pollution from sea-bed and land-based sources. Even though not expressly defined, the Articles tend to motivate Coastal States to confirm, ratify and create international binding rules for the control of pollution in Internal Waters and in Territorial Sea. [49] At the same time, they give power to Coastal States to regulate pollution arising from the sources described above in the EEZ, but it is a subject not mentioned by the Conference. Furthermore, these articles set forth provisions to be implemented in the near future through international organizations or diplomatic conferences. The idea is to create policies of a general character because the forecoming treaty would be a form of international constitution which would bind States to comply with pollution control rules. These articles do not make any difference between the degree of obligation in the different areas. As global and regional rules are inexistent, these current rules are very strong to be applied in the territorial sea; however, we consider that these are one of the gaps to be solved with the creation of an international

organization.

Article 210 of the Draft proposes that:

"1. States shall adopt laws and regulations to prevent, reduce and control pollution of the marine environment by dumping.

2. States shall take other measures as may be necessary to prevent, reduce and control such pollution.

3. Such laws, regulations and measures shall ensure that dumping is not carried out without the permission of the competent authorities of States.

4. States, acting especially through competent international organizations or diplomatic conference, shall endeavour to establish global and regional rules, standards and recommended practices and procedures to prevent, reduce and control pollution of the marine environment by dumping. Such rules, standards and recommended practices and procedures shall be re-examined from time to time as necessary.

5. Dumping within the territorial sea and the exclusive economic zone or onto the continental shelf shall not be carried out without the express prior approval of the Coastal State, which has the right to permit, regulate and control such dumping after due consideration of the matter with other States which by reason of their geographical situation may be adversely affected thereby.

6. National laws, regulations and measures shall be no less effective in preventing, reducing and controlling pollution of the marine environment by dumping than global rules and standards."

This Article gives th power to States to regulate pollution by dumping in the EEZ. The meaning of Dumping is defined in Article 1(5) of the Draft Convention as follows:

"5. (a) "Dumping" means:

(i) any deliberate disposal of wastes or other matter from vessels, aircraft, platforms or other man-made structures at sea;

(ii) any deliberate disposal of vessels, aircraft, platforms or other man-made structures at sea.

(b) "Dumping" does not include:

(i) the disposal of wastes or other matter incidental to, or derived from the normal operations of vessels, aircraft, platforms or other man-made structures at sea and their equipment, other than wastes or other matter transported by or to vessels, aircraft, platforms or other man-made structures at sea, operating for the purpose of disposal of such matter or derived from the treatment of such

wastes or other matter on such vessels, aircraft, platforms or structures;

(ii) placement of matter for a purpose other than the mere disposal thereof, provided that such placement is not contrary to the aims of this Convention."[50]

The above definition considers dumping a negative term which only includes deliberate disposal of wastes or other matters. In this regard Article 210(3) gives power to Coastal States to grant permission for dumping in the EEZ. This provision even though it is contemplated in some local laws, according to our opinion, requires a more detailed examination because it could be found inconsistent with the general principles of pollution control, taking into account that the power allowed to Coastal States should be for avoiding pollution, not to promote it. Furthermore, this kind of authorization which could affect the global marine environment should be issued by the competent international organization in the EEZ or the High Seas, only after the Environmental Assessment results [51] have been analysed. Finally, Article 210(6) set out that National Laws shall be no "less effective" in controlling pollution of the marine environment by dumping than global rules and standard. The term "less effective" is ambiguous, because, no one

knows what are the global rules and standards which are internationnaly accepted. For example, there are several international organizations dealing with pollution control. Also, there are many international rules to control dumping. They are found in the Brussels Resolution on International Cooperation Concerning Pollution other than oil of 1969, and in the Oslo Convention on Control of Marine Pollution by Dumping from Ships and Aircraft,of 1972, [52] as well as in the Stockholm Conference on the Human Environment (1972), [53] etc. Therefore, this article should read that the rules and standards shall be "very effective" to grant a good system of protection of the marine environment. Instead of the looser term "less effective" which is currently in use.

A. Control of Pollution from Vessels in the Exclusive Economic Zone (EEZ).

The provisions of Article 211 of the Draft Convention textually say:

"1. States, acting through the competent international organization or general diplomatic conference, shall establish international rules and standards for the prevention, reduction and control of pollution of the marine environment from vessels and promote the adoption, in the same manner, wherever appropriate,

of routine systems designed to minimize the threat of accidents which might cause pollution of the marine environment, including the coastline and related interests of Coastal States. Such rules and standards shall, in the same manner, be re-examined from time to time as necessary.

2. States shall adopt laws and regulations for the prevention, reduction and control of pollution of the marine environment from vessels flying their flag or of their registry. Such laws and regulations shall at least have the same effect as that of generally accepted international rules and standards established through the competent international organization or general diplomatic conference.

3. States which establish particular requirements for the prevention, reduction and control of pollution of the marine environment as a condition for the entry of foreign vessels into their ports or internal waters or for calling at their offshore terminals shall give due publicity to such requirements and shall communicate them to the competent international organization. Whenever such requirements are established in identical form by two or more Coastal States in an endeavour to harmonize policy, the communication shall indicate which States are participating in such co-operative arrangements. Every

State shall require the master of a vessel flying its flag or of its registry, when navigating within the territorial sea of a State participating in such co-operative arrangements, to furnish, upon the request of that State, information as to whether it is proceeding to a State of the same region participating in such co-operative arrangements and, if so, to indicate whether it complies with the port entry requirements of that State. The provisions of this article shall be without prejudice to the continued exercise by a vessel of its right of innocent passage or to the application of article 25, paragraph 2.

4. Coastal States may, in the exercise of their sovereignty within their territorial sea,adopt laws and regulations for the prevention, reduction and control of marine pollution from foreign vessels, including vessels exercising the right of innocent passage. Such laws and regulations shall, in accordance with section 5 of Part II, not hamper innocent passage of foreign vessels.

5. Coastal States, for the purpose of enforcement as provided for in section 6, may in respect of their exclusive economic zones adopt laws and regulations for the prevention, reduction and control of pollution from vessels conforming to and giving effect to generally accepted international rules

and standards established through the competent international organization or general diplomatic conference.

6. Where international rules and standards referred to in paragraph 1 are inadequate to meet special circumstances and where Coastal States have reasonable grounds for believing that a particular, clearly defined area of their respective exclusive economic zones is an area where, for recognized technical reasons in relation to its oceanographical and ecological conditions, as well as its utilization or the protection of its resources and the particular character of its traffic, the adoption of special mandatory measures for the prevention of pollution from vessels is required, Coastal States, after appropriate consultations through the competent international organization with any other States concerned, may for that area, direct a communication to the competent international organization, submitting scientific and technical evidence in support, and information on necessary reception facilities. The organization shall, within 12 months after receiving such a communication, determine whether the conditions in that area correspond to the requirements set out above. If the organization so determines, the Coastal State may, for that area, adopt laws and regulations for the prevention, reduction and control of pollution from vessels, implementing such international rules

and standards or navigational practices as are made applicable through the competent international organization for special areas. Coastal States shall publish the limits of any such particular, clearly defined area, and laws and regulations applicable therein shall not become applicable in relation to foreign vessels until 15 months after the submission of the communication to the competent international organization. Coastal States, when submitting the communication for the establishment of a special area within their respective exclusive economic zones, shall at the same time, notify the competent international organization if it is their intention to adopt additional laws and regulations for that special area for the prevention, reduction and control of pollution from vessels. Such additional laws and regulations may relate to discharges or navigational practices but shall not require foreign vessels to observe design, construction, manning or equipment standards other than generally accepted international rules and standards and shall become applicable in relation to foreign vessels 15 months after the submission of the communication to the competent international organization, and provided the organization agrees within 12 months after submission of the communication.

7. The international rules and standards referred to in this article should include inter alia those related to prompt notification to Coastal States, whose coastlines or related interests may be affected by incidents, including maritime casualties, which involve discharges or probability of discharges."

These provisions underline the authority of the Coastal State to adopt laws and regulations for the prevention, reduction and control of pollution. The authority extends beyond their own vessels. Under paragraph (4) this authority extends to foreign vessels using Territorial Waters, including vessels exercising the right of innocent passage in pursuance of Section III Part II of the Draft, provided the exercise of the right is not thereby hampered. Paragraph (5) extends this authority of the Coastal State to the EEZ, but a further and significant limitation is imposed on its authority. This limitation is dictated by the special status of the EEZ. The authority is limited to laws and regulations "conforming to and giving effect to generally accepted international rules and standards established through the competent international organization or general diplomatic conference" to this general limitation there is an exception made by paragraph (6) for "special mandatory measures for the prevention of pollution".

Where the State believes these are required "for recognized technical reasons in relation to its oceanological and ecological conditions, as well as its utilization or the protection of its resources and the particular character of its traffic". This exception is surrounded by safeguards:

"1. Consultation with other States concerned through "the competent international organization".

2. Thereafter submission of the proposed rules and supporting scientific and technical data to "the competent international organization".

Thereafter the competent international organization must determine within 12 months whether conditions and requirements correspond and if it so determines within the 15 months after communication implement these special measures including such international rules and standards or navigational practices" as are made applicable through the competent international organization for special areas". Here again, as elsewhere in the Draft, [54] the conference has failed to determine what is the competent international organization. However, paragraph (1) of the same article, suggests that the Intergovernmental Maritime Consultative Organization (IMCO) is the competent body for it states that: "Wherever appropriate of ruling systems designed to minimize the threat of accidents which may cause pollution". [55]

In relation to maritime pollution several international organizations have already undertaken activities in the field. For instance, the Organization for Economic Cooperation and Development (OECD) and the Council of Europe have performed numerous case studies and analyses of cooperative actions for the protection of the environment in frontier regions. [56] The United Nations Environmental Program (UNEP) has developed studies and programmes on the environmental protection field.[57] The Intergovernmental Maritime Consultative Organization (IMCO) has sponsored conferences, for example one in 1962 to amend the 1954 Convention for the Prevention of Pollution of the Sea by Oil and also it has set up a Subcommittee on Oil Pollution under the authority of the Maritime Safety. It has moreover worked in regulating marine pollution from ships prior to its formal creation in 1954. [58] There are many other international organizations dealing with the control of pollution but this topic will be discussed in detail in Chapter III. What is important to emphasize here is that the Conference should solve once and for all this problem of uncontrolled proliferation of international bodies and unify the system of environmental protection which is now a very complex one, and indeed a real organization will be required to implement the pollution regulation clauses which are proposed to be included in the future Law of the Sea Convention.

Other issues should be considered by the Conference to clean up the legal regime applicable to vessels in each of the different regions of the sea. Paragraph (2) for instance, gives authority to States to exercise a quasi-jurisdictional power to control and regulate their register ships; this power is part of the sovereign right which States have over ships flying their flag. The text of the second part of the same paragraph is ambiguous when it obliges States to issue laws and regulations which shall have "at least the same effect as that of generally accepted international rules and standards established through the competent international organization or general diplomatic conferences." The main difficulty is that this article moves away from sovereignty because States have not had to submit internal legislation to any international organization and they are free to impose rules on their own ships without violating the rules of international law. In this respect the function of the competent international organization could be the issuance of minimum international standards to guide contracting States in this matter. Paragraph (3) does not reflect the superior nature of the rules to be applied in internal waters of contracting States, and strongly impose an obligation to give publicity to such laws and communicate them to the competent international organiza-

tion. Therefore, this clause strays far away from the right of sovereignty claimed by contracting States.

Paragraphs (5) and (6) set forth the obligation of contracting States to confirm, in advance, the laws and regulations to be issued for the EEZ with the competent international organization. Similarly, this procedure should be applied to regulate pollution from satellites and spatial ships in the specific environmental protection zone of outer space. Human activities in outer space are presently covered by the United Nations Committee on the Peaceful Uses of Outer Space (UNCOPUOS) and the ICAO Council monitors the work of this Committee when there are implications for air law instruments. [59] But, this work on environmental matters in outer space, as well as the other aspect of pollution control in the future should be coordinated by a single international organization.

B. Control of Pollution from or through the Atmosphere

Article 212(1) postulates that "States shall, within the airspace under their sovereignty or with regard to vessels or aircraft flying their flag or of their registry, adopt laws and regulations to prevent, reduce and control pollution of the marine environment from or through the atmosphere, taking into account internationally agreed rules, standards and recommended practices and procedures, and the safety of air navigation". [60]

Under this article Coastal States will have a clear obligation to regulate air pollution which affects the marine environment. This article contains several aspects about which ICAO, aware of its responsibilities to study (with due priority) the implications for the Chicago Conventions, its annexes, and other international air law instruments, has undertaken to advise the Law of the Sea Conference.[61] This paragraph implies an obligation on contracting States to regulate pollution from and through the atmosphere of the airspace above their Territorial Waters where there is no discussion that States have "territorial sovereignty". However, the terms "under their sovereignty" used in the text of this paragraph, is not clearly defined to indicate other areas where States have jurisdiction to control pollution. It was discussed above that the rights which States have on the EEZ granted by the Draft Convention are sovereign rights or rights of partial sovereignty which encompass the jurisdiction to control pollution in this area. For these reasons we consider it important to define the term to be used. Our consideration is that the intention of the Conference should be to allow States the control of pollution in the airspace adjacent and above the EEZ because it represents a major warranty considering an authority which would control in larger areas activities which

adversely affect the international environment.

Another view regarding pollution from or through the atmosphere is that pollutants resulting either from aircraft or vessels crossing the airspace or maritime zone or both could consequently have adverse effects on the ocean, the final resting place of the polluting substances. Having analysed those aspects, our view is that the Conference should allow States to control pollution of the sea from or through the atmosphere in the airspace above the EEZ, regardless of the height at which the aircraft flies, but it must be clearly determined that "the right of safety and air navigation shall not be endangered".

Examples of pollution from or through the atmosphere are aircraft or vessels smoke emissions and dumping from aircraft. Paragraph (3) of the same Article says:

> "States, acting especially through competent international organizations or diplomatic conference, shall endeavour to establish global and regional rules, standards and recommended practices and procedures to prevent, reduce and control such pollution".

This paragraph proposes that States acting through the competent international organizations or diplomatic conference,

shall endeavour to establish global and regional rules. [62] In the area of air pollution from aircraft the competent international body is the International Civil Aviation Organization (ICAO). In this field, ICAO has developed certification schemes for aircraft emission control, studies on the possible effects of pollution on the earth's ozone layer, and has encouraged designers to apply the best available reduction techniques on aircraft to reduce smoke emission from aircraft engines. [63] On aircraft emissions there were no rules to guide contracting States of ICAO in the issuance of regulations, although Volume II of Annex 16 on Environmental Protection is going to fill this gap when it becomes effective on 18 February 1982. The other regulatory area on air pollution control in which ICAO has published SARPS is on aircraft noise. In fact Annex 16 on Aircraft Noise (in force since 1970) [64] was amended in 1980 and it will become Volume I of Annex 16 on Environmental Protection. We do not go into details here because this matter was sufficiently discussed in Chapter I. The Convention on the Control of Marine Pollution by Dumping from Ships and Aircraft of 1972, in Article 16, has created an International Commission composed of representatives of each of the Contracting Parties to the Treaty whose function is the supervision for the implementation of the Convention. [65] This commission along with ICAO has established, in this very limited area of pollution from

aircraft a duality of international organizations dealing with the matter. In this field, we consider that it is desirable to issue all the aviation pollution regulations through ICAO and the Law of the Sea Conference should be more precise in paragraph (3) of Article 212 designating ICAO as the competent international organization for this matter.

CHAPTER II - FOOTNOTES

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CHAPTER III

THE ROLE OF INTERNATIONAL ORGANIZATIONS ON POLLUTION CONTROL: PROPOSAL FOR THE CREATION OF AN INTERNATIONAL AGENCY FOR ENVIRONMENTAL PROTECTION

CHAPTER III:

THE ROLE OF INTERNATIONAL ORGANIZATIONS ON POLLUTION CONTROL: PROPOSAL FOR THE CREATION OF AN INTERNATIONAL AGENCY FOR ENVIRONMENTAL PROTECTION

1. THE DEFINITION OF POLLUTION

The definition of pollution plays a critical part in international environmental law. Only by linking scientific knowledge with a concept of the public interest can one arrive at a concrete definition of pollution.[1]

The environment is considered as a system comprising the earth's living things and the thin global skin of air, water, and soil that is their habitat. This system, the ecosphere, is the product of the joint, interdigitated evolution of living things and of the physical and chemical constituents of the earth's surface; otherwise, the basic functional element of the ecosphere is the ecological cycle in which each separate element influences the behaviour of the rest of the cycle and is in turn influenced by it.[2]

The current preference is to focus on "environment" rather than "resources". Pollution might then be defined as any kind of environmental impairment. This definition presents difficulties employing the words "environment" and "impairment". For example, to determine in what sense a specific environment can be regarded as impaired, and at what point the impairment should be considered as intolerable to the environment.[3]

In the Stockholm Declaration on the Human Environment of 1972, pollution in a general sense is defined as: "the discharge of toxic substances or of other substances and the release of heat, in such quantities or concentrations as to exceed the capacity of the environment to render them harmless."[4]

The Organization of Economic Cooperation and Development (OECD) in 1974, made a recommendation regarding trans-frontier pollution: For this organization pollution means the introduction by man, directly or indirectly, of substances or energy into the environment resulting in deleterious effects of such a nature as to endanger human health, harm living resources and ecosystem, and impair or interfere with amenities and other legitimate uses of the environment."[5]

Another definition considers that "pollution occurs when materials are accumulated where they are not wanted; it often represents valuable resources out of place.[6]

From the above definitions the common element is the introduction or discharge into the environment of noxious substances, energy or the release of heat, discharge of pollutants. The problem then arises when a method for the identification of such pollutants is sought to determine the degree of harm caused to the environment.[7]

There are many ways of thinking about pollution hazards, they commonly are divided taking into consideration

how they directly or indirectly affect men. A method of classifying pollutants is by considering the polluting agents, i.e. biological agents, chemical pesticides, etc.[8]

The concept of pollution is broadly defined using different terms.

In the Convention on the Protection of the Environment between Denmark, Finland, Norway and Sweden of 1974, the key words cited in Art. I are: "environmentally harmful activities." This means the discharge from the soil or from buildings or installations of solid or liquid waste, gas or any other substances into water courses, lakes, or to the sea and the use of land, the seabed, buildings, or installations in any other way which entails, or may entail, environmental nuisance by water pollution or any other effect on water conditions, sand, drift air pollution, noise, vibration, changes in temperature, ionizing radiation, light, etc.[9]

The concept of pollution legally analysed leads to several questions. First, the method of presenting relevant scientific evidence to establish environmental degradation as legal injury. Second, the proof of the damage or degradation alleged to result from the actions challenged (causality relation). Third, in establishing the mechanism to determine how such effects occur, and finally, the identification of pollutants.[10] The

Stockholm Conference on the Human Environment stated that any natural substances may be considered a pollutant if introduced into a wrong place, at the wrong time, and in a wrong quantity, and in the preparatory work was published a list of twenty-eight categories of pollutants.[11]

Another important element of litigation which arises from the definition includes the environmental degradation or hazards. When it involves the presentation of evidence describing ecological processes as a function of time and establishing the magnitude of the time lag. Sometimes many years pass berween the action challenged or complained and the occurrence of the damage or degradation.[12] For example in cases of noise pollution in the vicinity of airports the effects of long exposure to that pollutant could cause accumulative damage to the health of people of the neighbourhood. The above definitions involve several ways of thinking about pollution hazards where pollutants could result from the reduction of food supplies, deterioration of the habitat, or alteration of the climat. For example, when forest fires kill food, plants or animals, it renders them liable to disease or make the product unfit for consumption.[13] In this way the pollution is defined as any direct or indirect pollutant affecting the human welfare.

2. UNITED NATIONS ENVIRONMENTAL PROGRAM (UNEP)

A. The Stockholm Declaration on the Human Environment

A prominent impulse to the development of international environmental law was given by the Declaration of the UN Conference on the Human Environment, adopted unanimously by the UN Conference in Stockholm.[14] The Declaration contains twenty-six general principles for action in a global level relating to the protection of the nature. One hundred and five recommendations were also agreed upon; the whole was called the Action Plan for the Human Environment.[15]

The United Nations Conference on the Human Environment was held at Stockholm from 5 to 16 June 1972. Representatives of 113 States invited in accordance with General Assembly Resolution 2850 (XXVI) took part in the Conference. The major items on the agende were:

> Declaration on the Human Environment
> Planning and management of human settlements for environmental quality (subject area I)
> Environmental aspects of natural resources management (subject area II)
> Identification and control of pollutants of broad international significance (subject area III)
> Educational, informational, social and cultural aspects of environmental issues (subject area IV)
> Development and environment (subject area V)
> International organizational implications of action proposals (subject area VI)
> Adoption of plan of action.[16]

Prior to the Conference, the Preparatory Committee held four sessions; at the second of these, in February 1971,

it agreed on the proposed agenda of the Conference. It was decided that, in addition to the Declaration of the Human Environment, six main substantive items would be considered: the planning and management of human settlements for environmental quality; environmental aspects of natural resource management; identification and control of pollutants of broad international significance; environmental issues; development and environment, and the international organizational implications of action proposals. It was thus agreed more or less from the outset that some kind of institutional arrangements would have to be made for the period after Stockholm. Attention was initially concentrated, however, on the five substantive areas, on the ground that "form follows function" as was said at the time, i.e. that until it had become clearer what new tasks would have to be performed internationally, there would be little purpose in discussing particular organizational questions. Nevertheless, numerous meetings and consultations were held on this issue, within and outside the United Nations system, and the Secretary-General's report of 30 July 1971, to the Third Session of the Preparatory Committee contained a statement of the criteria by which the Conference secretariat was guided in its approach.[17]

> Any organizational arrangement should be based first on agreement about what needs to be done. Until this is reached, no firm decision can be made on the ways and means to be adopted.

