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Shrinking International Airspace as a Problem for Future Air Movements — A Briefing

P. M. Dadant

A Project AIR FORCE report
prepared for the
United States Air Force

Rand
SANTA MONICA, CA. 90406

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SUMMARY

Continuing changes in U.S. overseas basing and overflight rights, in perceptions by coastal nations of their offshore rights, and in world-wide antiair and antiship capabilities may hinder U.S. abilities to deploy units and move materiel by air or by sea to non-NATO areas. This report explores the possible effects on U.S. Air Force fighter deployments and airlift by examining hypothetical "pure" cases involving the use of only U.S.-owned bases and a base at the final destination and, as enroute alternatives, 1) avoiding overflight only of Communist countries, 2) avoiding overflight of any third country's land or territorial waters, except for overflights of straits less than 24 nautical miles (n mi) wide, 3) avoiding overflight of any third country's land or territorial waters, including straits less than 24 n mi wide, and 4) avoiding overflight of any third country's offshore "Exclusive Economic Zone" (EEZ).

Currently, the Air Force is able to deploy air units or airlift equipment to any place in the non-Communist world, using only U.S.-owned and final-destination bases, if the only route restriction is to avoid overflying Communist territory. New route restrictions could arise, however, particularly during a time of international tension or crisis, that could have three effects: 1) There would be no air access to some areas without violating some overflight stipulation. 2) Some areas would lie beyond the range of current and projected aircraft if they use circuitous routes to avoid certain overflights. 3) Longer routes to some areas that remain in range would substantially increase deployment times and aerial tanker requirements. The second and third of these effects apply most notably to destinations in and around the Indian Ocean.

This report includes a map illustrating the areas to which access depends on overflight, and a series of other maps that illustrate the range limitations for fighter deployments and airlift by current and projected aircraft. For the third effect it uses hypothetical exemplary moves to Nairobi, Kenya, and Tehran, Iran, to quantify fighter-deployment and airlift times and tanker requirements on routes necessitated by different overflight restrictions. For airlift, equipment sets for an infantry brigade and an armored division furnish illustrative lift packages for demonstrating the effects of the restrictions. The more circuitous routes take up to 4 times as long and require up to 3 times as many tankers as the direct routes. An advanced tanker aircraft could extend deployment ranges and decrease the numbers of tankers required by a factor of 3 to 4, but a large area in and around the Indian Ocean would still remain out of range. Use of improved bases on Ascension Island in the South Atlantic and Diego Garcia in the Indian Ocean would allow deployments to all countries not blocked off by overflight restrictions, but deployment and airlift times could still be 2 to 3 times longer, and tanker requirements 2 to 2½ times greater, than for direct routes.

Several policy questions are raised, most of which should be examined in conjunction with other agencies. In particular, from the viewpoint of this study, it appears that it would be beneficial to exclude airspace specifically from international agreements concerning EEZs. A look at the map of 200-n-mi EEZs also raises the question of limiting the breadth of these zones around small islands. Against ad-

verse contingencies, it appears very useful to develop both Diego Garcia and Ascension Island for tanker/transport use. If it can be done, it would also be helpful to ensure the use of bases or overflight rights in some other critical friendly areas, such as Spain or Morocco, and Malaysia or Indonesia. On a more technical level, also against adverse contingencies, the Air Force could prepare to defend tanker/transport flights over areas that might be contested, such as the narrow straits.

ACKNOWLEDGMENTS

The basic idea behind this briefing—that perceptions of what constitutes international seas and airspace are changing and may seriously hinder future deployments—was suggested by Captain C. L. Freeman, USN (Ret) as a result of his familiarity with the United Nations Conference on the Law of the Sea. He lent his continued assistance throughout the preparation of this briefing. The author also gratefully acknowledges the assistance of J. W. Higgins, Colonel F. Kozaczka, USAF (Ret), and J. A. Wilson, who gathered data, made deployment calculations, and prepared the tables and maps contained herein, and of Edmund Dews, who provided valuable suggestions for the briefing's content and form.

CHART 1: SHRINKING INTERNATIONAL AIRSPACE AS A PROBLEM FOR FUTURE AIR MOVEMENTS

This is a report on the first phase of a three-part study whose principal objective is to compare future U.S. and Soviet abilities to project forces by air into non-NATO areas. We are also looking at naval capabilities to some small extent, and I will have a few remarks about them. In the first phase, however, we have concentrated on future U.S. Air Force capabilities, and have been struck by an emerging problem that appears to be too narrowly appreciated and the dimensions of which are not widely understood.

I like to call this an "awareness" briefing. By that I mean that the problem and its effects that I want to discuss are things of which planners, operators, and diplomats should be acutely aware. I have chosen to call this problem *The Shrinking of International Airspace;* it has a naval counterpart in the shrinking of the "high seas." Many think of this as a problem more of the future than of today, but that future may be closer than we think. The problem has touched the Air Force once already, in 1973, and it will almost inevitably get much worse.

Chart 1

SHRINKING INTERNATIONAL AIRSPACE AS A PROBLEM FOR FUTURE AIR MOVEMENTS

CHART 2: TOPICS TO BE COVERED

First I'll discuss the three important developments that contribute to the problem. Then I'll describe and illustrate its possible effects on air deployments and airlift of materiel. Then I'll discuss the usefulness of a couple of island bases. As I will point out later, we want to look further at friendly areas where it may be critically important to maintain overflight privileges.

Chart 2

TOPICS TO BE COVERED

- NATURE, ASPECTS OF PROBLEM
- EFFECTS ON AIR DEVELOPMENT
- TWO USEFUL ISLAND BASES

CHART 3: DECREASING U.S. BASE AND OVERFLIGHT RIGHTS

One contributor to the problem is the decrease in U.S. base and overflight rights, coupled with increasing uncertainty over the remaining rights. In the 1950s, the United States had an extensive system of airbases around the world, but, as you

are aware, the number of airbases with U.S. aircraft or major support units outside of NATO and Korea has shrunk from 26 in 1958 to 10 in 1976. Three of these 10 are essentially in the NATO area—in Spain—and 6 are in the Western Pacific—Japan and the Philippines. The other one is in Cuba. This leaves no bases in South America, Africa, the Middle East, and South Asia. The trend may continue.

United States privileges for using airspace are also becoming more and more uncertain. A dramatic example is the situation that prevailed during the Middle East War in October 1973. At that time some of our staunchest allies disagreed with U.S. interpretations of the crisis, and the United States either could not get permission to use their airspace or, for diplomatic reasons, chose not to use their airspace for transit of goods to Israel. A primary lesson from that experience is the fundamental uncertainty of base and overflight rights and the degree to which any arrangements are subject to change during a time of crisis.

Chart 3

DECREASING U.S. BASE AND OVERFLIGHT RIGHTS

- MAJOR AIRBASES OUTSIDE NATO AND KOREA
  IN 1958: 26
  IN 1976: 10
- BASE RIGHTS BEING REVIEWED, U.S. PRESENCE DIMINISHED
- OVERFLIGHT RIGHTS NO LONGER AUTOMATIC
  EXAMPLE: 1973 MIDDLE-EAST WAR

CHART 4: CHANGING PERCEPTIONS OF INTERNATIONAL SEAS AND AIRSPACE (I)

A second development consists of the changing perceptions by the nations of the world, and particularly by coastal nations, of what constitutes areas of national jurisdiction off their shores—on the sea, under the sea, and in the airspace over the sea—and what remains as so-called "high seas" and international airspace. Whether the ongoing United Nations Conference on the Law of the Sea agrees on a new convention or not, the rules are changing. One change is that the traditional 3-mile limit to territorial seas is being extended to 12 nautical miles (n mi). Many countries have claimed 12-n-mi territorial seas for many years (although the United States has not), and some have claimed much more.

These new 12-mile limits will overlap more than 100 straits that are important to international commerce, very few of which are overlapped by 3-n-mi territorial seas. Because of the bond between territorial waters and the airspace over those waters, the air over these straits will also be overlapped by national airspace. Most nations agree that rights must be granted for unimpeded transit through and over these straits, but they also acknowledge that nations bordering on those straits have rights of self-defense. The danger is that although these transit rights might be honored during peacetime, they might not during a crisis.

Chart 4
CHANGING PERCEPTIONS OF INTERNATIONAL SEAS AND AIRSPACE

1. EXTENDED TERRITORIAL SEAS AND AIR
   - 12 NMI FROM COASTS
     (SOME CLAIM 200 NMI TERRITORIAL SEAS)

INTERNATIONAL STRAITS
   - MORE THAN 100 STRAITS OVERLAPPED BY NEW TERRITORIAL SEAS AND AIR

CHART 5: IMPORTANT STRAITS OVERLAPPED BY 12-N-MI TERRITORIAL SEAS

Most of the 100-plus straits are critical only to local movements; global deployments, and in particular deployments by air, can easily bypass most of them. Chart 5, however, shows some that are not so easily bypassed. For reaching certain places, in fact, those covered with triangles cannot be bypassed at all by ship, and cannot be bypassed by air without overflying the real estate of some third country. For example, most of the states on the Mediterranean coast cannot be reached without passing through or over the Strait of Gibraltar or overflying some intervening country.

