SUPERSONIC AIRCRAFT IN INTERNATIONAL AND NATIONAL LEGAL ORDER.

Daniel L. Gardner, LL.B.,
Institute of Air and Space Law,
McGill University,
Montreal.

ABSTRACT

Flight at supersonic speed by civil aircraft represents one of the biggest advances in the history of civil aviation. The technological achievements of supersonic aircraft are wellknown but little has been written about the international and national laws which regulate these aircraft.

This thesis gives a brief history of supersonic aircraft and their effects on the environment. It also describes how supersonic operations can be regulated by international law and by international organizations; the applicability of evolving international environmental law is also discussed.

On the subject of national regulation, the situation in the United States is described in some detail and the regulations of the countries which manufacture supersonic aircraft are outlined. Details of national legislation regarding supersonic flight in more than thirty countries is contained in Appendix C.

R É S U M É.

Le vol à la vitesse supersonique par les avions civils représente un des plus grand avancements dans l'histoire de l'aviation civile. Les accomplissements technologiques des avions supersoniques sont bien connus mais très peu a été écrit au sujet des lois internationales et nationales qui reglent ces avions.

Cette thèse-ci donne un rapport court des avions civils supersoniques et leurs effets sur l'environnement. Elle décrit aussi la manière dont les operations supersoniques peuvent être reglees par la loi internationale et par les organisations internationales; l'applicabilité de la loi internationale de l'environnement qui se developpe est aussi discutée.

Quant à ce qui concerne le règlement national , la situation dans les Etats Unis est décrite en detail et les règlements des pays qui construient les avions supersoniques sont compris. La legislation nationale qui concerne le vol supersonique dans plus de trente pays est contenue dans l'Appendice C.

PREFACE.

This thesis is submitted in partial fulfilment of the requirements for the degree of Master of Laws from the Faculty of Graduate Studies and Research, McGill University, Montreal.

In submitting the thesis, I should like to thank (firstly) the Ford Foundation of America in providing me with a financial grant without which I should have been unable to attend McGill University, (secondly) Professor Ivan Vlasic of the Institute of Air and Space Law for his guidance and help in my preparation of the thesis and (thirdly) Miss Marrion Duncan for typing the thesis in record time.

Daniel L. Gardner.
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C O N T E N T S.

C H A P T E R 1.

THE ERA OF SUPERSONIC FLIGHT.

The Development of Supersonic Flight.

Manned powered flight began in 1903 when the Wright Brothers piloted their craft for a few hundred yards at Kittihawk in the United States of America. Within one generation the world had witnessed the fragile aircraft constructed by the Wright Brothers develop along many avenues, into military fighter and bomber aircraft, into rocketry and spacecraft and also into aircraft capable of carrying many hundreds of passengers at speeds up to and faster than twice that of sound.(1)

The competition of war during 1939 to 1945 brought home to states the limitations of the traditional piston engined aircraft, the fastest fighters being able to achieve speeds of the order of 450 miles per hour at that time. Extensive research and development had been going on throughout the nineteen thirties in both the United Kingdom and Germany aimed at the production of jet fighter aircraft but it was only in the war's closing stages that these aircraft started to be produced.

In September 1946 a British De Havilland 108 flying over the River Thames estuary in South East England is believed to have been the first aircraft in the world to have exceeded the speed of sound but unfortunately this claim cannot be authenticated because the aircraft

broke up during flight killing the test pilot. The beginning of the era of supersonic flight can definitely be said to have started on the 14th of October 1947, when United States Air Force Captain Charles Yeager piloted the Bell X-1 rocketship at a speed faster than that of sound at an altitude of 70,000 feet over the Nevada Desert. Great Britain was not far behind and in September 1948 a De Havilland 108 was flown supersonically by test pilot John Denny.

Just as military aircraft had pioneered jet flight so they pioneered the next major step forward in the evolution of the aircraft, flight at supersonic speed. For over 20 years, until the first supersonic flights in 1969 by the TU-144 and Concorde, the sole users of supersonic aircraft were the air forces of the world and the cold war ensured the continuing development of even faster and more powerful military aircraft. By the mid-nineteen fifties, however, the thoughts of aircraft designers had already turned towards the civilian supersonic transport and independent serious studies had begun in the United States, Great Britain and France.

The United States Supersonic Transport Programme.

In the United States the Pentagon had commissioned much research into supersonic flight and in the early nineteen fifties North American, the Company which had built some of America's first supersonic fighter aircraft, won the contract to build the B 70 bomber, an aircraft which was designed to fly at three times the speed of sound. The manufacturers of the B 70 hoped that if the bomber was to be built in large numbers, then a

commercial version could be developed in rather the same way that the Boeing Company had developed the highly profitable 707 from the military KC 135 air tanker. The B 70, however, never went into production because when the time came for its future to be finally decided, the United States considered that the strategic potential of missiles was greater than anything that could be provided for by a long-range supersonic bomber.

Although the Boeing Company had lost the B 70 contract, the Company had continued to work on problems of supersonic aircraft and flight and so it was in a strong position when on the 5th of June 1963, President Kennedy speaking at the United States Air Force Academy at Colerado Springs, said:- " ..... It is my judgement that this Government should immediately commence a new program in partnership with private industry to develop at the earliest practical date the prototype of a commercially successful supersonic transport aircraft superior to that being built in any other country in the world .....". A few days after the President's speech the Federal Aviation Administration invited leading aircraft and engine manufacturers to enter a design competition for a supersonic transport aircraft.(2) Preliminary designs were submitted in January 1964 by General Electric, Pratt and Whitney, and Curtiss-Wright for the engine, and by Boeing, Lockheed and North American for the air frame.(3) In July 1965 President Johnson asked Congress for 140 million dollars for further design work in order to determine whether two prototype aircraft should be built.(4) The request was granted and on the last day of 1966 Boeing was chosen as the

airframe manufacturer and General Electric for the engine of the aircraft.(5)

The Boeing Company decided to construct an aircraft capable of carrying 300 passengers and of travelling at Mach 2.7. Because of the great increase in speed over contemporary subsonic jets which was being envisaged, conventional construction materials could not be used and the airframe engineers planned to use titanium and stainless steel both of which were able to withstand the high air temperatures which would be experienced at Mach 2.7. Boeing's decision to build an aircraft with a swing wing was one of the main reasons for its success in the initial design competition against the more conventional delta wing proposed by Lockheed, and it is ironic that this decision was to be one of the main factors in the undoing of the whole United States Supersonic Transport programme. Engineering difficulties began to be encountered with the wing-swivels which required extremely intricate hydraulic systems. The additional weight of these hydraulic systems meant that more powerful engines were required and consequently more fuel would need to be carried. All these factors started to raise doubts about the commercial viability of the whole swing wing concept and, eventually Boeing abandoned the swing wing and opted for the more conventional Concorde type delta wing.

Although the supersonic programme had appeared by 1969 to have overcome its main design and engineering problems, it was about to run into stiff Congressional opposition on the two grounds of cost and adverse environmental effects. An Ad Hoc Committee, set up by President Nixon

to review the status of the whole supersonic transport programme, raised serious doubts in its report[6] as to whether such an aircraft would ever be commercially attractive enough to sell in sufficient numbers to repay the proposed government investment. Despite the findings of the Committee, President Nixon requested a further 290 million dollars in development funds from Congress in the summer of 1970.[7] During 1970, however, many environmental groups had begun to spring up and they became very active and vociferous in their attacks on the supersonic transport programme. These environmental groups, by raising questions about the adverse effects of supersonic flight, questions which often did not appear to be satisfactorily answered, either by the Administration or by the manufacturers, found much support among influential Congressmen in Washington. These questions together with the prospect of ever spiralling research and development costs, resulted eventually in the Senate rejecting President Nixon's request for additional funds.[8] Interim funding was, however, provided for a period of ninety days until a newly elected Congress could make a final decision on the project. A decision was reached by the new Congress in March 1971 when the House of Representatives voted by 215 to 204 and the Senate by 51 to 46 to end all government funding of the supersonic transport programme.[9]

Although government funding of the programme ended in 1971, Congress has continued to vote the National Aeronautics and Space Administration funds for advanced supersonic technology development. 11.7 million dollars was allocated in fiscal year 1973 but fears that plans for a second

generation supersonic aircraft might be being made, led the House of Representatives Appropriations Committee to cut back the Administration's request for 28 million dollars for research during fiscal year 1974 to the 1973 allocation of 11.7 million dollars.(10) The question of whether the United States might recommence a supersonic transport programme is still very much on open one. The Boeing Aircraft Corporation has been reported as saying that a joint government/industry effort over ten years could produce a second generation supersonic aircraft capable of carrying 358 passengers at a speed of Mach 2.7 and be economically competitive with advanced wide bodied subsonic jets.(11) It has also been reported that the McDonnell Douglas Corporation and the British Aircraft Corporation have set up a joint working group aimed at the design of a second generation supersonic transport.(12)

The problems of operating economics and the environment will continue to be the two major problems facing any second generation aircraft and in this connection it is interesting to note the opinion of Dr Gerald Kayten, Director of Study and Analysis of the American office of Aeronautics and Space Technology. Dr Kayten testified at Hearings of the United States Sciences Committee in July 1974 that research under way in the United States could lead to a second generation supersonic transport aircraft with at least a 100% increase in payload capability, a 25% to 30% increase in range and a 25% increase in speed all relative to Concorde with noise levels well below the then current Federal regulations and objectionable engine emissions

reduced by 90% to 95% relative to present day engines.

The Development of Concorde.

In Great Britain consideration of a national supersonic transport programme had begun during 1955 and in 1956 the Supersonic Transport Aircraft Committee was formed to recommend the most suitable type of aircraft. The Committee reported three years later in favour of the production of two aircraft, a medium range aircraft capable of cruising at Mach 1.2 and a long range version able to travel at Mach 1.8, the British Aircraft Corporation being awarded the preliminary design study contracts. In France similar consideration to the development of a civil supersonic aircraft had begun in 1956. Three years later the development of a French supersonic aircraft was begun, the Mach 2.2 design of the Sud-Aviation Company being selected by the French Government.(13)

By 1961 it had become apparent to both the British and French Governments that there would be heavy demands on finance, manpower and research and development facilities in the production of a supersonic airliner and there were obvious advantages in sharing these burdens with another nation if agreement could be reached on the basic design. Approaches were made to companies in the United States of America but the feeling there at that time was that the first generation supersonic transport should be based on the Mach 3 B 70 Bomber aircraft. In France the Sud-Aviation Company became part of the nationalised S.N.I.A.S. Group (known as Aerospatiale) and although design work was progressing satisfactorily, it was clear that a

completely new engine would have to be developed. The French were aware that at that time the Rolls Royce Aero Engine Company were developing an engine for the British TSR 2 supersonic bomber aircraft and so consultations started between the French and British companies. In December 1961, the British and French Governments commissioned a joint design study and on 29th November 1962 an Agreement was signed providing for the development and production of a joint civil supersonic aircraft.(14)

Research and development progressed smoothly until the first major threat to the Concorde programme which occurred in 1965. The new Socialist Government in Great Britain decided at Cabinet level to cancel several advanced aircraft projects, among them Concorde. The Government were advised, however, by their chief law officer, the Attorney General, that the 1962 Agreement to develop Concorde was an international treaty and contained no clause permitting the ending of the project. A unilateral cancellation by the British Government could well have resulted in the French Government bringing proceedings in the International Court of Justice for a sum in damages which was estimated, at that time, to be in the region of £100 million. Following on this advice, the British Government reversed its decision to cancel the project.

The first flight by Concorde took place from Toulouse in France on 2nd March 1969 and the first flight at supersonic speed was on 1st October 1969. Of the sixteen Concorde aircraft constructed or under construction on 31st December 1976, only nine have been sold, five to British Airways and

four to Air France. Prelimin ry purchase agreements have also been entered into for three aircraft with Iranair and for another three aircraft with the airline of the People's Republic of China but neither airline has yet confirmed its order.

It can be claimed, with some justification, that 21st January 1976 was a milestone in the history of civil aviation for on that day British Airways and Air France inaugurated the world's first commercial supersonic air services, British Airways flying to Bahrain in the Persian Gulf and Air France flying to Rio de Janeiro. Four months later, on 24th May 1976, the supersonic era over the North Atlantic was opened when British Airways and Air France both inaugurated regular scheduled services from London and Paris respectively to Washington D.C.

The Soviet Tupolev 144.

The Soviet Union is the only other nation to have successfully constructed a civil supersonic aircraft. Although little is known about the early history of the Soviet Tupolev TU-144, design work is thought to have started considerably later than the initial work on Concorde and it has even been suggested that serious design work did not commence until as late as 1964.(15) The first official confirmation that the Soviet Union was working on a supersonic aircraft came in November 1963 when Prime Minister Kruschev announced that development of such an aircraft was already under way.(16) Virtually nothing was heard of the Soviet aircraft until the last day of 1968 when pictures were released showing the TU-144 in flight over the Soviet

Union. This 'first' which took the aviation world by surprise was followed by another 'first' in June 1969 when the TU-144 became the first commercial airliner to fly faster than the speed of sound.

The TU-144 has been designated the future standard aircraft for long range passenger travel in the Soviet Union and it will supplement and later replace the Ilyushin 62. It was reported in June 1973 that the TU-144 was already in full production at the Voronezh plant and also that Aeroflot had ordered thirty aircraft which constituted the first three years production(17) but this report was before the TU-144 gained the unfortunate distinction of being the first civil supersonic aircraft to have been involved in a fatal accident. At the Paris International Air Show on 3rd June 1973 the first of the production aircraft exploded in mid-air after the left wing had broken off and the airliner had rolled over. This aircraft was one of the first to incorporate major design changes which had lengthened the fuselage, increased the power of the engines and also moved the position of the engines but whether any of these changes contributed to the accident will probably never be known. Most observers believed that the accident would delay the introduction of the airliner into commercial service and a recent report estimated that only eight TU-144 aircraft had been constructed by early 1976.

On 26th December 1975 a TU-144 airliner took off from Moscow's Domodedovo airport to fly to Alma Ata, the capital of Kazakhstan, to inaugurate a twice weekly supersonic air service between the two cities. No

passengers are intended to be carried on this service, however, only cargo and mail and the flights are seen as a continuation of the programme of test flights.

Chapter 1 Footnotes.

(1) When any mass has a velocity equal to that of sound it is said to be travelling at Mach 1. The speed of sound varies having regard to atmospheric conditions and the elevation of the moving mass above sea level. Under standard atmospheric conditions, i.e. a temperature of 150°C and a barometric pressure of 29.92 inches of mercury, and at sea level elevation, the speed of sound is 760 miles per hour. Since both pressure and temperature decrease with altitude, this means that the higher an aircraft flies, the sooner it is able to reach Mach 1. At an altitude of 40,000 feet the drop in temperature and barometric pressure is such that the speed of sound has been 'reduced' to 660 miles per hour. Roth, "Sonic Boom: A Definition and Some Legal Implications", 25 J.A.L.C. 68 to 70 (1958)

(2) N.Y.T. 21st June 1963, p.59, c.1.

(3) N.Y.T. 1st January 1964, p.70, c.3.

(4) N.Y.T. 2nd July 1965, p.1, c.3.

(5) N.Y.T. 1st January 1967, p.1, c.8.

(6) U.S. Congressional Record 31st October 1969, H.10432.

(7) N.Y.T. 8th February 1970, p.2, c.1.

(8) N.Y.T. 4th December 1970, p.1, c.8.

(9) N.Y.T. 19th March 1971, p.1, c.8 and
25th March 1971, p.1, c.8.

(10) N.Y.T. 22nd June 1973.

(11) Av. Week and Space Technology 30th April 1973, p.30.

(12) Av. Week and Space Technology 5th July 1976, p.31.

(13) Nelson, "Concorde: International Co-operation in Aviation", 17 Am. J. Comp. Law 452 (1969).

(14) Agreement between the Government of the United Kingdom of Great Britain and Northern Ireland and the Government of the French Republic regarding the Development of a Civil Supersonic Transport Aircraft. (U.K. Cmnd 1916). For text of Agreement see Appendix A.

(15) Av. Week and Space Technology 2nd July 1973, p.23.

(16) N.Y.T. 7th November 1963, p.2, c.1.

(17) Av. Week and Space Technology 4th June 1973, p.14 and
18th June 1973, p.12.

CHAPTER 2

ENVIRONMENTAL EFFECTS OF SUPERSONIC AIRCRAFT.

Sonic Boom.

From the time of the first flight of the aircraft in 1903 up until the advent of the civil supersonic aircraft the environmental effects of civil aircraft have remained more or less the same. Aircraft engines have always created noise, they have emitted fumes and there has been a risk of injury both to the persons on board and to persons and property on the ground. The advent of the supersonic transport has changed all this. It is because supersonic aircraft fly both faster and higher than their subsonic counterparts that they cause completely new effects on man's environment. These new environmental effects give rise to new legal problems which in turn call for new regulatory measures. It is interesting to note the words of President Kennedy when he addressed the National Academy of Sciences in October 1963. He said: "Every time you scientists make a major invention, we politicians have to invent a new institution to cope with it."(1) It would not be wrong to add that new laws also have to be formulated to cope with the new inventions of science. The environmental effects caused by supersonic aircraft fall under three main headings - (first) sonic boom, (second) engine noise and (third) emissions in the stratosphere.

The sonic boom is created only when an aircraft travels at or faster than the speed of sound. Any disturbance in the air creates waves of

movement and when a subsonic aircraft is in flight the particles of air in the atmosphere through which it travels are moved aside and then they form again behind the aircraft. The waves of movement, which are created by an aircraft in flight are circular in shape and expand outwards from the place of initial disturbance in a way very similar to the waves produced by a stone when dropped into a pool of water. When these waves of movement reach a human being, he hears what we call sound.

These shock or sound waves move out in front of an aircraft, or indeed any disturbance in the air, at the speed of sound, but they are not capable of travelling faster than the speed of sound and so when an aircraft itself approaches the speed of sound a collision is inevitable. When an aircraft reaches supersonic speed the waves cannot continue moving out ahead of it and so they start to form one on top of the other. This overlapping of the sound waves forms strong wave fronts or high pressure areas which can have a great energy potential and these wave fronts travel away from the aircraft until they either meet some object or dissipate through loss of energy. When the waves meet an object whether it be a human being or a building or the ground, that object will experience a sudden rise in pressure followed by a drop to below the ambient air pressure, and then a quick recompression up to the ambient air pressure again. The difference between the highest pressure experienced and the existing background pressure is called the over pressure, a term which is usually used to denote the strength of a sound wave or sonic boom.

The sonic boom is strongest at its point of origin and is produced wherever the surface of the aircraft disturbs the air, the main surfaces being the nose and leading wing edges of the aircraft. The sonic boom sweeps away from the aircraft in the shape of a cone and it becomes progressively weaker as it travels further away from its point of origin. It is sometimes thought that a sonic boom is created only when an aircraft actually accelerates through the speed of sound but this is not so. A continuous sonic boom is created by an aircraft in supersonic flight although a person on the ground will only hear a boom once as the aircraft's shock wave reaches him. It is in fact more accurate to say that a person on the ground will hear two booms a fraction of a second apart because both the nose and the leading wing edge of the aircraft create their own separate sonic booms. By the time the shock waves reach the ground they have expanded considerably in width, in the case of Concorde the average width of the sonic boom carpet is about 80 kilometres.(2)

The force that a sonic boom may have will depend on several factors, some of the more important of which are as follows:-

(a) the size, weight and aerodynamic shape of an aircraft all affect the potential strength of a sonic boom, the general rule being that the larger and faster the aircraft, the stronger the sonic boom.

(b) the higher an aircraft flies the further the sonic boom will have to travel to reach the ground, so weakening the boom's strength.

In order to fly higher than 50,000 to 60,000 feet which is the optimal cruising altitude of Concorde, it is certain that any aircraft will have to have more powerful engines so increasing the aircraft's weight. This weight increase will in turn mean that a stronger sonic boom will be created.

(c) a sonic boom will travel faster where there is high air temperature.

(d) the direction and strength of the wind can noticeably affect a sonic boom particularly immediately before it reaches the ground.

(e) certain flight manoeuvres, such as acceleration through Mach 1, the change from horizontal flight to descent and simple turns can all cause the shock waves to catch up with each other in a concentration of energy.(3)

Physical and psychological damage to persons as well as physical damage to property can be caused by the sonic boom. When shock waves reach a structure of some sort they will set the components of that structure into vibration. The effect that a sonic boom will have on any particular structure clearly depends on that structure's size, location, shape, type of construction and state of maintenance. The United States Environment Protection Agency Office of Noise Abatement and Control has concluded(4) from an analysis of the four major series of sonic boom experiments carried out by the United States Air Force over the cities of St Louis, Oklahoma and Chicago and the Edwards Air Force Base that by and large damage caused by sonic booms will be confined to what is described as brittle secondary

structures such as window panes and plaster.[5] The report does concede, however, that there is an exceedingly small probability of a greatly magnified boom causing the collapse of a building whose primary structure is exceptionally weak or faulty.[6] The French Scientific and Technical Building Centre has carried out studies which tend to confirm the American findings.[7] The Centre's tests, which were carried out in 1972, showed, it was claimed, that a building in good condition will not be damaged by a sonic boom. Tests and studies have also been carried out in the United Kingdom and the Royal Aircraft Establishment at Farnborough has compared the type and rate of damage that occurs in houses due to their normal environment with the type and rate of damage that occurred from the sonic booms experienced during eighteen supersonic flights by Concorde. The British tests concluded that claims of alleged damage by sonic booms had almost invariably shown that the damage occurred in structures that were already defective as a result of other environmental factors.[8] There are exceptions, however, and one occurred in 1959 when a Canadian F 104 fighter aircraft broke the sound barrier at a height of 500 feet over the newly constructed Ottawa air terminal building. The resulting sonic boom caused almost all the glass to shatter, the roofing to be ripped apart and even some of the steel girders were twisted out of shape.