All functions that can be best performed by existing organizations should be assigned to those organizations, both international and national, most capable of carrying them out effectively. No unnecessary new machinery should be created.

It is more logical to consider a network of national, international, functional and sectoral organizations with appropriate linkages and "switchboard" mechanisms, whereby international organizations supplement and complement national organizations, than to think in terms of a global "super agency".

Any action envisaged should allow for the preliminary state of knowledge and understanding of environmental problems and should be flexible and evolutionary.

Governments will want to attach highest priority to the need for coordination and rationalization of the activities and programmes of the various international organizations active in the environmental field. This is essential in order to avoid overlap and duplication and to assure most effective use of scarce resource of money and manpower.

Any policy centre that is expected to influence and coordinate the activities of other agencies should not itself have operational functions which in any way compete with the organizations over which it expects to exercise such influence.

In the establishment of any additional or new machinery it is essential to provide strong capability at the regional level.

The United Nations should be the principal centre for international environmental cooperation.

The organization of environmental activities within the United Nations should be so designed as to strengthen and reinforce the entire United Nations system.[18]

These criteria, which received general support from the Preparatory Committee, illustrated clearly the trend of the discussion or, to put the matter more accurately ; the organizational implications of the wider discussion which was under way regarding the substantive items, and retain their interest as indications of the kind of institutional arrangements which were intended to be established.[19]

Afterwards, the proposal for the establishment of an inter-governmental body on the human environment was generally hailed during the conference. Some speakers considered that it should be a body of the General Assembly, while others argued that it should be a commission of the Economic and Social Council. Some speakers were in favour of an organization composed of twenty-seven members; others considered the number too small. Emphasis was placed by many speakers on the need for effective regional cooperation, since many environmental problems were capable of solution only be regional colaborative action. Several speakers pointed out the danger of duplicating efforts inherent in the creation of too many organizations. Finally, the creation of a small secretariate was supported.[20] The Stockholm Conference proposed the establishment of the United Nations Environmental Program with a Governing Council, an Environmental Secretariat and an Environment Fund,[21] which was approved and created.

B. The Creation and Organization of U.N.E.P.

Owing to an increasing international concern on pollution problems affecting the human ecosystem, the United Nations General Assembly agreed to include environmental problems within the competence of its system. Several considerations were made in the U.N.G.A. Resolution 2997 (XXVII) of 1972 which created the UNEP tending to promote international cooperation among States in accordance with the Charter of the United Nations and the principles of international law. In the text of such a Resolution it was also considered desirable to place stress on the interdependence of such environmental problems and the need for consensus for new approaches to face such problems. Contribution from scientific and professional communities was required. The new Resolution also demands contribution from the organizations belonging to the U.N. system acting within the sphere of their responsibilities.

The Resolution also made consideration for the assistance to developing countries to implement environmental policies. A requirement for additional financial and technical resources to face environmental problems, as well as the urgent need for a permanent institutional arrangement within the U.N. system.[22]

Taking into account the above considerations, the U.N. General Assembly appointed the membership of the Governing

Council of the UNEP including fifty-eight members elected by the Assembly, by simple majority, for a period of three years terms under the following categories: sixteen seats for African States; thirteen seats for Asian States; six seats for Eastern European States; ten seats for Latin American States; thirteen seats for Western European and other States.[23]

A small secretariat was established in the United Nations to serve as a focal point for environmental action and coordination within the U.N. system to ensure a high degree of effective management. The General Assembly shall also elect the Executive Director of the UNEP, who shall head the program for a term of four years on the nomination of the U.N. Secretary-General.[24] The Environment Fund, and the Environmental Coordination Board are a part of the institutional machinery which constituted the UNEP. The Environmental Fund is hoped to reach one-hundred million dollars in voluntary contributions over the next five year period, after 1972, to be used for financing new environmental initiatives, including these envisaged in the Action Plan.[25] It is notable and it is to be regretted that the Resolution did not provide any reliable guidelines for decison-making in areas which could involve dissention, especially as to the choice of means and to

ordering preferences in carrying out all the divergent purposes which have been set for the funds when they remain indeterminate.[26] The action of the General Assembly in relation to environment fund is only one index of the prominance of the environmental issues in the world political public attention. For measuring the insufficiency of the UNEP funds, a recent estimation of expenditures on environmental programs in the fiscal year 1972 by governmental agencies of the United States amounted to $6 billion compared with the $1 million of the UNEP estimated fund collection from contracting States for a period of five years.[27] Another example is that the assessment from contracting States for environmental purposes amounted to approximately 1% of the U.N. funds collection and to .4% of the global assessment including these of its specialized agencies in 1980.[28]

The Environmental Coordinating Board is chaired by the Exective Director, of the UNEP; he ensures cooperation and coordination among the United Nations Bodies concerning the implementation of environmental problems.[29]

In relation to the location of the environmental secretariat the General Assembly took into consideration the report of the United Nations Conference on the Human Environment, in particular the recommendations on the establishment of the environmental secretariat where two considerations were made.

First, the headquarters of the United Nations specialized agencies are all located in developed States, North America and Western Europe. Second, that in accordance with the Preamble of the Charter of the U.N., the activities of the headquarters or secretariats of U.N. bodies or agencies should be located having regard, to an equitable geographical distribution for the location of headquarters or secretariats. Therefore, the General Assembly decided to locate the environment secretariat in a developing country. Finally, the Assembly agreed upon the location of the environment secretariat in Nairobi, Kenya.[30]

C. The UNEP Functions and Financing Aspects

The Governing Council of the UNEP is entrusted with the following responsibilities:

> To promote international cooperation in the field of the environment and to recommend, as appropriate, policies to this end.
>
> To provide general policy guidance for the direction and coordination of environmental programmes within the United Nations system.
>
> To receive and review the periodic reports of the Executive Director of the United Nations Environment Programme, on the implementation of environmental programs within the United Nations system.
>
> To keep under review the world environmental situation in order to ensure the emerging

environmental problems or wide international significance receive appropriate and adequate consideration by Governments.

To promote the contribution of the relevant international scientific and other professional communities to the acquisition, assessment and exchange of environmental knowledge and information and, as appropriate, to the technical aspects of the formulation and implementation of environmental programmes within the United Nations system.

To maintain under continuing review the impact of national and international environmental policies and measures on developing countries, as well as the problem of additional costs that may be incurred by developing countries in the implementation of environmental programmes and projects, and to ensure that such programmes and projects shall be compatible with the development plans and priorities of those countries.

To review and approve annually the programme of utilization of resources of the Environment Fund.

The Governing Council shall report annually to the General Assembly through the Economic and Social Council, which will transmit to the Assembly such comments on the report as it may deem necessary, particularly with regard to questions of coordination and to the relationship of environmental policies and programmes within the United Nations system to overall economic and social policies and priorities.[31]

The UNEP Secretariat shall be established in the U.N. to serve as a focal point for environmental actions and coordination within the U.N. in such a way as to ensure a high degree of effective management. The secretariat is to be headed by the Executive Director. The Executive Director's responsibilities are specified as being:

To provide substantive support to the Governing Council of the United Nations Environmental Programme.

To coordinate under the guidance of the Governing Council, environmental programmes within the United Nations system, to keep their implementation under review and to assess their effectiveness.

To advise, as appropriate and under the guidance of the Governing Council, inter-governmental bodies of the United Nations system on the formulation and implementation of environmental programmes.

To secure the effective cooperation of, and contribution from, the relevant scientific and other professional communities in all parts of the world.

To provide, at the request of all parties concerned, advisory services for the promotion of international cooperation in the field of environment.

To submit to the Governing Council, on his own initiative or upon request, proposals embodying medium-range and long-range planning for United Nations' programmes in the field of the environment.

To bring to the attention of the Governing Council any matter which he deems to require consideration by it.

To administer, under the authority and policy guidance of the Governing Council, the Environment Fund.

To report on environmental matters to the Governing Council.

To perform such other functions as may be entrusted to him by the Governing Council.

The costs of servicing the Governing Council and providing the small secretariat referred to in paragraph 1 above shall be borne by the regular budget of the United Nations and that operational programme costs, programme

support and administrative costs of the Environment Fund shall be borne by the Fund.[32]

The Environment Fund is used to finance new environmental initiatives including those envisaged in the Action Plan. The emphasis of the Stockholm Conference on functions relating to environmental information was joined, as the preparatory process continued by a rising tide of concern from developing countries on the question of development and the relationship between their economic needs and the environmental preoccupation of the developed countries. Some representatives of developing countries pointed out during the Conference: "environmental included not only pollution and other ill-effects of industrialization, but also the problem of underdevelopment; malnutrition, bad housing and low standard of living." All these problems have priority and the only way to overcome this is by more intensive economic activity. While development and environmental considerations can be reconciled, the developing countries, wishing to ensure their independence and requirements, were suspicious about the taking of environmental protection measures by developed countries which could bring undesirable economic effects and warned about the establishment of environmental fund not to entail any decline in the international aid available for

development purposes.[33]

Taking into consideration the above debate, the General Assembly made certain monetary arrangements to satisfy aspiration of developing countries inter alia:

> For the purpose to enable the Governing Council of the United Nations Environment Programme to fullfil its policy-guidance role for the direction and coordination of environmental activities, the Environment Fund shall finance wholly or partly the costs of the new environmental initiatives undertaken within the United Nations system which will include the initiatives envisaged in the Action Plan for the Human Environment[34] adopted by the United Nations Conference on the Human Environment, with particular attention to integrated projects, and such other environmental activities as may be decided upon by the Governing Council and that the Governing Council shall review these initiatives with a view to taking appropriate decisions as to their continued financing.
>
> The Environment Fund shall be used for financing such programmes of general interest as regional and global monitoring, assessment and data collecting systems, including, as appropriate costs for national countrerparts; the improvement of environmental quality management; environmental research; information exchange and dissemination; public education and training; assistance for national, regional and global environmental institutions; the promotion of environmental research and studies for the development of industrial and other technologies best suited to a policy of economic growth compatible with adequate environmental safeguards, and such other programmes as the Governing Council may decide upon, and that in the implementation of such programmes due account should be taken of the special needs of the developing countries.
>
> The development priorities of developing countries shall not be adversely affected, adequate measures shall be taken to provide additional financial

resources on terms compatible with the economic situation of the recipient developing country, and that, to this end, the Executive Director, in co-operation with competent organizations, shall keep this problem under continuing review.

The Environment Fund shall be directed to the need for effective coordination in the implementation of international environmental programmes of the organizations in the United Nations system and other international organizations.

In the implementation of programmes to be financed by the Environment Fund, organizations outside the United Nations system, particularly those in the countries and regions concerned, shall also be utilized as appropriate, in accordance with the procedures established by the Governing Council, and that such organizations are invited to support the United Nations environmental programmes by complementary initiatives and contributions.

The Governing Council shall formulate such general procedures as are necessary to govern the operations of the Environment Fund.[35]

The Environmental Coordination Board (E.C.B.) is established under the auspices and within the framework of the Administrative Committee. The E.C.B. is under the chairmanship of the Executive Director of the UNEP. The functions of the E.C.B. are to ensure cooperation and coordination among all bodies concerning the implemetation of environmental programmes and it shall make an annual report to the Governing Council. Finally, the General Assembly in Resolution 2997 (XXVII) invited the organizations of the U.N. System and the regional

economic commissioners to adopt measures for the implementation of environmental programmes having regard to international environmental problems; and in the same way, the G.A. made other considerations, calling the attention of governmental, non-governmental organizations and governments, to give their full support and collaboration to the U.N. to insure cooperation and coordination on the field.[36]

3. THE INTERGOVERNMENTAL MARITIME CONSULTATIVE ORGANIZATION (IMCO)

IMCO is a United Nations agency with a twenty-two year history in the field of international environment regulations.[37] These regulations can be classified into three categories: a) rules to prevent pollution from ships; this encompasses standards to control internal or operational discharges and in recent years, accidental spillages as well; b) on the provision of remedies when prevention fails, i.e. action against threats of pollution, and payment of compensation when oil damage does occur; c) on jurisdiction power to prescribe and enforce particular pollution control; this last issue probably is going to be solved by the United Nations Law of the Sea Conference (UNCLOS).[38] The United Nationsl Maritime Conference at Geneva in February, 1948, created the Convention of the Intergovernmental Maritime Consultative Organization. The

organization itself came into being in 1958, after the requisite of twenty-one nations ratified it. The Convention has been amended in 1974, 1975 and 1977, although only the first set of amendments has entered into force (on April 1, 1978).[39] With the Torrey Canyon disaster in 1967 there arose an increased concern for environmental protection, and, consequently the situation changed rapidly in the field of pollution control; in fact in 1969, IMCO sponsored a conference on Coastal States Intervention and Compensation in Oil Pollution incidents. IMCO further prepared the Conference for the amendment of the 1954 Convention creating an ad hoc Sub-committee on Marine Pollution (SCMP) and organized the major Conference on Marine Pollution in 1975, as well as the Tanker Safety and Pollution Prevention Conference in 1978.[40] The role of IMCO within the U.N. system has been very unstable, but the mere involvement of the organization in the pollution field now gave to it "a second arm" which is continually increasing the IMCO status.[41]

All the IMCO's organs are concerned with marine pollution. The Assembly is the supreme governing body of IMCO. It is constituted by the representatives of all member governments and meets once every two years, although it can be called into extraordinary sessions with the approval of one-third of its members or by decision of the Council. The Assembly's recommendations are nonbinding, but they are often incorporated into national legislation

or international conventions. It is also empowered to adopt amendments to the IMCO Convention. The responsibility of the Assembly includes the election of the Council and the Maritime Safety Committee, the appointment of the Secretary-General and the determination of budgets.[42]

The Council is IMCO's governing body between meetings of the Assembly. It generally meets twice a year, but it can be called into extraordinary sessions. Its functions are: a) proposing substantive recommendations and organization's budget to the Assembly; b) administration of IMCO personnel; c) it is the central policy organ of the organization; it establishes the work program for other bodies, etc. ... The Council is integrated since 1974, for twenty-four States, including twelve members from the general memberships which have special interests in maritime transport or navigation, the election of whom to the Council ensures the representation of all the major geographical areas of the world.[43]

The Maritime Safety Committee (MSC), consists of fourteen to sixteen States of whom eight are from the largest shipping countries. It is the main technical body of the organization, and its work covers, inter alia, navigation aids, development, construction and equipment of ships and offshore drilling units, rules for preventing collisions at sea, fire protection, maritime casualty

studies and search and rescue. Its more detailed work is carried out through numerous subcommittees such as the now defunct Subcommittee on Marine Pollution (SCMP).[44] This subcommittee, like the present (MSC), has been open to any IMCO member wishing to participate.

The Legal Committee was set up under the auspices of the Council in May 1967 to examine possible changes in maritime law after the Torrey Canyon disaster.[45] This Committee has already studied issues such as liability and compensation for pollution damages from oil and other substances, wreck removal and salvage, legal aspects of ships in foreign ports, passengers and baggage, etc. ...

The Marine Environmental Protection Committee (MEPC)[46] was created by the Assembly in November 1973. It has equal status with the Maritime Safety Committee (MSC). The proposal for the creation of MEPC came from the U.S. in June 1973 in anticipation of the upcoming Law of the Sea Conference and because of the potential demands for either an extension of coastal States' jurisdiction to control pollution or for the creation of a new pollution prevention agency. In particular, the Americans hoped that the new body would increase IMCO's attractiveness as an environmental organization for the developing countries.[47]

The Technical Cooperation Committee (TCC) is another IMCO body. It was created by the Council in 1969 to respond

to the growing desire of developing countries for technical assistance for their vast shipping industries.[48] The Secretariat is another important body of IMCO. At the beginning it included only twenty professional members of the Secretariat; today it is still one of the smallest specialized agencies in the U.N. system formed by about eighty professional staff and it has increased about twice the original services staff,[49] and its assessment from contracting States, in 1980, represented about .7% of the global funds collection of the U.N. including its Agencies.[50]

4. THE ICAO CONCERN ON THE ENVIRONMENT

The International Civil Aviation Organization (ICAO) has realized important tasks dealing with environmental protection. The efforts of ICAO basically have been focussed on minimizing adverse effects of civil aviation on the environment.[51]

The ICAO Air Navigation Commission has developed an action program regarding the environment and the ICAO Council has entered into cooperative arrangements with the UNEP.[52] The ICAO Committee on Aircraft Noise (CAN) was created in 1970. It was requested by the 18th Assembly of the ICAO Council in 1971, the development of international standards recommended practices procedures and guidance material related to aircraft noise abatement and the study and measurement of

sonic booms.[53] This Committee has expanded the coverage of Annex 16 by the development of noise certification, now included as Volume I of Annex 16 on Environmental Protection, as it was already mentioned in Chapter I.

ICAO has also worked towards the control of aircraft smoke emissions encouraging designers to use the best available emission reducing technology in the next generation of aircraft engine emissions control. ICAO has produced a certificate scheme for aircraft engine emissions control for future engines available for State use, now expressed as standard and recommended practices in Annex 16, Volume II which will be applicable after 18 February 1982. The organization has furthermore stimulated work on the problem of high altitude pollution and participated in a UNEP meeting to consider specifically the possible effects of pollutants on the earth's ozone layer.[54] In this matter, ICAO receives from the UNEP an annual study which is elaborated with the cooperation of contracting States and some other international organizations engaged in air pollution research.[55]

Another area of pollution control where ICAO has participated is in agricultural aerial operations to control pests. This task was made in connection with the International Agricultural Aviation Center (IAAC). In this field three meetings have been held mainly in connection with the improvement of safety in aerial application using

better spraying techniques tending to reduce the damaging effects on the environment.[56]

5. INTERNATIONAL COOPERATION ON ENVIRONMENTAL PROTECTION

In recent decades, participation in world constitutive process for environmental policy, as well as in the embracing process of getting effective power to regulate pollution, has been tremendously democratized, not merely with the intervention of States in international conferences to make conventions, but also international governmental organizations, political parties, pressure groups, private associations, and also individual human beings. Similarly, a multiplying host of private associations operating within the larger constitutive process have determined an increase in membership, goals, and areas of activity at the U.N. Conferences, including these of environmental issues. Groups and individuals especially concerned with environmental problems have abundant opportunity to participate in all international aspects of rule-making[57] and a multiplicity of international bodies are involved in environmental programmes.

Intergovernmental and non-governmental international entities also have undertaken environmental protection activities such as research, cooperation, etc.[58] Most of

these motions are carried out by about twenty-four international organizations; most of them are part of the U.N. system. A classification of these activities can be functionally defined by the purpose of the agency carrying them out. For example, the World Meteorological Organization (WMO) is currently monitoring air pollution of global significance and working on the standardization of national data; the World Health Organization (WHO) is starting a decade of studies on the effects of environmental pollution on human health; the Codex Alimentarius Commission established by the Food and Agriculture Organization (FAO) is working on international standards for food, including acceptable levels of additives and control of pesticide residues.[59]

The International Labor Organization (ILA) has issued regulations dealing with the environment of the workers place of job; the United Nations Education, Scientific and Cultural Organization (UNESCO) has realized important environmental protection tasks through the Inter-governmental Oceanographic Commission and through the Man and the Biosphere Program; the International Atomic Energy Agency (IAEA) has worked on the surveillance and control of radio-nuclear reactors in the environment; the United Nations Economic and Social Council (ECOSOC) has responsibility under the U.N. Charter for international cooperation in the

economic and social spheres, and it is actively engaged on urban environmental problems and in the control of population field; the United Nations Development Program (UNDP) has a mission of coordinating and technical help for the development of third world countries. Therefore, it constantly faces the problem of introducing environmental considerations into development planning. Likewise, the World Bank Group (WBG), the United Nations Conference on Trade and Development (UNCTAD). The United Nations Industrial Development Organization (UNIDO) as well as many other international organizations have been involved in environmental protection activities.[60]

Other environmental activities have been undertaken on a regional basis by the United Nations Economic Commission for Europe (ECE), including examination of standards for motor exhaust emissions and the effects of water pollution by European iron and steel industries. Regional bodies, outside the United Nations system, such as the Council of Europe, the European Community, and the Committee on the Challenges of Modern Society (CCMS) set up by the North Atlantic Treaty Organization (NATO) have also undertaken research, data collection, and pilot studies on environmental problems, while the Organization for Economic Cooperation and Development (OECD) is engaged in environmental studies which include the management of air and water resources,

noise and pesticides. In addition, non-governmental bodies are examining problems for solving international environmental problems. The International Council of Scientific Union, (ICSU), the International Union of Conservation of Nature and Natural Resources (IUCN) and the Commonwealth Human Ecology Council, are working in the conservation of rare species and natural habitats and the promotion of integrated national case studies of environmental problems.[61] (see Appendix "D").

This complex and impressive picture of multiple efforts is deceptive and tends to conceal several obvious dangers. It is deceptive because institutions and agreements which on paper look impressive often yield very little in terms of positive results.[62]. One conspicuous example may be cited: The 1954 Brussels Convention (and annex) for the Prevention of Pollution of the Sea by Oil was signed by 36 countries. In 1962 the same governments agreed to several amendments to that convention, and in 1969-70 they signed a further International Convention relating to Intervention on the High Seas in Cases of Oil Pollution Casulaties. Yet a recent report by a group of experts to the United Nations Secretary General observed that ocean dumping of oil may have reached the level of 10 million tons a year and today threatens to destroy organic life in many part of the ocean.[63]

In addition to the problem of lack of enforcement and

inadequate surveillance of existing agreements there are innumerable problems of jurisdictional vacuum and overlap. Governments are increasingly finding themselves technically bound to the decisions of bodies that not only contradict the requirements of other intergovernmental organizations but are themselves inadequate for the scale of the problem involved. All this duplication leads, of course, to a considerable wastage of scarce technical expertise, as well as wasted time in official representation and other governmental resources. Much more important, however, is the clear inadequacy of the scope of present measures in the face of rapidly increasing environmental pressures.[64]

6. THE LAW OF THE SEA CONFERENCE CREATING NEW RESPONSIBILITIES FOR INTERNATIONAL ORGANIZATIONS ENGAGED IN POLLUTION CONTROL: SOME REFERENCES TO NATIONAL LAWS

Part XII of the Draft Convention on the Law of the Sea (informal texts) imposes a great deal of responsibility to be implemented through international organizations or diplomatic conferences.[65] Unfortunately, the Conference, after five years of discussions, have not arrived at a real solution to determine which is the competent international environmental protection organization. However, it is true

that the system proposed into the new draft is a complex network which requires a central and organized system to face all the compromises to be undertaken. The above task is to be executed through the development of separate legal regimes and practical action applicable to the different regions of the seas. For example, a system of legal schemes should be developed to unify pollution policies in territorial sea and in the exclusive economic zone. On the other hand, on the high seas the organization in charge should directly fight the pollution problems through the implementation of action plans for pollution casualties and by the adoption of liability systems effectively binding contracting States, a way to make efficient the protection of these common areas.