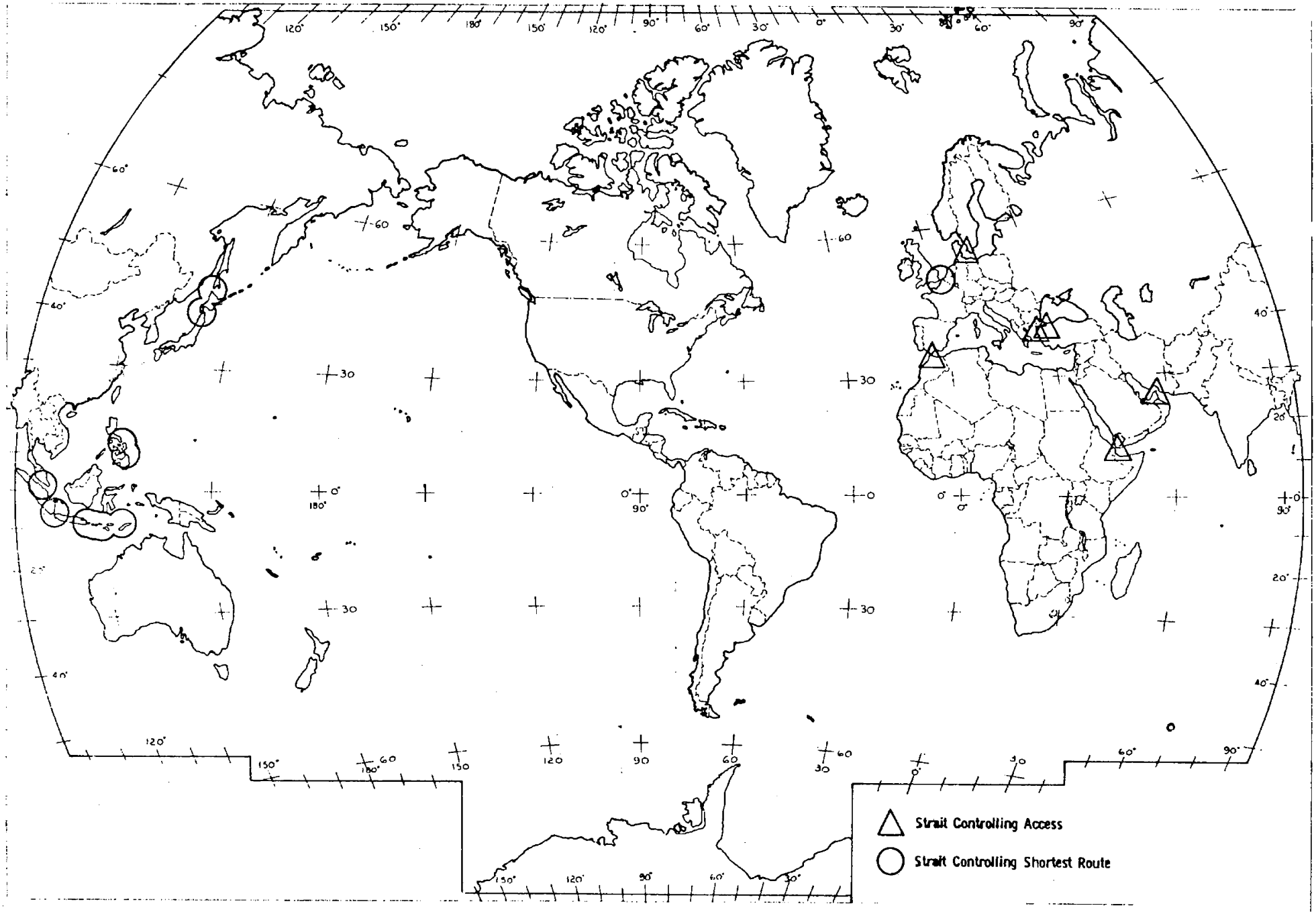
A number of somewhat less critical straits are those covered by circles. These are straits that *can* be bypassed without overflying land, but the bypass routes would be appreciably longer for certain deployments than the more direct route using the strait. Most critical in this category are the series of straits along Indonesia, including the Strait of Malacca. Movements between the Central Pacific Ocean and the Indian Ocean would be considerably longer if none of these straits were to be used.

CHART 6: CHANGING PERCEPTIONS OF INTERNATIONAL SEAS AND AIRSPACE (II)

The other offshore development of major interest here is the likely establishment of so-called Exclusive Economic Zones (EEZs) extending out 200 n mi from coastlines, over which the coastal states would have some sort of exclusive rights. Indeed, various nations during the last 30 years have been claiming rights in such areas. For example, the Truman Proclamation in 1945 proclaimed U.S. jurisdiction over the continental shelf for oil and gas resources, and we now have asserted 200-n-mi fishing jurisdiction. Some other countries have claimed 200-n-mi territorial seas. Little question is currently raised about the rights of transit through these economic zones as long as that transit does not infringe on the exclusive rights of the concerned coastal state. However, the status of these zones is a subject of current debate: Should the waters be high seas, territorial seas, or something in between? In the future it may become more and more difficult to undertake activities in these zones that cannot be construed as infringing on one or another of the

Chart 3

IMPORTANT STRAITS OVERLAPPED BY 12-N MI TERRITORIAL SEAS



rights of the coastal states. This may be particularly true of military craft during a time of tension or crisis.

Chart 6
CHANGING PERCEPTIONS OF INTERNATIONAL SEAS AND AIRSPACE

II. EXCLUSIVE ECONOMIC ZONES (EEZs)

- FOR FISHING, SEABED MINING, OIL AND GAS, POLLUTION CONTROL, SCIENCE
- 200 NMI OFFSHORE OR TO EDGE OF CONTINENTAL SHELF

CHART 7: IS THIS THE NEW MAP OF INTERNATIONAL AIRSPACE?

In some sense, then, it appears that we should face the question: Is this the future picture of what are truly high seas and international airspace, particularly in a time of international tension? Even if no state were ever to ask that U.S. military craft not use its economic zone or the airspace over it, U.S. decisionmakers during a crisis might wish, for political reasons, to avoid raising questions by circumnavigating these zones if possible. And the Air Force and Navy might be asked to provide U.S. decisionmakers with options that would avoid raising those questions.

CHART 8: NON-SUPERPOWER ANTIAIR CAPABILITIES

The third contributor to the problem is the spread of antiair and antiship capabilities to both large and small nations in every part of the globe. Antiair munitions have become small and less expensive, and some can be used without a great deal of technical training or technical expertise. Many are now available to almost anyone who wishes to acquire them.

Chart 8 shows the extent to which antiair capabilities were distributed in 1976. The critical feature is how little is left in white. This picture may be misleading, of course: The shading of any particular country, for example, does not mean that that country has a solid air defense system over that entire country. Many of these countries have but a meager capability. On the other hand, these weapons often are located near, or could be moved to, a critical area. Moreover, a loaded cargo aircraft, or even a fighter-bomber stripped for long-range deployment, can be an easy target. The existence of even a meager capability, coupled with an implied intention to act against airspace violators, would be strong encouragement for a U.S. decisionmaker to seek a route that bypasses such a danger zone.

Currently, most of the surface-to-air missiles (SAMs) in this picture are of fairly short range, but many would be applicable to airspace over a 12-n-mi territorial sea or an even narrower share of a critical strait. The interceptor aircraft are of longer

Chart 7

IS THIS THE NEW MAP OF INTERNATIONAL AIRSPACE?