There is no real evidence to show that physical injury to a person can be caused by the force of a sonic boom and tests have been carried out which show that very high over pressures indeed would be required to cause

damage to a person's eardrums, the part of the human body which is the most sensitive to changes in air pressure.(9) One cannot have any warning of the approach of a sonic boom because an aircraft in supersonic flight will almost invariably be too high to be visible by an observer on the ground and, of course, much too distant for any engine noise to be heard. Because there is no warning, the main effect which the sonic boom has on people is one of startle and it is not unreasonable to expect that this startle effect may result in people injuring both themselves and other people. The reported deaths and injuries that have occurred as a result of sonic booms have almost invariably always been due to the boom's secondary effects such as the collapse of a farmhouse in France which killed three people or the deaths of people who have been thrown from startled horses.(10)

At the second meeting of the Sonic Boom Committee of the International Civil Aviation Organisation, the Soviet Union was the only state to publish the results of a survey undertaken to find out public opinion of the sonic boom and these showed some measure of public acceptance.(11) French study of the startle reaction of human beings has resulted in a finding that there is a considerable degree of variation in individual susceptibility and that repetition of the booms seems to lead to habituation.(12) In a series of test flights by Concorde in the United Kingdom, hospital staff were asked to report if they found that patients were being affected by sonic booms but no adverse effects were reported.(13) Research has also been carried out,

mainly in the United Kingdom and France, to determine what adverse effects sonic boom may have on, among other things, cattle,[14] wild animals,[15] fish,[16] wild birds,[17] chicken eggs,[18] and the raising and production of laying chickens.[19]

The effect that the sonic boom will have on ships at sea and their passengers and crew is a matter of some dispute. Dr Bo Lundberg,[20] one of the leading critics of supersonic aircraft, has stated that he can find no valid reason why members of ships' crews should be subjected to bangs considered too severe to be inflicted on people on land.[21] On the other hand, information provided to the second meeting of the I.C.A.O. Sonic Boom Committee showed that although nearly four hundred hours of supersonic test flying by Concorde had taken place over the sea, no complaints had been received.[22]

Whether a sonic boom is able to start an avalanche is a question which will be of great importance to several countries should overland supersonic flight become acceptable. As in the case of supersonic flights over the sea, conflicting evidence exists about avalanches. Tests have been carried out by the United States Air Force which involved a series of supersonic flights over a mountainous, snow-covered area where avalanches regularly occur. The sonic booms created by the test aircraft were not observed to start any avalanches and no movement of the snow layers was detected.[23] The Soviet Union, on the other hand, submitted a working paper to the second meeting of the I.C.A.O. Sonic Boom Committee which concluded that sonic booms could be the immediate cause of avalanches.[24]

It is clear that if the sonic boom could in some way be eliminated, then supersonic flight would immediately become more acceptable. Many suggestions have been put forward which might reduce the intensity of the boom but it is not clear whether its complete elimination is considered scientifically possible at the moment. Both the United States Air Force[25] and the United States National Academy of Sciences[26] have expressed the view that it is not possible to eliminate the sonic boom but, more recently, the President of the Douglas Air Corporation, Mr John Brizendine, has been reported as saying that the sonic boom is not necessarily an insoluble problem when one sees what problems aerospace technology has solved in the past.[27] Of the international scheduled routes operated by British Airways and Air France, only one, the route from London to Bahrain, involves supersonic flight over land territories, those being Lebanon, Syria, Iraq and Saudi Arabia. As will be seen later, many states have already passed regulations affecting the overflight of their territories by civilian supersonic aircraft. Although such regulations do not seriously affect the initial routes being flown by British Airways and Air France, it should be remembered that the TU-144 is already operating a twice weekly supersonic service from Moscow to Alma Ata, a route which is entirely overland.

Subsonic Engine Noise.

The second main environmental problem associated with supersonic aircraft is engine noise. Although this is a problem common to all jet aircraft, it is important to understand from a technical viewpoint, why

supersonic aircraft are noisy. It is in fact the engine noise of these aircraft which has caused such a furore throughout the world and, in particular, with the United States Federal and Local Authorities.

The term 'jet engine' is applied to an engine which develops its thrust from a stream of high velocity exhaust gases ejected from the tail pipe. In the early types of jet aircraft, air was drawn into the engine, then compressed, mixed with fuel and burned. The gases produced by this process then pass over a turbine before being exhausted as the jet stream. In aircraft, such as the Boeing 707, the Vickers VC 10 and the Trident, only part of the flow of air is compressed, the remainder by-passing the compression and turbine stages before being exhausted from the engine. This type of engine is said to have a low by-pass ratio. On the new wide bodied aircraft, such as the Boeing 747, the Lockheed L 10-11 and the McDonnell Douglas Tristar, the by-pass principle in the engines has been taken a stage further. The air which is drawn into the engine, first passes through a large diameter fan and only about one-sixth is then compressed, burned and exhausted. The remainder of the air is exhausted directly after passing through the fan and this type of engine is said to have a high by-pass ratio. Because smaller amounts of air are compressed and exhausted, there is a reduction in the noise created by the jet engine as a whole.

The quieter high by-pass engine is unfortunately not suitable for supersonic aircraft since the greater diameter of this type of engine would

induce additional drag and this in turn would adversely affect the aircraft's performance. Because of these aerodynamic considerations, only zero or very low by-pass ratio engines are, at the moment, considered to be the most economically and technically feasible for supersonic aircraft and it is this type of engine which powers both the Concorde and the TU-144. The use of reheat on take off by supersonic aircraft is also a major noise source and research is under way in an attempt to eliminate, or at least reduce, the need for this afterburning of fuel.

No attempt will be made to relate in terms of decibels the noise level of Concorde to the noise levels of subsonic aircraft. It is perhaps sufficient to refer to the United States Secretary of Transportation's Decision on Concorde where he refers to the Environmental Impact Statement published by the Federal Aviation Administration and states that the noise impact of Concorde was analyzed under four separate noise descriptors: the FAR Part 36 measuring points system; the single-event noise contours system; the noise exposure forecast system and the aircraft sound description system.(28) The Secretary makes it clear that using each of the four noise descriptors, the Environmental Impact Statement clearly establishes that the Concorde will be noisier than existing subsonic aircraft save arguably for the Boeing 707 and the Douglas DC-8 on landing.(29)

Adverse Atmospheric Effects.

The third main problem associated with supersonic flight is the impact of supersonic aircraft engine emissions on the stratosphere. The

stratosphere is a relatively stagnant layer of air which varies in thickness and is found between five and seventy miles above the surface of the earth.

Concern over the impact of emissions revolves around two main issues:- the possible effect on the mean temperature of the earth and the possible reduction of the density of a gas called ozone which is found in the stratosphere. The main sources of stratospheric pollution from aircraft are (one) sulphur dioxide which reacts with other elements in the stratosphere so cutting off the sun's rays and consequently having a cooling effect on the earth; (two) water vapour which transmits ultra violet radiation to the surface of the earth and, since it tends to absorb infra red radiation, will have a warming effect on the earth and (three) nitrogen oxides which firstly absorb the sun's radiation so having a cooling effect on the earth and secondly may reduce the density of ozone in the stratosphere.

In the Secretary of Transportation's Decision on Concorde, the Secretary says that any temperature change of the surface of the earth will depend in large part on the residence times of the various pollutants. However, it would appear that scientists are unable to agree as to the length of these residence times. In order to give some indication as to what possible temperature changes might be involved the Federal Aviation Administration's Environmental Impact Statement showed that for a fleet of forty Concorde aircraft, depending on assumptions regarding pollutant

residence times, the net impact of the emissions of nitrogen oxide into the stratosphere could range from a maximum warming of about 0.003 degrees Centigrade to a maximum cooling of about 0.0024 degrees Centigrade.(30) This, however, was qualified by an uncertainty factor of three to ten and it should also be remembered that it has not been shown that temperature changes of the magnitude suggested above would necessarily be harmful to the earth's environment; they might well be beneficial.

Concorde's cruising altitude is between 50,000 feet and 60,000 feet and it is in this belt of the stratosphere that ozone gas is to be found, one of its main purposes being to act as a protective filter against too much harmful ultra violet radiation reaching the earth from the sun. It is thought that the emissions of nitrogen oxide from the engines of supersonic aircraft combine with ozone in a chemical reaction that breaks down the ozone molecule and produces a new nitrogen oxide molecule which may then combine with another ozone molecule. Should these chemical reactions occur in the stratosphere, then it is thought that the resultant depletion of the belt of ozone will allow greater quantities of ultra-violet radiation to reach the surface of the earth. An increase of certain wavelengths of ultra-violet radiation can, it is considered, increase the incidence of non-melanomic skin cancer.

It is of course difficult for the lawyer to formulate new laws and regulations on a matter where scientists disagree as to scientific causes and effects and this is especially the case when one considers the possible

effect that engine emissions may have on the stratosphere. The Environmental Studies Board of the United States National Academy of Sciences has stated in areport released in February 1973 that sufficient knowledge was at hand to warrant the utmost concern over the possible detrimental effects on the environment by the operation of large numbers of supersonic aircraft. At public hearings on the Federal Aviation Administration's draft Environmental Impact Statement held in New York and Washington D.C. in April 1975 Dr Robert Murgatroyd of the United Kingdom Meteorological Office and Chairman of the British Committee on the Meteorological Effects of Stratospheric Aircraft argued that thirty or forty aircraft of Concorde's characteristics would have no significant effects on the stratosphere and correspondingly little change would be experienced on the earth's surface.

Critics of this view include Dr Harold Johnston of the University of Columbia who maintains that within one year of the commencement of operations by a fleet of about five hundred supersonic aircraft, the introduction of oxides of nitrogen into the atmosphere will have initiated a series of ozone depleting chemical reactions which will result in a halving of the amount of ozone in the atmosphere.(31) This could, Dr Johnston maintains, blind all animals including human beings except those remaining under water or indoors. The most authoritative statement on the possible impact of supersonic aircraft emissions on the stratosphere is most probably the United States Department of Transportation's Climatic Impact

Assessment Programme (C.I.A.P.), a four year study costing forty million dollars which reported in early 1975. C.I.A.P.'s main conclusions were that the small number of supersonic transport aircraft in production in 1975 could not harm the earth's environment but future expansion of high altitude aircraft should be carefully monitored to permit timely regulation if necessary, and to provide a safeguard against environmental damage. The C.I.A.P. study also estimated that the minimal detectable change in global mean ozone was 0.5% and it considered that it would take 125 Concordes flying 4½ hours or more each day to reach this figure.

More recently than the C.I.A.P. study, the World Meteorological Organization has issued a statement which said that the role of nitrogen oxides was sufficiently well established to permit the Organization "to state with reasonable confidence that the planned number of supersonic transports was not predicted to have an effect that could be distinguished from natural variations".(32) Also scientists at the Lawrence Livermore Laboratory of the University of California have altered their earlier conclusions and now say that because of the absence of precise measurement of the rates that many chemical reactions occur in the stratosphere, they cannot state positively that a fleet of supersonic transports would damage the earth's ozone layer.(33) As Secretary of Transportation Coleman said in his Decision on the subject of depletion of the ozone layer:- "to ban Concorde would be justifiable only to ward off a substantial and

immediate danger of harm and the danger posed by these flights does not fall into this category.(34)

A somewhat lesser problem that can also arise as a result of supersonic flight is the effect that increased radiation may have on the aircraft's passengers and crew. The normal level of cosmic radiation which is present at between 50,000 feet and 60,000 feet, which is the proposed cruising altitude of Concorde,(35) will not endanger the occupants but any sudden burst of solar activity will result in an increase in the amount of radiation in the atmosphere and it is could rise to a dangerous level. The International Commission of Radiobiological Protection has stated that at the proposed cruising altitude of supersonic aircraft, the increased amount of radiation from major solar flares will exceed the maximum permissible limits and the aircraft will have to descend to an altitude where the radiation level is considered safe.(36) On 23rd February 1956, for example, sunspot activity was particularly intense and it has been estimated that the occupants of a supersonic aircraft flying at a high polar latitude (the magnetic poles attract atomic particles) on that day would have received a radiation dose equivalent to the maximum permissible dose for radiation workers in a whole year.(37) In order to warn pilots of any increase in the radiation level due to solar flare activity, supersonic aircraft have been fitted with radiation meters.

Chapter 2 Footnotes.

(1) 49 Dept of State Bulletin 778, 779 (1963).

(2) International Civil Aviation Organization - Sonic Boom Committee - Second Meeting - Working Paper 18 (SBC II WP/18):

(a) Under standard conditions and without wind the half width of the boom carpet produced by a supersonic aircraft flying at a cruising speed of Mach 2 and an altitude of approximately 15 kilometres is of the order of 40 kilometres.

(b) Study has shown that under certain atmospheric conditions the boom carpet can be displaced sideways, its furthest edge reaching a distance of 85 kilometres from the centre line of the flight path, while the opposite edge comes closer. This phenomenon can occur with a probability of 1%.

(3) Baxter, "The SST: From Watts to Harlem in Two Hours", 21 Stanford Law Review 1 at 4 (1968).

(4) The Effects of Sonic Boom and Similar Impulsive Noise on Structures - U.S. Environmental Protection Agency. Doc. No. NTID. 300.12 dated 31st December 1972.

(5) Id. at 12. For an analysis of Sonic Boom Damage Data - See Appendix B.

(6) Id. at 6.

(7) I.C.A.O. SBC II WP/12.

(8) I.C.A.O. SBC II WP/32.

(9) Baxter, The SST" at 32.

(10) N.Y.T. 3rd August 1967.

(11) I.C.A.O. SBC II WP/34: 44% of persons questioned termed the noise of the boom as severe and 40% as moderate, 26% were considerably annoyed, 20% slightly annoyed and 25% did not consider the boom unpleasant.

(12) I.C.A.O. SBC II WP/14.

(13) I.C.A.O. SBC II WP/24.

(14) I.C.A.O. SBC II WP/13, para. 5.2 and WP/24, para. 4.1.

(15) I.C.A.O. SBC II WP/24, para. 4.2.

(16) I.C.A.O. SBC II WP/24, para. 4.3.

(17) I.C.A.O. SBC II WP/24, para. 4.2.

(18) I.C.A.O. SBC II WP/13, para. 1.2.

(19) I.C.A.O. SBC WP/13, para. 3.2

(20) Dr Bo Lundberg is a former Director General of the Aeronautical Research Institute of Sweden.

(21) Lundberg, "The Acceptable Nominal Sonic Boom Overpressure in SST Operation over Land and Sea." Paper presented at the National Conference on Noise of the American Speech and Hearing Association. (June 1968)

(22) I.C.A.O. SBC II Report Para. 2 : 3.5.3.

(23) The Effects of Sonic Boom and Similar Impulsive Noise on Structures, p.16.

(24) I.C.A.O. SBC II WP/32.

(25) Sonic Boom Background Information. U.S. Air Force Document 68-1, p.1.

(26) National Academy of Sciences: Statement of the Committee on SST - Sonic Boom dated 19th August 1968.

(27) Flight International 31st January 1976, p.207.

(28) The United States Secretary of Transportation's Decision on Concorde Supersonic Transport - published 4th February 1976. (See Appendix I)

(29) The Secretary's Decision pp. 44 - 50.

(30) Id. at 35.

(31) N.Y.T. 5th November 1972 p.72, c.3.

(32) Av. Week and Space Technology 12th January 1976, p.15.

(33) The Secretary's Decision, p.41.

(34) Av. Week and Space Technology 30th August 1976, p.30.

(35) Concorde - The background story described by the Engineers - Flight International Magazine Publication - 1969.

(36) Radiobiological Aspects of the Supersonic Transport. Report of the I.C.R.P. Task Group on the Biological Effects of High-Energy Radiations, Health Physics. Pergamon Press, 1966.

(37) Concorde - The Background Story - 1969.

CHAPTER 3.

INTERNATIONAL REGULATION OF SUPERSONIC FLIGHT.

Sovereignty and International Air Services.

It is an established rule of international law that each State possesses complete and exclusive sovereignty over the airspace above its territory.(1) The first evidence of international agreement on this principle of sovereignty emerged from the deliberations of the 1910 Diplomatic Conference held in Paris to consider the international regulation of flight. The acceptance of the principle of absolute sovereignty was embodied first in the 1919 Convention relating to the Regulation of Aerial Navigation(2) and is now to be found in the Convention of International Civil Aviation concluded in Chicago in 1944.(3)

It follows from the principle of the sovereignty of airspace that no aircraft of one State may fly through the airspace of any other State without that latter State's authorisation or permission. The main problem, therefore, which faced the Conference delegates at Chicago was to what extent should the aircraft of one State be permitted to operate within the the airspace of other States and, in particular, to what extent should commercial operations be permitted. The problem was partially solved by the formulation of Articles 5 and 6 of the Convention which created a distinction between 'non-scheduled flight' and 'scheduled flight'.

Article 5 of the Convention grants the aircraft of contracting States "not engaged in scheduled international air services" authority to make flights into or non-stop across the territory of other contracting States and also to make stops for non-traffic purposes without the necessity of obtaining any special prior permission. Article 6 states unequivocally that no scheduled international air service may be operated over or into the territory of a contracting State except with the special permission of that State. Although the term 'scheduled' was not defined by the Chicago Convention, the Council[4] of the International Civil Aviation Organization (I.C.A.O.) did adopt a definition in 1952.[5] The distinction between the two types of service has become much less clear over the thirty years since first formulated, primarily because of the rapid growth in recent years of what is called 'charter traffic'. Charter traffic will not really be relevant to the international operations of supersonic aircraft at least in the foreseeable future since neither Concorde nor the TU-144 are suited to the main characteristics of charter traffic, namely high capacity and low fares. There will undoubtedly be some specialist charter flights by supersonic aircraft but these are bound to be few in number.

Before an airline of any State can operate an international commercial scheduled air service, some form of authorisation is required from the State into which that airline wishes to operate.. It was originally envisaged at the time of the Chicago Conference that the authorisation

which was required should be granted by one of the three following methods:-

(1) The International Air Transport Agreement,(6)

(2) The International Air Services Transit Agreement,(7)

(3) Bilateral Agreement between States.

The Transport and Transit Agreements which were drawn up by the Chicago Conference were an attempt to solve the problem of the exchange of traffic rights on a multilateral basis. The Transport Agreement, sponsored by the United States, did not meet with general acceptance and it is now mainly of academic interest. This Agreement granted to its parties what are generally known as the five freedoms of the air and these are embodied in Article I Section 1 of the Agreement which reads as follows:-

"Each contracting State grants to the other contracting States the following freedoms of the air in respect of scheduled international air services:

(1) The privilege to fly across its territory without landing.

(2) The privilege to land for non-traffic purposes.

(3) The privilege to put down passengers, mail and cargo taken on in the territory of the State whose nationality the aircraft possesses.

(4) The privilege to take on passengers, mail and cargo destined for the territory of the State whose nationality the aircraft possesses.

(5) The privilege to take on passengers, mail and cargo destined for the territory of any other contracting State and the

privilege to put down passengers, mail and cargo coming from any such territory."

The Transit Agreement which grants to its parties only the first two freedoms is, as is the Transport Agreement, subject to the terms of the Chicago Convention and so contracting States are at liberty to take action under Chapter II of the Convention, which deals with the flight of aircraft over the territory of contracting States, which action can restrict or even prohibit flight over certain areas of territory.

Regulation by Bilateral Air Transport Agreement.

The third method by which authorisation is given for the operation of international scheduled services is the bilateral agreement whereby States exchange commercial traffic rights.(8) In February 1946, the United Kingdom and the United States concluded the Bermuda Agreement which it can rightly be said marked the beginning of an era in the history of international air transport. Broadly speaking, agreements of the Bermuda type have managed to attain a compromise between unrestricted competition, which was advocated by the United States, and restrictive control over capacities and frequencies on international long-haul routes which was the position of the United Kingdom. Agreements of the Bermuda type embody the following main provisions:-

(1) the adaptation of the services offered to the demand for traffic;

(2) unrestricted competition, given equality of opportunity and observance of mutual interests;

(3) basic capacity geared to Third and Fourth Freedoms;

(4) free exercise of Fifth Freedom rights, but allowing for rival local and regional services; and

(5) the possibility of later readjustment of capacities according to the results obtained.

Although every State is free to decide which routes to grant to foreign carriers and it can also exercise some control over the capacity of the aircraft being operated on international routes, the exercise of these powers is unlikely to have any real effect, at least in the initial years, on commercial supersonic operations. In the case of Concorde, British Airways and Air France are both operating on routes already being flown by these airlines and the capacity of Concorde is considerably less than most of the subsonic jets. Possible regulation by a limitation on the frequency of operations by British Airways and Air France could affect traffic on the North Atlantic routes since one of the hopes of these two airlines is that each aircraft will be permitted to fly two round trips daily.

The introduction of the jet aircraft into regular commercial service in the early nineteen sixties meant greater speed and comfort, but these advantages were accompanied by a great increase in engine noise levels. Concern about the level of engine noise led to a special reservation in the United Kingdom/Soviet Union Bi-lateral Agreement signed in February 1958.(9) Paragraph 18 of the Annex to the Agreement stated:-

> "The airline designated by either contracting party shall, if as a result of noise measurements carried out by the

aeronautical authorities of the other contracting party these measures are required in order to reduce aircraft noise to an acceptable level:

(a) carry out any modification that may be necessary for this purpose to the aircraft to be used on the agreed services;

(b) provide any mufflers or other devices required for this purpose for use during ground running at airports in the territory of the other contracting party to which the aircraft are to operate regularly;

(c) employ such operating techniques or procedures as may be reasonably required by the other contracting party."

It is believed that this was the first time a clause in a bi-lateral agreement sought to regulate aircraft operations, albeit indirectly, by reference to engine noise levels. The clause was directed at the operating techniques of the Russian TU-104 jet airliner but this type of clause is not likely to be used today when new subsonic jets are introduced into service because of the much quieter engines being fitted to these jets. The engine noise of both Concorde and the TU-144 is, however, comparable with that of the noisiest of the current range of subsonic jets and so clauses in future bi-lateral agreements might be used to try and lay down maximum permissible levels not only of engine noise but also of sonic boom overpressures. Any clause in a bi-lateral agreement which purported to lay down maximum permissible noise levels for supersonic aircraft would, of course, have to be agreed upon by both parties. Conflicts of interest would immediately arise, and it seems clear that States will probably find

it easier to adopt noise levels multilaterally through I.C.A.O. There has already been some multilateral agreement on noise levels since in 1972 I.C.A.O. adopted Annex 16 to the Chicago Convention which laid down aircraft noise certification standards but these apply to subsonic aircraft only and supersonic aircraft are specifically excluded.

An important aspect of the role of the bi-lateral agreement has been raised as a consequence of the delay by the New York Port Authority in granting landing rights to the Concorde aircraft operated by British Airways and Air France. The delay has prompted the two airlines to bring an action in the New York District Court against the Port Authority for declaratory and injunctive relief to declare unlawful any action by the Port Authority which might prevent, delay or impede Concorde operations at John F. Kennedy Airport.(10) The Complaint is based on several grounds, the one of particular relevance to the obligations of the United States under the Bermuda and Paris Agreements states that any action or inaction by the Port Authority which might prevent, delay or impede Concorde operations is in conflict with valid and binding treaties, international agreements and obligations of the United States, and is, therefore, invalid under the Supremacy Clause of the United States Constitution.

The Complaint brought by the two airlines states that they are both designated air carriers pursuant to the Bermuda and Paris Agreements for the purpose of operating air services on certain routes including London - New York and Paris - New York. Both airlines are the holders of foreign

air carrier permits issued by the Civil Aeronautics Board and approved by the President of the United States authorising them to engage in foreign air transportation. Both airlines are also the holders of operations specifications issued by the Federal Aviation Administration which specify that they may conduct operations at New York and which, pursuant to the Decision of the Secretary of Transportation dated 4th February 1976,(11) were amended to specify that they may conduct Concorde operations subject to certain conditions. It is also pointed out in the Complaint that no term or condition of the Bermuda or Paris Agreements or of any permits granted thereunder relate to the type of aircraft that may be flown by British Airways and Air France in performing the authorised air transportation. It is also maintained by the two airlines that the Port Authority's Resolution dated 11th March 1976 denying Concorde permission to operate into or out of New York is illegal since it contravenes the terms of the Bermuda and Paris Agreements under which the United States has granted rights of access to New York Kennedy Airport that vest upon compliance with the terms of the Agreements.