Another important consideration is that most pollution phenomena occur in or finally find their way into the sea;[66] thus the focal point for fighting such problems should be concentrated on the creation of a super-agency or international organization, constituted by a main headquarter and some regional offices according to the need, which directly confront pollution problems in the following order of importance: a) fighting the pollution of the sea; b) managing and researching in airspace pollution, especially in areas of common interest; c) acting as the central coordinating body of other pollution activities carried out for States and other international organizations.

A brief analysis of the responsibilities to be implemented by the competent international organizations on entering into force, the Draft Convention will furnish us with an idea of the expected task. The development of systems of liability in cases of trans frontier pollution, for damage to endangered species and to the living resources of the sea; the adverse effects to the marine environment for introduction of new or alien species and in cases of oil spill; dumping or introduction of other substances affecting the quality of the marine environment demands a high degree of attention.[67]

References to national jurisdiction would furnish us with a clearer idea of the future undertakings of the competent international organization.

The Canadian Shipping Act of 1970, in section 734 (a) (b) (c), set forth a system of civil liability whereby owners of ships and owners of the pollutant carried are liable for the payment of costs and expenses incurred by the taking of any action to repair or remedy any condition into the sea. Subsection 734(2) imposes liability to pay the cost and expenses of preventive actions taken by the authority to destroy or remove a ship or cargo. A system of strict liability or liability without fault is also set out into the Act, to punish the person responsible for the discharge with a limited amount lesser than

(a) 2,000 gold francs for each ton of the ship's tonnage, and

(b) 210,000 gold francs.

When the incident occurs with actual fault or privity on the part of the person, there is no limited amount of liability. To assess and implement liability system a framework of administrative staff is required; for example, the appointment of experts to make the assessment, to determine loss or the establishment of fund to pay loss suffered by fishermen demands personnel.[68] In the same way, the U.S. Water Pollution Control Act has developed systems of strict liability and responsibility for negligence. One aspect which is evident is that the limit of liability in the Canadian Shipping Act is different from those of other countries' legislation, thus, a future task for the competent international organization would be the unification of this system in benefit of the sea carriers. Section 1321(P)(1) of the U.S. Water Pollution Act sets forth the establishment of financial responsibility by ships carrying oil or hazardous substances to cover payment of damages for discharges into the sea using the following methods:

a. evidence of insurance

b. surety bonds

c. qualification as a self-insurer

d. other evidence of financial responsibility.

This matter could also be subjected to international agreement.[69]

A system of cooperation on global and regional basis is proposed in the text of the Draft Convention to be implemented. This is required to guarantee the exchange of information and scientific research and data on marine pollution for the promotion of studies, for the development of standards and recommended practices and rules on pollution control to assist developing countries, etc.[70] For this system of cooperation to be effectively realized it is desirable that it should be institutionalized in the form of permanent regional agencies, responsible to a central coordination center. Likewise, as was referred to before, a great deal of organizations within the U.S. system and outside has already dealt with environmental problems. Therefore, a separate coordination center within the newly proposed agency is urged to centralize the coordination of all the activities carried out by these organizations.

The elaboration and execution of contingency plans in case of pollution casualties in the sea, is demanded. The U.S. Water Pollution Control Act exemplifies the need for such contingency plans. Sec. 1321 sets forth the bases for the implementation of contingency plans for the removal of discharged oil or hazardous substances which may affect marine environment or natural resources.[71] In

fact, subsection 1321(c)(2) postulates that the President shall prepare a National Contingency Plan (this provision went into force on October 18, 1972) for removal of oil and hazardous substances including contaminants, dispersants and removal of oil and hazardous substances, and these plans shall include:

A. assignment of duties and responsibilities among Federal departments and agencies in coordination with State and local agencies, including, but not limited to, water pollution control, conservation and port authorities;

B. identification, procurement, maintenance, and storage of equipment and supplies;

C. establishment or designation of a strike force consisting of personnel who shall be trained, prepared, and available to provide necessary services to carry out the Plan, including the establishment at major ports to be determined by the President, or emergency task forces of trained personnel, adequate oil and hazardous substance pollution control equipment and material and a detailed oil and hazardous substance pollution prevention and removal plan;

D. a system of surveillance and notice designed to insure earliest possible notice of discharges of oil and hazardous substances and imminent threats of such discharges to the appropriate State and Federal agencies;

E. establishment of a national center to provide coordination and direction for operations in carrying out the Plan;

F. procedures and techniques to be employed in identifying, containing, and removing oil and hazardous substances;

G. a schedule, prepared in cooperation with the States, identifying (i) dispersants and other chemicals, if any, that may be used in carrying out the Plan, (ii) the waters in which such dispersant or chemical which can be safely in such waters which schedule shall provide in the case of any dispersant, chemical, or waters not specifically identified in such schedule that the President, or his delegate, may, on a case-by-case basis, identify the dispersants and other chemicals which may be used, the waters in which they may be used, and the quantities which can be used safely in such waters, and

H. a system whereby the State or States affected by a discharge of oil or hazardous substance may act where necessary to remove such discharge and such State or States may be reimbursed from the fund established under subsection (k) of this section for the reasonable costs incurred in such removal.[72]

All the above preparation demands a network of personnel, equipment, etc. which the international organization will have to prepare through regional agencies and also by the development of schemes to advise Contracting States about the subject.

Concerning the assessment of potential effects of activities on the marine environment where the Draft Convention is not clear in the areas of application, it is my submission that it should be limited to big projects on the "Area" for reviewing purposes, and probably to a few projects in the EEZ. However, advise and production of schemes to guide in particular developing countries will be useful. In this area the Canada Environmental Protection Act did not

provide for the Environmental Impact Statement, but a Cabinet directive issued in December 1973 established a process to ensure that:[73]

> Environmental effects are taken into account early in the planning of new federal projects, programs, and activities.
>
> An environmental assessment is carried out for all projects that may have an adverse effect on the environment, before commitments or irrevocable decisions are made; projects and potentially significant environmental effects are submitted to the Department of the Environment.
>
> The results of these assessments are used in planning, decision-making and implementation.

Furthermore, most of the Canadian's Provinces have adopted the system of E.I.S.. For example, the Quebec Environmental Quality Act of 1978 enlarged the contents of the Federal Directive in relation to the number of projects to be assessed including "no person may undertaken any construction work activity or operation, or carry out work according to a plan or programme in the case provided for by the regulation of the Lieutenant-Governor in Council without following the environmental impact assessment and review procedures and obtaining an authorization certificate from the Lieutenant-Governor in Council."[74]

The United States' National Environmental Policy Act of 1969, set forth in Section 102(c) the following:

include in every recommendation or report on proposals for legislation and other major Federal actions significantly affecting the quality of the human environment, a detailed statement by the responsible official on:

(i) the environmental impact of the proposed action.
(ii) any adverse environmental effects which cannot be avoided should the proposal be implemented.
(iii) alternatives to the proposed action.
(iv) the relationship between local short-term uses of man's environment, and the maintenance and enhancement of longterm productivity, and
(v) any irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented.

Prior to making any detailed statement, the responsible Federal official shall consult with and obtain the comments of any Federal agency which has jurisdiction by law or special expertise with respect to any environmental impact involved. Copies of such statement and the comments and views of the appropriate Federal, State and local agencies, which are authorized to develop and enforce environmental standards, shall be made available to the President, the Council on Environmental Quality and to the public as provided by section 552 of Title 5, United States' Code, and shall accompany the proposal through the existing agency review processes.[75]

The above obligation is elucidated by a large number of guidelines and regulations developed through court interpretation and application of the Council on Environmental Quality Regulations (R.C.E.Q.). In, Scientists' Institute for Public Information, Inc. v. Atomic Energy Commission, the U.S. Court of Appeal of the District of Columbia held,

when interpreting the timing for the EIS preparation. "Agencies engaging in long term technology research and development programmes should develop either formal or informal procedures for regular, perhaps annual, evaluation of determining whether the time for drafting a NEPA statement has arrived."[76] This court interpreted the C.E.Q. regulation Section 1501.8, which reads:

> Although the Council has decided that the prescribed universal time limits for the entire NEPA process are too inflexible, Federal agencies are encouraged to set time limits appropriate to invidivual actions (consistent with the time intervals required by § 1506.10). When multiple agencies are involved, the reference to agency below means lead agency.
> (a) The agency shall set time limits if an applicant for the proposed action requests them; Provided that the limits are consistent with the purposes of NEPA and other essential considerations of national policy.
> (b) The agency may consider the following factors in determining time limits:
> (i) Potential for environmental harm.
> (ii) Size of the proposed action.
> (iii) State of the art of analytic techniques.
> (iv) Degree of public need for the proposed action, including the consequences of delay.
> (v) Number of persons and agencies affected.
> (vi) Degree to which relevant information is known and if not known the time required for obtaining it.
> (vii) Degree to which the action is controversial.
> (viii) Other time limits imposed on the agency by law, regulations, or executive order.[77]

Many other aspects have been interpreted by the U.S. Courts. In Sierra Club v. Froehlke, the Federal Court of the Southern District of Texas, held that "the legislative history of NEPA clearly reveals that Congress intended the development of adequate methodology for evaluating the full environmental impact and the full social cost, economical and environmental impact of federal actions."[78] This statement was made to support a holding interpreting cost-benefit analyses set forth in Section 1502.23 of the R.C.E.Q. which reads:

> If a cost-benefit analysis relevant to the choice among environmentally different alternatives is being considered for the proposed action it shall be incorporated be reference or appended to the statement as an aid in evaluating the environmental consequences. To assess the adequacy of compliance with sec. 102(2)(B) of the Act the statement shall, when a cost-benefit analysis is prepared discuss the relationship between that analysis and any analysis of unquantified environmental impacts, values and amenities. For purposes of complying with the Act, the weighing of the merits and drawbacks of the various alternatives need not be displayed in a monetary cost-benefit analysis and should not be when there are important qualitative considerations. In any event, an environmental impact statement should at least indicate those considerations, including factors not related to environmental quality, which are likely to be relevant and important to a decision.[79]

The above are a few examples of how complicated the system of EIS is and the possible implications which it could involve for an international organization dealing with

this matter.

Art. 194(3)(b) of the new Draft Convention provides for the development of measures for preventing accidents and safety of operation. This is another large subject which requires establishment of standard recommended practices and procedures.[80] IMCO has already worked in this field. Pollution from vessels is another complex area of regulation which requires a great deal of attention and dedication. For example, the area of standards for pollution certificates demands the development of schemes to unify the system for international tankers.[81] The U.S. Water Pollution Control Act Section 1341 sets forth regulations dealing with the subject. In order to unify the system of permits and standards required to tankers, the U.S. Federal law has preempted the State laws.[82] In Roy v. Atlantic Richfield Co., the U.S. Supreme Court, ruled invalid a State enactment regulating the design and operation of oil tankers upon its waters and setting standards higher than those required by Federal legislation.[83]

The obligation to report oil spills provided in Art. 220(2) of the Draft Convention also requires interpretation for its implementation.[84] An analogy is provided by Section 1321(b)(5) of the U.S. Water Pollution Control Act which provides the following:

> Any person in charge of a vessel or of an onshore facility or an offshore facility shall, as soon as he has knowledge of any

> discharge of oil or a hazardous substance from such vessel or facility in violation of paragraph (3) of this subsection, immediately notify the appropriate agency of the United States Government of such discharge. Any such person (A) in charge of a vessel from which oil or a hazardous substance is discharged in violation of paragraph (3)(i) of this subsection, or (B) in charge of a vessel from which oil or a hazardous substance is discharged in violation of paragraph 3(ii) of this subsection and who is otherwise subject to the jurisdiction of the United States at the time of the discharge, or (C) in charge of an onshore facility or an offshore facility, who fails to notify immediately such agency of such discharge shall, upon conviction, be fined not more than $10,000 or imprisoned for not more than one year or both. Notification received pursuant to this paragraph or information obtained by the exploitation of such notification shall not be used against any such person in any criminal case, except a prosecution for perjury for giving a false statement,[85]

The U.S. Court of Appeals, Ninth Circuit, interpreted this provision in U.S. v. Kennecott Copper Corp. It found the defendant guilty for failure to report immediately an oil spill and considered that the statute was constitutional.[86] Therefore, there was no denial of due process of law. Likewise, The Canadian Shipping Act, Section 753(1) (a)(b) makes it an offence for a person to fail to report any discharge of oil or toxic substances. Such person is liable on summary conviction, to a fine not exceeding one hundred dollars.[87]

These matters as well as others related to the dumping of substances into the sea raise many legal problems which would require settlement. Consequently, an international court within the framework of the newly proposed agency is a desirable creation.

FINAL REMARKS

The following conclusions emerge from this study:

a. In the field of aircraft noise and sonic boom, disagreement among ICAO' contracting States would endanger international relations among countries if solution is not reached between the U.S. government for the application of the Noise Limitation Rules, and ICAO for the implementation of Annex 16 which will be effective after January 1, 1988.

b. International aircraft smoke emissions standards and recommended practices, properly guiding ICAO member States in the issuance of smoke engine emission regulations, fortunately will be applicable on and after February 18, 1982.

c. In relation to outer space, a legal regime which truly satisfies the needs of the international community is required. A suggestion for a possible solution is made in this work with the establishment of specific environmental protection zone of outer space.

d. The general analysis of the new pollution rules set out in the Draft Convention on the Law of the Sea (informal text) leads us to say that the new system of separation zones (T.W., E.E.Z., H.S.) advocating different legal regimes, is a wise solution which could satisfy the

claims of States and could be successfully applied to the airspace regime.

e. The Draft Convention contains a great deal of advanced legislation which requires a unified and well-organized international network of mechanism to effectively implement these policies.

f. The implementation of specific environmental protection zone in the airspace could be a helpful proposal to resolve the conflicts for the delimitation of territorial airspace and outer space.

g. Many of the articles of the Draft Convention are inconsistent with the right of territorial sovereignty which contracting States have over international waters and territorial sea . Furthermore, many of the international policies for pollution control, contained in the Draft, do not make any difference in degree of compliance, among the different zones of the sea, it is an omission which incorrectly confuses the separated legal regimes to be applied.

h. The analyses of IMCO and UNEP history raises several questions. Inter alia, the active role of the IMCO has been motivated by the 1967 Torrey Canyon disaster;[88] however, even after the enlargement as a result of that event, today IMCO is still the

smallest U.N. specialized agency. It seems to us that the expectation of transcendental pollution disasters is one way of encouraging the implementation of pollution policies and gives impetus for legislative changes. This reminds us that measures regarding pollution have to be focussed on prevention to avoid the damage rather than to mitigate them.

i. A final consideration is that, after five years of discussions in the United Nations Law of the Sea Conference, has not yet reached finality on the creation of a defined organization to implement the wide and complicated provisions included in the new Draft Convention. This Draft, for instance, confers standard-setting jurisdiction over shipping on "the competent international organization" and IMCO would probably be the most appropriate agency in this field. However, it is desirable that the pollution prevention control jurisdiction be centralized in one super-agency formed by several regional offices according to the needs. In our opinion one way of properly facing up to the problem could be by fusing UNEP and IMCO in one super agency, having regulatory power and authority to guide world pollution control policies including those for the airspace.

CHAPTER III - FOOTNOTES

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7. P. Van Heijnsbergen, "The Pollution Concept in International Law", Environmental Policy and Law Journal, Vol. 5 No. 1, p. 11 (Feb. 15, 1979).

8. Barros & Johnston, supra, note 3, pp. 4-5.

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12. Victor Yannacone, supra, note 10, p. 199.

13. Barros & Johnston, supra, note 3, pp. 4-5.

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15. U.N. Doc. A/CONF. 48/14 REV. 1, pp. 3-6 (1972).

16. U.N. Doc. A/CONF. 48/14 REV. 1, Chapter VII, pp. 43-44 The States and entities which took part in the conference were:
Afghanistan, Algeria, Argentina, Australia, Austria,

Bahrein, Bangladesh, Belgium, Bolivia, Botswana, Brazil, Burundi, Cameroon, Canada, Central African Republic, Ceylon, Chad, Chile, China, Colombia, Congo, Costa Rica, Cyprus, Dahomey, Denmark, Dominican Republic, Ecuador, Egypt, El Salvador, Ethiopia, Federal Republic of Germany, Fiji, Finland, France, Gabon, Ghana, Greece, Guatemala, Guinea, Guyana, Haiti, Holy Sea, Honduras, Iceland, India, Indonesia, Iran, Iraq, Ireland, Israel, Italy, Ivory Coast, Jamaica, Japan, Jordan, Kenya, Kuwait, Lebanon, Lesotho, Liberia, Libyan Arab Republic, Lichtenstein, Luxembourg, Madagascar, Malawi, Malaysia, Malta, Mauritania, Mauritius, Mexico, Monaco, Morocco, Nepal, Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Pakistan, Panama, Peru, Philippines, Portugal, Republic of Korea, Republic of Viet-Nam, Romania, San Marino, Senegal, Singapore, South Africa, Spain, Sudan, Swaziland, Sweden, Switzerland, Syrian Arab Republic, Thailand, Togo, Trinidad and Tobago, Tunisia, Turkey, Uganda, United Arab Emirates, United Kingdom of Great Britain and Northern Ireland, United Republic of Tanzania, United States of America, Uruguay, Venezuela, Yemen, Yugoslavia, Zaire, Zambia.

The Secretary-General of the United Nations was present at the Conference. The Conference was attended also by representatives of the Secretary-General from the Department of Economic and Social Affairs, the regional economic commissions, the United Nations Economic and Social Office in Beirut, the United Nations Conference on Trade and Development, the United Nations Industrial Development Organization and the United Nations Development Programme. A representative of the United Nations Institute for Training and Research was also present.

Specialized agencies were represented: International Labour Organization, Food and Agriculture Organization of the United Nations, United Nations Educational, Scientific and Cultural Organization, International Civil Aviation Organization, World Health Organization, International Bank for Reconstruction and Development, International Monetary Fund, Universal Postal Union, International Telecommunication Union, World Meteorological Organization, and Inter-Governmental Maritime Consultative Organization, The International Atomic Energy Agency and the General Agreement on Tariffs and Trade were also represented.

Observers from a number of intergovernmental organizations participated in the Conference.

Representatives of numerous international non-governmental organizations invited to the Conference also participated.

17. Michael Hardy, infra, note 25, p. 61.

18. Report of the Secretary-General to the third session of the Preparatory Committee (1972). U.N. Doc. A/CONF. 48 PC. 11 # 222.

19. Michael Hardy, infra, note 25, p. 62.

20. U.N. Doc. A/CONF. 48/14 REV. 1, Brief Summary of the General Debate, Chapter VIII, p. 47 (1972). Some speakers offered their countries for establishing a secretariat: Austria, India, Kenya, Malta, Mexico, Spain and the United Kingdom of Great Britain.

21. U.N.G.A. RES. 2997 (XXVII) (1972) on Institutional or Financial Agreements for International Environmental Cooperation.

22. U.N.G.A. RES. 2997 (XXVII) Preamble p. 43 adopted by the General Assembly during its twenty-seventh session (19 Sep. - 19 Dec. 1972).

23. Id., p. 43.

24. Id., pp. 43-44.

25. Michael Hardy, The United Nations Environmental Program, International Environmental Law, p. 59, ED. Tecloff and Utton (U.S.A. 1974); see also U.N. RES. 2997 supra, note 22, § 3, p. 3.

26. L.F. Goldie, International Maritime Environmental Law Today - An Appraisal, Who Protects the Ocean? Published under the auspices of the American Society of International Law, p. 102 (1975).

27. Abram Chayes, International Institutions for the Environment, Law Institutions, and the Global Environment, jointly sponsored by American Society of International Law and the Carnegie Endowment of International Peace, p. 1 (N.Y. 1972).

28. U.N.G.A. DOC. A/34/6, (Supp. No. 6), Proposed Programme Budget for the Biennium, p. 56 (1980-81).

29. U.N. RES., supra, note 22, § 2, pp. 43-44.

30. Id., see also U.N. RES. 3004 (XXVII), p. 48 (Dec. 15, 1972).

31. U.N. RES., supra, note 22, § I, p. 43; see also U.N. DOC. A/8901 and Corr. 2, p. 2 (1973).

32. U.N. RES., supra, note 22, § II, p. 44.

33. Michael Hardy, supra, note 25, p. 59.

34. U.N. DOC. A/CONF., 48/14 and Corr. 1, Chap. II.

35. U.N. RES. 2997 (XXVII), § III.

36. Id., § IV.

37. M'Gonigle and Zacher, Pollution Politic and International Law, Tankers at Sea, p. 6 (1979).

38. Id., p. 7.

39. IMCO Publications Basic Doc. (S) I (March 1969). See also D.J. Padua, "The Curriculum of IMCO", International Organization 14, pp. 524-547 (1968).

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41. M'Gonigle and Zacher, supra, note 37, p. 42.

42. Id., p. 44.

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44. IMCO and its Activities, p. 7 (London 1974).