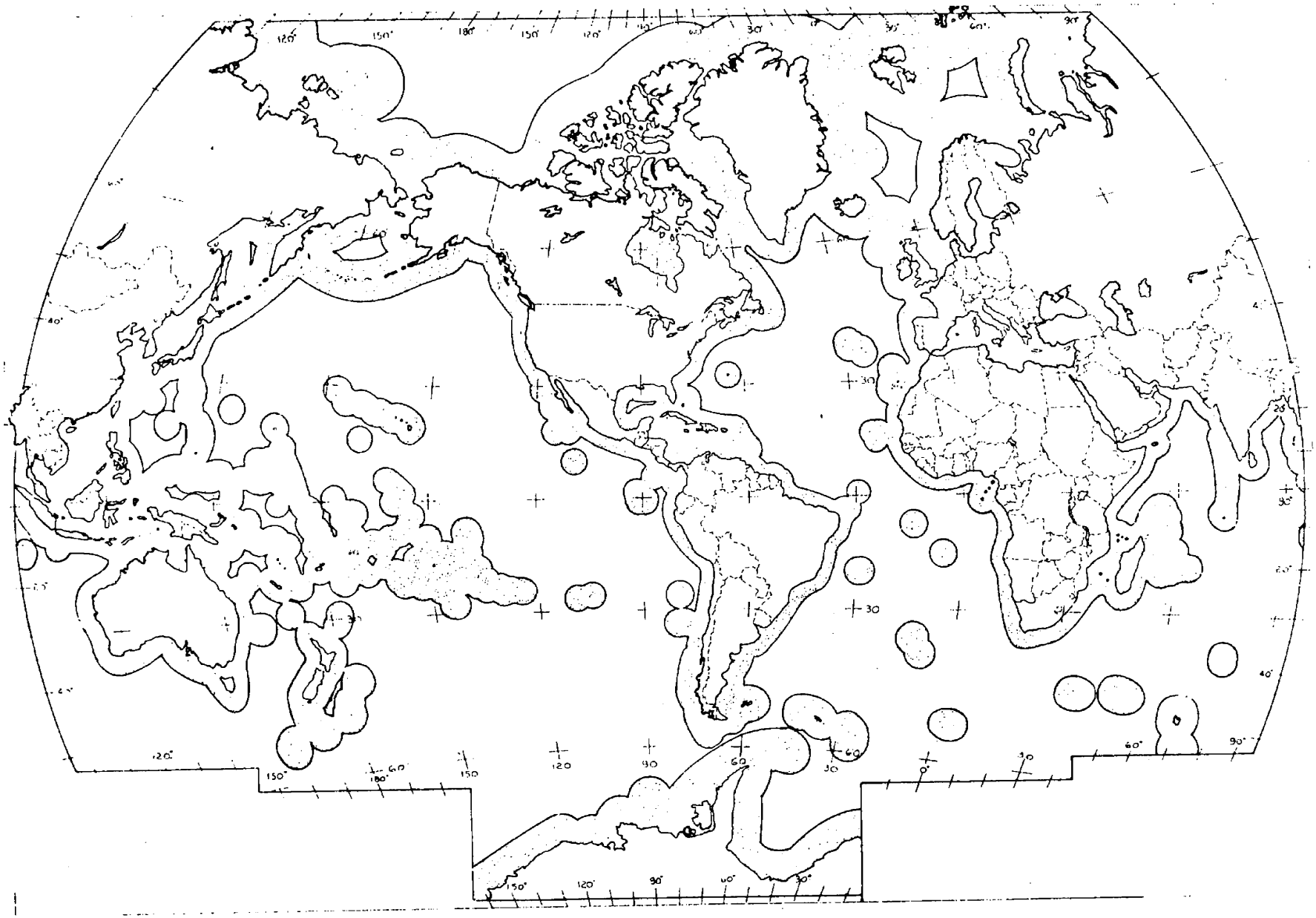
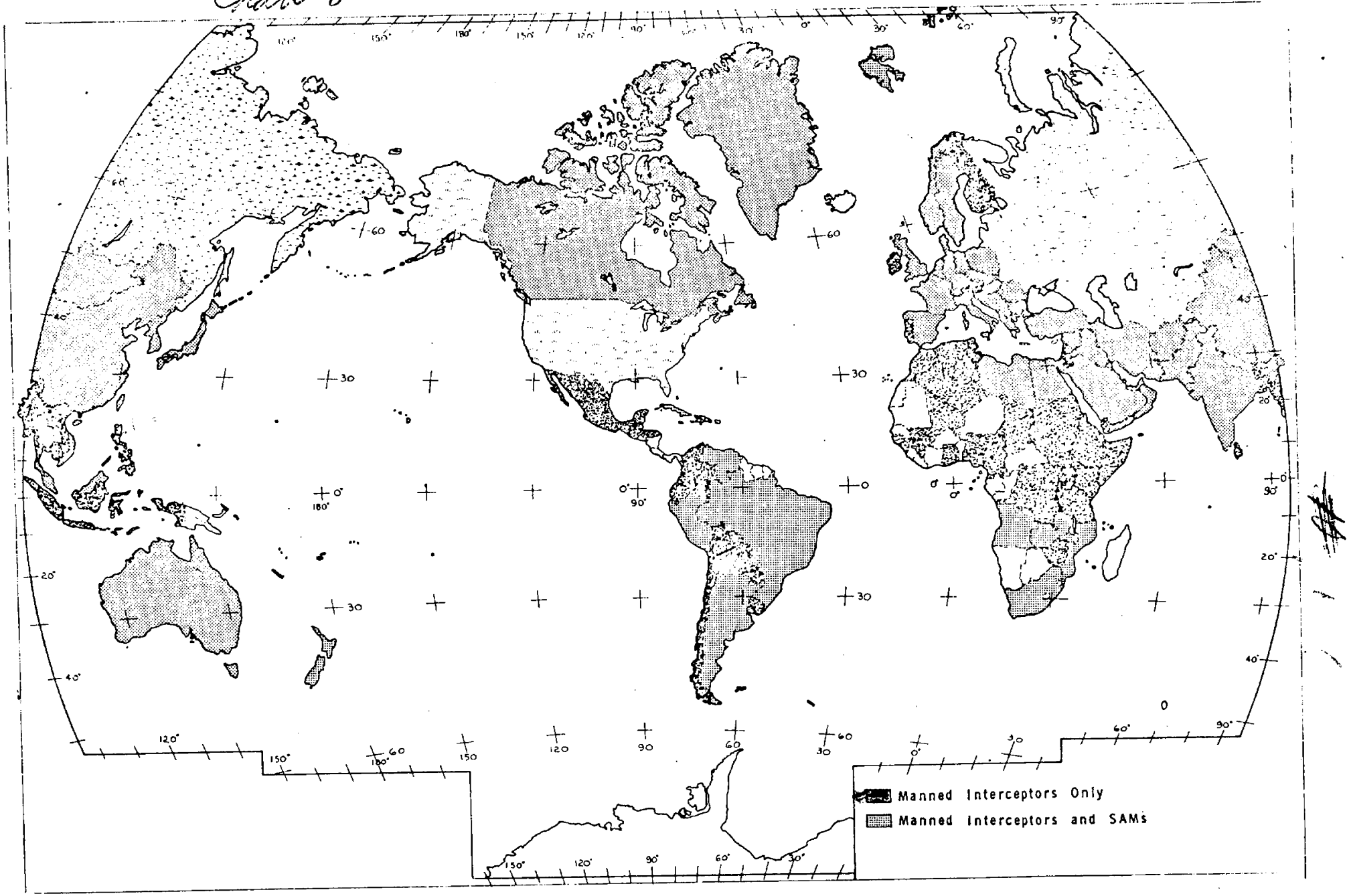


Chart 8

NON-SUPERPOWER ANTIAIR CAPABILITIES, 1970



range, of course, and some of the missiles could be mounted on boats—in fact, some *are* ship-mounted SAMs—and moved offshore. As for the EEZs, there may be little indication today of desires to patrol the airspace over these broad zones, but should perceptions of national rights and national dangers continue to change, one cannot rule out such airspace patrols in the future, particularly during a crisis.

CHART 9: NON-SUPERPOWER ANTISHIP CAPABILITIES

Chart 9 is a corresponding picture of the spread of antiship capabilities by 1976, with the same caveats about the small capability that some of these nations have. The torpedo capabilities shown here are either submarine launched or surface-ship launched, with 34 of these nations already having submarines and 2 more having them on order. But again the significant feature is how widespread this capability was by 1976.

CHART 10: POSSIBLE IMPLICATIONS IN A CRISIS

Now let us look at what these developing trends might mean to U.S. Air Force capabilities to deploy forces or airlift materiel to friends in Third Areas. In the first place, they mean that the United States should not assume that bases on foreign soil will always be available for its use during Third Area crises. In the second place, overflight of certain areas might have to be avoided during this kind of crisis: overflight of land and territorial seas belonging to another country, overflight of straits overlapped by territorial seas, or even overflight of another country's EEZ.

The major effects of these possible limitations are three: 1) There would be no air access to some areas without violating some overflight stipulation. 2) Some areas would lie beyond the range of current and projected aircraft using circuitous routes. 3) Longer routes to some areas that remain in range would substantially increase deployment times and aerial tanker requirements.

Let me illustrate each of these possible effects.