Regulation under the Chicago Convention.

A State might also seek to regulate international supersonic operations through some form of action under one of the applicable articles of the Chicago Convention. The Convention articles under which regulation might be possible are Articles 9, 11 and 12.

Article 9(a) permits contracting States for reasons of military

necessity or public safety to restrict or prohibit uniformly the aircraft of other States from flying international scheduled services over certain areas of their territories. Article 9(b), on the other hand, gives contracting States the right in exceptional circumstances or during a period of emergency or in the interest of public safety temporarily to restrict or prohibit flying over the whole or any part of their territories. Under Article 9(a) any restriction or prohibition issued by a contracting State must apply uniformly to the aircraft of other States and no distinction is permitted between aircraft of the State whose territory is involved and the aircraft of other contracting States. Any restriction or prohibition by a contracting State under Article 9(b) must also apply without distinction of nationality to the aircraft of all other States. An example of the establishment of a prohibited area under Article 9(a) was a decree of the Spanish Government issued on 12th April 1967 announcing that all military and civil flights over a forty mile stretch of coast line from Tarifa, which lies south-west of Gibraltar, to Estepona, which lies to the north-east of Gibraltar, were banned for national security reasons. Another example occurred in 1972 when India suspended overflights of her territory by Pakistan civil aircraft and one of the issues in dispute was whether or not the suspension was carried out under the provisions of the Chicago Convention.

Although these two cases provide examples of States seeking to prohibit the aircraft of other States from overflying their territories

or part of their territories, neither sought to declare areas where the passage of one type of aircraft alone was to be restricted or prohibited. This is what would, in effect, result if Article 9 was to be used in an attempt to regulate supersonic aircraft operations. Under Article 9(a) a contracting State is permitted to restrict or prohibit uniformly 'the' aircraft of other States. Does the word 'the' in front of aircraft mean all aircraft or only those aircraft which, in the opinion of the contracting State, it considers most likely to jeopardise "public safety"? Would the creation of such a restricted or prohibited area satisfy the requirement that any regulation must restrict or prohibit uniformly the aircraft of other States? These are questions which a State contemplating action under Article 9 will have to consider and they are not questions which admit of an easy answer.

An additional proviso in Article 9(a) is that any area "shall be of reasonable extent and location so as not to interfere unnecessarily with air navigation". It is evident that difficulties and misunderstandings would result from the creation of areas which permitted the passage of aircraft at subsonic speeds but prohibited the passage of aircraft at supersonic speeds. A contracting State attempting to establish such an area would also have to bear in mind the undertaking which it has given under Article 12 and this is that it must keep the rules and regulations relating to the flight of aircraft over its territory uniform to the greatest possible extent with those established from time to time under

the Convention.

The second article of the Chicago Convention which is of relevance to the regulation of supersonic flight is Article 11 which expressly requires aircraft of a contracting State when in or over the territory of another contracting State, to comply with the latter State's national laws and regulations. The only limitation is that these laws and regulations, which apply to the aircraft of all contracting States engaged in international air navigation, must apply without distinction as to nationality. This article would seem, therefore, to preclude the drafting of any regulation intended to affect, for example, only those contracting States operating supersonic aircraft.

Article 12 of the Chicago Convention declares inter alia that "over the high seas, the rules in force shall be those established under this Convention." Since all the projected routes of Concorde will pass in part over the high seas and also over the territorial waters of States and at least some of the proposed international routes of the TU-144 will also involve routes over the sea, it is of importance to consider what regulation is possible over both these areas. Article 2 of the Chicago Convention declares that "for the purposes of this Convention the territory of a State shall be deemed to be the land areas and territorial waters adjacent thereto under the sovereignty, suzerainty, protection or mandate of such State." There is, however, no uniform width of States' territorial waters,

the Hague Codification Conference of 1930 and the Geneva Law of the Sea Conferences of 1958 and 1960 all failing to agree on a recognised maximum width. One problem which arises out of this absence of international agreement is well known to maritime law and is whether the territorial waters referred to in Article 2 mean those generally accepted in international law or those claimed by any one State. Although the United Kingdom and the United States both still maintain a three mile territorial sea, most other States have unilaterally extended their territorial waters to twelve miles. No final agreement on this subject has been reached at the recent sessions of the Law of the Sea Conference but a twelve mile limit is virtually certain to receive universal application together with some form of exclusive economic zone, possibly extending to two hundred miles. Clearly problems will be faced by the operators of supersonic aircraft flying into those States which claim wide territorial waters (and therefore correspondingly large areas of superjacent airspace) and which have enacted domestic legislation prohibiting the passage of aircraft at supersonic speeds through their national airspace. Ecuador and Peru, for example, both claim territorial seas of two hundred miles.

As has been mentioned the geographical scope of the Chicago Convention is not limited to the territories of the contracting States since Article 12, which deals with the Rules of the Air, provides inter alia, that 'over the high seas, the rules in force shall be those established under this Convention'. Power has therefore been delegated under Article 12 to the

International Civil Aviation Organization to adopt flight rules applicable to the aircraft of contracting States in areas such as the high seas where no national sovereignty can be exercised. Some of these flight rules, those for example determining the cruising levels of aircraft or possibly ones establishing the maximum permissible levels of exhaust emissions or sonic boom overpressures, all comprise additional sets of regulations for the operators of supersonic aircraft and are subject to formulation in such a way as to constitute further restrictions on certain types of supersonic operations.

Although, as has been shown, some of the Articles of the Chicago Convention might be utilised in an attempt to restrict commercial supersonic operations, any contracting State so minded would have to bear in mind the terms of the Preamble to the Convention which calls upon contracting States to avoid friction and to promote cooperation between nations and peoples so that international civil aviation may develop in a safe and orderly manner. Reference should also be made to Article 15 of the Convention which provides that every airport in a contracting State which is open to public use by its national aircraft, shall likewise be open under uniform conditions to the aircraft of all the other contracting States. It is interesting to note that Article 15 has been invoked by British Airways and Air France in their Court action against the New York Port Authority which seeks authorisation from the Port Authority for landing rights for Concorde. The two airlines aver in their Complaint that John F. Kennedy International

Airport is an airport open to public use by United States aircraft and that the Chicago Convention thus creates an international obligation, binding on the United States, to permit operations of Concorde into and out of the airport. The airlines also state that the Chicago Convention does not recognise any limitation on this obligation imposed by laws or regulations enacted or promulgated by individual states or airport operators.

Although the Chicago Convention does not expressly provide for the freedom of flight over the high seas, this rule is found in Article 2(4) of the 1958 Geneva Convention on the High Seas.(12) This Article states that the high seas are open to all nations and that no State may validly purport to subject any part of them to its sovereignty. Freedom of the high seas, continues the Article, comprises, inter alia, freedom to fly over the high seas. Despite the terms of Article 2(4) of the High Seas Convention, some encroachment on that freedom has taken place. In 1950 the United States, followed in 1951 by Canada, created air defence identification zones around parts of their shores.(13) These zones are defined areas of air space within which the identification, location and control of aircraft is required in the interest of national security. In addition to this, the United States has notified I.C.A.O. that it designates from time to time certain areas of the high seas and the superjacent international airspace as 'Caution Areas' or 'Warning Areas'. These designations can almost amount to de facto sovereign control of the areas involved usually for military activities such as the test firing of missiles or aerial combat training.(14)

The United States regulations promulgated for the air defence identification zones state that foreign aircraft may report either when they enter the zone or when the aircraft is not less than one hour and not more than two hours cruising distance from the United States.(15) Since supersonic aircraft travel over the North Atlantic at speeds of over twice that of current subsonic jets, the effect of the American regulations will, in some circumstances, be a considerable extension of the United States jurisdiction over what is the high seas. In cases, for example, where civil supersonic aircraft report when at one hour's cruising distance, the United States will be assuming jurisdiction well beyond the present defined limits of the zone unless the regulations are relaxed in some way. Where, for example, Concorde is flying from London to Washington, the aircraft will still be approximately one thousand miles from the eastern coast of the United States when it has only one hour's cruising time left. Although the legality of air defence identification zones has never been seriously challenged,(16) the zones have not been free from dispute. The legality of a zone created by France off the coast of Algeria was disputed by the Soviet Union in 1961 when an aircraft carrying the Soviet President was intercepted and fired upon by French military aircraft.

Chapter 3 Footnotes.

(1) Article 1 of the Convention on International Civil Aviation signed at Chicago on 7th December 1944 states:- "The contracting States recognize that every state has complete and exclusive sovereignty over the airspace above its territory". The Convention came into force on 4th April 1947.

(2) Article 1 of the Convention relating to the Regulation of Aerial Navigation states:- "The High contracting Parties recognize that every Power has complete and exclusive sovereignty over the airspace above its territory".

(3) See (1) supra.

(4) The Council is the Organization's permanent elective body Arts 50-55.

(5) The definition adopted by the Council on 25th March 1952 (I.C.A.O. Doc. 7278 - c/841 - May 10th 1952) was as follows:-

"A scheduled international air service is a series of flights that possesses all the following characteristics:-

(a) it passes through the airspace over the territory of more than one State.

(b) it is performed by aircraft for the transport of passengers, mail or cargo for remuneration in such a manner that each flight is open to use by members of the public.

(c) it is operated so as to serve traffic between the same two or more points, either (i) according to a published timetable, or (ii) with flights so regular or frequent that they constitute a recognizably systematic series.

(6) The International Air Transport Agreement is embodied as Appendix III to the Final Act of the International Civil Aviation Conference at Chicago.

(7) The International Air Services Transit Agreement is embodied as Appendix IV to the Final Act of the Chicago Conference.

(8) Cheng The Law of International Air Transport, 10.

(9) Cheng, p.330.

(10) U.S. District Court Southern District of New York - British Airways and Compagnie Nationale Air France v. The Port Authority of New York and New Jersey and William J. Ronan and others, Commissioners of the Port Authority of New York and New Jersey. 76 Civ. 1276.

(11) See Appendix I.

(12) U.N. Doc. A/CONF. 13/L.53

(13) Martial, "State Control of the Airspace over the Territorial Sea and the Contiguous Zone", 30 Canad. Bar Review 245 (1952).

Hayton, "Jurisdiction of the Littoral State in the Air Frontier", 3 Phillipine International L.J. 369 (1964).

(14) Robinson, "Military Requirements for International Airspace: Evolving Claims for Exclusive Use of a Res Communes Natural Resource", 11 Natural Resources Jnl. 162 (1971).

(15) Part 99 - Security Control of Air Traffic:- Federal Aviation Regulations Title 14, para. 23.

(16) Martial, p.258.

C H A P T E R 4.

EVOLVING INTERNATIONAL ENVIRONMENTAL LAW AND SUPERSONIC FLIGHT.

The Global Environment.

Throughout most of the history of mankind the nature of the environment in which life on the planet earth subsists has been taken largely for granted. It is only within the last ten to fifteen years that man has begun to realize both how the ever expanding range of his activities can, directly and indirectly, adversely affect the global environment and just how delicate the relationship is between life forms and their surrounding environment. The activities of states, their nationals and their vessels and aircraft which can adversely affect the global environment are both varied and numerous. They include the testing of nuclear devices in the atmosphere with consequent radioactive fallout, marine pollution by the dumping of oil, atomic waste and other substances, weather modification practices, scientific experiments, aircraft exhaust emissions, the use of herbicides and pesticides and terrestial thermal pollution.

Perhaps the most important natural resource which this planet has is the thin layer of air which is essential for all life. Just as the air is no respecter of national frontiers, so pollution of the air, whether caused in the territory of one State or in an area of no national sovereignty, such as the high seas, often affects the territories of other States so

so bringing into issue the reciprocal rights and duties of those states. Military and civil supersonic aircraft represent great technological achievements; however, these achievements have brought with them certain environmental problems, the main ones being exhaust emissions in the stratosphere, sonic booms and engine noise. It is, therefore, important to consider how international environmental law has evolved and, in particular, what parts of this law affect the operation of civil supersonic aircraft.

Existing International Environmental Treaties.

The principal sources of international environmental law are similar to those of international law as a whole, namely, international Treaties, custom, decisions of Judicial or Arbitral Tribunals, juristic works and decisions of international institutions and their organs, in particular the United Nations and its specialized agencies. It is in the field of maritime law that most of the early environmental regulation is found and indeed the seas, both the high seas and territorial seas, are probably the most environmentally regulated international areas of the world. Article 25 of the 1958 Convention on the High Seas[1] is one of the first references in an international Treaty of the need for protection of international airspace, the Article providing (one) that every State shall take measures to prevent pollution of the seas from the dumping of radioactive waste and (two) that all States shall cooperate with the competent international

organizations in taking measures for the prevention of pollution of the seas or airspace above, resulting from any activities with radioactive materials or other harmful agents. Comparable provisions are also to be found in the 1958 Convention on Fishing and Conservation of the Living Resources of the High Seas(2) and the 1958 Convention on the Continental Shelf.(3) The Laws of the Seas Conventions of 1958 have been followed by a substantial number of Conventions(4) dealing with the pollution of the maritime environment but none of these has had any direct relevance to the protection of international airspace.

The first major fears, on a world wide scale, about the contamination of international airspace were voiced in the early nineteen fifties when a series of nuclear tests in the atmosphere was carried out by the United States. The radioactive fallout from these tests contaminated large areas of the high seas in the Pacific Ocean and the international airspace above. Several years after these tests, the major nuclear powers signed the Nuclear Test Ban Treaty(5) which came into force in October 1963. Article 1 of the Treaty provides that each party should not carry out nuclear explosions (a) in the atmosphere, beyond its limits, including Outer Space, or (b) in any other environment if such explosion causes radioactive debris to be present outside the territorial limits of the State under whose jurisdiction or control such explosion is conducted. This Article underlines the recognition by States, at least in the context of the Nuclear Test Ban Treaty, of the concept that a State activity should not cause

adverse effects outside the territorial limits of that state.

The 1972 United Nations Conference on the Human Environment.

The United Nations Conference on the Human Environment held in Stockholm in 1972 was one of the milestones in the evolution of international environmental law.(6) Prior to the holding of this Conference, the subject of the international protection and improvement of the human environment had usually been dealt with in a fragmentary way by international law with only certain areas being brought within the scope of international regulation when there was some danger or matter for concern. The Conference was an attempt, in the words of the Conference Declaration,(7) to meet the need for a common outlook and for common principles to inspire and guide the peoples of the world in the preservation and enhancement of the human environment. The role of civil aviation in the relationship between technological advancement and the human environment had been discussed prior to the Conference by the International Civil Aviation Organization and at the Eighteenth Session of the Assembly, Resolution A18-11(8) was adopted. This Resolution, which was the first formal environmental policy statement by the Organization, acknowledged the significant influence that civil aviation has in the human environment and recognized that both the Organization and its member States had obligations to achieve the maximum compatability between the safe and orderly development of civil aviation and the quality of the human environment.

The twenty first plenary meeting of the Stockholm Conference agreed on the wording of twenty six Principles and of these, two are of particular significance to the protection of international airspace. The first of these, Principle 2, states:-(9)

> "The natural resources of the earth including the air, water, land, flora and fauna and especially representative samples of natural ecosystems must be safeguarded for the benefit of present and future generations through careful planning or management, as appropriate."

The second Principle is Principle 6(10) and it states:-

> "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, must be halted in order to ensure that serious or irreversible damage is not inflicted upon ecosystems. The just struggle of the peoples of all countries against pollution should be supported".

Although the Principles are not part of any formal international Convention and are merely resolutions by a Conference, they underline the growing acceptance by States of certain constraints to their sovereignty. Although remaining sovereign bodies, States agree by accepting these Principles, to exercise the functions of a State within the context of a global environmental policy designed to protect and improve man's environment.

Principles 2 and 6 are both of relevance to civil supersonic aircraft because the operation of these aircraft in one of the earth's major natural resources, the air, has raised several environmental questions and, in

particular, the effect of exhaust emissions on the atmosphere. Clearly this is a case for the careful planning or management envisaged in the wording of Principle 2. The United States has already given this matter serious consideration in an international context since the Secretary of State for Transport announced, in conjunction with his affirmative decision on Concorde, a proposed programme for the international measurement of ozone levels in the stratosphere which would produce the necessary data base for the development of national and international regulations of aircraft operations in the stratosphere.(11) Principle 6 is somewhat more detailed than Principle 2 and makes particular mention of the discharge of substances into an environment which may not be able to render them harmless and it would seem clear that the exhaust emissions of supersonic aircraft constitute one of the substances envisaged by this Principle.

In addition to the Principles agreed on by the Conference, over one hundred Recommendations were also passed and those of relevance to the operation of civil supersonic aircraft include:-

Recommendation 70(12) which reminds Governments of the damages that are inherent in activities having an appreciable risk of effects on the climate;

Recommendation 71(13) which suggests that Governments use the best practicable means available to minimize the release to the environment of toxic or dangerous substances; and

Recommendation 72(14) which advises Governments to concert with each other and with the competent international organizations in planning and carrying out control programmes for pollutants

distributed beyond the national jurisdiction from which they are released.

Territorial Sovereignty and Transnational Environmental Damage.

The Stockholm Conference also deliberated on the difficult questions of how to balance the right of a State to control matters within its territory with its responsibility to ensure that what is done within that territory does not cause damage outside and of how States should use areas outwith the limits of any national jurisdiction in such a manner so as not to cause damage to the environment of such areas or to that of other States. Principle 21[15] of the Conference provides:-

> States have, in accordance with the Charter of the United Nations and the principles of international law, the sovereign right to exploit their own resources pursuant to their own environmental policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction.

This Principle was prepared to deal with the rights of States to control the exploitation of their natural resources. During the deliberations on this particular Principle, some delegations suggested that as a first step in the development of a body of international environmental law, it was essential that it be made clear that 'sovereignty includes the right to environmental integrity in an unimpaired condition'. However other delegates could not agree with this statement, observing that, unlike

sovereignty, the concept of the human environment did not have any clearly established limits. In the end, the final text does not merely reiterate the generally accepted principle that a State has the sovereign right to exploit its own resources, but it includes a reference both to the United Nations Charter and to the principles of international law so as to emphasize the right of a State to exploit these resources pursuant to its own environmental policies albeit within the concept of a single global environment from which no one part can be separated from the rest.

The second part of Principle 21 is of more relevance to the possible damage to the environment by the operation of civil supersonic aircraft, since it makes clear the responsibility of States to ensure that the exercise of their sovereign rights does not cause damage to others. This Principle not only reiterates the principle of responsibility of a State but, by the use of the words 'activities within their jurisdiction or control', makes it clear that the rule of responsibility applies also to any injury inflicted on the environment of areas beyond the limits of national jurisdiction, such as the High Seas, Antarctica or Outer Space. It is clear, therefore, that the operation of civil supersonic aircraft, whether solely within the territory of one State (e.g. the TU-144 services which are entirely within the territory of the Soviet Union) or in international airspace (e.g. the British Airways and Air France Concordes which both operate over the North Atlantic), are included within the wording of Principle 21.

The fourth Principle of the Conference which should be mentioned is Principle 22[16] which provides that:-

> "States shall cooperate to develop further the international law regarding liability and compensation for the victims of pollution and other environmental damage caused by activities within the jurisdiction or control of such States to areas beyond their jurisdiction."

This Principle takes a stage further the responsibility of States as outlined in Principle 21 and provides that if States are bound to prevent environment damaging activities, then they should be legally responsible for damage actually caused. The Principle is a first call for the preparation of an international Treaty on the subject of liability and compensation for the victims of pollution. However, the chances of any such agreement at the present time must be considered small, particularly when one recalls the difficulties encountered by the Stockholm Conference in agreeing to the wording of merely the Principles.[17]

There have been few international decisions on the question of transnational environmental damage. However, two of the leading decisions, The Trail Smelter Arbitration[18] and The Corfu Channel Case[19] must be mentioned as they are considered to have established a recognizable set of principles governing state responsibility for this type of damage. In the Trail Smelter Arbitration, The Consolidated Mining and Smelting Company of Canada Limited had operated a smelter plant for zinc and lead at Trail, British Columbia. The United States Government sought compensation from the

Canadian Government for the damage caused to crops and lumber in the State of Washington by the emission of sulphur dioxide fumes from the plant. The Tribunal held Canada liable for the damage suffered on the footing that it had permitted use of its territory by a resident in a manner which resulted in injury to the territory of another State. The Tribunal also held, as a principle of international law, that ..... no State has a right to use or permit the use of its territory in such a manner as to cause injury by fumes in or to the territory on another or the properties or persons therein'.(20)

Another illustration is the Corfu Channel case in which the International Court of Justice held that once the Albanian Government knew of the existence of a minefield in its territorial waters in the Corfu Channel, it was its duty to notify shipping and to warn approaching British naval vessels of the danger. This decision recognized that activity within a State's territorial bounds ceased to be within the exclusive competence of that State and became instead a matter of international concern if such action caused transnational effects. The Court held that it was the obligation of every State not to allow knowingly its territory to be used contrary to the rights of others.

More recently, in 1973, the International Court of Justice was called upon to consider the legality of the French nuclear tests in the atmosphere over the South Pacific Ocean.(21) In the application to the Court, which was at the instance of Australia and New Zealand, the applicants

asked for a declaratory judgement that the carrying out of further atmospheric nuclear tests was not consistent with the applicable rules of international law. The application was based on several arguments, the one which can be considered of relevance to the operators of civil supersonic aircraft being that the radioactive fallout from the tests violated the territorial sovereignty of Australia and New Zealand. A decision by the Court on the application would have been a very important pronouncement on the international legal requirements to establish liability for extra-territorial environmental effects. However, the Court did not decide any of the matters in issue, holding that the cessation by France of testing, coupled with the French Government's statements declaring an intention to carry out further tests only underground made academic the points in issue.(22)

As has been evidenced by existing international conventions, by the, albeit few, decisions of the International Court of Justice and arbitral tribunals and by certain of the Principles and Recommendations of the United Nations Conference on the Human Environment, the operators of civil supersonic aircraft have been given adequate notice of the way in which international environmental law is moving and, in particular, of the growing acceptance by States of responsibility for transnational environmental damage. Although there is little likelihood of any serious threat to the global environment from the operation of the few civil supersonic aircraft in the world to-day, the research and development teams of any second generation aircraft will necessarily have to bear in mind, not only the effects of

of these aircraft on the human environment, but also the national and international legal consequences following on any damage to that environment.

Chapter 4 Footnotes.

(1) Geneva Convention on the High Seas (U.N. Doc. A/Conf. 13/L.53).

(2) Geneva Convention on Fishing and Conservation of the Living Resources of the High Seas (U.N. Doc. A. Conf. 13/L.54).

(3) Geneva Convention on the Continental Shelf (U.N. Doc. A/Conf.13/L.55)

(4) 1954 International Convention for the Prevention of Pollution of the Sea by Oil (9 Inter. Legal Mats, p.1).