45. IMCO, 1975 Amendments to IMCO Convention.

46. IMCO Doc. RES. A 297 (VIII) (1973).

47. IMCO Doc. MEPC I/10 (March 8, 1974).

48. IMCO RES. A 358 (IX).

49. M'Gonigle and Zacher, supra, note 37, p. 49.

50. U.N.G.A. Doc. Supp. No. 6 (A/34/6), Proposed Programme Budget for the Biennium (1980-81).

51. Summary Report Reval Continuing Progress in ICAO, ICAO Bulletin, p. 13 (Dec. 1977).

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61. Brian, Johnson, supra, note 59, pp. 257-258.

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63. U.N. Doc. E/5003 (Report of a Group of Experts to the Secretary-General).

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65. The U.N. Conference on the Law of the Sea (Informal Text), Pt. XII, Geneva (June 28 - Aug. 29, 1980).

66. John Hargrove, Who Protect the Ocean, pp. 7-8 (1975).

67. Draft Convention, Art. 194 (2)(3)(5), 196(1).

68. Canada Shipping Act, § 734(2), R.S. C. S-9; c. 38. (1st supp.) c. 10 (2nd supp.) S-65, (1970), Amendments 71-72.

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82. U.S. WPPCA, supra, note 69, § 1341.

83. Ray v. Atlanta Richfield Co., 435 U.S. 151 (1978).

84. Draft Convention, Art. 220(2).

85. U.S. WPPCA, supra, note 69, § 1321(b)(5).

86. U.S. v. Kennecott Copper Corp., 523 F. 2d. 821 (1975).

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APPENDIX "A"

AMENDMENT NUMBER 5

TO THE

INTERNATIONAL STANDARDS
AND RECOMMENDED PRACTICES

AIRCRAFT NOISE

ANNEX 16

TO THE CONVENTION
ON INTERNATIONAL CIVIL AVIATION

The amendment to Annex 16 contained in this document was adopted by the Council of ICAO on 11 May 1981. Such parts of this amendment as have not been disapproved by more than half of the total number of Contracting States on or before 11 September 1981 will become effective on that date and will become applicable on 26 November 1981, as specified in the Resolution of Adoption.

MAY 1981

INTERNATIONAL CIVIL AVIATION ORGANIZATION

AMENDMENT 5

TEXT OF AMENDMENT TO THE INTERNATIONAL STANDARDS
AND RECOMMENDED PRACTICES

AIRCRAFT NOISE
(ANNEX 16 TO THE CONVENTION ON INTERNATIONAL CIVIL AVIATION)

REPLACE existing Annex 16, Third Edition, by the following proposed text:

PROPOSED TEXT

INTERNATIONAL STANDARDS AND RECOMMENDED PRACTICES

ENVIRONMENTAL PROTECTION

ANNEX 16

TO THE CONVENTION ON INTERNATIONAL CIVIL AVIATION

VOLUME I - AIRCRAFT NOISE

PART I.–DEFINITIONS

Aeroplane. A power-driven heavier-than-air aircraft, deriving its lift in flight chiefly from aerodynamic reactions on surfaces which remain fixed under given conditions of flight.

Aircraft. Any machine that can derive support in the atmosphere from the reactions of the air other than the reactions of the air against the earth's surface.

Associated aircraft systems. Those aircraft systems drawing electrical/pneumatic power from an auxiliary power unit during ground operations.

Auxiliary power unit (APU). A self-contained power unit on an aircraft providing electrical/pneumatic power to aircraft systems during ground operations.

By-pass ratio. The ratio of the air mass flow through the by-pass ducts of a gas turbine engine to the air mass flow through the combustion chambers calculated at maximum thrust when the engine is stationary in an International Standard Atmosphere at sea level.

Derived version of an aircraft. **An aircraft which, from the point of view of airworthiness, is similar to the noise certificated prototype but incorporates changes in type design which may affect its noise characteristics.**

Note: Where the certification authority finds that the proposed change in design, configuration, power or mass is so extensive that a substantially new investigation of compliance with the applicable airworthiness regulations is required, the aircraft should be considered to be a new type design rather than a derived version.

Helicopter: A heavier than air aircraft supported in flight chiefly by the reactions of the air on one or more power-driven rotors on substantially vertical axes.

Subsonic aeroplane. An aeroplane incapable of sustaining level flight at speeds exceeding flight Mach number of 1.

PROPOSED TEXT

PART II.–AIRCRAFT NOISE CERTIFICATION

CHAPTER 1.–ADMINISTRATION

1.1 The provisions of 1.2 to 1.5 shall apply to all aircraft included in the classifications defined for noise certification purposes in Chapters 2, 3, 4, 5, 6 and 8 of this Part where such aircraft are engaged in international air navigation.

1.2 Noise certification shall be granted by the State of Registry of an aircraft on the basis of satisfactory evidence that the aircraft complies with requirements which are at least equal to the applicable Standards specified in this Annex.

Note.–The documents attesting noise certification may take the form of a separate Noise Certificate or a suitable statement contained in another document approved by the State of Registry and required by that State to be carried in the aircraft.

1.3 The documents attesting noise certification for an aircraft shall provide at least the following information:

a) State of Registry;

b) Manufacturer's serial number;

c) Manufacturer's type and model designation;

d) Statement of any additional modifications incorporated for the purpose of compliance with the applicable noise certification Standards;

e) The maximum mass at which compliance with the applicable noise certification Standards has been demonstrated;

f) For aeroplanes for which application for certification is submitted on or after 6 October 1977:

The noise level(s) and their 90 per cent confidence limits at the reference point(s) for which compliance with the applicable noise certification Standards have been demonstrated.

1.4 Contracting States shall recognize as valid a noise certification granted by another Contracting State provided that the requirements under which such certification was granted are at least equal to the applicable Standards specified in this Annex.

1.5 A Contracting State shall suspend or revoke the noise certification of an aircraft on its Register if the aircraft ceases to comply with the applicable noise Standards. The State of Registry shall not remove the suspension of a noise certification or grant a new noise certification unless the aircraft is found, on reassessment, to comply with the applicable noise Standards.

1.6 Unless otherwise specified in this volume of the Annex and subject to the provisions in 1.6.1, the date to be used by Contracting States in determining the applicability of the Standards in this Annex shall be the date on which either the application for the certificate of airworthiness for the prototype was accepted or another equivalent prescribed procedure was carried out by the certificating authorities.

1.6.1 When the time interval between the acceptance of the application for and the issue of the certificate of airworthiness for the prototype or, where this procedure is not used, the issue of the certificate of airworthiness for the first individual aircraft of the type, exceeds 5 years, the date to be used by the certificating authorities in determining the applicability of the appropriate Standards in this Annex shall be 5 years before the date of issue of the certificate of airworthiness for the prototype or, where this procedure is not used, the issue of the certificate of airworthiness for the first individual aircraft of the type, except in special cases when the certificating authorities accept an extension of this period beyond 5 years.

PROPOSED TEXT

CHAPTER 2.—SUBSONIC JET AEROPLANES — APPLICATION FOR CERTIFICATE OF AIRWORTHINESS FOR THE PROTOTYPE ACCEPTED BEFORE 6 OCTOBER 1977

2.1.—Applicability

Note.—See also Chapter 1, 1.6.

2.1.1 The Standards of this Chapter shall be applicable to all subsonic jet aeroplanes for which either the application for certificate of airworthiness for the prototype was accepted or another equivalent prescribed procedure was carried out by the certificating authorities before 6 October 1977, except those aeroplanes:

a) requiring a runway length* of **610 m or less at maximum certificated mass for airworthiness; or**

b) powered by engines with a by-pass ratio of 2 or more and for which a certificate of airworthiness for the individual aeroplane was first issued before 1 March 1972; or

c) powered by engines with a by-pass ratio of less than 2, and for which either the application for certificate of airworthiness for the prototype was accepted or another equivalent prescribed procedure was carried out by the certificating authorities, before 1 January 1969, and for which a certificate of airworthiness for the individual aeroplane was first issued before 1 January 1976.

2.1.2 The Standards of this Chapter shall also be applicable to derived versions of all aeroplanes covered by 2.1.1 above for which the application for certification of a change in type design was accepted, or another equivalent procedure was carried out by the certificating authorities on or after **26 November 1981**.

2.2 - Noise Evaluation Measure

2.2.1 The noise evaluation measure shall be the effective perceived noise level in EPNdB as described in Appendix 1.

2.3 - Noise Measurement Points

2.3.1 An aeroplane, when tested in accordance with the flight test procedures of 2.6, shall not exceed the noise levels specified in 2.4, at the following points:

a) *Lateral Noise Measurement Point:* the point on a line parallel to and 650 m **from the runway** centre line, or extended runway centre line, where the noise level is a maximum during take-off.

b) *Flyover Noise Measurement Point:* the point on the extended centre line of the runway and at a distance of 6.5 km from the start of roll.

c) *Approach Noise Measurement Point:* the point on the ground, on the extended centre line of the runway, 120 m (395 ft) vertically below the 3° descent path originating from a point 300 m beyond the threshold. On level ground this corresponds to a position 2 000 m from the threshold.

2.4.—Maximum Noise Levels

2.4.1 The maximum noise levels of those aeroplanes covered by 2.1.1 above, when determined in accordance with the noise evaluation method of Appendix 1, shall not exceed the following:

a) *At Lateral and Approach Noise Measurement Points:* 108 EPNdB for aeroplanes with maximum certificated **take-off mass of 272 000 kg or over,** decreasing linearly with the logarithm of the **mass at** the rate of 2 EPNdB per halving of the **mass down to** 102 EPNdB at 34 000 kg, **after which the** limit remains constant.

b) *At Flyover Noise Measurement Point:* 108 EPNdB for aeroplanes with maximum certificated take-off **mass of 272 000 kg or over, decreasing** linearly with the logarithm of the **mass at the rate of** 5 EPNdB per halving of the **mass down to 93 EPNdB** at 34 000 kg, **after which the limit remains** constant.

Note: See Attachment A for equations for the calculation of noise levels as a function of take-off mass.

2.4.2 The maximum noise levels of those aeroplanes covered by 2.1.2 above, when determined in accordance with the noise evaluation method of Appendix 1, shall not exceed the following:

2.4.2.1 *At Lateral Noise Measurement Point.*

106 EPNdB for aeroplanes with maximum certificated take-off **mass of 400 000 kg or over, decreasing** linearly with the logarithm of the **mass down to 97 EPNdB** at 35 000 kg, **after which the limit remains** constant.

* With no Stopway or Clearway.

PROPOSED TEXT

2.4.2.2 *At Flyover Noise Measurement Point.*

a) Aeroplanes with two engines or less

104 EPNdB for aeroplanes with maximum certificated take-off mass of 325 000 kg or over, decreasing linearly with the logarithm of the mass at the rate of 4 EPNdB per halving of mass down to 93 EPNdB, after which the limit remains constant.

b) Aeroplanes with three engines

As a) but with 107 EPNdB for aeroplanes with maximum certificated take-off mass of 325 000 kg or over

or

as defined by 2.4.1 b), whichever is the lower.

c) Aeroplanes with four engines or more

As a) but with 108 EPNdB for aeroplanes with maximum certificated take-off mass of 325 000 kg or over

or

as defined by 2.4.1 b), whichever is the lower.

2.4.2.3 *At Approach Noise Measurement Point.*

108 EPNdB for aeroplanes with maximum certificated take-off mass of 280 000 kg or over, decreasing linearly with the logarithm of the mass down to 101 EPNdB at 35 000 kg, after which the limit remains constant.

Note: See Attachment A for equations for the calculation of noise levels as a function of take-off mass.

2.5.—Trade-offs

2.5.1 If the maximum noise levels are exceeded at one or two measurement points:

a) the sum of excesses shall not be greater than 4 EPNdB, except that in respect of four-engined aeroplanes powered by engines with by-pass ratio of 2 or more and for which the application for certificate of airworthiness for the prototype was accepted or another equivalent prescribed procedure was carried out by the certificating authorities before 1 December 1969, the sum of any excesses shall not be greater than 5 EPNdB;

b) any excess at any single point shall not be greater than 3 EPNdB; and

c) any excesses shall be offset by corresponding reductions at the other point or points.

2.6. - Test Procedures

2.6.1.—Take-off Test Procedure

2.6.1.1 Take-off thrust shall be used from the start of take-off to the point at which a height of at least 210 m (690 ft) above the runway is reached and the thrust thereafter shall not be reduced below that thrust which will maintain a climb gradient of at least 4 per cent.

2.6.1.2 A speed of at least V_2 + 19 km/h (V_2 + 10 kt) shall be attained as soon as practicable after lift-off and be maintained throughout the take-off noise certification test.

2.6.1.3 A constant take-off configuration selected by the applicant shall be maintained throughout the take-off noise certification demonstration test except that the landing gear may be retracted.

2.6.2.—Approach Test Procedure

2.6.2.1 The aeroplane shall be stabilized and following a 3° ± 0.5° glide path.

2.6.2.2 The approach shall be made at a stabilized airspeed of not less than 1.3 V_s + 19 km/h (1.3 V_s + 10 kt) with thrust stabilized during approach and over the measuring point and continued to a normal touchdown.

2.6.2.3 The configuration of the aeroplane shall be with maximum allowable landing flap setting.

PROPOSED TEXT

CHAPTER 3.—SUBSONIC JET AEROPLANES – APPLICATION FOR CERTIFICATE OF AIRWORTHINESS FOR THE PROTOTYPE ACCEPTED ON OR AFTER 6 OCTOBER 1977

3.1.—Applicability

Note.—See also Chapter 1, 1.6.

3.1.1 The Standards of this Chapter shall be applicable to all subsonic jet aeroplanes, including their derived versions, other than aeroplanes which require a runway* length of **610 m or less at maximum certificated mass for airworthiness, in respect of which either the application for certificate of airworthiness for the prototype was accepted or another equivalent prescribed procedure was carried out by the certificating authorities, on or after 6 October 1977.**

3.2.—Noise Measurements

3.2.1.—Noise Evaluation Measure

3.2.1.1 The noise evaluation measure shall be the effective perceived noise level in EPNdB as described in Appendix 2.

3.3.—Reference Noise Measurement Points

3.3.1 An aeroplane, when tested in accordance with these Standards, shall not exceed the noise levels specified in 3.4 at the following points:

a) *Lateral Reference Noise Measurement Point:* the point on a line parallel to and 450 m **from the** runway centre line or extended runway centre line, where the noise level is a maximum during take-off.

b) *Flyover Reference Noise Measurement Point:* the point on the extended centre line of the runway and at a distance of **6.5 km from the start of roll.**

c) *Approach Reference Noise Measurement Point:* the point on the ground, on the extended centre line of the runway 2 000 m **from the threshold. On** level ground this corresponds to a position 120 m (395 ft) vertically below the 3° descent path originating from a point 300 m beyond the threshold.

3.3.2 –Test Noise Measurement Points

3.3.2.1 If the test noise measurement points are not located at the reference noise measurement points, any corrections for the difference in position shall be made in the same manner as the corrections for the differences between test and reference flight paths.

3.3.2.2 Sufficient lateral test noise measurement points shall be used to demonstrate to the certificating authorities that the maximum noise level on the appropriate lateral line has been clearly determined. Simultaneous measurements shall be made at one test noise measurement point at symmetrical position on the other side of the runway.

3.3.2.3 The applicant shall demonstrate to the certificating authorities that during flight test, lateral and flyover noise levels were not separately optimized at the expense of each other.

3.4.—Maximum Noise Levels

3.4.1 The maximum noise levels, when determined in accordance with the noise evaluation method of Appendix 2, shall not exceed the following.

3.4.1.1 *At Lateral Reference Noise Measurement Point.*

103 EPNdB for aeroplanes with maximum certificated take-**off mass, at which the noise certification is requested, of 400 000 kg and over and decreasing linearly with the logarithm of the mass down to 94 EPNdB at 35 000 kg, after which the limit remains constant.**

3.4.1.2 *At Flyover Reference Noise Measurement Point.*

a) Aeroplanes with two engines or less

101 EPNdB for aeroplanes with maximum certificated take-off mass, at which the noise certification is requested, of 385 000 kg and over and decreasing linearly with the logarithm of the aeroplane mass at the rate of 4 EPNdB per halving of mass down to 89 EPNdB after which the limit is constant.

b) Aeroplanes with three engines

As a) but with 104 EPNdB for aeroplanes with maximum certificated take-off **mass of 385 000 kg and over.**

c) Aeroplanes with four engines or more

As a) but with 106 EPNdB for aeroplanes with maximum certificated take-off **mass of 385 000 kg and over.**

* With no stopway or clearway

3.4.1.3 *At Approach Reference Noise Measurement Point.*

105 EPNdB for aeroplanes with maximum certificated take-off mass, at which the noise certification is requested, of 280 000 kg or over, and decreasing linearly with the logarithm of the mass down to 98 EPNdB at 35 000 kg, after which the limit remains constant.

Note: See Attachment A for equations for the calculation of noise levels as a function of take-off mass.

3.4.2 If a reference ambient air temperature of 15°C is used (see 3.6.1.5 b)), 1 EPNdB shall be added to the measured (and adjusted) noise level obtained at the flyover measurement point before it is compared with the maximum noise level of 3.4.1.2.

3.5.—Trade-offs

3.5.1 If the maximum noise levels are exceeded at one or two measurement points:

a) the sum of excesses shall not be greater than 3 EPNdB;

b) any excess at any single point shall not be greater than 2 EPNdB; and

c) any excesses shall be offset by corresponding reductions at the other point or points.

3.6.—Noise Certification Reference Procedures

3.6.1.—General Conditions

3.6.1.1 The reference procedures shall comply with the appropriate airworthiness requirements.

3.6.1.2 The calculations of reference procedures and flight paths shall be approved by the certificating authorities.

3.6.1.3 Except in conditions specified in 3.6.1.4, the take-off and approach reference procedures shall be those defined in 3.6.2 and 3.6.3 respectively.

3.6.1.4 When it is shown by the applicant that the design characteristics of the aeroplane would prevent flight being conducted in accordance with 3.6.2 and 3.6.3, the reference procedures shall:

a) depart from the reference procedures defined in 3.6.2 and 3.6.3 only to the extent demanded by those design characteristics which make compliance with the procedures impossible; and

b) be approved by the certificating authorities.

3.6.1.5 The reference procedures shall be calculated under the following reference atmospheric conditions:

a) sea level atmospheric pressure of 1013.25 hPa (1013.25 mb);

b) ambient air temperature of 25°C i.e. ISA + 10°C except that, at the discretion of the certificating authorities, an alternative reference ambient air temperature of 15°C i.e. ISA may be used.

c) relative humidity of 70 per cent; and

d) zero wind.

3.6.2.—Take-off Reference Procedure

3.6.2.1 The take-off reference flight path shall be calculated as follows:

a) take-off thrust shall be used from the start of take-off to the point where at least the following height above runway level is reached:

aeroplanes with two engines or less — 300 m (985 ft)

aeroplanes with three engines — 260 m (855 ft)

aeroplanes with four engines or more — 210 m (690 ft);

b) upon reaching the height specified in a) above, the thrust shall not be reduced below that required to maintain:

1) a climb gradient of 4 per cent; or

2) in the case of multi-engined aeroplanes, level flight with one engine inoperative;

whichever thrust is the greater;

c) the speed shall be the all-engines operating take-off climb speed selected by the applicant for use in normal operation, which shall be at least V_2 + 19 km/h (V_2 + 10 kt) but not greater than V_2 + 37 km/h (V_2 +20 kt) and which shall be attained as soon as practicable after lift-off and be maintained throughout the take-off noise certification test.

d) a constant take-off configuration selected by the applicant shall be maintained throughout the take-off reference procedure except that the landing gear may be retracted; and

e) the mass of the aeroplane at the brake release shall be the maximum take-off mass at which the noise certification is requested.

3.6.3.—Approach Reference Procedure

3.6.3.1 The approach reference flight path shall be calculated as follows:

a) the aeroplane shall be stabilized and following a 3° glide path;

b) the approach shall be made at a stabilized airspeed of not less than $1.3V_s$ + 19 km/h ($1.3V_s$ + 10 kt) with thrust stabilized during approach and over the measuring point, and continued to a normal touchdown;

c) the constant approach configuration used in the airworthiness certification tests, but with the landing gear down, shall be maintained throughout the approach reference procedure;

d) the mass of the aeroplane at the touch-down shall be the maximum landing mass permitted in the approach configuration defined in 3.6.3.1 c) at which noise certification is requested; and

e) the most critical (that which produces the highest noise levels) configuration at the mass at which certification is requested, shall be used.

3.7. - Test Procedures

3.7.1 The test procedures shall be acceptable to the airworthiness and noise certificating authorities of the State issuing the certificate.

3.7.2 The test procedures and noise measurements shall be conducted and processed in an approved manner to yield the noise evaluation measure designated as Effective Perceived Noise Level, EPNL, in units of EPNdB, as described in Appendix 2.

3.7.3 Acoustic data shall be adjusted by the methods outlined in Appendix 2 to the reference conditions specified in this Chapter. Adjustments for speed and thrust shall be made as described in Section 9 of Appendix 2.

3.7.4 If the mass during the test is different from the mass at which the noise certification is requested the necessary EPNL adjustment shall not exceed 2 EPNdB for take-offs and 1 EPNdB for approaches. Data approved by the certificating authorities shall be used to determine the variation of EPNL with mass for both take-off and approach test conditions. Similarly the necessary EPNL adjustment for variations in approach flight path from the reference flight path shall not exceed 2 EPNdB.

3.7.5 For the approach conditions the test procedures shall be accepted if the aeroplane follows a steady glide path angle of $3^{o}\pm0.5^{o}$.

3.7.6 If equivalent test procedures different from the reference procedures are used, the test procedures and all methods for adjusting the results to the reference procedures shall be approved by the certificating authorities. The amounts of the adjustments shall not exceed 16 EPNdB on take-off and 8 EPNdB on approach, and if the adjustments are more than 8 EPNdB and 4 EPNdB respectively, the resulting numbers shall not be within 2 EPNdB of the limit noise levels specified in 3.4.