Chart 10

IMPLICATIONS IN A CRISIS

- DON'T RELY ON USE OF FOREIGN BASES
- MIGHT NOT OVERFLY:
  - LAND AND TERRITORIAL SEAS
  - NARROW STRAITS
  - EEZs

POSSIBLE EFFECTS

- NO AIR ACCESS TO SOME AREAS
- SOME AREAS BEYOND RANGE CAPABILITIES
- DEPLOYMENT TIMES, TANKER REQUIREMENTS INCREASED

Chart 9

NON-SUPERPOWER ANTISHIP CAPABILITIES, 1976

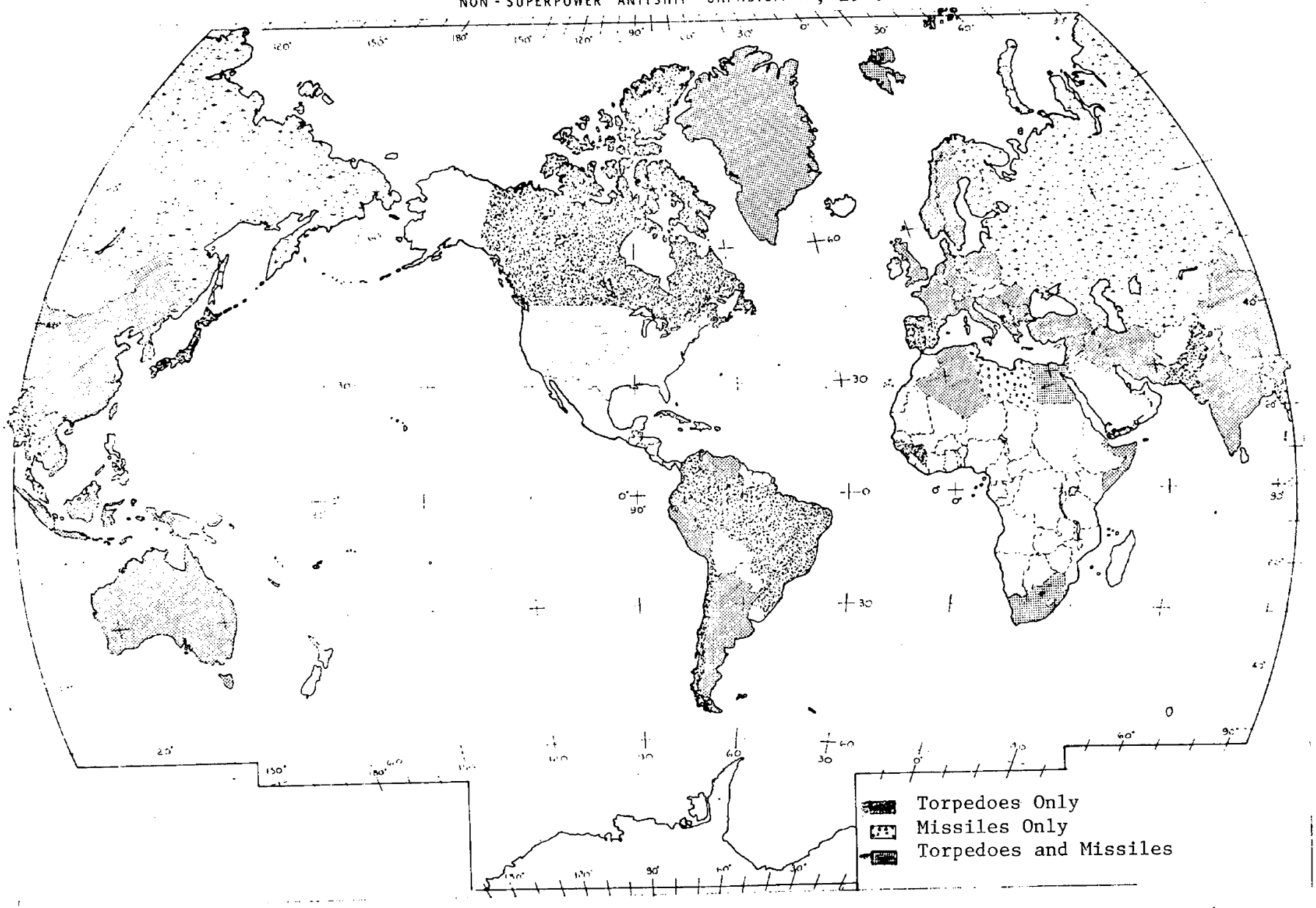


CHART 11: AREAS REQUIRING OVERFLIGHT FOR AIRLIFT OR AIR DEPLOYMENT

A lot of places just can't be reached without overflying some of these areas. First, there are landlocked states to which access requires overflying land areas belonging to some other state. These include Switzerland, Austria, Nepal, Mongolia, a large number of African states, Bolivia, and Paraguay. Second are states to which air access requires overflight either of a land area belonging to another state or of a strait less than 24 n mi wide. These are the areas around the Baltic, Mediterranean, Black, and Red Seas, and the Persian Gulf. The third category includes states to which air access requires overflying a third country's EEZ. This includes some interesting places such as Iran and Sweden.[1] Left in white here are the remaining states, to which the U.S. *can* fly without overflying any of these areas. These same access problems apply to surface ships, of course, except that no access is possible to the landlocked states.

CHART 12: FIGHTER-BOMBER DEPLOYMENT LIMITS FROM U.S.-OWNED BASES: STRAITS OK

The second effect is that of range limitations using circuitous routes, and these are different for fighter-bomber deployments and for airlift. To illustrate these, I'd like to consider what one might call some "pure" cases. In these "pure" cases we treat all non-Communist countries alike, realizing that there are all sorts of possible combinations where one country allows overflight and another doesn't. For example, if the only restriction is not to overfly Communist territory, the Air Force can deploy fighter-bombers to any non-Communist area, even if no bases are available on foreign soil except at the destination.

Even if no land overflights are permitted but flights over narrow straits are, these deployments can be made, by using KC-135 tankers, to nearly any place that is not landlocked. The only exceptions to this are Jordan, Sudan, and some small French islands in the Mozambique Channel. If an advanced tanker aircraft were available—say, an ATCA, and we have used a KC-747 as an example—these three areas could also be reached for fighter-bomber deployment. The range lines in the oceans, incidentally, indicate the ranges to which deployments could be made if a landing field were available.

CHART 13: FIGHTER-BOMBER DEPLOYMENT LIMITS FROM U.S.-OWNED BASES: NO EEZs

On the other hand, suppose the decision were to avoid overflight of others' EEZs. In this case the area to which fighter-bomber deployments can be made using KC-135 tankers is considerably reduced. Essentially only the Western Hemisphere, the west coasts of Europe and Africa, and some island nations in the Western Pacific can be reached. Adding KC-747 tankers in this case extends the area of possible

[1] Dividing lines between adjoining nations' EEZs were assumed to follow the same rules as do dividing lines between territorial seas.

Chart 11

AREAS REQUIRING OVERFLIGHT FOR AIRLIFT OR AIR DEPLOYMENT

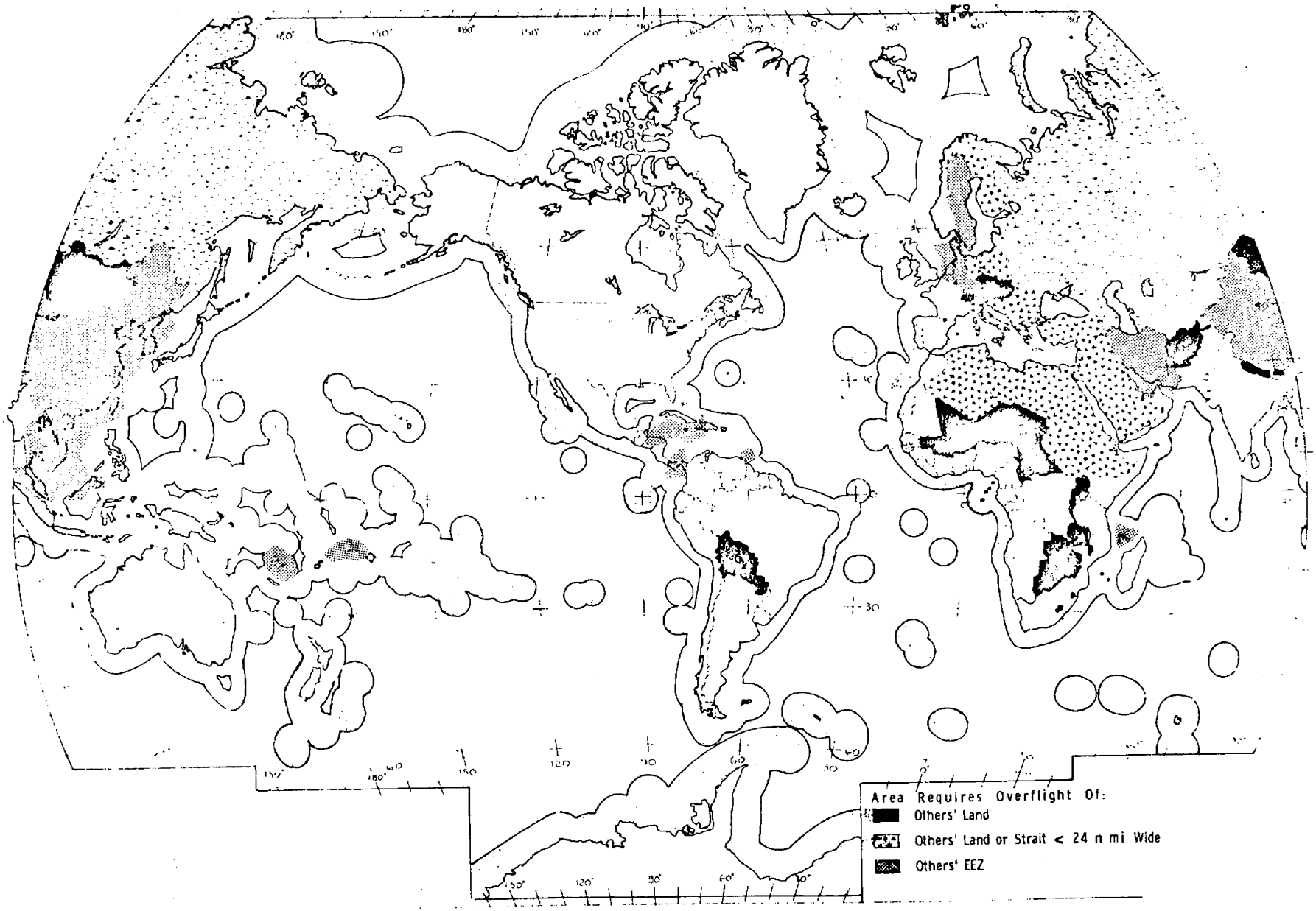


Chart 12

FIGHTER-BOMBER DEPLOYMENT LIMITS FROM U.S.-OWNED BASES

Route Restrictions: No Overflights of Land nor Territorial Seas Except Straits < 24 n mi Wide