1962 Brussels Convention on the Liability of Operators of Nuclear Ships.

International Convention relating to Intervention on the High Seas in Cases of Oil Pollution Casualties. (9 Inter. Legal Mats, p.25) (not yet in force)

International Convention on Civil Liability for Oil Pollution Damage (9 Inter. Legal Mats. p.45).

1972 Oslo Convention for the Prevention of Marine Pollution by Dumping from Ships and Aircraft (11 Inter. Legal Mats. p.262).

1972 London Convention on the Dumping of Wastes at Sea. (11 Inter. Legal Mats. p.1291).

1973 Convention for the Prevention of Pollution from Ships. (12 Inter. Legal Mats. p.1319).

1974 Convention for the Prevention of Marine Pollution from Land based Sources (13 Inter. Legal Mats. p.252)

(5) The Nuclear Test Ban Treaty (2 Inter. Legal Mats. p.883).

(6) Report of the United Nations Conference on the Human Environment held at Stockholm 5-16 June 1972. (U.N. Doc. A/Conf. 48/14 3rd July 1972).

(7) Conference Report, p.2.

(8) See Appendix H.

(9) Conference Report, p.4.

(10) Conference Report, p.4.

(11) The Secretary of Transportation's Decision on Concorde Supersonic Transport dated 4th February 1976, p.5; See Appendix I.

(12) Conference Report, p.40.

(13) Conference Report, p.40.

(14) Conference Report, p.40.

(15) Conference Report, p.7.

(16) Conference Report, p.7.

(17) A number of global and regional conventions and Protocols have been adopted in the field of the environment since the Stockholm Conference, including the Convention on the Prohibition of Military Use of Environmental Modification Techniques. (16 Inter. Legal Mats. p.88).

(18) 3 U.N. R.I.A.A. 1905. See also Read, "The Trail Smelter Dispute", 1 Canad. Y.B. Inter. Law 213 (1963).

(19) 1949 I.C.J. Reports 4, 22.

(20) Arbitral Award, supra p.1965.

(21) 1973 I.C.J. Reports 320; 1974 I.C.J. Reports 253 and 457.

(22) The Court's decision was a majority one and led to five of the Judges, together with the applicants' ad hoc Judge, giving dissenting opinions.

See also Handl, "Territorial Sovereignty and the Problem of Transnational Pollution", 69 A.J.I.L.50 (1975); Franck, "World Made Law: The Decision of the I.C.J. in the Nuclear Test Cases", 69 A.J.I.L. 612 (1975).

CHAPTER 5.

THE REGULATION OF SUPERSONIC AIRCRAFT BY THE INTERNATIONAL CIVIL AVIATION ORGANIZATION.

The Sonic Boom Panel and Sonic Boom Committee.

The International Civil Aviation Organization has been active in discussing the role of supersonic aircraft since at least 1962 and it is therefore of relevance in any discussion of the regulation of these aircraft to consider the measures which have been taken and which are still under discussion by the Organization. The Assembly,(1) which is the Organization's plenary body and where all member States are represented,(2) meets not less than once every three years(3) and at the fourteenth session of the Assembly in 1962 Resolution A14-7, the first resolution on the subject of supersonic aircraft, was adopted. This requested that supersonic aircraft should be able to operate in commercial service without creating unacceptable situations for the public due to sonic booms. This was, of course, a fairly broadly worded resolution but it did indicate I.C.A.O.'s awareness at an early stage of at least one of the problems associated with supersonic flight. At the sixteenth session of the Assembly in September 1968 further concern was expressed about the possible effects of sonic booms and Resolution A16-4 was adopted. This Resolution noted that research which had already been carried out indicated that at least some of the unacceptable situations envisaged by the fourteenth session of the Assembly

had become realities and therefore that some action would be necessary to prevent these continuing. In Resolution A16-4, the Assembly reaffirmed its earlier view that no unacceptable situations should be caused to the public by sonic booms and it instructed the Council to take the necessary action to achieve inter alia a definition of the expression "unacceptable situations for the public" and also to establish sonic boom limits.

Acting on these instructions of the Assembly the Council on 5th March 1969 adopted a four stage plan, the salient points of each stage being as follows:-

(1) The development of an internationally acceptable practical method of describing and measuring sonic boom and the establishment of a unit of measurement of sonic boom.

(2) A technical assessment of the ranges of sonic boom values likely to cause disturbance to inter alia human beings, property and animals.

(3) A determination of where, within each of the ranges of values defined in stage (2), sonic boom becomes unacceptable and consideration of the legal, social and economic factors needing to be taken into account in making this determination.

(4) The convening of a world-wide meeting for the purpose of establishing international acceptance of the outcome of stages (1), (2) and (3) and of recommending appropriate amendments in I.C.A.O. annexes and associated documents.

Following on the adoption of this plan, I.C.A.O. set up the Technical Panel on Supersonic Transport Operations[4] and the Sonic Boom Panel,[5] but neither of these dealt with any of the legal issues involved with supersonic flight and in March 1971 the Council replaced the Sonic Boom Panel with the Sonic Boom Committee.[6] This Committee, which held its first meeting in May 1972, included in its agenda the legal aspects of supersonic flight and in its first report, the Committee divided the legal aspects into two categories, (first) that relating to public international law on the prevention of sonic booms and the protection of the environment and (second) that relating to private international law and so concerned with the question of liability in the case of damage caused by the boom.[7] The first report of the Committee shows that it came to three main conclusions on the legal aspects of supersonic flight. It was agreed that States have the power to enact national legislation for the protection of their inhabitants, property and environment from the effects of sonic boom.[8] This conclusion was really a recognition of the complete and exclusive sovereignty that every State has over its territory but its formal adoption by the Committee was nevertheless important as a statement of the law as understood and recognized by member States. The second conclusion recognized that States have no power to prohibit supersonic flights of foreign aircraft outside their territories, even though these flights might produce sonic boom effects within their territories and it took note of Article 2(4) of the 1958 Geneva Convention

on the High Seas which provides for freedom to fly over the high seas.(9) The Committee in coming to its third conclusion did not wish to encroach on the principle of the freedom of flight over the high seas but recognized that there existed the problem of how a State which had enacted national legislation to protect its inhabitants, could also enjoy protection for its coastal regions from the effects of sonic booms which were generated over the high seas. It was decided that the difficulties raised in trying to reconcile the right of States to enjoy protection with the principle of the freedom of flight over the high seas, would have to be met by an amendment to one of the Annexes to the Chicago Convention.(10) The question of sonic booms created over one State and producing an effect on another State was also discussed by the Committee and it was decided that this could be settled by bilateral or regional agreements between the States concerned, although several members did think that a multilateral agreement would be more appropriate.(11)

A working group was established by the Committee to study the operational implications of supersonic flight having regard to the wish of some States to enjoy protection for their territory from sonic booms. The working group's report(12) concluded with certain proposals for action, the main proposal being that the Sonic Boom Committee recommend to the Council "that Annex 2 be amended to require the operation of civil supersonic transport aircraft over the high seas in such a manner that any sonic booms resulting therefrom will not impinge upon the surface of the territory of

any State prohibiting sonic booms".[13] This proposal was a far reaching one in its implications as it constituted a further encroachment on the principle of the freedom of the high seas but it was recognized that the justification for any prohibition of supersonic flight over the high seas could only be to protect the inhabitants, property and environment from the effects of sonic booms in the coastal areas of States which had prohibited supersonic flight over their coastal regions.

At the eighteenth session of the Assembly held in June 1971 two resolutions were adopted which indicated the Organization's recognition not only of the environmental effects of supersonic aircraft but also of the wider environmental problems posed by civil aviation generally.[14] Resolution A18-11, which was adopted unanimously, was the first formal policy statement by the Organization on the quality of the human environment in relation to civil aviation.[15] The Resolution recognized that advanced technology had caused civil aviation to become a significant influence in the human environment and that many of the adverse environmental effects of civil aviation activity could be reduced by the application of technology. In the second Resolution, A18-12, the Assembly requested the Council to develop Standards, Recommended Practices and Procedures dealing with the quality of the human environment and contracting States were urged to adopt these measures and procedures when eventually developed. By developing and adopting Standards, Recommended Practices and Procedures[16] (designated as Annexes) on various aeronautical subjects, the International

Civil Aviation Organization is acting in a quasi-legislative capacity and is performing one of its main intended functions since in ratifying the Chicago Convention, each contracting State undertook to collaborate in securing the highest practicable degree of uniformity in regulations, standards, procedures and organization in relation to aircraft, personnel, airways and auxiliary services in all matters in which such uniformity would facilitate and improve air navigation. These Annexes must first of all be approved by the Council by a two thirds majority(17) and after this they are submitted to contracting States and become binding on them within three months unless a majority of States registers its disapproval.(18) After an Annex has come into force, any contracting State is still free to notify the Council of any difference between its practice and that established by an international standard as laid down in an Annex.(19) It should be explained that Article 37 of the Chicago Convention differentiates between 'standards' which are specifications for physical characteristics, configuration, material, performance, personnel or procedure, the uniform application of which is recognized as necessary for the safety or regularity of international air navigation and 'recommended practices' which are similar specifications but their uniform application is considered only desirable and not necessary as in the case of a standard.

The second meeting of the Sonic Boom Committee endorsed the three main legal conclusions reached by the first meeting and it then proceeded to tackle the problems involved in the formulation of a proposed amendment to

to one of the Annexes to the Convention which would ensure protection to the coastal regions of States from the effects of sonic booms generated over the high seas. The Committee agreed that the basic objective of protecting States could best be met by the introduction of international Standards and Recommended Practices into Annex 6, although several members had argued that Annex 2 was the more appropriate instrument.(20)

The main problems which faced the Committee were, first, whether the proposed restriction should refer simply to all flight by aircraft at supersonic speeds, and, second, how to define the areas over which the restriction should apply. The Committee had before it evidence which showed that the width of the sonic boom carpet generally extended to 80 kilometres(21) although it was well known that differing operational and meteorological conditions could double this figure and so there was no doubt about the fact that supersonic flight over the high seas could cause sonic booms to reach both the coastal water areas and the land territories of States. Bearing in mind its earlier endorsement of the rule that States have no power to prohibit supersonic flights of foreign aircraft outside their territories, the Committee decided that it would be unreasonable to regulate supersonic flights by creating authorised or prohibited airways and that the proposed recommendation should not be phrased in a manner which would completely prohibit sonic booms being caused over States' coastal regions but rather should be phrased so as to prevent sonic booms being created which would give rise to adverse effects over the coastal

regions of States. This was, of course, a compromise solution between States like the United Kingdom and France whose airlines would be the first to fly scheduled international supersonic services and those States with coastlines near or under projected supersonic routes. The solution was undoubtedly a restriction on supersonic operations but is seen as a reasonable one having regard to all the circumstances.

Because difficulties were being encountered with the formulation of the proposed standard, it was decided that, as a first step, the Committee should develop a set of criteria which would be met by the Standard.(22) Six criteria were agreed upon and these form the basis of the recommendations finally made to the Council. As these recommendations constitute the first formal steps taken by States in any international body on the question of the regulation of supersonic flight, the six criteria are detailed ad longum:

(a) the Standard should address itself in general terms to the manner in which an aircraft is to be operated in order to achieve a specified objective;

(b) the Standard should be capable of being adhered to by any type of aircraft capable of supersonic flight on the basis of operational parameters pertaining to the aircraft type and the flight undertaken;

(c) the Standard should not unnecessarily restrict supersonic flight and should therefore (i) be phrased in terms of the effects of sonic booms rather than supersonic flight as such (ii) address itself not only to total protection from sonic boom, but also

apply in cases where a State might accept sonic booms of certain characteristics and (iii), permit exemption in individual cases by special permission by the State concerned;

(d) the Standard should respect the sovereignty of a State over its territory and airspace under the terms of the Convention;

(e) the Standard should be phrased in such a manner that it requires an initiative from the State desiring protection in order to make the provision operative for its territory or any portion thereof; and

(f) the Standard should be drafted in a manner compatible with comparable existing provisions in Annex 2.

Great difficulty was also encountered by the Committee when it attempted to delineate the area over which the restriction should apply. A delineation which would cover the maximum area over which sonic boom effects could be caused would have been a substantial encroachment on the rule of the freedom of airspace over the high seas. References to territorial waters and high seas were considered inappropriate because of the widely divergent views of States on the widths of these areas. The term 'coastal area' was suggested but this was also rejected, it being considered too vague. Finally, the Committee decided that the area in which, in an international context, protection should be enjoyed would be described as a State's 'land territory and its immediate vicinity'.(23) The words 'immediate vicinity' are of course vague themselves but the Committee felt that they delineated an area smaller and therefore more easily definable than, for example, the term 'coastal area' which had also been suggested.

On the basis of its findings, the Committee decided to make the following recommendations to the Council[24] for amending Annex 6:-

Recommendation 3/1 Amendment of Annex 6, Part I.

That Annex 6, Part I be amended as follows:-

Chapter 1 - Definitions.

ADD the following definition of "sonic boom";

"Sonic Boom: The acoustic event which is a manifestation of the shock wave system generated by an aircraft when it flies at a speed greater than the local sound velocity."

Chapter 3 - General.

ADD a new paragraph 3.3 to read:

"3.3 All appropriate measures shall be taken by the operator of an aeroplane to ensure that, when it is flying over the seas adjacent to the land area of a State which has decided and has duly published its decision to protect such an area and its immediate vicinity from adverse effects of sonic boom, it is flown in a manner that will not cause such adverse effects."

ADD a new paragraph 3.4 to read:

"3.4 Recommendation: In the event of a violation of the requirement in 3.3, the State concerned should provide all relevant information and assistance to the State of Registry to enable the latter to take the necessary measures."

Recommendation 3/2 Amendment of Annex 6, Part II.

That Annex 6, Part II be amended as follows:-

Chapter I - Definitions

ADD the following definition of "sonic boom":

"Sonic Boom: The acoustic event which is the manifestation

of the shock wave system generated by an aircraft when it flies at a speed greater than the local sound velocity."

Chapter 3 - General.

ADD a new paragraph 3.2 to read:

"3.2 All appropriate measures shall be taken by the pilot-in-command of an aeroplane to ensure that, when it is flying over the sea adjacent to the land area of a State which has decided and duly published its decision to protect such an area and its immediate vicinity from adverse effects of sonic boom, it is flown in a manner which will not cause such adverse effects."

Add a new paragraph 3.3 to read:

"3.3 Recommendation: In the event of a violation of the requirement of 3.2 the State concerned should provide all relevant information and assistance to the State of Registry to enable the latter to take the necessary measures."

It is not unfair to comment that the wording of the recommendations is not as restrictive of supersonic operations as might have been the case. Of the eight Committee members[25] three, the United Kingdom, France and the Soviet Union, are supersonic aircraft manufacturers and have nationally owned airlines operating supersonic aircraft. The recommendations as finally adopted were based extensively on the draft amendments to Annex 2 as originally put forward by the United Kingdom and France and submitted to the Sonic Boom Committee.[26]

The second legal question discussed by the Sonic Boom Committee was dealt with very briefly.[27] It was agreed that the problem of sonic booms

originating over one State and causing an effect in another State would rarely, if at all, arise in practice. If it were to arise, then it could be adequately dealt with by bilateral or regional agreements.(28)

The report of the second meeting of the Sonic Boom Committee was submitted to the President of the Council in June 1973 and at the twentieth meeting of the eightieth session of the Council on the 11th December 1973, the Council requested the Secretary General to refer the proposed amendments to Annex 6 together with certain alternative amendments developed by the Air Navigation Commission to States and appropriate international organizations for comment. The Council also requested the Air Navigation Commission to review comments and to refer the final proposed amendments to the Council for consideration.

The Committee on Aircraft Noise.

In addition to the detailed work being conducted by the Sonic Boom Committee, I.C.A.O. has also been holding regular meetings of its Committee on Aircraft Noise. The main task of this Committee is to develop and set noise certification requirements for subsonic aircraft and its first meeting was held in Montreal from 28th September to 2nd October 1970.(29) While the Committee's remit did not include consideration of any of the legal aspects of aircraft noise, its work should not be ignored in any discussion of the regulation of supersonic aircraft since noise certification standards not only affect the development of future aircraft but they can also be adopted by member States and made to apply to existing aircraft, thereby having an

immediate effect on airline operations.

At the second meeting of the Committee (Montreal 15th to 26th November 1971)[30] the question arose of applying noise certification standards to classes of aircraft not covered by the then current I.C.A.O. standards and it was agreed that possible noise standards for supersonic aircraft should be considered by the Committee. This was to be done under two main headings (first) the setting of standards for current aircraft such as Concorde and the TU-144 and (second) the setting of standards for aircraft still to be developed. It was accepted that it would not be appropriate to apply directly the Annex 16 noise certification requirements to supersonic aircraft as these requirements were developed essentially for application to subsonic aircraft. The Committee finally came to the conclusion that it was unable, at that time, to develop new noise requirements for supersonic aircraft as it did not have sufficient data on the noise characteristics of the aircraft.[31]

Although no second generation supersonic transport aircraft was being developed at the time of the second meeting of the Committee, it was agreed that the following Recommendation should be brought to the attention of all contracting States.[32]

Recommendation 2.1/1 Guidance on Noise Standards for Future Supersonic Transport Aeroplanes.

That contracting States be urged to ensure that any manufacturer or group initiating a programme to develop a supersonic transport aeroplane take into account the following:-

(i) the minimization of noise levels during take off, landing and when in flight;

(ii) the design of an aeroplane so as to minimize the total noise annoyance to communities around aerodromes; and

(iii) acceptance of the concept that a supersonic transport aeroplane should not cause greater total noise annoyance than noise certificated subsonic aeroplanes in service at the same time.

The third meeting of the Committee on Aircraft Noise (Montreal 5th to 23rd March 1973)(33) had before it detailed information on the efforts which were being made to reduce the noise of both Concorde and the TU-144. The position of the United Kingdom and France was that Concorde noise levels complied with Assembly Resolution A14-7 (1962) which constituted the only known guidelines when Concorde was in its early development stages. With regard to current supersonic aircraft, the Committee agreed to make the following Recommendation to the States of manufacture of the Concorde and the TU-144:-(34)

Recommendation 3/2 Noise Requirements for Concorde and TU-144.

That:

(i) the expected noise levels declared by the manufacturers of Concorde and the TU-144 and the considerable endeavours already made to reduce noise be noted;

(ii) the States manufacturing these aircraft be urged to make every endeavour to ensure that noise levels not higher, and hopefully lower, than those expected are achieved; and

(iii) the States manufacturing these aircraft be requested to

report to I.C.A.O. as soon as possible, and in any event significantly before the date of intended introduction into international air navigation, the noise levels achieved in flight tests and the progress of the manufacturers' continuing studies.

On the question of standards for future designs of supersonic aircraft, it became apparent that a majority of the Committee members thought it undesirable to include definitive standards in Annex 16 for application to future aircraft and so it was decided that Recommendation 2.1/1 of the Committee's second meeting be revised. Accordingly, a new recommendation was developed as follows:(35)

Recommendation 3/1 Guidance on Noise Standards for Future Supersonic Transport Aeroplanes.

That any future supersonic transport aeroplane be designed

(i) to minimize the noise levels of the aeroplane below the approach path, below the take-off path and to the side of the aeroplane during take-off climb. (Annex 16 noise certification Standards for subsonic turbojet aeroplanes, current at the time the application for certificate of airworthiness for the prototype was accepted, or another equivalent prescribed procedure was carried out by the certificating authorities, should serve as a general guideline for that purpose);

(ii) in such a manner, using the best noise annoyance rating systems available at the time, to minimize the total noise annoyance to communities around aerodromes.

At the fourth meeting of the Committee (Montreal 27th January to 14th February 1975),(36) it was agreed that States and manufacturers of supersonic

aircraft should use as noise certification guidelines the requirements of Annex 16 for subsonic aircraft and so the following recommendation was made:-(37)

Recommendation 6/1 Amendment of Annex 16 Guidance on Noise Standards for Future SST Aeroplanes.

That Part II of Annex 16 be amended as follows:

ADD a new Chapter, as follows:

"CHAPTER C - SUPERSONIC AEROPLANES

NOTE:- Standards and Recommended Practices for this Chapter are not yet developed but the provisions of CHAPTER 2 - SUBSONIC JET AEROPLANES, as current at August 1971, may be used as guidelines for SST 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."

As far as current supersonic aircraft were concerned, the meeting expressed its continued agreement with the terms of Recommendation 3/2 of the third meeting.

The Legal Committee and the Revision of the 1952 Rome Convention.

The 1952 Rome Convention on Damage caused by foreign aircraft to Third Parties on the Surface, although a private law Convention, is of relevance in any discussion on the regulation of international supersonic flight since the airline operators of supersonic aircraft must take into account the regime of liability imposed by a Convention of this type. The Convention was basically an attempt to ensure adequate compensation for

persons who suffered damage caused on the surface by foreign aircraft while limiting the extent of the liability incurred for such damage. States have, however, been slow to ratify or adhere to the Convention, the main reasons being (one) too low liability limits, (two) many States' domestic laws adequately cover the subject and (three) the Convention provides no clear solution as to its applicability to the problem of noise and sonic boom.

As the provisions of the Rome Convention are not considered strong enough and few States have adhered to the Convention, it does not play any significant role in present day international aviation law. However I.C.A.O. has been studying the revision of the Convention and particularly its applicability to the problems of noise and sonic boom. The Legal Committee of I.C.A.O. at its Nineteenth Session (May to June 1972) recommended that the Sub-Committee on the Study of the Rome Convention meet in 1973 to discuss the revision of the Convention as a whole and taking particularly into consideration the question of liability for damage caused by noise and sonic boom.

The Legal Sub-Committee met in April 1973 but was unable to reach any substantial measure of agreement.(38) Difficulties were immediately encountered by the delegates when they deliberated as to whether Article 1 of the Convention could be construed as applying to noise and sonic boom. Article 1(1) states:-

'Any person who suffers damage on the surface shall, upon

> proof only that the damage was caused by an aircraft in flight or by any person or thing falling therefrom, be entitled to compensation as provided by this Convention. Nevertheless there shall be no right to compensation if the damage is not a direct consequence of the incident giving rise thereto, or if the damage results from the mere fact of passage of the aircraft through the airspace in conformity with existing air traffic regulations.'

The Secretariat made it clear at the meeting that it had been the intention of the Rome Conference that passage of aircraft in conformity with existing air traffic regulations would not give rise to liability, including liability for damage caused by noise associated with that passage. There was also general agreement among the Sub-Committee members in favour of compensation for damage due to noise and sonic boom caused by flights not in accordance with air traffic regulations.(39) The Twenty-first Session of the Legal Committee (Montreal 3rd to 22nd October 1974) having discussed the Sub-Committee's Report decided that the Sub-Committee should proceed with the preparation of a text of a new instrument on the liability for damage caused by noise and sonic boom. During the detailed discussions on the wording of a draft text at the next meeting of the Sub-Committee, it became apparent that several delegates thought it premature to proceed with the actual drafting of a text before it was clear that an international problem existed that could be dealt with appropriately by a treaty.(40) Several proposed amendments to Article 1(1) were submitted, that, for example, of the Chairman of the Sub-Committee provided for absolute liability

for damage caused by noise but only if the flight was not in conformity with existing air traffic regulations.(41) The delegates of the United Kingdom and of the Soviet Union submitted a proposal which attempted to restrict absolute liability in sonic boom damage cases to flights not in conformity with existing air traffic regulations but several delegates declared that they could not support this proposal. Finally, the Sub-Committee decided that it was not an appropriate time for the drafting of a new instrument without further information and studies and the whole question was referred back to the full Legal Committee for further consideration.