Note: Guidance material on the use of equivalent procedures is provided in Attachment B.

PROPOSED TEXT

CHAPTER 4.-SUPERSONIC AEROPLANES

4.1 Supersonic aeroplanes - application for certificate of airworthiness for the prototype accepted before 1 January 1975.

4.1.1 The Standards of Chapter 2 of this Part, with the exception of maximum noise levels specified in 2.4, shall be applicable to all supersonic aeroplanes, including their derived versions, in respect of which either the application for the certificate of airworthiness for the prototype was accepted or another equivalent prescribed procedure was carried out by the certificating authorities before 1 January 1975 and for which a certificate of airworthiness for the individual aeroplane was first issued after 26 November 1981.

4.1.2 The maximum noise levels of those aeroplanes covered by 4.1.1, when determined in accordance with the noise evaluation method of Appendix 1, shall not exceed the measured noise levels of the first certificated aeroplane of the type.

4.2 Supersonic aeroplanes - application for certificate of airworthiness for the prototype accepted on or after 1 January 1975.

Note: Standards and Recommended Practices for these aeroplanes are not yet developed but the provisions of Chapter 2 of this Part applicable to subsonic jet aeroplanes may be used as guidelines for aeroplanes for which the application for a certificate of airworthiness for the prototype was accepted or another equivalent prescribed procedure was carried out by the certificating authorities on or after 1 January 1975.

PROPOSED TEXT

CHAPTER 5.-PROPELLER-DRIVEN AEROPLANES OVER 5 700 KG

5.1.–Applicability

Note.-See also Chapter 1, 1.6.

5.1.1 The Standards of this Chapter shall be applicable to all propeller-driven aeroplanes, including their derived versions, except those aeroplanes specifically designed for fire fighting and agricultural purposes, of over 5 700 kg maximum certificated take-off mass, other than aeroplanes which require a runway* length of 610 m or less at maximum certificated mass for airworthiness, for which either the application for a certificate of airworthiness for the prototype was accepted or another equivalent prescribed procedure was carried out by the certificating authorities on or after 6 October 1977.

5.1.2 For derived versions and individual aeroplanes of the types for which the application for a certificate of airworthiness for the prototype was accepted or another prescribed procedure was carried out by the certificating authorities before 6 October 1977 and for which a certificate of airworthiness for the individual aeroplane was first issued on or after 26 November 1981, the Standards of Chapter 2, as applicable to aeroplane types described in para 2.1.1, shall apply.

Note: The Standards in Chapter 2, although developed primarily for subsonic jet aeroplanes fitted with high by-pass ratio engines, are considered suitable for application to other aeroplane types regardless of the type of propulsion.

5.2.–Noise Measurements

5.2.1.–Noise Evaluation Measure

5.2.1.1 The noise evaluation measure shall be the effective perceived noise level in EPNdB as described in Appendix 2.

5.3.–Reference Noise Measurement Points

5.3.1 An aeroplane, when tested in accordance with these Standards, shall not exceed the noise levels specified in 5.4 at the following points:

a) *Lateral Reference Noise Measurement Point:* the point on a line parallel to and 450 m from the runway centreline or extended runway centreline, where the noise level is a maximum during take-off.

b) *Flyover Reference Noise Measurement Point:* the point on the extended centre line of the runway and at a distance of 6.5 km from the start of roll.

c) *Approach Reference Noise Measurement Point:* the point on the ground, on the extended centre line of the runway 2 000 m from the threshold. On level ground this corresponds to a position 120 m (395 ft) vertically below the 3° descent path originating from a point 300 m beyond the threshold.

5.3.2.–Test Noise Measurement Points

5.3.2.1 If the test noise measurement points are not located at the reference noise measurement points, any corrections for the difference in position shall be made in the same manner as the corrections for the differences between test and reference flight paths.

5.3.2.2 Sufficient lateral test noise measurement points shall be used to demonstrate to the certification authorities that the maximum noise level on the appropriate lateral line has been clearly determined. Simultaneous measurements shall be made at one test noise measurement point at symmetrical position on the other side of the runway.

5.3.2.3 The applicant shall demonstrate to the certificating authorities that during flight test, lateral and flyover noise levels were not separately optimized at the expense of each other.

5.4.–Maximum Noise Levels

5.4.1 The maximum noise levels, when determined in accordance with the noise evaluation method of Appendix 2, shall not exceed the following:

a) at Lateral Reference Noise Measurement Point: 96 EPNdB constant limit for aeroplanes with maximum take-off mass, at which the noise certification is requested, up to 34 000 kg and increasing linearly with the logarithm of aeroplane mass at the rate of 2 EPNdB per doubling of mass from that point until the limit of 103 EPNdB is reached, after which the limit is constant;

b) at Flyover Reference Noise Measurement Point: 89 EPNdB constant limit for aeroplanes with maximum take-off mass, at which the noise certification is requested, up to 34 000 kg and increasing linearly

*With no Stopway or Clearway.

PROPOSED TEXT

with the logarithm of aeroplane mass at the rate of 5 EPNdB per doubling of mass from that point until the limit of 106 EPNdB is reached, after which the limit is constant; and

c) at Approach Reference Noise Measurement Point: 98 EPNdB constant limit for aeroplanes with maximum take-off mass, at which the noise certification is requested, up to 34 000 kg and increasing linearly with the logarithm of aeroplane mass at the rate of 2 EPNdB per doubling of mass from that point until the limit of 105 EPNdB is reached, after which the limit is constant.

Note: See Attachment A for equations for the calculation of noise levels as a function of take-off mass.

5.5.–Trade-offs

5.5.1 If the maximum noise levels are exceeded at one or two measurement points:

a) the sum of excesses shall not be greater than 3 EPNdB;

b) any excess at any single point shall not be greater than 2 EPNdB; and

c) any excesses shall be offset by corresponding reductions at the other point or points.

5.6.–Noise Certification Reference Procedures

5.6.1.–General Conditions

5.6.1.1 The reference procedures shall comply with the appropriate airworthiness requirements.

5.6.1.2 The calculations of reference procedures and flight paths shall be approved by the certificating authorities.

5.6.1.3 Except in conditions specified in 5.6.1.4, the take-off and approach reference procedures shall be those defined in 5.6.2 and 5.6.3 respectively.

5.6.1.4 When it is shown by the applicant that the design characteristics of the aeroplane would prevent flight being conducted in accordance with 5.6.2 and 5.6.3, the reference procedures shall:

a) depart from the reference procedures defined in 5.6.2 and 5.6.3 only to the extent demanded by those design characteristics which make compliance with the procedures impossible; and

b) be approved by the certificating authorities.

5.6.1.5 The reference procedures shall be calculated under the following reference atmospheric conditions:

a) sea level atmospheric pressure of 1 013.25 hPa (1 013.25 mb);

b) ambient air temperature of 25°C i.e. ISA + 10°C except that at the discretion of the certificating authorities, an alternative reference ambient air temperature of 15°C i.e. ISA may be used;

c) relative humidity of 70 per cent; and

d) zero wind.

5.6.2.–Take-off Reference Procedure

5.6.2.1 The take-off flight path shall be calculated as follows:

a) take-off power shall be used from the start of take-off to the point where at least the following height above runway level is reached:

aeroplanes with two engines or less – 300 m (985 ft)

aeroplanes with three engines – 260 m (855 ft)

aeroplanes with four engines or more – 210 m; (690 ft);

b) upon reaching the height specified in a) above, the power shall not be reduced below that required to maintain:

1) climb gradient of 4 per cent; or

2) in the case of multi-engined aeroplanes, level flight with one engine inoperative;

whichever power is the greater;

c) the speed shall be the all-engines operating take-off climb speed selected by the applicant for use in normal operation, which shall be at least V_2 + 19 km/h (V_2 + 10 kt) and which shall be attained as soon as practicable after lift-off and be maintained throughout the take-off noise certification test;

d) a constant take-off configuration selected by the applicant shall be maintained throughout the take-off reference procedure except that the landing gear may be retracted; and

PROPOSED TEXT

e) the mass of the aeroplane at the brake-release shall be the maximum take-off mass at which the noise certification is requested.

5.6.3.—Approach Reference Procedure

5.6.3.1 The approach reference flight path shall be calculated as follows:

a) the aeroplane shall be stabilized and following a 3° glide path;

b) the approach shall be made at a stabilized airspeed of not less than $1.3V_S$ + 19 km/h ($1.3V_S$ + 10 kt) with power stabilized during approach and over the measuring point, and continued to a normal touchdown;

c) the constant approach configuration used in the airworthiness certification tests, but with the landing gear down, shall be maintained throughout the approach reference procedure;

d) the mass of the aeroplane at the touchdown shall be the maximum landing mass permitted in the approach configuration defined in 5.6.3.1 c) at which noise certification is requested; and

e) the most critical (that which produces the highest noise levels) configuration at the mass at which certification is requested, shall be used.

5.7 Test Procedures

5.7.1 The test procedures shall be acceptable to the airworthiness and noise certificating authorities of the State issuing the certificate.

5.7.2 The test procedures and noise measurements shall be conducted and processed in an approved manner to yield the noise evaluation measure designated as Effective Perceived Noise Level EPNL, in units of EPNdB, as described in Appendix 2.

5.7.3 Acoustic data shall be adjusted by the methods outlined in Appendix 2 to the reference conditions specified in this Chapter. Adjustments for speed and thrust shall be made as described in Section 9 of Appendix 2.

5.7.4 If the mass during the test is different from the mass at which the noise certification is requested, the necessary EPNL adjustment shall not exceed 2 EPNdB for take-offs and 1 EPNdB for approaches. Data approved by the certificating authorities shall be used to determine the variation of EPNL with mass for both take-off and approach test conditions. Similarly, the necessary EPNL adjustment for variations in approach flight path from the reference flight path shall not exceed 2 EPNdB.

5.7.5 For the approach conditions the test procedures shall be accepted if the aeroplane follows a steady glide path angle of 3° ± 0.5°.

PROPOSED TEXT

5.7.6 If equivalent test procedures different from the reference procedures are used, the test procedures and all methods for adjusting the results to the reference procedures shall be approved by the certificating authorities. The amounts of the adjustments shall not exceed 16 EPNdB on take-off and 8 EPNdB on approach, and if the adjustments are more than 8 EPNdB and 4 EPNdB respectively, the resulting numbers shall not be within 2 EPNdB of the limit noise levels specified in 5.4.

Note.- Guidance material on the use of equivalent procedures is provided in Attachment B.

PROPOSED TEXT

CHAPTER 6.-PROPELLER-DRIVEN AEROPLANES NOT EXCEEDING 5 700 KG

6.1.–Applicability

Note.–See also Chapter 1, 1.6.

6.1.1 The Standards of this Chapter shall be applicable to all propeller-driven aeroplanes, except those aeroplanes specifically designed for aerobatic purposes or agricultural or fire fighting uses, of a maximum certificated take-off mass not exceeding 5 700 kg (except that in the case of an application for a change in type design, the maximum certificated take-off mass may not exceed 6 500 kg, provided that the prototype has been certificated at a maximum certificated take-off mass not exceeding 5 700 kg) for which:

a) application for the certificate of airworthiness for the prototype was accepted, or another equivalent prescribed procedure was carried out by the certificating authorities, on or after 1 January 1975; or

b) a certificate of airworthiness for the individual aeroplane was first issued on or after 1 January 1980.

6.2.–Noise Evaluation Measure

6.2.1 The noise evaluation measure shall be a weighted overall sound pressure level as defined in International Electrotechnical Commission (IEC) Publication 179 *. The weighting applied to each sinusoidal component of the sound pressure shall be given as a function of frequency by the standard reference curve called "A".

6.2.2 When requested by the certificating authorities, noise data in terms of EPNdB as described in Appendix 1 of this Annex shall also be provided. In determining the duration correction as specified in 4.5 of Appendix 1, the time interval shall in each case be taken as the period, to the nearest 1.0 second, over which PNLT(k) remains greater than or equal to PNLTM-10, the lower limit of 90 TPNdB not being applied.

6.3.–Maximum Noise Levels

6.3.1 For aeroplanes specified in 6.1.1 a) and 6.1.1 b), the maximum noise levels when determined in accordance with the noise evaluation method of Appendix 3 shall not exceed the following:

- A 68 dB(A) constant limit up to an aeroplane mass of 600 kg, varying linearly with mass from that point to 1 500 kg, after which the limit is constant at 80 dB(A) up to 5 700 kg (except that in the case of an application for a change in type design, the maximum certificated take-off mass may not exceed 6 500 kg, provided that the prototype has been certificated at a maximum certificated take-off mass not exceeding 5 700 kg).

6.4 Noise certification reference procedures

6.4.1 The reference procedure shall be calculated under the following reference atmospheric conditions:

a) sea level atmospheric pressure of 1 013.25 hPa (1 013.25 mb);

b) ambient air temperature of 25°C i.e. ISA + 10°C

6.5. - Test Procedures

6.5.1 Either the test procedures described in 6.5.2 and 6.5.3 or equivalent test procedures approved by the certificating authorities shall be used.

6.5.2 Tests to demonstrate compliance with the maximum noise levels of 6.3.1 shall consist of a series of level flights overhead the measuring station at a height of

$$300\ ^{+10}_{-30}\ \text{m}\quad (985\ ^{+30}_{-100}\ \text{ft})$$

The aeroplane shall pass over the measuring point within $\pm$ 10° from the vertical.

6.5.3 Overflight shall be performed at the highest power in the normal operating range+, stabilized airspeed and with the aeroplane in the cruise configuration.

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* As amended. Available from the Bureau Central de la Commission Electrotechnique Internationale, 1 rue de Varembe, Geneva, Switzerland.

+ This is normally indicated in the Aeroplane Flight Manual and on the flight instruments.

PROPOSED TEXT

CHAPTER 7.-PROPELLER-DRIVEN STOL AEROPLANES

Note.–Standards and Recommended Practices for this Chapter are not yet developed. In the meantime, guidelines provided in Attachment C may be used for noise certification of propeller-driven STOL aeroplanes for which a certificate of airworthiness for the individual aeroplane was first issued on or after 1 January 1976.

PROPOSED TEXT

CHAPTER 8 - HELICOPTERS

8.1 Applicability

Note: See also Chapter 1, 1.6

8.1.1 The Standards of this Chapter shall be applicable to all helicopters, except those designed and operated specifically for agricultural, fire fighting or external load carrying purposes, for which:

a) application for the certificate of airworthiness for the prototype was accepted, or another equivalent prescribed procedure was carried out by the certificating authorities, on or after 1 January 1980; or

b) application for a change of type design that has a significant effect on the noise characteristics of the helicopter was accepted, or other equivalent prescribed procedure was carried out by the certificating authorities, on or after 1 January 1985.

Note 1: Certification of helicopters which are capable of carrying external loads or equipment for specific purposes such as crop spraying should be made without such loads or equipment fitted.

Note 2: For helicopter types where there is no civil prototype, demonstration to the satisfaction of the certificating authorities of safety equivalent to that required for civil certification before 1 January 1985 should be accepted as the basis of a subsequent application for a change of type design.

8.2 Noise Evaluation Measure

8.2.1 The noise evaluation measure shall be the Effective Perceived Noise Level in EPNdB as described in Appendix 4.

8.3 Reference Noise Measurement Points

8.3.1 A helicopter, when tested in accordance with these Standards, shall not exceed the noise levels specified in 8.4 at the following points:

a) Take-off Reference Noise Measurement Points

1) A flight path reference point located on the ground vertically below the flight path defined in the take-off reference procedure (see 8.6.2.1) and 500 m horizontally in the direction of flight from the point at which transition to climbing flight is initiated in the reference procedure (see 8.6.2.1 (b);

2) Two other points on the ground symmetrically disposed at 150 m on both sides of the flight path defined in the take-off reference procedure and lying on a line through the flight path reference point.

PROPOSED TEXT

b) Overflight Reference Noise Measurement Points

1) A flight path reference point located on the ground 150 m (490 ft) vertically below the flight path defined in the overflight reference procedure (see 8.6.3.1).

2) Two other points on the ground symmetrically disposed at 150 m on both sides of the flight path defined in the overflight reference procedure and lying on a line through the flight path reference point.

c) Approach Reference Noise Measurement Points

1) A flight path reference point located on the ground 120 m (395 ft) vertically below the flight path defined in the approach reference procedure (see 8.6.4.1). On level ground, this corresponds to a position 1 140 m from the intersection of the 6.0° approach path with the ground plane.

2) Two other points on the ground symmetrically disposed at 150 m on both sides of the flight path defined in the approach reference procedure and lying on a line through the flight path reference point.

8.4 Maximum Noise Levels

8.4.1 For helicopters specified in 8.1.1a), the maximum noise levels when determined in accordance with the noise evaluation method of Appendix 4 shall not exceed the following:

8.4.1.1 At the take-off flight path reference point: 106 EPNdB for helicopters with maximum certificated take-off mass at which the noise certification is requested, of 80 000 kg and over and decreasing linearly with the logarithm of the helicopter mass at a rate of 3 EPNdB per halving of mass down to 86 EPNdB after which the limit is constant.

8.4.1.2 At the overflight flight path reference point: 105 EPNdB for helicopters with maximum certificated take-off mass at which the noise certification is requested, of 80 000 kg and over and decreasing linearly with the logarithm of the helicopter mass at a rate of 3 EPNdB per halving of mass down to 85 EPNdB after which the limit is constant.

8.4.1.3 At the approach flight path reference point: 107 EPNdB for helicopters with maximum certificated take-off mass at which the noise certification is requested, of 80 000 kg and over and decreasing linearly with the logarithm of the helicopter mass at a rate of 3 EPNdB per halving of mass down to 87 EPNdB after which the limit is constant.

Note: See Attachment A for equations for the calculation of noise levels as a function of take-off mass.

8.4.2 For helicopters specified in 8.1.1 b) no change in type design shall be made that will cause the noise levels of the helicopter to exceed the limits specified in 8.4.1 or the levels created by the helicopter prior to the change in the type design, whichever is higher. All noise level determinations shall be in accordance with the noise evaluation method of Appendix 4.

8.5 Trade-Offs

8.5.1 If the noise level limits are exceeded at one or two measurement points:

a) the sum of excesses shall not be greater than 4 EPNdB;

b) any excess at any single point shall not be greater than 3 EPNdB; and

c) any excess shall be offset by corresponding reductions at the other point or points.

8.6 Noise Certification Reference Procedures

8.6.1 General Conditions

8.6.1.1 The reference procedures shall comply with the appropriate airworthiness requirements.

8.6.1.2 The reference procedures and flight paths shall be approved by the certificating authorities.

8.6.1.3 Except in conditions specified in 8.6.1.4, the take-off, overflight and approach reference procedures shall be those defined in 8.6.2, 8.6.3 and 8.6.4 respectively.

8.6.1.4 When it is shown by the applicant that the design characteristics of the helicopter would prevent flight being conducted in accordance with 8.6.2, 8.6.3 or 8.6.4, the reference procedures shall:

a) depart from the reference procedures defined in 8.6.2, 8.6.3 or 8.6.4 only to the extent demanded by those design characteristics which make compliance with the reference procedures impossible; and

b) be approved by the certificating authorities.

8.6.1.5 The reference procedures shall be established for the following reference atmospheric conditions:

a) sea level atmospheric pressure of 1013.25 hPa (1013.25 mb);

b) ambient air temperature of 25°C i.e. ISA + 10°C except that, at the discretion of the certificating authorities, an alternative reference ambient air temperature of 15°C i.e. ISA may be used;

c) relative humidity of 70 per cent; and

d) zero wind.

8.6.1.6 In subparagraphs 8.6.2.1d), 8.6.3.1c) and 8.6.4.1c), the maximum normal operating rpm shall be taken as the "maximum value in the normal rpm operating range" which is consistent with the airworthiness limitations for maximum rotor rpm for continuous (i.e. power on) operations.

8.6.2 Take-off Reference Procedures

8.6.2.1 The take-off reference flight procedure shall be established as follows:

a) the helicopter shall be stabilized at the maximum take-off power and at the best rate of climb along a path starting from a point located 500 m forward of the flight path reference point, at 20 m (65 ft) above the ground;

b) the best rate of climb speed V_Y, or the lowest approved speed for the climb after take-off, whichever is the greater, shall be maintained throughout the take-off reference procedure;

c) the steady climb shall be made with the rotor speed stabilized at the maximum normal operating rpm certificated for take-off;

d) a constant take-off configuration selected by the applicant shall be maintained throughout the take-off reference procedure except that the landing gear may be retracted; and

e) the mass of the helicopter shall be the maximum take-off mass at which noise certification is requested.

8.6.3 Overflight Reference Procedure

8.6.3.1 The overflight reference procedure shall be established as follows:

a) the helicopter shall be stabilized in level flight overhead the flight path reference point at a height of 150 m (490 ft);

b) a speed of 0.9 V_H or 0.9V_{NE}, whichever is the lesser, shall be maintained throughout the overflight reference procedure;

Note: V_H is the maximum speed in level flight at power not exceeding maximum continuous power.
V_{NE} is the never exceed speed.

c) the overflight shall be made with the rotor speed stabilized at the maximum normal operating rpm certificated for level flight;

d) the helicopter shall be in the cruise configuration; and

e) the mass of the helicopter shall be the maximum take-off mass at which noise certification is requested.

8.6.4 Approach Reference Procedure

8.6.4.1 The approach reference procedure shall be established as follows:

a) the helicopter shall be stabilized and following 6.0° approach path;

b) the approach shall be made at a stabilized airspeed equal to the best rate of climb speed V_y, or the lowest approved speed for the approach, whichever is the greater, with power stabilized during the approach and over the flight path reference point, and continued to a normal touchdown;

c) the approach shall be made with the rotor speed stabilized at the maximum normal operating rpm certificated for approach;

d) the constant approach configuration used in airworthiness certification tests, with the landing gear extended, shall be maintained throughout the approach reference procedure; and

e) the mass of the helicopter at touchdown shall be the maximum landing mass at which noise certification is requested.