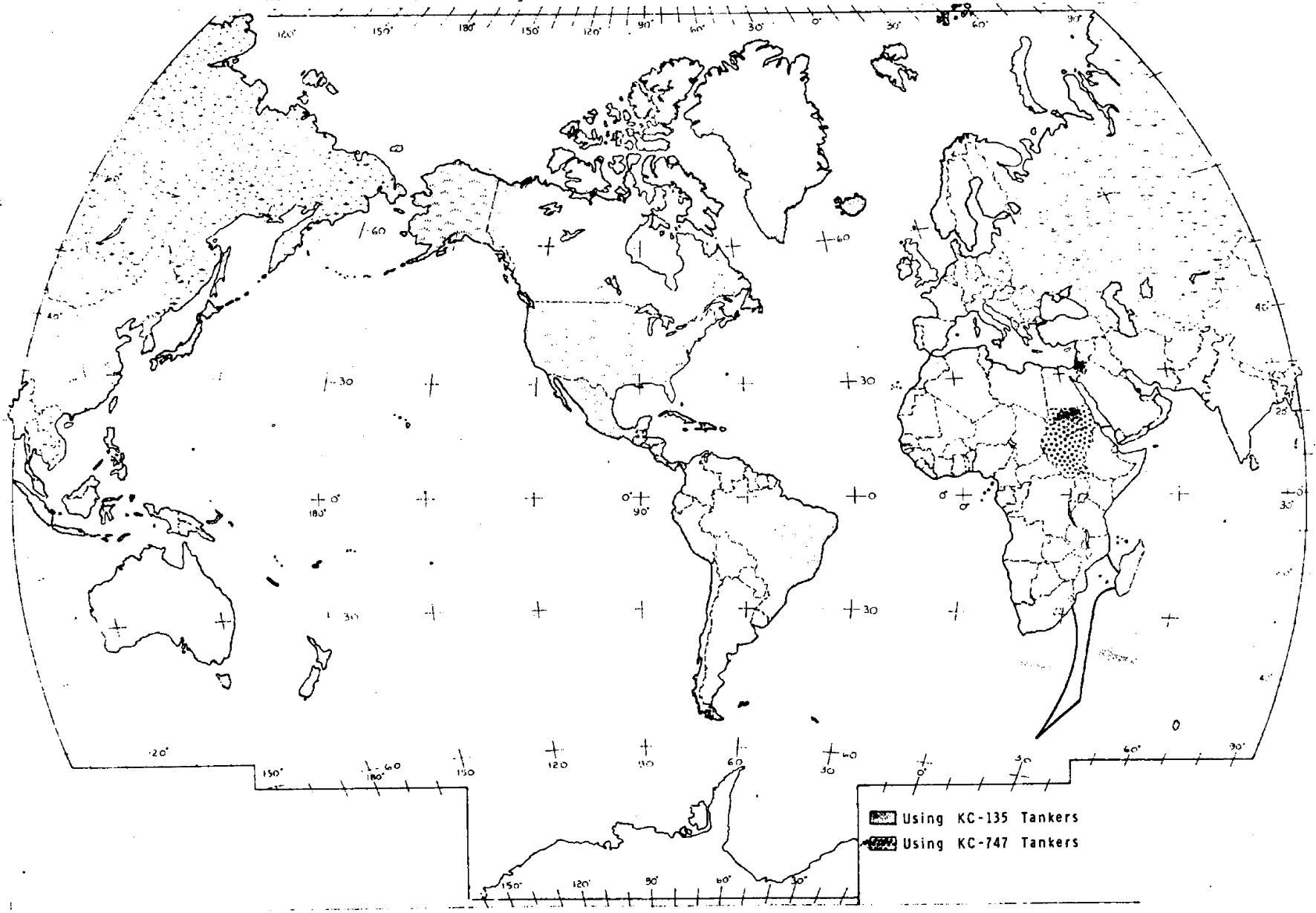
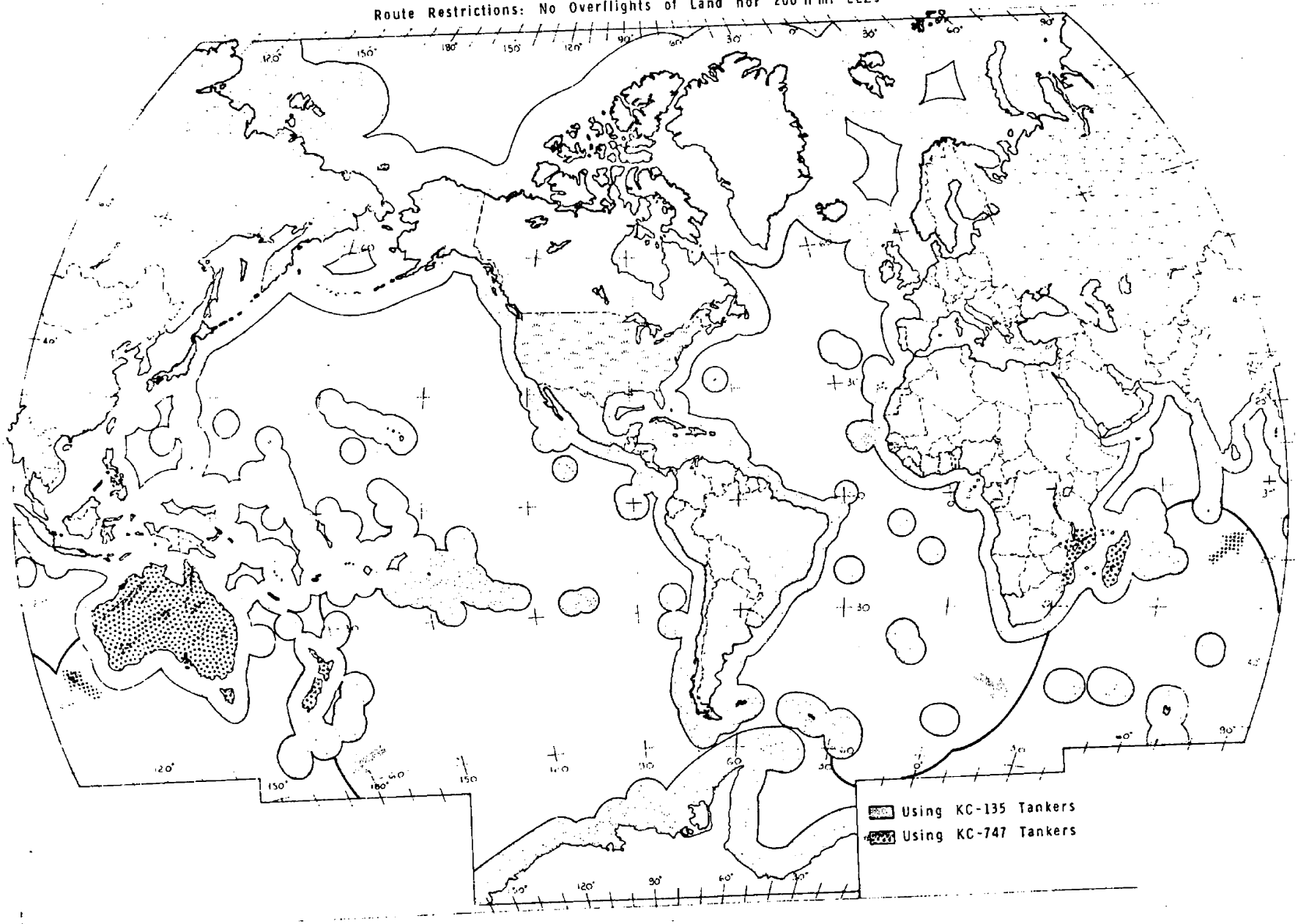


Chart 15

FIGHTER-BOMBER DEPLOYMENT LIMITS FROM U.S.-OWNED BASES

Route Restrictions: No Overflights of Land nor 200 n mi EEZs



deployment only a short distance along the east coast of Africa and in the Southwest Pacific. The United States would still be unable to deploy fighter-bombers to more than a small part of the Indian Ocean area; the aircraft can barely reach Diego Garcia. If deployments were desired to places like Ethiopia, Iran, India, or Thailand, we would need to make overflights of some land or EEZ areas, or gain permission for refueling operations in or out of foreign-owned bases.