Chapter 5 Footnotes.

(1) Chicago Convention Chapter VIII.

(2) Ibid. Article 48(b)

(3) Ibid. Article 48(a)

(4) The Technical Panel on Supersonic Transport Operations (SSTP)

1st Meeting - 23/7/68 to 3/8/68 (Doc. 8776 SSTP/I)
2nd Meeting - 6/1/70 to 23/1/70 (Doc. 8861 SSTP/II)
3rd Meeting - 21/9/71 to 8/10/71 (Doc. 8977 SSTP/III)

(5) The Sonic Boom Panel (SBP)
2nd Meeting - 12/10/70 to 21/10/70 (Doc. 8894, SBP/II)

(6) The Sonic Boom Committee (SBC)
1st Meeting - 9/5/72 to 19/5/72 (Doc. 9011, SBC/I)
2nd Meeting - 19/6/73 to 29/6/73 (Doc. 9064, SBC/II)

(7) SBC/I 3:2

(8) SBC/II 3:2

(9) SBC/II 3:3.1

(10) SBC/II 3:3.2

(11) SBC/II 3:3.4

(12) SBC/II WP/5

(13) SBC/II WP/5 7:1(a)

(14) Paper presented by the I.C.A.O. Council to the U.N. Conference on the Human Environment (Stockholm June 1972) - C-WP/5429 dated 9th September 1971.

(15) See Appendix H.

(16) Chicago Convention: Article 37.

(17) Ibid. Article 90.

(18) Ibid. Article 90.

(19) Ibid. Article 38.

(20) SBC/II 3:2.3

(21) SBC/II 3:4.3.1

(22) SBC/II DP/3 3:2.4

(23) SBC/II 3:2.4

(24) SBC/II 3:2.6

(25) Australia, Canada, France, Japan, the Soviet Union, Sweden, the United States of America and the United Kingdom.

(26) SBC/II WP/25

(27) SBC/II 3:3

(28) SBC/II 3:3.2

(29) The Committee's first meeting was largely procedural and no report of its proceedings was published.

(30) Committee on Aircraft Noise - 2nd Meeting (Doc. 8993 CAN/2)

(31) CAN/2 2.1:2.4

(32) CAN/2 2.1:3.3

(33) Committee on Aircraft Noise - 3rd Meeting (Doc. 9063 CAN/3)

(34) CAN/3 3:4.3.2

(35) CAN/3 3:4.2.4

(36) Committee on Aircraft Noise - 4th Meeting (Doc. 9133 CAN/4)

(37) CAN/4 6:2.4

(38) LC/SC Rome Report dated 16th April 1973, paras. 40 to 57.

(39) Ibid., para. 57

(40) LC/SC Rome - (NSB) Report dated 22nd April 1975.

(41) Ibid., para. 17.1

C H A P T E R 6.

FEDERAL REGULATION IN THE UNITED STATES.

The Federal Aviation Administration and the Environmental Protection Agency.

It is of particular relevance to any discussion of the role of civil supersonic aircraft in national order to examine the regulatory steps which have been taken in the United States. The method by which federal regulations and government decisions on the question of supersonic aircraft have been reached in the United States provides a fascinating insight into the consultative processes of the American system of open government. The Concorde aircraft, and to a lesser extent the TU-144, have suffered as a result of this long consultative process and as a result of the very long research and development period which these aircraft have required. In the twenty years which it has taken for civil supersonic aircraft to be developed, many environmental groups have had time to emerge, those in the United States being particularly well organized and efficient lobbyists against supersonic aviation. There has also, over this period, developed a much greater public awareness of noise as a pollutant and the views of many States have had ample time to form.

In the United States the Federal Aviation Act of 1958[I] set up the the Federal Aviation Administration (F.A.A.) which was charged with the

safety and promotion of air commerce. In particular, the 1958 Act provides that the Federal Aviation Administration shall consider, among other things, as being in the public interest:-

(1) The regulation of air commerce in such a manner as to best promote its development and safety;

(2) The promotion, encouragement and development of civil aeronautics; and

(3) The control of the use of navigable airspace and the regulation of both civil and military operations in the interest of the safety and efficiency of both.(2)

Because of the increasing public concern about aircraft noise that followed the introduction of jet aircraft in the early nineteen sixties, the Federal Government in 1968 passed the Aircraft Noise Abatement Act.(3) This Act amended Title VI of the 1958 Federal Aviation Act by adding a new Section 611 which states that in order to afford present and future relief and protection to the public from unnecessary aircraft noise and sonic boom, the Administrator of the Federal Aviation Administration shall prescribe and amend control and abatement of aircraft noise and sonic boom.(4) It is interesting to note that this was the first reference in a United States Statute to aircraft noise and sonic boom.

In response to Section 611, the Federal Aviation Administration promulgated its first aircraft noise regulations in November 1969 - Federal Aviation Regulations, Part 36.(5) These regulations prescribed noise standards and limits for the type certification of the large subsonic

aircraft of new design and reflected the technological development of the high by-pass engine. Supersonic aircraft were specifically excluded from the new Part 36, however, paragraph V of the Regulations did state that civil supersonic aircraft should at some future time be regulated for take off and landing noise purposes as well as for sonic boom. The 1969 National Environmental Policy Act[6] signified the next stage in the development of environmental awareness in the United States, one of its major provisions being that any Governmental department or agency was obliged to submit to the Environmental Protection Agency (E.P.A.) set up by the Act, an Environmental Impact Statement in regard to any proposed course of action affecting the quality of the human environment.

The first clear indication of Presidential Policy towards the question of supersonic flight over the United States was contained in a Policy Statement issued in January 1970 which said that "it was the unequivocal position of the Administration that no commercial supersonic aircraft would be allowed to fly over populated areas at boom producing speeds."[7] Three months after the Presidential Policy Statement, the F.A.A. in further implementation of the provisions of Section 611 of the 1958 Federal Aviation Act, issued a Notice of Proposed Rule Making on Civil Aircraft Sonic Boom.[8] The Notice was more restrictive of supersonic operations than the Presidential Policy Statement had envisaged since it proposed to restrict flight over the whole land surface of the United States and not just over populated areas as had been envisaged in the Statement;

however, the wording would have permitted flight by aircraft above the speed of sound as long as this did not create sonic booms. The Notice stated[9] that a sonic boom restriction over land areas was believed to be a necessary environmental policy and that the objective of the rule should be to restrict all supersonic operations to speeds that ensured that no sonic booms would reach any part of the surface of the United States except the territorial waters. The exclusion of the territorial waters was short lived however, because when the final regulations were issued by the F.A.A. in 1973[10] it was made clear that the territorial seas of the United States would enjoy the same protection afforded to the land areas.

The actual restriction of supersonic flying over the United States is only one of the methods of regulation open to the Government since through the F.A.A., the Government is responsible for the type certification of aircraft. On 4th August 1970, the F.A.A. issued an Advance Notice of Proposed Rule Making[11] which was the first step in the establishment of noise standards for the type certification of civil supersonic aircraft and in the Notice the F.A.A. stated that it was their intention to make supersonic aircraft subject to standards which required the full application of noise reduction technology.

The next major piece of legislation was the 1972 Noise Control Act.[12] This Act specifically gives to citizens of the United States the right to start civil actions on their own behalf against any person or the Government or any Governmental agency for violation of the provisions of

the Act. Similarly, civil actions may be brought against the Administrator of the E.P.A. or F.A.A. for failure to perform any non-discretionary duty under the Act. The Act also defines the responsibilities of and the relationship between the F.A.A. and E.P.A. in the field of control and abatement of aircraft noise and sonic boom. It is specifically provided in the Act that in order to afford present and future relief and protection to the public health and welfare from aircraft noise and sonic boom the F.A.A., after consultation with the E.P.A., shall prescribe and amend such regulations as the F.A.A. may find necessary.

In March 1973, nearly three years after publication of its Notice of Proposed Rule Making, the F.A.A. formally amended its aviation regulations by prohibiting the supersonic flight of civil aircraft except under the terms of an authorisation to exceed Mach I, the purpose of the amendment being to afford the public the protection from sonic booms referred to in Section 611 of the 1958 Federal Aviation Act. Prior to the amendment being issued the F.A.A. had proceeded through all the consultative stages required of it including consultation with the Secretary of Transportation and submission of the proposed amendment to the E.P.A.

The amendment added a new paragraph 91.55 to Part 91 of the Federal Aviation Regulations:-(13)

91.55 Civil Aircraft Sonic Boom:-

No person may operate a civil aircraft at a true flight mach number greater than 1 except in compliance with conditions

and limitations in an authorisation to exceed mach 1 issued to the operator under Appendix B of this part.

A new Appendix B was added and this states in detail the manner in which an applicant must apply for an authorisation to operate a civil aircraft at a true flight mach number greater than 1. Such authorisation might, for example, be granted to permit test flights aimed at trying to reduce or eliminate the effects of sonic booms or to show compliance with air worthiness requirements. Under the terms of the Noise Control Act of 1972, the Administrator of the F.A.A. is prohibited from issuing an original type certificate to any aircraft until a finding has been made as to whether or not substantial noise abatement could be achieved for that aircraft by prescribing standards and regulations. As a consequence of this and of the provision in the Act that the E.P.A. be consulted by the F.A.A., the E.P.A. has prepared draft regulations for the eventual noise certification of supersonic aircraft.(14) In the draft regulations, which were published in November 1973, the E.P.A. recommended that the proposed rule should contain certain elements, the more important of which are:-

(1) All supersonic aircraft (except the Concorde and TU-144) applying for type certification after the publication date of the proposed rule should meet the noise criteria of F.A.R. Part 36 for subsonic aircraft.

(2) Future developments in noise control should be reflected in modifications to the rule as soon as technology permits.

(3) Aircraft having applied for type certification or having made their first flight prior to the publication date of

the rule should be exempted from meeting the F.A.R. Part 36 criteria noise levels for subsonic aircraft.

(4) Concorde and TU-144 certification should be contingent upon meeting the noise levels at the F.A.R. Part 36 measuring points listed in Table 2.

Table 2.

F.A.R. Part 36 Measuring Points	Concorde and TU-144 Criteria Levels in EPNdR	Subsonic Aircraft Comparison Levels in EPNdR.	
		707	DC-8
Sideline	115	107.5	103
Take off	117	114	117
Approach	115	119.5	117

On 27th February 1975, the E.P.A. formally submitted to the F.A.A. recommended noise standards for civil supersonic aircraft that would have made F.A.R. Part 36 standards applicable to future production aircraft i.e., those upon which substantive production was started after 28th March 1975. Current supersonic aircraft were not included in this proposal but the E.P.A. suggested eight possible options for consideration, ranging from exemption of the original sixteen Concordes from any noise requirements to prohibition of their operation in the United States. The E.P.A. recommended Option 3, which would have allowed supersonic aircraft operations at United States airports designated by the F.A.A. as suitable, if accepted by the local airport operator, and subject to certain specified operating restrictions. On January 14th 1976 the E.P.A. transmitted to

the F.A.A. new noise proposals which would apply the F.A.R. Part 36 standards to any aircraft, including supersonics, that did not have flight time before 31st December 1974. Despite the plethora of proposals by the E.P.A., the F.A.A. has not yet issued any Notice of Proposed Rule Making on the question of noise standards for civil supersonic aircraft.

The Environmental Impact Statement and the Secretary of Transportation's Decision on Concorde Supersonic Transport.

In compliance with the terms of the 1969 Environmental Protection Act, the F.A.A. in March 1975 issued its draft Environmental Impact Statement (E.I.S.) on the proposed supersonic services to the United States by British Airways and Air France. The main recommendations in the Statement were:-

(i) that six supersonic flights a day be allowed to the United States, two flights to New York and one flight to Washington by both British Airways and Air France,

(ii) that Concorde was still operating outwith F.A.R. Part 36 and was noisier by 10 EPNdB than the next noisiest aircraft, the DC8-60,

(iii) that public hearings should be held so as to enable interested parties to put their opinions and points of view to the F.A.A., and

(iv) that prior to route proving flights or scheduled operations, operators must obtain the necessary authorisation from the operators of the airports involved.

On 13th November 1975, the F.A.A. issued its Final Environmental Impact

Statement. While this document was a significantly more detailed account of the technical standards, measurements and calculations involved, it did not alter in any material way the main findings of the draft Statement. The Final Statement did expand, however, on the environmental effects on the United States of the proposed Concorde operations, concluding that the utilization of Concorde in regular commercial services on a limited basis would produce adverse environmental effects. In particular, the Statement concluded that the much greater size of the Concorde noise footprint would undoubtedly bring occasional serious disturbance to areas where jet noise had not been a problem. The Statement also concluded that Concorde operations might create an incidence of two hundred new cases of non-melanomic, non-fatal skin cancer in the United States each year as a result of increased ultra-violet radiation reaching the earth caused by damage to the ozone layer in the stratosphere.

British Airways and Air France applied on 29th August 1975 and on 21st September 1975, respectively, to the F.A.A. for amendment of their operations specifications so as to enable Concorde to fly into the United States. However, despite the publication of the Final Environmental Impact Statement, the Secretary of Transportation did not feel able to decide finally on the two applications without a further public hearing which took place on 5th January 1976.

The long awaited 'Decision on Concorde Supersonic Transport'(15) was made public by the Secretary of Transportation on 4th February 1976 and it

permitted British Airways and Air France to conduct limited scheduled commercial flights into the United States for a trial period not to exceed sixteen months under certain limitations and restrictions. The Secretary directed the Administrator of the F.A.A. to amend provisionally the operations specifications of the two carriers involved so as to permit each carrier to operate up to two Concorde flights per day into New York Kennedy Airport and one Concorde flight per day into Washington Dulles Airport. The Secretary added, however, that the provisional amendments could be revoked at any time on four months' notice, or immediately in the event of an emergency deemed harmful to the health, welfare or safety of the American people. With regard to the question of ozone depletion in the stratosphere, the Secretary directed the F.A.A. to proceed with a proposed High Altitude Pollution Programme to produce the necessary data for the development of national and international regulations of aircraft operations in the stratosphere. In addition, the Secretary requested the President of the United States to instruct the commencement of negotiations with the United Kingdom and France for the establishment of a monitoring system for measuring ozone levels in the stratosphere.

The Role of the United States Congress.

The United States Congress has witnessed the introduction of many bills attempting to prohibit the overflight of civil supersonic aircraft but these have all been unsuccessful.(16) The first such attempt, in 1967,(17) was a proposal to amend the 1958 Federal Aviation Act so as to make it

unlawful to operate any civil supersonic aircraft through the navigable airspace of the United States if sonic boom overpressures were generated which exceeded one and five-tenth pounds per square foot. Another Congressional attempt was made in April 1968 when Senator Case introduced a bill which sought to prohibit non-military aircraft from creating sonic booms while in operation over the United States, but this again was unsuccessful.(18) These attempts to prohibit overland supersonic flight failed for numerous reasons, firstly because the full environmental effects of such flights had not yet been thoroughly examined by Congress, neither had they been fully publicised by the environmental pressure groups; secondly, the United States was still engaged in building a supersonic aircraft at this time; and thirdly, the Federal Government was whole-heartedly behind the whole concept of supersonic flight.

Throughout 1969 and 1970, Congressional attempts continued unabated in an effort to try and prohibit supersonic flights and December 1970 witnessed the introduction of a further two bills. The first bill(19) introduced by Senators Magnuson and Jackson tried to prohibit any person from operating a civil aircraft at a true flight Mach number greater than 1 and, although there was a unanimous Senate view in favour of this, the bill did not become law.(20) A second bill,(21) introduced by Senator Nelson, sought to show that it was the policy of Congress to prohibit the operation of civil supersonic aircraft within the territorial jurisdiction of the United States until the costs of the sonic boom and stratospheric pollution

had been reduced to zero. This bill together with many subsequent bills were all unsuccessful not only because of the reasons which have already been mentioned but also because the very powerful aviation lobby had managed to show that any outright ban on supersonic flight might result in the cancellation of the whole United States supersonic aircraft programme and this might mean that American airlines would be forced to purchase the British-French Concorde in order not to lose their competitive positions in world markets. The continued pressure from the aerospace and airline lobby groups together with the Federal Administration's continued funding of the programme, managed to persuade Congress that the time was not yet right for the introduction of regulatory or prohibitory legislation.

One might have thought that after the F.A.A. had formally amended its Regulations by prohibiting the supersonic flight of civil aircraft, the flow of Congressional bills aimed at controlling the flight of supersonic aircraft would have stopped, bearing in mind also that the American supersonic programme had by this time been cancelled, but this was not the case. Yet another bill,[22] this one introduced into the House of Representatives shortly after the visit of Concorde to the United States in September 1973, sought to halt all flights of supersonic aircraft into or over the United States. The sponsor of the bill, Representative Lester Wolff, referring to the decision to abandon the American supersonic programme claimed that Congress would be seen as applying a double standard

if foreign supersonic aircraft were permitted to fly even subsonically over, and land in the United States, but the bill was rejected.

One of the last major Congressional attempts to prohibit the entry of Concorde to the United States occurred in July 1975 but was once again unsuccessful. Both the House of Representatives and Senate narrowly defeated an amendment to the 1976 Department of Transportation Appropriations Bill. The amendment put forward in the House of Representatives proposed the exclusion of aircraft not meeting United States aircraft noise standards and the vote was 196 in favour to 214 against. In the Senate, the amendment sought to prohibit expenditure on Air Traffic Control facilities for supersonic aircraft and the vote was 44 in favour and 46 against, a majority against of only 2.

The Clean Air Acts.

In addition to the mass of legislation and regulation on the questions of noise and sonic boom, there also exists a regulatory framework for the control of aircraft engine emissions. The Clean Air Amendments of 1970(23) significantly increased the authority of the Federal Government to limit air pollution by the setting of engine emission standards. In particular, these Amendments added a new Section 231 to the Clean Air Act of 1963 which instructs the Administrator of the U.P.A. to investigate the emission of any air pollutant from any class or classes of aircraft, or aircraft engines which in his judgement casues or contributes to, or is likely to cause or contribute to air pollution which endangers public health

or welfare.[24] In July 1973, the E.P.A. brought into force a new Part 87 of The Clean Air Act - "Control of Air Pollution from Aircraft and Aircraft Engines"[25] and this established emission standards and test procedures for most types of aircraft and aircraft engines. It also laid down maximum permissible pollutant levels for hydrocarbons, carbon monoxide, nitrogen oxide and smoke. These standards are, however, not yet applicable to supersonic aircraft, although the E.P.A. has proposed standards that would apply to supersonic engines manufactured on or after 1st January 1979.

Enforcement of the standards is as important as the standards themselves and under section 232 of the Clean Air Act, the Secretary of Transportation is specifically given the responsibility of insuring compliance with all the standards prescribed under section 231 by the E.P.A. Following on this, the F.A.A. issued Special Federal Aviation Regulation (S.F.A.R.) No.27[26] and in terms of this, no operating certificates will be issued by the F.A.A. for an engine or aircraft to which the E.P.A. standards apply unless that engine or aircraft complies with the relevant standards.

Chapter 6 Footnotes.

(1) Public Law 85 - 726, 72 Stat. 731 (1958) U.S.C.

(2) Public Law 85 - 726 Section 102.

(3) Public Law 90 - 411, 82 Stat. 395 (1968) U.S.C.

(4) S.611(a) In order to afford present and future relief and protection to the public from unnecessary aircraft noise and sonic boom the Administrator of the Federal Aviation Administration after consultation with the Secretary of Transportation shall prescribe and amend standards for the measurement of aircraft noise and sonic boom, and shall prescribe and amend such rules and regulations as he may find necessary to provide for the control and abatement of aircraft noise and sonic boom, including the application of such standards, rules and regulations in the issuance, amendment, modification, suspension or revocation of any certificate authorized by this title.

(5) Federal Aviation Regulations Part 36 - Noise Standards: Aircraft Type Certification - 4th November 1969 - Docket No. 9337; Amendments 21 - 27 - 34 F.D. 19025.

(6) 42 U.S.C. 4332(2) (c) 1970.

(7) N.Y.T. 9th January 1970, p.66, c.2 - Policy Statement by Deputy Presidential Assistant Wm E. Timmons contained in letter to Representative Reuss of Wisconsin.

(8) 14 Code of Federal Regulations (C.F.R.) Part 91 - Docket No. 10261, Notice No. 70 - 16 (35 Fed. Reg. 6189).

(9) 35 Fed. Reg. at 6190.

(10) 14 C.F.R. Part 91 - Docket No. 10261, Amendment No. 91 - 112 (38 Fed. Reg. 8051).

(11) 14 C.F.R. Part 36 - Docket No. 10494, Notice No. 70 - 33 (35 Fed. Reg. 12555)

(12) Public Law 92 - 574, 86 Stat. 1234.

(13) 14 C.F.R. Part 91 - Docket No. 10261, Amendment No. 91 - 112 (38 Fed. Reg. 8051)

(14) U.S.E.P.A. Draft Project Report dated 28th November 1973 - "Aircraft Noise Certification Rule for Supersonin Civil Aircraft".

(15) See Appendix I.

(16) See Appendix D.

(17) H.R. 1110, 90th Cong., 1st Session (1967)

(18) S.3399, 90th Cong., 2nd Session (1968)

(19) S.4547, 91st Cong., 2nd Session (1970)

(20) N.Y.T. 3rd December 1970, p.1, c.4.

(21) S.4565, 91st Cong., 2nd Session (1970)

(22) H.R. 10531, 93rd Cong., 1st Session (1973)

(23) Public Law 91 - 604, 42 U. .C. (1970) paras. 1857-1858 (a).

(24) 42 U.S.C. para. 1857f - g (1970)

(25) 40 C.F.R. Part 87, 38 Fed. Reg. 19087 (1973)

(26) S.F.A.R. No.27, Fuel Venting and Exhaust Emission Requirements for Turbine Engine Powered Airplanes. 38 Fed. Reg. 35440 (1973)

C H A P T E R 7

REGULATION IN THE UNITED STATES BY STATE AND MUNICIPAL AUTHORITIES.

State and Local Authorities Including Airport Proprietors.

The regulation of aircraft noise in the United States of America has brought into conflict the Federal Government, local and state governments, airport proprietors and airline operators. Because of the complexity of the noise problem and of the confusion about which regulatory body has what responsibilities, the Department of Transportation published in November 1976 an Aviation Noise Abatement Policy Statement(1) in an attempt to summarize the major responsibilities of each party involved and also to outline the Federal Government's proposed course of action in the field of aircraft noise abatement. The Policy Statement summarizes as follows the responsibilities of the three main regulatory bodies:(2)

(1) The Federal Government has the authority and responsibility to control aircraft noise by the regulation of source emissions, by flight operational procedures and by management of the air traffic control system and navigable airspace in ways that minimise noise impact on residential areas, consistent with the highest standards of safety. The Federal Government also provides financial and technical assistance to airport proprietors for noise reduction planning and abatement activities and,

working with the private sector, conducts continuing research into noise abatement technology.