8.7 Test Procedures

8.7.1 The test procedures shall be acceptable to the airworthiness and noise certificating authorities of the State issuing the certificate.

PROPOSED TEXT

8.7.2 The test procedures and noise measurements shall be conducted and processed in an approved manner to yield the noise evaluation measure designated as Effective Perceived Noise Level, EPNL, in units of EPNdB, as described in Appendix 4.

8.7.3 Test conditions and procedures shall be closely similar to reference conditions and procedures or the acoustic data shall be adjusted, by the methods outlined in Appendix 4, to the reference conditions and procedures specified in this chapter.

8.7.4 Adjustments for differences between test and reference flight procedures shall not exceed 4.0 EPNdB on take-off or 2.0 EPNdB on overflight or approach.

8.7.5 Adjustments for differences between test and reference noise measurement positions shall be included with the flight procedure adjustments of 8.7.4 and limited accordingly.

PROPOSED TEXT

CHAPTER 9 - INSTALLED AUXILIARY POWER UNITS (APU) AND ASSOCIATED AIRCRAFT SYSTEMS DURING GROUND OPERATIONS

Note.– Standards and Recommended Practices for this Chapter are not yet developed. In the meantime, guidelines provided in Attachment D may be used for noise certification of installed auxiliary power units (APU) and associated aircraft systems in:

a) all aircraft for which application for a certificate of airworthiness for the prototype was accepted or another equivalent prescribed procedure was carried out by the certificating authorities, on or after 6 October 1977; and

b) aircraft of existing type design for which application for a change of type design involving the basic APU installation was accepted or another equivalent prescribed procedure was carried out by the certificating authorities, on or after 6 October 1977.

PROPOSED TEXT

PART III. — NOISE MEASUREMENT FOR MONITORING PURPOSES

Note.—The following Recommendation has been developed to assist States which measure noise for monitoring purposes, until such time as agreement on a single method can be reached.

Recommendation. — *Where the measurement of aircraft noise is made for monitoring purposes, the method of Appendix 5 should be used.*

Note.—These purposes are described as including: monitoring compliance with and checking the effectiveness of such noise abatement requirements as may have been established for aircraft in flight or on the ground. An indication of the degree of correlation between values obtained by the method used for measuring noise for aircraft design purposes and the method(s) used for monitoring purposes would be necessary.

PROPOSED TEXT

PART IV. — INTERNATIONAL NOISE EXPOSURE REFERENCE UNIT FOR LAND-USE PLANNING

Note.—The following Recommendations have been developed for the purpose of promoting international correlation and communication between those States that have adopted a variety of methods of calculating a noise exposure index indicative of community response to noise, for land-use planning purposes, and also for the benefit of those States that have not yet developed or agreed to use any such noise exposure index. Guidance material on land-use planning in the vicinity of airport is given in Part 2 of the Aerodrome Planning Manual (Doc 9184-AN/902).

1. **Recommendation.** — *The total noise exposure expressed by the equivalent continuous perceived noise level given in Appendix* 6 *should be adopted for international usage and should be referred to as the International Noise Exposure Reference Unit.*

2. **Recommendation.** — *Contracting States that have adopted, or may in future adopt, a noise exposure unit different from the International Noise Exposure Reference Unit should provide other States with information that would enable noise exposure to be expressed in terms equivalent to, or related to, the International Noise Exposure Reference Unit.*

PROPOSED TEXT

PART V. — AIRCRAFT NOISE ABATEMENT OPERATING PROCEDURES

Note.—Guidance material relating primarily to safety considerations in the establishment of aircraft noise abatement operating procedures is contained in Attachment G.

APPENDIX "B"

INTERNATIONAL STANDARDS AND RECOMMENDED PRACTICES

ENVIRONMENTAL PROTECTION

ANNEX 16

TO THE CONVENTION ON INTERNATIONAL CIVIL AVIATION

VOLUME II

AIRCRAFT ENGINE EMISSIONS

FIRST EDITION - 1981

This first edition of Volume II of Annex 16 was adopted by the Council on June 30, 1981 and becomes applicable on Feb. 1, 82

For information regarding the applicability of the Standards and Recommended Practices, see Foreword, and the relevant clauses in each Chapter.

INTERNATIONAL CIVIL AVIATION ORGANIZATION

PART 1 - DEFINITIONS AND SYMBOLS

Chapter 1 - Definitions

Where the following expressions are used in this Annex, they have the meanings ascribed to them below:

Afterburning: A mode of engine operation wherein a combustion system fed (in whole or part) by vitiated air is used.

Approach phase: The operating phase defined by the time during which the engine is operated in the approach operating mode.

Climb phase: the operating phase defined by the time during which the engine is operated in the climb operating mode.

Date of manufacture: The date of issue of the document attesting that the individual aircraft or engine as appropriate conforms to the requirements of the type or the date of an analogous document.

Derivative version: An aircraft gas turbine engine of the same generic family as an originally type-certificated engine and having features which retain the basic ~~core~~ engine and combustor design of the original model and for which other factors, as judged by the certificating authority, have not changed.

Note: Attention is drawn to the difference between the definition of "derived version of aircraft" in Volume I of Annex 16 and the definition of "derivative version" in this Volume.

Oxides of nitrogen: The sum of the amounts of the nitric oxide and nitrogen dioxide contained in a gas sample calculated as if the nitric oxide were in the form of nitrogen dioxide.

Reference pressure ratio: The ratio of the mean total pressure at the last compressor discharge plane of the compressor to the mean total pressure at the compressor entry plane when the engine is developing take-off thrust rating in ISA sea level static conditions.

Note: Methods of measuring reference pressure ratio are given in Appendix 1.

Smoke: The carbonaceous materials in exhaust emissions which obscure the transmission of light.

Smoke Number: The dimensionless term quantifying smoke emissions (see paragraph 3 of Appendix 2).

Take-off phase: The operating phase defined by the time during which the engine is operated at the rated output.

Rated Output: For engine emissions purposes, the maximum power/thrust available for take-off under normal operating conditions at ISA sea level static conditions without the use of water injection as approved by the certificating authority. Thrust is expressed in kilonewtons.

Taxi/ground idle: The operating phases involving taxi and idle between the initial starting of the propulsion engine(s) and the initiation of the take-off roll and between the time of runway turn-off and final shutdown of all propulsion engine(s).

Unburned Hydrocarbons: The total of hydrocarbon compounds of all classes and molecular weights contained in a gas sample, calculated as if they were in the form of methane.

Chapter 2 - Symbols

Where the following symbols are used in this Annex, they have the meanings ascribed to them below:

CO	Carbon monoxide
D_p	The mass of any gaseous pollutant emitted during the reference emissions landing and take-off cycle
F_n	Thrust in International Standard Atmosphere (ISA), sea level conditions, for the given operating mode
F_{oo}	Rated Output (see definition)
F^*_{oo}	Rated Output with after-burning applied.
HC	Unburned hydrocarbons (see definition)
NO	Nitric oxide
NO_2	Nitrogen dioxide
NO_X	Oxides of nitrogen (see definition)
SN	Smoke number (see definition)
π_{oo}	Reference pressure ratio (see definition)

PART II - VENTED FUEL

Chapter 1 - Administration

1.1 The provisions of this Part shall apply to all turbine engine powered aircraft intended for operation in international air navigation manufactured after (the date of applicability of this Standard).

1.2 Certification related to the prevention of intentional fuel venting shall be granted by the certificating authority on the basis of satisfactory evidence that either the aircraft or the aircraft engines complies with requirements of Chapter 2.

Note: The document attesting certification relating to fuel venting may take the form of a separate fuel venting certificate or a suitable statement contained in another document approved by the certificating authority.

1.3 Contracting States shall recognize as valid a certification relating to fuel venting granted by the certificating authority of another Contracting State provided the requirements under which such certification was granted are not less stringent that the provision of this Annex.

Chapter 2 - Prevention of intentional fuel venting

Aircraft shall be so designed and constructed as to prevent the intentional discharge into the atmosphere of liquid fuel from the fuel nozzle manifolds resulting from the process of engine shutdown following normal flight or ground operations.

PART III - EMISSIONS CERTIFICATION

Chapter 1 - Administration

1.1 The provisions of 1.2 to 1.4 shall apply to all engines included in the classifications defined for emission certification purposes in Chapters 2 and 3 where such engines are fitted to aircraft engaged in international air navigation.

1.2 Emissions certification shall be granted by the certificating authority on the basis of satisfactory evidence that the engine complies with requirements which are at least equal to the stringency of the provisions of this Annex. Compliance with the emissions levels of Chapters 2 and 3 shall be demonstrated using the procedure described in Appendix 6.

Note: The document attesting emissions certification may take the form of a separate emissions certificate or a suitable statement contained in another document approved by the certificating authority.

1.3 The document attesting emissions certification for each individual engine shall include at least the following information which is applicable to the engine type:

a) name of certificating authority;

b) manufacturer's type and model designation;

c) statement of any additional modifications incorporated for the purpose of compliance with the applicable emissions certification requirements;

d) rated output;

e) reference pressure ratio;

f) a statement indicating compliance with smoke number requirements.

g) a statement indicating compliance with gaseous pollutant requirements.

1.4 Contracting States shall recognize as valid emissions certification granted by the certificating authority of another Contracting State provided that the requirements under which such certification was granted are at least equal in stringency to the provisions of this Annex.

Chapter 2 - Turbojet and turbofan engines intended for propulsion only at subsonic speeds

2.1 General

2.1.1 Applicability

The provisions of this chapter shall apply to all turbo-jet and turbo-fan engines, as further specified in 2.2 and 2.3, intended for propulsion only at subsonic speeds, except when certificating authorities make exemptions for specific engine types and derivative versions of such engines for which the type certificate of the first basic type was issued or other equivalent prescribed procedure was carried out before 1 January 1965. In such cases an exemption document shall be issued by the certificating authority.

Note: In considering exemptions, certificating authorities should take into account the probable numbers of such engines that will be produced and their impact on the environment. When such an exemption is granted, the certificating authority should consider imposing a time limit on the future production of such engines for installation on new aircraft, although production of such engines as spares should be permitted indefinitely.

2.1.2 Emissions involved

The following emissions shall be controlled for certification of aircraft engines:

Smoke;
Gaseous emissions: Unburned Hydrocarbons (HC),
Carbon Monoxide (CO); and
Oxides of Nitrogen (NO_x).

2.1.3 Units of measurement

2.1.3.1 The smoke emission shall be measured and reported in terms of Smoke Number (SN).

2.1.3.2 The mass (D_p) of the gaseous pollutants HC, CO, or NO_x emitted during the reference emissions landing and take-off (LTO) cycle, defined in 2.1.4.2 and 2.1.4.3 shall be measured and reported in grams.

2.1.4 Reference conditions

2.1.4.1 Atmospheric conditions

The reference atmospheric conditions shall be ISA at sea level except that the reference absolute humidity shall be 0.00629 kg water/kg dry air.

2.1.4.2 Thrust settings

The engine shall be tested at sufficient power settings to define the gaseous and smoke emissions of the engine so that mass emission rates and smoke numbers corrected to the reference ambient conditions can be determined at the following specific percentages of rated output as agreed by the certificating authority:

Operating mode	Thrust setting
Take-off	100 percent of rated output.
Climb	85 percent of rated output.
Approach	30 percent of rated output.
Taxi/ground idle	7 percent of rated output.

2.1.4.3 Reference emissions landing and take-off (LTO) cycle

The reference emissions LTO cycle for the calculation and reporting of gaseous emissions shall be represented by the following time in each operating mode.

Phase	Time in operating mode, minutes
Take-off	0.7
Climb	2.2
Approach	4.0
Taxi/ground idle	26.0

2.1.4.4 Fuel specifications

The fuel used during tests shall meet the specifications of Appendix 4. Additives used for the purpose of smoke suppression (such as organo-metallic compounds) shall not be present.

2.1.5 Test conditions

2.1.5.1 The tests shall be made with the engine on its test bed.

2.1.5.2 The engine shall be representative of the certificated configuration (see Appendix 6); off-take bleeds and accessory loads other than those necessary for the engine's basic operation shall not be simulated.

2.1.6 When test conditions differ from the reference conditions in 2.1.4 the test results shall be corrected to the reference conditions by the methods given in Appendix 3.

2.2 Smoke

2.2.1 Applicability

The provisions of 2.2.2 shall apply to engines whose date of manufacture is on or after 1 January 1983.

2.2.2 Regulatory Smoke Number

The Smoke Number at any thrust setting when measured and computed in accordance with the procedures of Appendix 2 and converted to a characteristic level by the procedures of Appendix 6 shall not exceed the level determined from the following formula:

$$\text{Regulatory Smoke Number} = 83.6\ (F_{oo})^{-0.274}$$

or a value of 50, whichever is lower

2.3 Gaseous Emissions

2.3.1 Applicability

The provisions of 2.3.2 shall apply to engines whose rated output is greater than 26.7 kN and whose date of manufacture is on or after 1 January 1986.

2.3.2 Regulatory levels

Gaseous emission levels when measured and computed in accordance with the procedures of Appendix 3 and converted to characteristic levels by the procedures of Appendix 6 shall not exceed the regulatory levels determined from the following formulae:

Hydrocarbons (HC)	$\frac{D_p}{F_{oo}} = 19.6$
Carbon monoxide (CO)	$\frac{D_p}{F_{oo}} = 118$
Oxides of nitrogen (NO_x)	$\frac{D_p}{F_{oo}} = 40 + 2\,\pi_{oo}$

Note: The characteristic level of the smoke number or gaseous pollutant emissions is the mean of the values of all the engines tested, measured and corrected to the reference standard engine and reference ambient conditions divided by the coefficient corresponding to the number of engines tested, as shown in Appendix 6.

2.4 Information Required

Note: The information required is divided into three groups 1.) general information to identify the engine characteristics, the fuel used and the method of data analysis, 2.) the data obtained from the engine test(s) and 3.) the results derived from the test data.

2.4.1 General information

The following information shall be provided for each engine type for which emissions certification is sought:

a) engine identification;

b) rated output (in kilonewtons)

c) reference pressure ratio;

d) fuel specification reference;

e) fuel hydrogen/carbon ratio;

f) the methods of data acquisition

g) the method making corrections for ambient conditions; and

h) the method of data analysis.

2.4.2 Test information

The following information shall be provided for each engine tested for certification purposes at each of the thrust settings specified in 2.1.4.2. The information shall be provided after correction to the reference ambient conditions where applicable:

a) fuel flow (kilograms/second);
b) emission index (grams/kilogram) for each gaseous pollutant; and
c) measured Smoke Number.

2.4.3 Derived information

2.4.3.1 The following derived information shall be provided for each engine tested for certification purposes.

a) emission rate, i.e. emission index x fuel flow (grams/second) for each gaseous pollutant;
b) total gross emission of each gaseous pollutant measured over the LTO cycle (grams);
c) values of D_p/F_{oo} for each gaseous pollutant; (grams/kilonewton); and
d) maximum Smoke Number.

2.4.3.2 The characteristic smoke number and gaseous pollutant emission levels shall be provided for each engine type for which emissions certification is sought.

Note: The characteristic level of the smoke number or gaseous pollutant emissions is the mean of the values of all the engines tested, measured and corrected to the reference standard engine and reference ambient conditions, divided by the coefficent corresponding to the number of engines tested, as shown in Appendix 6.

Chapter 3 - Turbo-jet and turbo-fan engines intended for propulsion at supersonic speed

3.1 General

3.1.1 Applicability

The provisions of this Chapter shall apply to all turbo-jet and turbo-fan engines intended for propulsion at supersonic speeds whose date of manufacture is on or after (the date of applicability of these provisions).

3.1.2 Emissions involved

The following emissions shall be controlled for certification of aircraft engines:

Smoke
Gaseous emissions: Unburned Hydrocarbons (HC)
Carbon Monoxide (CO), and
Oxides of Nitrogen (NO_x)

3.1.3 Units of Measurement

3.1.3.1 The smoke emission shall be measured and reported in terms of Smoke Number (SN).

3.1.3.2 The mass (D_p) of the gaseous pollutants HC, CO, or NO_x emitted during the reference emissions landing and take-off cycle defined in 3.1.4.2 and 3.1.4.3 shall be measured and reported in grams.

3.1.4 Nomenclature

Throughout this Chapter, where the expression F^*_{oo} is used, it shall be replaced by F_{oo} for engines which do not employ afterburning. For taxi/ground idle thrust setting, F_{oo} shall be used in all cases.

3.1.5 Reference conditions

3.1.5.1 Atmospheric conditions

The reference atmospheric conditions shall be ISA at sea level except that the reference absolute humidity shall be 0.00629 kg water/ kg dry air.

3.1.5.2 Thrust settings

The engine shall be tested at sufficient power settings to define the gaseous and smoke emissions of the engine so that mass emission rates and smoke numbers corrected to the reference ambient conditions can be determined at the following specific percentages of rated output as agreed by the certificating authority.

Operating mode	Thrust settings
Take-off	100 percent F^*_{oo}
Climb	65 percent F^*_{oo}
Descent	15 percent F^*_{oo}
Approach	34 percent F^*_{oo}
Taxi/ground idle	5.8 percent F_{oo}

3.1.5.3 Reference emissions landing and take-off (LTO) cycle.

The reference emissions LTO cycle for the calculation of gaseous emissions shall be represented by the indicated times in each operating mode.

Phase	Time in operating mode, minutes
Take-off	1.2
Climb	2.0
Descent	1.2
Approach	2.3
Taxi/ground idle	26.0

3.1.5.4 Fuel specifications

The fuel used during tests shall meet the specifications of Appendix 4. Additives used for the purpose of smoke suppression (such as organo-metallic compounds) shall not be present.

3.1.6 Test conditions

3.1.6.1 The tests shall be made with the engine on its test bed.

3.1.6.2 The engine shall be representative of the certificated configuration (see Appendix 6); off-take bleeds and accessory loads other than those necessary for the engine basic operation shall not be simulated.

3.1.6.3 Measurements made for determination of emission levels at the thrusts specified in 3.1.5.2 shall be made with the afterburner operating at the level normally used, as applicable.

3.1.7 When test conditions differ from the reference conditions in 3.1.5. the test results shall be corrected to the reference conditions by the methods given in Appendix 5.

3.2 Smoke

3.2.1 Regulatory Smoke Number

The Smoke Number at any thrust setting when measured and computed in accordance with the procedures of Appendix 2 and converted to a characteristic level by the procedures of Appendix 6 shall not exceed the regulatory level determined from the following formula.

$$\text{Regulatory Smoke Number} = 83.6\,(F^*_{oo})^{-0.274}$$

or a value of 50, whichever is lower

Note: Certificating authorities may alternatively accept values determined using afterburning provided that the validity of these data is adequately demonstrated.

3.3 Gaseous Emissions

3.3.1 Regulatory levels

Gaseous emission levels when measured and computed in accordance with the procedures of Appendix 3 or Appendix 5, as applicable, and converted to characteristic levels by the procedures of Appendix 6 shall not exceed the regulatory levels determined from the following formulae:

Hydrocarbons (HC) $$\frac{D_p}{F^*_{oo}} = 140(0.92)^{\pi_{oo}}$$

Carbon monoxide (CO) $$\frac{D_p}{F^*_{oo}} = 4550(\pi_{oo})^{-1.03}$$

Oxides of nitrogen (NO_x) $$\frac{D_p}{F^*_{oo}} = 36 + 2.42\,\pi_{oo}$$

Note: The characteristic level of the smoke number or gaseous pollutant emissions is the mean of the values of all the engines tested, measured and corrected to the reference standard engine and reference ambient conditions, divided by the coefficient corresponding to the number of engines tested, as shown in Appendix 6.

3.4 Information Required

Note: The information required is divided into three groups 1.) general information to identify the engine characteristics, the fuel used and the method of data analysis, 2.) the data obtained from the engine test(s) and 3.) the results derived from the test data.

3.4.1 The following information shall be provided for each engine type for which emissions certification is sought.

a) engine identification;

b) rated output (in kilonewtons)

c) rated output with afterburning applied, if applicable (in kilonewtons)

d) reference pressure ratio;

e) fuel specification reference;

f) fuel hydrogen/carbon ratio;

g) the methods of data acquisition ;

h) the method of making corrections for ambient conditions; and

i) the method of data analysis.

3.4.2 Test information

The following information shall be provided for each engine tested for certification purposes at each of the thrust settings specified in 3.1.5.2. The information shall be provided after correction to the reference ambient conditions where applicable.

a) fuel flow (kilograms/second);

b) emission index (grams/kilogram) for each gaseous pollutant;

c) percentage of thrust contributed by afterburning; and

d) measured Smoke Number.

3.4.3 Derived information

3.4.3.1 The following derived information shall be provided for each engine tested for certification purposes:

a) emission rate, i.e. emission index x fuel flow (grams/second), for each pollutant;

b) total gross emission of each gaseous pollutant measured over the LTO cycle (grams);

c) values of D_p/F_{oo} for each gaseous pollutant (grams/kilonewton); and

d) maximum Smoke Number.

3.4.3.2 The characteristic Smoke Number and gaseous pollutant emission levels shall be provided for each engine type for which emissions certification is sought.

Note: The characteristic level of the smoke number or gaseous pollutant emissions is the mean of the values of all the engines tested, measured, and corrected to the reference standard engine and reference ambient conditions, divided by the coefficient corresponding to the number of engines tested, as shown in Appendix 6.

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APPENDIX "C"

POLLUTION CLAUSES IN THE DRAFT CONVENTION ON THE LAW OF THE SEA (INFORMAL TEXT) RESUMED NINTH SESSION, GENEVA, JULY 28, 1980. AUG. 29, 1980.

PART XII. PROTECTION AND PRESERVATION OF THE MARINE ENVIRONMENT

SECTION 1. GENERAL PROVISIONS

Article 192
General obligation

States have the obligation to protect and preserve the marine environment.

Article 193
Sovereign right of States to exploit their natural resources

States have the sovereign right to exploit their natural resources pursuant to their environmental policies and in accordance with their duty to protect and preserve the marine environment.