CHART 14: AIRLIFT DELIVERY LIMITS FROM U.S.-OWNED BASES: STRAITS OK

Turning to airlift, with no overflight of land areas but overflight of narrow straits permitted, the green areas in Chart 14 indicate countries that can be reached from U.S.-owned bases by fully loaded C-141s. The orange shading indicates additional countries that can be reached by fully loaded C-5s using KC-135 tankers, or by C-141s loaded to no more than 20,000 pounds. In this case, a large part of the Middle East and eastern Africa cannot be reached for airlift deliveries—unless an improved tanker is available or C-5s fly with only a partial load, as shown by the magenta shading. For this example we specified a partial load equal to the heaviest vehicle in an armored division, a tank recovery vehicle. Limiting the C-5 load in this fashion, of course, would necessitate many more flights to deliver any sizable amount of equipment.

CHART 15: AIRLIFT DELIVERY LIMITS FROM U.S.-OWNED BASES: NO EEZs

If flights over others' EEZs are not used, the airlift picture is quite different. Without an improved tanker, C-5s must fly with partial loads to reach such places as Argentina and New Zealand. Even with the KC-747, C-5s must use partial loads to reach Australia or the lower east coast of Africa, and nearly all of the countries bordering the Indian Ocean are beyond the delivery limits. Diego Garcia can barely be reached using this larger tanker and lighter load.

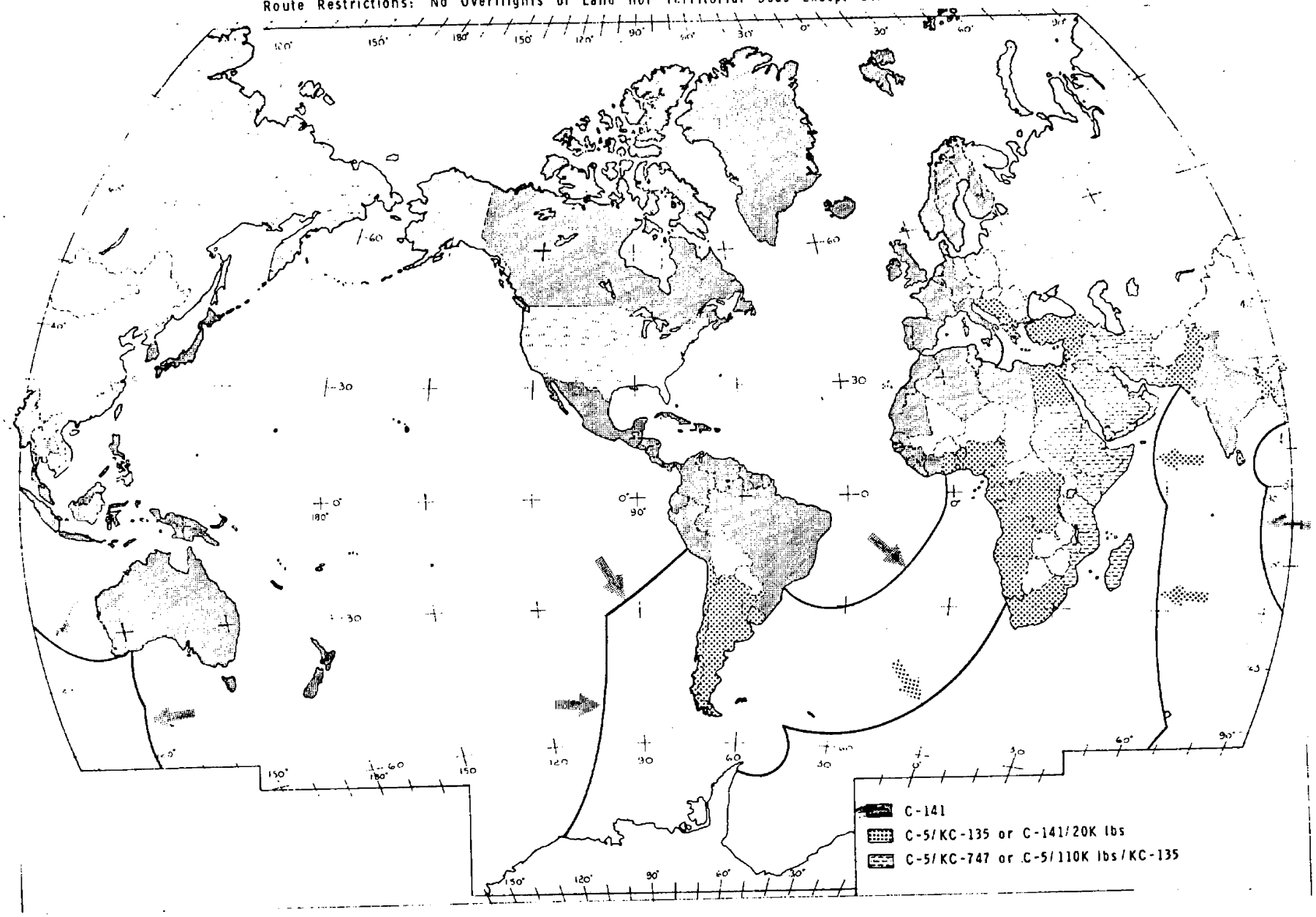
CHART 16: FIGHTER-BOMBER ROUTES TO NAIROBI UNDER DIFFERENT OVERFLIGHT RESTRICTIONS

Even when the destination can be reached, however, the longer distances on the more restricted routes increase both the time required for the operation and the number of tankers that must be used. To compare these requirements for some different route restrictions, consider the rim of the Indian Ocean, which is the most difficult area to reach, and take as a hypothetical example a fighter deployment from whichever U.S.-owned base gives the quickest deployment to, say, Nairobi, Kenya. Later I will talk about airlift to either Tehran or Nairobi. But keep in mind that these are hypothetical examples chosen to illustrate the effects of these "pure" cases of air route restrictions; they are not predictions of anything the United States might or might not do. Shown here are routes that could be used: 1) if there

Chart 14

AIRLIFT DELIVERY LIMITS FROM U.S.-OWNED BASES

Route Restrictions: No Overflights of Land nor Territorial Seas Except Straits <24 n mi Wide