(2) Airport Proprietors are primarily responsible for planning and implementing action designed to reduce the effect of noise on residents of the surrounding area. Such actions include optimal site location, improvements in airport design, noise abatement ground procedures, land acquisition, and restrictions on airport use that do not unjustly discriminate against any user, impede the federal interest in safety and management of the air navigation system, or unreasonably interfere with interstate or foreign commerce.

(3) State and Local Governments must provide for land use planning and development, zoning, and housing regulation that will limit the uses of land near airports to purposes compatible with airport operations.

As a result of the Federal Government's exclusive statutory responsibility for noise abatement, the responsibilities of state and local governments of noise abatement through the exercise of their basic police powers have been circumscribed. The scope of their authority has been most clearly described in negative terms, arising from litigation over their rights to enact ordinances and regulations. The first important case is undoubtedly Allegheny Airlines v Village of Cedarhurst.(3) In this case the Village of Cedarhurst adopted an ordinance which prohibited overflights by aircraft at altitudes lower than one thousand feet. The ordinance was challenged by Allegheny Airlines and the Federal District

Court held the ordinance invalid declaring that legislative action by Congress had regulated air traffic in the navigable airspace to such an extent as to constitute pre-emption in that field. On appeal, the Court of Appeals affirmed the District Court's decision by holding the ordinance to be an encroachment on the federally pre-empted domain of air traffic control. In a second case, American Airlines v Town of Hempstead,(4) the Town enacted an ordinance prohibiting aircraft from creating noise at or above specified levels over certain areas within the town limits. This ordinance was more restrictive than that passed by the Village of Cedarhurst since almost all aircraft contravened its terms on normal take-off from New York airport. The ordinance was challenged by American Airlines and again, as in the Allegheny Airlines v Village of Cedarhurst case, the Federal District Court held that the ordinance conflicted with federal regulations.

In a more recent case, City of Burbank v Lockheed Air Terminal,(5) the Supreme Court concluded that the Federal Aviation Administration had full control over aircraft noise, pre-empting state and local control including, in this case, a municipal ordinance which imposed a curfew on the take-off of pure jet aircraft between the hours of 11 p.m. and 7 a.m. This ordinance was passed by the City Council of Burbank in California and the Lockheed Air Terminal brought an action against the Council seeking an injunction against the enforcement of the ordinance. The District Court found the ordinance to be unconstitutional on the grounds that it conflicted with the Supremacy Clause of the United States Constitution and

also that it was an undue burden on interstate commerce. The Court of Appeals affirmed the District Court's decision as did the Supreme Court. In the Supreme Court decision (a five to four majority decision) reference was made to an important statement by the Secretary of Transportation at the time the 1968 Amendment to the Federal Aviation Act of 1958 was being considered by the Aviation Sub-Committee of the Senate Committee on Commerce.(6) In response to a question as to whether the proposed legislation would to any degree pre-empt state and loval government regulation of aircraft noise and sonic boom, the Secretary of Transportation stated in reply:-

> "The Courts have held that the Federal Government presently pre-empts the field of noise regulation in so far as it involves controlling the flight of aircraft. Local noise control legislation limiting the permissible noise level of all overflying aircraft has recently been struck down because it conflicted with federal regulation of air traffic. The legislation (i.e., the 1968 Amendment) operates in an area committed to federal care, and noise limiting rules operating, as do those of the ordinance, must come from a federal source. The Amendment would merely expand the Federal Government's role in a field already pre-empted. There is, however, a way in which local or state authorities can regulate the operations of supersonic aircraft and that can be done in their capacities as airport owners and operators."

Mention should also be made of an interesting opinion given in 1971 by the Supreme Court of Massachusetts. In this opinion the Court advised the Massachusetts State Legislature that a proposed statute that denied

the use of airports located in the State to supersonic aircraft and other commercial aircraft having noise levels above the specified standards would be invalid because federal legislation had pre-empted the field of aircraft noise control.(7) In the case, the Department of Transportation, the Federal Aviation Administration and the Civil Aeronautics Board all maintained that by banning supersonic transport take-offs and landings, the Legislature would be completely forbidding a certain type of air traffic and a certain use of airspace, and this would consequently be illegal. The Court indicated that although it accepted that Congress had not intended to restrict the right of state or local agencies to issue regulations concerning aircraft noise levels, it still doubted the constitutional validity of such a regulation, even if framed in terms of airport proprietors, because of the action already taken by the F.A.A. in issuing Notices of Proposed Rule Making on aircraft noise reduction techniques,(8) on protection from sonic booms,(9) and on supersonic aircraft type certification standards.(10)

The two most recent cases of relevance to the legal responsibilities of municipal airport proprietors are Air Transportation Association v Crotti(11) and National Aviation v City of Hayward.(12) Both cases follow on the earlier important decision in Griggs v Allegheny County(13) which was that an airport proprietor is liable for aircraft noise damages resulting from operations at his airport and both cases refer extensively to the Secretary of Transportation's letter cited in the City of Burbank v Lockheed Air

Terminal case. In the case of Crotti (a three judge District Court decision), the Court upheld in part a California airport noise statute imposing noise abatement duties on airport proprietors. In the case of the City of Hayward, the Court refused to enjoin a curfew on noisier aircraft which had been imposed at the municipally owned Hayward Air Terminal in California. The Court held that it could not make findings similar to those in the City of Burbank case because in that case, the ordinance had been passed by a city council, whereas in the case under consideration the ordinance had been passed by a municipal airport proprietor. Two important Constitutional restrictions on the powers of municipal airport proprietors were laid down by the Court in the City of Hayward case and these were that any exercise of powers must not impose an undue burden on interstate or foreign commerce nor must it unjustly discriminate between different categories of airport users.

British Airways and Air France v The New York Port Authority.

On 4th February 1976 the United States Secretary of Transportation, William T. Coleman, published his Decision and Order on the applications by British Airways and Air France to operate Concorde supersonic flights into the United States.(14) The Order authorized the two airlines to conduct limited scheduled commercial operations for a trial period not to exceed 16 months and each airline was to be permitted two Concorde flights a day into and out of New York John F. Kennedy Airport and one Concorde flight a day into and out of Washington Dulles Airport. Within one week

of the Secretary's Decision, the two airlines had notified the New York Port Authority of their intention to start operations and immediately following that, the Port Authority passed a Resolution[15] denying Concorde permission to operate into or out of New York Kennedy Airport until it had received a report evaluating supersonic operations experience over a six month period at Washington Dulles, London Heathrow and Paris Charles de Gaulle Airports.

The passing of the Resolution by the Port Authority denying Concorde operating rights into and out of New York Kennedy Airport has resulted in a court action which will undoubtedly reach the Supreme Court and may rule definitely on the respective powers and responsibilities of the Federal Government and the municipal airport proprietor in the field of aircraft noise. The New York Port Authority which operates and maintains Kennedy Airport, is a bi-state corporation created by the two states of New York and New Jersey and it is composed of twelve Commissioners, six from each state. Following on intimation of the terms of the Resolution to British Airways and Air France, the two airlines commenced civil proceedings in the Southern District Court of New York against the Port Authority and the Commissioners seeking to have declared unlawful any actions or inactions by the Port Authority which might be intended to or have the effect of preventing, delaying or impeding the operation by the airline of Concorde at New York Kennedy Airport.[16]

The grounds put forward by the two airlines in their action against

the Port Authority are clearly of importance since they must necessarily form the basis from which the courts will eventually rule on the conflict between the Federal Government's pre-emption in the regulation of navigable airspace and aircraft operations and the recognized right of municipal airport proprietors to decide on what aircraft will use their airports. The first ground on which British Airways and Air France base their case is that the Port Authority's Resolution invaded an area of regulation pre-empted by the Federal Government and was, therefore, invalid under the Supremacy Clause, Article VI Section 2 of the United States Constitution. As evidence of federal pre-emption, the case refers to the following points:-

(1) The Secretary of Transportation's Decision was in implementation of a comprehensive regulatory scheme, set up under federal statutes such as the Federal Aviation Act of 1958, the Department of Transportation Act of 1966 and the Noise Control Act of 1972, to control the use of navigable airspace and aircraft operations in the United States;

(2) British Airways and Air France being foreign air carriers, their operations are the subject of federal regulation;

(3) Section 611 of the Federal Aviation Act directs the F.A.A. Administrator to control aircraft noise and sonic booms; and

(4) The Civil Aeronautics Board, a federal agency, is responsible for granting British Airways and Air France foreign air carrier permits under Section 402 of the Federal Aviation Act.

The second ground put forward by the two airlines is that the refusal

by the Port Authority constitutes a breach of the treaty obligations of the United States under the Bermuda and Paris Agreements and the Chicago Convention. It is maintained that the terms[17] of the two air services agreements require that British Airways and Air France be permitted to use New York Kennedy Airport for commercial operations and that they do not recognize any limitation imposed by regulations promulgated by any individual state or airport proprietor. Reference is also made to Article 15 of the Chicago Convention which requires that every airport of a contracting State which is open to public use by its national aircraft shall likewise be open under uniform conditions to the aircraft of all other contracting States.

The third ground advanced by British Airways and Air France is that the Port Authority's Resolution has direct foreign policy implications for the United States because any discriminating treatment of foreign air carriers is likely to upset the careful balance of reciprocal international landing and take-off rights. As the Port Authority's action in denying Concorde landing and take-off rights constitutes, the airlines maintain, discriminatory treatment, it is invalid interfering as it does with the constitutional authority of the Federal Government to conduct foreign relations.

Following on the original submission of the court action, the two airlines waited until the expiry of the six month evaluation period provided

for in the Port Authority's Resolution, however, no final decision was forthcoming. The action was heard on 11th May 1977 and Judge Milton Pollack of the Southern District Court of New York ruled (solely on the issue of federal pre-emption) that the Port Authority did not have the power to prevent Concorde landings for a test period. The Judge held that the Secretary of Transportation was empowered under the 1958 Federal Aviation Act to authorize a 16 month trial period and the Port Authority's decision, being in irreconcilable conflict with this, was necessarily invalid. The Port Authority has appealed against the District Court ruling and Concorde operations to New York have not yet commenced. It should also be mentioned that the New York Port Authority is not the only airport proprietor to enact a resolution which has the effect of restricting or prohibiting supersonic aircraft operations. The Board of Commissioners of Los Angeles International Airport have adopted two Resolutions (Number 5456:- 22nd October 1969 and Number 7467:- 20th December 1972)[18] which state in effect that the airport will accept any aircraft which meets the provisions of Part 36 of the Federal Aviation Regulations in respect of noise.

Concorde and Washington Dulles Airport.

Washington Dulles International Airport is owned and operated by the Federal Government and so the granting of permission for Concorde operations at the airport was never in doubt. Despite this, determined efforts to stop the Concorde services were made by the municipal authorities whose

districts were going to be affected by the proposed operations and by an influential environmental pressure group, the Environmental Defense Fund. Prior to the Secretary of Transportation's Decision on 4th February 1976 the governing bodies of Fairfax and Loudon Counties, Virginia and Nassau County, New York had brought an action in the District of Columbia District Court against both the Administrator of the F.A.A. and the Secretary of Transportation.(19) This action sought a preliminary injunction prohibiting the defendants from taking any action that would allow the Concorde to land at either Washington Dulles or New York Kennedy Airports without the Federal Government having first promulgated supersonic aircraft noise regulations under Section 611 of the 1958 Federal Aviation Act as amended by the 1972 Noise Control Act. Before the action could be heard, the Secretary of Transportation's Decision was published and, at the same time, the Environmental Defense Fund filed a petition in the District of Columbia Court of Appeals for review of that Decision.(20) In view of this, the District Court ruled that it could not consider the merits of the case before it, as the petition for review in the Court of Appeals was based on a provision in the Federal Aviation Act which established exclusive jurisdiction in the Court of Appeals to affirm, modify or set aside any order, affirmative or negative, issued by the Secretary of Transportation.(21)

The petition filed in the Court of Appeals by the Environmental Defense Fund sought to have the Secretary of Transportation's Decision set aside and

was based inter alia on the following grounds:-

(1) The action of the Secretary of Transportation in authorizing a sixteen month trial period for Concorde violated both Section 611 of the Federal Aviation Act and the 1972 Noise Control Act as general noise standards for supersonic aircraft had not yet been promulgated.

(2) The Secretary of Transportation's authorization of flights violated Section 610 of the Federal Aviation Act since this requires that foreign civil aircraft operated in the United States must either have an American airworthiness certificate or have been granted exemption from this requirement; Concorde neither has an American airworthiness certificate nor does the Secretary's Decision qualify as an grant of exemption under Section 610(b).

(3) The Secretary of Transportation did not give appropriate weight to all the environmental factors in reaching his Decision and so violated the National Environmental Policy Act which seeks to assure for all Americans safe, healthful, productive and aesthetically and culturally pleasing surroundings.[22]

A detailed reply was filed by the respondents to the charges made in the Petition and in respect of the specific points enumerated above, the respondents maintained:-

(1) There is no statutory provision in either the Department of Transportation Act or the Federal Aviation Act which prevents operations specifications being issued or amended in the absence of a general noise regulation. The decision, therefore, whether and when to issue a noise rule for supersonic aircraft under Section 611(b)(1) is totally independent of the decision whether the operations specifications of British Airways and Air France

should be amended.

(2) Section 610 of the 1958 Federal Aviation Act states that 'it shall be unlawful for any person to operate in air commerce any civil aircraft for which there is not currently in effect an airworthiness certificate'. The contention that this Section is to be construed as meaning an American airworthiness certificate is invalid since only the owners of aircraft registered in the United States can be issued with an American airworthiness certificate and the British Airways and Air France Concordes are not registered in the United States. Article 33 of the Chicago Convention also makes quite clear the obligation to recognize foreign airworthiness certificates.

(3) The Secretary of Transportation's Decision contained detailed reasons as to how he had come to decide on the airlines' applications. The National Environmental Policy Act does not authorize a reviewing Court to decide any issue de novo and the Secretary's Decision could only be reversed if found to be 'arbitrary, capricious, an abuse of discretion or otherwise not in accordance with law'.(23)

Just five days before Concorde was due to start commercial flights to Washington Dulles Airport, the Court of Appeals ruled against the petitioners in their attempt to have the Secretary of Transportation's Decision set aside. The case was not decided principally on its merits as the Court ruled that the Secretary had authority and power to order a trial period of flights and that this was not arbitrary or capricious or otherwise in violation of law. Following on the Appeals Court ruling, the petitioners sought a temporary injunction from the Supreme

Court in a final attempt to stop the proposed Concorde landings. This request was, however, refused by the Court and two days later on 24th May 1976 British Airways and Air France inaugurated transatlantic supersonic air services.

Chapter 7 Footnotes.

(1) Aviation Noise Abatement Policy dated 18th November 1976 - Published by the office of the Secretary, Federal Aviation Administration.

(2) Ibid. at p.5

(3) Allegheny Airlines Inc. v Village of Cedarhurst F.Supp. 871, 881 (E.D. N.Y. 1955) affirmed 238 F.2d 812(2d Cir. 1956)

(4) American Airlines Inc. v Town of Hempstead
272 F.Supp. 226 (E.D.N.Y. 1967)
Affirmed 398 F.2d 369 (2d. Cir. 1968)
Cert. denied 393 U.S. 1017 (1969)

(5) Lockheed Air Terminal Inc. v City of Burbank
318 F.Supp. 914 (C.D. Cal. 1970)
457 F.2d 667 (9th Cir. 1972)
409 U.S. 840 (1972)
411 U.S. 624 (1973)

(6) Hearings on S.707 and H.R.3400; Aircraft Noise Abatement Regulation, 90th Cong., 2nd Session, 29.

(7) Opinion of the Justices; 359 Mass. 778, 271 N.E. 2d 354 (1971)

(8) 14 Code of Federal Regulations (C.F.R.) Ch. I
Civil Airplane Noise Reduction Retrofit Requirements - Advance Notice of Proposed Rule Making - Docket No. 10664; Notice No. 70 - 44; (35 Fed. Reg. 16,980)

(9) 14 C.F.R. Part 91 - Docket No. 10261; Notice No. 70-16; (35 Fed. Reg. 6189)

(10) 14 C.F.R. Part 36 - Civil Supersonic Noise Type Certification Standards - Advance Notice of Proposed Rule Making - Docket No. 10494; Notice No. 70-33; (35 Fed. Reg. 12,555)

(11) Air Transport Association of America, et al v. J.R. Crotti, Director of Aeronautics of the State of California, et al; 389 F. Supp. 58 (N.D. Cal., 1975).

(12) National Aviation, et al. v The City of Hayward, California; No. C-75-2279 R.F.P.C. (N.D. Cal., 1976)

(13) Griggs v Allegheny County 369 U.S. 84 (1962)

(14) See Appendix I

(15) See Appendix J

(16) British Airways Board and Compagnie Nationale Air France v The Port Authority of New York and New Jersey and William J. Ronan and Others, Commissioners; 76 Civ. 1276

(17) Articles 1a and 2 of the U.S. - G.B. Air Transport Agreement; 60 Stat. 1499, T.I.A.S. No.1507 and of the U.S. - France Air Transport Agreement; 61 Stat. 3445, T.I.A.S. No.1697.

(18) See Appendix K.

(19) Board of Supervisors of Fairfax County, Virginia, et al. v. John L. McLucas et al., 13 Aviation Cases 17, 181 and 18, 354.

(20) District of Columbia Court of Appeals Civil Action Numbers 76 - 1260 and 76 - 1259 (consolidated with actions numbers 76 - 1105 and 76 - 1213)

(21) 49 U.S.C. Para. 1486(a) and (d)

(22) National Environmental Policy Act, Para. 101(b)(2); 42 U.S.C. Para. 4331(b)(2)

(23) The 'arbitrary and capricious' standard is laid down in Section 10(e)(2)(A) of the Administrative Procedure Act, 5 U.S.C. Para. 706(2)(A)

CHAPTER 8

REGULATION IN THE UNITED KINGDOM FRANCE AND THE SOVIET UNION

The United Kingdom.

The regulation of civil supersonic aircraft on a national basis has not been the sole preserve of the United States although it is true to say that only in the United States because of its open system of government decision making have many of the environmental aspects of supersonic flight come under public scrutiny. This situation of disclosure contrasts sharply with what has happened throughout the rest of the world and in particular with what has happened in the United Kingdom, France and the Soviet Union, the three countries which manufacture supersonic passenger aircraft.

In the United Kingdom no legislation has been passed by the Government regulating supersonic flight and the environmental groups have only managed to introduce one Bill[1] into Parliament in an attempt to restrict supersonic aircraft operations. The lack of effective action in the United Kingdom is in sharp contrast with the position in the United States and there are several reasons for this. Firstly, it should be remembered that in the United Kingdom none of the environmental groups has the influence or the power of their American counterparts nor do there

exist in the United Kingdom, Parliamentary Committees similar to the Congressional Committees in the United States with their wide ranging powers to summon witnesses and obtain information from Government departments. Secondly, the conflict between the Federal Government on the one hand, and state governments and municipal airport proprietors on the other hand, has tended to force the Federal Administration to move somewhat faster than it might otherwise have done in a effort to assert its pre-emption in the areas of disputed responsibility.

The first formal statement made by the British Government on the question of civil supersonic flight was contained in a White Paper on the Environment published in 1970.(2) The Paper read:-

> "It is the Government's view that commercial supersonic flights which could cause a boom to be heard on the ground should be banned and they intend to publish draft proposals to this effect with a view to consultation with all those concerned."

The first and indeed the only reference to the flight of aircraft at supersonic speeds which appears on the United Kingdom Statute Book is Section 19 of the 1968 Civil Aviation Act(3) and this gives to the Government the power, if needed, to regulate or prohibit civil supersonic flight over the United Kingdom. The provisions of Annex 16 to the Chicago Convention have been incorporated into United Kingdom legislation by the bringing into force of the Air Navigation (Noise Certification) Order of 1970,(4) but under Section 3(1)(c) the Order is made to apply only to aircraft which

inter alia are "incapable of sustaining level flight at a speed in excess of Flight Mach 1". No draft proposals, as envisaged by the 1970 White Paper, have ever been published and no Order in Council has been made under Section 19 of the 1968 Civil Aviation Act.

The restriction that does exist on the supersonic overflight of the United Kingdom is contained in a Notice to Airmen published by the Civil Aviation Authority in May 1976.(5) This Notice sets out the routes and procedures to be followed by Concorde's operations to and from the United States from London and Paris. The effect of the Notice is:-

(1) To prevent supersonic flight over land (although not over territorial waters);(6)

(2) To avoid any initial 'focussed' boom; and

(3) To control the flight of aircraft along the English Channel and approaching the United Kingdom from the United States.

It is interesting to note that unlike the regulations passed by many other countries, the Notice does not prohibit supersonic flight over territorial waters. As one might expect the flight by aircraft at supersonic speeds over parts of the English Channel has resulted in sonic booms being heard in the Channel Islands and also over a wide area of southern England. The United Kingdom Under Secretary of Trade has recently stated publicly(7) that primary booms as well as secondary booms are being experienced from Air France Concordes and also that some secondary booms are being caused by British Airways Concordes. It has also been announced that a working

group from the United Kingdom and France is to meet to consider how the flight paths of the aircraft might be altered so as to prevent sonic booms being heard on land.

As has been mentioned, environmental groups in the United Kingdom have only managed the introduction of one Bill into Parliament aimed at regulating supersonic aircraft operations and this was the Aircraft Noise Restriction Bill introduced by Mr Hugh Jenkins into the House of Commons in March 1973. The purpose of this Bill was principally to amend the United Kingdom Air Navigation (Noise Certification) Order of 1970 which granted exemption to supersonic aircraft from the provision that no aircraft could land or take off in the United Kingdom except in accordance with a noise certificate. The effect of the Bill would have been that Concorde's noise level would have had to be reduced to the 108 EPNdB level prescribed for subsonic aircraft. It is also of interest to observe that the effects of the Aircraft Noise Restriction Bill would have been the same as those of Bill number 3802 which was being introduced at about the same time into the Senate of the state of New York.(8) Mr Jenkins in introducing his Bill into the House of Commons, stated that he believed it to be the first occasion on which an attempt was made to reproduce American legislation in United Kingdom terms.(9)

France.

In France, as in Great Britain, no specific statutory provisions have been enacted regulating the supersonic flight of civil aircraft. Article

L.131-1[10] of the French Civil Aviation Code provides that all aircraft may fly freely over French territory but Article L.131-2[11] restricts this by stating that the right of an aircraft to fly shall be exercised in such a manner as not to interfere with the exercise of the rights of the landowner. Despite the absence of any specific legislation, the Code does enable the Government to take the measures they consider necessary for the regulation of supersonic flight. It had also been stated in 1972[12] that the drafting of any measures would not be undertaken until nearer the time of the introduction of Concorde into commercial service. Although Concorde has been in commercial service since January 1976, no measures have yet been enacted.