Article 194
Measures to prevent, reduce and control pollution of the marine environment

1. States shall take all necessary measures consistent with this Convention to prevent, reduce and control pollution of the marine environment from any source using for this purpose the best practicable means at their disposal and in accordance with their capabilities, individually or jointly as appropriate, and they shall endeavour to harmonize their policies in this connexion.

2. States shall take all necessary measures to ensure that activities under their jurisdiction or control are so conducted that they do not cause damage by pollution to other States and their environment, and that pollution arising from incidents or activities under their jurisdiction or control does not spread beyond the areas where they exercise sovereign rights in accordance with this Convention.

3. The measures taken pursuant to this Part shall deal with all sources of pollution of the marine environment. These measures shall include, inter alia, those designed to minimize to the fullest possible extent:

(a) Release of toxic, harmful and noxious substances, especially those which are persistent:

(i) from land-based sources;

(ii) from or through the atmosphere;

(iii) by dumping.

(b) Pollution from vessels, in particular for preventing accidents and dealing with emergencies, ensuring the safety of operations at sea, preventing intentional and unintentional discharges, and regulating the design, construction, equipment, operation and manning of vessels;

(c) Pollution from installations and devices used in exploration or exploitation of the natural resources of the sea-bed and subsoil, in particular for preventing accidents and dealing with emergencies, ensuring the safety of operations at sea, and regulating the design, construction, equipment, [illegible]

(d) Pollution from other installations and devices operating in the marine environment, in particular for preventing accidents and dealing with emergencies, ensuring the safety of operations at sea, and regulating the design, construction, equipment, operation and manning of such installations or devices.

4. In taking measures to prevent, reduce or control pollution of the marine environment, States shall refrain from unjustifiable interference with activities in pursuance of the rights and duties of other States exercised in conformity with this Convention.

5. The measures taken in accordance with this Part shall include those necessary to protect and preserve rare or fragile ecosystems as well as the habitat of depleted, threatened or endangered species and other marine life.

Article 195
Duty not to transfer damage or hazards or transform one type of pollution into another

In taking measures to prevent, reduce and control pollution of the marine environment, States shall so act as not to transfer, directly or indirectly, damage or hazards from one area to another or transform one type of pollution into another.

Article 196
Use of technologies or introduction of alien or new species

1. States shall take all necessary measures to prevent, reduce and control pollution of the marine environment resulting from the use of technologies under their jurisdiction or control, or the intentional or accidental introduction of species, alien or new, to a particular part of the marine environment, which may cause significant and harmful changes thereto.

2. This article shall not affect the application of this Convention regarding the prevention, reduction and control of pollution of the marine environment.

SECTION 2. GLOBAL AND REGIONAL CO-OPERATION

Article 197
Co-operation on a global or regional basis

States shall co-operate on a global basis and, as appropriate, on a regional basis, directly or through competent international organizations, global or regional, in formulating and elaborating international rules, standards and recommended practices and procedures consistent with this Convention, for the protection and preservation of the marine environment, taking into account characteristic regional features.

Article 198
Notification of imminent or actual damage

A State which becomes aware of cases in which the marine environment is in imminent danger of being damaged or has been damaged by pollution shall immediately notify other States it deems likely to be affected by such damage, as well as the competent international organizations, global or regional.

Article 199
Contingency plans against pollution

In the case referred to in article 198 States in the area affected, in accordance with their capabilities, and the competent international organizations, global or regional, shall co-operate, to the extent possible, in eliminating the effects of pollution and preventing or minimizing the damage. Towards that end, States shall jointly promote and develop contingency plans for responding to pollution incidents in the marine environment.

Article 200
Promotion of studies, research programmes and exchange of information and data

States shall co-operate directly or through competent international organizations, global or regional, for the purpose of promoting studies, undertaking programmes of scientific research and encouraging the exchange of information and data acquired about pollution of the marine environment. They shall endeavour to participate actively in regional and international programmes to acquire knowledge for the assessment of the nature and extent of pollution and the pathways and risks of, exposures to and the remedies for pollution.

Article 201
Scientific criteria and regulations

In the light of the information and data acquired pursuant to article 200 States shall co-operate directly or through competent international organizations, global or regional, in establishing appropriate scientific criteria for the formulation and elaboration of rules, standards and recommended practices and procedures for the prevention of pollution of the marine environment.

SECTION 3. TECHNICAL ASSISTANCE

Article 202
Scientific and technical assistance to developing States

States shall directly or through competent international or regional organizations, global or regional:

(a) Promote programmes of scientific, educational, technical and other assistance to developing States for the protection and preservation of the marine environment and the prevention, reduction and control of marine pollution. Such assistance shall include, inter alia:

(i) Training of their scientific and technical personnel;

(ii) Facilitating their participation in relevant international programmes;

(iii) Supplying necessary equipment and facilities;

(iv) Enhancing the capacity of developing States to manufacture such equipment;

(v) Developing facilities for and advice on research, monitoring, educational and other programmes;

(b) Provide appropriate assistance, especially to developing States, for the minimization of the effects of major incidents which may cause serious pollution in the marine environment;

(c) Provide appropriate assistance, in particular to developing States, concerning the preparation of environmental assessments.

Article 203
Preferential treatment for developing States

Developing States shall, for purposes of the prevention of pollution of the marine environment or the minimization of its effects, be granted preference in:

(a) The allocation of appropriate funds and technical assistance facilities of international organizations, and

(b) The utilization of their specialized services.

SECTION 4. MONITORING AND ENVIRONMENTAL ASSESSMENT

Article 204
Monitoring of the risks or effects of pollution

1. States shall, consistent with the rights of other States, endeavour, as far as practicable, individually or collectively through the competent international organizations, global or regional, to observe, measure, evaluate and analyse, by recognized methods, the risks or effects of pollution of the marine environment.

2. In particular, States shall keep under surveillance the effect of any activities which they permit or in which they engage to determine whether these activities are likely to pollute the marine environment.

Article 205
Publication of reports

States shall publish reports of the results obtained relating to risks or effects of pollution of the marine environment, or provide at appropriate intervals such reports to the competent international or regional organizations, which should make them available to all States.

Article 206
Assessment of potential effects of activities

When States have reasonable grounds for expecting that planned activities under their jurisdiction or control may cause substantial pollution of, or significant and harmful changes to, the marine environment, they shall, as far as practicable, assess the potential effects of such activities on the marine environment and shall communicate reports of the results of such assessments in the manner provided in article 205.

SECTION 5. INTERNATIONAL RULES AND NATIONAL LEGISLATION TO PREVENT, REDUCE AND CONTROL POLLUTION OF THE MARINE ENVIRONMENT

Article 207
Pollution from land-based sources

1. States shall establish national laws and regulations to prevent, reduce and control pollution of the marine environment from land-based sources including rivers, estuaries, pipelines and outfall structures, taking into account internationally agreed rules, standards and recommended practices and procedures.

2. States shall also take other measures as may be necessary to prevent, reduce and control pollution of the marine environment from land-based sources.

3. States shall endeavour to harmonize their national policies at the appropriate regional level.

4. States, acting in particular through competent international organizations or diplomatic conference, shall endeavour to establish global and regional rules, standards and recommended practices and procedures to prevent, reduce and control pollution of the marine environment from land-based sources, taking into account characteristic regional features, the economic capacity of developing States and their need for economic development. Such rules, standards and recommended practices and procedures shall be re-examined from time to time as necessary.

5. Laws, regulations, measures, rules, standards and recommended practices and procedures referred to in paragraphs 1, 2 and 4 respectively shall include those designed to minimize, to the fullest possible extent, the release of toxic, harmful and noxious substances, especially persistent substances, into the marine environment.

Article 208
Pollution from sea-bed activities

1. Coastal States shall establish national laws and regulations to prevent, reduce and control pollution of the marine environment arising from or in connexion with sea-bed activities subject to their jurisdiction and from artificial islands, installations and structures under their jurisdiction, pursuant to articles 60 and 80.

2. States shall also take other measures as may be necessary to prevent, reduce and control such pollution.

3. Such laws, regulations and measures shall be no less effective than international rules, standards and recommended practices and procedures.

4. States shall endeavour to harmonize their national policies at the appropriate regional level.

5. States, acting in particular through competent international organizations or diplomatic conference, shall establish global and regional rules, standards and recommended practices and procedures to prevent, reduce and control pollution of the marine environment arising from or in connexion with sea-bed activities subject to their jurisdiction and from artificial islands, installations and structures under their jurisdiction referred to in paragraph 1. Such rules, standards and recommended practices and procedures shall be re-examined from time to time as necessary.

Article 209
Pollution from activities in the Area

1. International rules, standards and recommended practices and procedures shall be established in accordance with the provisions of Part XI to prevent, reduce and control pollution of the marine environment from activities relating to the exploration and exploitation of the Area. Such rules, standards and recommended practices and procedures shall be re-examined from time to time as necessary.

2. Subject to other relevant provisions of this section, States shall establish national laws and regulations to prevent, reduce and control pollution of the marine environment from activities relating to the exploration and exploitation of the Area undertaken by vessels, installations, structures and other devices flying their flag or of their registry. The requirements of such laws and regulations shall be no less effective than the international rules, standards and procedures referred to in paragraph 1.

Article 210
Dumping

1. States shall establish national laws and regulations to prevent, reduce and control pollution of the marine environment from dumping.

2. States shall also take other measures as may be necessary to prevent, reduce and control such pollution.

3. Such laws, regulations and measures shall ensure that dumping is not carried out without the permission of the competent authorities of States.

4. States, acting in particular through competent international organizations or diplomatic conference, shall endeavour to establish global and regional rules, standards and recommended practices and procedures to prevent, reduce and control pollution of the marine environment by dumping. Such rules, standards and recommended practices and procedures shall be re-examined from time to time as necessary.

5. Dumping within the territorial sea and the exclusive economic zone or onto the continental shelf shall not be carried out without the express prior approval of the coastal State, which has the right to permit, regulate and control such dumping after due consideration of the matter with other States which by reason of their geographical situation may be adversely affected thereby.

6. National laws, regulations and measures shall be no less effective in preventing, reducing and controlling pollution from dumping than global rules and standards.

Article 211
Pollution from vessels

1. States, acting through the competent international organization or general diplomatic conference, shall establish international rules and standards for the prevention, reduction and control of pollution of the marine environment from vessels and promote the adoption, in the same manner, wherever appropriate, of routing systems designed to minimize the threat of accidents which might cause pollution of the marine environment, including the coastline and related interests of coastal States. Such rules and standards shall, in the same manner, be re-examined from time to time as necessary.

2. States shall establish laws and regulations for the prevention, reduction and control of pollution of the marine environment from vessels flying their flag or vessels of their registry. Such laws and regulations shall at least have the same effect as that of generally accepted international rules and standards established through the competent international organization or general diplomatic conference.

3. States which establish particular requirements for the prevention, reduction and control of pollution of the marine environment as a condition for the entry of foreign vessels into their ports or internal waters or a call at their off-shore terminals shall give due publicity to such requirements and shall communicate them to the competent international organization. Whenever such requirements are established in identical form by two or more coastal States in an endeavour to harmonize policy, the communication shall indicate which States are participating in such co-operative arrangements. Every State shall require the master of a vessel flying its flag or of its registry, when navigating within the territorial sea of a State participating in such co-operative arrangements to furnish, upon the request of that State, information as to whether it is proceeding to a State of the same region participating in such co-operative arrangements and, if so, to indicate whether it complies with the port entry requirements of that State. The provisions of this article shall be without prejudice to the continued exercise by a vessel of its right of innocent passage or to the application of article 25, paragraph 2.

4. Coastal States may, in the exercise of their sovereignty within their territorial sea, establish national laws and regulations for the prevention, reduction and control of marine pollution from vessels, including vessels exercising the right of innocent passage. Such laws and regulations shall, in accordance with section 3 of Part II not hamper innocent passage of foreign vessels.

5. Coastal States, for the purpose of enforcement as provided for in section 6 may in respect of their exclusive economic zones establish laws and regulations for the prevention, reduction and control of pollution from vessels conforming to and giving effect to generally accepted international rules and standards established through the competent international organizations or general diplomatic conference.

6. Where international rules and standards referred to in paragraph 1 are inadequate to meet special circumstances and where coastal States have reasonable grounds for believing that a particular, clearly defined area of their respective exclusive economic zones is an area where, for recognized technical reasons in relation to its oceanographical and ecological conditions, as well as its utilization or the protection of its resources, and the particular character of its traffic, the adoption of special mandatory methods for the prevention of pollution from vessels is required, coastal States, after appropriate consultations through the competent international organization with any other countries concerned, may for that area, direct a communication to the competent international organization, submitting

scientific and technical evidence in support, and information on necessary reception facilities. The organization shall, within twelve months after receiving such a communication, determine whether the conditions in that area correspond to the requirements set out above. If the organization so determines, the coastal State may, for that area, establish laws and regulations for the prevention, reduction and control of pollution from vessels, implementing such international rules and standards or navigational practices as are made applicable through the competent international organization for special areas. Coastal States shall publish the limits of any such particular, clearly defined area, and laws and regulations applicable therein shall not become applicable in relation to foreign vessels until fifteen months after the submission of the communication to the competent international organization. Coastal States, when submitting the communication for the establishment of a special area within their respective exclusive economic zones, shall at the same time, notify the competent international organization if it is their intention to establish additional laws and regulations for that special area for the prevention, reduction and control of pollution from vessels. Such additional laws and regulations may relate to discharges or navigational practices but shall not require foreign vessels to observe design, construction, manning or equipment standards other than generally accepted international rules and standards and shall become applicable in relation to foreign vessels 15 months after the submission of the communication to the competent international organization, and provided the organization agrees within twelve months after submission of the communication.

7. The international rules and standards referred to in this article should include inter alia those related to prompt notification to coastal States, whose coastlines or related interests may be affected by incidents including maritime casualties which involves discharges or probability of discharges.

Article 212
Pollution from or through the atmosphere

1. States shall, within air space under their sovereignty or with regard to vessels or aircraft flying their flag or of their registry, establish national laws and regulations to prevent, reduce and control pollution of the marine environment from or through the atmosphere, taking into account internationally agreed rules, standards and recommended practices and procedures, and the safety of air navigation.

2. States shall also take other measures as may be necessary to prevent, reduce and control such pollution.

3. States, acting in particular through competent international organizations or diplomatic conference shall endeavour to establish global and regional rules, standards and recommended practices and procedures to prevent, reduce and control pollution of the marine environment from or through the atmosphere.

SECTION 6. ENFORCEMENT

Article 213
Enforcement with respect to land-based sources of pollution

States shall enforce their laws and regulations established in accordance with article 207 and shall adopt the necessary legislative, administrative and other measures to implement applicable international rules and standards established through competent international organizations or diplomatic conference for the protection and preservation of the marine environment from land-based sources of marine pollution.

Article 214
Enforcement with respect to pollution from sea-bed activities

States shall enforce their laws and regulations established in accordance with article 208 and shall adopt the necessary legislative, administrative and other measures to implement applicable international rules and standards established through competent international organizations or diplomatic conference for the protection and preservation of the marine environment from pollution arising from sea-bed activities subject to their jurisdiction and from artificial islands, installations and structures under their jurisdiction, pursuant to articles 60 and 80.

Article 215
Enforcement with respect to pollution from activities in the Area

Enforcement of international rules, standards and recommended practices and procedures established to prevent, reduce and control pollution of the marine environment from activities concerning exploration and exploitation of the Area pursuant to Part XI shall be governed by the provisions of that Part.

Article 216
Enforcement with respect to dumping

1. Laws and regulations adopted in accordance with this Convention and applicable international rules and standards established through competent international organizations or diplomatic conference for the prevention, reduction and control of pollution of the marine environment from dumping shall be enforced:

(a) by the coastal State with regard to dumping within its territorial sea or its exclusive economic zone or onto its continental shelf;

(b) by the flag State with regard to vessels and aircraft registered in its territory or flying its flag;

(c) by any State with regard to acts of loading of wastes or other matter occurring within its territory or at its off-shore terminals.

2. This article shall not impose on any State an obligation to institute proceedings when such proceedings have already been commenced by another State in accordance with this article.

Article 217
Enforcement by flag States

1. States shall ensure compliance with applicable international rules and standards established through the competent international organization or general diplomatic conference and with their laws and regulations established in accordance with this Convention for the prevention, reduction and control of pollution of the marine environment, by vessels flying their flag or vessels of their registry and shall adopt the necessary legislative, administrative and other measures for their implementation. Flag States shall provide for the effective enforcement of such rules, standards, laws and regulations, irrespective of where the violation occurred.

2. Flag States shall, in particular, establish appropriate measures in order to ensure that vessels flying their flags or vessels of their registry are prohibited from sailing, until they can proceed to sea in compliance with the requirements of international rules and standards referred to in paragraph 1 for the prevention, reduction and control of pollution from vessels, including the requirements in respect of design, construction, equipment and manning of vessels.

3. States shall ensure that vessels flying their flags or of their registry carry on board certificates required by and issued pursuant to international rules and standards referred to in paragraph 1. Flag States shall ensure that their vessels are periodically inspected in order to verify that such certificates are in conformity with the actual condition of the vessels. These certificates shall be accepted by other States as evidence of the condition of the vessel and regarded as having the same force as certificates issued by them, unless there are clear grounds for believing that the condition of the vessel does not correspond substantially with the particulars of the certificates.

4. If a vessel commits a violation of rules and standards established through the competent international organization or general diplomatic conference, the flag State, without prejudice to articles 218, 220 and 228 shall provide for immediate investigation and where appropriate cause proceedings to be taken in respect of the alleged violation irrespective of where the violation occurred or where the pollution caused by such violation has occurred or has been spotted.

5. Flag States may seek in conducting investigation of the violation the assistance of any other State whose co-operation could be useful in clarifying the circumstances of the case. States shall endeavour to meet the appropriate request of flag States.

6. Flag States shall, at the written request of any State, investigate any violation alleged to have been committed by their vessels. If satisfied that sufficient evidence is available to enable proceedings to be brought in respect of the alleged violation, flag States shall without delay cause such proceedings to be taken in accordance with their laws.

7. Flag States shall promptly inform the requesting State and the competent international organization of the action taken and its outcome. Such information shall be available to all States.

8. Penalties specified under the legislation of flag States for their own vessels shall be adequate in severity to discourage violations wherever the violations occur.

Article 218
Enforcement by port States

1. When a vessel is voluntarily within a port or at an off-shore terminal of a State, that State may undertake investigations and, where warranted by the evidence of the case, cause proceedings to be taken in respect of any discharge from that vessel in violation of applicable international rules and standards established through the competent international organization or general diplomatic conference, outside the internal waters, territorial sea, or exclusive economic zone of that State.

2. No proceedings pursuant to paragraph 1 shall be taken in respect of a discharge violation in the internal waters, the territorial sea or exclusive economic zone of another State unless requested by that State, the flag State, or the State damaged or threatened by a discharge violation, or unless the violation has caused or is likely to cause pollution in the internal waters, territorial sea or exclusive economic zone of the State instituting the proceedings.

3. A State, whenever a vessel is voluntarily within one of its ports, or off-shore terminals, shall, as far as practicable, comply with requests from any State for investigation of discharge violations of international rules and standards referred to in paragraph 1, believed to have occurred in, caused, or threaten damage to the internal waters, territorial sea or exclusive economic zone of the State making such a request, and likewise, shall, as far as practicable comply with requests from the flag State for investigation of such violations, irrespective of where the violations occurred.

4. The records of the investigation carried out by a port State pursuant to the provisions of this article shall be transferred to the flag State or to the coastal State at their request. Any proceedings initiated by the port State on the basis of such an investigation, subject to the provisions of section 7 may be suspended at the request of a coastal State, when the violation has occurred within the internal waters, territorial sea or exclusive economic zone of that State and the evidence and records of the case and any bond posted with the authorities of the port State shall be transferred to the coastal State. Such transfer shall preclude the continuation of proceedings in the port State.

Article 219
Measures relating to seaworthiness of vessels to avoid pollution

Subject to the provisions of section 7 States which have ascertained, upon request or on their own initiative, that a vessel within their ports or at their off-shore terminals is in violation of applicable international rules and standards relating to seaworthiness and thereby threatens damage to the marine environment shall, as far as practicable, take administrative measures to prevent the vessel from sailing. Such States may permit the vessel to proceed only to the nearest appropriate repair yard and upon rectification of the causes of the violation, shall permit the vessel to continue immediately.

Article 220
Enforcement by coastal States

1. When a vessel is voluntarily within a port or at an off-shore terminal of a State, that State may, subject to the provisions of section 7 cause proceedings to be taken in respect of any violation of national laws and regulations established in accordance with this Convention or applicable international rules and standards for the prevention, reduction and control of pollution from vessels when the violation has occurred within the territorial sea or the exclusive economic zone of that State.

2. Where there are clear grounds for believing that a vessel navigating in the territorial sea of a State has, during its passage therein, violated national laws and regulations established in accordance with this Convention or applicable international rules and standards for the prevention, reduction and control of pollution from vessels, that State, without prejudice to the application of the relevant provisions of section 3 of Part II, may undertake physical inspection of the vessel relating to the violation and may, when warranted by the evidence of the case, cause proceedings, including detention of the vessel, to be taken in accordance with its laws, subject to the provisions of section 7.

3. Where there are clear grounds for believing that a vessel navigating in the exclusive economic zone or the territorial sea of a State has, in the exclusive economic zone, violated applicable international rules and standards or national laws and regulations conforming and giving effect to such international rules and standards for the prevention, reduction and control of pollution from vessels, that State may require the vessel to give information regarding the identification of the vessel and its port of registry, its last and next port of call and other relevant information required to establish whether a violation has occurred.

4. Flag States shall take legislative, administrative and other measures so that their vessels comply with requests for information as set forth in paragraph 3.