Map B

Chart 15

AIRLIFT DELIVERY LIMITS FROM U.S. OWNED BASES

Route Restrictions: No Overflights of Land nor 200 n mi EEZs

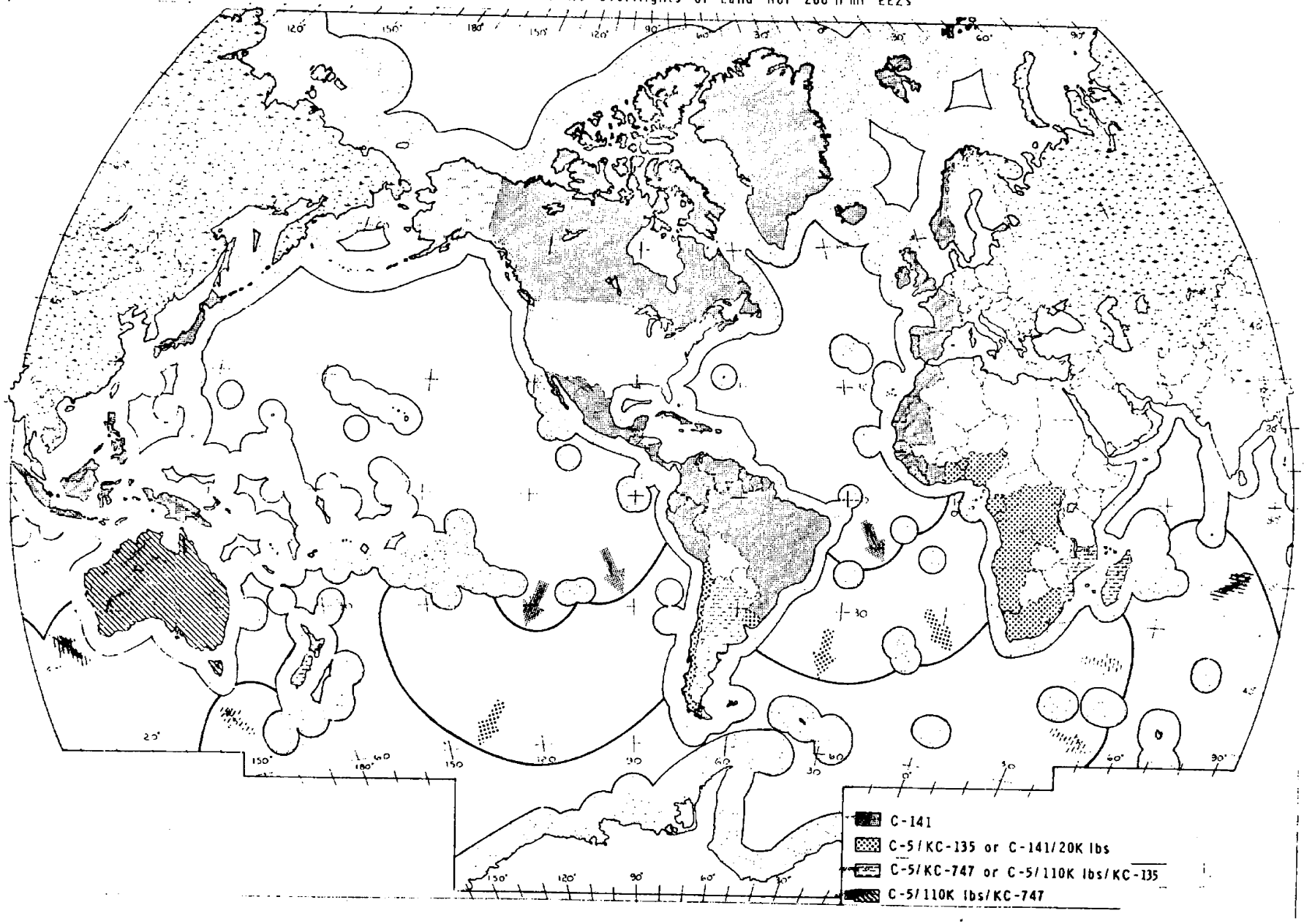
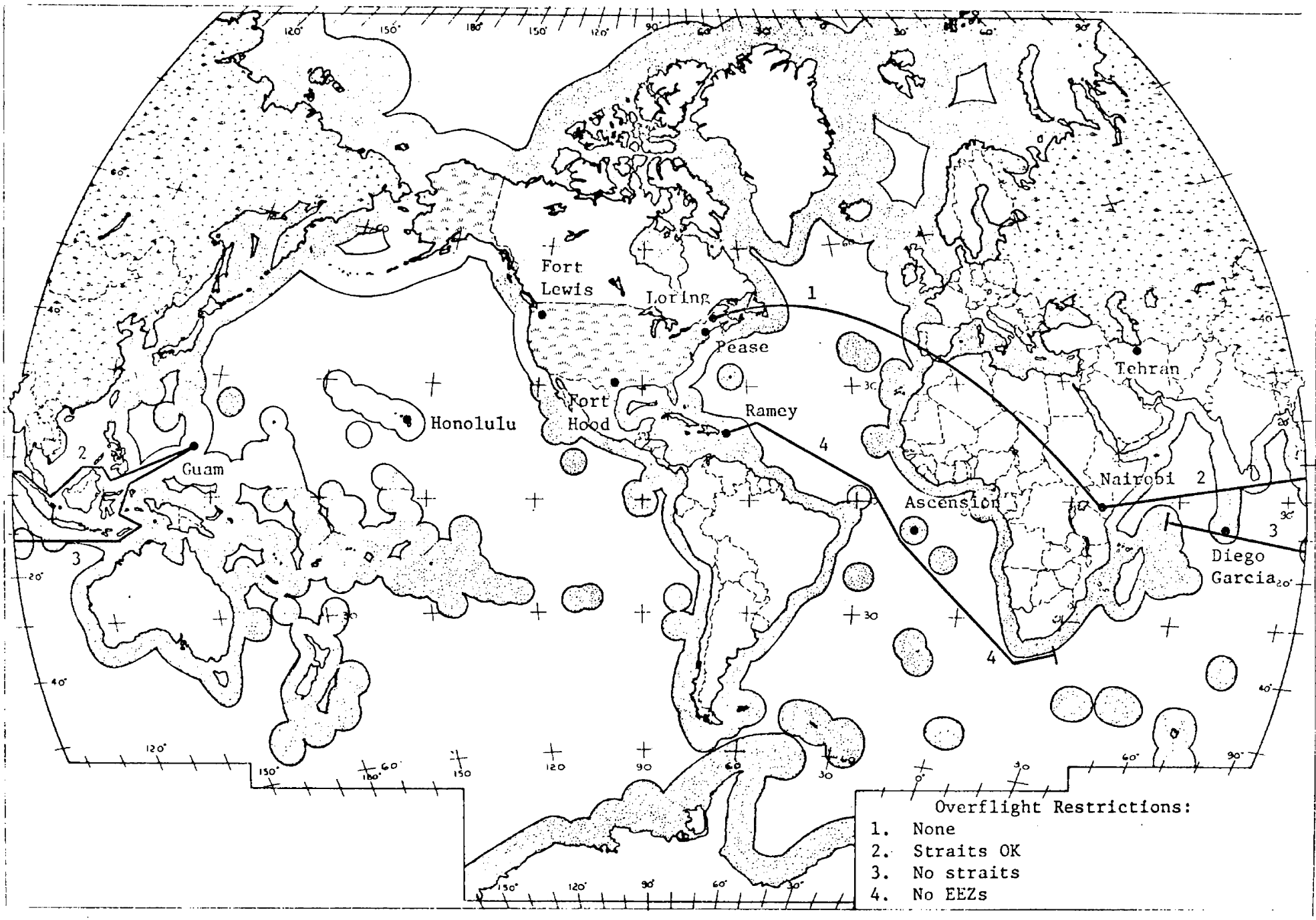


Chart 16

FIGHTER-BOMBER ROUTES TO NAIROBI UNDER DIFFERENT OVERFLIGHT RESTRICTIONS



were no restrictions on overflights, starting from Loring AFB; 2) if we could not overfly land but could use narrow straits, like the Strait of Malacca, starting from Guam; 3) if narrow straits were to be avoided, again starting from Guam; and 4) if we were not to overfly any other country's EEZ, starting from Ramey AFB. Note that in the third and fourth cases the fighters can't reach Nairobi by using only U.S.-owned bases and KC-135s. As we'll see in a moment, they could reach it in the third case if an advanced tanker aircraft were available.

CHART 17: EXAMPLES OF POTENTIAL DEPLOYMENT PROBLEMS: F-4s

Looking at the time required for these flights with only U.S.-owned bases available, we see that it is a long (14-hour) flight from Loring to Nairobi, even with no route restrictions—and with, incidentally, a minimum of four aerial refuelings en route—but I'm told it can be done. With the route from Guam through the Strait of Malacca, the flight is only a bit longer, but the tanker requirements go way up: A minimum of eight aerial refuelings per fighter are required in this case. We are really working at fingertip length for the KC-135.

If an improved tanker were available, the number of tankers required, given here in KC-747 equivalents, is cut way down, and, as I said, the fighters can make the deployment even if narrow straits are to be avoided—that is, if 18 hours is a feasible time for crews to be sitting in the cockpits.

As I said earlier, two island bases, Diego Garcia and Ascension, turn out to be particularly useful for deployments under these conditions. We looked at these two particular islands for three reasons: They are usefully located, the United States already has some kind of base-use agreement, and there are no natives on the islands. Also, both islands are British.

If the facilities at Diego Garcia were suitably improved and we could use that base for enroute refueling, the fighters could get to Nairobi in the "No Straits" case using KC-135s. In addition, for the "Straits OK" case, both the long time in the cockpit and the numbers of tankers could be eased. The times here mean 11 or 13 hours from Guam to Diego Garcia and 5 hours on in to Nairobi. If an improved tanker is available, the "No EEZs" route is feasible from a range standpoint, although it may not be from other standpoints—including, perhaps, the number of these large tankers required.

With a usable base at Ascension Island in the South Atlantic, as well as at Diego Garcia, fighter deployments would be feasible to any part of the rim of the Indian Ocean, using current KC-135 tankers, even in the most restrictive pure case of "No EEZs." Deployment times get quite a bit longer: 9 hours from Puerto Rico to Ascension, 14 from Ascension to Diego Garcia, and 5 on to Nairobi. To these times, of course, must be added the ground time at each stop. Although tanker requirements are high at 3 tankers for each fighter, they may not be prohibitive. An improved tanker such as the KC-747 would not shorten deployment times, but it would decrease the number of tankers required.

Chart 17

EXAMPLES OF POTENTIAL DEPLOYMENT PROBLEMS
DEPLOYMENT OF F-4s FROM U.S.-OWNED BASE TO NAIROBI, KENYA

Route Restrictions	Non-U.S.-Owned Bases Available					
	None		Diego Garcia		Diego Garcia & Ascension	
	Flying Time (hrs)[a]	KC-135s per 12 Fighters[b]	Flying Time (hrs)[a]	KC-135s per 12 Fighters	Flying Time (hrs)	KC-135s per 12 Fighters
None	14	16 (5)	14	16 (5)	14	16 (5)
Straits OK	15	77 (6)	11 + 5	14 (4)	11 + 5	14 (4)
No Straits	** (18)[c]	** (9)	13 + 5	20 (5)	13 + 5	20 (5)
No EEZs	** (**)	** (**)	** (22[c] + 5)	** (45)	9 + 14 + 5	35 (9)

NOTE: ** = deployment not possible.