France has also amended its Civil Aviation Code by introducing the maximum permissible noise levels for aircraft as laid down in Annex 16 to the Chicago Convention[13] but, as in the case of Part 36 of the United States Federal Aviation Regulations and of the United Kingdom Air Navigation (Noise Certification) Order, the French amendments apply only to subsonic aircraft.

It should be remembered that the United Kingdom and French Governments are in a peculiarly difficult position when considering how to regulate supersonic operations over their own territories. They are, of course, concerned to protect their nationals from the adverse effects of sonic booms but at the same time, they also wish to negotiate supersonic land corridors over states for their national airlines. This difficulty has

been encountered more by British Airways than by Air France principally because of the nature of the airlines inaugural routes. The Air France route from Paris to Rio de Janeiro is a straightforward route over water and involves only a technical stop at Dakar in West Africa but the British Airways route to Bahrain involved the negotiation of supersonic corridors over Lebanon, Jordan, Syria and Saudi Arabia. The negotiations for the Middle East supersonic corridors were long and difficult and continued up until a few weeks before the inauguration of services in January 1976.

Mention should also be made of two resolutions on the subject of civil supersonic aircraft which were passed by the Council of the European Economic Community in 1972. Resolution 511 noted with satisfaction that the prohibition of supersonic flight over inhabited areas was a generally held view of member states. Resolution 512 recommended the setting of international standards relating to the environmental aspects of supersonic flight and it also warned against the expansion of supersonic services before extensive scientific research on potential environmental hazards had been carried out.(14)

The Soviet Union.

There is no legislation in the Soviet Union prohibiting the passage of civil aircraft at supersonic speeds and it is unlikely that any such legislation is under consideration. In a communication to the Secretary General of the International Civil Aviation Organization in 1972(15)

the Chairman of the U.S.S.R. Committee for I.C.A.O. advised that consideration of the question of the regulation of supersonic flight would be based on the premise that the use of supersonic aircraft in civil aviation was a necessary and legitimate phenomenon. More recently, the Soviet Deputy Civil Aviation Minister, Mr Aleksei Semenkov, has been reported as saying that he does not foresee any environmental restrictions on overland supersonic operations in the Soviet Union.(16) Mr. Semenkov's statement seems to be confirmed by the designation of the Tupolev-144 as the future standard aircraft for long range passenger traffic in the Soviet Union and by the fact that all the routes on which Aeroflot is planning to use the TU-144 are domestic ones and entirely overland.(17) It should also be mentioned that the proposed British Airways and Air France routes from London and Paris to Japan will involve supersonic land corridors over the Soviet Union and negotiations between the Governments concerned are still under way.

Chapter 8 Footnotes.

(1) 1973 Aircraft Noise Restriction Bill. (Bill No.99) (See Appendix F)

(2) The Protection of the Environment: The Fight against Pollution; 1970 Cmnd. 4373 Para.46

(3) See Appendix C.

(4) U.K. Statutory Instrument (S.I.) 1970 No.823 as amended by S.I. 1972 No.455

(5) Notice to Airmen (NOTAM) No. 466/1976: 'Routes and Procedures for Supersonic Transport Flight'.

(6) NOTAM No.466/1976 Para. 3.?.1. 'It will be the responsibility of pilots in command to avoid the production of Sonic Booms over land.'

(7) London Times, 27th April 1977, p.4.

(8) See Appendix E.

(9) U.K. Parl. Deb. H.C. Vol. 853, No.86, col. 1098.

(10) Article L.131-1: 'Les aéronefs peuvent circuler librement au-dessus des territoires français.'

(11) Article L.131-2: 'Le droit pour un aéronef de survoler les propriétes privées ne peut s'exercer dans des conditions telles qu'il entraverait l'exercice du droit du propriétaire.'

(12) Letter dated 13th March 1972 from the Representative of France to the Secretary General of I.C.A.O.

(13) Ministere des Transports: Décret No. 73-256 du 6 Mars 1973.

(14) Les Nuisances Des Avions au Conseil de L'Europe; R. Goy, 1972 Revue Generale De L'Air et De L'Espace P.8.

(15) Letter dated 21st February 1972 from the Chairman of the U.S.S.R. Committee for I.C.A.O. to the Secretary General of I.C.A.O.

(16) Av. Week and Space Technology 18th June 1973 P.15.

(17) Av. Week and Space Technology 4th June 1973 P.14.

C O N C L U S I O N.

By reading this thesis one can obtain some idea of the amount and complexity of the laws, regulations, orders, decrees, standards, resolutions and others which exist in the world to-day concerning supersonic aircraft. Without doubt, supersonic aircraft are the most regulated aircraft of all time, both internationally and nationally.

The future of civil aviation may well lead to the development of the hypersonic transport travelling at speeds of up to Mach 4 or 5 and then on to the ballistic transport with a possible block speed of Mach 6 or 7. One can be sure that however technologically complex the future developments of civil aviation may be, they will be accompanied by an equally complex framework of laws.

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APPENDIX A

A G R E E M E N T

between

the Government of the United Kingdom of Great Britain and Northern Ireland and the Government of the French Republic

regarding

the Development and Production of a Civil Supersonic Transport Aircraft.

London, November 29, 1962.

(The Agreement entered into force on the date of signature)

AGREEMENT BETWEEN THE GOVERNMENT OF THE UNITED KINGDOM OF GREAT BRITAIN AND NORTHERN IRELAND AND THE GOVERNMENT OF THE FRENCH REPUBLIC REGARDING THE DEVELOPMENT AND PRODUCTION OF A CIVIL SUPERSONIC TRANSPORT AIRCRAFT

The Government of the United Kingdom of Great Britain and Northern Ireland and the Government of the French Republic:

Having decided to develop and produce jointly a civil supersonic transport aircraft:

Have agreed as follows:

ARTICLE 1

(1) The principle of this collaboration shall be the equal sharing between the two countries, on the basis of equal responsibility for the project as a whole, of the work, of the expenditure incurred by the two Governments, and of the proceeds of sales.

(2) This principle, which shall be observed as strictly as possible, shall apply, as regards both development and production (including spares), to the project considered as a whole (airframe, engine, systems and equipments).

(3) The sharing shall be based upon the expenditure corresponding to the work carried out in each country, excluding taxes to be specified by agreement between the two Governments. Such expenditure shall be calculated from the date of the present Agreement.

ARTICLE 2

The two Governments, having taken note of the agreement dated 25th October, 1962 between Sud Aviation and the British Aircraft Corporation (B.A.C.) and of the agreement dated 28th November, 1961 between Bristol Siddeley and the Societie Nationale d'Etudes et de Construction de Moteurs d'Aviation (S.N.E.C.M.A.) have approved them, except in so far as they may be in conflict with provisions which are the subject of agreement between the Governments.

ARTICLE 3

(1) The technical proposals, which shall form the basis for the joint undertaking by Sud Aviation and B.A.C. comprise a medium range and a long range version of the aircraft.

(2) The Bristol Siddeley - S.N.E.C.M.A. BS/593/3 turbojet engine shall be developed jointly for the aircraft by Bristol Siddeley on the British side and by S.N.E.C.M.A. on the French side.

ARTICLE 4

In order to carry out the project, integrated organisations of the airframe and engine firms shall be set up.

ARTICLE 5

A Standing Committee of officials from the two countries shall supervise the progress of the work, report to the Governments and propose the necessary measures to ensure the carrying out of the programme.

ARTICLE 6

Every effort shall be made to ensure that the programme is carried out, both for the airframe and for the engine, with equal attention to the medium range and the long range versions. It shall be for the two integrated organisations of the British and French firms to make detailed proposals for the carrying out of the programme.

ARTICLE 7

The present Agreement shall enter into force on the date of its signature.

In witness whereof the undersigned, being duly authorised thereto by their respective Governments, have signed the present Agreement.

Done in duplicate at London this 29th day of November, 1962 in the English and French languages, both texts being equally authoritative.

For the Government of the United Kingdom of Great Britain and Northern Ireland:

JULIAN AMERY.
PETER THOMAS.

For the Government of the French Republic:

G de COURCEL.

APPENDIX B

SONIC BOOM DAMAGE DATA RESULTING FROM UNITED STATES AIR FORCE SUPERSONIC TEST FLIGHTS OVER ST. LOUIS (1961-1962), OKLAHOMA CITY (1964) AND CHICAGO (1965)

Boom Dates	Metro-politan population	Total SS over-flights	Median peak over pressure N/m^2	Median peak over pressure lb/ft^2	Boom-person ex-posures (millions)	Number of com-plaints	Number of Claims filed	Number of Claims paid	Value of Claims paid
St Louis 1961-62	*2,600,000	150	86	1.8	390.0	5,000	1,624	825	$ 58,648
Oklahoma City 1964	! 512,000	1,253	58	1.2	642.0	15,452	4,901	289	123,061
Chicago 1965	6,221,000	49	86	1.8	304.5	7,116	2,964	1,442	114,763
Total	9,333,000	1,452	!! 84	1.76	1,336.5	27,568	9,489	2,556	$296,472

*Metropolitan area as given in National Geographic Atlas, 1963 Edition, rounded off to nearest thousand population.
!Greater St Louis population affected by boom.
!! Average.

ANALYSIS OF SONIC BOOM DAMAGE DATA

	Complaints per million BPE	Claims per million BPE	Paid-out claims per million BPE	Paid-out damage per million BPE
St Louis	12.8	4.16	2.11	$ 151
OKlahoma City	24.1	7.63	.45	192
Chicago	23.4	9.75	4.74	377
Weighted average	20.6	7.10	1.91	$ 222

APPENDIX C

SURVEY OF NATIONAL LEGISLATIONS REGULATING SUPERSONIC FLIGHT

NOTE: This Survey has been compiled by the Author by contacting the aeronautical authorities of the various States concerned and by analyzing and tabulating the replies. The date below the name of each State represents the date on which the information was obtained.

Australia 23rd February 1977	There is no legislation specifically relating to the flight of supersonic aircraft. The Australian Air Navigation Regulations apply to aircraft operating at supersonic speeds. Conditions have been specified as to the route to be flown by Concorde over Australian territory so as to ensure that flights at supersonic speeds will take place only over very sparsely populated areas.
Austria 2nd June 1977	Luftverkehrsregeln (Bgbl. Nr. 56/1967 as amended) provides that flights over Austrian territory with civil aircraft must be conducted so as to avoid supersonic noise. Exemptions are not provided for.
Barbados 4th March 1977	Barbados is not contemplating passing any legislation which would regulate the operation of supersonic aircraft.
Belgium 14th November 1973	No legislation exists specifically regarding supersonic transport flights. The King by royal decree is permitted to forbid flights over national territory which might harm people and damage property on the surface. No royal decrees have yet been promulgated. Loi relative à la lutte contre le bruit - loi de 18 Juillet 1973. Article ler - le Roi peut dans l'interêt de la santé des personnes, prendre les mesures nécessaires pour prévenir ou combattre le bruit provenant de source sonores fixes ou mobiles, permanentes ou temporaires et ces mesures concernerant le bruit provoqué, en autres, par les avions.
Brazil 4th February 1977	There are regulations which prohibit the flight over Brazilian territory of civil supersonic aircraft. These regulations apply up to a distance of 100 kilometres out to sea from the coastline.
Canada 14th February 1977	(1) By an amendment of the Air Regulations (P.C. 1972-1813 24th August 1972) subsection (2) of section 515 of the Air Regulations was revoked and the following substituted therefor: S.515 (2) "Subject to subsection (3) no person shall fly an aircraft in such a manner as to create a shock wave or sonic boom, the effect of which /

which may imperil the safety of other aircraft, be injurious to persons or animals or cause damage to property." S.515(3) (3) The Minister (of Transport) may make orders or directions with respect to the operation of aircraft in sonic or supersonic flight.

(2) Air Navigation Order, Series V , No. 28 dated 4th October 1972; Order respecting the Control of Sonic and Supersonic flight. Section (2) of the Order defines "sonic flight" as meaning flight at the speed of a true flight Mach number of 1 and "supersonic flight" as meaning flight at speeds in excess of a true flight Mach number of 1. Section (3) states that no person shall operate an aircraft in Canada in sonic or supersonic flight unless authorised by the Minister.

Denmark
18th February
1977

A Danish Law of June 1972 which came into effect on 1st July 1972 prohibited flight at supersonic speeds over Danish territory. Exemption from the law is permitted in exceptional circumstances.

Finland
8th February
1977

Under the Finnish Law on the Aviation Administration of 14th January 1972 and in accordance with Aviation Ordinance (Number 525/68) of 22nd August 1968 the National Board of Aviation issued a notice with effect from 30th March 1972 as follows:-

"Above Finnish territory flying at a speed greater than that of sound is only allowed by civil aircraft by a separate authorisation issued by the National Board of Aviation."

France
12th February
1977

There are no regulations in France specifically regulating supersonic flight. The French Civil Aviation Code contains powers sufficient to enable the Ministry of Transport to regulate supersonic flight over French territory.

West Germany
18th February
1977

A new paragraph 11(a) and 11(b) was added to the Air Traffic Regulations on 28th November 1975. Paragraph 11(a) states that flights of civil aircraft at supersonic speeds (exceeding flight Mach 1) are prohibited. Paragraph 11(b) states that exemptions from the prohibition are permitted provided that it has been ascertained that sonic booms do not reach the ground.

Hungary
2nd June
1977

No legislation exists regulating supersonic flight over Hungary.

India
23rd February
1977

Although no formal legislation has been enacted on the subject of supersonic flights, it is the policy of the Indian Government not to permit supersonic aircraft to overfly Indian territory.

Indonesia 6th June 1977	There is no legislation regulating supersonic flights over Indonesian territory although the matter is under consideration.
Ireland 17th February 1977	No legislation exists regulating supersonic flight over Ireland. Any prohibition of such flight would not be considered to be a breach of any commitments under international Conventions. Draft legislation which would prohibit all supersonic flight over Irish territory, unless specifically authorised, has been prepared and will be introduced when necessary.
Italy 18th February 1977	There is no legislation regulating supersonic flight over Italian territory and cases are dealt with as they arise.
Japan 8th January 1974	No legislation at present but draft legislation has been prepared and submitted by the Civil Aviation Bureau of the Ministry of Transport to the Japanese Diet which would prohibit inter alia all supersonic flight, unless specifically authorised by the Minister, over:- (1) areas of high density population (2) air traffic control areas, and (3) air traffic control zones. Note: The Japanese air traffic control area covers all the territory of Japan except for some parts of Hokkaido, the northern island of Japan.
The Netherlands 22nd February 1977	Article 11 paragraph 3 of the 'Regulations for Air Navigation Control' entered into force on 17th July 1972 and provides as follows:- "Article 11 paragraph 3:- Flying at a speed greater than that of sound is prohibited unless: (a) with respect to civil aircraft, the Minister of Transport, Water Control and Public Works has granted dispensation; (b) with respect to military aircraft, the relevant rules laid down by or on behalf of the Minister of Defence are observed."
New Zealand 21st February 1977	No specific legislation exists and none is contemplated. Sufficient power exists under domestic New Zealand law to control or prohibit supersonic flight by scheduled or non-scheduled international operators.
Nigeria 10th March 1977	No legislation regulating supersonic flight exists and none is under preparation.
Norway 20th April 1977	By an act dated July 28th 1972, the Aviation Act of 16th December 1960 was amended to include the /

	the following two paragraphs:- Paragraph 5a - (1) Flights over Norwegian territory at supersonic speeds are prohibited. (2) When special circumstances so warrant, permission might be granted by the King to perform flights at supersonic speed over Norwegian territory. Such permission might be subject to conditions. Paragraph 176a - If the owner or operator of an aircraft uses that aircraft for flights in contravention of paragraph 5a, section 1, or violates the conditions attached to a grant of permission under paragraph 5a, section 2, he shall be liable to a fine or to imprisonment of up to one year.
Portugal 14th April 1977	There is no legislation at present regulating supersonic flight over Portuguese territory.
Saudi Arabia 20th November 1973	There is no legislation at present regulating supersonic flight over Saudi Arabia, however, such legislation will be drafted when supersonic air services begin.
Singapore 21st February 1977	There is no legislation at present regulating supersonic flight over Singapore and none has been drafted.
South Africa 18th February 1977	No existing legislation and no draft legislation prepared. The 1962 Aviation Act (Act 74 of 1962) empowers the Minister of Transport to make regulations relating to conditions under which aircraft may pass into, within or from the Republic.
Spain 3rd June 1977	No existing legislation and none is being contemplated.
Sweden 18th February 1977	In 1972 a Government Bill prohibiting supersonic flight by civil aircraft over Sweden was passed and was incorporated into the 1957 Civil Aviation Act as paragraph 2a, Section 1. This provides that: "Air traffic at supersonic speed may not take place over Swedish territory." In exceptional circumstances, the King in Council or after authorization by the King in Council, the Board of Civil Aviation may permit such supersonic traffic and decide upon the conditions for such traffic.
Switzerland 16th February 1977	The Federal Assembly of the Swiss Confederation has amended the Air Navigation Act of 17th December /

December 1971, Article 14 of which provides that "supersonic flights are forbidden in Swiss airspace." Article 14 entered into force on 1st January 1974. Article 14 does not apply to military flights but the Federal Council could, under Article 106 of the Air Navigation Act, declare the Article applicable to the Air Force.

Turkey
12th July
1977

No existing legislation regulating supersonic flight but the matter is under active consideration.

The United
Kingdom
22nd June
1977

Section 19(1) of the 1968 Civil Aviation Act reads as follows:- "In subsection (2) of section 8 of the Civil Aviation Act 1949 (which, in paragraphs (a) to (q) specifies matters concerned with the regulation of air navigation for which provision may be made by an Order in Council under that section) there shall be added (inter alia) the following:-

(s) for regulating or prohibiting the flight of aircraft over the United Kingdom at speeds in excess of Flight Mach 1.

Notice to Airmen No 466/1976 - Routes and Procedures for Supersonic Transport Flights provides as follows:-

Section 3.2.1. It will be the responsibility of pilots in command to avoid the production of sonic booms over land.

The United
States of
America
18th February
1977

(1) Public Law 90-411 90th Congress H.R. 3400 July 21st 1968 amended Title VI of the Federal Aviation Act of 1958 (49 U.S.C. 1421-1430) as follows:-
Section 611(a) In order to afford present and future relief and protection to the public from unnecessary aircraft noise and sonic boom the Administrator of the Federal Aviation Administration shall prescribe and amend such rules and regulations as he may find necessary to provide for the control and abatement of aircraft noise and sonic boom.

(2) Subchapter F of Chapter I of Title 14 of the Code of Federal Regulations was amended on April 27th 1973 by the addition of inter alia a new paragraph (91.55) which reads as follows:-

"No person may operate a civil aircraft at a true flight Mach number greater than 1 except in compliance with conditions and limitations in an authorisation /

	authorisation to exceed Mach 1 issued to the operator under Appendix B of this part. A new Appendix B (Authorisation to exceed Mach 1) is added which makes it necessary for a formal application to be made to the Administrator of the F.A.A. for authority to exceed Mach 1. This authority may be given where the flight is necessary (1) to show compliance with airworthiness requirements, (1) to determine the sonic boom characteristics of the airplane or is necessary to establish means of reducing or eliminating the effects of sonic boom or (3) to demonstrate the conditions and limitations under which speeds greater than a true flight Mach number of 1 will not cause a measurable sonic boom overpressure to reach the surface.
The Union of the Soviet Socialist Republics 21st February 1972	The question of the regulation of supersonic flight over the Soviet Union will be based on the premise that the use of supersonic aircraft in civil aviation is a necessary and legitimate phenomenon.
Yugoslavia 20th June 1977	No legislation exists regulating supersonic flight over Yugoslavian territory and none is in preparation.

APPENDIX D

NOTES ON BILLS INTRODUCED INTO THE UNITED STATES CONGRESS DEALING WITH THE REGULATION OF CIVIL SUPERSONIC AIRCRAFT MOVEMENTS OVER UNITED STATES TERRITORY UP TO THE DATE OF THE CANCELLATION OF THE UNITED STATES SUPERSONIC TRANSPORT PROGRAMME IN MARCH 1971.

(1) 10th January 1967 90th Congress. 1st Session H.R.1110 (Pucinski)

This Bill would have made it unlawful pursuant to the Federal Aviation Act to operate any civil supersonic aircraft through the navigable air space of the United States which would generate sonic boom overpressures exceeding one and five-tenths pounds per square foot on the ground beneath the flight path.

(2) 23rd January 1967 90th Congress. 1st Session H.R.3400 (Staggers)

Became law as the Aircraft Noise Abatement Act 1968 and authorised the Administrator of the F.A.A. to prescribe such rules and regulations as he may find necessary to provide for the control and abatement of aircraft noise and sonic boom.

(3) 29th April 1968 90th Congress. 2nd Session S.3399 (Case)

Authority would have been given to the F.A.A. to regulate public exposure to sonic booms by prohibiting non military aircraft from creating sonic booms while in operation over the United States.

(4) 30th November 1970 91st Congress. 2nd Session S.4547 (Magnuson and Jackson)

Provision that no person should operate a civil aircraft at a true flight Mach number greater than 1 except in compliance with certain conditions and limitations as specified in an authorisation issued under the bill.

(5) 7th December 1970 91st Congress. 2nd Session S.4564 (Nelson)

This bill stated that it was the policy of Congress to prohibit the operation, within the territorial jurisdiction of the United States, of any civil supersonic aircraft until and unless the social and economic costs of the sonic boom and stratospheric pollution were reduced to zero.

(6) 2nd February 1971 92nd Congress. 1st Session H.R. 3229 (Anderson)

The wording of this bill was similar to that introduced by Senators Magnuson and Jackson in November 1970 and provided that no person may operate a civil aircraft at a true flight Mach number greater than 1 unless specially authorised.

APPENDIX E

STATE OF NEW YORK.

3802

1973-1974 Regular Sessions

IN SENATE

February 20, 1973.

Introduced by Sens. B C SMITH, GOODMAN - read twice and ordered printed, and when printed to be committed to the Committee on Health

A N A C T

To amend the public health law, in relation to prohibition of detrimental aircraft noise levels at airports within the state

The People of the State of New York, represented in Senate and Assembly, do enact as follows:

Section 1. The public health law is hereby amended by adding thereto a new section, to be section twelve-d, to read as follows:

12-d. Declaration of policy. 1. The legislature of the state of New York recognizing that the problems caused by excessive noise have increased dramatically in recent years and recognizing further that aircraft noise in particular potentially constitutes a degradation of our environment and a hazard to the health and welfare of the citizens of New York, hereby declares that it feels compelled to impose a noise limit for New York state as a necessary and proper function of the state's police and health powers, in order to protect the health and welfare of its citizens and hereby declares that aircraft noise levels in excess of 108 EPNdB (effective perceived noise, in decibels), measured as provided herein, are detrimental to health and welfare and shall be prohibited at any airport operated in New York state.