5. Where there are clear grounds for believing that a vessel navigating in the exclusive economic zone or the territorial sea of a State has, in the exclusive economic zone, violated applicable international rules and standards or national laws and regulations conforming and giving effect to such international rules and standards for the prevention, reduction and control of pollution from vessels and the violation has resulted in a substantial discharge causing or threatening significant pollution of the marine environment, that State may undertake physical inspection of the vessel for matters relating to the violation if the vessel has refused to give information or if the information supplied by the vessel is manifestly at variance with the evident factual situation and if the circumstances of the case justify such inspection.

6. Where there is clear objective evidence that a vessel navigating in the exclusive economic zone or the territorial sea of a State has, in the exclusive economic zone, committed a violation of applicable international rules and standards or national laws and regulations conforming and giving effect to such international rules and standards for the prevention, reduction and control of pollution from vessels, resulting in discharge causing major damage or threat of major damage to the coastline or related interests of the coastal State, or to any resources of its territorial sea or exclusive economic zone, that State may, subject to the provisions of section 7, provided that the evidence so warrants, cause proceedings, including detention of the vessel, to be taken in accordance with its laws.

7. Notwithstanding the provisions of paragraph 6, whenever appropriate procedures have been established either through the competent international organization or as otherwise agreed, whereby compliance with requirements for bonding or other appropriate financial security has been assured, the coastal State if bound by such procedures shall allow the vessel to proceed.

8. The provisions of paragraphs 3, 4, 5, 6 and 7 shall apply correspondingly in respect of national laws and regulations established pursuant to article 211, paragraph 6.

Article 221
Measures relating to maritime casualties to avoid pollution

1. Nothing in this Part shall prejudice the right of States, pursuant to international law, both customary and conventional, to adopt and enforce measures beyond the territorial sea proportionate to the actual or threatened damage to protect their coastline and related interests, including fishing, from pollution or threat of pollution following upon a maritime casualty or acts relating to such a casualty, which may reasonably be expected to result in major harmful consequences.

2. For purposes of this article, "maritime casualty" means a collision of ships, stranding or other incident of navigation, or other occurrence on board a ship or external to it resulting in material damage or imminent threat of material damage to a ship or cargo.

Article 222
Enforcement with respect to pollution from or through the atmosphere

States shall, within air space under their sovereignty or with regard to vessels or aircraft flying their flag or of their registry, enforce their laws and regulations established in accordance with the provisions of this Convention and shall adopt the necessary legislative, administrative and other measures to implement applicable international rules and standards established through competent international organizations or diplomatic conference to prevent, reduce and control pollution of the marine environment from and through the atmosphere, in conformity with all relevant international rules and standards concerning the safety of air navigation.

SECTION 7. SAFEGUARDS

Article 223
Measures to facilitate proceedings

In proceedings pursuant to this Part, States shall take measures to facilitate the hearing of witnesses and the admission of evidence submitted by authorities of another State, or by the competent international organization and shall facilitate the attendance at such proceedings of official representatives of the competent international organization or of the flag State, or of any State affected by pollution arising out of any violation. The official representatives attending such proceedings shall enjoy such rights and duties as may be provided under national legislation or applicable international law.

Article 224
Exercise of powers of enforcement

The powers of enforcement against foreign vessels under this Part may only be exercised by officials or by warships or military aircraft or other ships or aircraft clearly marked and identifiable as being on government service and authorized to that effect.

Article 225
Duty to avoid adverse consequences in the exercise of the powers of enforcement

In the exercise of their powers of enforcement against foreign vessels under this Convention, States shall not endanger the safety of navigation or otherwise cause any hazard to a vessel, or bring it to an unsafe port or anchorage, or cause an unreasonable risk to the marine environment.

Article 226
Investigation of foreign vessels

1. States shall not delay a foreign vessel longer than is essential for purposes of investigation provided for in articles 216, 218 and 220. Any physical inspection of a foreign vessel shall be limited to an examination of such certificates, records or other documents as the vessel is required to carry by generally accepted international rules and standards or of any similar documents which it is carrying. Following such an examination, an inspection of the vessel may be undertaken only when there are clear grounds for believing that the condition of the vessel or its equipment does not correspond substantially with the particulars of those documents or when the contents of such documents are not sufficient to confirm or verify a suspected violation or when the vessel is not carrying valid certificates and records. If the investigation indicates a violation of applicable laws and regulations or international rules and standards for the preservation of the marine environment release shall be made promptly subject to reasonable procedures such as bonding or other appropriate financial security. Without prejudice to applicable international rules and standards relating to the seaworthiness of ships, the release of a vessel may, whenever it would present an unreasonable threat of damage to the marine environment, be refused or made conditional upon proceeding to the nearest appropriate repair yard. In situations where release has been refused or made conditional, the flag State of the vessel must be promptly notified, and may seek release of the vessel in accordance with the provisions of Part XV.

2. States shall co-operate to develop procedures for the avoidance of unnecessary physical inspection of vessels at sea.

Article 227
Non-discrimination of foreign vessels

In exercising their rights and carrying out their duties under this Part, States shall not discriminate in form or in fact against vessels of any other State.

Article 228
Suspension and restrictions on institution of proceedings

1. Proceedings to impose penalties in respect of any violation of applicable laws and regulations or international rules and standards relating to the prevention, reduction and control of pollution from vessels committed by a foreign vessel beyond the territorial sea of the State instituting proceedings shall be suspended upon the taking of proceedings to impose penalties under corresponding charges by the flag State within six months of the first institution of proceedings, unless those proceedings relate to a case of major damage to the coastal State or the flag State in question has repeatedly disregarded its obligations to enforce effectively the applicable international rules and standards in respect of violations committed by its vessels. The flag State shall in due course make available to the first State instituting proceedings a full dossier of the case and the records of the proceedings, whenever the flag State has requested the suspension of proceedings in accordance with the provisions of this article. When proceedings by the flag State have been brought to a conclusion, the suspended proceedings shall be firmly terminated. Upon payment of costs incurred in respect of such proceedings, any bond posted or other financial security provided in connexion with the suspended proceedings shall be released by the coastal State.

2. Proceedings to impose penalties on foreign vessels shall not be instituted after the expiry of a period of three years from the date on which the violation was committed, and shall not be taken by any State in the event of proceedings having been instituted by another State subject to the provisions set out in paragraph 1.

3. The provisions of this article shall be without prejudice to the right of the flag State to adopt any measures, including the taking of proceedings to impose penalties, according to its laws irrespective of prior proceedings by another State.

Article 229
Institution of civil proceedings

Nothing in this Convention shall affect the institution of civil proceedings in respect of any claim for loss or damage resulting from pollution of the marine environment.

Article 230
Monetary penalties and the observance of recognized rights of the accused

1. Only monetary penalties may be imposed with respect to violations of national laws and regulations or applicable international rules and standards, for the prevention, reduction and control of pollution of the marine environment from vessels committed by foreign vessels beyond the territorial sea.

2. Only monetary penalties may be imposed with respect to violations of national laws and regulations or applicable international rules and standards for the prevention, reduction and control of pollution of the marine environment from vessels committed by foreign vessels in the territorial sea, except in the case of a wilful and serious act of pollution in the territorial sea.

3. In the conduct of proceedings to impose penalties in respect of such violations committed by a foreign vessel, recognized rights of the accused shall be observed.

Article 231
Notification to flag States and other States concerned

States shall promptly notify the flag State and any other State concerned of any measures taken pursuant to section 6 against foreign vessels, and shall submit to the flag State all official reports concerning such measures. However, with respect to violations committed in the territorial sea, the foregoing obligations of the coastal State shall apply only to such measures as are taken in proceedings. The consular officers or diplomatic agents, and where possible the maritime authority of the flag State, shall be immediately informed of any such measures.

Article 232
Liability of States arising from enforcement measures

States shall be liable for damage or loss attributable to them arising from measures taken pursuant to section 6 when such measures were unlawful or exceeded those reasonably required in the light of available information. States shall provide for recourse in their courts for actions in respect of such damage or loss.

Article 233
Safeguards with respect to straits used for international navigation

Nothing in sections 5, 6 and 7 shall affect the legal régime of straits used for international navigation. However, if a foreign ship other than those referred to in section 10 has committed a violation of the laws and regulations referred to in article 42, paragraphs 1 (a) and (b), causing or threatening major damage to the marine environment of the straits, the States bordering the straits may take appropriate enforcement measures and if so shall respect mutatis mutandis the provisions of this section.

SECTION 8. ICE-COVERED AREAS

Article 234
Ice-covered areas

Coastal States have the right to establish and enforce non-discriminatory laws and regulations for the prevention, reduction and control of marine pollution from vessels in ice-covered areas within the limits of the exclusive economic zone, where particularly severe climatic conditions and the presence of ice covering such areas for most of the year create obstructions or exceptional hazards to navigation, and pollution of the marine environment could cause major harm to or irreversible disturbance of the ecological balance. Such laws and regulations shall have due regard to navigation and the protection of the marine environment based on the best available scientific evidence.

SECTION 9. RESPONSIBILITY AND LIABILITY

Article 235
Responsibility and liability

1. States are responsible for the fulfilment of their international obligations concerning the protection and preservation of the marine environment. They shall be liable in accordance with international law. (deletion)

2. States shall ensure that recourse is available in accordance with their legal systems for prompt and adequate compensation or other relief in respect of damage caused by pollution of the marine environment by natural or juridical persons under their jurisdiction.

3. With the objective of assuring prompt and adequate compensation in respect of all damage caused by pollution of the marine environment, States shall co-operate in the implementation of existing international law and the further development of international law relating to responsibility and liability for the assessment of and compensation for damage and the settlement of related disputes, as well as, where appropriate, development of criteria and procedures for payment of adequate compensation such as compulsory insurance or compensation funds.

SECTION 10. SOVEREIGN IMMUNITY

Article 236
Sovereign immunity

The provisions of this Convention regarding pollution of the marine environment shall not apply to any warship, naval auxiliary, other vessels or aircraft owned or operated by a State and used, for the time being, only on government non-commercial service. However, each State shall ensure by the adoption of appropriate measures not impairing operations or operational capabilities of such vessels or aircraft owned or operated by it, that such vessels or aircraft act in a manner consistent, so far as is reasonable and practicable, with this Convention.

SECTION 11. OBLIGATIONS UNDER OTHER CONVENTIONS ON THE PROTECTION AND PRESERVATION OF THE MARINE ENVIRONMENT

Article 237
Obligations under other conventions on the protection and preservation of the marine environment

1. The provisions of this Part shall be without prejudice to the specific obligations assumed by States under special conventions and agreements concluded previously which relate to the protection and preservation of the marine environment and to agreements which may be concluded in furtherance of the general principles set forth in this Convention.

2. Specific obligations assumed by States under special conventions, with respect to the protection and preservation of the marine environment, should be applied in a manner consistent with the general principles and objectives of this Convention.

APPENDIX "D"

ACTIVITIES ON POLLUTION CONTROL BY INTERNATIONAL ORGANIZATIONS

1. Interdisciplinary or Comprehensive Approach

Organization	Type and Nature of Work
United Nations	UN Conference on the Human Enviroment, Stockholm, 1972. Comprehensive consideration of international environmental problems, both physical and social.
Economic Commission for Europe	Governmental conference on the environment and its influence on society, Prague, 1971. (See also below.)
United Nations Educational, Scientific and Cultural Organization	Follow-up to 1968 UNESCO Conference on the Rational Use and Conservation of the Resources of the Biosphere. Establishment of operational program based on conference resolutions. 1970 Helsinki Interdisciplinary Symposium on Man's Role in Changing his Environment. (See also below.)
Organisation for Economic Co-operation and Development	On the recommendation of the Ad Hoc Preparatory Committee on the Environment the OECD has established an Environment Committee which will direct the activities of the Sector Groups on Air Management, Unintended Occurrence of Chemicals in the Environment, Water Management, and Urban Environment.
Council of Europe	European Committee for the Conservation of Nature and Natural Resources has produced recommendations and declarations in many fields (see below). Its future work program following the European Conservation Conference of February 1970 is now under consideration.

[1] Based on material included in a working paper kindly made available by the United Kingdom Foreign and Commonwealth Office.

Organization	Type and Nature of Work
World Meteorological Organization	Weather and climate analysis, including hydrometeorology. Interpretation of meteorological effects on man's activities, such as transport, agriculture, industry, living conditions, etc. Prediction of future weather.
Science and Technological Research Committee of the European Community (Aigrain Group)	Nuisances constitute one of seven selected areas for multilateral research projects.
North Atlantic Treaty Organization	The Committee on the Challenges of Modern Society has commissioned national pilot projects on the physical and social environment with a view to stimulating national or international action in the appropriate body. They are at present: disaster relief, road safety, air pollution, open waters pollution, inland waters pollution, job satisfaction and productivity (United Kingdom pilot), transmission of scientific knowledge into the decisionmaking process, environment, and the strategy of regional development (United Kingdom co-pilot).
International Council of Scientific Unions	In 1969 the Special Committee on Problems of the Environment (SCOPE) was established with a view to identifying and indicating the research effort necessary for solving environmental problems of an international nature.
International Union for the Conservation of Nature and Natural Resources	Conservation of rare species and natural habitats.
Commonwealth Human Ecology Council	Promotion of integrated national case studies of environmental problems.
2. Air Pollution	
Organisation for Economic	Study groups on harmonization of

Organization	Type and Nature of Work
Co-operation and Development (Committee for Research Co-operation: Air Management Research Group)	national research policies and programs on monitoring, measuring, and control of air pollution from industrial or domestic sources, biological and physical effects, etc.
Council of Europe (Committee of Experts on Air Pollution)	Drafting of principles, recommendations, etc. for governments, comparison and harmonization of national legislation on air pollution from industrial and domestic sources.
Economic Commission for Europe (Working Party on Air Pollution Problems, Coal, Gas, Steel, and Inland Transport committees)	Studies of air pollution and control: economic effects and policy, motor vehicle pollution, drawing up of standards and regulations for vehicle construction.
North Atlantic Treaty Organization (Committee on the Challenges of Modern Society)	Pilot study by United States and Turkey on air pollution with view to joint discussion and recommendations to governments.
World Meteorological Organization (Commission for Atmospheric Sciences, Climatology, and Agricultural Meteorology; Executive Committee Panel on Meteorological Aspects of Air Pollution)	Studies on atmospheric pollution, its transfer, dispersion, and deposition: effects of air pollution on vegetation and climate, incidence and intensity of airborne pests and diseases. Prediction of pollution levels and the effect of control measures.
World Health Organization (Expert Committee on Urban Air Control)	Study of health and welfare aspects of air pollution including vehicle pollution, methods of measurement. Reference and training centers, publications.
International Labor Organization	Study of control of atmospheric pollution of working environment.
3. Freshwater Pollution	
Organisation for Economic Co-operation and Development (Committee for Research Co-operation: Water Management Research Group)	Exchange of information on national policies for water management and research. Identification of research deficiencies in water management problems to stimulate national or international action. International

Organization	Type and Nature of Work
	collaborative investigation into a standard test for detergent biodegradability.
Organisation for Economic Co-operation and Development (Committee for Research Co-operation: Water Management Research Group)	Regional studies of the occurrence and distribution of pesticide residues in freshwater animals.
Council of Europe (European Committee for the Conservation of Nature and Natural Resources: Ad Hoc Study Group on Water Conservation)	Comparison of international legislation on water management, conservation, and pollution. Technical studies of forms of pollution. Preparation of draft conventions.
Council of Europe (Consultative Assembly Working Party on Freshwater Pollution Problems)	Preparation of draft conventions.
Economic Commission for Europe (Committee on Water Problems)	Activities and studies designed to promote cooperation in the rational utilization of water resources and in water pollution control, concentrating on water policy problems. Exchange of information and experience on water policies and exchange of experts on water problems.
	A seminar on river basin management was held in London in June 1970.
Economic Commission for Europe (Steel Committee Working Party on Chemical Industry)	An expert group has been considering problems of water pollution in the iron and steel industries.
North Atlantic Treaty Organization (Committee on the Challenges of Modern Society)	Pilot study on inland water pollution by Canada.
World Health Organization	Health aspects of water pollution: water pollution surveys. The European office has devised a long-term program on water pollution control

Organization	Type and Nature of Work
	in Europe. It held a conference in 1971 on Accidental Pollution of Inland Waters which will report to the UN Conference on the Human Environment in 1972.
World Meteorological Organization (Commission for Hydrometeorology)	Meteorological factors in water pollution.
Food and Agriculture Organization (European Inland Fisheries Administration Commission)	The EIFAC Subcommittee on Water Quality criteria lays down standards relating to water pollutants. The FAO undertakes field projects and technical assistance on water quality management and fisheries. Seminars and training centers on water use. Comparative studies of national legislation and practice.
United Nations Educational, Scientific and Cultural Organization (Committee for the International Hydrological Decade)	Ten-year program (1965-1975) of international efforts to promote the study of water resources, including scientific aspects of water pollution.
4. Marine Pollution	
Intergovernmental Maritime Consultative Organization (Subcommittee on Marine Pollution, Legal Committee, Maritime Safety Committee, Subcommittees on Marine Pollution, Carriage of Dangerous Goods, Ships Design and Equipment, and Safety of Navigation)	Negotiation of international agreements on measures to prevent pollution by ships and other equipment operating in the marine environment and to reduce the risk of marine casualties involving pollution. Legal rights of states in seeking redress. Exchange of information about methods of dealing with oil and other pollutants. (See Joint Group of Experts below.)
Food and Agriculture Organization	Studies of fishery aspects of marine pollution (See Joint Group of Experts below.) FAO Technical Conference on Marine Pollution and its Effects on Living Resources and Fishing (Rome, December 1970).
United Nations Educational, Scientific and Cultural	Study of the oceanographic aspects of marine pollution problems.

Organization	Type and Nature of Work
Organization (Intergovernmental Oceanographic Commission)	
Joint Group of Experts of FAO, UNESCO, WMO, IMCO, IAEA, WHO (GESAMP)	Studies on scientific aspects of marine pollution. Advisory body on information systems, research priorities, investigation of pollution accidents.
North Atlantic Treaty Organization (Committee on the Challenges of Modern Society)	Pilot study by Belgium and Portugal on open water pollution.
North Atlantic Treaty Organization (Science Committee: Oceanographic Subcommittee).	Study of the oceanographic aspects of marine pollution.
International Council for the Exploration of the Sea	Investigation of pollution problems in the North Atlantic, North Sea, and Baltic Sea.
Organisation for Economic Co-operation and Development ("Holden" Group)	Regional studies of the occurrence and distribution of pesticide residues in marine animals.
5. Pollution of the Soil: Pesticides	
Council of Europe	
European Committee for the Conservation of Nature and Natural Resources	
ad hoc Study Group on Pesticides Working Party on Fauna, Flora, and Landscapes	Studies and exchanges of information on the safe use of pesticides and methods of residual analysis.
Partial Agreement Committee	
Subcommittee on Industrial Safety and Health: Chemical Questions	Studies and recommendations.
Subcommittee on Poisonous Substances in Agriculture	Comparison of national legislation with a view to establishing a European convention.

Organization	Type and Nature of Work
European Conservation Year	General.
Organization for Economic Co-operation and Development (Study Group on Unintended Occurrence of Pesticides in the Environment)	Study of pesticide levels; movement, transformation, and accumulation of pesticides; analysis of pesticide residues and biological effects.
Food and Agriculture Organization (Committee on Pesticides in Agriculture)	Review of registration, use, and marketing of agricultural pesticides. Referee methods for residue analysis.
Joint Meeting of the Food and Agriculture Organization Working Party on Pesticide Residues and World Health Organization Expert Committee on Pesticide Residues	Studies and recommendations for acceptable daily intakes, tolerances, and methods of analysis.
Food and Agriculture Organization Working Party on the Official Control of Pesticides	Preparation of a model law for the official control of pesticides (section A) and preparation of internationally acceptable specifications (section B).
Food and Agriculture Organization Working Party on Pest Resistance to Pesticides	Collection of data on the occurrence of resistance and consideration of standard tests for determining incidence of resistance.
Codex Committee on Pesticide Residues	Proposing international tolerances for pesticide residue in specific foods. Preparation of list of priorities of those pesticide residues found in food commodities.
World Health Organization	Studies on the ill effects of pesticides on man; preventive measures. See also joint activities with the Food and Agriculture Organization.
World Meteorological Organization (Commissions for Agricultural Meteorology and Hydrometeorology)	Weather and fertilizer practice, soil moisture balance, and leaching.

Organization	Type and Nature of Work
6. Radioactive Pollution	
International Atomic Energy Agency	Studies on radioactive contamination of atmosphere, soil, freshwater, and seas. Advice on waste disposal.
United Nations (FAO, WHO, UNSCEAR)	Monitoring of levels of radioactive contamination.
Organisation for Economic Co-operation and Development (European Nuclear Energy Agency)	Development of scientific and technical cooperation on questions of health and safety, including the publication of guides for handling radioactive products. Organization of joint disposal operations. Elaboration and harmonization of legislation for the protection of public health.
International Commission on Radiological Protection	Estimation of potential risks from radiation sources. Advice on maximum permissible levels of radiation exposure and dose.
World Meteorological Organization	Studies on transfer, dispersion, and deposition of airborne radioactive particles.
7. Noise	
Organisation for Economic Co-operation and Development (Committee for Research Co-operation: Transportation Group)	Studies of noise from urban transportation and sonic boom.
European Public Health Committee	Effect of noise on health.
Economic Commission for Europe	1971 Prague conference: urban man, including noise.
International Civil Aviation Organization	The development of international standards and recommended practices for aircraft noise abatement and the study and measurement of sonic boom.
World Health Organization	Studies of the effect of noise on health.

Organization	Type and Nature of Work
8. MISCELLANEOUS	
United Nations	1972 Conference on the Human Environment.
United Nations Educational, Scientific and Cultural Organization	Some existing work. 1970 Helsinki Interdisciplinary Symposium on Man's Role in Changing his Environment.
North Atlantic Treaty Organization	United Kingdom pilot study on job satisfaction and productivity.