[a]Flying times in parentheses are those if ATCA is available.

[b]Numbers in parentheses are tankers required if ATCA is available, expressed in 747 equivalents.

[c]May not be feasible.

CHART 18: EXAMPLES OF POTENTIAL DEPLOYMENT PROBLEMS: ARMY EQUIPMENT

For airlift comparisons, we needed some illustrative packages to be lifted that would demonstrate the effects of these route restrictions. For two packages we chose sets of equipment that correspond to an infantry brigade and an armored division. Although chosen as hypothetical examples, they illustrate an array of real possibilities; you can think of them, for example, in terms of re-outfitting an indigenous unit or lifting a U.S. unit, perhaps with some of the personnel transported by the civilian reserve air fleet (CRAF). I've selected both Tehran and Nairobi as destinations partly because it might seem more logical to send armored equipment to Tehran and infantry equipment to Nairobi. In our scenarios we moved infantry equipment from either Fort Lewis, Washington, or Honolulu, and armored equipment from Fort Hood, Texas. We used the entire unit-equipment (UE) airlift fleet of 70 C-5s and 234 C-141s for these lifts, with 10 flying hours per day per UE aircraft, and set up a continuous cycling airlift operation. With operations restricted to only U.S.-owned bases (plus a base at the destination), deployment time for the infantry-brigade equipment increases by a factor of 2½ or so from the no-route-restrictions case to the no-straits case, and the tanker requirements become quite high. The decrease in tankers for Nairobi from the straits-OK to the no-straits cases is caused by C-5s carrying partial loads on the latter route and hence using fewer tankers on some early legs of the trip, but at the expense of taking more time for the total lift. In all cases, we tried to minimize the time.

With an advanced tanker aircraft, we can save a little time by carrying full loads in the C-5s in the no-straits case to Nairobi, and we can cut the tanker requirements somewhat. But we still can't make it in the no-EEZs cases. Of course, Iran is a no-access destination in the pure case where we don't go through anyone else's EEZ.

For the equipment of an armored division, the time to Tehran increases by nearly a factor of 4 with the current tanker aircraft, and over a factor of 3 with an advanced tanker, on the more restricted route. To Nairobi, the factor is 3 for the KC-135, cut to 2 by the improved tanker. Again, the numbers of tankers required are very large in some KC-135 cases, but substantially less with the improved tanker.

Chart 18

EXAMPLES OF POTENTIAL DEPLOYMENT PROBLEMS

DEPLOYMENT OF ARMY EQUIPMENT SETS USING ENTIRE UE AIRLIFT FLEET AT 10 FLYING HOURS/DAY

Route Restrictions	Time Required (Days)[a]		KC-135 Tankers Required[b]	
	Inf. Brig.	Arm. Div.	Inf. Brig.	Arm. Div.
To Tehran, Iran				
None	4	16	27 (12)	27 (12)
Straits OK	6	36	48 (16)	52 (17)
No Straits	11	63 (53)	74 (32)	68 (31)
No EEZs	**	** (**)	** (**)	** (**)
To Nairobi, Kenya				
None	5	25	52 (19)	55 (20)
Straits OK	10	52	89 (29)	84 (28)
No Straits	12 (11)	73 (53)	76 (55)	66 (50
No EEZs	** (**)	** (**)	** (**)	** (**)

NOTE: ** = deployment not possible.

[a]Numbers in parentheses are days required if ATCA available as tanker.

[b]Numbers in parentheses are tankers required if ATCA is available, expressed in 747 equivalents.

CHART 19: DEPLOYMENT TIME (DAYS) VERSUS BASE AVAILABILITY

As with the fighter deployments, usable bases on Ascension and Diego Garcia would be very helpful for these lifts. Chart 19 repeats the airlift times from Chart 18 for the infantry brigade and armored division equipment, and compares them with times in cases where either Diego Garcia or Ascension is available, and where both are available. As you see, neither island base improves the capability for lifting the infantry equipment if there are no route restrictions, but as these "pure" cases get worse, Diego Garcia helps the more until we get to the Nairobi, No-EEZs case. There, Ascension is the key to the move with current tankers. Adding Diego Garcia cuts the time even further with current tankers, and makes the airlift possible without Ascension if an improved tanker is available.

For movement of the armored equipment, the island bases make a difference even with the lesser route restrictions—even with no restrictions, in the case of Nairobi. Again, Diego Garcia is more important for Tehran and Ascension for Nairobi, but having both bases is best in the most restrictive case for each.

These times get quite long, of course, and one has to ask if it wouldn't be quicker to use surface transport. There are two answers: First, surface movement isn't so quick, either. The equipment has to be moved overland to a seaport, and the ships have to assemble at that port. Then it's a 25- to 32-day ocean trip to a port in the country of destination, depending on the particular port and the route restrictions. If the destination is Tehran, the port might be Chah Bahar, chosen to avoid the narrow confines of the Persian Gulf. Even if the port is *in* the Persian Gulf, there is still another long overland trip to Tehran. And secondly, by sea, nothing arrives until the entire package arrives; by air, a first "brigade slice" of armored equipment can be there in about a third of the times shown on Chart 19, and equipment begins arriving very quickly—with the first aircraft arrival.

Chart 19

DEPLOYMENT TIME (DAYS) VS. BASE AVAILABILITY

DEPLOYMENT OF ARMY EQUIPMENT SETS: INFANTRY BRIGADE/ARMORED DIVISION USING ENTIRE UE AIRLIFT FLEET AT 10 FLYING HOURS/DAY, AND KC-135s

	Non-U.S.-Owned Bases Available							
	None		Diego Garcia		Ascension		Diego Garcia & Ascension	
Route Restrictions	Inf. Brig.	Arm Div.	Inf. Brig.	Arm. Div.	Inf. Brig.	Arm. Div.	Inf. Brig.	Arm. Div.
To Tehran, Iran								
None	4	16	4	16	4	16	4	16
Straits OK	6	36	6	30	6	36	6	30
No Straits	11	63 (53)	7	36	11	55 (49)	7	33
No EEZs	**	**	**	**	**	**	**	**
To Nairobi, Kenya								
None	5	25	5	19	5	17	5	17
Straits OK	10	52	6	31	7	24	6	24
No Straits	12 (11)	73 (53)	7	36	7	24	7	24
No EEZs	**	**	** (14)	** (53)	14 (13)	68 (49)	10	43

NOTE: ** = deployment not possible. Numbers in parentheses are days required if ATCA is available.

CHART 20: CONCLUSIONS

Three major conclusions concerning airlift capabilities emerge from this part of our study, and raise several issues for the consideration of policymakers. Changing international agreements such as the Law of the Sea, and changing national perceptions of airspace and offshore rights, can hurt Air Force capabilities to deploy forces or airlift materiel to third areas. An improved tanker aircraft can stretch ranges somewhat and reduce the number of tankers required, but the Air Force will need some refueling bases, such as on Ascension Island and Diego Garcia, if it is to reach many places around the Indian Ocean under the most restrictive airspace conditions. There may also be other areas that could furnish critical transit rights, and we will continue to investigate those.

Of the policy questions that the study has surfaced, some clearly should be examined in conjunction with other agencies. From the sole viewpoint of this study, however, it appears, for example, that it would be beneficial to exclude airspace specifically from international agreements concerning economic-zone rights. A look at the map of 200-n-mi EEZs also raises the question of limiting the breadth of these zones around small islands. Against adverse contingencies, it appears very useful to develop both Diego Garcia and Ascension Island for tanker/transport use. If it can be done, it would also be helpful to ensure the use of bases or overflight rights in some other critical friendly areas, such as Spain or Morocco, and Malaysia or Indonesia. On a more technical level, also against adverse contingencies, the Air Force could prepare to defend tanker/transport flights over areas that might be contested, such as the narrow straits.

Chart 20

CONCLUSIONS

- CHANGING "RULES OF THE ROAD" CAN HURT AF CAPABILITY
- IMPROVED TANKER
- ASCENSION, DIEGO GARCIA, OTHERS

} CAN HELP

POLICY QUESTIONS

- EXCLUDE AIR FROM EEZ RIGHTS?
- LIMIT BREADTH OF SMALL ISLANDS' EEZs?
- DEVELOP ASCENSION, DIEGO GARCIA FOR TANKER/ TRANSPORT USE?
- ENSURE (HOW?) USE OF CRITICAL FRIENDLY AREAS?

* * * * * * * * * *

- PREPARE TO DEFEND TANKER/TRANSPORT FLIGHTS (E.G., THROUGH STRAITS)?