2. /

2. Prohibitions. (a) Aircraft noise in excess of 108 EPNdB, measured as set forth herein, is detrimental to health and shall be prohibited at any airport operated within the boundaries of New York state.

(b) No carrier operating, controlling, or owning an aircraft which emits a noise in excess of 108 EPNdB as measured as set forth herein, shall land, lift off or apply for permission to land or lift off such aircraft at any airport operated within New York state.

(b) No airport proprietor or operator within New York state, whether a private or public entity or authority, shall permit or contract for the landing or lift off of any aircraft which emits a noise in excess of 108 EPNdB as measured as set forth herein, at any airport it owns or operates.

3. Emergency. In any case of emergency involving the possible saving of human life the prohibitions of subdivision two may be temporarily suspended.

4. Measurement. For purposes of subdivision two, aircraft noise of any aircraft within the airports' boundaries is to be measured at a distance of 0.35 nautical miles from the extended centerline of the runway where the noise level on liftoff or upon landing is greatest.

5. Enforcement. (a) For each violation of subdivision two, the offending carrier shall be subject to a fine of five thousand dollars and the attorney-general is hereby authorized to sue for the purpose of collecting such fines.

(b) The attorney-general is further authorized to bring actions against carriers or airport operators and proprietors or both for the purpose of enjoining or obtaining other appropriate relief for violations of subdivision two.

6. Exemptions. Commercial aircraft certified by the federal aviation administration prior to January first, nineteen hundred seventy-three are exempted from the prohibitions contained in this section until they are retrofitted with noise silencers.

7. Severability. If any provision of any section or any part of this act or the application thereof to any person or circumstances shall be judged invalid by a court of competent jurisdiction, such order or judgment shall be confined in its operation to the controversy in which it was rendered, and shall not affect or invalidate the remainder of any provision of any section or any part of this act or the application thereof to any other person or circumstances and to this end the provisions of each section and each part of this act are hereby declared to be severable.

2. This act shall take effect on the first day of September next succeeding the date on which it shall have become a law.

APPENDIX F

Aircraft Noise Restriction Bill

A

B I L L

TO

RESTRICT AIRCRAFT NOISE

A.D. 1973

BE IT ENACTED by the Queen's most Excellent Majesty, by and with the advice and consent of the Lords Spiritual and Temporal, and Commons, in this present Parliament assembled, and by the authority of the same, as follows:-

Amendment of Air Navigation (Noise Certification) Order 1970. S.I. 1970 No. 823

1. The Air Navigation (Noise Certification) Order 1970 shall be amended as follows:-

(a) in Article 3 -
(i) by leaving out sub-paragraph (c); and
(ii) in sub-paragraph (d)(ii) by inserting after the word "Order" the words "for such period, not exceeding three years, as the Secretary of State shall think fit"; and
(iii) by leaving out paragraph (2); and
(b) by leaving out Article 16.

Short title and commencement.

2. (1) This Act may be cited as the Aircraft Noise Restriction Act 1973.

(2) This Act shall come into force on such day as the Secretary of State may by order appoint, being a day not later than 31st December 1973.

EXPLANATORY MEMORANDUM.

The purpose of the Bill is to amend the Air Navigation (Noise Certification) Order 1970, which provides inter alia that no aircraft to which it applies shall land or take off in the United Kingdom except in accordance with a noise certificate -

(a) by removing the provision that the Order does not apply to supersonic aircraft;

(b) by restricting the period for which certain aircraft, of a type manufactured before 1st January 1969, may be exempted from the provisions of the Order to a maximum period of three years; and

(c) by ending the general power of the Secretary of State to exempt certain aeroplanes or their operators from the provisions of the Order.

APPENDIX G.

INTERNATIONAL AIR TRANSPORT ASSOCIATION REQUIREMENTS FOR THE SUPERSONIC AIRLINER 1962

SAFETY

The level of safety afforded by the SST must be at least equal to that of subsonic aircraft operating at the time it is introduced into service.

This implies that:-

(1) Cabin structural integrity must be assured since the possibility of rapid decompression in flight cannot be tolerated.

(2) Good aircraft control response and handling characteristics are essential to safe operation. They are important at all speeds but particularly in the low-speed regime. Control response and handling characteristics of the SST must therefore be comparable to, or better than, those of subsonic aircraft.

(3) There must be a vast improvement over existing materials, structures, systems and instruments prior to introduction of the SST into airline service. Only thus can the necessary standards of reliability and maintainability be achieved. Only thus can the desired airframe life of at least 30,000 hours be attained and satisfactory overall reliability be extended.

(4) Thorough flight testing of one or more prototype aircraft is required under airline operating conditions. This must be carried out before the production programme of an SST is launched if safe operation is to result, if serious errors are to be avoided and if the costly period of change normally experienced with new equipment is to be eliminated.

COMPATIBILITY

The SST must be adaptable to air traffic control facilities existing at the time of its introduction into service so that it is capable of integration with subsonic aircraft operating at that time.

This means that:-

(5) Runway length and strength requirements for the SST must /

must be no greater than those for large subsonic jets operating at that time.

(6) SST flight characteristics in the airport terminal area, such as speed, glide slope, and holding patterns should permit its treatment as 'just another aircraft' without undue penalty. The SST must be capable of mixing with other traffic in all weather.

EFFICIENCY

The SST must be competitive with subsonic aircraft operating at the time of its introduction.

Accordingly:-

(7) No increase in the level of engine noise can be tolerated. In fact, engine noise from the SST must be lower than that of sub-sonic jets operating at present in order to permit round-the-clock operations.

(8) Economic operations at supersonic speed must be practicable over inhabited areas at any time of the day or night. Sonic boom could prevent this unless the aircraft is designed to permit practical and economic operating procedures for its alleviation.

(9) SST seat mile costs must be equal to or better than those of subsonic jets of comparable size and range operating at the time of its introduction.

(10) The SST must be capable of reasonably economic operation at subsonic speeds as a considerable portion of its operation will be at the slower speeds. Its design should permit this without unduly penalising its supersonic performance.

APPENDIX H

ICAO POSITION AT THE INTERNATIONAL CONFERENCE ON THE PROBLEMS OF THE HUMAN ENVIRONMENT (STOCKHOLM, JUNE 1972)

The 18th Session of the ICAO Assembly (Vienna, June-July 1971) unanimously adopted Resolution A18-11, the first formal policy statement by the Organization on the quality of the human environment in relation to civil aviation. The full text of the Resolution states:

WHEREAS an International Conference on the Problems of the Human Environment under the aegis of the United Nations will convene in 1972;

WHEREAS this Conference aims to encourage and to provide guidelines for action by Governments and International Organizations towards the harmonization of industrial and technological development with the preservation of a wholesome human environment;

WHEREAS advancing technology has caused civil aviation to become a significant influence in the human environment;

WHEREAS the preamble to the Convention on International Civil Aviation states that "the future development of international civil aviation can greatly help to create and preserve friendship and understanding among the nations and peoples of the world..." and Article 44 of that Convention states that ICAO should "develop the principles and techniques of international air navigation and to foster the planning and development of international air transport, so as to ... meet the needs of the peoples of the world for safe, regular, efficient and economical air transport";

WHEREAS many of the adverse environmental effects of civil aviation activity can be reduced by the application of technology and the appropriate use of airport planning and land use control mechanisms; and

WHEREAS in fulfilling its role, ICAO strives to achieve a balance between the benefit accruing to the world community through civil aviation and the harm caused to the human environment in certain areas through the progressive advancement of civil aviation;

THE ASSEMBLY RESOLVES that the United Nations Conference on the Problems of the Human Environment be informed that:

(1) the Convention on International Civil Aviation places on ICAO the responsibility to guide the development of international civil aviation in such a manner as to

benefit the peoples of the world;

(2) in fulfilling this role ICAO is conscious of the adverse environmental impacts that may be related to aircraft activity and of its responsibility and that of its member States to achieve maximum compatibility between the safe and orderly development of civil aviation and the quality of the human environment;

(3) in discharging its responsibility, ICAO is already assisting and will continue to assist States by all available means, in order that they may increasingly reap the benefits of the potential which civil aviation offers for improving living conditions.

THE ASSEMBLY FURTHER RESOLVES to invite Contracting States to support, at the United Nations Conference on the Problems of the Human Environment, the position established in this Resolution.

APPENDIX I

THE UNITED STATES SECRETARY OF TRANSPORTATION'S DECISION ON CONCORDE SUPERSONIC TRANSPORT FOURTH FEBRUARY 1976

After careful deliberation, I have decided for the reasons set forth below to permit British Airways and Air France to conduct limited scheduled commercial flights into the United States for a trial period not to exceed 16 months 5/ under limitations and restrictions set forth below. I am thus directing the Federal Aviation Administrator, subject to any additional requirements he would impose for safety reasons or other concerns within his jurisdiction, to order provisional amendment of the operations specifications of British Airways and Air France to permit those carriers, for a period of no longer than 16 months from the commencement of commercial service, to conduct up to two Concorde flights per day into JFK by each carrier.6/ These amendments may be revoked at any time upon four months' notice, or immediately in the event of an emergency deemed harmful to the health, welfare or safety of the American people. The following additional terms and conditions shall also apply:

1. No flight may be scheduled for landing or take-off in the United States before 7 A.M. local time or after 10 P.M. local time.

2. Except where weather or other temporary emergency conditions dictate otherwise, the flights of British Airways must originate /

5/ The 16 months will enable 12 months of data collection (during all four seasons) and four months of analysis.

6/ The FAA is the proprietor of Dulles and it is therefore part of my decision today to direct the Federal Aviation Administrator to permit one Concorde flight per day at Dulles by each carrier under the conditions noted. The situation with respect to JFK may be complicated by the fact that under federal policy that has hitherto prevailed a local airport proprietor has had authority under certain circumstances to refuse landing rights. If for any legitimate and legally binding reason it should turn out that the JFK part of the demonstration could not go forward -- and no one has indicated to me any such final disposition by JFK's proprietor -- that would obviously be extremely unfortunate and would greatly diminish, but in my opinion it would not destroy, the validity of the demonstration.

originate from Heathrow Airport and those of Air France must originate from Charles de Gaulle Airport. 7/

3. Authorization of any commercial flights in addition to those specifically permitted by this action shall constitute a new major federal action within the terms of NEPA and therefore require a new Environmental Impact Statement. 8/

4. In accordance with FAA regulations (14 C.F.R.S91.55), the Concorde may not fly at supersonic speed over the United States or any of its territories.

5. The FAA is authorized to impose such additional noise abatement procedures as are safe, technologically feasible, economically justified, and necessary to minimize the noise impact, including, but not limited to, the thrust cut-back on departure.

I am also directing the FAA, subject to Office of Management and Budget Clearance and Congressional authorization, to proceed with a proposed High Altitude Pollution Program (HAPP), to produce the data base necessary for the development of national and international regulation of aircraft operations in the stratosphere.

I herewith order the FAA to set up monitoring systems at JFK and Dulles to measure noise and emission levels and to report /

7/ As will appear, one reason this demonstration is being permitted, despite the environmental problems discussed herein is to avoid discrimination against foreign manufacturers and carriers. I surely see no reason why we should treat the Concorde better than it is treated at home. Thus, I am not about to subject those who live near JFK and Dulles to noise, however slight the increment, that the British and French governments regard as too great for the neighbors of Heathrow and Charles de Gaulle.

8/ It is not contemplated that another EIS would be required to permit continuation beyond 16 months of the six flights for which provisional permission is now being granted. It is most definitely contemplated -- indeed, this is the whole point of today's decision -- that the Secretary of Transportation, in deciding whether to permit continuance of the six flights, will give serious attention to the various data collected during the first twelve months, and assembled and analyzed during the demonstration's final four months, and approach the question of continuation of permission /

report the result thereof to the Secretary of Transportation on a monthly basis. These reports will be made public within 10 days of receipt.

I shall also request the President to instruct the Secretary of State to enter into immediate negotiations with France and Great Britain so that an agreement that will establish a monitoring system for measuring ozone levels in the stratosphere can be concluded among the three countries within three months. The data obtained from such monitoring shall be made public at least every six months. I shall also request the Secretary of State to initiate discussions through ICAO and the World Meteorological Organization on the development of international stratospheric standards for the SST.

8/ (Cont'd) permission for the six flights beyond the 16th month without any presumption either way being created by today's decision. The data and analysis will be made public.

APPENDIX J

RESOLUTION BY THE BOARD OF COMMISSIONERS OF THE PORT AUTHORITY OF NEW YORK AND NEW JERSEY DATED 11TH MARCH 1976

Kennedy International Airport - Concorde Operations

The Executive Director recalled to the Board that on July 12 1951 the Committee on Operations had adopted a Port Authority air terminal regulation providing that no jet aircraft may land or take off at a Port Authority air terminal without permission. This rule reflected the Authority's concern that noise from jet-powered aircraft would prove far more annoying to airport neighbors than that produced by piston aircraft.

Subsequently, Port Authority acoustics consultants developed a method for measuring a listener's reaction to this new aircraft noise, the perceived noise decibel, and, from 1958 to the present time, the Committee on Operations has used the PNdB to establish the Terms and Conditions governing jet operations at Port Authority airports.

The Port Authority's present jet Terms and Conditions at Kennedy International Airport require that takeoffs by jet aircraft be so planned and conducted that the noise level of 112 PNdB as measured on the ground in the neighboring communities will not be exceeded. Jet aircraft must also make over-water takeoffs during nighttime hours. The aviation industry, responding to the aircraft noise problem, has in recent years introduced jet aircraft that are quieter than their predecessors with one exception, the supersonic transport.

Airport operators and airport neighbors have therefore been apprehensive about the addition of noisier air transports to the civil aviation fleet - the airport neighbors because of the possible adverse effect such transports will have on their environment and the airport operators for the additional reason that the courts have imposed on them, and not on the Federal Government or the air carriers, financial liability for damages (takings) to neighboring property caused by the noise of low flying aircraft operating at public airports.

The Executive Director reviewed with the Board both the Federal Aviation Administration's final environmental impact statement relating to the request by British Airways and Air France /

France for an amendment to their operations specifications to permit these carriers to fly the supersonic Concorde aircraft in limited commercial service at Kennedy International and Dulles International Airports and the February 4, 1976 decision of the Secretary of Transportation of the United States, William T. Coleman, Jr., directing the FAA to issue provisional amendments to such operations specifications. The restrictive amendments, which the Secretary justified on the basis of the Concorde's significantly different environmental characteristics, will permit each airline to conduct during daylight hours up to two Concorde flights per day into Kennedy and one Concorde flight per day into Dulles, for a period of no longer than 16 months from the commencement of commercial service, subject to revocation at any time upon four months' notice or immediately in the event of an emergency being harmful to the health, welfare or safety of the American people.

At the direction of the Governor of New York, New York State's Commissioners of Transportation and Environmental Protection, Raymond Schuler and Ogden Reid appeared before the February 25, 1976 meeting of the Operations Committee to express in detail the State's reasons for recommending that the Concorde be denied permission to use Kennedy International Airport. Excessive noise was identified by them as the principal objection to the Concorde. In addition, the Legislature of the State of New York has passed and the Governor has signed, proposed legislation that would mandate the Port Authority to deny permission to such aircraft to use Kennedy International Airport. Concurrent proposed legislation is pending in New Jersey.

Although it is claimed that the Concorde would meet the Port Authority's 112 PNdB standard by executing a low altitude turn shortly after take-off, the environmental impact statement and the Secretary's decision raise a number of significant questions concerning the effect of low frequency noise and vibrations generated by the Concorde and the airplane's overall impact on the noise environment in the area surrounding Kennedy. As Secretary Coleman points out, the Concorde's individual noise events will disturb more airport neighbors than the comparable range subsonic aircraft. The area exposed by the Concorde's take-off noise levels will be 47.6 square miles, approximately 6 times that exposed by the Boeing 707 and 15 times that by the Boeing 747. On landing, the area exposed by the Concorde, 11.1 square miles, will be approximately 5 times that exposed by the Boeing 707 and 20 times that by the Boeing 747. In addition, the Concorde engines generate low frequency energy and, consequently, induce higher levels of noise and structural vibrations in homes and other structures than do subsonic aircraft. The unique noise characteristics of the Concorde and /

and the expected aggravated community response to this noise add new and serious dimensions to the present aircraft noise problem, one not necessarily reflected in the Port Authority's current noise standard.

Secretary Coleman has therefore concluded that the subjective characteristics of noise response to the Concorde "may best be evaluated through a controlled demonstration period of sufficient length to enable an assessment, after the initial publicity has subsided, of community reaction to Concorde noise". He has therefore directed the FAA, the proprietor of Dulles International Airport, to permit the Concorde to operate at that airport. At Dulles, a facility double the size of Kennedy, less than 1,000 residents will be included within the noise exposure forecast 30 noise impact contour and none within the NEF 40 severe noise impact area. However, according to the environmental impact statement there are 485,000 persons within the NEF 30 contour at Kennedy and 112,000 within the NEF 40 contour. It does not appear to be in the public interest to test the subjective characteristics of noise response to the Concorde in the densely populated areas around Kennedy International Airport. In this regard it was noted that the Secretary had expressed the opinion that the elimination of Kennedy International Airport "would greatly diminish, but .. would not destroy, the validity of the demonstration." It is clear from the foregoing that a test at Dulles is clearly preferable as the actual performance and environmental results could be monitored without impacting so large a residential population. It is accordingly recommended that the Port Authority defer any action to permit supersonic aircraft, including the Concorde, from operating at Port Authority air terminals for a period not to exceed 6 months following the commencement of regular commercial operation of the Concorde at Dulles Airport.

It is further recommended that the Director of Aviation analyze the Concorde flights at Dulles, Heathrow and De Gaulle Airports and the communities' reaction thereto, and study the results of the Department of Transportation's mandated monitoring program for such 6 month period, and, if necessary, request the FAA to modify its program in order to provide the Port Authority with required data, or otherwise secure data, which would enable the Port Authority to apply this information to communities surrounding Kennedy International Airport.

In addition, the liability of the Port Authority for any claims for damages arising out of the Federally mandated operation of such aircraft requires a most thorough-going review and it is directed that General Counsel proceed to research and study the question, to contact the appropriate Federal agencies for possible liability coverage and to assess the /

the airline operator's responsibility as well.

Whereupon, the following resolution was unanimously adopted:

RESOLVED, that the Port Authority deny permission to operate any supersonic aircraft, including the Concorde, at Kennedy International Airport, until after at least six months of operating experience has been evaluated, after a report on such experience has been made to the Board and pending further action thereon by the Board; and it is further

RESOLVED, that the Director of Aviation is directed to analyze Conporde flights for a period of six months at Dulles International Airport and also at Heathrow and De Gaulle Airports, the community reaction thereto, the results of the Department of Transportation mandated monitoring program at Dulles, and, if necessary, request the Federal Aviation Administration to modify such program, or otherwise to secure additional information concerning the Concorde's noise and other environmental characteristics, and it is further

RESOLVED, that the Executive Director be and he hereby is authorized to retain such number of consultants in connection with the foregoing study as he may deem advisable; and it is further

RESOLVED, that the Executive Director and the Director of Aviation be and they hereby are directed, at the end of the foregoing six month program, based upon analysis of noise data and community reaction thereto, to make a recommendation to the Commissioners as to the acceptability of supersonic operations at Kennedy International Airport.

Whereupon, the meeting was adjourned.

APPENDIX K

RESOLUTION NO 2059 BY THE BOARD OF AIRPORT COMMISSIONERS OF LOS ANGELES INTERNATIONAL AIRPORT - ADOPTED 25TH SEPTEMBER 1963

WHEREAS, the President of the United States has announced that the Federal Government, through the Federal Aviation Agency, will participate in the development of a supersonic transport; and

WHEREAS, Pan American World Airways, Continental Air Lines, and certain other United States flag carriers have ordered or expressed an interest in the British/French Concorde transport; and

WHEREAS, this Commission is cognizant of the serious noise and community relations problems in the vicinity of the airports occasioned by the present-day subsonic jet transport;

NOW, THEREFORE, BE IT RESOLVED that the Board of Airport Commissioners of the City of Los Angeles does hereby urge and request that those in a position of authority and policy decision on the development of the supersonic transport direct their efforts so that this new family of supersonic aircraft will:

1. Be able to operate from the existing and currently planned civil airports

2. Require no greater runway lengths and/or clear zones for landing and take-off than present subsonic jet transports

3. Produce sound levels under the approach and departure flight paths of the airports that are less than the current jet subsonic transports

4. Produce sound levels within the airport environment from flight operations, ground, and maintenance operations that are compatible with the comfort, health and welfare requirements of all persons within this area. This includes air terminal areas, parking lots and maintenance areas.

5. Be able to accept inlet and exhaust suppression devices that are attached or placed in position during ground maintenance run-up operations

BE IT FURTHER RESOLVED that this Commission will place operating restrictions on supersonic transport operations at Los Angeles International Airport which will control the noise levels from this aircraft unless the following operating sound levels are achieved in the aircraft design:

1. Take-off sound levels parallel to the runway at a measurement distance of 1400 feet parallel to the runway centerline shall not exceed 120 perceived noise decibels (Pndb.)

2. The take-off sound level shall not exceed 112 Pndb. at a point on the ground three miles from the start of the take-off roll on a line which is a prolongation of the centerline of the runway;

3. Approach sound levels shall not exceed 120 Pndb. at a point on the ground 4000 feet from the landing threshold of the runway; and

4. Be able to operate with effective ground suppression devices during ground maintenance operations.

BE IT FURTHER RESOLVED that the Secretary of this Commission be, and he hereby is, directed to forward a copy of this Resolution to the Administrator of the Federal Aviation Agency, the Air Transport Association of America, Senator Thomas Kuchel, Senator Clair Engle, Senator A S "Mike" Monroney and Congressman Oren Harris.

RESOLUTION NO 5456 BY THE BOARD OF AIRPORT COMMISSIONERS OF LOS ANGELES INTERNATIONAL AIRPORT - ADOPTED 22ND OCTOBER 1969

WHEREAS, since the previous action of the Board of Airport Commissioners, dated September 25, 1963, the Government of the United States has indicated that it is continuing with the development of a supersonic transport; and

WHEREAS, this Commission is cognizant of the serious noise and community relations problems in the vicinity of airports occasioned by the present-day subsonic jet transport; and

WHEREAS, it is necessary that standards be set in order that said noise problem be contained; and

WHEREAS, the Federal Aviation Administration, by the adoption of FAR 36, has commenced to establish standards in this area;

NOW, THEREFORE, BE IT RESOLVED that the Board of Airport Commissioners of the City of Los Angeles does hereby urge and request that those in a position of authority and policy decision on the development of the supersonic transport direct their efforts to developing such aircraft in a manner to enable it to operate from existing civil airports.

BE IT FURTHER RESOLVED that no aircraft hereafter developed for use in commercial aviation shall be permitted the use of Los Angeles International Airport in the event that such aircraft imposes total noise levels upon adjacent communities which would exceed the total noise level created by the current Boeing 707-320-C.